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Firm-Specific Advantages
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of Multinational Enterprises

by

Alan Rugman*

And

Nessara Sukpanich**

*Alan M. Rugman

L. Leslie Waters Chair in International Business
and Director, IU CIBER

Kelley School of Business, Indiana University
1309 E. Tenth Street

Bloomington, IN 47401-1701 U.S.A.

Tel: 812-855-5415

Fax: 812-855-9006

Email: rugman@indiana.edu

<http://www.kelley.indiana.edu/rugman>

and

**Nessara Sukpanich

Title: Lecturer of Economics

University Address:

Faculty of Economics

Thammasat University

Thaprachan, Bangkok, 10200

Thailand

Tel: 662-613-2411

E-mail: nessara@econ.tu.ac.th

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Abstract

This paper is an extension of recent work that has examined the intra-regional sales of large multinational enterprises (MNEs). First, we examine the interaction between the performance of MNEs and four proxies for their firm-specific advantages (FSAs). This includes: firm size, knowledge (as represented by R&D), marketing ability, and industry type. We find that FSAs in R&D and service sector type are best exploited within the home region. In contrast, the FSA firm size is better exploited by global and bi-regional firms. Second, we find that a service MNE tends to be more home-region oriented and has a higher proportion of intra-regional sales than a manufacturing firm.

Key words: firm-specific advantages, intra-regional sales, multinational enterprises, performance, geographic scope, and home region.

I. Introduction

According to Rugman and Verbeke (2004), much economic activity is location bound and takes place in clusters of the broad “triad” regions of North America, the European Union (EU), and Asia. More specifically, most of the world’s 500 largest firms, which are multinational enterprises (MNEs) are not global and average over 70% of their sales in their home region of the triad. This intra-regional concentration of sales of the world’s largest MNEs has important implications for the concept of the geographic reach of firm-specific advantages (FSAs) of these MNEs, as suggested by Rugman (2005).

It is generally recognized that the FSAs stem from the proprietary assets of the MNEs that arise due to their production and/or marketing activities, (Rugman, 1981b). There is a large body of literature which examines the relationship between firm performance (based on these firm-specific advantages) and a firm’s degree of multinationality, especially where the latter is based on the level of foreign direct investment (FDI), (e.g., Hennart, 1986; Grubaugh, 1987; Morck and Yeung, 1992). However, these studies on the multinationality and performance of MNEs neglect to address the following issues.

First, many of the previous studies tend to focus on the relationship between the FSAs and the performance of the firm’s foreign subsidiaries, i.e. the MNE’s upstream production activity in terms of the multinationality of its subsidiaries is being tested (Dunning, 1981). Those empirical studies, therefore, fail to address the effect of the FSAs on downstream marketing and sales activities. Yet, according to Rugman (2005), FSAs not only affect the firm’s upstream activity, such as the level of FDI in the subsidiaries, but also affect the downstream activities of the MNE.

Second, most previous empirical studies fail to address the effect of FSAs on a firm's regional sales. Most of the 500 largest MNEs are not global in the sense of having the ability to sell the same products and services around the world (Rugman and Brain, 2003; Rugman and Verbeke, 2004; Rugman, 2005). Accordingly, regional analysis rather than a global one is needed.

Finally, most previous empirical studies fail to examine the geographic reach of the FSAs of the MNEs. Rugman (2005) suggests that, in theory, the firm's FSAs can be exploited either regionally or globally. For example, national patent laws and standards or regional environmental regulations (such as EU as "eco" labels) can restrict the global reach of the FSAs and serve as protectionist barriers at a regional level (Rugman, Kirton and Soloway, 1999). In order to achieve global reach, the FSA has to become a global standard or a global brand. It should also have the global benefits of integration, with economies of scale and scope¹.

To address these issues, first, this study tests whether each FSA (including firm size, knowledge, marketing ability, and industry type) exhibits any home-region geographic bias or non-home-region geographic bias. In other words, this study tests whether certain FSAs are more strongly correlated with profitability in home versus non-home region oriented firms. Second, this study tests the effect of each of the FSAs on a firm's regional sales. That is, factors influencing regional sales are explored.

In this study, firms are grouped into four categories; home-region oriented, host-region oriented, bi-regional, and global firms. According to Rugman (2005), firms are categorized as home-region oriented firms if they have at least 50% of their sales in their home region of the triad of North America, Europe, and Asia; host-region oriented firms

if they have at least 50% of their sales in a triad market other than their home region; bi-regional firms if they have at least 20% of their sales in each of two regions of the triad, but less than 50% in any one region; global firms if they have at least 20% in each part of the triad, but less than 50% in any one region. This study also defines non-home-region oriented firms as firms in the host-region oriented, bi-regional, or global categories. It is also noted that most of the firms used in the study are North American and European firms.

This paper is organized into eight main sections. The first section is the introduction to the paper. The second section is the literature review. The third section states the main hypothesis and a proposition. The fourth section explains the econometric models and describes measures of variables used in the analysis. The fifth section describes data sources and the sample used in the paper. The sixth section shows and analyzes the results of the test. The seventh section describes the limitations of the paper. The last section provides conclusions of the paper.

II. Literature Review

According to the existing theories of MNEs, firm-specific advantages (FSAs) are important factors in determining the performance of MNEs (Dunning, 1981; Rugman, 1981b). The resource-based view also suggests that a firm's unique resources and heterogeneous capabilities can generate competitive advantages, which can lead to sustainable superior returns (Barney, 1991; Rugman and Verbeke, 2002). These resources may include brand names, skilled labor, knowledge of technology, and efficient production processes (Wernerfelt, 1984).

