EAESP-FGV

RELATÓRIO DE PESQUISA - NPP

HOW MUCH DOES COUNTRY MATTER?

Prof. Flávio C. Vasconcelos

Professor Adjunto do Departamento de Administração Geral e Recursos Humanos da FGV-EAESP, Doutor em Administração pela Ecole des Hautes Etudes Commerciales de Paris, Mestre em Sociologia pelo Institut d'Etudes Politiques de Paris, Bacharel em Administração Pública pela FGV-EAESP e em Direito pela Universidade de São Paulo.

How much does country matter?

Abstract

Several factors affect firms' performance. Components of variance technique has been used to identify and quantify industry, firm and corporate effects using data of US business environment establishing an active debate between the structure-conduct-performance model and the resource-based view in strategy. Using data from the COMPUSTAT global database, covering 78 countries, this paper proposes and analyzes a new type of effect: the country effect. An empirical study with 60,092 observations, 12,592 firms, and 448 industry sectors shows that country effects do exist, and quantifies them for different economic sectors. The research also estimates the country-industry interaction that could be linked to the phenomenon of clusters and reassesses the composition of performance variance for an international environment identifying similarities and differences to previous studies using US data only.

Introduction

Firms do differ. The sources and significance of differences among firms and industries offer a fertile ground for studies in economics and strategy fields (Nelson, 1991; Carroll, 1993). Firms' performances also vary. Although explaining variation in performance is one of the most enduring themes in the study of organizations, it is not a simple issue and faces many problems (March and Sutton, 1997).

Variance components technique can offer interesting insight on the assessment of the several types of effects that determine performance in a descriptive approach. After the original works of Schmalensee (1985) and Rumelt (1991), several authors studied the structure of performance variance, decomposing it into firm, corporate, industry and year effects (Roquebert, Phillips and Westfall, 1996; Mauri and Michaels, 1998; Brush, Bromiley and Hendrickx, 1999; McGahan, 1999; Chang and Singh, 2000; Hawawini, Subramanian and Verdin, 2003; McGahan and Porter, 1997, 2002; McNamara, Vaaler and Devers, 2003;).

The vast majority of these studies indicate firm effects as the dominant component of explained variance. This has fueled the debate between the industrial organization derived approach to strategy and the resource-based view. The importance of corporate effects has had contradictory findings and seems to be sensitive to the sample and period analyzed. Year effects were, normally, found to be very small or non-existent. All the studies previously cited were done on US data and depict the business environment of US economy. One of the few, perhaps, the only paper published on this subject, analyzing the performance variance of firms outside the US, was done by Claver, Molina and Tarí (2002) and the results, analyzing a set of Spanish firms, have shown a performance variance composition similar to what was found in the US. There is very little evidence to support that it is possible to generalize the findings from US data to the rest of the world. In the globalized economic environment of today, it is unnecessary to stress the importance of this shortcoming.

Since the overwhelming majority of studies were made on US data, location has never been treated as a source of heterogeneity in this type of research. Economic and strategy theory, however, recognize location as one of the important determinants of firm performance. In the economic research tradition, this aspect can be traced back to the work of classical economist David Ricardo (1817) and the notion of comparative advantages. In the strategy field, Michael Porter's (1990, 1998, 2000) work on the competitive advantage of nations and on clusters, certainly relates performance to location.

This paper intends to contribute the effort of reducing the above mentioned shortcomings of current knowledge. The first objective is to detect the country influence in the heterogeneity of performance. Drawing from previous research on variance components, a new type of effect, the country effect, was conceived. The country effect captures the influence of particular countries in all firms belonging to it. It should represent factors in that country economy that influence performance in a positive or negative way like severe recessions or extreme prosperity and growth, specific to that country. In other words, our first objective is to answer the question: does country matter? A significant country effect will mean that these factors do explain part of the total observed variance in performance. The second objective is to answer the logical follow up question: *how much* does country matter? This will be done by quantifying the magnitude of this effect in different economic sectors.

Country effects, however, may not be independent from other effects. Country related factors may affect only a few industries and be neutral to others. The third objective is thus to expand the findings of the first and second objectives by identifying and quantifying the country – industry interaction with a model that includes this interaction as a variance component.

Finally, this paper will assess the performance variance composition of firms in 78 different countries. The fourth objective is then to assess the performance variance composition in a truly international environment, expanding what was done by previous studies that used mainly US data. The COMPUSTAT global database was used as a source of data. A subset of this database covering results of 12,592 firms during 1997 to 2001, operating in 78 countries, with a total of 60,092 observations was selected.

Having explained what the paper intends to develop, it is convenient to clarify what it will not cover. The approach of variance components technique is a descriptive rather than a normative one (Rumelt, 1991; McGahan and Porter, 1997). Identifying and quantifying a certain component does not allow one to draw cause and effect conclusions. Further and different research approaches would be necessary to identify which country aspects influence

in a positive or negative way the performance. Understanding and mapping the performance distribution is, however, useful. If a large proportion of variance in attributable to a certain factor it is logical that specific aspects encompassed by that factor are worth studying and the opposite is true.

Initially, previous studies on performance variance components are reviewed. The main theoretical streams relating performance and location are then covered. The variance components method, the choice of performance measurement used, and the characteristics of the database are described in the Method and Data section. Results and the discussion follow and a section on conclusions is presented. A final section on directions for future research proposes possible links of this line of strategy research with the new institutional economics and development economics fields.

Reviewing previous studies on variance components

Schmalensee (1985) published a seminal paper using data from the Federal Trade Commission (FTC), year of 1975, analyzing the results of 1,775 business units. Industry effects accounted for 19-20% of total variance. One of the important points of the research resided, however, in what was not found rather than what was unveiled. Recognizing that the model could not explain 80% of the variance of business profitability, the author mentions: *"While industry differences matter, they are clearly not all that matters"* (Schmalensee, 1985, p. 350).

