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Country effect on firm performance: A multilevel approach

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ABSTRACT

The debate about the impact of environmental constraints on firm performance in developing countries is relevant for business enterprises and governments. However, the academic literature offers limited empirical evidence comparing firm performance in emerging and developed countries. This paper performs a statistical analysis based on a sample of more than 10,000 firms in a 10-year span. A cross-classified 3-level hierarchical linear model allows the estimation of country, industry and country–industry interaction effects, which have roughly the same relative importance each. The analytical procedure is able to estimate the influence of each specific country on firm performance and produce a ranking of nations based on this effect. Country effects have a greater positive influence on firm performance in emerging countries than in more developed economies.

1. Introduction

International business literature has clearly established the relevance of country to firm performance (Ghemawat, 2003; Hawawini et al., 2004). The empirical question is about the extent of this effect relative to other performance components. Sample and method limitations present an additional challenge to this task.

The well-known line of research about firm performance variance components (Rumelt, 1991; McGahan and Porter, 1997) deals mainly with USA firms, so research models do not consider any country effect. This line of research has seen a recent renewed interest with a new wave of papers that tackled the same issue using the novel and more appropriate multilevel techniques (Hough, 2006; Misangyi et al., 2006a; Short et al., 2007). These recent papers, however, do not consider country effects. The few papers that explore country effects use the conventional variance components techniques (Makino et al., 2004b; Brito and Vasconcelos, 2006; Victer and McGahan, 2006).

This paper joins the multilevel approach, but exploring specifically the country effect by investigating a large sample of companies (10,927 firms) from 224 industries and 37 different countries, during the period 1995–2004. The use of multilevel methods provides at least two additional contributions to previous research. First, multilevel models estimate more precisely and reliably the relative relevance of the country and the country–industry interaction effects. Results indicate that both country and country–industry interaction effects are of the same order of industry effects and thus an important component in understanding firm performance in an international setting. Second, the multilevel method allows one to go beyond the estimate of variance percentage and measure country effects for each specific country in the sample using an Empirical Bayesian Estimator. Using such estimation this paper proposes a ranking of country effects for the countries in the sample. This paper measures country influence on firm performance, using only profitability while several other country competitiveness rankings consider the country influence in a broader perspective.

Next section makes a brief review of the theoretical framework that supports country effect and describes previous empirical studies. The methodological discussion follows, including description of data (Compustat Global) and method of analysis (hierarchical linear models). The paper then presents and discusses results ending with a section on conclusions, research limitations and suggestions for further research.

2. Theoretical framework and hypothesis

2.1. Country effect

Countries differ on a wide range of attributes which may influence firm performance. In the current section, this paper discusses two groups of such attributes: economic and institutional.

In economic terms, globalization, reducing barriers to integrate countries' economic activities could make location look less relevant for firm performance. Notwithstanding, Ghemawat (2003) describes the semi-globalization, marked by important barriers to the economic integration of countries, based on evidence from international trade, FDI geographical distribution, price dispersion among countries and international flow of production factors.

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In line with Ghemawat (2003), Hawawini et al. (2004) point three home country biases that support the existence of a country effect on firm performance. The first one consists of home country bias in internal commerce, related to a limited integration of international market products and a more intense commerce inside the countries than between them. The second home country bias refers to internal financing and to the high correlation between internal investment and internal savings. National savings mainly finance national investments and capital does not freely cross borders looking for better returns. Investors' preference for domestic shares creates the third home country bias. National firms tend to concentrate capital market investment portfolios (Hawawini et al., 2004). Ghemawat (2003) and Hawawini et al. (2004) suggest firms' activities depend significantly on their home country economic environment and that globalization is far from making national borders irrelevant.

Differences in national institutional environments (North, 1990; Eggertsson, 1990) may also influence firm performance, as these differences affect the construction of firm's resource base and the appropriation of the economic rents generated by such resources.

Murtha and Lenway (1994) highlight government's influence on firms' activities, as "national political economical institutional arrangements can systematically contribute to (or detract from) country capabilities that form the basis of firms' competitive advantages" (Murtha and Lenway, 1994: 114). Ring et al. (2005) introduce a thorough discussion on national government, detailed in other papers in the same number of the Academy of Management Review.

