Country dispersion, risk and international performance of SMEs. A Bayesian analysis.

1. Introduction

The relationship between internationalisation and performance has been at the centre of international business research since Hymer (1976) in 1960 identified the existence of a "liability of foreignness" for firms expanding in international markets. Following Hymer's pioneering work a large number of studies have been devoted to the analysis of the impact of internationalisation on performance. The main research question addressed by these studies can be summed up in such a simple sentence as: "is international expansion good for firms?". However, even if the question looks simple the answer demonstrates to be very complex. Most of the empirical studies that address the question find a positive relationship but the form of the relationship is so differentiated, ranging from simple linear positive relationship to different kind of U-shaped relationships, that it can be reasonably argued that a definite answer to the question has not been reached yet. This question seems even more complex when small and medium-sized (SMEs) firms are involved. As Beamish and Lu (2001) pointed out the question of the impact of internationalization on performance is still relatively unexplored with regards to SMEs. The hurdles to internationalisation which generate the "liability of foreignness" are more difficult to be overcome by SMEs which are typically characterised by a scarcity of both managerial and financial resources and therefore incur in higher fixed cost when following an international path of expansion. This lack of resources explains why for SMEs time seems a crucial variables in explaining the internationalisation path. Most of the studies on SMEs (Majocchi *et al.*, 2005) have highlighted the role that experience play for SMEs in gaining knowledge about international operation and international market and thus leading to better performance. However, most of these studies have treated internationalisation as a unidimensional concept while, as Ietto-Gilles (1998) clearly demonstrates, internationalisation is a complex multi-faced concept. Firms can follow an international expansion through very different means ranging from simple export activities in similar countries to foreign direct investments in far

and distant countries. Consequently, on one side, internationalisation can be measured with simple differentiated indexes, such as export intensity or the number of subsidiaries, or with much complex measures that consider all the range of possible means of internationalisation. On the other side, as Goerzen and Beamish (2003) have rightly pointed out the concept of internationalisation cannot be limited to a simple measure but should also consider the kind of internationalisation and the characteristics of the countries involved and the degree of country diversity. The 'stage theory' developed by the Uppsala school (Johanson and Vahlne, 1977), a theory widely applied to the world of SMEs, states that a firm initially seeks only familiar markets. The hypothesis behind this approach is that firms have to gather information on new markets and that not all the markets are similar. This idea that markets differs is surprisingly unexplored in the IB arena so that Makino *et al*. (2004, p. 1030) have observed that "*most .. …of the studies… …implicitly assumes that the variation in business unit performance within and between industries is constant across countries*".

In this paper we try to develop and expand the idea of internationalisation as a multidimensional concept including some countries variables in the analysis of the impact of internationalisation on firm's performance. More specifically, we focus our analysis on the effects of international dispersion on economic performance. This analysis has been already developed with regards to large firms but, according to our knowledge, our analysis is innovative in the sense that for the first time these concepts have been applied to a sample of small and medium-sized (SMEs) firms. This analysis is now quite relevant since, as recent reviews clearly show (Unctad, 2001), the share and the number of SMEs expanding internationally their activities is rapidly increasing. In order to test on the impact of asset dispersion on economic performance we rely on the accounting data of a panel of 403 Italian small and medium-sized manufacturing firms covering a period of 5 years (2000-2004). Using Bayesian regression technique we test the effects of internationalisation not only through space but also through time. In this sense our methodology improves previous researches by two points of view. First, using a panel data technique we control for possible effects through time. Secondly, as asserted by Hansen, Perry and Reese (2004) in their

study about the relationship between administrative decisions and economic performance over time, the application of Bayesian techniques have the advantage of accounting for individual firm differences. The authors proposed a Bayesian Hierarchical methodology, where the firm effect on economic performance can be isolated and indicates if the focal firm possesses some competitive advantage that will allow it to achieve economic performance greater than what would be predicted by the actions taken by that firm. As Hansen et al. pointed out, the Bayesian methodology allows making meaningful probability statements about specific, individual firms and the effect of covariates on the dependent variable. The advantages of Bayesian models are also underlined by Hahn and Doh (2006), showing that these methodologies are highly relevant not only for strategic problems, but also to its extensions in the areas of dynamic capabilities and co-evolution of industries and firms. The advantages of Bayesian methods include the full estimation of the distribution of individual effect terms, a straightforward estimation of predictive results even in complex models and exact distributional results under skew and small samples.

The paper is organised in the following way. In the next paragraph we develop the conceptual framework behind our analysis, then we review the literature and develop the hypotheses that have been tested in the empirical part describing our data and the methodology we used. Finally, we present our results and discuss the main findings. In the conclusion we highlight some of the limits of our analysis and we identify some possible developments of the research.

2. Conceptual framework

The process of international expansion by firms has always been associated with the presence of unique resources that allow the international firms to overcome the difficulties of the internationalisation process and the tough competition that firms face in foreign markets. International firms should possess internal advantages in order to overcome the costs araising from the lack of knowledge concerning the local context. However, as Hymer itself states clearly

(Hymer, 1976 , pg. 34) this disadvantage is mainly initial and, once firms have located in a foreign market, they progressively fill this knowledge gap. In this perspective it can be said that there is, as often happens in economic matter, a trade off through time. As the cost of operating in a foreign context decrease the firm's ability to pick up local knowledge, if any, should increase. This view of the internationalisation process has been at the heart of most of the transaction cost studies which posit the existence of a firms ownership advantages able to offset the location based disadvantages (Makino and Delios, 1996). It is the presence of firm-specific advantages that explain the existence international firms (Buckley and Casson 1976, Caves 1982). As Rugman and Verbecke (2001, pg. 239) states: "*In this context, the dominating FDI pattern was one whereby key nonlocation-bound firms' specific advantages (FSAs) needed to be transferred from the home country centre to host country subsidiaries, and where subsidiary roles were determined by the parent company.* " However, (Peng, 2001) it has only been thanks to the contribution of the resource-based view (RBV) that a deep analysis of these resources have been developed in order to identify the sources of these unique capabilities that explain internationalisation. The RBV (Barney, 1991) predicts that is through the control of specific resources that are that are valuable, rare, imperfectly imitable, and not substitutable that firms develop superior performance. A large number of studies which used a RBV approach in the field of international business focus on the analysis of the kind of internal resource, mainly intangible, that lead firms to international expansion through FDI or through agreements and eventually to superior economic performance. However, even if the founders of the view mainly focus on internal resources the concept of control has been widen. Dunning (2003), in his review the theories of the determinants of international business activities, concludes that all these theories are mainly assets-based and that these assets, besides managerial ability, are mainly of two kind. Those assets internal and peculiar to the international firms but also those assets that are external to the firms and that are accessed by firms and located potentially all over the word. This firm's capacity to leverage on external sources, the so called relational knowledge, has been extensively explored by IB scholars (Holm, Eriksson and Johanson, 1996) in recent time. Here a

