The impact of capital structure on profitability. Evidence from the FTSE 100 and FTSE 250.

Serafeimidis Antonios

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Student Name: Antonios Serafeimidis

SID: 1103180019

Supervisor: Prof. Athanasios Fassas

I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

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Abstract

This dissertation was written as part of the MSc in Banking and Finance at the International Hellenic University.

The present study addresses the effect of capital structure on profitability of listed non-financial firms in the London Stock Exchange and more especially in FTSE 100 and FTSE 250 Indexes. The objectives of the study are to identify the nature of the relationship between capital structure and firm performance, as well as explore the impact of capital structure on firm performance.

The issue is important since the capital structure is a decision that firms take and influence all stakeholders. Models structured as having dependent variables ROA, ROE, and Gross Profit Margin, whereas Debt (Long term debt, Short term debt and Total debt) was the independent variable. Research models were developed for each group of the data as well as for each independent variable. The Simple linear regression analysis conducted using OLS, fixed effects, and random effects methods.

According to the research results, capital structure affects profitability, to a greater or lower extent. There is not a specific rule for firms to follow since the capital structure is also an internal decision and can be affected by several factors. Nevertheless, the present study adds in the existing literature by confirming previous research results as well as by revealing new relationships between the variables selected for the research.

Keywords: capital structure, leverage, profitability, index analysis

Antonios Serafeimidis

15/12/2019

Preface

This thesis is consecrate to the memory of my *father Ilias.*

First of all, I would like to thank my professor Athanasio Fassa for his valuable support and contribution, but also his orientation and correspondence to all my questions for this project. As well as my family for the patience they showed during the difficult and demanding period of the preparation of the present study. Also, I would like to thanks my friend Kostas for his contribution. I would also like to acknowledge the hospitality of all the personnel of the International Hellenic University. Last but not least I would like to thank my friends that I met during my MSc in IHU and specifically, Stelios Grigoriadis, Aris Vaitsidis and Nikolaos Moutzoglou.

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Table of Contents

List of Figures

List of Tables

2.Introduction

2.1 Purpose of this Study

The financing decision is very important for companies since financing represents the way that firms use to fund their operations. The basic financing decision is whether a company will seek funding by issuing equity either by using their earnings or by borrowing from financial institutions. There are a lot of different determinants that firms use to choose the ideal capital structure, i.e. the proportion of debt in their assets. Profitability is one of these determinants and examined in the present study. Specifically, this study addresses the effect of capital structure on profitability of listed non-financial firms in the London Stock Exchange and more especially in FTSE 100 and FTSE 250 Indexes. The objectives of the study are to:

i. Identify the nature of the relationship between capital structure and firm performance.
ii. Explore the impact of capital structure on firm performance.

2.2 The Structure of this Study

In order to fulfill the project's aim, the study structured as follows. First, the literature review on the subject realized. The literature review concentrates on the determinants of capital structure as well as previous research on the impact of Capital Structure on profitability. The capital structure represents a very important but also complex decision for companies because it is highly related to several other aspects of the organizational performance, as well as external environmental factors. As mention above, widely presented during the literature review section.

Then research methodology and results follow — the present cross-sectional study based on secondary research data. The data from the annual financial report and Thomson- EIKON database collection were administrated contemporaneously for the entire selected population. The descriptive analysis used to systematize and present the data. Panel data analysis was used, beginning with the calculation of mean, median and standard deviation to transmit the orientation of the distribution

of overall data. Correlation tests were conducted to observe the correlation coefficient of variables at significant levels (5% and 10%). Then, the simple linear regression analysis conducted using OLS, fixed effects and random effects methods. Furthermore, research models presented, and research analysis follows. Last, concluding remarks follow.

3.Literature Review

3.1 The determinants of capital structure

Capital structure is an issue that has long occupied economists all over the world. It is highly related to market value, and firms wish to find the best combination to achieve the ultimate profitability and market value. Researchers have used data of different kinds of firms in terms of volume, sector, and country in which they operate. The theory on Capital structure based on Modigliani & Miller's (1958) work argued that the need for making decisions on a capital structure derived by the fact that the markets are not frictionless. Instead, there are some elements in the markets, such as the risk of bankruptcy or the need to pay taxes, which makes the capital structure of firms important for their value increase. Moreover, researchers who have dealt with capital structure note that there are several factors, such as taxation, financial distress costs or regulatory decisions, which influence a firm's change in value, thus an optimal degree of leverage need to be found by each company. Research has revealed that the determinants of capital structure are the following:

3.1.1 The size of a firm

As far as the size of the firms concerned, it would be expected – as the pecking order theory suggests - that large firms generate more profits than small ones. Thus, they have the resources to fund their operations.

On the other hand, there is the theory according to which large firms are prone to leverage since the debt interest rate is deductible. Also, it is easier for large firms to access the debt market because they are more reliable, enjoy lower information asymmetry and are more diversified. It is obvious that, generally, researchers tend to support the idea that large firms are probable to leveraged than smaller ones (Sibindi, 2016).

3.1.2 Asset tangibility

Tangible assets are the assets that lenders value more in a transaction than intangible ones. They represent assets that can be used as collaterals when firms

need to borrow, something that reduces the risk for lenders. Thus, according to the trade-off theory, as firms grow and their tangible assets grow, they are more likely to borrow more (Antoniou et al., 2008). As a result, there is a positive relationship between debt and asset tangibility. On the other hand, some researchers support the argument that high tangibility is related to low information asymmetry, something that reduces equity issuance cost and leads to a negative relationship between asset tangibility and leverage (Frank & Goyal, 2009).

3.1.3 Growth

According to the trade-off theory, growth negatively related to debt, since growth offers greater value to shareholders, the cost of financial distress increases, and firms prefer to reduce debt. Besides, growing firms that expect to grow further, issue equity instead of debt (Barkley & Smith, 2005). On the other hand, some researchers argue that growing firms are more probable to have financing needs, and – according to the pecking order theory – they issue debt before equity (Sibindi, 2016).

3.1.4 Profitability

Profitability, which is the factor that is investigated by the author of the present study, is also a determinant factor of firms' capital structure. Generally, researchers support the argument, which aligned with the pecking order theory, that profitability negatively correlated with debt. Profitable firms have their resources to finance their operations, and they do not need external funding through debt (Ahmed et al., 2010). On the other hand, according to the trade-off theory, there is a positive correlation between leverage and profitability. In this case it is assumed that firms that are profitable use debt to take advantage of the debt-interest tax shield. More specifically, the positive correlation between debt and profitability is explained by the savings due to interest rate deduction and the reduction of bankruptcy probability (Myers, 2001).

3.1.5 Debt tax shields

According to the trade-off theory, there is a positive correlation between debt and tax rate, due to interest tax benefits of debt. The tax shield, which is the result of tax savings, is a very important reason for firms to increase debt (Frank & Goyal, 2009). There is also the pecking order theory, which suggests that high tax rates increase

the cost of capital for firms, something that leads to a negative relationship between tax rate and debt of a firm (Rasiah & Kim, 2011).

3.1.6 Non-debt-tax shield

Generally, researchers agree that there is negative correlation between leverage and non-debt tax shield. According to them, tax deductions for depreciation, or other intangible assets, substitute tax benefits from lending. Thus, firms that enjoy non-debt tax shields have lower leverage levels (Frank & Goyal, 2009). Some researchers support the inverse, where there is positive correlation between debt and non-debt-tax shields. Nevertheless, this is attached to firms' anomalous behavior (Sibindi, 2016).

3.1.7 Age

Age is a determinant factor of capital structure because it is related to characteristics that are related to decisions on capital structure. The most important factor is reputation, where old firms enjoy a better reputation, thus lower lending costs, something that creates a positive relationship between age and leverage (Harris & Raviv, 1991). On the other hand, old firms are expected to be more profitable. Thus, it is easier for them to finance their needs by using their internal resources (Ahmed et al., 2010).

3.1.8 Risk

Risk is a term that is related to firms' performance. It is an indicator of the volatility of the earning of a company. According to the trade-off theory, there is negative correlation between risk and debt. It argued that when the risk is high, the probability of the firm not being able to fulfill its commitments concerning debt increased. So is the probability of bankruptcy. Thus, companies that demonstrate volatile earnings should avoid leverage (Antoniou et al., 2008). On the other hand, the pecking order theory supports the positiverelationship between debt and risk, because in this way the adverse selection problem is avoided (Frank & Goyal, 2009).

Below, a literature review on the impact of one of these determinants, profitability, on the Capital Structure presented.

3.2 The impact of Capital Structure on Profitability

Below, an extended literature review on the subject is presented to set the theoretical framework for the empirical part of the present study, the impact of Capital Structure on the Profitability of Companies listed in the London Stock Exchange, and belonging to the FTSE 100 and the FTSE 250 index. The literature review that follows is presented by the date, starting from the earlier research on the subject.

Titman & Wessels (1988) investigated the determinants of the optimal capital structure choice. More specifically, they examined the existing theories on the determinants of capital structure by analyzing short term, long term and convertible debt measures and they used the linear structural modeling technique in their research. According to the researchers, the determinants of Capital Structure are the following:

- Inventory, gross plant, and equipment/total assets present positive relationship with Collateral Value.
- Non-debt tax Shields (companies which enjoy the important volume of non-debt tax shields, concerning their cash flow, form their capitals with less debt)
- Growth (the negative relationship between debt and growth opportunities)
- Uniqueness (negative correlation between uniqueness and debt)
- Industry classification (heavy industry firms are financed with less debt than others since their liquidation is costly)
- Size (researchers do not agree on the correlation between leverage and firm size, since large firms are less prone to bankruptcy, thus more leveraged, while small firms can also be more leveraged since it is less costly for them to borrow short-term by banks.
- Volatility (debt level is a decreasing factor of the earnings' volatility)

- Profitability (profitability is negatively correlated to debt since firms prefer to use their capitals as a result of asymmetric information and transaction costs)

The variables used by Titman & Wessels (1988), as Capital structure measures are long term debt, short term debt, and convertible debt, dividend by market and dividend by the book value of equity. They used data from 469 firms in the USA during the period 1974-1982. According to their linear structural modeling technique results, debt negatively related to the uniqueness of a firm. Also, transaction costs affect debt structure, while short term debt is negatively related to firm size.

Voulgaris et al. (2002), tried to reveal the factors that influence capital structure of Large Size Enterprises (LSEs) in Greece, to present the implications involved after the financial integration of Greece and the EU, under the use of the single monetary unit, the euro. According to the researchers, there are three major theories concerning the capital structure of companies and are based on the so call M-M (from Modigliani & Miller) model, where only the ability of a company to generate profit affects its market value, whereas the company's financial structure does not affect market value. The first theory based on the tax advantages that a company has due to its debt. According to this theory, companies that generate high profits should use more debt than equity, since interest rates have tax benefits. Of course, this choice leads to a tradeoff between tax benefits and increased bankruptcy possibility, something that may increase the cost of capital. The second theory is known as the "agency cost" theory where firms finance their needs according to the following order: first, they use funds that are created internally by the firm's operation, then they use debt and, last, they issue new equity. Thus, profitability and debt are negatively related. The third theory is asymmetric information. According to this theory, companies with large free cash flow and low growth opportunities tend to have higher levels of debt. Also, according to the asymmetric information theory, capital structure depends on the firms' size. Consider the previous theory; there is a positive correlation between debt and asset structure.

Voulgaris et al. (2002) used data of the Balance Sheets and the Income Statements of 75 Greek manufacturing LSEs. They calculated twenty-two financial ratios, which belong to the following categories:

- Solvency
- Managerial Performance
- Profitability
- Growth

The dependent variables of their model were Total Debt/Total Assets, Long-term Debt/Total Debt, and Short-term Debt/Total Assets. According to the results of their analysis, there is negative correlation between Total Debt and profitability. In other words, LSEs prefer to use their profits to finance their activities; the higher the profits, the lower the debt.

Furthermore, profitability was found correlated with long term debt, rather than short-term borrowing, while total debt correlated to Total Assets turnover. Companies with high growing ratios and financing needs seem to prefer debt to new equity issuing. Besides, long term debt is positively affected by gross profit margins and negatively correlated with assets productivity and growth, as well as sales. Voulgaris et al. (2002) did not find significant correlation between capital structure and ratios such as return on equity and asset profitability.

Pasiouras & Kosmidou (2007) examined the factors that influence profitability in the case of foreign and domestic banks in the EU 15, for the years 1995 – 2001. Deregulation, according to the authors, was a factor that enhanced competition among banks in the EU15, since the official authorities permitted more freedom concerning the establishment, operation, and control of banks. Competition increased and banks needed to issue new, attractive financial products for their customers. Also, mergers and acquisitions used as a strategy that helped banks become larger and more competitive. All these changes were vital, and the authors wished to examine the factors that affect profitability in this new environment. Pasiouras & Kosmidou (2007) used their model's dependent variable Return on Average Assets (ROAA), which is an indicator of the profits earned per euro of assets. The independent variables of their model based on both internal and external factors. Internal factors were measured using the following:

- Capital adequacy ratio
- Cost/ Income Ratio
- Liquidity Ratio
- Size (accounting value of assets)

Macroeconomic factors' measures were inflation rate, gross GDP, Total deposits / GDP, Stock Market Capitalization / Total Assets, Stock Market Capitalization / GDP, Concentration (Assets of the five major banks / Total assets of banks).

The researchers used a sample of 584 commercial banks, form the EU15 countries, for the years 1995 – 2001. They further divided their sample into two sub-categories, domestic banks (332 banks) and foreign banks (218 banks), while 34 banks not classified at this second stage. According to research results, all independent variables, except for concentration in the case of domestic banks, were found significant for banks' profitability. Capital adequacy and Cost / Income Ration seem to be the most important determinant of profitability. The cost of income has a significant, negative correlation with profitability, especially in the case of foreign banks. Liquidity is positively correlated with profitability, in the case of domestic banks, whereas it negatively correlated with profitability in the case of foreign banks. Size in negatively correlated to profitability, for domestic as well as for foreign banks.

Furthermore, all macroeconomic factors affect profitability, but in different ways for domestic and foreign banks. Inflation positively correlated with profitability, in the case of domestic banks, and negatively correlated with profitability in the case of foreign banks. GDP Growth positively affects profitability for domestic banks, whereas foreign banks not favored by GRD growth. Stock market capitalization and Total Assets / Deposits positively correlated with profitability in both cases.