Rumelt (1991) extended the original work of Schmalensee (1985) using the same FTC database, but using four years instead of only one. In total, 6,932 observations were considered. Having four years of results made it possible to identify a part of the total variance associated with the individual business unit, and the variance associated with the

interaction year *x* industry separating fixed and transient industry influences. The model was able to explain 63.33% of the variance. Industry membership explained 16.2% of total variance, but half of that was associated with transient effects through industry x year interaction, so permanent industry effects were only 8.3%. Firm effects, or persistent factors associated with each individual business unit accounted for 46.4% of total variance.

Although these two papers provided consistent findings, they have been used to support different views. Schmalensee´s (1985) work was used to support the strategic analysis based on industry structure (Montgomery and Porter, 1991) while Rumelt´s results were used to question this view since he found a large, significant influence of permanent factors associated with the business unit itself. This emphasized the importance of the resource-based approach (Roquebert, Phillips and Westfall, 1996).

Roquebert, Phillips and Westfall (1996) published a similar research using the COMPUSTAT database. The data covered the period of 1985 to 1991, using 16,596 observations. Findings were similar to the two previous studies with one notable exception, the corporate effect. They found a significant corporate effect explaining 17.9% of the total variance. The model was able to explain 68.0% of total variance leaving 32% unexplained.

McGahan and Porter (1997) published a broad work based on COMPUSTAT data from 1981 to 1994, with 72,742 observations. While previous studies have used only manufacturing firms, McGahan and Porter (1997) analyzed also other economic sectors besides Manufacturing like Mining and Agriculture, Retailing, Transport, Services, Lodging and Entertainment. When the results of the Manufacturing economic sector are compared, the findings were, again, consistent with the previous studies. The largest variance component was associated with the business unit and amounted 35.45% of the total. The industry accounted for 10.81% of the variance and year effects for 2.34%. The same manufacturing data was analyzed using Rumelt´s (1991) model delivering comparable results.

In other broad economic sectors, like Mining and Agriculture, Retailing, Transport, Services, Lodging and Entertainment, variance composition was significantly different from Manufacturing and industry influence was much greater so that when the aggregate results were examined industry accounted for over 17% of the variance (McGahan and Porter, 1997).

A comparison of these studies, showing results for manufacturing data only, is presented in Table 1. Although there are discrepancies related to corporation effects there is remarkable coincidence in the other components of the variance given the differences in the data and method used. The largest component of variance has always been the individual business unit characteristics accounting from a third to half of the total variance. Industry is significant, but its influence is somewhere between 10 and 20% of the total variance, and part of that is due to interaction with year.

Other authors also explored the theme using different methodologies and approaches, but reaching conclusions that are consistent with the previous summary. Wernerfelt and Montgomery (1988) used Tobin´s q to measure firm performance. Hansen and Wernerfelt (1989) decomposed the profit rates into its economic and organizational components. Powell (1996) used a survey and interview methodology confirming that industry factors could explain around 20% of total. Mauri and Michaels (1998) explored the effects influence on the strategies pursued by the business units. McGahan (1999) explored the use of different performance metrics (Tobin´s q, traditional accounting profitability and a hybrid measure, return on replacement value of assets). McGahan and Porter (1999) explored the issue of persistence of the various effects. Hawawini, Subramanian and Verdin (2003) also explored other financial performance measures and effect of sample composition. McNamara, Vaaler and Devers (2003) used four-year moving windows to observe the changing pattern variance composition using US Compustat data from 1978 to 1997. All these studies used US data. Similar analysis with data from other countries is very limited. Claver, Molina and Tari (2002) studied Spanish firms finding similar results. All analysis covered only firm, industry, corporate and year effects. Cross-country studies were never undertaken with this approach.

Location was not considered as a factor influencing performance variance.

Location and performance

Geography has been linked with firms' economic performance since early days of economic thinking. Adam Smith (1776) introduced the idea of absolute advantage by which a region with a lower cost could dominate the market exporting to others. Ricardo (1817) further developed the subject with the notion of comparative advantage. International trade is based on the existence of inequalities in production factors among countries. Countries enjoying abundance of certain production factors can exploit a comparative advantage when producing goods that demand intense use of these factors. Countries where labor cost is low should have a comparative advantage in the production of good that require high labor intensity in the production process.

Krugman (1994) revisited the effects of external economies related to a particular geographical location on a firm competitive position reaching the conclusion that geography matters, and that the borderless economy has not yet arrived. The increasing degree of integration of modern economy, the reduction of transportation costs, and the increase of information exchange could indicate that we are on the brink of becoming a "borderless" world populated by global, even anational firms. Krugman (1984) analysis posited that location still matters not only due to the comparative advantages, but also due to the increased competitiveness arising from created advantages. These "created advantages" were advanced by Marshall (1890) and are related to both large-scale clustering of industries in certain areas or nations, and the localization of particular industries in certain specific areas. The advantage arises from labor market pooling, availability at lower cost of specialized inputs and services, and technological externalities or spillovers. Empirical evidence showed that the phenomena can be observed in both high-technology and low-technology industries (Ibid).

Kogut (1991) examined the notion of country competitiveness as countries do differ in their prevailing technological and organizational capabilities. These differences influence the performance of firms based in those countries and part of the observed heterogeneity in performance can be attributable to the effects of a firm's country of origin. The persistence of these competitive differences among countries is a function of the relative permeability of country borders versus firms' borders. The slower rate of diffusion of organizational capabilities in relation to technological capabilities is an additional reason for the persistence of these competitive differences.