decisive contribution has been supplied by the network theory that have shown that firms tend to develop specialized knowledge, i.e. competencies, actively managing it both within and across a firm's boundaries. As Gulati, Nohria and Zaaheer (2000, pg. 203) state: "*the image of atomistic actors competing for profits against each other in an impersonal marketplace is increasingly inadequate in a world in which firms are embedded in networks of social, professional, and exchange relationships with other organizational actors*". But if the competitive advantage of firms is the result of the managerial ability to combine internal and external knowledge then the question of the location choice of MNC raise at the forefront. The booming literature on the new, more decentralise configuration of MNCs (Bartlett and Ghoshal, 1989; Harzing, 2000) and the consequent literature on the new role of subsidiaries (Frost, Birkinshaw and Ensign; 2002) had the merit to stress the important role of location for MNCs strategies. Bartlett (1986) supports the idea that subsidiaries should be differentiated along two different lines: the competences that reside in the subsidiary and the strategic importance of the local environment. Gupta and Govindarajan (1991, 2000) follow a similar approach by classifying subsidiaries not according to resources but to the flow of knowledge attracted and dispersed by the units. These authors emphasize that the role of the subsidiary is defined by the linkages with important external entities (Andresson, Forsgren and Holm 2002**)**. In this perspective the well-know Dunning (1988) statement that location is a neglected aspect of international business is increasingly losing ground. The location decision of MNCs and the effects that these decisions brought about in term of profitability have been extensively surveyed in recent literature.

In the light of these research developments different scholars analyse in a new perspectives the determinants of MNCs profitability. Different authors have tested, not only the effects of internationalisation *per se* i.e. the traditional stream of research, but also the effect that different localisation choices and that country characteristics have on the overall firms performance. Under the influence of the new institutional economics the role of institutional factors such as the level of

political risk, of corruption, the investment climate has been tested to measure if these factors affect profitability.

In the present paper we adopted this RBV approach assuming that the economic performance of international firms is the result of the management of internal and external resources and that the characteristics, mainly in terms of risk, of the location chosen by firms effects overall performance.

Most of the studies have limited their analysis of the country effects on foreign affiliate performance. In our analysis we suggest that the total performance of a firms is the results of the total portfolio of resources that it directly control and of the resources it indirectly control that are in the surrounding environment. The choice of the location of the different firms' activities is therefore a crucial one. Our study explore performance benefits associated with different levels of internationalization, and explicitly control the influence of extraneous factors such as size, intangible intensity, industrial sector, and so on.

3. Hypothesis development

The relationship between internationalisation and economic performance has been intensively explored in the international business literature (for a review see Contractor, Kundu and Hdu, 2003. Delios and Beamish (1999) affirm the results of investigations into the relationship between geographic scope and performance has been quite conclusive with most of the studies finding a positive, although not necessarily linear, relationship.

Some studies (Tallman and Li, 1996, Siddharthan and Lall, 1982) posit that in the early stage of internationalisation firms resources and capabilities are absorbed by the needs to address the new markets so that the overall effects of internationalisation is - in the short run - negative. Grant (1987) underlines how this decrease in performance can be attributed to managers' difficulty in coping with the greater complexity that internationalisation bring in. As the firms enter in new markets these firms have to face not only new economic, legal, political and cultural environments

but also have to cope with previously unknown and more complex managerial problems such as hedging currencies risk or planning international logistic expansion.

The results is (Lu and Beamish, 2000 and 2004; Contractor *et al* 2003) that for low level of internationalisation the total effects on profitability is negative and it is only when geographic diversification reach a certain level that the positive effects of internationalisation emerge. The resulting curve is an S-shape line with a negative slope for low levels of internationalisation and a positive slope for higher level. With regards to SMEs the concept has been less investigated and some authors pointed out that, for minor firms, the concept of *liability of foreignness* seems particularly well suited because for SMEs the process of market discovery at the international level is a lengthy and costly process. In the early stage of internationalisation learning costs are high because of the need to explore foreign markets, cultures and habits. However, as some studies have demonstrated (Bonaccorsi, 1992), the means through which SMEs acquire this knowledge are very differentiated. Many small firms rely on such means as networks or export or alliances in order to get the needed knowledge on foreign market. In this sense, the recent phenomenon of *born globals* (McDougall, *et al*. 1994) firms seems to confirm that even in the domain of small firms the hurdles of the foreign market knowledge can be rapidly overcome through different means. Majocchi and Zucchella (2003), for example, show that export activities are often used by SMEs to gain market knowledge that is then used to enter in foreign markets with direct investments without incurring in the liability of foreignness. Along similar lines, Beamish and Lu (2001) and Gomes Casseres (1997) show that alliances with local partners are often used by SMEs to increase market knowledge and improve the performance of the firm through the internationalisation process. Kohn (1997) in his research in US international SMEs find that manufacturing firms tend to focus on very narrow market segments where they are market technological and leader. Focusing on very small niche markets, mainly in the producer goods sector, SMEs tend have a deep knowledge of the market and to overcome the knowledge and managerial barriers that often hurdle the small firms international expansion. All this findings support the idea that SMEs have different means to overcome the

negative effects of the first steps in the internationalisation process. Given the well known paucity of resources SMEs do not ventures in foreign direct investments unless their have explored different roads to lower the cost of internationalisation. We therefore posit that, once small and medium firms arrive to set up foreign subsidiaries, the process of foreign market knowledge acquisition is already well on the way. Qian (2002) sustains that for SMEs the interantionalisation process bring both advantages and constraints. However, he finds that the overall effect of internationalisation on performance is mainly positive because the benefit of internationalisation more then offset the costs. Moreover, because the cost of internationalisation is mainly a fixed cost, their effects are decreasing as internationalisation increase. This leads to the following hypothesis:

H1: The relationship between international geographical dispersion and the overall firms performance is nonlinear but positive. Performance should moderately increases with internationalisation for low level of internationalisation but, as internationalisation increase, also the slope of the curve increase.