Chen & Chen (2011), wanted to explore the way profitability affects firm value, by using the capital structure as a mediator and the firm size as well as industry as control variables. Specifically, the researchers, based on previous literature on the subject, developed the following hypotheses:

- Profitability has a positive relationship with firm value

- Profitability harms leverage
- Leverage harms the firm value
- The industry type has a moderating effect
- The firm's size has a moderating effect

The researchers, to test their hypotheses, used data of 302 Taiwanese companies belonging to the electronic industry and 345 companies belonging to other sectors, for the years 2005 – 2009. Profitability was measured using ROA, and leverage was measured using debt/equity ratio and liability capitalization ratio. The firm value was measured using the stock price per share at the end of the year. Firm size was measured using the Log of the Total Assets. Regression analysis results revealed the following:

- Profitability is positively correlated with firm value and negatively correlated with leverage
- Leverage negatively correlated with value
- Profitability has a mediating effect, which is influenced by the industry in which the firm operates. Thus, the negative effect of profitability on non-electronic firms is stronger
- When firms have the same level of profitability, no effect on firms' value detected due to industry differences
- When firms have the same leverage, no effect on firms' value detected due to profitability differences
- Size has no significant effect on firm value
- The negative effect of profitability on debt is stronger for large companies.

Gill et al. (2011) investigated the effect of the capital structure of firms in the USA on their profitability. Specifically, they used a sample of 272 firms that belonged to the services and manufacturing factors. They used the regression analysis

technique, and their data covered the period from 2005 to 2007. They used profitability as their dependent variable and measured it using EBITDA, scaled by ROE. They also used short term debt to total assets, long term debt to total assets and total debt to total assets as independent variables. Last, they included three control variables to their model, firm size, sales growth, and sector. The researchers used data derived from the financial reports of the firms included in the sample. Gill et al. (2011), regression analysis results revealed the following:

- There is a positive relationship between short term debt/total assets and profitability, for all the firms in the sample
- There is no significant correlation between sales growth and firm size and profitability for all the firms in the sample
- There is positive correlation long term debt/total assets and profitability, only for the firms belonging to the manufacturing sector
- There is a positive correlation between total debt/total assets and profitability, for all the firms of the sample

Consequently, the researchers argue that there is a positive correlation between debt and profitability and that profitable companies tend to depend on debt, but they also have to consider the risk entailed, so they should choose a structure were debt represents a proportion in the capital structure.

Shubita & Maroof (2012), concentrated their research on industrial companies listed in the Amman Stock Exchange, to reveal capital structure on profitability. They used data from 39 companies for the years 2004 - 2009. Their dependent variable was ROE. The variables selected as independent were Short term debt / Total Assets, Long Term Debt /Total Assets and Total debt / Total Assets. Also, they used Firms' Size and Growth as control variables. Regression analysis results revealed negative relationship between profitability and all debt variables (short-term debt, long-term debt, and total debt). Also, size and growth positively influence profitability.

Chisti et al. (2013) examined the impact of the capital structure of firms in India on their profitability. For their study, they used a sample of ten firms that belong to

the automobile sector of Pakistan for the period 2007 – 2012. All the companies of the sample listed in Stock Exchanges in India. Profitability Ratios used as independent variables and capital structure ratios used as dependent variables. More specifically, the independent variables used were:

- Gross profit ratio
- Net profit ratio
- Operating profit ratio
- Return on capital employed
- Return on investment

Capital structure ratios used were:

- Debt/Assets ratio
- Debt / Equity ratio
- Interest Coverage ratio

Regression analysis results revealed that there is a negative relationship between Debt / Equity ratio and profitability ratios, and a significant positive relationship between Debt/Assets ratio and interest coverage ratio and profitability ratios. Also, among capital structure ratios, the following correlations were noticed: Debt/Asset ratio, as well as theinterest coverage ratio negatively correlated with Debt / Equity Ratio. Debt/Assets ratio is significantly correlated, in a positive way, with interest coverage ratio.

Addae et al. (2013) examined the effects of capital structure on profitability for 34 firms listed in the Ghana Stock exchange, for the years 2005 - 2009. The researchers had two objectives, to investigate the effect of capital structure on profitability, and to reveal the different forms of capital structure, according to the different industry sectors. Specifically, they included industries of twelve different sectors, with the Banking & Finance and the manufacturing sectors being the dominant ones. The Banking and Finance Sector is characterized by the need for

regulated capital structure, whereas the manufacturing sector characterized by heavy tangible assets and may have long-term capital requirements. The researchers used ROE as their dependent variables and capital structure ratios as their independent variables. Capital Structure ratios used were Short term Debt, Long term Debt/ and Total Debt to the total capital ratio. Log of sales and Sales growth used as the regression's control variables. Addae et al. (2013) used the Panel data method analysis. The results of their research revealed the following:

- There is a positive correlation between Short term Debt and profitability, whereas 52% of the firms of the sample used short term debt to finance their needs.

- There is a significant negative correlation between profitability and long-term debt. Also, companies in Ghana do not rely on long term debt, since they only finance 11% of their operation using long-term debt.

- There is a significant and negative relationship between Total debt and profitability, while the firms in Ghana finance 63% of their operations using debt instead of equity.

Ahmad (2014) examined the impact of capital structure on profitability for firms in Pakistan that belong in the cement sector. They used data for 16 (out of 21) cement manufacturing firms listed in the Karachi Stock Exchange for the years 2005 – 2010. Their model's dependent variable was ROE, whereas they used the following independent variables:

- Debt to Equity Ratio

- Debt Ratio

- Interest Coverage ratio

- Short Term Debt/ Total Assets

- Long Term Debt / Total Assets

Regression analysis results revealed that there is a positive correlation between Short term Debt and ROE, while there is negative correlation between long term debt and ROE. These results demonstrate that companies belonging in the specific sector should use more short-term debt to finance their operation, and they should reduce long-term debt –by increasing equity resources utilization – since it has negative impact on ROE.

Oino & Ukaegbu (2015), investigated non-financial firms listed in the Nigerian Stock exchange to reveal the impact of capital structure on their performance. They also investigated the speed of adjustment of these firms to the desired capital structure. The researchers used panel data analysis for 30 firms for the period 2007 – 2012. According to their regression analysis results, there is negative correlation between total leverage and profitability. Also, the size of the firms is positively related to leverage.

Furthermore, profitability negatively correlated with both long term and total debt. Growth was found positively correlated to leverage. Tangibility positively correlated with long term and total debt. Taxation and leverage were also positively correlated, and this is mainly since interest payment is tax deducted. As far as speed of adjustment concerning leverage, Nigerian firms seem to have a speed of 47%, which is a good percentage, compared to firms that operate in developed countries. This percentage demonstrates the leverage target accomplishment of each firm.

De Mesquita & Lara (2015), examined the correlation between capital structure and profitability for companies in Brazil. They used ROE as their model's dependent variable and the following independent variables:

- Short term debt/Total liabilities
- Long term debt / Total liabilities
- Equity on total liabilities
- Long term debt / Total equity

They used data of 70 industrial, commercial and service companies for the years 1995 – 2001. The regression analysis results showed that Long term debt was not

significant in the model and excluded. Also, Long term debt / total equity was found negatively correlated to ROE, thus the larger the debt, the lower the profitability. Short term debt was positively correlated to profitability, while equity on total liabilities was found to have positive relationship with profitability. The Brazilian economy is unstable, and the theoretical models are not the ideal ones for describing the optimal capital structure for firms in the country. Specifically, the firms demonstrate low debt levels compared to developed countries, something indicative of the conservative management of these firms, as far as capital structure is concerned.

Tailab (2015), wished to analyze the effect of Capital Structure on Profitability in the energy sector in the USA. He used a sample of 30 firms and used data from the period 2005-2013. The dependent variables of this analysis were ROA and ROE, while the independent variables were Short Term Debt, Long Term Debt, Total debt, Debt / Equity and Size (measured using sales and assets). The hypothesized Relations among the selected variables shown below:

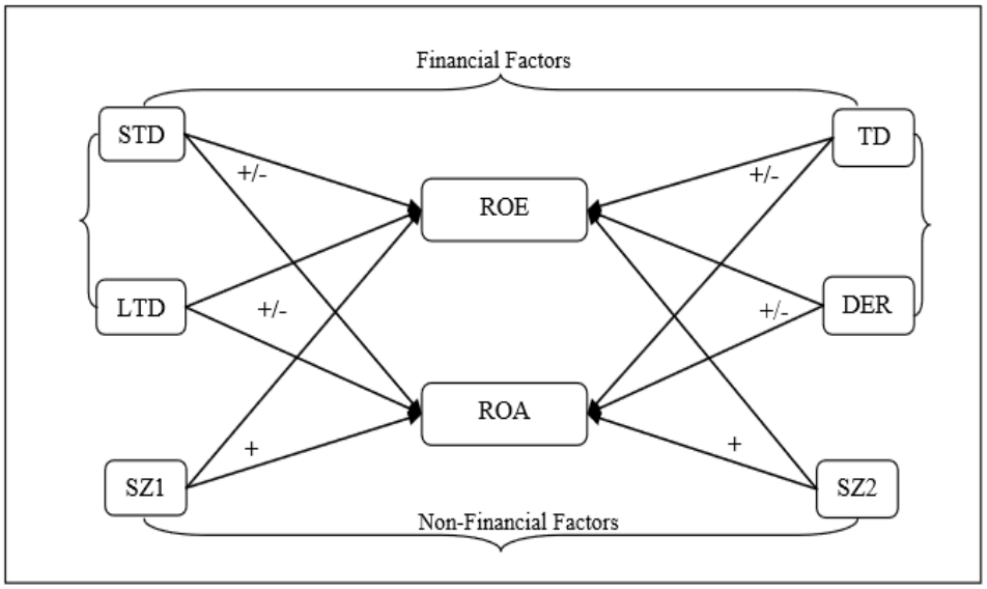

Figure 1: Hypothesized Relations among the selected variables of Tailab (2015) research, where: ROE = return on equity; ROA = return on assets; STD = short-term-debt; LTD = long-term-debt; TD = total debt, DER = debt-equity ratio; Size1=log of sales, Size2= log of assets, source: Tailab (2015, p.56)

Regression analysis revealed the following:

- Total debt is negatively correlated, at a significant level, with both ROE and ROA

- Size (measured using sales) harms ROE
- Short-term Debt has a significant and positive impact on ROE

Sultan & Adam (2015), investigated the effect of capital structure on profitability of listed firms in Iraq. The authors argue that capital structure decision, which is determined by the size and composition of debt and equity, is essential for the efficient performance and the development of companies because it helps them become competitive and well-known and, as a result, attract investors. Sultan & Adam (2015) study's objectives were the following:

- To specify the way capital structure and profitability are correlated
- To specify the way capital structure affects profitability evaluation
- To reveal the best capital structure choice

The researchers used data from companies listed in the Iraq Stock exchange for the period 2004 – 2013. The independent variables that they used in their regression analysis were:

- Profit Margin Ratio, which is a performance and profitability ratio and it demonstrates the net income generated by each monetary unit of sales
- Return on Assets Ratio (ROA), which is an efficiency ratio that measures the effectiveness of using available resources to generate profit
- Return on Equity (ROE), which demonstrates the profit generated by equity

Capital structure was measured using the following ratios:

- Financial Leverage Ratios (EL), which include Debt Ratio and Debt/Equity Ratio and demonstrate the percentage of debt a company has, compared to its assets or equity
- Capital Turnover, which is an indicator of the company's efficiency in using its capital to generate profit. it is considered a long-term profitability ratio

According to Sultan & Adam's (2015) regression analysis results, Capital Structure positively correlated with profitability and firms should pay attention to create a capital structure that can make them operate efficiently. Equity is positively correlated to profitability, while debt negatively correlated to profitability.

Stekla & Grycova (2015), examined the way capital structure and profitability are interrelated, and they used data of 706 limited liability companies of the agricultural sector in the Czech Republic, for the years 2008-2013. They used two ratios to measure capital structure, Debt to Equity and Debt to Assets. To measure profitability, the researchers used the following four ratios:

- Interest coverage ratio
- Gross profit ratio
- Net profit ratio
- Return on Capital employed

The researchers to test the interrelations of their variables, they developed the following conceptual model:

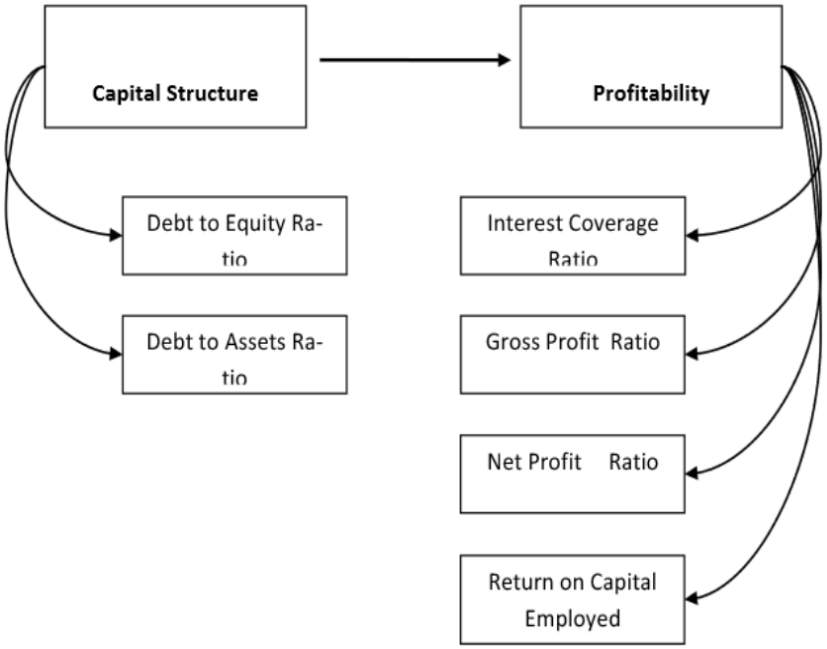

Figure 2: Stekla & Grycova (2015) conceptual model, source: Stekla & Grycova (2015, p. 35)

According to their research results, there is a negative correlation between Debt to equity ratio and Debt to Total Asset Ratio and the following ratios:

- Return on Capital
- Interest Coverage
- Net Profit / Gross profit

Stekla & Grycova (2015), research took place during the years of crisis and revealed that during that period, Debt to assets and Debt to equity ratios were lower than the recovery period that followed. Also, the variation of profitability ratios is higher than the variation of the debt ratios.

Hamid et al. (2015), also researched in order to reveal whether a relationship exists between profitability and capital structure, using data of 46 Family and 46 Non-family firms listed in the Malaysian Stock Exchange, Bursa. The period of the study was from 2009 to 2011. They used ROE as their dependent variable and leverage ratios as independent variables (short term debt/total assets, long term debt/total assets, total debt/total assets). Firm size, Sales growth, and industry type used as control variables.

According to their research results, ROE for family firms is higher than that of non-family firms something which demonstrates that family firms are more profitable. Also, as far as the independent variables are concerned, short term Debt/ Total assets and Total debt/Total assets are higher for family firms, while, on the other hand, non-family firms seem to finance their operation with long-term debt. According to the regression analysis results, there is significant negative correlation between capital structure and profitability, which refers to all independent variables for both firm categories, except for Short term debt/Total Assets for family firms. These results are under the pecking order theory, where firms follow a specific pattern when they wish to finance their activities, and the first use internal funding, then they use debt and, last, they use equity issuing. On the other hand, results are not following the trade-off theory, where profitable firms use debt to finance their activities, something that leads them to further profitability.