Wan (2005) argues that national environments have different levels and kinds of factors and institutions. The resources firms need or obtain and the capabilities they develop (market and nonmarket capabilities) are different between countries. In a similar vein, Thomas and Waring's (1999) use of the environment-conduct-performance model emphasizes the influence of home country environment on the construction of the firm's resource base. They argue that differences between firms from diverse home countries tend to persist because the dependency on national environment characteristics acts as a barrier to imitation to competitors from other nationalities. This perspective is coherent with Peng's (2002) discussion of the interaction between institutions, industry conditions, firm resources and strategic actions.

National environment may also affect the value of firms' resources and the room for firms to appropriate the rents generated by such resources. This argument is in line with several papers on RBV that discuss the influence of the external environment on firm resources value (Miller and Shamsie, 1996) and emphasize the role of the institutional environment over firm heterogeneity (Oliver, 1997). This approach is also coherent with Kim and Mahoney (2005) and Foss and Foss (2005) integration of Transaction Costs Economics and RBV, highlighting how property rights and transaction costs influence the appropriation of economic rents by firms. High transaction costs would reduce the potential of firms to appropriate economic rents from its scarce resources. These costs, in turn, depend on national institutions (North DC, 1990).

These arguments suggest that numerous independent variables (economic and institutional) that can explain firm performance variance are at the country level. Altogether, these variables may lead to firm performance variability among countries, which supports the first hypothesis of this paper:

H1. Firm performance significantly varies across countries.

2.2. Country–industry interaction effect

Porter's diamond framework (Porter, 1990) is the most well-known theory about the influence of country–industry interaction. Although the dependent variable in the diamond framework is not firm profitability, the last dimension of the diamond (firm strategy, structure and rivalry) brings an important idea—industry structure varies across countries. So firms may be able to obtain different economic profit in the same industry but in different countries.

Based on an institutional perspective, Hall and Soskice (2001) propose that national systems consist of complementary and strongly associated institutions. They identify two basic varieties of capitalism: coordinated market economies and liberal market economies. In the latter (represented more clearly by the USA), firms coordinate their activities using hierarchy and competitive market arrangements. In coordinated market economies (e.g. Germany), firms tend to use nonmarket modes of coordination, such as relational or incomplete contracting.

From the set of institutional characteristics of each variety of capitalism, Hall and Soskice (2001) develop the concept of institutional sources of competitive advantage. When applied to innovation, for instance, this rationale suggests the prevalence of radical innovation in liberal market economies and incremental innovation in coordinated market economies, as supported by patents records. In some industries, such as in biotechnology semiconductors and software development, radical innovation is key to competitive advantage, while in others cumulative and incremental knowledge development is more relevant. In the former, firms from liberal market economies would perform better, while the latter would benefit in coordinated market economies. This reasoning implies that each variety of capitalism would have comparative advantages in specific types of industries. The analysis by Hall and Soskice (2001) implies similar consequences concerning the country–industry effects as the national business system approach by Haake (2002).

In more specific regional terms, the existence of industry clusters (Porter, 1990; Krugman, 1994; Rigby and Essletzbichler, 2002) may also support the idea of an influence of the country–industry interaction on firm performance. Altogether, these arguments support the second hypothesis of this paper:

H2. Firm performance significantly varies across country–industry interactions.

2.3. Previous empirical studies

One of the first approaches to the empirical analysis of country effect on firm performance is the direct comparison of results from firms in different countries. Brown et al. (1994) compare the performance of Japanese and North American companies in 11 industries along the 1995–1998 period, finding no significant differences in profit margin. American firms, however, have higher asset turnover and thus, higher return on assets. Brouthers (1998) performs a similar analysis comparing the performance of 167 North-American and Japanese manufacturing companies finding similar results.

Collins (1990) analyzes the relationship between host country economic development and firm performance based on profitability data of 133 U.S. Fortune 500 firms. He concludes that firms with activities concentrated on developed countries have higher performance than those operating mainly on developing countries.

Makino et al. (2004a) study data of 26,857 FDI of Japanese companies in 150 countries from 1991 to 1999 and find higher profitability in less developed countries contradicting findings of Collins (1990).

Christman et al. (1999) collect primary data from 99 subsidiaries of 4 consumer packaged goods Multinational Corporations—2 from the USA and 2 from Europe—scattered around 37 countries. They analyze the influence of some host country attributes (development level, population, inflation rate and political stability) and firm characteristics on gross margins of each local subsidiary. A multiple regression model explains 74% of performance variance and country characteristics accounts for 39%. Consistent with Collins (1990) findings, performance is lower in less developed countries.

Recently, authors use variance components models to analyze country effect. Furman (2000) decomposes the performance variance of Australian, Canadian, British and North-American firms between 1992 and 1996. Differences in variance compositions between countries are indicators of the existence of a country effect.