Once firms have developed their international expansion many different factors impact on the overall firm's performance. Some of these factors are strictly related to the internationalisation process. In our analysis we try to identify which of these internationalisation factors impact on the overall firm performance the most. Many scholars have highlighted the role of cultural distance. However, most of the studies have been focusing on the effects of cultural distance on entry mode (Kogut and Singh, 1988; Barkema, et al. 1997). Brouthers and Brouthers, (2001 pg. 178) suggest that "*Greater cultural differences commonly lead to higher organizational and administrative cost perceptions as well as additional costs associated with managing more diverse employee expectation*". Their conclusion is that larger cultural distance leads to less intensive form of investments. However, once the mode of entry has been chosen the effects of cultural distance still produce its effects. Because in the process of internationalisation SMEs lack the financial and managerial resources to rapidly acquire the specialised knowledge on foreign market, the problem

of the physic distance between the home market and the foreign market seems a crucial one. According to the much cited Uppsala model firms tend to expand in familiar market and – only after a deep knowledge of these markets has been developed – they move to more distance environments. Several scholars argue that the experience of a firm in distant markets affects its international position, with some authors concentrating only on international experience (Erramilli, 1991; Barkema, Bell and Pennings, 1996) and others on business experience (Leonidou, 2000; Balabanis and Katsikea, 2003).

According to this view, the larger the cultural distance between the countries where the firms' subsidiaries have been placed and the home country, the more difficult and time-consuming will be for firms to get the necessary knowledge. For example, Vermeulen and Barkema (2001) found that when an MNE has invested in very dissimilar countries, it has to face increasing problems in the managing of different sources of information and consequently that lead to higher costs. This is even more true for SMEs which do not benefit from the high economies of scale generated by large firms. In these sense cultural distance will have mitigating effects on the overall firms' performance. We therefore posit the following hypothesis:

H2: The larger the average cultural distance for the overall international network of subsidiaries the lower the overall firm performance

Cultural distance is only one of the possible features of the much wider phenomenon of the degree of diversity in the country environments. Also political and economic diversity should be considered as firms have to accommodate their strategies also to political and economic factors that differ from country to country. Part of the total risk of MNCs consists of political risks arising from operations in foreign countries. Henisz, (2000) recently compute a Political Constraint Index that has already been effectively used in other empirical works (Goerzen and Beamish, 2003) in order to gauge the differences in political systems. The index aims at measuring the role of checks and balances on policy-makers' discretion in the political system. Where policy makers discretion is

high the political risk of the investment is higher. Our hypothesis is that even such factors impact on firm performance and that firms and small firms in particular will invest only in riskier countries if the pay-off of the investment is worth the risk. Consequently, the higher the political risk that SMEs have to face the higher is the economic results it will get. Therefore, we posit the following hypothesis:

H3: The larger the average political hazard (as measured by a low level of the index of political constraints) the higher the overall firm performance

Similarly, we try to measure the impact of the overall country financial rating on SMEs economic performance. Here, the empirical evidence and theory of finance seem in some way to clash since the relationship between risk and return do not hold to empirical investigation. Click (2005) founds that the overall country risk position, as measured by the country rating, influence positively the firm economic performance both in the short and in the long run. The explanation of this seemingly confusing results can be found in the strong correlation between country rating and the country economic performance. When the economic shape of the country is good this effects both the country rating, that generally increases, and the economic performance of the firms located there. Following this study we posit the following hypothesis.

Hypothesis 4: Firms characterized by subsidiaries located in countries where the rating is higher are characterized by a better economic performance.

3. Methodology

3.1 Data collection

The data we employed for the analysis were collected from different sources. The primary source is the database AIDA (Bureau Van Dijk), which contains firms' financial and commercial data for enterprises characterized by a turnover of at least one million of euros and operating in Italy. We also collected data from other databases to estimate the diversity in the country environment of

firms' subsidiaries. In particular, following Goerzen and Beamish (2003) we associated to for each enterprise 4 different indexes: the Political Constraint Index (Heinsz, 2000), the Global Competitiveness index, the Economic Freedom Index and the Cultural Diversity Index (Hofstede, 1980). Finally, we added the Standard & Poor's sovereign credit rating to evaluate the overall financial capacity of the considered countries. Therefore, from the different sources listed above we created a unique database of SMEs with FDI.

For the dataset cleansing we applied the following procedure. We extracted information about Italian firms with a number of employees lower than 500, and active in the manufacturing sector and with subsidiaries in at least one foreign country.

The original dataset has 1269 observations, one for each firm, and 20 variables. We chose to consider the selected enterprises for a period of five years, form 2000 to 2004, with the aim of observing their evolution over that particular time horizon.

After data collection, the following step was data preparation. This is a very important task that influences the methodology implementation and it is fundamental to obtain good results.

First of all we removed Italian subsidiaries, since we chose to focus our attention only to firms investing in foreign countries.

Then, we tried to solve the problem of missing data, affecting our database in particular for variables concerning subsidiaries' information. We then deleted "not available" values for the FDI variables, obtaining 753 observations.

Nevertheless, our dataset was still characterized by some missing data for the balance sheet variables, where blanks represented approximately the 13% of all the observations. We therefore removed all missing values, in order to obtain the same number of observations for all the considered years. Therefore, the final sample contains 403 cross-sections (firms) and 5 years time-series that make up a panel data of a total of 2015 observations. As a final step, we standardized the quantitative variables.

4. Variables description

In this paper we try to measure the impact of internationalisation on SMEs' economic performance using, as a proxy of performance, an accounting measure i.e. the return on assets (ROA). This solution has been used in a large number of studies (i.e. Ruigrok and Wagner, 2002; Hitt et al. 1997). The main criticism against accounting measures is that these kinds of measurements do not weighted return for risk, as higher economic performances could be the results of more risky businesses developed rather then the results of better management and strategies. In some studies

market-based measurements (for example the Tobin-Q or the market value of the firm) have been used. However, in our case these indexes were not available given the small size of the firms studied, and given the fact that none of the firms in the sample is quoted on the stock exchange market. Moreover, a measure of market risk (clearly only a part of the overall risk) has been explicitly considered in the model as a regressor.