Mashavave & Tsaurai (2015) used data of firms listed in the Johannesburg Stock Exchange in South Africa and examined the effect of capital structure on profitability. The researchers used data for the years 2001 – 2013 and calculated the debt/equity ratio and profit margin. They found no relationship between capital structure and profitability for none of the companies of the sample. There were periods where the ratios were positively correlated and others where they were negatively correlated, without following a specific pattern. The authors argue that there are external factors that influence the relationship between capital structure and profitability.

Abeywardhana (2015), investigated the correlation between capital structure and profitability for SMEs in the United Kingdom, for the years 1998 – 2008. The study used the dynamic model and used ROA and ROCE (Return on Capital Employed) as dependent variables, whereas the independent variables of the model were:

- Debt/Assets
- Total debt/Total Assets
- Long term debt / Total Assets
- Short term debt/ Total Assets
- Short term Debt / Total Debt

Firm Size, Sales Growth, and Liquidity chosen as control variables. Panel data analysis revealed a negative correlation between capital structure and profitability for both the dependent variables. Also, a positive correlation between firm size and profitability revealed.

Petria et al. (2015) investigated the determinants of profitability in a special sector, that of banks in the EU27. The European Banking system has encountered a lot of changes during the last decades, mainly due to European integration, which took place in several stages, beginning in 1957. The authors use data of 1098 European banks for the period 2001 – 2011. They used Average ROA (ROAA) and Average ROE (ROAE) as their model's dependent variables, whereas the independent variables were:

- Business Mix Indicator (Other operating Income / Average Bank Assets
- Liquidity Risk (Loans / Customer Deposits)
- Management Efficiency (Cost / Income Ratio)
- Credit Risk (Impaired Loans / Gross Loans
- Capital Adequacy (Equity / Total Assets)
- Bank Size (Log of Total Assets)

Also, Inflation, Economic Growth, and Market Concentration were the external factors used in the model. Petria et al. (2015), research results revealed the following correlations:

- ROAE is not affected by the size of the bank, while ROAA is slightly and positively affected by the size of the bank
- Both ROAA and ROAE negatively correlated with the Cost / Income Ratio
- Credit Risk is negatively correlated with ROAA and with ROAE, the latter correlation being stronger
- ROAA and ROAE are not significantly affected by Capital Adequacy
- Operating Income affects both ROAA and ROAE, with the effect being much stronger in the case of ROAE
- Market concentration reduces profitability; GDP growth is positively correlated to profitability, while inflation is not significantly correlated to profitability.

Nasimi (2016) used data from British listed companies to investigate the effect on capital structure on firm profitability. The sample of his study consisted of 30 firms of the top 100 companies that were listed in the FTSE100 Index, in the London Stock Exchange for the period 2005 – 2014. The researcher developed three different models, using debt/equity and interest coverage as independent variables and return on equity (ROE), return on assets (ROA) and return on invested capital

(ROIC) as dependent variables. They tested the effect on independent variables in each of the dependent variables. Their analysis results revealed the following:

- There is a positive relationship between Debt/equity and ROE and ROIC
- There is a negative relationship between Debt/equity and ROA
- Interest Coverage positively correlated with all three independent variables
- Debt /equity negatively correlated with Interest Coverage
- There is a positive correlation between the independent variables

Vaicondam & Ramakrishnan (2017), examined the effect of capital structure on profitability for firms that registered in the Malaysian Stock Exchange. They conducted longitudinal research between the years 2001 and 2014, using 9.912 observations. They used ROA as their dependent variable and long-term debt / total debt and short-term debt / total debt as independent variables. They found that short term debt is positively and significantly correlated to ROA, thus to profitability. On the other hand, long term debt was found to negatively correlated with ROA.

Singh & Bagga (2019) studied Nifty 50 companies listed in the National Stock Exchange of India, for the period 2008 – 2017, to reveal the effect of Capital Structure on profitability. Specifically, they used panel data methodology, and ROA and ROE were the dependent variables of the models they tested, while Total Liabilities/Total Assets and Total Equity/Total Assets chosen as the independent variables. Also, Tangibility (Fixed Assets/Total Assets), Tax (EBIT), Business Risk (% change in EBIT and %change in Net Sales), Liquidity (Current Assets/Current Liabilities), and Annual Inflation Rate chosen as the models' control variables.

Singh & Bagga (2019) their regression panel data analysis resulted that there is a significant impact of Capital structure on profitability, and specifically results revealed the following:

- Random effect model: results show that there is negative correlation between total Debt and ROA and positive relationship between equity and ROA.

- Fixed effects model: results reveal a positive correlation between Total Debt and ROE and a negative correlation between equity and ROE.

After having presented extended literature on the influence of Capital Structure on Profitability, empirical research follows, to examine, based in above-presented theory, the impact of capital structure on profitability for companies listed in the FTSE100 Index as well as companies listed in the FTSE250 Index, in the London Stock Exchange.

4.Research Methodology

4.1 Data

In order to investigate the impact of capital structure on profitability, data of 150 non-financial listed firms were used. Specifically, the author downloaded data via Thomson-EIKON in the IHU database as well as the London Stock exchange, for the years 2002-2018. Data referred to 50 companies listed in the FTSE100 Index as well as 100 companies listed in the FTSE250 Index. Financial firms were not chosen since the Financial Sector operates with a high proportion of debt, compared to assets, as a result, these data would not be comparable with other sectors. Furthermore, data were divided into two sub-periods, the one from 2002 to 2010 and the other from 2011 to 2018. The variables that were included in the analysis are the following:

Dependent Variables:

- *ROA (Return on Assets)*

  Return on Assets is calculated using the following type:

  ROA = Net Income / Total Assets

  It is an efficiency ratio that demonstrates the proportion of profitability in total assets. In other words, it demonstrates the ability of the company to generate a profit using its assets.

- *ROE (Return on Equity*)

  Return on Equity is calculated using the following type:

  ROE = Net Income / Shareholders' Equity

  It is also an efficiency ratio, and, in simple words, it demonstrates the profit a company generates using each monetary unit of shareholders' equity. In other words, it demonstrates the ability of the company to generate profit using shareholders' equity.

- *Gross Profit Margin* (%): (Revenue – Cost of Goods Sold) / Revenue

  Gross Profit Margin is an indicator of the company's profit, before costs and taxes, and it demonstrates how successful the company is in providing products and services in a profitable way.

Independent Variables:

- Long-term Debt

  Long-term Debt is calculated using the following type:

  Long-term Debt / Total Assets

  Represents the proportion of the debt the company holds - that has a maturity of more than twelve months – compared to its total assets

- Short-term Debt

  Short-term Debt is calculated using the following type:

  Short-term Debt / Total Assets

  Short-term Debt– or current liabilities – represents the proportion of the debt that is to be paid within a year, compared to the total assets.

- Total Debt

  Total Debt is calculated using the following type:

  Total Debt / Total Assets

  Total Debt consists of Long-Term Debt and Short-Term Debt.

Control Variable:

- Sales Growth

  Sales Growth was calculated by using the following formula:

  (Current Year's Sales – Previous Year's Sales) / Previous Year's Sales

The control variable is used as it has been demonstrated by other researchers who had also investigated the effect of capital structure on profitability.

4.2 Modeling

The research aims at fulfilling the following objectives:

- Identify the nature of the relationship between Capital Structure and Firm Performance.
- Explore the impact of Capital Structure on Firm Performance.

  More specifically, the research questions that were developed in order to fulfil the research objectives are the following:

- Is there an impact of Capital structure on ROA?
- Is there an impact of Capital Structure on ROE?

- Is there an impact of Capital Structure on Gross Profit Margin?

4.3 Population

As mentioned above, the research population consists of LSE non-financial shareholding companies listed in the FTSE100 and FTSE250 in London Stock Exchange for the study period (2002-2010) and (2011-2018). Specifically, the sample consists of 50 companies listed in the FTSE 100 (50% of the population) and 100 companies listed in the FTSE 250 (40% of the population).

4.4 Research Hypotheses

To fulfil the research objectives, the following hypotheses were developed:
Model 1:
H0: There is no significant impact of Independent Variables on Return on Asset
H1: There is a significant impact of Independent Variables on Return on Asset.
Model 2:
H0: There is no significant impact of Independent Variables on Return on Equity.
H1: There is significant impact of Independent Variables on Return on Equity.
Model 3:
H0: There is no significant impact of Independent Variables on Gross Profit Margin.
H1: There is significant impact of Independent Variables on Gross Profit Margin.

The above-mentioned hypotheses need to be checked for each of the three independent variables and for the two periods of investigation (2002-2010 and 2011 – 2018). Also, companies are divided according to the database they are included (FTSE100 or FTSE250) Thus, 9 different models were developed and regressed, following the analysis by Abor (2005) and Gill et al. (2011). These models are the following (which are estimated for the two different periods, 2002-2010 and 2011-2018 as well as the two groups of companies):

1. $ROA_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_i t + e_1$
2. $ROA_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$
3. $ROA_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

4. $ROE_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$
5. $ROE_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$
6. $ROE_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

7. $GM_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$
8. $GM_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SGit + e_2$
9. $GM_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

Where:

β_0, α_0, λ_0: The intercept of equation.

β, α, λ: Coefficients for independent variables.

ROE: Net Income/ average equity

ROA: Net Income / Total Assets

Gross Margin (GM): Revenue – Cost of Goods Sold / Revenue

SDA: Short-term debt/total assets.

LDA: Long-term debt/total assets.

DA: Total debt/total assets

SG: Sales Growth (Current year's sales minus previous year's sales divided by previous year's sales.)

i: firm

t: time = 1, 2,…,16 years.

e_{it} = Error term

Stationarity tests were realized for all the different variables that are included in the analysis below. Stationarity tests' results are included in the appendix.

5.Empirical Results & Analysis

5.1 FTSE 100 Period: 2002 – 2010

Results concerning the 50 companies of the FTSE100 Index, for the years 2002-2010 are listed below. The 50 companies of the sample belong to the following sectors:

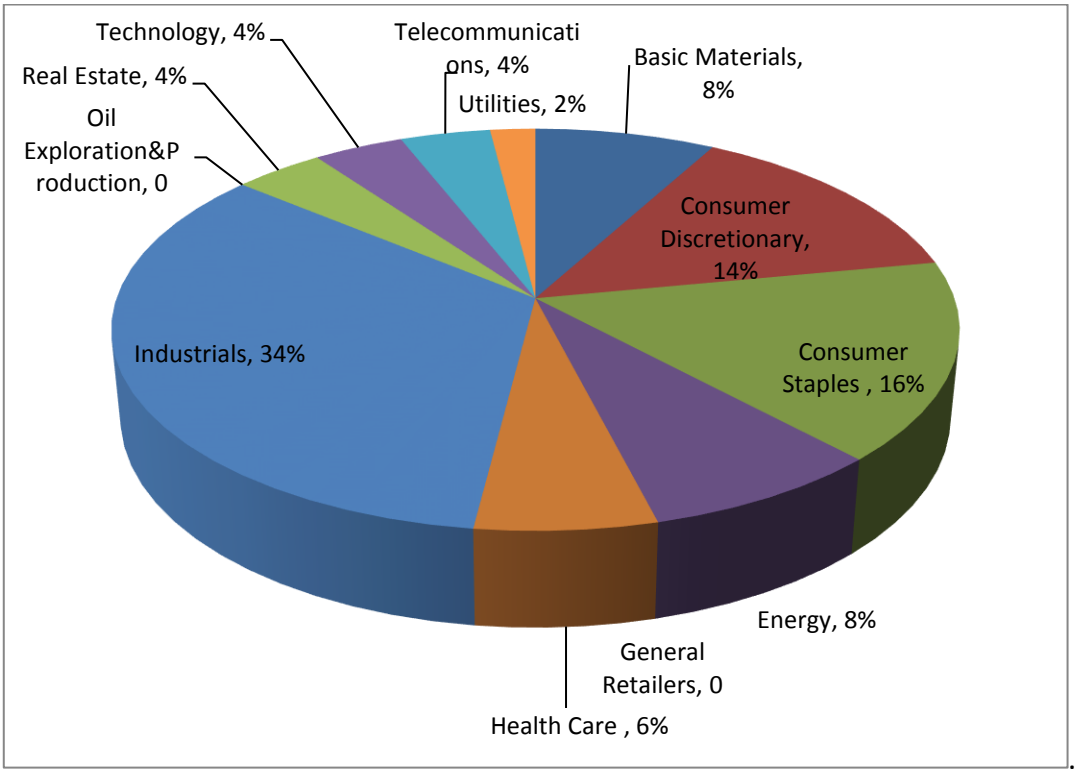

Figure 3: Number of Companies for each Sector FTSE100

First descriptive statistics for the variables were calculated and are demonstrated on table1 below:

Table 1: Descriptive statistics for FTSE100 data for the years 2002-2010

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View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	GROSS_M_	ROA	ROE	STD_TA	LTD_TA	TD_TA	SALES_GR...
Mean	0.564307	0.084338	0.404259	0.301879	0.223754	0.285212	0.100525
Median	0.353200	0.074200	0.196700	0.296318	0.193497	0.254239	0.075657
Maximum	11.60000	0.586500	25.18000	3.566988	2.288464	2.649304	1.402397
Minimum	0.029182	-0.174700	-0.465800	0.001573	0.000000	0.012050	-0.894500
Std. Dev.	1.104372	0.073465	1.479368	0.227660	0.190352	0.209657	0.192192
Skewness	7.981705	1.426032	12.59246	8.006252	5.425190	5.861256	1.512808
Kurtosis	71.24848	10.69165	191.4734	106.6376	53.52432	60.61473	13.62071
Jarque-Bera	91908.16	1258.990	676428.0	205738.4	49959.44	64672.37	2281.554
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	253.3740	37.86771	181.5121	135.5436	100.4656	128.0602	45.13559
Sum Sq. Dev.	546.3974	2.417897	980.4607	23.21935	16.23285	19.69240	16.54814
Observations	449	449	449	449	449	449	449

Table 1 demonstrates the descriptive statistics for the variables that are used for all the models, for the companies that belong to the FTSE Index, for the years 2002 – 2010. It seems that there is important deviation among the Gross Profit Margins and ROE for the companies of the sample. Nevertheless, the average Gross Profit Margin as well as ROE is high, something indicative of the effectiveness with which the companies of the sample were operating during the period 2002 – 2010. As far as Short-term Debt and Long-term Debt are concerned, there is also substantial difference between the minimum and maximum values; nevertheless, standard deviation is not high. It is also important to note that 449 observations were included.

