

**“The Determinants of Capital Structure of the SMEs: Evidence
from the Greek and the French firms”**

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Abstract

The main aim of our research is twofold: First to obtain the main determinants of capital structure of Small and Medium Enterprises (SMEs) for Greece and France, and second to compare and analyze any emerging differences between the two countries. To do so we apply panel data methodology on the Greek and French firms, derived from the ICAP and the DIANE databases respectively. The hypothesis that is tested in this paper is that the debt ratio of the firms depends upon their asset structure, their size, their profitability, and their growth rate. The results show that the SMEs in both countries seem to behave in a very similar way. Specifically, for both countries, the asset structure and the profitability seem to have a negative relationship with the firm leverage, whereas the firm size and growth are positively related to their debt ratio. The main conclusion is that there are great similarities in the determinants of the SMEs' capital structure for Greece and France.

Keywords: Capital Structure, Pecking order Theory, SME financing

JEL Classification: C23, G32, G33

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1. Introduction.

It is widely known that SMEs represent a vast portion of the population of firms of almost every developed country and are the “real giants of the European economy”¹. In respect to the Seventh Report, 99,8% of European Companies (20,5 million) were SMEs with 80,8 million employees (66% of the total European employment) and micro enterprises represented 93% of SMEs with 19 million companies. Thus, it is important to shed some light on the capital structure of these firms. As Zingales (2000, p.1629) pointed out “empirically, the emphasis on large companies has led us to ignore (or study less than necessary) the rest of the universe: the young and small firms, who do not have access to public markets”. In effect, there have been quite many empirical studies about the financial decisions of large and listed firms² relatively to those for SMEs.

An important question in the SMEs literature is the definition of what is really considered as an SME as these companies are often very heterogeneous. In order to get some unbiased results for our study we have adopted the European Commission SME definition of 1996³: companies that employ less than 250 employees, have either an annual turnover not exceeding 40 millions euros, and/or an annual balance-sheet total not exceeding 27 millions euros and are independent and privately held. Note that these criteria were altered in 2000. Concerning the annual turnover criterion, SMEs must have an annual turnover of less than 50 million euros, and an annual balance sheet of less than 43 million euros. However, as the sample of our study covers the period of 1997 to 2002⁴ we considered the European Commission SME definition of 1996.

In this paper, we investigate the determinants of capital structure for the SMEs in Greece and France. To the authors’ knowledge, this is the first attempt to conduct a joint research in the determinants of the SMEs’ capital structure for the companies of

¹ Using the terms of the Seventh Report on SMEs carried out by the European Commission in 2002.

² For example, Bradley et al. (1984), Chen and al. (1998), Wald (1999).

³ Recommendation 96/280/EC, April 3; 1996.

⁴ To be more precise to calculate the growth variable for instance for 1997 we need also the results of 1996.

two countries. Apart from the valuable information about the SMEs' capital structure determinants for the firms of these two countries, the results will also provide useful inter-country comparisons.

The structure of the paper is as follows. Section 2 discusses how the existing capital structure theories can be used to explain SMEs' capital structure and their financing decisions. Section 3 describes the variables and data used in this study and how we have constructed the firm samples. Section 4 refers to the model employed and the econometric analysis that we have conducted. Section 5 interprets the results of the analysis and conducts an inter-country comparison. Section 6 concludes the paper.

2. Debt vs. Equity in SMEs.

Capital structure theory was initially established by the seminal work of Modigliani and Miller (1958) who provided a substantial boost in the development of the theoretical framework within which various theories were about to emerge in the future. The broadly known "capital structure irrelevance" conclusion of MM (1958) was about to be questioned and revised by several others who developed their own theoretical aspect provided their own piece in the capital structure puzzle. Yet the puzzle still remains unsolved; what we do have is a wide variety of theoretical approaches but no theory is universally accepted and practically applied.