Covariates can be classified into two main categories (figure 1): Internationalization Variables and Control Variables. The latter group contains firm specific features such as “firm age” and “number of employees”, balance sheet variables like “debt-to-equity ratio” and “intangible intensity” and sector variables (“NACE class”). The former group is made up by variables indicating the geographical dispersion (“number of foreign subsidiaries”), country environment diversity (Economic Freedom Index “EFI”, Political Constraint Index “PCI”, Cultural Diversity Index “CDI” and Global Competitiveness Index “GCI”) (Goerzen and Beamish, 2003) and the country risk (“rating”). The Economic Freedom Index “EFI” and the Global Competitiveness Index “GCI” have been considered in order to test for the possible effects of these variables on the overall economic performance following a similar study by Groezen and Beamish (2003). These variables, however, have not been used in order to test for specific hypothesis and were dropped from the general model for their correlation with country rating.

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The degree of internationalisation has been measured with very different variables. Many authors refer to the degree of internationalisation in terms of ratio of foreign sales, assets and employees on the total corresponding value (Ramaswamy, 1993). Others authors use variables that, according to Contractor et al. (2003, pg. 1), can be defined as a measure of the scope or ‘breadth’ of internationalization such as the number of operations across countries or the number of overseas plants (Kogut, 1985). It is clear that a comprehensive analysis of firm’s internationalisation should consider all these factors. However, given the data at hand we could only rely on a restricted measure of internationalisation i.e the number of foreign subsidiaries (*num_sub*).

The Economic Freedom Index is a measure of how difficult is for ordinary people living in a particular country to achieve their life goals. The obstacles that they have to face are represented by tax rates, tariffs, regulation and government intervention, property rights, type of capital markets and monetary stability. Countries with high levels of EFI are characterized by a better life quality (Miles, O'Grady and Holmes, 2006).

The Political Constraint Index underlines the differences between policy systems of different countries. This indicator estimates the feasibility of policy change and in particular the extent to which a change in the preferences of any one actor may lead to a change in government policy (Heinsz, 2000). Possible scores for the final measure of political constraints range from zero for the most hazardous countries to one for the most constrained.

The Cultural Diversity Index highlights the cultural differences between countries. It is described by four dimensions: the Power Distance Index (degree of equality between people in the country's society), Individualism (degree the society reinforces individual or collective achievement and interpersonal relationships), Masculinity (degree the society strengthens the traditional masculine work role model of male achievement, control, and power), Uncertainty Avoidance Index (level of tolerance for uncertainty and ambiguity within the society) (Hofstede, 1980). The Cultural Diversity Index is computed as the mean of the four dimensions' value.

Finally, the Global Competitiveness Index considers a collection of factors, policies and institutions which affects the level of productivity of a country and that, therefore, determines the level of prosperity that can be attained by an economy. This indicator takes also into account the growth rates of the economy, associating high levels of competitiveness to faster growing economies (World Economic Forum, 2006).

Indexes measuring country diversity are calculated, for each observation, as the mean of indexes' values corresponding to the countries where the firm has a subsidiary. As an example for a firm with two subsidiaries, one in France and the other in Great Britain, the variable "efi" is measured as the mean of France's EFI and Great Britain's EFI.

The country rating was computed following the same procedure used for the average indexes. Each of the different rating classes (AAA, AA, A, …) was identified by a number, associating the higher numeric value to the most reliable country (AAA). Hence, we assigned the value 1 to Argentina, which is denoted by a rating of B-, and the value 15 to the United States, characterized by a rating of AAA.

For country diversity indexes and ratings, we also computed the natural logarithm of the sum of the indexes for each observation, to take into account the differences that might exist between firms characterized by few subsidiaries and firms with many subsidiaries. Nonetheless the parameters' estimates of the model were pretty similar but less significant then the results obtained with the average indexes. We thus chose to use the average.

We then calculated the natural logarithm of both the variables "age" and "number of employees", since we are interested mostly in their relative changes than in absolute changes. For example, a one unit's change of the firm's size might be certainly more relevant for a company with only 5 employees then for a 400-employees' firm (Verwaal and Donkers, 2002).

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Table 1 contains some descriptive statistics of the sample. The dependent variable ROA for example is, on average, equal to 0.0596, ranging from a minimum of –0.8386 and a maximum of 0.4643. Between and within values for maximum and minimum show the variation of the variable between and within firm around the global mean. The total variability is described by a standard deviation of 0.0775; between-firm variability is 0.0631, while within-firm variability is 0.0451. As we can see from these results, the standard deviation is decomposed into between and within components, to underline the lower variability and the correlation within a firm during the considered time horizon. Obviously, for time-invariant variables, the within-firm standard deviation is equal to zero.

5. The panel data model

The data consists of repeated observations on the same cross section of 403 firms over five years. Due to the temporal correlation of the companies over the time horizon, the best statistical method to be applied appears to be the Panel Data Model (Wooldridge, 2002). The Panel Data Model belongs to the family of Longitudinal Models that allow understanding the diversity of behaviour and sensitivities among enterprises. This difference, expressed through the individual unobserved heterogeneity, cannot be gathered by a simple multivariate linear model, but requires more complex statistical techniques, able to measure not only the general variability of the model, but also the individual specific variability.

Therefore, the selected model is undoubtedly appropriate, but the choice between fixed and random effects could not always be straightforward. Considering the database, we extracted a sample of firms from a larger population of Italian manufacturing SMEs. It might suggest the use of random effects, since the cross-sectional units in the sample are regarded as random drawings. To confirm our conclusion, we performed the Hausman test in order to verify the suitability of the random effects model. The null hypothesis underlying the test states that fixed and random effects estimators do not differ substantially. The value of the Hausman's statistic, with five degrees of freedom, is 2.9417, with a p-value of 0.709, so that the null hypothesis has been accepted. This result confirms that the random effects model is appropriate for the data (Hausman, 1978).

The model equation is the following:

$$ROA_{it} = \alpha + \beta X + \gamma Z + \lambda_i + w_{it} \quad (1)$$

where $i = 1, \ldots, N$ ($N = 403$) and $t = 1, \ldots, T$ ($T = 5$).