Table 2: Correlation matrix for FTSE100 data for the years 2002-2010

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	GROSS_M_	ROA	ROE	STD_TA	LTD_TA	TD_TA	SALES_GR...
GROSS_M_	1.000000	-0.012855	-0.028334	-0.073942	0.050500	0.019077	0.012732
ROA	-0.012855	1.000000	0.121386	-0.066819	-0.186717	-0.190120	0.145746
ROE	-0.028334	0.121386	1.000000	0.037386	0.015536	0.013984	-0.024412
STD_TA	-0.073942	-0.066819	0.037386	1.000000	0.251820	0.296032	-0.043149
LTD_TA	0.050500	-0.186717	0.015536	0.251820	1.000000	0.962415	0.002588
TD_TA	0.019077	-0.190120	0.013984	0.296032	0.962415	1.000000	-0.012810
SALES_GR...	0.012732	0.145746	-0.024412	-0.043149	0.002588	-0.012810	1.000000

According to table 2 above, there is a negative correlation between ROA and the independent variables. Specifically, there is 6,7% negative correlation between ROA and Short-term Debt/ Total assets, 18,7% negative correlation between ROA and Long-term Debt/Total Assets and 19% negative correlation between ROA and Total Debt / Total Assets.

As far as ROE is concerned, there is 3,7% positive correlation between ROE and Short-term Debt / Total Assets, 1,6% positive correlation between ROE and Long-term Debt / Total Assets, 1,4% positive correlation between ROE and Total Debt / Total Assets.

As for Gross Profit Margin, there is 7,4% negative correlation between Gross Profit Margin and Long-term Debt / Total Assets, 5% positive correlation between Gross Profit Margin and 1,9% positive correlation between Gross Profit Margin and Total Debt / Total Assets.

Model 1:

The first group of hypotheses is the following:

H0: There is no significant impact of Independent Variables on Return on Asset

H1: There is significant impact of Independent Variables on Return on Asset.

Thus, the following regression models are checked for the period 2002-2010 for the companies belonging to FTSE100:

1.1 $ROA_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_i t + e_1$

First, the method OLS was applied to estimate the regression function. The results are included in the appendix. Short-term Debt is not statistically important in the 95% significance level, something that indicates that *there is not significant correlation between ROA and Short-term Debt,* or in other words, there is not significant impact of Short-term Debt on ROA. The lack of significance is also indicated by the "t-statistics" value, which demonstrates the statistical importance of the co-efficient. Also, in this case, t-statistics for Short-term Debt is -1,3, which is lower than 1,96, thus not statistically important *(UCLA, 2015).*

Next, the method Fixed Effects (FE) was applied, to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are included in the appendix. According to FE method, Short-term Debt is not statistically important in the 95% significance level, p=0,06 something that indicates *that there is not significant correlation between ROA and Short-term Debt,* or in other words, there is not significant impact of Short-term Debt on ROA. The lack of significance is also indicated by the "t-statistics" value, which demonstrates the statistical importance of the co-efficient. Also, in this case, t-statistics for Short-term Debt is -1,85, which is lower than 1,96, thus not statistically important (UCLA, 2015).

Then, the Random Effects method was applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. The results are shown in Table 3 below.

Table 3: Regression Analysis Results, ROA/Short-term Debt. Method Random Effects, period 2002-2010, FTSE100

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:02
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.089479	0.008384	10.67248	0.0000
STD_TA	-0.024215	0.013086	-1.850448	0.0649
SALES_GROWTH	0.022980	0.014324	1.604295	0.1094

Effects Specification	S.D.	Rho
Cross-section random	0.048107	0.4477
Idiosyncratic random	0.053429	0.5523

Weighted Statistics

R-squared	0.013098	Mean dependent var	0.029331
Adjusted R-squared	0.008673	S.D. dependent var	0.053900
S.E. of regression	0.053652	Sum squared resid	1.283819
F-statistic	2.959713	Durbin-Watson stat	1.374615
Prob(F-statistic)	0.052853		

Unweighted Statistics

R-squared	0.017914	Mean dependent var	0.084338
Sum squared resid	2.374582	Durbin-Watson stat	0.743186

According to the RE method, for the 449 observations, Short-term Debt is not statistical important in the 95% significance level, p=0,0649, something that indicates that *there is not a significant correlation between ROA and Short-term Debt,* or in other words, there is no significant impact of Short-term Debt on ROA. The lack of significance is also indicated by the "t-statistics" value, which demonstrates the statistical importance of the co-efficient. Also, in this case, t-statistics for Short-term Debt is -1,85, which is lower than 1,96, thus *not statistically important* (UCLA, 2015).

Last, the Hausman Test was applied to decide on the best method between RE and FE. According to results that are included in the appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant importance between the dependent variable (ROA) and the independent variable (Short-term Debt) for the companies of FTSE100 and the period 2002-2010. Thus, H0 is accepted.

1.2. $ROA_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS was applied in order to estimate the regression function. Results are shown in appendix. For the 449 observations, Long-term Debt is statistical important in the 95% significance level, something that indicates that *there is significant correlation between ROA and Long-term Debt,* or in other words, there is significant impact of Long-term Debt on ROA.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix.According to FE method, Long-term Debt is statistical important in the 95% significance level, p=0,0013, something that indicates that *there is significant correlation between ROA and Long-term Debt,* or in other words, there is significant impact of Long-term Debt on ROA.

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 4, below.

Table 4: Regression Analysis Results, ROA/Long-term Debt. Method Random Effects, period 2002-2010, FTSE100

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:08
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.095635	0.008158	11.72261	0.0000
LTD_TA	-0.060248	0.016949	-3.554552	0.0004
SALES_GROWTH	0.023671	0.014195	1.667603	0.0961

Effects Specification	S.D.	Rho
Cross-section random	0.046848	0.4390
Idiosyncratic random	0.052964	0.5610

Weighted Statistics

R-squared	0.032796	Mean dependent var	0.029792
Adjusted R-squared	0.028458	S.D. dependent var	0.054001
S.E. of regression	0.053213	Sum squared resid	1.262905
F-statistic	7.561402	Durbin-Watson stat	1.389608
Prob(F-statistic)	0.000590		

Unweighted Statistics

R-squared	0.048185	Mean dependent var	0.084338
Sum squared resid	2.301390	Durbin-Watson stat	0.762558

According to RE method, for the 449 observations Long-term Debt is statistical important in the 95% significance level, p=0,0004, something that indicates that *there is significant correlation between ROA and Long-term Debt.* The model that can be developed according to Random Effects Method is the following:

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is significant correlation between the dependent variable (ROA) and the independent variable (Long-term Debt). Thus, H0 is rejected. Also, since the RE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$$ROA = 0,095635 - 0,060248\ LDA_{it} + 0,023671\ SG_it + e_1$$

The equation above shows that 1% increase in Long-term Debt (Ceteris paribus), results to an average decrease of 6,02% of ROA.

1.3 $ROA_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. For the 449 observations R-squared is 5,7%, something that indicates that 5,7% of the variation of the dependent variable is explained by the independent variables. Also, Total Debt is statistical important in the 95% significance level, p=0,0001, something that indicates that *there is significant correlation between ROA and Total Debt,* or in other words, there is significant impact of Total Debt on ROA. Also, there is negative correlation between the dependent and the independent variable.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix.According to FE method, Total Debt is statistical important in the 95% significance level, p=0,0017, something that indicates that *there is significant correlation between ROA and Total Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 5, below.

Table 5: Regression Analysis Results, ROA/Total Debt. Method Random Effects, period 2002-2010, FTSE100

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View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:22
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.097357	0.008428	11.55119	0.0000
TD_TA	-0.053173	0.015175	-3.503917	0.0005
SALES_GROWTH	0.023260	0.014202	1.637806	0.1022

Effects Specification	S.D.	Rho
Cross-section random	0.046864	0.4389
Idiosyncratic random	0.052994	0.5611

Weighted Statistics

R-squared	0.032057	Mean dependent var	0.029798
Adjusted R-squared	0.027716	S.D. dependent var	0.054002
S.E. of regression	0.053234	Sum squared resid	1.263924
F-statistic	7.385419	Durbin-Watson stat	1.390324
Prob(F-statistic)	0.000699		

Unweighted Statistics

R-squared	0.048464	Mean dependent var	0.084338
Sum squared resid	2.300715	Durbin-Watson stat	0.763790

According to RE method, for the 449 observations R-squared is 3,2%, something that indicates that 3,2% of the variation of the dependent variable is explained by the independent variables. Also, Total Debt is statistical important in the 95% significance level, p=0,0005, something that indicates that *there is significant correlation between ROA and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

All the three methods of regression analysis indicate that there is significant correlation between the dependent variable (ROA) and the independent variable (Total Debt). Thus, H0 is rejected. Also, since the RE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$ROA = 0,097357 - 0,053173\ DA_{it} + 0,023260\ SG_it + e_1$

The equation above shows that 1% increase in Total Debt (Ceteris paribus), results to an average decrease of 5,3% of ROA.

As far as the first Model is concerned, the regression analysis results revealed that there is significant negative correlation between ROA and two of the three independent variables (Long-term Debt and Total Debt).

Model 2:

H0: There is no significant impact of Independent Variables on Return on Equity.
H1: There is significant impact of Independent Variables on Return on Equity.

2.1 $ROE_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Short-term Debt is not statistical important in the 95% significance level, something that indicates that *there is not significant correlation between ROE and Short-term Debt,* p=0,4424, or in other words, there is not significant impact of Short-term Debt on ROA.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, for the 449 observations R-squared is 21,8%, something that indicates that 21,8% of the variation of the dependent variable is explained by the independent variables. Also, Short-term Debt is not statistical important in the 95% significance level, p=0,1470, something that indicates *that there is not significant correlation between ROE and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 6, below.

Table 6: Regression Analysis Results, ROE/Short-term Debt. Method Random Effects, period 2002-2010, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:27
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.441142	0.138747	3.179462	0.0016
STD_TA	-0.071185	0.315263	-0.225795	0.8215
SALES_GROWTH	-0.153192	0.358514	-0.427296	0.6694

Effects Specification	S.D.	Rho
Cross-section random	0.472359	0.1036
Idiosyncratic random	1.389230	0.8964

Weighted Statistics

R-squared	0.000509	Mean dependent var	0.283146
Adjusted R-squared	-0.003973	S.D. dependent var	1.396233
S.E. of regression	1.399005	Sum squared resid	872.9178
F-statistic	0.113460	Durbin-Watson stat	1.908088
Prob(F-statistic)	0.892766		

Unweighted Statistics

R-squared	-0.000345	Mean dependent var	0.404259
Sum squared resid	980.7986	Durbin-Watson stat	1.698212

According to RE method, Short-term Debt is not statistical important in the 95% significance level, p=0,8215, something that indicates that *there is not significant correlation between ROE and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (ROE) and the independent variable (Short-term Debt). Thus, H0 is accepted.

2.2 $ROE_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. For the 449 observations Long-term Debt is not statistical important in the 95% significance level, p=0,7419, something that indicates that *there is not significant correlation between ROE and Long-term Debt*, or in other words, there is not significant impact of Long-term Debt on ROE.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Long-term Debt is not statistical important in the 95% significance level, p=0,8582, something that indicates that *there is not significant correlation between ROE and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table7, below.

Table 7: Regression Analysis Results, ROE/Long-term Debt. Method Random Effects, period 2002-2010, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:31
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.410844	0.138504	2.966299	0.0032
LTD_TA	0.036820	0.400004	0.092050	0.9267
SALES_GROWTH	-0.147850	0.361302	-0.409215	0.6826

Effects Specification	S.D.	Rho
Cross-section random	0.526370	0.1250
Idiosyncratic random	1.392864	0.8750

Weighted Statistics

R-squared	0.000394	Mean dependent var	0.267565
Adjusted R-squared	-0.004088	S.D. dependent var	1.387391
S.E. of regression	1.390225	Sum squared resid	861.9954
F-statistic	0.087983	Durbin-Watson stat	1.936216
Prob(F-statistic)	0.915792		

Unweighted Statistics

R-squared	0.000694	Mean dependent var	0.404259
Sum squared resid	979.7801	Durbin-Watson stat	1.703452

According to RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,9267, something that indicates that *there is not significant correlation between ROE and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (ROE) and the independent variable (Long-term Debt). Thus, H0 is accepted.

2.3 $ROE_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. For the 449 observations Total Debt is not statistical important in the 95% significance level, p=0,7728, something that indicates that

there is not significant correlation between ROE and Total Debt, or in other words, there is not significant impact of Total Debt on ROE.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, for the 449 observations, Total Debt is not statistical important in the 95% significance level, p=0,7361, something that indicates that *there is not significant correlation between ROE and Total Debt.*

Then, the Random Effects method was applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 8, below.

Table 8: Regression Analysis Results, ROE/Total Debt. Method Random Effects, period 2002-2010, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:34
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.419880	0.147652	2.843717	0.0047
TD_TA	-0.002788	0.360402	-0.007735	0.9938
SALES_GROWTH	-0.147626	0.361230	-0.408675	0.6830

Effects Specification	S.D.	Rho
Cross-section random	0.525627	0.1247
Idiosyncratic random	1.392720	0.8753

Weighted Statistics

R-squared	0.000376	Mean dependent var	0.267762
Adjusted R-squared	-0.004107	S.D. dependent var	1.387500
S.E. of regression	1.390347	Sum squared resid	862.1467
F-statistic	0.083815	Durbin-Watson stat	1.935293
Prob(F-statistic)	0.919616		

Unweighted Statistics

R-squared	0.000558	Mean dependent var	0.404259
Sum squared resid	979.9140	Durbin-Watson stat	1.702707

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,9938, something that indicates that *there is not significant correlation between ROE and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

As far as the second Model is concerned, the regression analysis results revealed that there is not significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt). In fact, the lack of correlation is important, since all p-values are close to 1.

Model 3:

H0: There is no significant impact of Independent Variables on Gross Profit Margin

H1: There is significant impact of Independent Variables on Gross Profit Margin

3.1 $GM_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Short-term Debt is not statistical important in the 95% significance level, p=0,1205, something that indicates that *there is not significant correlation between Gross Profit Margin and Short-term Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Short-term Debt is not statistical important in the 95% significance level, p=0,9310, something that indicates that *there is not significant correlation between Gross Profit Margin and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (Gross Profit Margin), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table9, below.

Table 9: Regression Analysis Results, Gross Profit Margin/Short-term Debt. Method Random Effects, period 2002-2010, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 21:39
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.570173	0.138904	4.104801	0.0000
STD_TA	-0.020843	0.173594	-0.120069	0.9045
SALES_GROWTH	-0.002746	0.188830	-0.014542	0.9884

Effects Specification	S.D.	Rho
Cross-section random	0.869143	0.6064
Idiosyncratic random	0.700256	0.3936

Weighted Statistics

R-squared	0.000033	Mean dependent var	0.146422
Adjusted R-squared	-0.004451	S.D. dependent var	0.698107
S.E. of regression	0.699678	Sum squared resid	218.3390
F-statistic	0.007342	Durbin-Watson stat	0.379268
Prob(F-statistic)	0.992685		

Unweighted Statistics

R-squared	0.000604	Mean dependent var	0.564307
Sum squared resid	546.0672	Durbin-Watson stat	0.151646

According to RE method, Short-term Debt is not statistical important in the 95% significance level, p=0,9045, something that indicates that *there is not significant correlation between Gross Profit Margin and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Short-term Debt). Thus, H0 is accepted.