Internalization theory suggests that internalization can occur in response to imperfections and externalities in the goods and factor markets (Rugman, 1981b). According to Hennart (2001), these externalities can come from structural market imperfections (as suggested by Hymer, 1960) and natural market imperfections (as suggested by Rugman, 1981b). Hymer's analysis of structural market imperfections is consistent with Bain-type advantages to enhance the asset power of the MNE (Dunning and Rugman, 1985). A firm's asset power could be partly reflected by firm size since resources are needed in absorbing the high costs of marketing, for enforcing patents and contracts, and for achieving economies of scale (Agarwal and Ramaswami, 1992; Hood and Young, 1979). According to Grubaugh (1987), Hymer's analysis also emphasizes the importance of the industry sector a firm is in.

Rugman and Verbeke (2003) integrate FSAs and internalization theory with the resource-based view. They suggest that "in more general terms, FSAs should be viewed as knowledge bundles that can take the form of the intangible assets, learning capabilities, and even privileged relationships with outside actors" (Rugman and Verbeke, 2003 p. 127).

Many empirical studies use various intangible assets as proxies for FSAs (e.g., Rugman, 1981a; Hennart, 1986; Grubaugh, 1987; Morck and Yeung, 1991). Such intangible assets are commonly thought to include technological know-how, marketing ability and related consumer goodwill, and effective and dedicated management (Helpman, 1984; Morck and Yeung, 1992).

The most common empirical proxy for technological know-how in the literature is research and development (R&D) expenditure or R&D intensity, such as R&D per sales

and R&D per assets (see, for example, Rugman, 1981a; Grubaugh, 1987; Morck and Yeung, 1992). Most studies utilize advertising expenditures or advertising intensity, such as advertising per sales or advertising per assets, as a proxy for marketing ability and related consumer goodwill (e.g., Morck and Yeung, 1992). Grubaugh (1987) uses sales and general administrative expenses as a proportion of total sales as a proxy for marketing ability (or advertising intensity in Grubaugh's 1987 paper). Due to the fact that it is difficult to define variables reflecting effective and dedicated management, different studies use different proxies for management quality. Morck and Yeung (1992), for example, use a fraction of the firm's outstanding equity held by insiders (INS) as a proxy for effective management. Caves (1974), on the other hand, has non-production workers in total employment and average earnings per employee as proxies for management quality. Pugel (1978) measures management ability according to the share of managers in total employment.

Some studies incorporate firm size as one of the FSAs. The proxies used for firm size include a firm's assets and its sales (e.g., Horst, 1972; Grubaugh, 1987). Moreover, Ray (1989) states that the relationship between level of FDI and firm size cannot be assumed to be linear. Kimura (1989) uses the log of the firm's domestic merchant sales as a proxy for firm size.

In a regional context, Rugman (2005) proposes a two-by-two regional matrix representing the interaction between the firm's desired strategic geographic reach of its FSAs (regional or global) and the empirically determined geographic scope of its locational advantages (regional or global). According to Rugman (2005), only firms with both a global reach of FSAs and a global scope of locational advantages are truly global

firms. Empirically, we observe that there are very few such global firms. Instead, most of the largest companies are regional firms in the sense of having a regional reach of FSAs and a regional scope of locational advantages. As stated in the Introduction, there are home-region bound MNEs (with more than 50% of their sales in their home region). Some companies may have a global reach of FSAs, but the geographic scope of locational advantages is regional; these firms are bi-regional (having at least 20% of their sales in two regions of the triad, but less than 50% in any one region). Finally, it is difficult to find any firms with a regional reach of FSAs and a global scope of locational advantages.

III. Hypothesis and Empirical Proposition

Based on the evidence that most of the world's 500 largest firms have the vast majority of their sales within their home region of the triad, Rugman and Verbeke (2004) demonstrate that the lack of global market activity can be interpreted as a reflection of the limits to the international transferability of a company's firm-specific advantages (FSAs). Anand and Delios (1997) suggest that the transferability of resources could be restricted by the physical boundedness of FSAs or by the applicability of FSAs in the host country environment. That is, there exist location-specific capabilities for firms engaging in international expansion.²

According to Hitt, Hoskisson, and Kim (1997), although international expansion can provides greater opportunities to achieve economies of scales, to leverage strategic resources and achieve economies of scope, and to exploit market imperfections across countries, it is also associated with significant costs. Based on transaction cost theory,

multinational involvement can generate significant transaction costs and information-processing demand (Jones and Hill, 1988; Hitt, Hoskisson, and Ireland, 1994). Zaheer and Mosakowski (1997) propose that a firm operating abroad may encounter the liability of foreignness, “a comparative disadvantage compared to a local firm in a country” (Zaheer and Mosakowski, 1997, p. 440).

In a regional context, Rugman and Verbeke (2004) suggest that firms trying to expand their sales from the home region of the triad to other regions may face liabilities of inter-regional foreignness (such as trade regulations, powerful foreign rivals in other regions, and local product preferences) so that they cannot repeat their home-triad base advantages in the two other triad markets. Indeed, the evidence is that most available FSAs might well be realized and exhausted within the home region of the triad itself. However, no formal test has been conducted to explore the geographic reach of FSAs. Accordingly, this paper examines whether the benefits of each FSA (including firm size, knowledge, marketing ability, and industry type) are better exploited by the home region oriented firms. This leads to the main hypothesis of the paper;

Hypothesis 1: each FSA can be exploited more efficiently by home-region oriented firms rather than by non-home-region oriented firms.

In this study, a distinction is made between home-region bound FSAs and non-home-region bound FSAs. Home-region bound FSAs are the FSAs that can be exploited more effectively by home-region oriented firms whose geographic reach is limited to the home region. Non-home-region bound FSAs are those whose geographic reach is not

limited to the home region; that is, these FSAs can be exploited both in the home region and beyond the home region, for example, by bi-regional and/or global firms.