Hawawini et al. (2004) directly include home country effect in variance components models. They use economic and financial performance indicators of 1305 firms in six countries (USA, UK, Germany, Netherlands, Belgium and Luxemburg) from 1993 to 1996 and find a small country effect (under 1% of total variance).

Using a different database—Compustat Global—with 12,592 firms in 78 countries, Brito and Vasconcelos (2006) decompose ROA variance in firm, industry, year, country and country–industry interaction effects. The authors compare variance composition across SIC divisions. In manufacturing firms, country effect explains up to 17.7% of performance variance in Agriculture, 13.5% in Construction, while the country–industry interaction accounts for 11.7% in Construction and 45% in Transports.

Victer and McGahan (2006) also analyze a sample of Compustat Global including ROA of 4551 firms in 43 countries. They apply ANOVA and did not consider firm effect, but only industry, country, year and their interactions. Country–industry interaction accounts for the higher proportion of total variance, 14.79%, with country effect of 1.12%, country-year 2.98% and year-industry 7.31%, explaining only 31.36% of total variance. In the manufacturing division, total variance explained is higher (39.56%) as well as country (2.35%), country-year (5.13%) and country–industry (16.51%) effects. The exclusion of firm effect may, however increase the magnitude of other effects, particularly country–industry interaction, suggesting caution when interpreting these results. Victer and McGahan (2006) do not exclude from their sample country–industry interaction with less than two observations, a procedure that may further inflate the country–industry interaction variance. In interactions with only one firm, the method is unable to separate the performance variability due to idiosyncratic characteristics of that firm from the country–industry interaction.

Hawawini et al. (2004), Victer and McGahan (2006) and Brito and Vasconcelos (2006) analyze home country effect, as they use data aggregated across national subsidiaries. On the other hand, Makino et al. (2004b) studies the performance (operationalized as return on sales) variance composition of 5.183 subsidiaries in 616 Japanese multinational corporations from 1996 to 2001, which allows the estimation of host country effect. This effect accounts for 4.3% of total variance, close to industry effect (5.0%) and country–industry effect (7.5%).

Scholars have also studied country effects on other performance indicators—such as market value volatility. According to Brooks and Del Negro (2005), country effect is one of the most pronounced empirical regularities in the portfolio diversification literature. The correlation between market indexes of different countries has been historically low, contrary to what one could expect in a globalized economy. While Roll (1992) attributes the low correlation between national indexes to different compositions of industries in each country, Heston and Rouwenhorst (1994) decompose market value volatility in pure country and industry effects. Country effects are prevalent, and country variance is about 4.5 times industry variance.

On the other hand, Cavaglia et al. (2000) find that variance associated to industry has increased in recent years. The analysis by Ferreira and Gama (2005) of shares in 12 developed markets shows that international diversification benefits are significant between 1974 and 2001. The fraction of volatility due to country is still significant although decreasing in the last years (Ferreira and Gama, 2005).

Results on estimation of country effects on performance presented above vary and are sometimes conflicting. The estimates of country effect magnitude range from 0.2%, in Hawawini et al. (2004) and Brito and Vasconcelos (2006) in the Transportation SIC Division to 17.7 % in the Mining and Agriculture Division according to Brito and Vasconcelos (2006). Country and country–industry effects, together, explain 2% of total performance variance in Hawawini et al. (2004); 22%, in Victer and McGahan (2006); and 45% in the Transportation Division, according to Brito and Vasconcelos (2006).

These significant differences are possibly due to the wide variety of criteria for sample selection and the method of analysis applied. On the other hand, studies using variance components analysis just estimate the magnitude of country effect, but do not analyze in which countries firm performance is higher (or lower) than expected. In this paper, the sample size, its screening process and estimation of multilevel models contribute to reduce the limitations found in previous studies.

3. Research methodology

3.1. Financial performance construct operationalization

Venkatraman and Ramanujam (1986) discuss the operationalization of firm performance in strategy research. Even when dealing only with financial performance, the construct has a multidimensional nature and these dimensions can present conflicting objectives, creating difficulties in identifying a common performance objective.

This paper uses Net Profit over Total Assets (Return on Assets—ROA) as operationalization of performance. This choice considers that differences in capital market efficiency between countries may imply a severe bias in indicators based on market value. On the other hand, Hawawini et al. (2004) find similar variance compositions for different performance indicators.