Michael Porter (1990, 1994, 1998, 2000) developed a whole theory of competition based on clusters. Clusters affect competition in three broad ways: they increase the productivity of constituent firms or industries; they increase their capacity for innovation; and they stimulate new business formation that supports innovation and expands the cluster (Porter, 1998, p.213). The cluster approach offers thus a dynamic influence of location in competition as opposed to a static one associated with the basic economic analysis. Porter (1990) offered the "diamond" framework to analyze the determinants of a competitive advantage of a nation. The diamond consists of four interrelated sets of attributes linked to location: factor (input) conditions; demand conditions; related and supporting industries; and the context for firm strategy and rivalry.

The above brief, and by no means comprehensive, review indicates that previous research and theory in both economics and strategy fields supports the notion that location affects firms' individual performance. Part of the observed heterogeneity in firms' performance should be attributable to a location determinant. Previous research on variance composition of performance, however, has never considered this type of influence, perhaps because most of it was done using US data only. On the other hand, specific research on clusters and agglomeration of firms and industries looked at specific agglomerations and their effects not putting the analysis in perspective with other factors that affect performance.

The "country effect" proposed in this paper is related to country specific factors that affect all firms in a given country in a similar way. It captures most of the argument proposed by Kogut (1991), but only part of the influence of clusters as developed by Porter (1994). The influence of the actual cluster is not simple to capture since it involves some firms of a certain industry, not all of them. It also involves some firms of related industries and finally, the geographical definition may not coincide with national borders. Firms located in neighboring countries may be part of a cluster. Some of this "cluster" effect can be captured in the interaction between country and industry, but it must be recognized that this is not the definition of a cluster. The major benefit of the approach is that it looks at the variance as it occurs in the real world and estimates all the components simultaneously allowing the researcher to compare magnitudes and assess one in perspective of the others.

Method and data

Components of variance

The components of variance technique is widely used in other fields like genetics, but its application to business has been limited (Rumelt, 1991). It attempts to decompose the variance observed in a specific variable into the components (or variances) that represent the contribution of each random effect causing that final variance. Searle, Casella and McCulloch (1992) provide a comprehensive treatment of the technique. In the case in study, firm, industry sector, year and country are taken as random effects, each contributing to the total variance of the observable variable. The basic model, without considering possible interactions is:

$$r_{i,j,k,t} = \mu + \gamma_t + \alpha_i + \beta_j + \phi_k + \varepsilon_{i,j,k,t} \qquad\qquad (1)$$

Where $r_{i,j,k,t}$ is the performance measure of an individual company in the sample. The index t represents the different years considered; i the different industry sectors; j the country where the firm is located; and k the individual firms. The term μ is the average result of all companies taken as one group. The term γ_t is the year effect, α_i is the industry sector effect, β_j accounts for the country effect and, finally, ϕ_k is the individual contribution of the company k to its results, or the firm effect. The error term $\varepsilon_{i,j,k,t}$ is the residual, not explained by the model. This simple model can be extended including the possible interactions of country, industry sector and year by adding another three terms accounting for country-industry, country-year and industry-year interactions.

The variance of the term $r_{i,j,k,t}$ is given by:

$$\sigma_r^2 = \sigma_\gamma^2 + \sigma_\alpha^2 + \sigma_\beta^2 + \sigma_\phi^2 + \sigma_\varepsilon^2 \qquad\qquad (2)$$

These variances can be estimated by several methods. This paper uses MINQUE (Minimum Norm Quadratic Estimation) since it is recognized as unbiased and requires no iteration, reducing the computational power required.

Performance measurement

One important issue in this type of analysis is how to measure firms' performance? Performance has been seen as having multidimensional nature, relative to the various stakeholders and not representable by a single index (Chakravarthy, 1986; Donaldson and Preston, 1995; Kaplan and Norton, 1996, p. 24). Besides, a true measure of strategic performance should include a futuristic component related to the ability the firm has to face future challenges (Chakravarthy, 1986). Jensen (2001) challenged the multi-dimensional approach positing that a single value function, incorporation all dimensions should be used to assess firm performance. Financial indicators end up being used since they are available and comparable, but it is necessary to keep in mind that only one and limited dimension of

performance is being measured. Most of previous studies on performance variance composition used the ratio of accounting profit to total firm assets. Some authors, however, explored different financial measures of performance as *Tobin's q,* economic profit, market value, hybrid measures and even surveys among managers reaching similar conclusions (Wernerfelt and Montgomery, 1988; Powell, 1996; McGahan, 1999; Hawawini, Subramanian and Verdin, 2003). Recognizing all these limitations, as a first approach to measure country effects, this research used return on assets as a measure of performance. The definition of ROA (Return on Assets) of the Compustat Global Database was used. It is calculated as the income before extraordinary items divided by the average of the most recent two years total assets.

Data

The COMPUSTAT Global Database was the data source. This database compiles financial and market data of more than 13,000 companies in over 80 countries around the world. COMPUSTAT (Global) data is collected by Standard and Poor's using consistent sets of financial data items that are developed by examining financial statements from a variety of countries and identifying items that are widely reported by companies regardless of their geographic location, business activity or accounting practices. Data is normalized according to local accounting principles, disclosure methods and data item definitions. Results for each firm are reported in the country where the firm in incorporated. Multinational companies are often reporting their results in their country of origin rather than the country where the operations are being performed. This study is considering country as the country of origin rather than the country where operations are taking place. For the great majority of companies the two country concepts coincide, but not for all. Another limitation is that the COMPUSTAT Global database does not provide a breakdown of company activities by business unit. A four digit SIC (Standard Industry Classification) code is assigned to a company considering its most typical activity. This probably leads to an underestimation of industry effects since results not relating specifically to each industry are pooled together.