The intercept α denotes the mean value of all the cross sectional intercepts and w_{it} correspond to the sum of ε_i, the firm specific error component representing the random deviation of the individual intercept from α, and u_{it}, the combined time series and cross section error component. In the random effect model ε_i is treated as a random variable normally distributed, with mean zero and variance σ^2_ε.

The matrix of control variables is denoted with X and Z is the matrix of internationalization variables, while β and γ represent the associated vectors of parameter estimates.

We also introduced a set of sectors dummies λ_i to consider the effects of industry specific factors. Sectors are identified by the 2-digit NACE classification used by the European Union[1]. Firstly we tried to build a model with the 20 dummy variables corresponding to all the considered manufacturing sectors, dropping one of them in order to avoid multicollinearity, but we obtained significant estimates only for very few variables. Moreover, we noticed that the frequency of firms belonging to some sectors (as, for example, the 20th, the 21st and the 30th) was less than one percent. Therefore, according to the Pavitt (1984) taxonomy, we decided to group the sectors into four sets: Traditional sectors (NACE classes: 15, 16, 17, 18, 19, 20, 28), Scale-intensive sectors (NACE classes: 21, 22, 23, 24, 25, 26, 27, 31, 32, 34), Specialized suppliers (NACE classes: 29, 36, 37) and Science-based sectors (NACE classes: 30, 33, 35). We then removed the dummy corresponding to the Specialized suppliers group, since the mean value of the dependent variable in those sectors was the closest to the overall ROA mean. In this way, the interpretation of coefficients is made on the basis of this group, which represents the benchmark category. A positive coefficient indicates that the economic performance of the considered sectors is greater than the average of the Specialized suppliers group.

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[1] Our dataset is formed by firms belonging to the following sectors: (15) Food products and beverages; (17) Textiles; (18) Wearing apparel; (19) Tanning and dressing of leather and footwear; (20) Wood and products of wood and cork, except furniture; (21) Pulp, paper and paper products; (22) Publishing, printing and recorded media; (24) Chemicals and chemical products; (25) Rubber and plastic products; (26) Other non-metallic mineral products; (27) Basic metals; (28) Fabricated metal products, except machinery equipment; (29) Machinery equipment; (30) Office machinery and computer; (31) Electrical machinery; (32) Radio, television and communication equipment and apparatus; (33) Medical, precision and optical instruments; (34) Motor vehicles; (35) Other transport equipment; (36) Furniture; (37) Recycling.

Table 2 contains the correlations of the covariates included in the model. The variable "efi" is characterized by a strong negative correlation with the variables "gci" and "rating" and we also noticed a high positive correlation between the global competitiveness and the country rating. For this reason we decided to build one general model and one restricted model, where we drop the correlated and non-significant covariates.

Now, as you can notice from equation (1), adopting a random effect model, we restricted heterogeneity only to the intercept, which is a subset of parameters. However, in this framework, there is no reason to believe that differences should be confined to the intercept because differences in slope coefficient are critically important. Then, a solution to this problem would be to implement the Seemingly Unrelated Regressions (SUR) Model, where both the constant terms and the slopes are allowed to vary from individual to individual. Nevertheless, in our case the number of individuals (firms) *N* is very much larger then the time horizon's length *T* and it is not possible to estimate different individual slopes for all the exogenous variables (Fahrmeir and Tutz, 1994). In this context, Bayesian models are the most appropriate choice, since they consent to obtain such estimates as point estimates of unit-level parameters, giving also information about their uncertainty (Rossi, Allenby, Mc Culloch, 2006).

6. The Bayesian Panel Data Model

The Bayesian approach we followed is based upon a Hierarchical Bayesian Panel Data Model, as applied in the literature by Hansen, Perry and Reese (2004) in order to examine the relationship between administrative decisions and economic performance over time. In their study, the performance parameter is expressed as a function of the firm, the industry in which the firm operates and the set of administrative decisions (actions) made by the firm.

As they rightly pointed out, a *prior* distribution must be specified for the entire set of parameters and the joint *posterior* distribution is then estimated through Markov Chain Monte Carlo (MCMC). Therefore, in our case the model equation becomes the following:

$$ROA_{it} = \alpha + \beta_i (X + Z) + \lambda_i + w_{it} \qquad (2)$$

where the random effects distribution of heterogeneity for β_i is

$$\beta_i \approx N(\Delta' h, V_\beta),$$

and the error term varies according to the distribution:

$$w_{it} \approx N(0, \tau_i).$$

Since we implemented a hierarchical Bayesian methodology, we specified a second level of non informative prior distributions and a set of hyperparameters (Gelman et al., 2004).
Through the assumptions listed above, we got one general model and one restricted model, in order to easily compare the results with those obtained with the classical panel data model.

7. Results and Discussion

The general results obtained with the classical methodology are reported in table 3, while those attained with the Bayesian approach are listed in table 4.
Concerning the classical model, among internationalization variables, geographical dispersion, measured by the subsidiaries' number and also by the square of the variable *num_sub*, is not significant and we decided to remove it in the restricted model. This result is somehow surprising as we expected that internationalisation has some impact on economic performance. Therefore, our hypothesis 1 is not confirmed. We think that a better and more precise measure of internationalisation could lead to more significant result. A unidimensional measure is clearly insufficient to gauge such a complex phenomenon.

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As previously reported we have also to drop the 2 variables representing the economic freedom index and the global competitiveness index for their high correlation with country rating.
Our second hypothesis posits that the larger the average cultural distance for the overall international network of subsidiaries the lower the overall firm performance. Table 3 shows that even if the sign is the expected one the coefficient is not significant. Therefore, even our second hypothesises is not confirmed.
Analysing the results, the only significant average index seems to be the Political constraint, even if we have only a weak significance, as shown by the p-value greater then 5%, but lower then 10%. This result partially confirms our third hypothesis. Political risk impacts on the overall economic performance of firms and this seems also true for SMEs.

Country risk, measured by the rating, is a particularly relevant covariate, characterized by a positive effect on economic performance, in the sense that firms with subsidiaries in the most reliable countries are associated with the highest levels of ROA. Also hypothesis 4 therefore is confirmed.

Considering control variables, the effect of firm's age on economic performance is highly significant, with a p-value of 0.01 for the general model and of 0.004 for the restricted model, and negative, meaning that the older is a company the lower is ROA. This is the most striking result as many previous works find that age increase economic performance. The point surely needs further investigation.