3.2. Data source and sample

Global Compustat (Standard and Poor's, 2006) is the database for this research. Standard and Poor's analysts normalize Compustat Global data to provide comparability across a wide variety of global accounting standards and practices, minimizing problems arising from differences in accounting standards across countries (Standard and Poor's, 2006).

Sample uses data from all sets of firms available in the period 1995–2004, except Financial Research. The original database includes 23,334 firms in 87 countries and 458 industries (defined by 4-digit SIC), in a ten years span (1995–2004), reaching 233,340 observations. This paper uses several criteria to screen data. The screening procedure eliminates firms without primary SIC code as well those from financial industries, deletes companies with mean assets or sales under US$ 10 million and excludes 45,024 observations with missing dependent variable.

If one includes countries with only one industry, for instance, the method is unable to separate country from country–industry interaction effect. Thus, at least three observations should be available for each effect, which means not less than three industries per country, three countries per industry, and three firms per country–industry interaction, as well as four annual observations per firm. To avoid confusing different effects, the data screening procedure eliminates subsets that did not meet the above criteria.

Finally, 846 observations (0.4% of the complete database) had ROA under −100% or over 100%. Based on construct validity concerns as well as possible data errors, the analysis eliminates also these observations. Final sample has 83,641 observations from 10,927 firms, representing 42% of the original database after excluding observations without SIC and financial firms.

Compustat data presents aggregated performance of all national subsidiaries with shares not traded in the stock markets of host countries. Strictly, one could analyze only home country effect with this data. Notwithstanding, some large companies, with local subsidiaries, do report independent subsidiaries results on Compustat Global. Smaller companies, on the other hand, tend to have FDI with less

intensity. For them, the home country is responsible for a great part of their operations. Thus, these sample characteristics allow one to consider that country effect analyzed in this study captures mainly home country effect and some minor part of host country effect.

3.3. Method of analysis

Firm performance data—yearly observations nested in firms, industries or countries—have a hierarchical nature, which means data have different levels of aggregation. Besides being hierarchical, data have a longitudinal nature, including repeated measures—the dependent variable is observed, for the same individual (firm) over time (years).

Raudenbush and Bryk (2002) describe five advantages of using multilevel models to analyze longitudinal data: the possibility of different growth curves for each individual; no restrictions to different measurement intervals; the possibility of modeling the covariance between repeated measures; valid *t* and *F* tests and easy inclusion of higher levels. Hox (2002) includes the possibility of analyzing stable or transient (time-varying) variables.

Misangyi et al. (2006b) compare repeated measures ANOVA, multivariate repeated measures ANOVA and multilevel models in the analysis of longitudinal data. They conclude that multilevel models are preferable mainly when data do not respect the sphericity assumption, and when handling missing values or unbalanced data. These characteristics are frequent in firm performance data.

Multilevel models also allow the analysis of crossed classifications in the same level (Rashbash and Goldstein, 1994; Snijders and Bosker, 1999; Raudenbush and Bryk, 2002), for example, industries and countries. Meyers (2004) studies the consequences of ignoring cross-classification in multilevel models and concludes that, among other implications, variance components estimators are biased.

3.3.1. Country and country–industry effect

An unconditional (with no explanatory variables) multilevel model can decompose performance variance (similarly to ANOVA or Variance Components Analysis). Defining the hierarchical structure of data is an important and complex issue in multilevel models, contrary to ANOVA or Variance Components Analysis that consider all effects as independent.

This paper explores two different effects on firm performance: country effect and country–industry effect. The model considers country and industry effects as cross-classified at the same level. Thus, the model's highest level includes the cross-classification of countries and industries main effects, as well as their interaction. Firms belong to country–industry interactions and, at last, annual observations belong to firms. This approach is similar to the one adopted by Hough (2006) when cross classifying corporations and industries, although without the interaction effect.

So a 3-level model is adequate, with countries (l), industries (k) and country–industry interactions (kl) at level 3, firms (j) at level 2 and years (i) at level 1. Formally:

$$\text{Level } 1 - ROA_{ijkl} = \pi_{0jkl} + e_{ijkl} \qquad e_{ijkl} \sim N(0, \sigma_e^2)$$

where π_{0jkl} is the mean performance of firm j in and ε_{ijkl} is the deviation of this firm's average performance in year i.

$$\text{Level } 2 - \pi_{0jkl} = \beta_{00kl} + r_{0jkl} \qquad r_{ojkl} \sim N(0, \sigma_r^2)$$

where β_{00kl} is the mean performance of firms in the industry k–country l interaction and r_{0jkl} is the deviation of the performance of firm j from this mean (firm effect).