The main ground upon which capital structure theory was initially developed concerned the large listed firms⁵. However, several authors have pointed out that the theoretical implications of capital structure can also be applied in the small firm context. For example, Ang (1991), Holmes and Kent (1991) and Cosh and Hughes (1994) emphasized that the pecking order theory can also be applied in small and medium sized firms. On the other hand, there are some specific capital structure considerations that cannot fit into the SMEs context. Pettit and Singer (1985) have pointed out that tax considerations are of little attention for SMEs because these firms are less likely to generate high profits and therefore are less likely to use debt for tax shields. Nevertheless, most of (if not all) the theoretical approaches of capital structure can be applied for SMEs, in our search for the determinants of their capital

⁵ For instance Rajan and Zingales (1995) provide an extensive analysis of the determinants of capital structure by examining the financing decisions of public firms in the major industrialized countries.

structure. In this paper we investigate whether some certain theoretical implications are applied in the SME context for the Greek and the French firms.

Moving back to the pecking order theory, the implications of this theory are that SMEs will have a preference hierarchy for different types of finance in their financial policy. Companies will first choose internally generated earnings to finance new projects. If additional funds are needed, companies will turn to debt rather than new equity; the latter will be their last option. Pecking order theory can easily be explained in the SME framework. SMEs are often opaque and have important adverse selection problems that are explained by credit rationing and therefore bear high information costs (Psillaki 1995). These costs can be considered null for internal funds but are very high when issuing new capital, whereas debt lies in an intermediate position. Moreover, SMEs are often managed by very few managers whose main objective is to minimize the intrusion in their business and avoid the discipline inherent in other financing options than internal funds. That is why internal funds will lie in the first place of their preference of financing. In case internal funds are not enough, SMEs will prefer debt to new equity mainly because debt means lower level of intrusion and, most importantly, lower risk of losing control and decision-making power than new equity.

Agency costs on the other hand must be carefully considered within the SME context. That is because there are actually no (or very few) agency costs of equity, because managers are, most likely, also the owners of an SME. However, agency conflicts between shareholders and lenders may be particularly severe, as Van der Wijst (1989) and Ang (1992) denote. This is another reason why firms prefer internal funds to debt financing.

Financial distress considerations are also very important for SMEs. Theory and practice have many times proven that when it comes to financial distress, size is an important factor. Warner (1977), Ang et.al. (1982) and Pettit and Singer (1985) state, among others, that larger firms tend to be more diversified and go bankrupt less often than smaller ones. Thus, larger firms are able and expected to employ more debt than smaller ones.

Asymmetric information can be applied, apart from the pecking order theory, in the notion of growth potential as well. However, growth may have ambiguous effects on firms concerning their financing. On the one hand, growth causes variations in the value of a firm. Larger variations in the value of the firm are often interpreted as

greater risk. That is why a firm that has considerable growth opportunities will be considered as a risky firm and will face difficulties in raising debt capital with favorable terms. Thus, it will employ less debt in its capital structure. Furthermore, the cash flows of a firm which value is most likely to remain stable in the future are predictable and its capital requirements can be financed with debt more easily than those of a firm with growth potential (Psillaki and Mondello 1996). Myers (1977) argues that firms with growth potential will tend to have lower leverage. On the other hand, growth will push firms into seeking external financing, as firms with high growth opportunities are more likely to exhaust internal funds and require additional capital. From this point of view, growth is expected to have a positive relationship with leverage, as Michaelas et. al. (1999) have already shown.

The type of assets that a firm possesses can also be considered as an ambiguous factor that contributes in the determination of the debt-equity ratio. On the one hand, this particular factor is closely related with the notion of financial distress costs. Specifically, the costs of financial distress depend on the types of assets that a firm has. For example, if a firm retains large investments in land, equipment and other tangible assets, it will have smaller costs of financial distress than a firm that relies on intangible assets. Scott (1976) argues that a firm determining the optimal capital structure will issue as much secured debt as possible, because the agency costs of secured debt are lower than those of unsecured debt. Securable assets are considered the tangible assets such as plant and machinery. Thus, firms with more tangible assets should issue more debt. However, on the other hand, lots of tangible assets may mean that a firm has already found a stable source of return which provides it more internally generated funds and prohibits it from turning to external financing. Thus, in case of a negative relationship between leverage and asset structure, this also is an indication that pecking order exists. As a matter of fact, Hall, Hutchinson and Michaelas (2004) and Sogorb-Mira (2002) find a negative relationship between the short term debt and the asset structure and a positive relationship between long-term debt and asset structure. In our study, we do not discriminate between long-term and short-term debt, however in case we find a negative relationship between asset

structure and leverage, this may mean that firms use more short-term debt in their capital structures than long-term debt⁶.