Intangible intensity and debt to equity variables are significant, with a p-value lower than the five percent, and they are characterized by a negative coefficient, so that the economic performance grows if intangible intensity and debt to equity diminish.

The influence of NACE classes does not have a relevant effect on the dependent variable and for firms operating in foreign countries industry sectors do not seem important to explain economic performance, even after grouping them.

The general model has been tested to verify the significance of the entire regression via the Fisher test and the results reveal that it is appropriate for the data.

The restricted model shows that the covariates "log(age)", "intangible intensity", "debt-to-equity", "pci" and "rating" are strongly relevant to explain economic performance, with a p-value smaller than ten percent. The F test confirms the validity of the restricted model.

Concerning the Bayesian methodology, we note that the signs of regression coefficients are identical to those obtained through the classical approach and even the magnitude of the considered parameter estimates look very similar in both models, confirming therefore the interpretation of our results. However, the Bayesian method performs better, since it estimates the parameters with a lower standard error, as shown in figure 2 and, more clearly, in figure 3.

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Insert figure 2 here
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Insert figure 3 here
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Regarding the general model (figure 2), in fact, standard errors are always lower then those calculated with the classical approach and equal to them only in the case of the variable denoting

the number of subsidiaries. Figure 3, instead, shows the results of the restricted model, where standard errors are always clearly lower with the Bayesian approach.

The overall conclusion of our analysis is the country really matter and that the countries' characteristics do have an impact on the firm economic performance. The stronger results of our analysis id that the political hazard is effecting the firms results and, therefore, that SMEs should carefully select – also by point of view – they market entry and eventually exit decisions.

In this sense our analysis reaches some significant results confirming that the features of the countries selected in the internationalisation process have an impact on the SMEs' overall economic performance. Given this strength of the paper also limitations should be kept in mind. Firstly, a better and more refined measurement of internationalisation should be developed in order to fully gauge the different aspects of this complex process. Secondly, given the overall results that underline the role of institutional aspects we are conscious that new and more detailed measurements of the countries institutional characteristics should be inserted in the model. Finally, we are aware that a lot of firms specific and industry specific variables such as the level of firm's international experience or proxies for the kind of international strategies followed have not been inserted thus lowering the overall significance of our analysis.