3.2 $GM_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SGit + e_2$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Long-term Debt is not statistical important in the 95% significance level, p=0,2864, something that indicates that *there is not significant correlation between Gross Profit Margin and Long-term Debt*, or in other words, there is not significant impact of Long-term Debt on Gross Profit Margin.

Next, the method Fixed Effects (FE) was applied. Long-term Debt is not statistical important in the 95% significance level, p=0,4330, something that indicates that *there is not significant correlation between Gross Profit Margin and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (Gross Profit Margin), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 10, below.

Table 10: Regression Analysis Results, Gross Margin/Long-term Debt. Method Random Effects, period 2002-2010, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel EGLS (Cross-section random effects)
Date: 11/13/19 Time: 19:34
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.520125	0.139838	3.719495	0.0002
LTD_TA	0.195726	0.229250	0.853768	0.3937
SALES_GROWTH	-0.005330	0.188729	-0.028241	0.9775

Effects Specification	S.D.	Rho
Cross-section random	0.879586	0.6124
Idiosyncratic random	0.699720	0.3876

Weighted Statistics

R-squared	0.001639	Mean dependent var	0.144695
Adjusted R-squared	-0.002838	S.D. dependent var	0.697220
S.E. of regression	0.698227	Sum squared resid	217.4342
F-statistic	0.366156	Durbin-Watson stat	0.384325
Prob(F-statistic)	0.693603		

Unweighted Statistics

R-squared	0.002244	Mean dependent var	0.564307
Sum squared resid	545.1712	Durbin-Watson stat	0.153283

According to RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,3937, something that indicates that *there is not significant correlation between Gross profit Margin and Long-term Debt*.

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Long-term Debt). Thus, H0 is accepted.

3.3 $GM_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

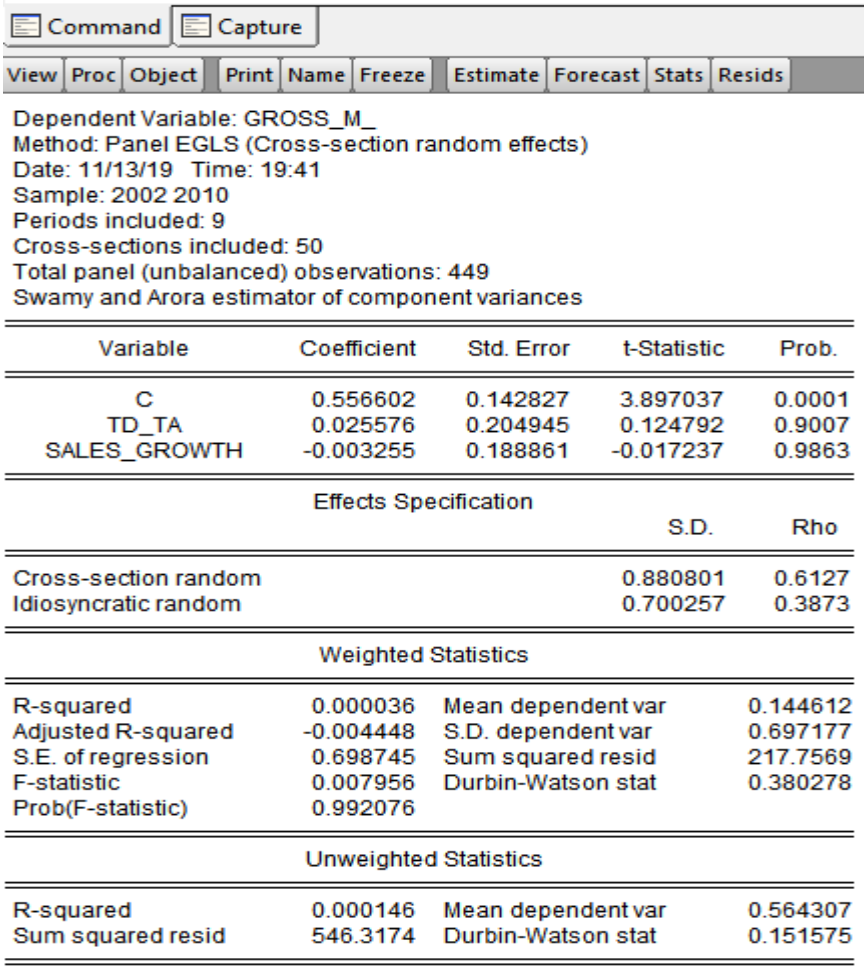
First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Total Debt is not statistical important in the 95% significance

level, p=0,6846, something that indicates that *there is not significant correlation between Gross Profit Margin and Total Debt,* or in other words, there is not significant impact of Total Debt on Gross Profit Margin.

Next, the method Fixed Effects (FE) was applied. According to FE method, Total Debt is not statistical important in the 95% significance level, p=0,9310, something that indicates that *there is not significant correlation between Gross Profit Margin and Total Debt.*

Then, the Random Effects method was applied. Results are demonstrated on table 11, below.

Table 11: Regression Analysis Results, Gross Margin/Total Debt. Method RE, period 2002-2010, FTSE100



Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel EGLS (Cross-section random effects)
Date: 11/13/19 Time: 19:41
Sample: 2002 2010
Periods included: 9
Cross-sections included: 50
Total panel (unbalanced) observations: 449
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.556602	0.142827	3.897037	0.0001
TD_TA	0.025576	0.204945	0.124792	0.9007
SALES_GROWTH	-0.003255	0.188861	-0.017237	0.9863

Effects Specification	S.D.	Rho
Cross-section random	0.880801	0.6127
Idiosyncratic random	0.700257	0.3873

Weighted Statistics

R-squared	0.000036	Mean dependent var	0.144612
Adjusted R-squared	-0.004448	S.D. dependent var	0.697177
S.E. of regression	0.698745	Sum squared resid	217.7569
F-statistic	0.007956	Durbin-Watson stat	0.380278
Prob(F-statistic)	0.992076		

Unweighted Statistics

R-squared	0.000146	Mean dependent var	0.564307
Sum squared resid	546.3174	Durbin-Watson stat	0.151575

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,9007, something that indicates that *there is not significant correlation between Gross profit Margin and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Total Debt). Thus, H0 is accepted.

5.2 FTSE 100 Period: 2011 – 2018

Results concerning the 50 companies of the FTSE100 Index, for the years 2011-2018 are listed below.

First descriptive statistics for the variables were calculated and are demonstrated in table 12 below:

Table12: Descriptive statistics for FTSE100 data for the years 2011-2018

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	ROA	ROE	GROSS_M_	LTD_TA	STD_TA	TD_TA	SALES_GR...
Mean	0.070380	0.364278	0.442550	0.220424	0.283518	0.268446	0.055068
Median	0.064100	0.159700	0.334050	0.211303	0.259150	0.254730	0.039450
Maximum	0.840000	19.76850	3.749494	1.322611	4.032620	1.787506	0.885370
Minimum	-0.750000	-1.172800	0.047044	0.000000	0.018304	0.008806	-0.324600
Std. Dev.	0.082574	1.238472	0.327814	0.118965	0.258278	0.141798	0.138351
Skewness	-0.376331	11.50937	3.859756	2.128476	9.286160	3.261100	1.414451
Kurtosis	45.43778	164.3716	34.46306	20.32282	123.7369	34.71737	10.01646
Jarque-Bera	30025.53	442844.1	17491.91	5303.364	248705.6	17475.51	953.8897
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	28.15184	145.7111	177.0202	88.16943	113.4074	107.3783	22.02710
Sum Sq. Dev.	2.720566	611.9915	42.87736	5.646957	26.61632	8.022508	7.637294
Observations	400	400	400	400	400	400	400

The figure above, demonstrates the descriptive statistics for the variables that are used for all the models, for the companies that belong to the FTSE Index, for the years 2011 – 2018. It seems that there is important deviation among the Gross Profit Margins and ROE for the companies of the sample. Nevertheless, the average Gross Profit Margin as well as ROE is high, something that indicates that the companies continued to demonstrate efficiency even during the years of the financial crisis (2011 – 2018). Of course, compared to the descriptive statistics of the same sample

for the years 2002-2010, all independent variables' values were reduced, something indicative of the influence – even not very important – of the financial crisis on the performance of the companies.

Table 13: Correlation matrix for FTSE100 data for the years 2011-2018

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	ROA	ROE	GROSS_M_	LTD_TA	STD_TA	TD_TA	SALES_GR...
ROA	1.000000	0.161906	0.205780	-0.031694	0.081089	-0.050603	0.113089
ROE	0.161906	1.000000	0.059280	0.084848	0.130503	0.091231	-0.012916
GROSS_M_	0.205780	0.059280	1.000000	0.012822	-0.151562	-0.054375	-0.031296
LTD_TA	-0.031694	0.084848	0.012822	1.000000	0.140542	0.941901	-0.006387
STD_TA	0.081089	0.130503	-0.151562	0.140542	1.000000	0.220410	-0.025248
TD_TA	-0.050603	0.091231	-0.054375	0.941901	0.220410	1.000000	-0.015194
SALES_GR...	0.113089	-0.012916	-0.031296	-0.006387	-0.025248	-0.015194	1.000000

According to figure above, the correlation between the dependent and the independent variables, negative or positive, is not significant.

Model 1:

The first group of hypotheses is the following:

H0: There is no significant impact of Independent Variables on Return on Asset

H1: There is significant impact of Independent Variables on Return on Asset.

Thus, the following regression models are checked for the period 2011-2018 for the companies belonging to FTSE100:

1.1 $ROA_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_i t + e_1$

First, the method OLS was applied in order to estimate the regression function. Results are shown in appendix. Short-term Debt is not statistical important in the 95% significance level, p=0,0918, something that indicates *that there is not significant correlation between ROA and Short-term Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Short-term Debt is not statistical important in the 95% significance level, p=0,1350 something that indicates *that there is not significant correlation between ROA and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table14, below.

Table 14: Regression Analysis Results, ROA/Short-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/05/19 Time: 23:54
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.058979	0.006333	9.313580	0.0000
STD_TA	0.026855	0.015885	1.690559	0.0917
SALES_GROWTH	0.068762	0.029655	2.318757	0.0209

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.081927	1.0000

Weighted Statistics

R-squared	0.019840	Mean dependent var	0.070380
Adjusted R-squared	0.014902	S.D. dependent var	0.082574
S.E. of regression	0.081956	Sum squared resid	2.666589
F-statistic	4.018018	Durbin-Watson stat	2.035431
Prob(F-statistic)	0.018725		

Unweighted Statistics

R-squared	0.019840	Mean dependent var	0.070380
Sum squared resid	2.666589	Durbin-Watson stat	2.035431

According to RE method, for the 400 observations Short-term Debt is not statistical important in the 95% significance level, p=0,0917, something that indicates that *there is not significant correlation between ROA and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant importance between the dependent variable (ROA) and the independent variable (Short-term Debt) for the companies of FTSE100 and for the period 2011-2018. Thus, H0 is accepted.

1.2. $ROA_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS was applied in order to estimate the regression function. Results are shown in appendix. Long-term Debt is not statistical important in the 95% significance level, something that indicates that *there is not significant correlation between ROA and Long-term Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. For the 400 observations, Long-term Debt is not statistical important in the 95% significance level, p=0,5348, something that indicates that *there is not significant correlation between ROA and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table15, below.

Table15: Regression Analysis Results, ROA/Long-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:00
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.071542	0.009297	7.695280	0.0000
LTD_TA	-0.021526	0.034620	-0.621786	0.5344
SALES_GROWTH	0.065057	0.030506	2.132616	0.0336

Effects Specification	S.D.	Rho
Cross-section random	0.008175	0.0098
Idiosyncratic random	0.082122	0.9902

Weighted Statistics

R-squared	0.012372	Mean dependent var	0.057551
Adjusted R-squared	0.007396	S.D. dependent var	0.082247
S.E. of regression	0.081943	Sum squared resid	2.665688
F-statistic	2.486583	Durbin-Watson stat	2.047906
Prob(F-statistic)	0.084489		

Unweighted Statistics

R-squared	0.013733	Mean dependent var	0.070380
Sum squared resid	2.683203	Durbin-Watson stat	2.034538

According to RE method, for the 400 observations, Long-term Debt is not statistical important in the 95% significance level, p=0,5344, something that indicates that *there is not significant correlation between ROA and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (ROA) and the independent variable (Long-term Debt). Thus, H0 is accepted.

1.3 $ROA_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Total Debt is not statistical important in the 95% significance level, p=0,3269, something that indicates that *there is not significant correlation between ROA and Total Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Total Debt is not statistical important in the 95% significance level, p=0,3104, something that indicates *that there is not significant correlation between ROA and Total Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table16, below.

Table 16: Regression Analysis Results, ROA/Total Debt. Method Random Effects, period 2011-2018, FTSE100

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:05
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.074555	0.009428	7.907857	0.0000
TD_TA	-0.028845	0.029032	-0.993577	0.3210
SALES_GROWTH	0.064792	0.030469	2.126470	0.0341

Effects Specification	S.D.	Rho
Cross-section random	0.008067	0.0096
Idiosyncratic random	0.082054	0.9904

Weighted Statistics			
R-squared	0.013891	Mean dependent var	0.057789
Adjusted R-squared	0.008923	S.D. dependent var	0.082253
S.E. of regression	0.081885	Sum squared resid	2.661942
F-statistic	2.796235	Durbin-Watson stat	2.045080
Prob(F-statistic)	0.062242		

Unweighted Statistics			
R-squared	0.015165	Mean dependent var	0.070380
Sum squared resid	2.679309	Durbin-Watson stat	2.031823

According to RE method, for the 400 observations Total Debt is not statistical important in the 95% significance level, p=0,3210, something that indicates *that there is not significant correlation between ROA and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

All the three methods of regression analysis indicate that there is not significant correlation between the dependent variable (ROA) and the independent variable (Total Debt). Thus, H0 is accepted.

As far as the first Model is concerned, the regression analysis results revealed that there is not significant correlation between ROA and the three independent variables (Short-term Debt, Long-term Debt and Total Debt) for the FTSE100 Index companies for the years 2011-2018.

Model 2:

H0: There is no significant impact of Independent Variables on Return on Equity.

H1: There is significant impact of Independent Variables on Return on Equity.