After testing whether each FSA exhibits any home-region geographic bias or whether each FSA can be exploited more efficiently in the home region, the next step is to examine the effect of each FSA on a firm's regional sales to test whether a firm indeed exercises each of these FSAs within the home region. This leads to the empirical proposition 1.

Empirical Proposition 1: if the benefits of any of the FSAs are better exploited by home-region oriented firms, it is expected that a firm with a greater level of that FSA tends to have a higher proportion of intra-regional sales than a firm with a lower level of such an FSA.

IV. Econometric Models and Measures

To test Hypothesis 1, the model can be estimated by regressing a firm's performance on those FSAs and the interaction between each FSA and the dummy whether a firm is in a home-region oriented category (*HOMEdummy*, the variable will have a value of one if a firm has at least 50% of its sales in its home region of the triad and a value of zero otherwise). The estimation can be written in the following equations

$$\begin{aligned}
 performance = & \beta_0 + \beta_1 firm_size + \beta_2 knowledge + \beta_3 marketing_ability \\
 & + \beta_4 industry_type + \beta_5 firm_size \bullet HOMEdummy \\
 & + \beta_6 knowledge \bullet HOMEdummy + \beta_7 marketing_ability \bullet HOMEdummy \\
 & + \beta_8 industry_type \bullet HOMEdummy + \beta_9 HOMEdummy + \varepsilon
 \end{aligned}
 \tag{1}$$

where ε stands for the error term.

The firm's performance is measured by a firm's return on equity (*ROE*). Firm size is measured by a firm's log of total asset (*logasset*). Knowledge is measured by a firm's research and development (R&D) expenditures as a proportion of total sales (*RDpsale*). Marketing ability is measured by the firm's selling and general administrative expenses as a proportion of total sales (*selladminpsale*). Industry type is identified by a dummy of whether a firm is in the manufacturing industry or service industry (*servicedummy*); (see Table 1 for the detail description of variables used in the analysis, and see Table 2 for the descriptive statistics and the correlations of the variables).

The Ordinary Least Squares (OLS) method is used to estimate the model in equation (1). If the coefficient on the interaction term between any FSA and *HOMEdummy* is significant, it can be interpreted that the effect of that FSA on a firm's performance depends on whether a firm is home-region oriented. Moreover, if the coefficient has a positive value, this implies that that FSA can be exploited more efficiently in the home region of the triad than in other regions. If this is the case, that FSA would be defined as a home-region bound FSA. In contrast, if the coefficient on the interaction term is negative and significant, the FSA would be defined as a non-home-region bound FSA.

To test the empirical proposition 1 or to examine the effect of each FSA (including firm size, knowledge, marketing ability, and industry type) on a firm's regional sales, the estimation can be written in the following equation

$$\begin{aligned}
 \text{regionsales} = & \beta_0 + \beta_1 \text{firm_size} + \beta_2 \text{knowledge} + \beta_3 \text{marketing_ability} \\
 & + \beta_4 \text{industry_type} + \beta_5 \text{NAdummy} + \varepsilon
 \end{aligned}
 \tag{2}$$

where ε stands for the error term.

The dependent variable *regionsales* represents a firm's regional sales. This can be measured with three proxies. The first proxy is the four types of firms as classified by Rugman (2005), including home-region oriented firms, bi-regional firms, host-region oriented firms, and global firms, denoting this variable as *regiontypes*³. With this proxy, a model could be estimated using the multinomial logit method. With this method, the effect of FSAs can be compared across firms with different geographic sales structures. The most interesting comparisons would be those with home-region oriented firms as a comparison group; that is, the effect of FSAs of host-region oriented vs. home-region oriented firms; bi-regional vs. home-region oriented firms; and global vs. home-region oriented firms. In this case, it is expected that a firm possessing a high value of home-region bound FSAs tends to be a home-region oriented firm (rather than a host-region oriented firm, a bi-regional firm, or a global firm). The opposite would occur for the firms with a high value of non-home-region bound FSAs.

The second proxy for regional sales is a binary variable regarding whether a firm is of a home-region oriented type (*HOMEdummy*). In this case, the logit method could be used to estimate the effect of each FSA on a firm's propensity to be home-region oriented. It is expected that a firm with a higher value of home-region bound FSAs has a greater possibility of being a home-region oriented firm than a non-home-region oriented one.

The last proxy for regional sales is a continuous variable of the firm's intra-regional sales as a proportion of total sales (*INTRA*). With this proxy, the OLS method

could be used to estimate the relationship between the FSAs and a firm's proportion of intra-regional sales. However, Wooldridge (2001) argues that using the OLS method to estimate the model with proportion (in this case "*INTRA*") as a dependent variable has two limitations. First, the OLS predicted value of proportional change might lie outside the unit interval. Second, the OLS model implies that a *ceteris paribus* unit increase in each independent variable always changes the dependent variable in the same amount, regardless of the initial value of the independent variable. He suggests that this implication cannot be true because continually increasing one unit of the independent variable would eventually drive the dependent variable to be greater than one or less than zero. Accordingly, this paper also uses the fractional logit estimation to estimate the effect of FSAs on a firm's proportion of intra-regional sales. It is expected that a firm with a higher value of home-region bound FSAs tends to have higher proportion of intra-regional sales than other firms with a lower level of this kind of FSAs.

To examine the effect of each FSA on a firm's regional sales, the model also controls for the effect of the firm's region of origin, that is, market effect. Due to the fact that North America is the largest market among the broad triad region, it is expected that all other things being equal (if firms possess the same level of FSAs), the North American firms tend to have more sales within their home region than firms of other regions. Accordingly, the dummy variable defining when a firm is a North American firm (denoted by *NAdummy*) is included in the model.