3. Data and measurement of variables

Our empirical investigation uses two sets of data for Greece and France respectively. The sample of SMEs in Greece is extracted from the ICAP database and the sample of the French firms will be extracted from the DIANE database. Note that we decided to exclude from our analysis, as the majority of similar empirical studies, the firms of the financial sector and the sector of investment and insurance companies because the nature of operations for these firms differs according to the determination of capital structure when compared to other industries.

The Greek sample was extracted by the ICAP database, which contains over 30.000 Greek companies. The Greek firms that are included in our sample were the largest SMEs that fulfilled the criteria of an SME as described in the introductory section. We decided to consider the largest SMEs mainly because their financial data are considered to be more objective when compared to the smaller firms. The number of the Greek firms contained in our sample was 1252, for which we have accounting data for the six-year period time 1997-2002, resulting in 6260 observations.⁷

The French sample was extracted from DIANE (Bureau Van Dijk), which is a database that contains economic and financial information (company's report) up to ten years of data over more than 400.000 French firms.

More specifically, we have selected those firms from this database that meet the following criteria:

- Active companies not included in a bankruptcy process.
- Less than 40 million euros turnover.
- Less than 27 million euros of total assets.
- More than 5 employees and less than 250.

⁶ In fact, Vasiliou, Daskalakis and Eriotis (2004) provide an extensive analysis of the capital structure for the listed Greek firms and find that these firms avoid long-term debt financing and turn to short-term debt. They imply that this may be due to the bank policy in Greece and if we consider that this implication does hold for the listed firms, there seems to be no reason why this implication should not also hold for the SMEs.

⁷ We should denote that, as long as the $GROWTH_{i,t}$ variable refers to the annual change on earnings, we cannot calculate the growth ratios for 1997, because we would also need the results of 1996. Thus, our analysis covers the period 1998-2002 and we have: 1252 firms multiplied by 5 years equal to 6260 observations.

- Independent and privately held companies which are owned up to 24.9% of the capital of the voting rights by one enterprise or jointly by several enterprises.

The data set has been restricted to observations that embody all the essential variables available, and also these variables have a complete record over the period of examination.

The number of firms that makes up the French sample amounts to 2006 SMEs, for which we have accounting data for the six year period time 1997-2002, resulting in a 10030 observations balanced panel data⁸.

Concerning the variables used in our analysis, first we define our dependent variable which is the debt ratio ($DR_{i,t}$). The debt ratio is defined as the ratio of total liabilities⁹ divided by the total assets of the firm. Total liabilities contain both long-term and short-term liabilities.

Our first independent variable is the asset structure of the firm. We measure the asset structure ($AS_{i,t}$ regressor) as the ratio of the tangible assets divided by the total assets of the firm. As was explained in section 2, there can be either a positive, or a negative relationship between the asset structure and leverage.

The next variable we use is the size of the firm ($SIZE_{i,t}$). Size can be considered as an explanatory variable of potential cross-sectional differences in leverage. We expect that size will be positively related to leverage for three reasons. First size is closely related to risk and bankruptcy costs. Larger firms tend to be more diversified, which means that they enclose less risk and as a consequence they have a lower probability of default. Second, larger firms may be able to reduce transaction costs associated with debt. Third, information costs are lower for larger firms because the quality of the financial information improves as the firm becomes larger and any mistrust is diminished. In fact, according to the Observatory of European SMEs (2003/2) often the problem of inadequate information is mentioned as one of the main aspects hampering bank finance to SMEs¹⁰. The conclusion is that banks will be more willing

⁸ For the same reason as described in footnote 6, we have: 2006 firms multiplied by 5 years equal to 10030 observations.

⁹ We measure leverage considering the ratio of total liabilities to total assets. Total liabilities include accounts payable and accounts receivable, thus the trade credit which is an important mean of finance of SMEs'. For this reason we consider this broadest definition.