2.1 $ROE_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS was applied in order to estimate the regression function. Results are shown in appendix. Short-term Debt is statistical important in the 95% significance level, p=0,0092, something that indicates that *there is significant correlation between ROE and Short-term Debt*, or in other words, there is significant impact of Short-term Debt on ROA.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Short-term Debt is statistical important in the 95% significance level, p=0,0069, something that indicates that *there is significant correlation between ROE and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 17, below.

Table 17: Regression Analysis Results, ROE/Short-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:11
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.191935	0.095418	2.011519	0.0449
STD_TA	0.624611	0.239353	2.609579	0.0094
SALES_GROWTH	-0.086181	0.446831	-0.192872	0.8472

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	1.234453	1.0000

Weighted Statistics

R-squared	0.017124	Mean dependent var	0.364278
Adjusted R-squared	0.012172	S.D. dependent var	1.238472
S.E. of regression	1.230912	Sum squared resid	601.5120
F-statistic	3.458265	Durbin-Watson stat	2.041776
Prob(F-statistic)	0.032436		

Unweighted Statistics

R-squared	0.017124	Mean dependent var	0.364278
Sum squared resid	601.5120	Durbin-Watson stat	2.041776

According to RE method, for the 400 observations Short-term Debt is statistically important in the 95% significance level, p=0,0094, something that indicates that *there is significant correlation between ROE and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (ROE) and the independent variable (Short-term Debt). Thus, H0 is accepted. Also, since the RE method is the most appropriate the model that is derived by the regression analysis is the following:

$$ROE = 0{,}191935 + 0{,}624611\ SDA_{it} - 0{,}086181\ SG_i t + e_1$$

The equation above shows that there is positive correlation between the variables and that 1% increase in Short-term Debt (Ceteris paribus), results to an average increase of 62,5% of ROE.

2.2 $ROE_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS was applied in order to estimate the regression function. Results are shown in appendix. For the 400 observations Long-term Debt is not statistical important in the 95% significance level, p=0,0908, but it is statistically important in the 90% significance level. Something that indicates that *there is significant correlation between ROE and Long-term Debt,* or in other words, there is significant impact of Long-term Debt on ROE. The regression is the following:

$$ROE_{it} = 0,175859 + 0,882476\ LDA_{it} - 0,110775\ SG_{it} + e_2$$

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, of which the results are shown on figure above, Long-term Debt is not statistical important in the 95% significance level, p=0,1110, something that indicates that *there is not significant correlation between ROE and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on Table 18, below.

Table 18: Regression Analysis Results, ROE/Long-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:15
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.175859	0.133336	1.318917	0.1880
LTD_TA	0.882476	0.522671	1.688397	0.0921
SALES_GROWTH	-0.110775	0.449434	-0.246476	0.8054

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	1.242014	1.0000

Weighted Statistics

R-squared	0.007352	Mean dependent var	0.364278
Adjusted R-squared	0.002352	S.D. dependent var	1.238472
S.E. of regression	1.237015	Sum squared resid	607.4920
F-statistic	1.470246	Durbin-Watson stat	2.080290
Prob(F-statistic)	0.231118		

Unweighted Statistics

R-squared	0.007352	Mean dependent var	0.364278
Sum squared resid	607.4920	Durbin-Watson stat	2.080290

According to RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,0921, but it is statistically important in the 90% significance level, something that indicates that *there is significant correlation between ROE and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, there is significant correlation between the dependent variable (ROE) and the independent variable (Long-term Debt), at 90% significant level. Thus, H0 is rejected. Also, since the RE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$$ROE_{it} = 0{,}175859 + 0{,}882476\ LDA_{it} - 0{,}110775\ SG_{it} + e_2$$

The equation above shows that there is positive correlation between the variables and that 1% increase in Long-term Debt (Ceteris paribus), results to an average increase of 88,25% of ROE.

2.3 $ROE_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Total Debt is not statistically important in the 95% significance level, p=0,0692, but it is statistically important in at 90% significance level, something that indicates that *there is significant correlation between ROE and Total Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix.

According to FE method, of which the results are shown on figure above, Total Debt is not statistically important in the 95% significance level, p=0,0811, but it is statistically important in at 90% significance level, something that indicates that *there is significant correlation between ROE and Total Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 19, below.

Table 19: Regression Analysis Results, ROE/Total Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:21
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.156472	0.135623	1.153722	0.2493
TD_TA	0.795286	0.438269	1.814606	0.0703
SALES_GROWTH	-0.103236	0.449186	-0.229829	0.8183

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	1.241212	1.0000

Weighted Statistics			
R-squared	0.008456	Mean dependent var	0.364278
Adjusted R-squared	0.003461	S.D. dependent var	1.238472
S.E. of regression	1.236327	Sum squared resid	606.8165
F-statistic	1.692831	Durbin-Watson stat	2.079582
Prob(F-statistic)	0.185323		

Unweighted Statistics			
R-squared	0.008456	Mean dependent var	0.364278
Sum squared resid	606.8165	Durbin-Watson stat	2.079582

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,0703, but it is statistically important in the 90% significance level. something that indicates that *there is significant correlation between ROE and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, there is significant correlation between the dependent variable (ROE) and the independent variable (Total Debt), at 90% significant level. Thus, H0 is rejected. Also, since the RE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$$ROE_{it} = 0{,}156472 + 0{,}795286\ DA_{it} - 0{,}103236\ SG_{it} + e_2$$

The equation above shows that there is positive correlation between the variables and that 1% increase in Total Debt (Ceteris paribus), results to an average increase of 79,53% of ROE.

As far as the second Model is concerned, the regression analysis results revealed that there is significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt), at the 95% and the 90% significance level.

Model 3:

H0: There is no significant impact of Independent Variables on Gross Profit Margin

H1: There is significant impact of Independent Variables on Gross Profit Margin

3.1 $GM_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS was applied in order to estimate the regression function. Results are shown in appendix. According to figure above, Short-term Debt is statistically important in the 95% significance level, p=0,0023, something that indicates that *there is significant negative correlation between Gross Profit Margin and Short-term Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, for the 400 observations, Short-term Debt is statistically important in the 95% significance level, p=0,0019, something that indicates that *there is significant correlation between Gross Profit Margin and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (Gross Profit Margin), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table20, below.

Table 20: Regression Analysis Results, Gross Profit Margin/Short-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:28
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.501995	0.025247	19.88331	0.0000
STD_TA	-0.193493	0.063332	-3.055233	0.0024
SALES_GROWTH	-0.083274	0.118229	-0.704342	0.4816

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.326630	1.0000

Weighted Statistics

R-squared	0.024205	Mean dependent var	0.442550
Adjusted R-squared	0.019289	S.D. dependent var	0.327814
S.E. of regression	0.324637	Sum squared resid	41.83950
F-statistic	4.923933	Durbin-Watson stat	2.284252
Prob(F-statistic)	0.007721		

Unweighted Statistics

R-squared	0.024205	Mean dependent var	0.442550
Sum squared resid	41.83950	Durbin-Watson stat	2.284252

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Short-term Debt). Thus, H0 is rejected. Also, since the RE Method is the most appropriate, the model that is developed is the following:

$$GM_{it} = 0{,}501995 - 0{,}193493\ SDA_{it} - 0{,}083274\ SG_it + e_1$$

The equation above shows that there is negative correlation between the variables and that 1% increase in Long-term Debt (Ceteris paribus), results to an average decrease of 19,35% of Gross Profit Margin.

3.2 $GM_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SGit + e_2$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. For the 400 observations Long-term Debt is not statistical important in the 95% significance level, p=0,8014, something that indicates that *there is not significant correlation between Gross Profit Margin and Long-term Debt*, or in other words, there is not significant impact of Long-term Debt on *Gross Profit Margin.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Long-term Debt is not statistical important in the 95% significance level, p=0,7717, something that indicates that *there is not significant correlation between Gross Profit Margin and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (Gross Profit Margin), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 21, below.

Table 21: Regression Analysis Results, Gross Profit Margin/Long-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:35
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.438957	0.035499	12.36543	0.0000
LTD_TA	0.034782	0.139153	0.249955	0.8028
SALES_GROWTH	-0.073963	0.119655	-0.618135	0.5368

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.330667	1.0000

Weighted Statistics			
R-squared	0.001139	Mean dependent var	0.442550
Adjusted R-squared	-0.003893	S.D. dependent var	0.327814
S.E. of regression	0.328452	Sum squared resid	42.82854
F-statistic	0.226302	Durbin-Watson stat	2.249497
Prob(F-statistic)	0.797580		

Unweighted Statistics			
R-squared	0.001139	Mean dependent var	0.442550
Sum squared resid	42.82854	Durbin-Watson stat	2.249497

According to RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,8028, something that indicates that *there is not significant correlation between Gross Profit Margin and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Long-term Debt). Thus, H0 is accepted.

3.3 $GM_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Total Debt is not statistical important in the 95% significance level, p=0,2741, something that indicates that *there is not significant correlation between Gross Profit Margin and Total Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix.

According to FE method, Total Debt is not statistically important in the 95% significance level, p=0,2803, something that indicates that *there is not significant correlation between Gross Profit Margin and Total Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (Gross Profit Margin), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 22, below.

Table 22: Regression Analysis Results, Gross Profit Margin/Total Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 00:41
Sample: 1 400
Periods included: 50
Cross-sections included: 8
Total panel (balanced) observations: 400
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.480791	0.036081	13.32541	0.0000
TD_TA	-0.126836	0.116596	-1.087826	0.2773
SALES_GROWTH	-0.076129	0.119500	-0.637062	0.5245

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.330208	1.0000

Weighted Statistics

R-squared	0.003989	Mean dependent var	0.442550
Adjusted R-squared	-0.001029	S.D. dependent var	0.327814
S.E. of regression	0.327983	Sum squared resid	42.70634
F-statistic	0.794937	Durbin-Watson stat	2.264865
Prob(F-statistic)	0.452327		

Unweighted Statistics

R-squared	0.003989	Mean dependent var	0.442550
Sum squared resid	42.70634	Durbin-Watson stat	2.264865

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,2773, something that indicates that *there is not significant correlation between Gross Profit Margin and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

As far as the third Model is concerned, the regression analysis results revealed that there is not significant correlation between Gross Profit Margin and the three independent variables (Short-term Debt, Long-term Debt and Total Debt).

5.3 FTSE 250 Period: 2002 - 2010

Results concerning the 100 companies of the FTSE250 Index, for the years 2002-2010 are listed below. The 100 companies of the sample belong to the following sectors:

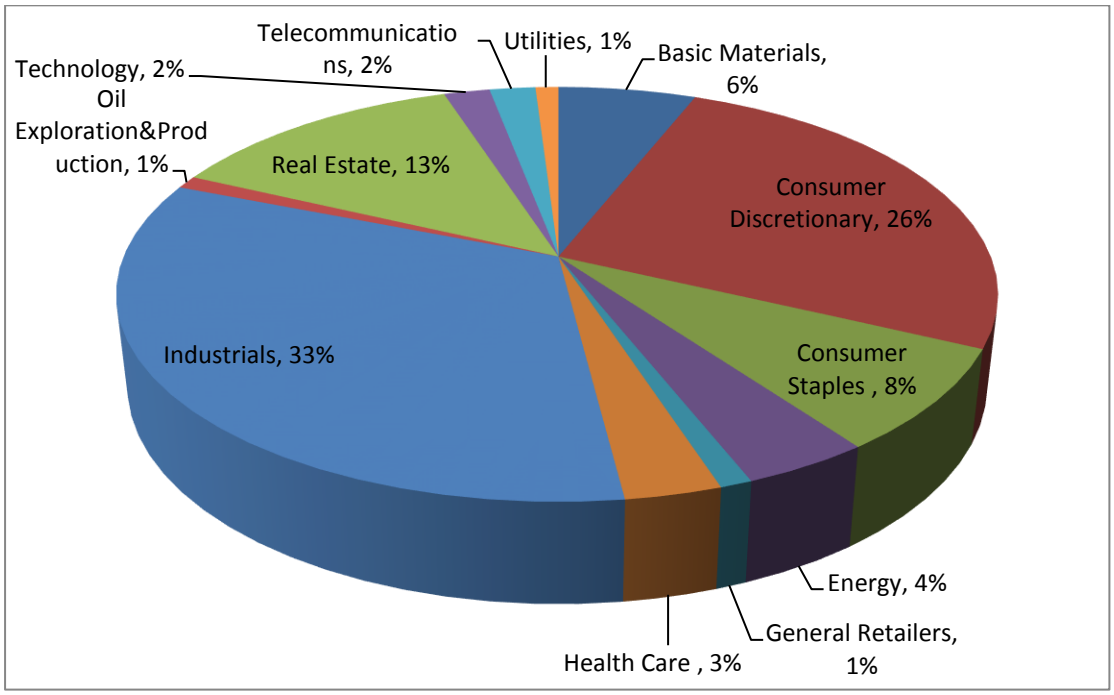


Figure 4: Number of Companies for each Sector FTSE250

First descriptive statistics for the variables were calculated and are demonstrated on figure below:

Table 23: Descriptive statistics for FTSE250 data for the years 2002-2010

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	ROA	ROE	GROSS_M_	STD_TA	LTD_TA	TD_TA	SALES_GR...
Mean	0.063147	0.262843	0.403357	0.306329	0.219391	0.258569	0.108634
Median	0.058950	0.164100	0.353287	0.291955	0.199659	0.254371	0.085162
Maximum	0.383400	69.54840	1.619048	5.475570	2.200326	2.200326	1.411765
Minimum	-1.046000	-2.084100	-0.324060	0.000000	0.000000	0.000000	-0.902830
Std. Dev.	0.086242	2.334162	0.259492	0.249275	0.188690	0.188977	0.223566
Skewness	-2.961197	29.11477	0.972893	10.15700	1.876884	1.621388	1.190440
Kurtosis	37.53733	864.5240	4.417336	206.9401	16.25749	15.00798	8.775522
Jarque-Bera	46046.31	27960535	217.3096	1575159.	7119.444	5801.522	1463.447
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	56.83265	236.5584	363.0210	275.6962	197.4520	232.7120	97.77027
Sum Sq. Dev.	6.686512	4898.031	60.53495	55.86227	32.00800	32.10548	44.93368
Observations	900	900	900	900	900	900	900

Table 23 demonstrates the descriptive statistics for the variables that are used for all the models, for the companies that belong to the FTSE Index, for the years 2002 – 2010. It seems that there is important deviation among the ROE and ROA for the companies of the sample. Nevertheless, the average Gross Profit Margin as well as ROE is high, something indicative of the effectiveness with which the companies of the sample were operating during the period 2002 – 2010. As far as Short-term Debt

and Long-term Debt are concerned, there is also substantial difference between the minimum and maximum values. 900 observations were included.