V. Data sources and sample

This paper uses two databases for the analysis; (1) the “Regional Nature of Global Multinational Activity” (the RNGMA database), the same database used in Rugman (2005); and (2) the industrial annual section of the Standard & Poor’s COMPUSTAT North America database provided by Wharton Research Data Services⁴.

The first database, covering the world’s 500 largest companies according to the “*Fortune* Global 500” (2002), contains year 2001 data on firms’ total revenues (denoted by *revenueRNGMA*); regional sales in the triad region of North America, Europe, and Asia; proportion of intra-regional sales (denoted by *INTRA*); type of industry the firms are in (manufacturing or services, denoting this variable as *servicedummy*); and firms’ region of origin.⁵

The second database provides financial statistics and market information covering publicly traded companies in the United States and Canada. It provides year 2001 data on firms’ consolidated net income, common equity, total sales (denoted by *revenueCOMPUSTAT*), total assets, selling and general administrative expenses, and R&D expenditures.

According to the RNGMA database, of the 500 largest firms, 380 firms have intra-regional sales data available. The industrial annual section of the COMPUSTAT North America database contains multiple entries. In order to align the 380 firms in the RNGMA database with firms in the COMPUSTAT North America database, company names, firms’ stock ticker symbols (available for some firms in the RNGMA database, but available for all firms in the COMPUSTAT North America database), and firms’ revenues (available in both databases) are compared between the two databases. In the process of comparison, out of 380 firms in the RNGMA database, only 253 firms have

similar names or similar stock ticker symbols with available revenue data in the COMPUSTAT North America database. For these reasons, only 253 firms are left for further comparison.

Due to the fact that each database may have different methods of collecting and reporting the data, all 253 firms in the RNGMA database are needed to compare their revenues with firms in the COMPUSTAT North America database in order to obtain consistent data between the two databases. The percentage differences between revenues of the RNGMA and those of the COMPUSTAT North America databases (denoted by *percentdifferent*) are calculated by the following formula:

$$\textit{percentdifferent} = \frac{\textit{revenueCOMPUSTAT} - \textit{revenueRNGMA}}{\textit{revenueRNGMA}} \times 100 \quad (3)$$

where *revenueCOMPUSTAT* is the revenue data derived from the COMPUSTAT North America database, and *revenueRNGMA* is the revenue data derived from the RNGMA database.

If the firms have a high value of “*percentdifferent*”, it implies that those firms in the two databases might be different or both databases may have very different methods of collecting and reporting the data. For these reasons, a cut-off point of “*percentdifferent*” is needed in order to determine which firms should be included for further analysis. The ± 3 threshold is chosen as a cut-off point; that is, firms with value of “*percentdifferent*” greater than 3 or less than -3 are eliminated from the database. Then, out of 253 firms, 206 firms are left for further analysis. This threshold is chosen because the new 206 firms database and the original 380 firms database have a similar percentage

of each type of firm (home-region oriented, host-region oriented, bi-region, global firms, and insufficient data to identify the type of firms); and they are in exactly the same order.

Out of 206 firms, eleven do not have sufficient data to determine the type of firms based on their regional sales (*regiontypes*). Therefore, only 195 firms are left for further analysis. Out of 195 firms, after eliminating firms without data on at least one of the following three variables: *ROE*, *selladminpsale*, and *RDpsale*, 87 firms are used for the final analysis.

Out of 87 firms used in the analysis, there are 64 firms from North America; 22 firms from Europe; no firms from Asia or Asia-Pacific; and only 1 firm from OTHER (regions other than North America, Europe, Asia, and Asia Pacific, Europe/OTHER). Of these 87 overall firms; 69 firms (79.31%) are home-region oriented; 2 firms (2.30%) are host-region oriented; 12 firms (13.79%) are bi-regional; and 4 firms (4.60%) are global. Due to the fact that there are very few firms that are host-region oriented or global, we anticipate high variation and a possible lack of reliability in the tests. But there is little that can be done to improve the tests as so few MNEs can meet the classification of being global or bi-regional.

VI. Results

Table 3 reports the results of the OLS estimations of the effects of FSAs and their interactions with *HOMEdummy* on a firm's performance (measured by *ROE*). The hypothesis that all interaction terms coefficients equal zero can be rejected at the 5% significant level. This implies that the overall effects of all FSAs on a firm's performance depend on whether a firm is home-region oriented. Each of the interaction term

coefficients except that of “*selladminpsaleHOME*” is statistically significant at the 5% or 10% significant level. Because the coefficient on *selladminpsaleHOME* is not significant at the 10% significant level, the null hypothesis that the effect of *selladminpsale* on performance does not depend on whether a firm is home-region oriented cannot be rejected. However, the results show that variables *logassetHOME*, *RDpsaleHOME*, and *serviceHOME* are negatively, positively, and positively related to *ROE* respectively. It can be interpreted that the FSA *logasset* can be exploited both in the home region and beyond the home region of the triad (non-home-region bound FSA), while the FSAs *RDpsale* and *servicedummy* can be exploited more efficiently in the home region of the triad (home-region bound FSAs).

The results derived from Table 3 determine the prediction of empirical proposition 1. That is, it is predicted that a firm with a lower value of *logasset* (a small firm), a firm with a higher value of *RDpsale*, and a service firm tends to be home-region oriented or tends to have higher proportion of intra-regional sales. Then, equation (2) is used to test the empirical proposition 1.

To estimate equation (2), either *regiontypes*, *HOMEdummy* or *INTRA* can be used as a proxy for a firm’s regional sales (*regionsales*). The first analysis is to use *regiontypes* to measure *regionsales*. Table 4 reports the results of the multinomial logit estimation of the effect of all FSAs on types of firms based on their regional sales (*regiontypes*). The pseudo R-squared of the estimation is 0.3110. The results derived from the multinomial logit estimation should be analyzed with much caution because of the limitation of observation for some categories of *regiontypes*.