$$\text{Level } 3 - \beta_{00kl} = \gamma_{0000} + s_{000k} + t_{000l} + u_{00kl}$$
$$s_{000k} \sim N(0, \sigma_s^2)\; t_{000l} \sim N(0, \sigma_t^2)\; u_{00kl} \sim N(0, \sigma_u^2)$$

where

γ_{0000} is the performance grand-mean

s_{000k} is the random main effect of industry k, that is, the contribution of industry k averaged over all countries (industry effect)

t_{000l} is the random main effect of country l, that is, the contribution of country l averaged over all industries (country effect)

u_{00kl} is the random effect of industry k–country l interaction (country–industry interaction effect)

In summarized notation:

$$ROA_{ijkl} = \gamma_{0000} + s_{000k} + t_{000l} + u_{00kl} + r_{0jkl} + e_{ijkl} \tag{1}$$

The ratio of each variance component to total variance (intraclass correlation coefficient) indicates the magnitude of each effect. Results present variance components shares of total variance as well as their square roots proportions, representing more adequately the relative importance of each effect (Brush and Bromiley, 1997).

3.3.2. Country-specific effect

An important practical application of multilevel models consists of monitoring the performance of individual organizations—firms, schools or classrooms (Raudenbush and Willms, 1995). Two-level hierarchical models (schools and students) are suitable to evaluate school performance. Level 1 includes independent variables which represent students' characteristics, such as family background and previously developed abilities. Some academic performance indicator (for instance, mathematics achievement) is the dependent variable. Level 2 represents the differences between schools. A significant level-2 residual indicates the existence of an effect of this school on students' performance.

This paper applies a similar strategy to evaluate country effect on firm performance. The difference between expected value of firm performance in a country and mean observed performance in this country is the country-specific effect.

It's important to highlight the difference between country effect and country-specific effect. The model in Eq. (1) assumes normally distributed country residuals (t_{000l}) with variance σ_t^2. One can estimate the magnitude of country effect by the ratio of this variance to total variance (also known as intraclass correlation coefficient). On the other hand, the analysis of country-specific effect consists of the prediction of t_{000l}, the residual of country l, for each individual country. This residual indicates the average effect of each country on the profitability of its firms. The model includes the industry cross-classification, controlling for a different industrial activity mix among countries. These residuals yield a ranking of country-specific effects on firm performance, which represents in what extent in a given country, firms are more (or less) profitable than expected.

This paper uses an Empirical Bayesian (EB) Estimator to predict t_{000l} as $t_{000l} = \lambda_l \hat{t}_{000l}$ where $\hat{t}_{000l}$ is the ordinary least square residual of country l, and λ_l is the reliability of this estimator (Raudenbush and Bryk, 2002). The prediction of t_{000l} uses two sources of information: data from firm in country l, and the model assumption about the residuals (normally distributed with null mean and constant variance). This estimator exhibits shrinkage, which means it's biased toward the mean. Countries with small samples tend to generate unstable and less reliable estimates of t_{000l}. Thus, the smaller the number of observations in a country and the higher the variance of firm performance in that country, the lower the reliability and more pronounced the effect of shrinkage (Raudenbush and Bryk, 2002). While EB estimators are biased, they provide more efficient predictions, with smaller standard errors (Snijders and Bosker, 1999).

In countries whose prediction intervals do not contain zero, the existence of a country-specific effect is supported. Notwithstanding, the empirical identification of such effect does not allow causal inference concerning the impact of country characteristics on firm performance. The existence of a country effect is, however, only a descriptive finding,

given the lack of control variables and all the limitations of nonexperimental research designs (Pedhazur and Schmelkin, 1991).

4. Findings and discussion

The final sample, after screening, includes 37 countries from the original 87 in Compustat. Despite this reduction in the number of nations, the sample includes observations from the five continents (Table 1). These 37 countries include the 20 greatest economies and represent more than 86% of world's GDP, what suggests the data adequately represent the global economic and geographical distribution.

USA, Japan and China concentrate more than 60% of the observations in the sample, but this fact is not a major concern for two reasons. First, these countries produce more than 40% or world's GDP. Second, multilevel models are robust for this unbalanced design (Misangyi et al., 2006b).