Table 24: Correlation matrix for FTSE250 data for the years 2002-2010

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	ROA	ROE	GROSS_M_	STD_TA	LTD_TA	TD_TA	SALES_GR...
ROA	1.000000	0.085204	0.057001	0.159647	-0.154651	-0.179992	0.156591
ROE	0.085204	1.000000	0.064850	0.048848	0.030732	0.029449	-0.000639
GROSS_M_	0.057001	0.064850	1.000000	-0.269227	0.297211	0.252267	-0.035985
STD_TA	0.159647	0.048848	-0.269227	1.000000	-0.014367	0.062292	0.039070
LTD_TA	-0.154651	0.030732	0.297211	-0.014367	1.000000	0.954269	-0.057260
TD_TA	-0.179992	0.029449	0.252267	0.062292	0.954269	1.000000	-0.058043
SALES_GR...	0.156591	-0.000639	-0.035985	0.039070	-0.057260	-0.058043	1.000000

According to table 24 above, there is 15,9% positive correlation between ROA and Short-term Debt/ Total assets, 15,5% negative correlation between ROA and Long-term Debt/Total Assets and 18% negative correlation between ROA and Total Debt / Total Assets.

As far as ROE is concerned, there is 4,8% positive correlation between ROE and Short-term Debt / Total Assets, 3,1% positive correlation between ROE and Long-term Debt / Total Assets, 2,9% positive correlation between ROE and Total Debt / Total Assets.

As for Gross Profit Margin, there is 26,9% negative correlation between Gross Profit Margin and Long-term Debt / Total Assets, 29,7% positive correlation between Gross Profit Margin and 25,2% positive correlation between Gross Profit Margin and Total Debt / Total Assets.

Model 1:

The first group of hypotheses is the following:

H0: There is no significant impact of Independent Variables on Return on Asset

H1: There is a significant impact of Independent Variables on Return on Asset.

Thus, the following regression models checked for the period 2002-2010 for the companies belonging to FTSE2500:

1.2 $ROA_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_i t + e_1$

First, the method OLS was applied. The results included in the appendix. Short-term Debt is statistically important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Short-term Debt.*

Next, the method Fixed Effects (FE) was applied, to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are included in the appendix. According to FE method, Short-term Debt is statistically important in the 95% significance level, p=0,04, something that indicates that *there is a significant correlation between ROA and Short-term Debt,* or in other words, there is not the significant impact of Short-term Debt on ROA.

Then, the Random Effects method was applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are shown on table25, below.

Table 25: Regression Analysis Results, ROA/Short-term Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 11:58
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.044403	0.005930	7.487639	0.0000
STD_TA	0.042990	0.012660	3.395592	0.0007
SALES_GROWTH	0.051320	0.012737	4.029097	0.0001

Effects Specification	S.D.	Rho
Cross-section random	0.034843	0.1711
Idiosyncratic random	0.076689	0.8289

Weighted Statistics

R-squared	0.031266	Mean dependent var	0.037354
Adjusted R-squared	0.029106	S.D. dependent var	0.077892
S.E. of regression	0.076750	Sum squared resid	5.283861
F-statistic	14.47526	Durbin-Watson stat	1.294776
Prob(F-statistic)	0.000001		

Unweighted Statistics

R-squared	0.046909	Mean dependent var	0.063147
Sum squared resid	6.372854	Durbin-Watson stat	1.073525

According to RE method, for the 900 observations, Short-term Debt is not statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Short-term Debt.*

Last, the Hausman test applied in order to decide on the best method between RE and FE. According to results that included in the appendix, there is not a significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is significant importance between the dependent variable (ROA) and the independent variable (Short-term Debt) for the companies of FTSE250 and for the period 2002-2010. Thus, H0 is rejected. The model developed is the following:

ROA_{it}= 0,044403 + 0,042990 SDA_{it}+ 0,051320 SG_it+e_1

The equation above shows that there is positive correlation between the variables and that 1% increase in Short-term Debt (Ceteris paribus), results to an average decrease of 4,3% of ROA.

1.2. $ROA_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS applied to estimate the regression function. The results are shown in the appendix. Long-term Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Long-term Debt,* or in other words, there is a significant impact of Long-term Debt on ROA.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are shown in the appendix. According to FE method, Long-term Debt is statistical important in the 95% significance level, p=0,00, something that indicates *that there is significant correlation between ROA and Long-term Debt,* or in other words, there is significant impact of Long-term Debt on ROA.

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table 26, below.

Table 26: Regression Analysis Results, ROA/Long-term Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 12:03
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.073044	0.006161	11.85632	0.0000
LTD_TA	-0.071040	0.018417	-3.857378	0.0001
SALES_GROWTH	0.052365	0.012725	4.115035	0.0000

Effects Specification	S.D.	Rho
Cross-section random	0.036197	0.1832
Idiosyncratic random	0.076421	0.8168

Weighted Statistics

R-squared	0.034680	Mean dependent var	0.036342
Adjusted R-squared	0.032528	S.D. dependent var	0.077639
S.E. of regression	0.076365	Sum squared resid	5.231017
F-statistic	16.11299	Durbin-Watson stat	1.278941
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.045586	Mean dependent var	0.063147
Sum squared resid	6.381698	Durbin-Watson stat	1.048336

According to RE method, for the 900 observations Long-term Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Long-term Debt.*

Last, the Hausman Test applied to decide on the best method between RE and FE. According to results that are shown in the appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all three methods of regression analysis indicate that there is a significant correlation between the dependent variable (ROA) and the independent variable (Long-term Debt). Thus, H0 rejected. Also, since the RE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$ROA = 0, 073044 - 0, 071040\ LDA_{it} + 0,052365\ SG_it + e_1$

The equation above shows that 1% increase in Long-term Debt (Ceteris paribus) results in an average decrease of 7,1% of ROA.

1.3 $ROA_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. The results are shown in the appendix. For the 900 observations, Total Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Total Debt,* or in other words, there is a significant impact of Total Debt on ROA. Also, there is a negative correlation between the dependent and the independent variable.

Next, the method Fixed Effects (FE) applied, to obtain better results since the bias minimized (the regression is realized for each data group separately). The results are shown in the appendix. According to FE method, Total Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Total Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. Results are demonstrated on figure 27, below.

Table 27: Regression Analysis Results, ROA/Total Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 12:07
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.080175	0.006645	12.06459	0.0000
TD_TA	-0.088037	0.018481	-4.763723	0.0000
SALES_GROWTH	0.052799	0.012666	4.168638	0.0000

Effects Specification	S.D.	Rho
Cross-section random	0.036025	0.1832
Idiosyncratic random	0.076070	0.8168

Weighted Statistics

R-squared	0.042877	Mean dependent var	0.036346
Adjusted R-squared	0.040743	S.D. dependent var	0.077640
S.E. of regression	0.076042	Sum squared resid	5.186740
F-statistic	20.09205	Durbin-Watson stat	1.277705
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.053297	Mean dependent var	0.063147
Sum squared resid	6.330140	Durbin-Watson stat	1.046916

According to RE method, Total Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Total Debt.*

Last, the Hausman test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

All three methods of regression analysis indicate that there is a significant correlation between the dependent variable (ROA) and the independent variable (Total Debt). Thus, H0 rejected. Also, since the RE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$$ROA = 0,080175 - 0,088037\ DA_{it} + 0,052799\ SG_it + e_1$$

The equation above shows that 1% increase in Total Debt (Ceteris paribus), results in an average decrease of 8,8% of ROA.

As far as the first Model is concerned, the regression analysis results revealed that there is a significant negative correlation between ROA and two of the three independent variables (Long-term Debt and Total Debt), whereas there is a significant positive correlation between ROA and Short-term Debt.

Model 2:

H0: There is no significant impact of Independent Variables on Return on Equity.

H1: There is a significant impact of Independent Variables on Return on Equity.

2.1 $ROE_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS is applied to estimate the regression function. The results are shown in the appendix. Short-term Debt is not statistical important in the 95% significance level, something that indicates that *there is no significant correlation between ROE and Short-term Debt*, p=0,1428, or in other words, there is no significant impact of Short-term Debt on ROA.

Next, the method Fixed Effects (FE) was applied to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are shown in the appendix. According to FE method, Short-term Debt is not statistical important in the 95% significance level, p=0,7513, something that indicates *that there is no significant correlation between ROE and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on Table28, below.

Table 28: Regression Analysis Results, ROE/Short-term Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 12:12
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.129339	0.132545	0.975812	0.3294
STD_TA	0.439587	0.320444	1.371806	0.1705
SALES_GROWTH	-0.010632	0.352224	-0.030186	0.9759

Effects Specification	S.D.	Rho
Cross-section random	0.282223	0.0146
Idiosyncratic random	2.317876	0.9854

Weighted Statistics			
R-squared	0.002095	Mean dependent var	0.246887
Adjusted R-squared	-0.000129	S.D. dependent var	2.317008
S.E. of regression	2.317158	Sum squared resid	4816.192
F-statistic	0.941801	Durbin-Watson stat	1.036399
Prob(F-statistic)	0.390310		

Unweighted Statistics			
R-squared	0.002387	Mean dependent var	0.262843
Sum squared resid	4886.341	Durbin-Watson stat	1.021520

According to RE method, Short-term Debt is not statistical important in the 95% significance level, p=0,1705, something that indicates that *there is not a significant correlation between ROE and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in the appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (ROE) and the independent variable (Short-term Debt). Thus, H0 is accepted.

2.2 $ROE_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS is applied in order to estimate the regression function. The results are shown in appendix. For the 900 observations Long-term Debt is not statistical important in the 95% significance level, p=0,3572, something that indicates *that there is no significant correlation between ROE and Long-term Debt,*or in other words, there is not significant impact of Long-term Debt on ROE.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group

separately). Results are shown in appendix. According to FE method, Long-term Debt is not statistical important in the 95% significance level, p=0,2711, something that indicates *that there is not significant correlation between ROE and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. The results are demonstrated in table29, below.

Table 29: Regression Analysis Results, ROE/Long-term Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 12:16
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.171266	0.133244	1.285356	0.1990
LTD_TA	0.403373	0.431630	0.934535	0.3503
SALES_GROWTH	0.028352	0.353456	0.080214	0.9361

Effects Specification	S.D.	Rho
Cross-section random	0.313988	0.0180
Idiosyncratic random	2.316262	0.9820

Weighted Statistics

R-squared	0.000975	Mean dependent var	0.243479
Adjusted R-squared	-0.001252	S.D. dependent var	2.313467
S.E. of regression	2.314915	Sum squared resid	4806.874
F-statistic	0.437741	Durbin-Watson stat	1.031603
Prob(F-statistic)	0.645630		

Unweighted Statistics

R-squared	0.000940	Mean dependent var	0.262843
Sum squared resid	4893.426	Durbin-Watson stat	1.013357

According to RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,3503, something that indicates that *there is not significant correlation between ROE and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not

significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (ROE) and the independent variable (Long-term Debt). Thus, H0 is accepted.

2.3 $ROE_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. For the 900 observations Total Debt is not statistical important in the 95% significance level, p=0,3776, something that indicates that *there is not significant correlation between ROE and Total Debt,* or in other words, there is not significant impact of Total Debt on ROE.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, for the 900 observations, Total Debt is not statistical important in the 95% significance level, p=0,6024, something that indicates that *there is not significant correlation between ROE and Total Debt.*

Then, the Random Effects method was applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. Results are demonstrated on table30, below.

Table 30: Regression Analysis Results, ROE/Total Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 12:20
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.164968	0.145815	1.131350	0.2582
TD_TA	0.367467	0.431209	0.852178	0.3943
SALES_GROWTH	0.026320	0.353484	0.074460	0.9407

Effects Specification	S.D.	Rho
Cross-section random	0.310084	0.0176
Idiosyncratic random	2.317627	0.9824

Weighted Statistics

R-squared	0.000812	Mean dependent var	0.243927
Adjusted R-squared	-0.001416	S.D. dependent var	2.313930
S.E. of regression	2.315568	Sum squared resid	4809.585
F-statistic	0.364266	Durbin-Watson stat	1.033118
Prob(F-statistic)	0.694809		

Unweighted Statistics

R-squared	0.000866	Mean dependent var	0.262843
Sum squared resid	4893.788	Durbin-Watson stat	1.015342

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,3943, something that indicates that *there is not a significant correlation between ROE and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

As far as the second Model is concerned, the regression analysis results revealed that there is not significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt).

Model 3:

H0: There is no significant impact of Independent Variables on Gross Profit Margin

H1: There is significant impact of Independent Variables on Gross Profit Margin

3.1 $GM_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Short-term Debt is statistical important in the 95%

significance level, p=0,00, something that indicates that *there is significant correlation between Gross Profit Margin and Short-term Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are shown in appendix. According to FE method, Short-term Debt is not statistical important in the 95% significance level, p=0,5132, something that indicates that *there is not significant correlation between Gross Profit Margin and Short-term Debt.*

Table 31: Regression Analysis Results, Gross Profit Margin/Short-term Debt. Method Random Effects, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel Least Squares
Date: 11/06/19 Time: 12:41
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.408762	0.007734	52.85196	0.0000
STD_TA	-0.014021	0.021436	-0.654111	0.5132
SALES_GROWTH	-0.010217	0.019597	-0.521353	0.6023

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.839976	Mean dependent var	0.403357
Adjusted R-squared	0.819723	S.D. dependent var	0.259492
S.E. of regression	0.110178	Akaike info criterion	-1.467065
Sum squared resid	9.687015	Schwarz criterion	-0.922793
Log likelihood	762.1791	Hannan-Quinn criter.	-1.259149
F-statistic	41.47294	Durbin-Watson stat	0.946020
Prob(F-statistic)	0.000000		

Then, the Random Effects method is applied. According to RE method, Short-term Debt is not statistical important in the 95% significance level, p=0,1704, something that indicates *that there is not significant correlation between Gross Profit Margin and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

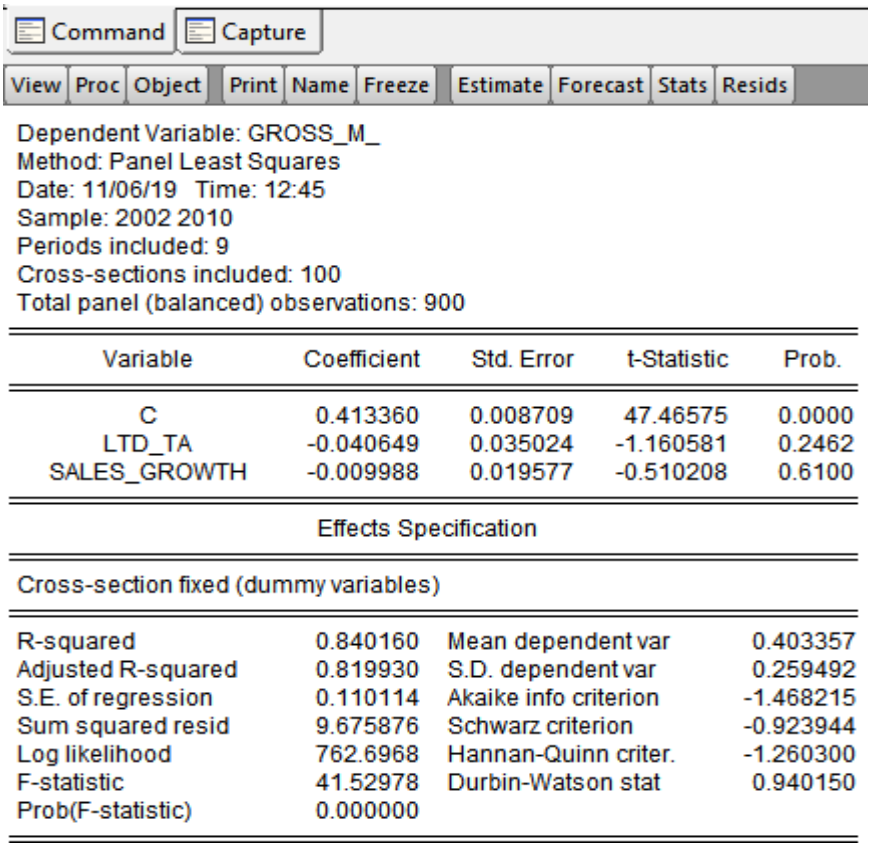
Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Short-term Debt). Thus, H0 is accepted.