According to Table 4, the coefficient on all FSAs (*logasset*, *selladminpsale*, *RDpsale*, and *servicedummy*) for all comparison groups (host-region oriented vs. home-region oriented firms; bi-regional vs. home-region oriented firms; and global vs. home-region oriented firms) are not significant at the 10% significant level. Accordingly, the prediction of the empirical proposition 1 cannot be supported. However, the results from Table 4 show that the coefficient on *NAdummy* in the comparison groups between bi-regional firms vs. home-region oriented firms is significant at the 5% significant level with negative value. That means all things being equal (each firm possesses the same level of all FSAs), the North American firm tends to be a home-region oriented firm rather than a bi-regional firm.

Next, a binary variable *HOMEdummy* is used as a proxy for *regionsales* for the model in equation (2). Table 5 reports the results of the logit estimation of the effect of FSAs on *HOMEdummy* (see column 1 of Table 7 for the results of marginal effects of each FSA on *HOMEdummy*). The results show that the coefficient on *servicedummy* is significant at the 5% significant level with positive value. That is, a service firm is more likely to be home-region oriented than a manufacturing firm. This result supports the prediction of the empirical proposition 1 based on the home-region bound nature of the FSA *servicedummy*. In other words, firms tend to exercise the FSA *servicedummy* based on its geographic reach. According to Table 5, the coefficient on *RDpsale* is significant at the 10% significant level with negative value. That is, a firm with higher level of *RDpsale* is less likely to be home-region oriented. This result does not support the prediction of the empirical proposition 1 based on the home-region bound nature of the FSA *RDpsale*. This means that most firms with higher levels of *RDpsale* try to exercise

the FSA *RDpsale* both in the home region and beyond the home region of the triad without realizing that indeed the FSA *RDpsale* can be exploited more efficiently in the home region of the triad itself.

Finally, the dependent variable in equation (2) is measured by the continuous variable *INTRA*. The results of Table 6 (column 1 demonstrates the OLS estimation and column 2 demonstrates the fractional logit estimation) show that among the coefficients on all four FSAs, only the coefficient on *RDpsale* and *servicedummy* are significant at the 5% significant level with negative and positive value respectively (see column 2 of Table 7 for the results of the marginal effects of each FSA on *INTRA* using the fractional logit model). That is, a firm with higher level of *RDpsale* tends to have lower proportion of intra-regional sales than a firm with lower level of *RDpsale*, and a service firm tends to have higher proportion of intra-regional sales than a manufacturing firm. These results are similar to the results of Table 5; therefore, the implications of the results of the two tables regarding the FSAs *RDpsale* and *servicedummy* are similar.

Moreover, the results from Table 5 and Table 6 (both column 1 and column 2) show that the effects of *NAdummy* on a firm's regional sales (*HOMEdummy* and *INTRA*) are significant at the 5% significant level with positive value. That means that the North American firm is more likely to be a home-region oriented firm and tends to have a higher proportion of intra-regional sales. These results are consistent with the prediction that all things being equal, the North American firms tend to have more sales within their home region, the largest market among all three triad regions, than firms of other regions.

However, Table 5 and Table 6 (both column 1 and column 2) show the same results that the coefficient on variable *logasset* is not significant at the 10% significant

level (similar to the results derived from Table 4). Accordingly, the prediction that a firm with a lower value of *logasset* tends to be home-region oriented or tends to have a higher proportion of intra-regional sales can not be supported.

VII. Limitations

This paper has some limitations. First, due to the fact that the RNGMA database has available data on intra-regional sales only for year 2001, the data used for the analysis are cross-sectional. This generates limitations to analyze the relationship between a firm's FSAs, intra-regional sales, and performance across time. Accordingly, a timewise analysis would be a logical next step for future research.

Second, the small number of observations from *OTHER* and the absence of observations from Asia and Asia-Pacific are due to two factors. The first is that most of the Asian firms and firms from *OTHER* fail to report information that can be used in this analysis. Moreover, this paper derives most of the independent variables from the COMPUSTAT North America database. This database covers only publicly traded companies in the United States and Canada, and most of these companies are North American or European firms. Moreover, among the 87 firms included in the analysis, none of these firms are in banking or other financial services industries. For these reasons, the interpretation of results is based almost entirely on North American and European firms and do not cover banking and other financial services industries.

Finally, this paper does not incorporate any analysis of a firm's structure and its managerial capability. This is a distinct limitation of studies using secondary data.

Accordingly, future research may try to collect data regarding a firm's structure and its managerial method from primary sources and incorporate these variables in the analysis.

VIII. Conclusions

The main contribution of this study is to test the performance of MNEs, given the recently observed regional nature of such large MNEs. Rugman and Verbeke (2004) have observed that most MNEs operate intra-regionally and they have therefore proposed that the lack of truly global presence among large MNEs can be attributed to the problem of transferability of the firms' FSAs outside of the home region of the MNE. This is the first empirical study to test whether the benefits of each FSA (specifically firm size, knowledge, marketing ability, and industry type) can be exploited more effectively within the home region of the triad itself, or on a more global basis. We explore the effect of each FSA on a firm's regional sales, as measured by its proportion of intra-regional sales and other variables indicating whether it is a home-region oriented firm in contrast to a host-region oriented, bi-regional, or global firm.

First, we find that some FSAs can be exploited profitably only in the home region (R&D and service sector type), and one FSA can be exploited both in the home region and in other regions (firm size). Second, we find that a service firm tends to be home-region oriented or tends to have higher proportion of intra-regional sales than a manufacturing firm. Finally, we find that most firms do not exercise its FSA in knowledge based on its geographic reach. That is, a firm with higher levels of R&D tends to use their knowledge both in the home region and beyond the home region of the triad

without realizing that indeed they can exercise the knowledge from R&D more effectively in the home region of the triad itself.