Data selection for this study started with four basic databases: industrial active, industrial research, financial active, and financial research. Only firms with revenues and total assets of more than USD 10 million, and with reported results in at least four of the five years considered (1997-2001), were included. In total, 12,592 firms met these criteria, providing 60,092 observations, covering 78 countries and 448 different four-digit SIC codes. The analysis was done grouping SIC codes by broad economic sector or divisions. Division A included Agriculture, Forestry and Fishing (SIC codes below 1000); division B was Mining (SIC codes 1000-1499); division C was Construction (SIC codes 1500-1799); division D, the largest one, was Manufacturing (SIC codes 2000-3999); division E covered Transportation, Communications, Electric, Gas and Sanitary Service (SIC codes 4000-4971); divisions F and G were analyzed together covering Wholesale trade and Retail Trade (SIC 5000-5999); division H was Finance, Insurance, and Real Estate (SIC 6000-6799); division I was Services (SIC 7000-8999).

Results and Discussion

The descriptive analysis of the large sample considered, covering 78 countries, offers an interesting perspective of the characteristics of the distribution of performance measured as return on assets. The mean estimate was 1.71% and the standard deviation 13.72%. This value of standard deviation is comparable to previous studies made on US data only. McGahan and Porter (1997) found a standard deviation of 15.7% and Rumelt (1991) 16.7%. It is important to note the significance of this dispersion relating it to the interpretation of the result for one individual firm. Being only one standard deviation above the mean results in a quite good performance and a firm situated one standard deviation below is delivering a really poor and troubled performance. Another aspect is the shape of the distribution that can be seen in Figure 1. It is a bell shaped distribution, slightly skewed to the right (skewness coefficient of -7.86) and significantly more "peaked" than the normal distribution. This is a leptokurtic

characteristic, indicated by the high kurtosis coefficient of 176.14. Intuitively this distribution represents a situation where the shoulders of the normal curve have been shaved off and this material has been added to the peak and the tails (Spanos, 1999). Firms tend to group their results around the mean closer than one would expect in a normal distribution and, at the same time, show more frequent large deviations (positive and negative) from the mean than would be expected if the distribution were normal. Table 2 shows the descriptive results for each economic sector or division.

The analysis of variance components was done for each economic sector and results presented wide variations in variance composition as McGahan and Porter (1997) have found analyzing US data only. Table 3 shows the variance composition of each economic sector using a simple model where no interaction in the factors is accounted for.

In most cases, the simple model could explain 40 to 50% of the total variance, which is consistent with previous studies reviewed. Firm effects were the most important class of effects in most economic sectors with the exception of Construction and Mining where they were the second most influential factor. Industry effects ranged from nil to 15.6% in Mining. They were surprisingly low in most economic sectors when compared with previous studies. Year effects were always below 3% consistently with all previous studies. Country effects did appear and exhibited a non-systematic variation across the different economic sectors ranging from non-existent to 20.8% in Agriculture.

The manufacturing economic sector is the one with the largest number of observations and the one most explored in previous research, it deserves so, a more thorough analysis. The standard deviation was 13.16. This figure is not far from the ones found previously: 18.7% by Schmalensee (1985); 16.7% by Rumelt (1991); and 15.7% by McGahan and Porter (1997). Firm effects of 37.2% of total variance were also consistent with the 46.37% of Rumelt (1991), and the 35.45% of McGahan and Porter (1997). Industry effects of only 3.2%, however, were lower than the 10.81% found by McGahan and Porter (1997). The comparison

with Rumelt (1991) model cannot be properly made since he used a model including year x industry interaction, but figure was clearly smaller. Rumelt (1991) found a fixed industry effect of 8.32% and a transient one (the interaction with year) of 7.84%. Since the sample of this study included US and non-US firms, and the previous studies were done with US data only, one of the possibilities was that the variance composition outside the US would be very different. This was checked performing the analysis separately for US and non-US countries, but the results did not show any significant differences for the two sub-samples. Another possible explanation could be the different periods of sample collection and the occurrence of a change in the variance composition with time. McNamara, Vaaler and Devers (2003) presented an analysis showing the variance composition in 17 four-year windows from 1978 to 1997, using the Compustat US database. The industry effect showed a clear and steady pattern of reduction since its peak in 1983-1986 of 13.1% to 3.5% for the last time window analyzed, 1994-1997. Claver, Molina and Tari (2002), using a model similar to Rumelt (1991) applied it to Spanish firms during 1994-1998, found a fixed industry effect of 2.06% and a transient one of 2.78%.Under this perspective, the figure of 3.2% for the period 1998-2001 seems quite reasonable. Another aspect that could explain the lower percentage of industry effects is that the Compustat Global database assigns the whole company to its most representative SIC code while the US database company's results are split by significant business lines and reported separately. This leads to a pooling of results that could reduce industry effects in diversified companies. Country effects were found to be 2.0% of total variance.

The more complete model, accounting for the interaction of SIC and country (Table 4) did not show great differences for Manufacturing. In fact, a small negative figure was found for the interaction in this case, so it was set to zero, meaning that the interaction could not be identified in the model. Given the small magnitude of the percentages, they are slightly different in the model with interaction, but the same pattern of small country and industry effects, and large firm effects remains.

Still analyzing the results of the simple model in Table 3, country effects were largest in Agriculture and Construction economic sectors, accounting for 20.8% and 16.9% of total variance. They also reached 8.2% in Mining. This is not surprising since in all these economic sectors geography should have an important effect in production factors economies. Firm effects seem to be less important in Mining and Construction where they are not the leading factors in explaining the variance composition. McGahan and Porter (1997) grouped the results of all these three economic sector into one they called Agriculture, Mining. They found firm effects accounting for 5.02% of total variance, industry effects for 29.35% and corporate effects accounting for 22.35%. The model also found year effects of 2.35% and a negative covariance between corporation and industry of -9.45%. The model was able to explain 49.52% of total variance. Results are not directly comparable given the different grouping of data used. It is clear, however, that firm effects were less important.