¹⁰ For instance in 2002 according to the same source only about 60% of the SMEs regularly provide documents such as the balance sheet and the profit and loss statement. Around 8% of the SMEs hand over to their financier their annual budget, whilst 7% also share financial plans or cash flows forecasts with them and about 4% provide information on inventories or unpaid invoices.

to lend their funds to larger firms. We measure size as the natural logarithm of sales revenue. We use the natural logarithm so as to measure the trend of this specific variable in the determination of capital structure rather than the contribution of the absolute size. This way, we smooth the differences that may arise between large differences in sizes among the firms.

The third variable we use refers to the profitability ($PROFIT_{i,t}$) of the firms, which is closely related to the pecking order theory. As already mentioned in the second section, the pecking order theory denotes that firms will prefer internal funds to external financing. As a result, firms that are profitable will use their internal funds (retained earnings) to finance their operations and investments and thus they will borrow relatively less than firms with low profitability. Therefore, we expect an inverse relationship between profitability and leverage. We measure profitability as the ratio of earnings before taxes divided by total assets.

Finally, we also investigate if and how growth affects the firm's capital structure (variable: $GROWTH_{i,t}$). We proxy our growth measurement as the annual change on earnings. As already mentioned in the previous section, there may be either a negative or a positive relationship between this regressor and our dependent variable.

4. The model

Our analysis is based on panel data which combines time series and cross sectional data. The models for panel data are powerful research instruments, which give the researcher the ability to take into account any kind of effect that the cross-sectional data may have, and finally to estimate the appropriate empirical model. A great advantage of combining time series and cross sections in panel data is that we are able to examine issues that could not be studied in either cross sectional or time series settings alone. The use of panel data reduces collinearity among the explanatory variables thus improving the efficiency of econometric estimates. Furthermore, panel data models can take into account a greater degree of the heterogeneity that characterizes firms. Thus, we decided to use panel data methodology instead of cross-section analysis for every year, mainly because this specific methodology provides results and conclusions that can be considered as dynamic. However, we also present some yearly descriptive statistics in order to capture any trend in yearly differences.

We will use pooling methods for our panel data so as to formulate the features of the Greek and the French markets. Our panel can be considered as “typical” according to the econometric literature in the sense that there are large numbers of cross sectional units and only a few periods. Indeed, we use only five periods, while using 1252 Greek and 2006 French firms.

The hypothesis that will be tested is that the capital structure of the firm expressed by the ratio of total liabilities to total assets depends upon its asset structure, its size, its profitability and its growth rate.

Modelling the Greek and the French firms, according to the variables described in the previous section, we estimate the following model:

$$DR_{i,t} = \beta_0 + \beta_1 AS_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 PROFIT + \beta_4 GROWTH_{i,t} + \varepsilon_{i,t} \quad (1)$$

where:

- $DR_{i,t}$ = the debt ratio of the firm i at time t,
- $AS_{i,t}$ = the asset structure of the firm i at time t,
- $SIZE_{i,t}$ = the size of the firm i at time t,
- $PROFIT_{i,t}$ = the profitability of the firm i at time t,
- $GROWTH_{i,t}$ = the percentage change in earnings of the firm i between time t and t-1,
- $\varepsilon_{i,t}$ = the error term.

5. Empirical results-Comparisons between the two countries

Before analyzing the results from the econometric analysis, we present some descriptive statistics for our two samples to capture any differences among the Greek and the French firms in Tables 1 and 2 respectively. We first present the mean and the standard deviation for the whole period and then the same statistics for each year for both countries.

Table 1: Descriptive Statistics for Greece

	Debt ratio		Asset Structure		Size		Profitability		Growth	
<i>Panel statistics</i>										
Mean	59,58%		20,41%		15,74		7,62%		19,33%	
Std. Dev.	0,23		0,19		0,90		0,10		17,21	
<i>Annual Statistics</i>										
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
1998	59,91%	0,23	21,40%	0,19	15,46	0,92	8,94%	0,09	103,72%	5,64
1999	58,31%	0,23	20,22%	0,18	15,61	0,89	9,19%	0,11	162,67%	9,83
2000	58,65%	0,23	20,22%	0,18	15,80	0,86	7,84%	0,10	-117,79%	33,59
2001	59,72%	0,23	20,07%	0,18	15,90	0,85	6,66%	0,10	-36,70%	12,67
2002	61,30%	0,23	20,13%	0,19	15,94	0,90	5,45%	0,09	-15,26%	7,74