Future research on international business should pay more attention to the recent empirical finding that the vast majority of MNEs operate on an intra-regional basis, rather than globally. This suggests that their performance is better explained by FSAs, which appear to be exhausted in the home region, rather than by alleged “globalization” advantages. If there are economies of scale resulting from international integration then these scale economies appear to be realized in the home region of the MNE. It is clear that scholars need to take into account differences in terms of the geographic reach of each FSA when analyzing the effect of FSAs on any firm’s policy and strategic decisions. Attention to regional strategy rather than global strategy is needed.

References

- Agarwal, S. and Ramaswami, S. N. 1992. Choice of Foreign Market Entry Mode: Impact of Ownership, Location and Internalization Factors. *Journal of International Business Studies* 23(1):1-27.
- Anand, J. and Delios, A. 1997. Location Specificity and the Transferability of Downstream Assets to Foreign Subsidiaries. *Journal of International Business Studies* 28(3): 579-603.
- Barney, J. 1991. Firm Resources and Sustained Competitive Advantages. *Journal of Management* 17(1): 99-120.
- Caves, R. E. 1974. Causes of Direct Investment: Foreign Firms' Shares in Canadian and United Kingdom Manufacturing Industries. *Review of Economics and Statistics* 56(3):279-293.
- Dunning, J. H. 1981. *International Production and the Multinational Enterprise*. George Allen Unwin, London.
- Dunning, J. H. and Rugman, A. M. 1985. The Influence of Hymer's Dissertation on the Theory of Foreign Direct Investment. *The American Economic Review* 75(2):228-232.
- Erramilli, K. M., Agarwal, S., and Kim, S. 1997. Are Firm-Specific Advantages Location-Specific Too? *Journal of International Business Studies* 28(4):735-757.
- Grubaugh, S. G. 1987. Determinants of Direct Foreign Investment. *The Review of Economics and Statistics* 69(1):149-152.
- Helpman, E. 1984. A Simple Theory of International Trade with Multinational Corporations. *Journal of Political Economy* 92(3):451-471.
- Hennart, J. 2001. Theories of the Multinational Enterprise. In: Rugman, A.M. and T. L. Brewer (Eds.), *The Oxford Handbook of International Business*. Oxford University Press, New York, pp. 127-149.
- Hennart, J. 1986. Internalization in Practice: Early Foreign Direct Investments in Malaysian Tin Mining. *Journal of International Business Studies* 17(2): 131-143.
- Hitt, M. A., Hoskisson, R. E., and Ireland, R. D. 1994. A Mid-Range Theory of the Interactive Effects of International and Product Diversification on Innovation and Performance. *Journal of Management* 20:297-326.
- Hitt, M. A., Hoskisson, R. E., and Kim, H. 1997. International Diversification: Effects on Innovation and Firm Performance in Product-Diversified Firms. *The Academy of Management Journal* 40(4), 767-798.

- Hood, N. and Young, S. 1979. *The Economics of Multinational Enterprise*. Longman Group Ltd, London.
- Horst, T. 1972. Firm and Industry Determinants of the Decision to Invest Abroad: An Empirical Study. *The Review of Economics and Statistics* 54(3): 258-266.
- Hymer, S. H. 1960. *The International Operations of National Firms*. Ph.D. Dissertation, Massachusetts Institute of Technology. Published in 1976 by MIT Press, Cambridge, MA.
- Jones, G. R. and Hill, C. W. L. 1988. Transaction Cost Analysis of Strategy-Structure Choice. *Strategic Management Journal* 9:159-172.
- Kimura, Y. 1989. Firm-Specific Strategic Advantages and Foreign Direct Investment Behavior of Firms: The Case of Japanese Semiconductor Firms. *Journal of International Business Studies* 20(2):296-314.
- Morck, R. and Yeung, B. 1992. Internalization: An Event Study Test. *Journal of International Economics* 33(1-2):41-56.
- Morck, R. and Yeung, B. 1991. Why Investors Value Multinationality. *The Journal of Business* 64(2):165-187.
- Pugel, T.A. 1978. *International Market Linkages and US Manufacturing*. Ballinger, Cambridge, USA.
- Ray, E. J. 1989. The Determinants of Foreign Direct Investment in the United States, 1979-1985. In R. Feenstra (Ed.), *Trade Policies for International Competitiveness*. University of Chicago Press, Chicago, pp. 53-84.
- Rugman, A. M. 2005. *The Regional Multinationals*. Cambridge University Press, Cambridge.
- Rugman, A. M. 1981a. A Test of Internalization Theory. *Managerial and Decision Economics* 2(4): 211-219.
- Rugman, A. M. 1981b. *Inside the Multinationals: The Economics of Internal Markets*. Columbia University Press, New York.
- Rugman, A. M., Kirton, J. and Soloway, J. 1999. *Environmental Regulations and Corporate Strategy: A NAFTA Perspective*. Oxford University Press, Oxford.
- Rugman, A. M. and Brain, C. 2003. Multinational Enterprises Are Regional, Not Global. *The Multinational Business Review* 11(1): 3-12.

Rugman, A. M. and Verbeke, A. 2004. A Perspective on Regional and Global Strategies of Multinational Enterprises. *Journal of International Business Studies* 35(1):3-18.

Rugman, A. M. and Verbeke, A. 2003. Extending the Theory of the Multinational Enterprise: Internalization and Strategic Management Perspectives. *Journal of International Business Studies* 34(2):125-137.