The model with interaction, shown in Table 4, identified relevant percentages of variance explainable through the interaction country *x* industry for these three economic sectors. This indicates effects of specific countries in specific industry sectors and could be taken as an imperfect indication of a kind of a "cluster effect". In fact, the definition of a cluster is much stricter since it does not need to include all companies of a given industrial sector in a country, so the fact that part of the variance can be explained through this interaction is highly significant.

Economic sectors Transportation, Wholesale and Retail, and Insurance, Finance and Real Estate have shown a different behavior. In the simple model, firm effects were dominant with over 40% of total variance, country effects ranged from nil for Transportation to 5.0% for Wholesale and Retail and industry effects ranged from 0.7% for Wholesale and Retail to 15.6% in Transportation. This is quite different from what was found by McGahan and Porter (1997) who found a highly significant industry effects and quite small firm effects for Transportation and Wholesale and Retail (Insurance, Finance and Real Estate was not analyzed. The same restrictions to a direct comparison previously mentioned apply given the

differences in sample and model, but the results indicate the need for future research in the area. When these economic sectors were analyzed with the model including the interaction country *x* industry, a surprisingly strong explanatory power due to this interaction could be seen. In Transportation the interaction accounted for 45.0% of total variance becoming the dominant effect since firm effects dropped to 23.6%.Similar, however less marked, impacts could be seen in Wholesale and Retail and Insurance, Finance and Real Estate. Performance in these economic sectors seems to be strongly linked to factors associated to country and industry, leaving less variance explainable by firm idiosyncratic factors than what happens in other economic sectors.

Finally, in the services sector, country effects did not show up in neither the simple nor the interaction models.

Conclusions

This research investigated the existence and the magnitude of a new class of factor in explaining firms' performance using variance components analysis. Its main finding is that location does have a saying in explaining part of the observed variance of performance among firms in different economic and industry sectors, throughout the world. Country does matter when it comes to explaining the dispersion of performance. Although this has been indicated as an important factor in the economic literature (Krugman, 1994), explored in several case studies in the strategy literature (Porter, 1998, p. 197-287), linked to competition at theoretical level (Kogut, 1991; Porter, 1998, p. 309-346), this is the first broad statistical assessment of this influence covering 12,592 different firms in 78 different countries.

The statistical nature and the large sample base of this research also allow an assessment of the answer to the second natural question: *how much* does country matter? A broad answer is

that country effects are not the main factor in explaining performance variance. Factors associated with the individual firm are still the most important source of explanation of performance dispersion. Country effects compete in the second rank of factors like industry membership. The variance composition varies by different economic sectors. Economic sectors were defined as broad groups of industries (four-digit SIC codes) with some sort of similarity like Mining, Agriculture, Manufacturing, and Retail. McGahan and Porter (1997) also highlighted the fact that the variance composition is significantly different among the different economic sectors. Country seems to matter most in economic sectors where production factors are logically more closely associated with geography like Agriculture, Mining and Construction. In Agriculture, country effects were able to explain 20.8% of total observed variance. In Construction, country effects were the most important identifiable factor with 16.9% of total variance surpassing firm effects. In Mining, country effects accounted for 8.2% of total variance while industry and firm effects were at 15.6% and 14.0% respectively. In Manufacturing, by far the largest economic sector considered, encompassing 223 industries, and where most of previous studies were made, country effects accounted for only 2.0% of total performance variance. Manufacturing seems to be dominated by firm effects that were able to explain 37.2% of total variance while industry accounted for 3.2% and year effects for 1.2% of total variance. In economic sectors where the activity is more closely related to service and intangibles (like Transportation, Wholesale and Retail, Finance and Services) country seems to matter less. Only in Wholesale and Retail, country accounted for 5.0% of total variance and in Finance for 2.9%, in the other economic sectors no effect related to country could be identified.

The interaction of country *x* industry was also explored using and expanded model that included this interaction as a separate effect. The interaction country *x* industry accounts for variations specific to certain countries and industries. If the particular conditions of a certain country affect (positively or negatively) only certain specific industries, this interaction factor captures this variation. This has certainly a relation to the concept of cluster. If firms belonging to the shoe industry, in Italy, perform better than shoe firms in other regions of the

world, this variation in performance would be assigned to this interaction factor. Two aspects must be kept in mind when interpreting the results of this interaction and relating them to the cluster concept. The first relates to the extension of the phenomena. Finding a large percentage of variance assigned to the interaction means that the country combines with industry to give a unique effect extensively, it occurs, in this case, very frequently in the sample of 78 countries and 448 industries. If the interaction phenomenon occurs in just some specific cases, even if it may be very important when it happens, only a small percentage of variance will be explained through the factor. The second aspect relates to the definition of cluster. A cluster is not the interaction of industry and country. Not all firms of the same industry in a certain country need to be members of the cluster. The cluster can also cross borders and include firms of neighboring countries. In addition, the cluster concept includes several related industries. The interaction country and industry captures, thus, only part of the cluster concept. Any percentage of total variance attributable to it should be regarded as highly indicative of a type of "cluster effect".

In manufacturing, where the country effect itself was found to be small, the interaction country x industry could not de detected by the model. In Agriculture, Mining and Construction the interaction was clearly noticeable ranging from 4.5% in Agriculture to 11.7% in Construction. If total country influence is considered, summing the percentages of country itself and country-industry interaction, quite significant proportions of total variance were found. In Agriculture, it reached 22.2%, close to firm effects with 26.3%. In Mining and Construction, it became the most important influence, explaining 15.0% and 25.2% of total variance respectively. This gives even more support to the statement that country does matter.