According to Table 1, mean ROA for the whole sample is 1.2% while median ROA is 2.7%. In some countries, as the USA, mean performance is negative and much lower than the median. This difference is due to the asymmetry of the performance distribution, negatively skewed. Observed standard deviation (12.8%) is close to that obtained in other studies on the composition of performance variance such as 15.7% standard deviation reported by Rumelt (1991) and 16.7% by McGahan and Porter (1997).

4.1. Country and country–industry effect on firm performance

This paper reports variance components as well as their square root, representing more adequately the relative importance of each effect (Brush and Bromiley, 1997). Following McGahan and Porter (1997) and Hough (2006), this paper also compares variance composition between Manufacturing and NonManufacturing SIC Divisions.

Table 2 shows variance decomposition results. The fractions of variance explained by country (3.2%), industry (2.5%) and country–industry (2.9%) are statistically significant at the 1% level. This finding indicates the existence of country and country–industry effects and confirms both hypothesis of this paper.

Country and industry effects were slightly higher for nonmanufacturing (3.6% and 2.9% respectively) than for manufacturing firms (2.1% and 1.2% respectively).

These results are different from the ones obtained by Victer and McGahan (2006) and Brito and Vasconcelos (2006) with the same source of data and performance indicator. Such differences may be due to distinct sample screening processes and statistical method.

The analysis of the square root of variance components indicates the external environment effects (country, industry and country–industry, accounting for 27.5%) are, altogether, almost as relevant as firm effect (31%).

To assess convergent validity, the same model uses two additional performance indicators (Operational Income over Total Assets, and Return on Sales) finding similar results.

A similar model with Variance Components technique provides comparable results, consistent with the conclusions of Hough (2006) in a comparison based on North American firms' data. Multilevel models main contribution however is not limited to adequately considering the hierarchical structure of data for variance decomposition. Their most important benefit, when compared to ANOVA and variance components analysis, is the possibility of predicting country-specific effects and identifying the relative position of specific countries in this aspect. Multilevel models also allow the inclusion of independent variables at the country level, not only to measuring how much does country matter, but also explaining why. While this paper focuses on estimating country-specific effects, such possibility may be valuable for future studies.

Table 1
Descriptives statistics by country.

Country	No. of observations	No. of Firms	No. of industries	ROA Mean	ROA Median	ROA Std. Dev.
Argentina	57	9	3	0.7	2.4	9.5
Australia	1167	179	31	2.4	4.5	15.2
Austria	121	19	5	−0.4	2.4	15.8
Belgium	85	18	6	0.4	2.7	16.7
Bermuda	1574	239	47	−1.4	2.6	19.5
Brazil	664	95	18	1.2	2.0	10.4
Canada	2527	363	43	−0.3	2.9	15.0
Cayman Islands	317	88	21	−3.2	2.2	25.4
Chile	243	33	7	4.4	4.4	9.5
China	8313	948	54	4.6	4.6	8.1
Denmark	210	43	12	4.0	5.1	14.4
Finland	301	50	13	2.1	4.5	14.4
France	2846	454	87	1.2	3.0	11.4
Germany	3051	481	80	−0.8	1.9	13.2
Greece	70	14	5	5.5	4.2	5.3
Hong Kong	189	27	7	1.5	2.7	9.9
Índia	360	46	10	5.0	4.8	5.0
Indonesia	774	117	29	−1.7	1.2	16.5
Israel	89	11	3	0.4	2.8	16.0
Italy	678	113	26	0.3	2.0	9.4
Japan	20,814	2230	189	1.2	1.4	5.2
Korea	848	147	33	2.5	3.1	11.7
Malaysia	3579	489	79	1.0	2.8	12.2
Mexico	220	36	9	4.7	6.2	7.7
Netherlands	413	59	13	5.5	6.0	12.4
New Zealand	39	7	2	10.0	7.4	6.9
Norway	363	61	10	−2.4	1.9	18.4
Russian Federation	61	10	3	5.9	4.3	11.0
Singapore	1520	230	42	1.3	2.7	12.7
South Africa	223	36	8	4.9	5.2	16.0
Spain	352	50	11	4.9	4.3	5.3
Sweden	813	133	23	−4.0	2.0	20.6
Switzerland	555	71	15	2.6	3.3	8.7
Taiwan	1057	169	26	3.9	4.3	9.8
Thailand	942	134	33	3.3	4.2	11.5
United Kingdom	6149	917	138	3.1	5.1	13.4
United States of America	22,057	2801	192	−0.4	3.4	17.0
Total	83,641	10,927	224	1.2	2.7	12.8

Source: the authors based on Compustat Global.