Table 2: Descriptive Statistics for France

	Debt ratio		Asset Structure		Size		Profitability		Growth	
<i>Panel statistics</i>										
Mean	52,78%		30,97%		7,62		5,12%		20,54%	
Std. Dev.	0,28		0,22		1,09		0,13		77,59	
<i>Annual Statistics</i>										
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
1998	55,08%	0,30	31,12%	0,22	7,48	1,12	4,93%	0,14	-40,83%	21,40
1999	53,93%	0,26	31,04%	0,22	7,55	1,10	5,05%	0,13	198,94%	146,35
2000	53,21%	0,27	30,65%	0,22	7,65	1,07	5,58%	0,13	-5,16%	83,31
2001	51,79%	0,29	30,80%	0,22	7,70	1,07	5,44%	0,13	-49,94%	31,75
2002	49,89%	0,26	31,26%	0,22	7,73	1,09	4,59%	0,12	-0,30%	16,79

Comparing the panel statistics for both countries we see that Greek SMEs seem to retain more debt in their capital structures than their French counterparts. However, the Greek firms contained in our sample are much larger compared with the French firms. Thus, this may be a potential explanation why Greek firms seem to be more leveraged than the French ones. On the other hand, French firms seem to maintain a higher proportion of tangible assets than the Greek ones. The profitability of the Greek firms is higher than that of the French counterparts however French firms seem to have a slightly higher growth rate than the Greek ones.

Looking at the annual statistics, the debt ratio for Greek SMEs is maintained in a relatively stable level at 60%, whereas that of the French firms seems to follow a descending route. Firms in both countries seem to become larger over time, however their profitability follows a \cap -shape route. Another striking information from both tables is derived when we look at the standard deviations of the growth variable. It seems that the variation in the growth rates for the firms in both countries is very high. For instance, when we look at the annual descriptives, we see that the mean growth rate for 1999 for the Greek firms was 162,67%, whereas it was -117,79% for 2000. Similarly, the mean growth rate was 198,94% in 1999 for the French firms and -5,16% for 2000. These high variations show a relative instability in the firms' growth rates for both countries. Nevertheless, looking at the statistics in two tables, there does not seem to be great differences between the firms in the two countries. On the contrary, all the ratios are quite similar, leading us to the conclusion that the Greek and French SMEs behave in a similar way.

As far as the econometric analysis is concerned, the results are presented in Tables 3 and 4 for Greece and France respectively. The results for Greece denote that the independent variables explain the debt ratio determination of the firms at 96.54%. The adjusted R-squared is slightly lower at 96.53%. The results for France denote that the independent variables explain the debt ratio determination of the firms at 94.46%. The adjusted R-squared is also 94.46%.

The F-statistic for both countries proves the validity of the estimated model. Furthermore, all the coefficients are statistically significant in level of confidence 99%. EViews estimates covariances that are robust to general heteroskedasticity. In fact, EViews calculated heteroskedasticity consistent standard errors and covariances when running the regression, according to the White formula.

Table 3: Greece

Dependent Variable: DR				
Method: GLS (Cross Section Weights)				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.179372	0.016394	-10.94110	0.0000
AS	-0.433617	0.004263	-101.7182	0.0000
SIZE	0.058418	0.000995	58.72593	0.0000
PROFIT	-0.667104	0.009886	-67.47841	0.0000
GROWTH	0.000113	4.13 x10 ⁻⁵	2.727490	0.0064
Weighted Statistics				
R-squared	0.965355	Mean dependent var	1.077566	
Adjusted R-squared	0.965333	S.D. dependent var	1.065936	
S.E. of regression	0.198467	Sum squared resid	246.3787	
F-statistic	43573.16	Durbin-Watson stat	0.511050	
Prob(F-statistic)	0.000000			

Analyzing the results for Greece and France we first note that the signs for both countries are the same. Thus, the relationships between each regressor and the dependent variable lead also to the same conclusions. For instance, the asset structure of the firms in both countries is negatively related to their leverage. According to what was mentioned in the second section this result lead us to conclude that those firms that maintain a large proportion of fixed assets in their total assets tend to use less debt than those which do not, perhaps because a firm with lots of tangible assets may have already found a stable source of return which provides it more internally generated funds and prohibits it from turning to external financing.