In Transportation, Retail and Finance economic sectors, where the simple model could initially detect a small or non-existent country effect, a surprising result was found. The model with interaction unveiled a significant interaction effect that was able to explain a significant proportion of the total variance left undisclosed by the simpler model. In Transportation, the interaction was able to explain 45.0% of total variance while firm effects

were left with 23.6%. The total explained variance, that was 49.2% with the simple model, jumped to 74.8% when the interaction effect was included. In Retail and Finance the interaction country *x* industry also showed up as relevant with 12.2% and 19.0% respectively.

Besides the identification and preliminary quantification of the country effect and its interaction with industry, this research also offered the opportunity to observe the performance variance composition outside the US in an extensive way since 78 countries were included. In general terms, the findings support the view that the variance of performance on a global basis is not radically different from what was found with US data. Firm effects dominate the explanation of performance variance. It was not possible to confirm, however, the strong industry influence in economic sectors outside Manufacturing as was found by McGahan and Porter (1997). Given the differences in sample and method, this highlights the need of extensive further research in the area to reconcile and generalize the findings.

This paper has also limitations. The sample cannot be taken as probabilistic sample of all firms in the world and thus external validity is limited. It is, however, such a large sample, that the results are useful even if restricted to it, since it included the most relevant companies in each country. The concept of country has also its limitations. In the database, country was taken as the country where the results are reported. Thus if a global company decided to consolidate its results and report them in the country o origin, this will be the country considered in the study. The large number of companies of 12,592 minimizes this problem, but it must be acknowledged and can be explored in further studies. Industry definition also suffers from a similar fate. Despite any shortcomings of the SIC system in itself, a diversified firm operating in several businesses was assigned to the most typical one. Further analysis comparing the data for the US where both forms of classification are available can also be explored. The dynamic aspect of variance composition is another possibility of extension of the study. This paper analyzed the period 1998-2001 since the interest was to assess the present situation, but different timeframes can be investigated. The choice of Return of Assets

as an indicator of performance has well-known limitations and other dimensions and measurements can be investigated. Despite the fact that some clear and relevant conclusions were drawn and can be of use in guiding and giving relevance to different streams of strategy research, there is clear opportunity for further study in the area.

Directions for Future Research

This paper focused on showing that besides industry and firm specific elements, country appears as a relevant source of performance variance among firms. This leads to a set of problems that are not usually at stage in the business strategy field. These problems include understanding how and why some countries constitute a more favorable business environment than others do, allowing the firms to perform consistently better. Preliminary answers to these questions can be found in the new institutional economics (North, 1992) and in the development economics (Meier and Stiglitz, 2001). The new institutional economics develops a vision of economic relationships that partly breaks with neo-classical economics assumptions. It agrees with neo-classical theorists in the fundamental issue that economics is essentially built around the rational allocation of scarce resources among alternative ends. However, it takes a divergent approach regarding rationality and the role of institutions. The new institutional economics builds on the bounded rationality concept (Simon, 1945) to postulate that because rationality is limited, and decision makers are imperfect institutions, ideas and ideology matter. New institutional economists argue that institutions impose constraints on human interaction to structure economic behavior. Economic institutions are in that perspective the "rules of the game" of a society, or, in other words, the mechanisms (formal and informal) that structure social life. The ways institutions evolve, in each country, are likely to affect firm's performance in a direct way and the understanding of how these institutions are created and evolve is paramount to understand the differences between countries. On the other hand, some recent developments in Development Economics can

provide other important insights on how to deal with strategy making in different countries. The first generation of economists that targeted development economic processes created models of high mathematical complexity, aiming at structural transformations in the economy, starting from the involvement of the government as planning agent and as catalyst of a change process encompassing economic, social and institutional aspects. These early models focused the growth of actual the per capita income, taking into account that the population was growing and that in many of these countries inflationary phenomena were also persistent. The logical consequence of these models was that the capital accumulation was the first priority (Solow, 2000) and that the state was the key agent in the development process. However, a second generation of development economists focused on a new idea, that economic development depends essentially on individual productive agents that through their abilities, values and resources actively adapt to the local conditions to increase their personal wealth and the general productivity of the economic system (Sen, 1997). This perspective opens new possibilities of dialogue between economics and the strategic management, from a different perspective, investigating how human capital, resources competencies, entrepreneurship, institutions, development and prosperity are linked in a pluralistic national setting.

In a world where the differences between rich and poor are becoming increasingly wider, such a pluralistic approach must be a priority in the research agenda for strategic management in the coming years.

References

Brush, T. H.; Bromiley, P. and Hendrickx, M. (1999). 'The relative influence of industry and corporation on business segment performance: an alternative estimate', *Strategic Management Journal*, **20**, pp. 519 – 547.

Carroll, G.R. (1993). 'A sociological view on why firms differ', *Strategic Management Journal,* **14**, pp. 237 – 249.

Chakravarthy, B. S. (1986). 'Measuring strategic performance', *Strategic Management Journal*, **7**, pp. 437-458.

Chang, S. and Singh, H. (2000). 'Corporate and industry effects on business unit competitive position', *Strategic Management Journal*, **21**, pp.739 – 752.

Donaldson, T. and Preston, L. E. (1995). 'The stakeholder theory of the corporation: concepts, evidence, and implications', *Academy of Management Review,* **20** (1), pp. 65-91.

Hansen, G. S.and Wernerfelt, B. (1989). 'Determinants of firm performance: The relative importance of economic and organizational factors', *Strategic Management Journal*, **10**, pp. 399 – 411.

Hawawini, G.; Subramanian, V. and Verdin, P. (2003). 'Is performance driven by industry - or firm-specific factors? A new look at the evidence', *Strategic Management Journal*, **24**, pp. 1-16.

Kaplan, R. S.and Norton, D. P. (1996). *The balanced scorecard:* translating strategy into action. Harvard Business School Press, Boston.

