The effects of the degree of internationalization on firm performance

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Abstract

This study developed and tested a model that attempts to describe the influence of internationalization on firm performance. Degree of internationalization was measured by foreign revenues/total revenues. Results based on data from a cross-sectional set of U.S. multinational firms find evidence of a nonmonotonic relationship between degree of internationalization and firm performance. The rate of return on assets declines, then increases, and finally decreases slightly as the degree of internationalization increases. © 1998 Elsevier Science Ltd. All rights reserved.

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1. Introduction

The level of the degree of internationalization of most large U.S. firms has been increasing steadily, ranging from 10 to over 90% of total operations. One question frequently asked is if these foreign operations make any difference in the firm performance. However, results from the financial performance effects of multinationality have been inconsistent (Sullivan, 1994). The studies reported either a positive, indeterminate, or negative relationship. The disarray may be easily attributed to a misspecification of the nature of the linear relationship. While most studies examined a simple linear relationship between DOI and financial performance, this study argues
for the existence of a nonmonotonic relationship. Basically, it is hypothesized that the rate of return on assets declines, then increases, and finally decreases slightly as the degree of internationalization, measured by foreign revenues/total revenues, increases. The results based on a cross section of U.S. multinationals from Forbes’ ‘Most International’ 100 U.S. Firms find evidence of the nonmonotonic relationship for the 1987–93 period.

2. Theoretical framework

Numerous theories in the international business literature explain the emergence of the multinational corporation. According to the monopolistic advantages foreign direct investment (FDI) theory, firms undertake FDI to get monopolistic advantages (Hymer, 1960). For the internalization FDI theory, the multinational corporation emerges because it is more beneficial to the enterprise possessing these advantages to internalize them (Rugman, 1980). Finally the eclectic theory of Dunning (1979, 1995) maintains that the firm possessing these advantages uses them in conjunction with other factor inputs existing in the foreign country. Potential benefits of international expansion include volume economies, intelligence gathering, product improvement, operational flexibility and stability, tax arbitrage, and organizational advantages (Harris et al., 1991; Mitchell et al., 1993). The fundamental assumption is that diversification across national boundaries increases the stabilization of profits (Madura & Whyte, 1990; Morck & Yeung, 1991). The multinational firm is also viewed as a collection of valuable options and generates arbitrage profits that enhance its value (Tsetsekos, 1991). The arbitrage benefits result from (a) the exploitation of various institutional imperfections; (b) timing options; (c) technology options; and (d) staging options (Baldwin, 1986; Kogut, 1983). Better financing bargains (Giavazzi & Stonehill, 1989), as well as capital availability (Eiteman & Stonehill, 1986; Shapiro, 1989) are also possible through internationalization. In addition, this ability of the multinational firm to exploit interrelationships between different segments, geographical areas, or related industries, coupled with the benefits of economies of scale, scope and experience, suggest a positive association between dependence on foreign operations and profit performance. (Porter, 1985; Kogut, 1985). However, the rush to test this simple relationship has been inconclusive, with some studies showing a positive relationship (Vernon, 1971; Dunning, 1995; Grant, 1987; Grant et al., 1988; Daniels & Bracker, 1989; Geringer et al., 1989), a negative relationship (Siddharthan & Lall, 1982; Kumar, 1984; Michel & Shaked, 1986; Shaked, 1986; Collins, 1990), or an indeterminate relationship (Horst, 1973; Hughes et al., 1975; Buckley et al., 1977; Rugman et al., 1985; Yoshihara, 1985; Buhner, 1987).

What these inconsistent results suggest is that the relationship is far from a simple linear one. It is due to the failure of theories of foreign investment to specify whether some optimal degree of multinationality of a firm’s operations exist (Geringer et al., 1989: 111). The thesis of ‘More Multinationality is Better’ should only hold after a certain level of multinationality, and until the firm reaches an optimum combination of domestic to foreign operations. What the simple relationship implicitly says is
that a firm gains immediately with the lowest level of multinationality and continues to improve its financial performance until they have no domestic operations at all. One more logical thesis would be that the entry of a firm in the multinational arena is costly up to a first level of combination of domestic to foreign operations, then is profitable up to a second level beyond which performance will stagnate or decline. It implies that firm performance will be negatively related to lower and higher ranges of multinationality and positively related to middle ranges of multinationality. In other words, a nonmonotonic relationship is implied:

\[ H^1: \text{There will be a negative relationship between a firm's performance and degree of internationalization at a lower or higher range, and a positive relationship for a middle range.} \]

3. Method

The hypothesis states that firm performance, as measured by the rate of return on assets, is associated with the degree of internationalization, as measured by foreign revenues/total revenues, in a piecewise linear fashion. Control for size is accomplished by introducing the logarithm of assets as a control variable.

The piecewise linear regression model allowing for two changes in the slope coefficient of the degree of internationalization is as follows:

\[
\text{PERF}_i = a_1 + a_2 \text{DOI}_1i + a_3 \text{DOI}_2i + a_4 \text{DOI}_3i + a_5 \text{LA}_i + u_i \quad (1)
\]

where

- \( \text{PERF}_i \) = Financial performance of a firm as measured by the rate of return on assets.
- \( \text{DOI}_i \) = Degree of internationalization, measured by foreign revenues/total revenues, defined as follows:
  - if \( \text{DOI}_i < \text{level one} \) then \( \text{DOI}_{1i} = \text{DOI}_i \);
  - if \( \text{DOI}_i > \text{level one} \) then \( \text{DOI}_{1i} = \text{Level one} \);
  - if \( \text{DOI}_i < \text{level one} \) then \( \text{DOI}_{2i} = 0 \);
  - if (level one \( \leq \) DOI \( \leq \) level two) then \( \text{DOI}_{2i} = \text{DOI}_i - \text{level one} \);
  - if \( \text{DOI}_i > \) level two then \( \text{DOI}_{2i} = \text{level two} - \text{level one} \);
  - if \( \text{DOI}_i < \) level two then \( \text{DOI}_{3i} = 0 \);
  - if \( \text{DOI}_i > \) level two then \( \text{DOI}_{3i} = \text{DOI}_i - \text{level two} \);
- \( \text{LA}_i \) = logarithm of assets.