Figure 1: Variables

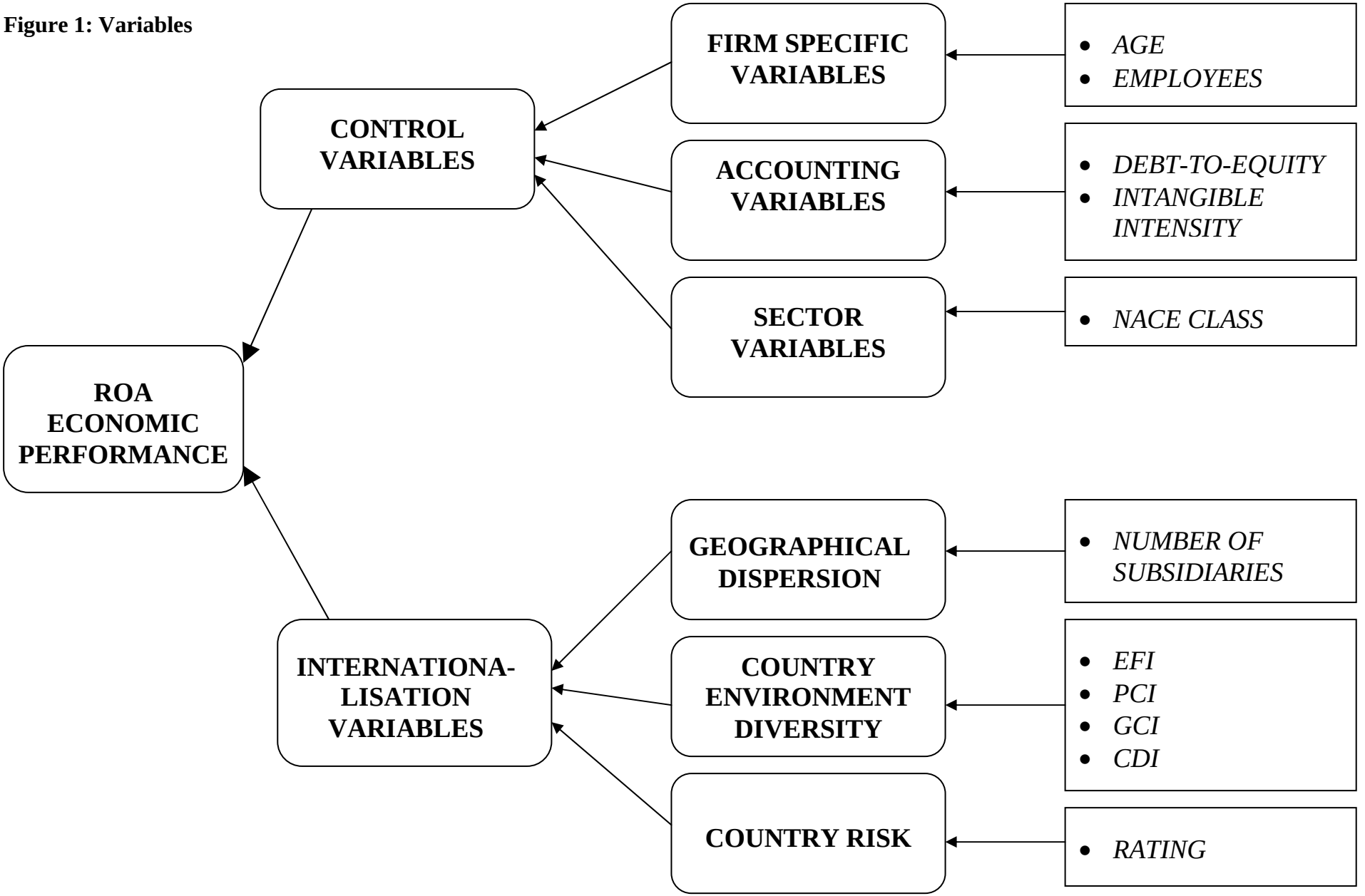


Table 1. Descriptive statistics

Variable		Mean	Std. Dev.	Min	Max
ROA	*overall*[1]	0.0596	0.0775	-0.8386	0.4643
	between[2]		0.0631	-0.2491	0.3926
	within[3]		0.0451	-0.5299	0.4767
log(age)	*overall*	3.0188	0.6376	0	4.5951
	between		0.6272	0.6356	4.5746
	within		0.1181	2.0613	3.7695
log(employees)	*overall*	4.4379	1.1069	0	6.1984
	between		1.1080	0	6.1984
	within		0	4.4379	4.4379
intangible intensity	*overall*	0.0131	0.0371	0	0.4475
	between		0.0334	0	0.3606
	within		0.0162	-0.1305	0.2872
num_sub	*overall*	1.4689	0.9691	1	9
	between		0.9701	1	9
	within		0	1.4689	1.4689
debt-to-equity	*overall*	5.3615	10.8713	-102.7881	233.5
	between		7.2650	-7.4496	95.5453
	within		8.0938	-89.9769	207.7468
efi	*overall*	2.4084	0.51314	1.5979	3.775
	between		0.5011	1.7605	3.597
	within		0.1123	1.9104	2.7854
pci	*overall*	0.4502	0.0742	0.1203	0.6907
	between		0.0632	0.1838	0.6724
	within		0.0389	0.2338	0.6868
cdi	*overall*	60.5349	5.2336	45.5	79
	between		5.2388	45.5	79
	within		0	60.5349	60.5349
gci	*overall*	4.5271	0.4113	3.46	5.21
	between		0.4117	3.46	5.21
	within		0	4.5271	4.5271
rating	*overall*	13.528	2.9979	3.5	15
	between		3.0008	3.5	15
	within		0	13.528	13.528

Table 1: Descriptive statistics
[1] Number of observations N = 2015 (dimension of the whole dataset)
[2] Number of observations n = 403 (dimension of the cross-section)
[3] Number of observations T = 5 (dimension of the time-series)

Table 2 - Variables' correlation matrix

	log(age)	log(empl)	int int	num_su	de-to-eq	efi	pci	cdi	gci	rating	trad_s	scale_s	scien_s
log(age)	1.0000												
log(employees)	0.2204	1.0000											
intang intensity	-0.1186	0.0521	1.0000										
num_sub	0.0570	0.1516	0.0238	1.0000									
debt-to-equity	-0.0592	-0.1117	0.0177	-0.0520	1.0000								
efi	0.0807	-0.0878	-0.1068	-0.0890	0.0185	1.0000							
pci	-0.0025	0.0076	0.0249	0.0072	-0.0362	0.2952	1.0000						
cdi	0.0855	-0.0475	-0.0756	-0.1244	-0.0099	0.4619	0.2075	1.0000					
gci	-0.0462	0.0636	0.0828	0.0397	0.0068	-0.7946	-0.1640	-0.3029	1.0000				
rating	-0.0695	0.0962	0.0693	0.0542	-0.0514	-0.7566	-0.1391	-0.1390	0.8233	1.0000			
trad_sect	-0.0855	-0.0261	0.0054	-0.0412	-0.0081	0.1444	0.0614	0.0676	-0.1184	-0.1282	1.0000		
scale_sect	-0.0030	0.0792	0.0183	-0.0358	0.0455	-0.0833	-0.0559	-0.0742	0.0136	0.0313	-0.5006	1.0000	
science_sect	-0.0404	-0.0187	0.0205	0.0248	-0.0469	0.0030	0.0456	-0.0122	0.0237	-0.0012	-0.1609	-0.1711	1.0000

Table 3: Classical Model's parameters estimates

CLASSICAL MODEL								
	GENERAL MODEL				RESTRICTED MODEL			
	Coef.	**Std. Error**	**z-value**	**Pr(>|z|)**	**Coef.**	**Std. Error**	**z-value**	**Pr(>|z|)**
(intercept)	0.714	0.248	2.88	0.003	0.488	0.175	2.782	0.005
log(age)	-0.148	0.058	-2.53	0.011	-0.161	0.056	-2.855	0.004
log(employees)	-0.049	0.037	-1.33	0.180				
intangible intensity	-0.055	0.026	-2.05	0.039	-0.058	0.026	-2.195	0.028
num_sub	-0.022	0.113	-0.19	0.843				
(num_sub)^2	0.004	0.017	0.26	0.789				
debt-to-equity	-0.042	0.018	-2.28	0.022	-0.041	0.018	-2.211	0.027
efi	0.0014	0.053	0.02	0.972				
pci	-0.042	0.024	-1.71	0.086	-0.044	0.023	-1.861	0.062
cdi	-0.032	0.045	-0.72	0.470				
gci	-0.106	0.076	-1.38	0.164				
rating	0.167	0.074	2.23	0.025	0.083	0.039803	2.094	0.036
trad_sect	-0.085	0.103	-0.82	0.407				
scale_sect	0.044	0.101	0.44	0.659				
science_sect	-0.302	0.191	-1.58	0.113				
Overall Statistics								
Total Sum of Squares	865.66				862.5			
Residual Sum of Squares	850.63				851.1			
Rsq	0.017364				0.013221			
F	2.52439				5.38332			
P(F>0)	0.0235031				0.0319337			

Table 4: Bayesian Model's parameters estimates

BAYESIAN MODEL								
	GENERAL MODEL				RESTRICTED MODEL			
	Coef.	**std dev**	**num se**	**rel eff**	**Coef.**	**std dev**	**num se**	**rel eff**
(intercept)	0.875	0.984	0.1758	57.4	0.543	0.203	0.0232	24
log(age)	-0.354	0.117	0.0127	21.1	-0.194	0.066	0.0073	22
log(employees)	-0.05	0.137	0.0202	39.3				
intangible intensity	-0.157	0.08	0.0069	13.3	-0.13	0.066	0.0057	14
num_sub	0.826	0.663	0.1126	51.9				
(num_sub)^2	-0.217	0.189	0.0303	46.3				
debt-to-equity	-0.311	0.079	0.0063	11.3	-0.358	0.063	0.0047	10
efi	-0.017	0.051	0.0031	6.7				
pci	-0.033	0.036	0.0019	5.2	-0.036	0.03	0.0017	6
cdi	-0.035	0.137	0.0174	28.9				
gci	-0.041	0.237	0.0351	39.3				
rating	0.047	0.279	0.044	44.7	0.061	0.066	0.006	15
trad_sect	-0.392	0.309	0.0479	43.4				
scale_sect	-0.164	0.297	0.0432	38.1				
science_sect	-0.531	0.62	0.1044	51.2				