Kogut, B. (1991). 'Country capabilities and the permeability of borders', *Strategic Management Journal,* **12**, pp. 33-47.

Krugman, P. (1994). 'Location and competition: notes on economic geography'. In: Rumelt, R.; Schendel, D. E. and Teece, D. J. (1994). *Fundamental issues in strategy* – a research agenda. Harvard Business School Press.

Jensen, M. C. (2001). 'Value maximization, stakeholder theory, and the corporate objective function', *European Financial Management,* **7**(3), pp. 297-317.

March, J.G.and Sutton, R.I. (1997). 'Organizational performance as a dependent variable', *Organization Science,* **8**(6), pp. 698 – 706.

Mauri, A. J.and Michaels, M. P. (1998). 'Firm and industry effects within strategic management: An empirical examination', *Strategic Management Journal*, **19**, pp. 211 – 219.

McGahan, A. M. (1999). 'The performance of US corporations: 1981 – 1994', *The Journal of Industrial Economics,* **XLVII**(4), pp. 373 – 398.

McGahan, A. M. and Porter, M. E. (1997). 'How much does industry matter, really?', *Strategic Management Journal*, **18**, Summer Special Issue, pp. 15-30.

McGahan, A. M. and Porter, M. E. (1999). 'The persistence of shocks to profitability', *The Review of Economics and Statistics*, **81**(1), pp. 143 – 153.

McGahan, A. M. and Porter, M. E. (2002). 'What do we know about variance in accounting

profitability?', *Management Science*, **48**, pp. 834-851.

McNamara, G.; Vaaler, P. M. and Devers, C. (2003). 'Same as it ever was: the search for evidence of increasing hypercompetition', *Strategic Management Journal,* **24**, pp. 261-278.

Meier, G.and Stiglitz, J. (2001). *Frontiers of Development Economics – The Future in Perspective*. Oxford University Press-World Bank, Oxford.

Montgomery, C. A. and Porter, M. E. (1991). *Strategy: seeking and securing competitive advantage*. Harvard Business School Publishing, Boston.

Nelson, R.R. (1991). 'Why do firms differ, and how does it matter?', *Strategic Management Journal,* **12**, pp. 61 – 74.

North, D. C. (1992). 'Institutions and Economic Theory', *The American Economist* **36**(1), pp.3-6.

Porter, M. (2000). 'Location, competition, and economic development: local cluster in a global economy', *Economic Development Quarterly,* **14**(1), pp. 15-34.

Porter, M. (1998). *On competition.* Harvard Business School Publishing, Boston.

Porter, M. (1990). *The competitive advantage of nations.* The Free Press, New York.

Porter, M. 'The role of location on competition', *Journal of the Economics of Business,*.**1**(1), pp. 35-39.

Powell, T. C. (1996). 'How much does industry matter? An alternative empirical test', *Strategic Management Journal*, **17**, pp. 323 – 334.

Ricardo, D. (1817). *Principles of Political Economy and Taxation*. Prometheus Books, Amherst NY, printed in 1996.

Roquebert, J. A., Phillips, R. L., and Westfall, P. A. (1996). 'Markets vs. management: what drives profitability?', *Strategic Management Journal*, **17**, pp. 653-664.

Rumelt, R. P. (1991). 'How much does industry matter?', *Strategic Management Journal*, **12**, pp. 167-185.

Schmalensee, R. (1985). 'Do markets differ much?', *The American Economic Review*, **75**(3), pp. 341-351.

Searle, S.R., Casella, G. and McCulloch, C.E. (1992). *Variance components.* John Wiley and Sons Inc, New York.

Sen, A. K. (1997). *Resources, Values and Development*. Harvard University Press, Cambridge MA.

Simon, H. (1945). *Administrative Behavior*. Free Press, New York.

Smith, A. (1776). *The Wealth of Nations*. Penguin Books, London, reprinted in 2000.

Solow, R. M. (2000). *Growth Theory - An Exposition*. Oxford University Press, Oxford.

Spanos, A. (1999). *Probability theory and statistical inference: econometric modeling with observational data.* Cambridge University Press, Cambridge.

Wernerfelt, B. and Montgomery, C.A. (1988). 'Tobin´s q and the importance of focus in firm performance', *The American Economic Review*, **78**, pp. 246 – 250.

Table 1 - Comparative summary of previous studies on variance composition of performance (manufacturing firms)

	Schmalensee	Rumelt	Roquebert et al.	McGahan and Porter, using Rumelt model	McGahan and Porter
Year	n.a.	0%	0.5%	0.40%	2.34%
Industrial sector x year	n.a.	7.84%	2.3%	4.44%	n.a.
Industrial sector, fixed	n.a.	8.32%	10.2%	7.20%	10.81%
Industrial sector, total	19.59%	16.16%	12.5%	11.64%	10.81%
Corporation	n.a.	0.80%	17.9%	2.05%	n.a.
Corporation - industry covariance	-0.62%	0%	n.a.	-1.42%	-2.27%
Market share	0.62%	n.a.	n.a.	n.a.	n.a.
Business unit/segment	n.a.	46.37%	37.1%	33.79%	35.45%
Model	19.59%	63.33%	68.0%	46.46%	46.33%
Unexplained variance, error	80.41%	36.67%	32.0%	53.54%	53.67%