Rugman, A. M. and Verbeke, A. 2002. Edith Penrose's Contribution to the Resource-Based View of Strategic Management. *Strategic Management Journal* 23(8):769-780.

Wernerfelt, B. 1984. A Resource-Based View of the Firm. *Strategic Management Journal* 5(2):171-180.

Wharton Research Data Services 2001. *COMPUSTAT Data Manual* at <http://wrds.wharton.upenn.edu/ds/comp/manuals/>

Wooldridge, J. M. 2001. *Econometric Analysis of Cross Section and Panel Data*. The MIT Press, Massachusetts.

Zaheer, S. and Mosakowski, E. 1997. The Dynamics of the Liability of Foreignness: A Global Study of Survival of Financial Services. *Strategic Management Journal* 18(6):439-464.

Table 1: List of variables used in the estimation

Variables	Explanation
ROE	Return on equity = (net income – preferred dividend) / common equity
regiontypes	Categorical variables, Home-region oriented group: firms having at least 50% of their sales in their home region of the triad of North America, Europe, and Asia Host-region-oriented group: firms having at least 50% of their sales in a triad market other than their home region Bi-regional group: firms having at least 20% of their sales in each of two regions of the triad, but less than 50% in any one region Global group: firms having at least 20% in each part of the triad, but less than 50% in any one region
logasset	Log of total assets (millions of dollars)
selladminpsale	Selling and general administrative expenses as a proportion of total sales
RDpsale	Research and Development expenses as a proportion of total sales
servicedummy	Dummy, 1 if the firm is a service firm
HOMEdummy	Dummy, 1 if the firm is home-region oriented
logassetHOME	logasset × HOMEdummy
adpsaleHOME	adpsale × HOMEdummy
RDpsaleHOME	RDpsale × HOMEdummy
serviceHOME	servicedummy × HOMEdummy
INTRA	Proportion of a firm's intra-regional sales
NAdummy	Dummy, 1 if the nationality of a firm is in North America

Note: The total sales data used to calculate *selladminpsale*, and *RDpsale* are derived from the variable *RevenueCOMPUSTAT*.

: The original selling and general administrative expenses data item from COMPUSTAT database normally includes R&D expenses. The selling and general administrative expenses used here is obtained by subtracting the R&D expenses from the original one.

Table 2: Means, standard deviations, and correlations

Variables	Mean	Standard Deviation	1	2	3	4	5	6
1. ROE	0.10	0.33						
2. INTRA	0.70	0.21	0.13					
3. HOMEdummy	0.79	0.41	0.05	0.69 *				
4. logasset	9.98	0.94	-0.16	-0.26 *	-0.16			
5. RDpsale	0.04	0.06	0.01	-0.50 *	-0.35 *	0.19		
6. selladminpsale	0.16	0.10	0.14	-0.17	-0.15	0.15	0.32 *	
7. servicedummy	0.32	0.47	-0.04	0.60 *	0.29 *	-0.22 *	-0.41 *	0.14

Note: * means p-value < 0.05

Table 3: The OLS estimation of the effect of FSAs and the interaction terms on a firm's performance

Dependent Variable: ROE (\$ per share)	ROE	
Independent Variables		
logasset	0.0218 (0.66)	
selladminpsale	1.8074 (3.59)	**
RDpsale	-1.7908 (-2.94)	**
servicedummy	-0.7633 (-4.08)	**
logassetHOME	-0.1096 (-1.82)	*
selladminpsaleHOME	-1.1002 (-1.57)	
RDpsaleHOME	1.7589 (1.78)	*
serviceHOME	0.6675 (3.23)	**
HOMEdummy	1.2306 (2.08)	**
constant	-0.3222 (-0.88)	
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Number of observations	87	
R-squared	0.1064	
Test of all interaction term:		
F-statistic	2.86	
p-value	0.0288	**

Note: Values in the parenthesis are the Huber-White robust t-statistic value

** means p-value < 0.05

* means p-value < 0.10

Table 4: The multinomial logit estimation of the effect of FSAs on types of firms

Comparison group	Host-region oriented firms vs. Home-region oriented firms	Bi-regional Firms vs. Home-region oriented firms	Global Firms vs. Home-region oriented firms
Variables			
logasset	3.2385 (1.08)	-0.2422 (-0.44)	0.4660 (0.69)
selladminpsale	10.7067 (0.77)	-0.1325 (-0.03)	5.4501 (1.06)
RDpsale	40.3395 (1.13)	10.6435 (1.55)	10.8546 (1.18)
servicedummy	-34.9556 (0.00)	-35.4505 (0.00)	-0.5294 (-0.36)
NAdummy	-37.3693 (0.00)	-2.0888 (-2.70)	-1.3983 (-1.19)
constant	-41.4907 (-1.09)	1.9290 (0.34)	-8.1927 (-1.10)
Number of observations	87		
Log likelihood	-41.0873		
Model chi-squared	37.09		
Significance of model	0.0012		
Pseudo R-squared	0.3110		
The Likelihood-Ratio test (LR-test) for the coefficient on each FSA			
Chi-squared statistics for coefficient on logasset	4.21		
Chi-squared statistics for coefficient on selladminpsale	1.79		
Chi-squared statistics for coefficient on RDpsale	5.00		
Chi-squared statistics for coefficient on servicedummy	7.75	*	
Chi-squared statistics for coefficient on NAdummy	14.26	**	
Note: Values in the parenthesis are the z-statistic value			
** means p-value < 0.05			
* means p-value < 0.10			

Table 5: The logit estimation of the effect of FSAs on *HOMEdummy*

Dependent Variable: HOMEdummy (0 or 1)	Coefficient	
Independent Variables		
logasset	-0.0976 (-0.26)	
selladminpsale	-1.7890 (-0.48)	
RDpsale	-10.1281 (-1.85)	*
servicedummy	2.1246 (2.19)	**
NAdummy	2.0803 (3.32)	**
constant	1.5133 (0.38)	
Number of observations	87	
Pseudo R-squared	0.2903	