Figure 2: General Model: parameters' standard error

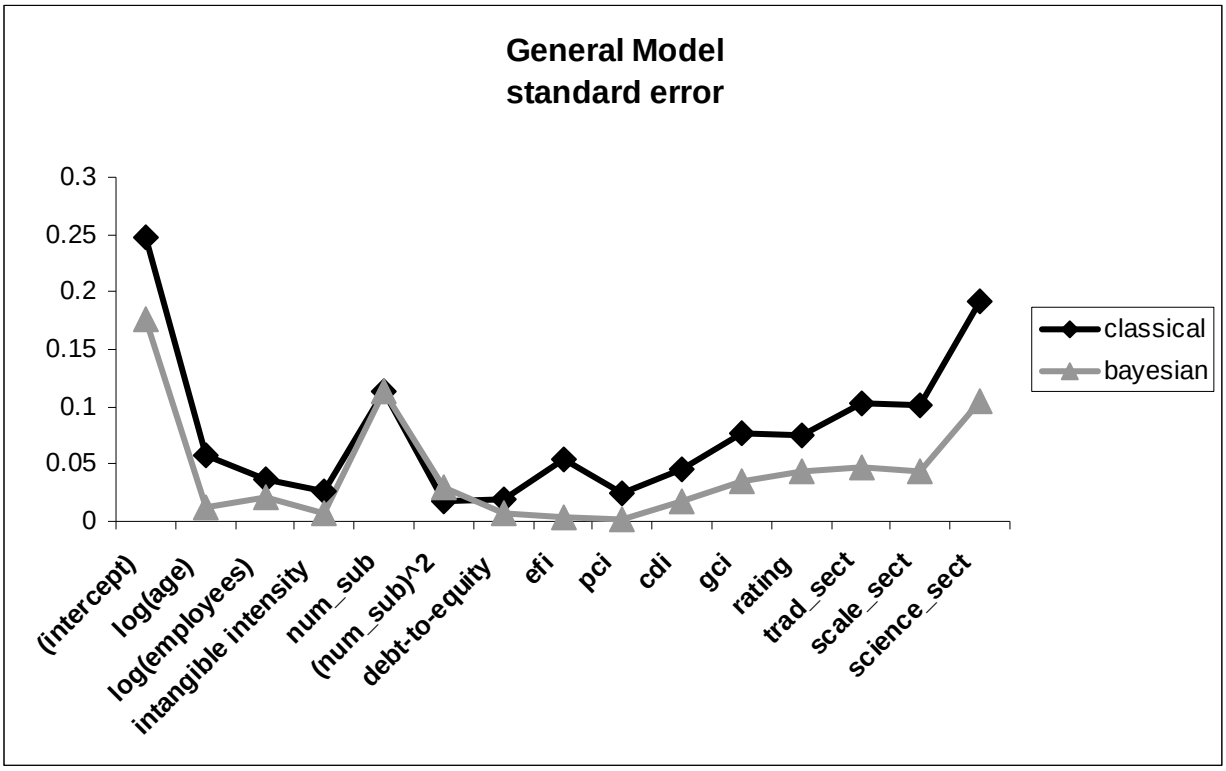
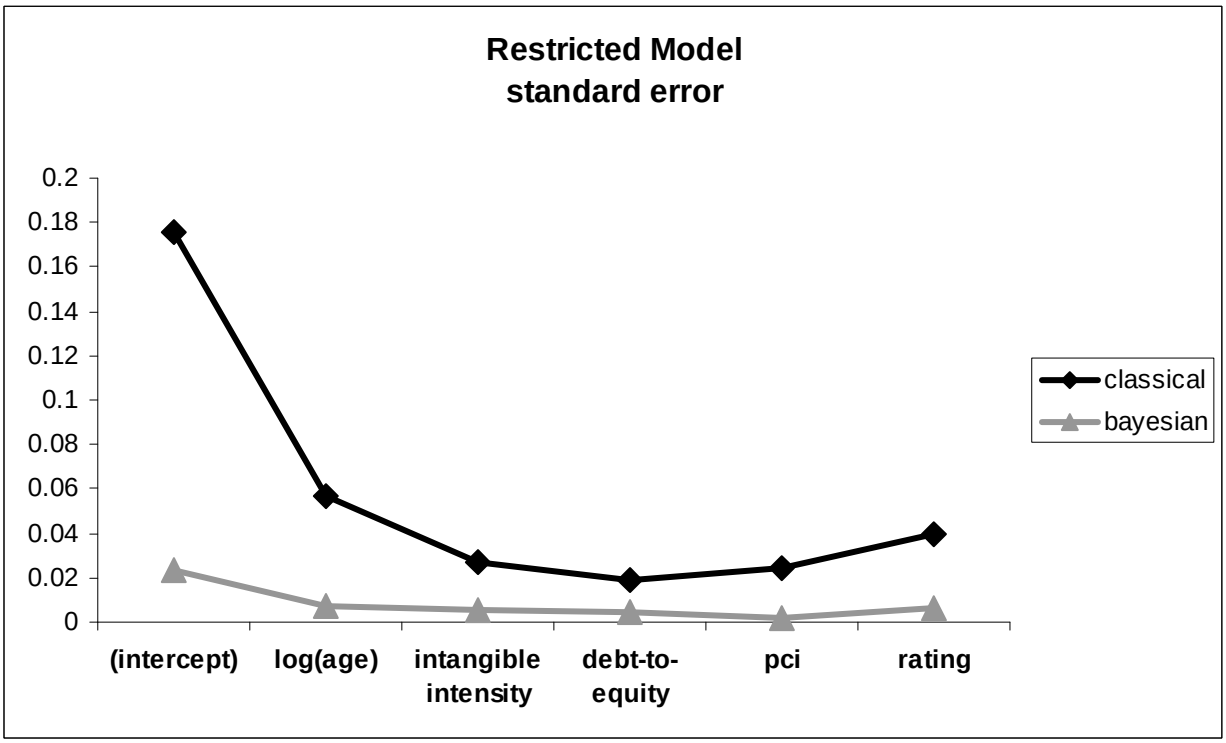


Figure 3: Restricted Model: parameters' standard error



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