Source: McGahan and Porter, 1997; Roquebert, Phillips and Westfall, 1996; Rumelt, 1991; Schmalensee, 1985.
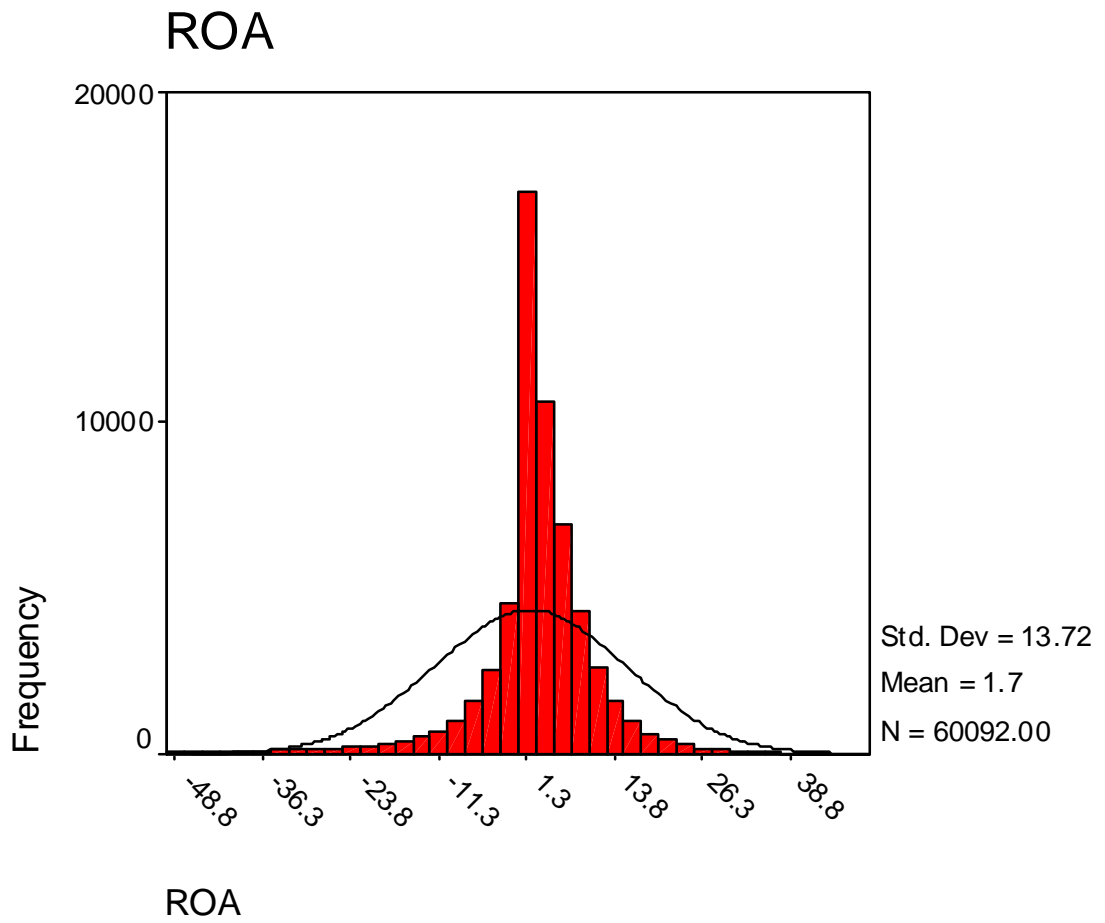
Figure 1

Table 2 - Descriptive analysis of the sample by economic sector

Economic Sector	Obser-vations	Firms	Coun-tries	Industry sectors	Mean	Vari-ance	Skew-ness	Kur-tosis
Agriculture, Forestry and Fishing	400	88	24	5	1.66	83.96	-2.07	8.26
Mining	1594	351	47	11	2.01	237.37	-2.57	15.25
Construction	2446	516	39	8	0.92	84.22	-2.56	102.17
Manufacturing	27928	5940	61	223	2.05	173.11	-9.157	263.98
Transportation	5368	1141	56	37	1.59	180.26	-10.14	203.63
Wholesale and Retail	7493	1573	47	63	2.48	91.08	-3.27	30.65
Insurance, Finance and Real Estate	8128	1816	62	40	1.99	85.95	-3.53	97.89
Services	6735	1167	44	61	-0.6	509.26	-5.39	56.93
Total	60092	12592	78	448	1.71	188.18	-7.86	176.14

Source: analysis by the authors based on Compustat global database.

Table 3 - Variance composition, simple model

	Agricul-ture	Mining	Construc-tion	Manufac-turing	Trans-porta-tion	Whole-sale and Retail	Insu-rance, Finance and Real Estate	Services
Firm	27.7%	14.0%	6.5%	37.2%	49.5%	42.6%	40.4%	43.3%
Country	20.8%	8.2%	16.9%	2.0%	0.0%	5.0%	2.9%	0.0%
Industry	0.0%	15.6%	0.5%	3.2%	15.6%	0.7%	6.8%	0.8%
Year	0.6%	2.9%	0.2%	1.2%	0.4%	0.8%	0.2%	2.5%
Error	50.9%	59.4%	75.8%	56.5%	34.5%	50.8%	49.7%	53.4%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: analysis by the authors.

Table 4 - Variance composition - model with interaction country and industry

	Agricul-ture	Mining	Construc-tion	Manufac-turing	Trans-porta-tion	Whole-sale and Retail	Insu-rance, Finance and Real Estate	Services
Firm	26.3%	11.9%	2.4%	40.9%	23.6%	33.8%	28.1%	45.6%
Country	17.7%	7.5%	13.5%	2.1%	0.0%	5.5%	2.3%	0.0%
Industry	0.0%	8.2%	0.0%	1.3%	5.9%	0.0%	8.6%	1.2%
Year	0.6%	3.0%	0.2%	1.1%	0.3%	0.8%	0.2%	2.4%
Country x industry	4.5%	7.5%	11.7%	0.0%	45.0%	12.2%	19.0%	0.0%
Error	50.9%	61.9%	72.1%	54.7%	25.2%	47.7%	41.8%	50.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: analysis by the authors.