The first stage of the analysis is to determine the turning points of level one and two of DOI. The Multivariate Adaptive Regression Spline (MARS) methodology is used for the determination of these two levels of DOI (Friedman, 1991; Lewis & Stevens, 1991).
Table 1
Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRTR*</td>
<td>37.45</td>
<td>15.85</td>
<td>93</td>
<td>6.6</td>
</tr>
<tr>
<td>Profit†</td>
<td>769.791</td>
<td>1199.824</td>
<td>6020</td>
<td>-7987</td>
</tr>
<tr>
<td>Assets</td>
<td>29,626.3</td>
<td>43,942.55</td>
<td>251,506</td>
<td>56.4</td>
</tr>
<tr>
<td>ROA‡</td>
<td>0.0720</td>
<td>0.0565</td>
<td>0.3497</td>
<td>0.1695</td>
</tr>
</tbody>
</table>

*Foreign revenues; †in $million; ‡rate of return on assets.

4. Sample selection and descriptive statistics

Since 1979, Forbes has annually ranked the ‘Most International’ 100 American Manufacturing and Service firms on the basis of total revenues. All the firms in Forbes’ classification from 1987 to 1993 were included in our sample, resulting in 612 firm year observations. Data on profit and assets were obtained from the Compu- stat Annual Primary–Secondary–Tertiary database. Table 1 presents the descriptive statistics on foreign revenues/total revenues (FRTR), profits, assets and rate of return on assets (ROA) for our sample.

5. Empirical results

The MARS technique fits a model in the form of an expansion in product line spline function of predictors (Lewis & Stevens, 1991; Friedman, 1991). The two thresholds identified by the program were 14 and 47% for foreign revenues/total revenues. They were used as level one and level two in the piecewise linear regression between, on one hand, the rate of return on assets of multinational firms, and, on the other hand the three ranges of degree of internationalization and the logarithm of total assets. Basically, DOI1 covers the foreign revenues/total revenues between 0 and 14%, DOI2 covers the range between 14 and 47%, and DOI3 covers the area above 47%.

Table 2 reports the piecewise linear regression results. As suggested by the main

Table 2
Piecewise linear ordinary least-squares regression of ROA on degree of internalization*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
<th>t†</th>
<th>F</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.3072</td>
<td>(12.796)‡</td>
<td>63.13</td>
<td>28.8%</td>
</tr>
<tr>
<td>DOI1§</td>
<td>-0.00082</td>
<td>(-2.185)‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOI2</td>
<td>0.0011</td>
<td>(4.183)‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOI3</td>
<td>-0.0009</td>
<td>(-2.682)‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>-0.0242</td>
<td>(-13.978)‡</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*ROA = rate of return on assets.
†t-statistics are computed according to White (1980).
‡Significant at the 99% level.
§DOI = degree of internationalization, measured as foreign revenues/total revenues.
hypothesis in this study, the relationship between firm performance, as measured by the rate of return on assets, and the degree of internationalization, as measured by foreign revenues/total revenues is a nonmonotonic one. It is negative at a low range of DOI (0–14%), positive at a higher range (14–47%), and negative at levels superior to 47%. Basically, for each 1% increase in multinationality between 0 and 14%, firm performance, in terms of rate of return on assets, declines respectively by an average of 0.0082. For each 1% increase in multinationality between 14 and 47% firm performance increases by 0.0011. As multinationality increases beyond 47%, firm performance decreases slightly by 0.0009. The results are consistent with the optimal degrees of multinationality hypothesis. The results were different from most studies which showed a monotonic relationship, and the two studies which showed only one threshold of 50% (Daniels & Bracker, 1989), and 60% (Geringer et al., 1989).

6. Conclusions

The results of this study show a nonmonotonic relationship between firm performance, as measured by the rate of return on assets, and DOI, as measured by foreign revenues/total revenues. They support the existence of a dual threshold point that defines better the nature of the relationship, with a negative relationship under 14%, a positive relationship between 14 and 47%, and a negative relationship for a degree of internationalization higher than 47%. The ‘More Multinationality is Better’ thesis is only verified in the range defined by the threshold of 14 and 47% of foreign revenues/total revenues. Basically, there is a minimum and a maximum combination of foreign to domestic operations that defines the relationship between firm performance and degree of internationalization. These thresholds need to be determined for each firm as a way of defining the potential benefits of multinationality. The ‘More Multinationality is Better’ thesis is not a valid theory. The ‘Multinationality is Better Between an Upper and Lower Threshold’ is a more valid theory.

More empirical validation is necessary for the construction of a more complete theory of the relationship between firm performance and multinationality. The replications may be done on a different sample than the ‘100 Most Multinational’ firms, a different time period, and different measures of firm performance and DOI. Basically, future research should rely on a multi-item scale or index as more likely to tap a broader range of the total meaning of the construct of a firm = s degree of internationalization (Sullivan, 1994; Ramaswamy et al., 1996). In addition, future research should evaluate different measures of financial performance that may include (a) measures of monopoly power; (b) other measures of profitability; (c) measures of fixed asset intensity; (d) measures of growth opportunities, and (e) measures of financial risk, efficiency and size (Kim & Lyn, 1990).

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