4.2. Country-specific effect

Table 3 indicates country-specific effect predicted for the whole sample and two different time windows (1995–1999 and 2000–2004). This effect represents, in percentage, the difference between the observed firm performance and the expected performance given the composition of industries in the country.

While emerging countries as China, Taiwan and India have high country-specific effects, the greatest world economies—USA, Japan and Germany occupy far lower positions in the ranking.

One must take caution in interpreting country-specific effect. National environment conditions change over time and effects estimated on a ten year time span may hide these changes. The comparison of country-specific effects estimated for 1995 to 1999 and 2000 to 2004 indicates these changes are relevant. China's effect, for instance, fell from 3.9% in the first interval to 1.5% in the last, while Brazil's effect increased from −4.0% in 95–99 to 2.0% in 00–04. On the other hand, USA's effect remained stable (−1.8% in 95–99 and −1.7% in 00–04).

Netherlands, South Africa, China, Taiwan and United Kingdom have positive, significant country-specific effects, while Japan, Malaysia, USA, Canada, Germany, Bermuda, Cayman Island, Norway, Sweden and Indonesia have negative, significant effects.

In general, emerging countries such as China and Taiwan are at the top of the ranking, while the largest world economies—Japan, USA and Germany—rank far below. The positions look inverted when compared

Table 2
Variance composition and the relative importance of country and country–industry effects on firm performance.

	Whole sample			Manufacturing			Nonmanufacturing		
	Var.	% Var.	Relat. import.	Var.	% Var.	Relat. import.	Var.	% Var.	Relat. import.
Country	5.58	3.2%	9.7%	2.92	2.1%	8.1%	7.42	3.6%	10.1%
Industry	4.44	2.5%	8.6%	1.69	1.2%	6.2%	5.96	2.9%	9.0%
Country–industry	5.03	2.9%	9.2%	4.38	3.1%	9.9%	7.24	3.5%	10.0%
Firm	57.03	32.7%	31.0%	47.04	33.5%	32.4%	65.69	31.6%	30.0%
Time[a]	102.54	58.7%	41.5%	84.23	60.1%	43.4%	121.62	58.5%	40.9%
Total	174.62	100.0%	100.0%	140.26	100.0%	100.0%	207.93	100.0%	100.0%
Countries	37			35			37		
Industries	224			124			100		
Firms	10,927			5318			5609		

Source: Analysis by the authors based on Compustat Global Data.
[a] Time is analogous to error term in variance components analysis.

to other rankings of the competitiveness of nations such as those developed by the World Economic Forum (Porter, 2004). In these rankings, strongly correlated to per capita GDP, the richest nations usually appear on the first positions.

The ranking developed in this paper is conceptually different from those competitiveness of nations classifications, which highlight the maintenance and increase in national GDP as the final goal of competitiveness. Such approach focuses competitiveness as a mean to economic development and uses aggregate indicators rather than firm profitability (Waheeduzzaman and Ryans, 1996).

Rankings of the competitiveness of nations are not about firm performance, but focus on structural socioeconomic factors which may foster economic development. The effect of such factors on firm performance, however, is controversial. One rationale considers time necessary to create a new firm as a proxy for the red tape level of an economy and judges countries with shorter periods of time as more competitive. Taking a firm level perspective, however, a complex process to create a new business may be detrimental to economic development, but may also act as a barrier to entry and increase the profitability of existent firms.

If strategy is the exploitation of market imperfections (Porter, 1980), one may expect countries with more developed institutional frameworks and efficient markets to offer less room for exploiting market imperfections and obtaining economic profit. Monopoly power—one of the major sources of economic profit—creates a deadweight loss in the national economy. The increase in producers' surplus is lower than the reduction in consumers' surplus, with negative implications on economic development, which is the base for antitrust policies (Bain, 1956).

In this perspective, one can expect a negative relation between competitiveness of nations and firm profitability. National environments with more imperfect markets would offer better opportunities for economic profit, although at the cost for economic development. This issue goes beyond the scope of the paper and offers opportunities for future research.

Table 3
Country-specific effect.