Table 4: France

Dependent Variable: DR				
Method: GLS (Cross Section Weights)				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.632331	0.002280	277.3450	0.0000
AS	-0.331366	0.001627	-203.6554	0.0000
SIZE	0.004417	0.000247	17.85109	0.0000
PROFIT	-0.700849	0.007687	-91.16927	0.0000
GROWTH	7.69x10 ⁻⁶	1.50 x10 ⁻⁶	5.138389	0.0000
Weighted Statistics				
R-squared	0.944578	Mean dependent var	1.177751	
Adjusted R-squared	0.944556	S.D. dependent var	1.056181	
S.E. of regression	0.248695	Sum squared resid	620.0389	
F-statistic	42714.72	Durbin-Watson stat	0.447626	
Prob(F-statistic)	0.000000			

Next, we found a positive relationship between the SIZE variable and leverage. This means that the bigger the firm, the more debt it uses. This result is also expected according to the theoretical background. The profitability of the firms is negatively related with their leverage. Thus, firms that generate relatively high internal funds, generally tend to avoid gearing. This finding is consistent with the pecking order theory that denotes that firms prefer internal financing from external. Finally, firms with higher growth seem to retain more debt than those with lower growth rates. This can also be explained by the fact that the higher-growth firms need more funds than the lower-growth ones and are obliged to turn to external financing, namely debt.

6. Conclusions

In this paper we conduct a joint analysis for the capital structure determinants for the Greek and the French SMEs. We use panel data for both countries. We first present some descriptive statistics for each country and we also apply an econometric

analysis on the panel data. The most remarkable conclusion in our study is that there seems to be a similar behaviour of the SMEs in Greece and France, as the econometric analysis provided the same signs in the relationships between each regressor and our dependent variable.

This may mean that there are similar circumstances upon which the SMEs are operating in these two countries. However, note that there exist some differences between these two countries according to the Observatory of European SMEs (2003) regarding the types of debt finance. For instance bank loan is very important for both countries (more than 60%), but on the other hand factoring, leasing and overdraft is much more important in France (32% 48%, and 38% respectively) where in Greece is less than 10%, 15% and 22% respectively. Despite these different types of debt financing, there seems to be a positive relationship between size and growth in both countries. Larger firms and companies with high growth rates seem to rely more on debt than smaller and low-growth firms. Furthermore, firms' asset structure and profitability seem to be negatively related with leverage. The negative relationship between profitability and leverage implies that firms may finance themselves following the pecking order pattern of financing. Thus we conclude that although the Pecking order theory has originally emerged to model the financial behaviour of large and publicly traded companies, the hypotheses inherent to this theory can also be shared by SMEs

All the regressors for both countries are statistically significant at 99%. The R-squared and adjusted R-squared are also very high for both countries. Finally, the results and conclusions are consistent with the theoretical background as presented in the second section of the paper.

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Appendix

The general model for panel data that allows the researcher to empirically estimate the relation between the dependent variable and the regressors and formulate any cross sectional differences during a time period is theoretically the following:

$$y_{it} = x'_{it}\beta + z'_i\alpha + \varepsilon_{it}$$

where $i = 1, 2, \dots, N$ refers to a cross sectional unit/individual and $t = 1, 2, \dots, T$ refers to a given time period. Thus,

$y_{i,t}$ = the value of the dependent variable for the individual i at time t .

$x_{i,t}$ = the value of the k th nonstochastic explanatory variable for the individual i at time t .

z_i = a matrix which contains a constant term and/or a set of individual or group specific variables, which may be observed or unobserved, for the individual i , assumed to be constant over time t .

$\varepsilon_{i,t}$ = the stochastic term for the unit i at time t ¹¹.

According to the estimation technique, the OLS is optimal only in case the errors are spherical. However, it is unlikely that errors will meet the assumption of sphericity and thus the usual OLS formula for standard errors will most probably provide misleading indications of the sampling variability of the coefficient estimates. That is why we decided to apply the GLS formula using cross section weights.

¹¹ For more information about the econometric model see Judge et. al. (1985) and Greene (2003)