Note: Values in the parenthesis are the Huber-White robust t-statistic value

** means p-value < 0.05

* means p-value < 0.10

Table 6: The OLS and fractional logit estimation of the effect of FSAs on a firm's proportion of intra-regional sales (*INTRA*)

Dependent Variable: INTRA (between 0 and 1)	INTRA (OLS)		INTRA (fractional logit)	
Independent Variables				
logasset	0.0027 (0.15)		-0.0319 (-0.30)	
selladminpsale	-0.2224 (-1.13)		-1.2332 (-1.13)	
RDpsale	-0.8911 (-2.90)	**	-3.6957 (-2.65)	**
servicedummy	0.2126 (6.13)	**	1.3174 (4.92)	**
NAdummy	0.1555 (3.91)	**	0.7292 (4.19)	**
constant	0.5555 (2.75)	**	0.6677 (0.58)	
<hr/>				
Number of observations	87		87	
R-squared	0.5598		0.5389	

Note: Values in the parenthesis are the Huber-White robust t-statistic value

** means p-value < 0.05

* means p-value < 0.10

Table 7: The marginal effects of each FSA on HOMEdummy (logit model) and INTRA (fractional logit model)

Dependent Variable: HOMEdummy and INTRA	HOMEdummy (logit)	INTRA (fractional logit)
Independent Variables		
logasset	-0.0097 (-0.26)	-0.0064 (-0.30)
selladminpsale	-0.1773 (-0.45)	-0.2461 (-1.13)
RDpsale	-1.0040 * (-1.80)	-0.7376 ** (-2.66)
servicedummy	0.1704 ** (2.67)	0.2328 ** (6.51)
NAdummy	0.2996 ** (2.47)	0.1553 ** (3.88)
Number of observations	87	87

Note: Values in the parenthesis are the Huber-White robust z-statistic value

** means p-value < 0.05

* means p-value < 0.10

¹ In related work, Erramilli, Agarwal, and Kim (1997) conduct an empirical study to examine the subsidiary ownership preferences among Korean MNEs. They found that the influence of FSAs (including technological intensity, product differentiation, and capital intensity) on subsidiary ownership levels depends on whether the subsidiary is located in a relatively less developed or more developed country than the home country. Although the study tests the effect of FSAs (contingent upon location of the subsidiary) on a firm's levels of subsidiary ownership decision, it does not examine the effect of these FSAs on the MNE's downstream activity and does not examine the geographic reach of these FSAs.

² Anand and Delios (1997) suggest that a firm's FSAs could be local in scope. However, they do not directly examine the geographic reach of each of the firm's FSAs. Instead, they measure a firm's location-specific capabilities by the proportion of production that must occur at the time of consumption (S-factor), and examine the effect of the S-factor on the choice of foreign entry mode (acquisition, joint venture, and greenfield) and subsidiary performance, using the sample of Japanese FDI data from the wholesale and retail industries. They find that "entry in industries in which the foreign parent's resources and capabilities were not transferable to the host country increased location-specific disadvantages and impeded the frequency and efficacy of entry by greenfield" (Anand and Delios, 1997, p. 598).

³ According to Rugman (2005), firms are categorized as home-region oriented firms if they have at least 50% of their sales in their home region of the triad of North America, Europe, and Asia; host-region oriented firms if they have at least 50% of their sales in a triad market other than their home region; bi-regional firms if they have at least 20% of their sales in each of two regions of the triad, but less than 50% in any one region; global firms if they have at least 20% in each part of the triad, but less than 50% in any one region.

⁴ Wharton Research Data Services provide both the COMPUSTAT North America and the COMPUSTAT Global databases. The former is a database of financial, statistical and market information covering publicly traded companies in the U.S. and Canada, whereas the latter provides authoritative financial and market data covering publicly traded companies in more than 80 countries (Wharton Research Data Services, 2001). However, not all firms in the COMPUSTAT North America database are included in the COMPUSTAT Global database. It appears that the COMPUSTAT North America database contains more firms from the "Fortune Global 500" than the COMPUSTAT Global database. Accordingly, this paper obtains data from the industrial section of the COMPUSTAT North America database rather than the COMPUSTAT Global database. Although some companies are available in the COMPUSTAT Global database but not in the COMPUSTAT North America database, only three of them, including Assicurazioni Generali, Tesco, and BHP Billiton, have "*percentdifferent*" between -3 and +3. The *percentdifferent* in this context is calculated by

$$\text{percentdifferent} = \frac{\text{revenueCOMPUSTATglobal} - \text{revenueRNGMA}}{\text{revenueRNGMA}} \times 100$$

where *revenueCOMPUSTATglobal* is the revenue data derived from the COMPUSTAT Global database, and *revenueRNGMA* is the revenue data derived from the RNGMA database.

However, these firms do not have data on at least one of the two independent variables, *selladminpsale* and *RDpsale*, available. Accordingly, the three firms from the COMPUSTAT Global database will not be included for the analysis of this study.

⁵The countries included in the ‘broad’ triad used in the RNGMA database here (from Rugman, 2005) are:-

North American: USA, Canada, Mexico

Asian grouping: Asia includes all countries in the Asia-Pacific region: Japan, four tigers, China, India, ASEAN countries, Australia, New-Zealand

Europe: includes Central and Eastern Europe.

However, for regional sales data, the defined region may vary based on how the annual report of each firm reports the data. We do our best to categorize sales consistently into the three broad triad regions of North America, Europe, and Asia. The RNGMA database contains information from the firm annual report which is the basis for each firm’s geographical classification of sales.