Country	Whole sample		1995–1999		2000–2004	
	Country spec. effect	Ranking	Country spec. effect	Ranking	Country spec. effect	Ranking
Netherlands	3.61[a]	1	4.47[a]	1	1.72	8
South Africa	3.14[a]	2	2.51	4	2.98	2
China	2.77[a]	3	3.86[a]	2	1.54[a]	12
Taiwan	2.52[a]	4	0.60	15	3.25[a]	1
Greece	2.38	5	1.52	7	1.93	6
Spain	1.88	6	1.26	10	2.29	4
New Zealand	1.85	7	1.57	6	1.19	14
India	1.66	8	0.93	12	1.79	7
Mexico	1.51	9	1.33	9	1.44	13
Finland	1.36	10	2.34	5	1.13	15
Russia	1.31	11	−0.62	25	2.57	3
United Kingdom	1.27[a]	12	1.39[a]	8	−0.19	22
Denmark	1.16	13	−0.36	21	1.09	16
Korea	1.05	14	−0.96	27	1.65[a]	11
Chile	1.01	15	0.74	13	0.97	17
Israel	0.82	16	0.57	16	0.02	20
Australia	0.77	17	−0.39	22	1.69[a]	9
Thailand	0.54	18	−0.85	26	1.68[a]	10
Hong Kong	0.29	19	−0.43	23	0.35	18
Switzerland	0.00	20	0.16	20	−0.45	25
France	−0.08	21	0.21	19	−0.19	23
Belgium	−0.16	22	1.06	11	−0.04	21
Singapore	−0.18	23	0.39	17	0.04	19
Argentina	−0.41	24	0.31	18	−0.61	26
Austria	−0.98	25	0.63	14	−1.34	28
Japan	−1.03[a]	26	−2.09[a]	32	−0.37	24
Malaysia	−1.26[a]	27	−1.29[a]	28	−1.21[a]	27
Brazil	−1.33	28	−4.05[a]	36	2.00	5
USA	−1.35[a]	29	−1.75[a]	31	−1.66[a]	29
Canada	−1.38[a]	30	−2.14[a]	33	−1.84[a]	31
Italy	−1.66	31	−0.61	24	−1.84	30
Germany	−2.06[a]	32	−1.38[a]	29	−2.18[a]	32
Bermuda	−3.04[a]	33	−2.54[a]	34	−2.89[a]	33
Cayman Island	−3.41[a]	34	2.90	3	−3.15[a]	34
Norway	−3.47[a]	35	−1.62	30	−4.32[a]	36
Sweden	−3.58[a]	36	−3.03[a]	35	−4.39[a]	37
Indonesia	−3.66[a]	37	−4.23[a]	37	−3.26[a]	35

Source: Analysis by the authors based on Compustat Global Data.
[a] Country-specific effect significant at the 5% significance level.

5. Conclusions and implications

This paper main objective includes analyzing country effects on firm performance. A variance decomposition of performance by a cross-classified hierarchical linear model indicates significant country and country–industry effects. The relative importance of country, industry and country–industry effects are similar, around 10% each. This result is consistent for manufacturing and nonmanufacturing firms, although these effects are slightly higher in the latter. Despite the tendency of national markets integration, this research could not detect significant changes in country effect magnitude (as fraction of total observed variance) over the last ten years. Results support both hypotheses proposed. Country and country industry–interaction matter to firm performance.

Besides estimating country effect relative importance, the method is able to predict country-specific effects, developing of a ranking of countries based on their influence on firm profitability. This ranking shows different relative positions when compared with other classifications such as those based on the competitiveness of nations. The world's greatest economies were far behind some emerging countries.

The limitations of this paper cannot be ignored. The sample is not probabilistic which undermines the external validity of the results.

Accounting data is the source of all performance indicators and do not consider the cost of capital, which varies significantly across countries. Although, the consistency of results obtained with three different accounting data-based performance indicators reinforce the validity of the findings. Comparing the results with economic profit indicators, such as performed by Hawawini et al. (2004) is an important next step. Also, country-specific effect ranking does not consider the different types of risk associated to countries. Another important limitation refers to the database used. Compustat Global aggregates the results of national subsidiaries, what partly confuses home country and host country effects. A database of local subsidiaries performance (similar to the one used by Makino et al., 2004b), from different home countries would allow the analysis of host and home country effects simultaneously.

After confirming the existence of a country effect, the next challenge consists of explaining why firms in some countries perform better, as well as what drives the change in country-specific effect along time. The 3-level hierarchical model discussed in this paper might include, in future studies, variables that describe national environments. These variables include, among others, the level of institutional development (Aron, 2000).

Analyzing the relationship between economic development and firm performance is also possible. For the strategic management field, this approach may offer further support and guidance for international business strategies. For a public administration perspective, the relationship between economic development and firm performance may offer evidences for the analysis of the impact of public industrial policies, helping to find out who reaps its fruits—the country as a whole, with economic development or firms, with increased profitability.

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