3.2 $GM_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SGit + e_2$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Long-term Debt is statistically important in the 95% significance level, p=0,00, something that indicates that *there is significant correlation between Gross Profit Margin and Long-term Debt,* or in other words, there is not significant impact of Long-term Debt on Gross Profit Margin.

Next, the method Fixed Effects (FE) was applied. Long-term Debt is not statistical important in the 95% significance level, p=0,2462, something that indicates that *there is not significant correlation between Gross Profit Margin and Long-term Debt.*

Table 32: Regression Analysis Results, Gross Margin/Long-term Debt. Method Fixed Effects, period 2002-2010, FTSE250



Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (Gross Profit Margin), when the independent variable changes one unit, through time and among companies. Results are demonstrated in appendix.According to RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,9341, something that indicates that *there is not significant correlation between Gross profit Margin and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in appendix, there is significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is not significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Long-term Debt). Thus, H0 is accepted.

3.3 $GM_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. Results are shown in appendix. Total Debt is not statistical important in the 95% significance level, p=0,00, something that indicates that *there is significant correlation between Gross Profit Margin and Total Debt*, or in other words, there is not significant impact of Total Debt on Gross Profit Margin.

Next, the method Fixed Effects (FE) was applied. According to FE method, Total Debt is not statistical important in the 95% significance level, p=0,2494, something that indicates that *there is not significant correlation between Gross Profit Margin and Total Debt.*

Table 33: Regression Analysis Results, Gross Profit Margin/Total Debt, Method FE, period 2002-2010, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel Least Squares
Date: 11/06/19 Time: 12:50
Sample: 2002 2010
Periods included: 9
Cross-sections included: 100
Total panel (balanced) observations: 900

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.415094	0.010096	41.11293	0.0000
TD_TA	-0.041404	0.035918	-1.152733	0.2494
SALES_GROWTH	-0.009497	0.019598	-0.484584	0.6281

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.840157	Mean dependent var	0.403357
Adjusted R-squared	0.819926	S.D. dependent var	0.259492
S.E. of regression	0.110116	Akaike info criterion	-1.468192
Sum squared resid	9.676096	Schwarz criterion	-0.923921
Log likelihood	762.6866	Hannan-Quinn criter.	-1.260277
F-statistic	41.52866	Durbin-Watson stat	0.938527
Prob(F-statistic)	0.000000		

Then, the Random Effects method was applied. The results demonstrated in the appendix.

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,8011, something that indicates that *there is not a significant correlation between Gross profit Margin and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to the results shown in the appendix, there is a significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis indicate that there is no significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Total Debt). Thus, H0 is accepted.

6.4 FTSE 250 Period: 2011 – 2018

Results concerning the 100 companies of the FTSE250 Index for the years 2011-2018 are listed below.

First descriptive statistics for the variables were calculated and demonstrated in the figure below:

Table 34: Descriptive statistics for FTSE250 data for the years 2011-2018

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	ROA	ROE	GROSS_M_	STD_TA	LTD_TA	TD_TA	SALES_GR...
Mean	0.070743	0.176479	0.433344	0.276974	0.209742	0.238658	0.079126
Median	0.060800	0.140800	0.385048	0.256915	0.172912	0.216783	0.058740
Maximum	0.580000	2.772000	1.278846	2.703954	6.881373	7.117632	2.232773
Minimum	-0.393200	-3.269000	-0.018270	0.003252	0.000000	0.000000	-0.782490
Std. Dev.	0.073776	0.314779	0.249616	0.211493	0.306497	0.316023	0.207257
Skewness	-0.065910	0.678561	0.590757	3.555227	13.57907	13.54745	3.295434
Kurtosis	11.47263	38.85438	2.732720	30.85156	284.5051	284.4832	33.91145
Jarque-Bera	2390.435	42858.97	48.85266	27507.85	2662757.	2662232.	33256.95
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	56.52394	141.0064	346.2420	221.3025	167.5840	190.6879	63.22161
Sum Sq. Dev.	4.343432	79.07068	49.72179	35.69402	74.96450	79.69690	34.27861
Observations	799	799	799	799	799	799	799

Table 34 demonstrates the descriptive statistics for the variables that used for all the models, for the companies that belong to the FTSE250 Index, for the years 2011 – 2018. It seems that there is an important deviation among the ROE for the companies of the sample.

Nevertheless, the average Gross Profit Margin, as well as ROE, is high. As far as Short-term Debt and Long-term Debt are concerned, there is also a substantial difference between the minimum and maximum values. 900 observations were included.

Table 35: Correlation matrix for FTSE250 data for the years 2011-2018

Command | Capture

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	ROA	ROE	GROSS_M_	STD_TA	LTD_TA	TD_TA	SALES_GR...
ROA	1.000000	0.503041	0.146160	-0.053208	-0.193770	-0.215456	0.182064
ROE	0.503041	1.000000	0.175621	0.091942	-0.052532	-0.061729	0.088901
GROSS_M_	0.146160	0.175621	1.000000	-0.318083	0.192611	0.171751	-0.035862
STD_TA	-0.053208	0.091942	-0.318083	1.000000	0.110473	0.207265	-0.085177
LTD_TA	-0.193770	-0.052532	0.192611	0.110473	1.000000	0.967069	-0.086196
TD_TA	-0.215456	-0.061729	0.171751	0.207265	0.967069	1.000000	-0.097278
SALES_GR...	0.182064	0.088901	-0.035862	-0.085177	-0.086196	-0.097278	1.000000

According to table 35 above, there is 5,3% negative correlation between ROA and Short-term Debt/ Total assets, 19,4% negative correlation between ROA and Long-term Debt/Total Assets and 21,5% negative correlation between ROA and Total Debt / Total Assets.

As far as ROE is concerned, there is 9,2% positive correlation between ROE and Short-term Debt / Total Assets, 5,2% negative correlation between ROE and Long-term Debt / Total Assets, 6,2% negative correlation between ROE and Total Debt / Total Assets.

As for Gross Profit Margin, there is 31,8% negative correlation between Gross Profit Margin and Long-term Debt / Total Assets, 19,2% positive correlation between Gross Profit Margin and 17,2% positive correlation between Gross Profit Margin and Total Debt / Total Assets.

Model 1:

The first group of hypotheses is the following:

H0: There is no significant impact of Independent Variables on Return on Asset

H1: There is a significant impact of Independent Variables on Return on Asset.

Thus, the following regression models checked for the period 2011-2018 for the companies belonging to FTSE250:

1.3 $ROA_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_i t + e_1$

First, the method OLS was applied. Results are included in appendix. Short-term Debt is not statistically important in the 95% significance level, p=0,2776, something that indicates that *there is not significant correlation between ROA and Short-term Debt.*

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). Results are included in the appendix. According to FE method, Short-term Debt is statistically important in the 95% significance level, p=0,0458, something that indicates that *there is significant correlation between ROA and Short-term Debt,* or in other words, there is not significant impact of Short-term Debt on ROA.

Then, the Random Effects method was applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. The results are shown in table 36, below.

Table 36: Regression Analysis Results, ROA/Short-term Debt. Method Random Effects, period 2011-2018, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 13:36
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.075063	0.006919	10.84908	0.0000
STD_TA	-0.027926	0.015197	-1.837596	0.0665
SALES_GROWTH	0.044818	0.009605	4.665922	0.0000

Effects Specification	S.D.	Rho
Cross-section random	0.050752	0.4915
Idiosyncratic random	0.051623	0.5085

Weighted Statistics

R-squared	0.032187	Mean dependent var	0.023974
Adjusted R-squared	0.029756	S.D. dependent var	0.052516
S.E. of regression	0.051718	Sum squared resid	2.129124
F-statistic	13.23660	Durbin-Watson stat	1.229290
Prob(F-statistic)	0.000002		

Unweighted Statistics

R-squared	0.030384	Mean dependent var	0.070743
Sum squared resid	4.211464	Durbin-Watson stat	0.621473

According to RE method, for the 900 observations Short-term Debt is not statistical important in the 95% significance level, p=0,0665, but it is statistically important in the 90% significance level, something that indicates that *there is significant correlation between ROA and Short-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are included in the appendix, there is not significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is significant importance between the dependent variable (ROA) and the independent variable (Short-term Debt) for the companies of

FTSE250 and the period 2011-2018. Thus, H0 is rejected. The model developed is the following:

ROA_{it}= 0,075063- 0,027926 SDA_{it}+ 0,044818 SG_it+e_1

The equation above shows that there is a positive correlation between the variables and that 1% increase in Short-term Debt (Ceteris paribus) results in an average decrease of 2,8% of ROA.

1.2. $ROA_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS was applied to estimate the regression function. The results are shown in appendix. Long-term Debt is statistical important in the 95% significance level, p=0,00, something that indicates *that there is a significant correlation between ROA and Long-term Debt, or in other words, there is significant impact of Long-term Debt on ROA.*

Next, the method Fixed Effects (FE) applied to obtain better results since the bias minimized (the regression is realized for each data group separately). According to the FE method, Long-term Debt is statistical important in the 95% significance level, p=0,1157, something that indicates that *there is no significant correlation between ROA and Long-term Debt.*

Table 37: Regression Analysis Results, ROA/Long-term Debt, Method FE, period 2011-2018, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel Least Squares
Date: 11/06/19 Time: 13:40
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.070066	0.002639	26.54575	0.0000
LTD_TA	-0.012775	0.008110	-1.575116	0.1157
SALES_GROWTH	0.042418	0.009717	4.365421	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.571417	Mean dependent var	0.070743
Adjusted R-squared	0.509312	S.D. dependent var	0.073776
S.E. of regression	0.051679	Akaike info criterion	-2.968770
Sum squared resid	1.861522	Schwarz criterion	-2.370895
Log likelihood	1288.024	Hannan-Quinn criter.	-2.739080
F-statistic	9.200880	Durbin-Watson stat	1.411949
Prob(F-statistic)	0.000000		

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROA), when the independent variable changes one unit, through time and among companies. The results demonstrated in the appendix. According to RE method, Long-term Debt is statistical important in the 95% significance level, p=0,0128, something that indicates that *there is a significant correlation between ROA and Long-term Debt.*

Last, the Hausman Test applied in order to decide on the best method between RE and FE. According to results that are shown in the appendix, there is a significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

Taking the above under consideration, since the fixed effects method is the most appropriate, there is no significant correlation between the dependent variable (ROA) and the independent variable (Long-term Debt). Thus, H0 is accepted.

1.3 $ROA_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied to estimate the regression function. The results are shown in the appendix. For the 900 observations, Total Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Total Debt,* or in other words. There is a significant impact of Total Debt on ROA. Also, there is a negative correlation between the dependent and the independent variable.

Next, the method Fixed Effects (FE) applied, to obtain better results since the bias minimized (the regression is realized for each data group separately). According to FE method, Total Debt is not statistical important in the 95% significance level, p=0,0844, but it is statistically important in the 90% significance level, something that indicates that *there is a significant correlation between ROA and Total Debt.*

Table 38: Regression Analysis Results, ROA/Total Debt. Method Fixed Effects, period 2011-2018, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROA
Method: Panel Least Squares
Date: 11/06/19 Time: 13:49
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.070633	0.002757	25.62192	0.0000
TD_TA	-0.013573	0.007855	-1.728029	0.0844
SALES_GROWTH	0.042332	0.009713	4.358089	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.571726	Mean dependent var	0.070743
Adjusted R-squared	0.509666	S.D. dependent var	0.073776
S.E. of regression	0.051661	Akaike info criterion	-2.969492
Sum squared resid	1.860179	Schwarz criterion	-2.371616
Log likelihood	1288.312	Hannan-Quinn criter.	-2.739802
F-statistic	9.212507	Durbin-Watson stat	1.413614
Prob(F-statistic)	0.000000		

Then, the Random Effects method is applied. According to the RE method, Total Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between ROA and Total Debt.*

Last, the Hausman Test was applied to decide on the best method between RE and FE. According to results that are shown in the appendix, there is a significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

All three methods of regression analysis indicate that there is a significant correlation between the dependent variable (ROA) and the independent variable (Total Debt). Thus, H0 rejected. Also, since the FE Method is the most appropriate, the equation that explains the correlation between the variables is the following:

$ROA = 0,070633 - 0,013573\ DA_{it} + 0,042332\ SG_i t + e_1$

The equation above shows that 1% increase in Total Debt (Ceteris paribus), results to an average decrease of 1,36% of ROA.

As far as the first Model is concerned, the regression analysis results revealed that there is significant negative correlation between ROA and two of the three independent variables (Short-term Debt and Total Debt).

Model 2:

H0: There is no significant impact of Independent Variables on Return on Equity.

H1: There is a significant impact of Independent Variables on Return on Equity.

2.1 $ROE_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS is applied to estimate the regression function. The results are shown in the appendix. Short-term Debt is not statistical important in the 95% significance level, something that indicates that *there is a significant correlation between ROE and Short-term Debt*, p=0,00, or in other words, there is a significant impact of Short-term Debt on ROA.

Next, the method Fixed Effects (FE) was applied, to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are shown in appendix. According to FE method, Short-term Debt is not statistical important in the 95% significance level, p=0,4228, something that indicates that *there is not a significant correlation between ROE and Short-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Short-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. The results are demonstrated in table39, below.

Table 39: Regression Analysis Results, ROE/Short-term Debt. Method Random Effects, period 2011-2018, FTSE100

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 14:08
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.156476	0.028719	5.448600	0.0000
STD_TA	0.033644	0.068389	0.491946	0.6229
SALES_GROWTH	0.137096	0.045851	2.990060	0.0029

Effects Specification	S.D.	Rho
Cross-section random	0.191177	0.3729
Idiosyncratic random	0.247892	0.6271

Weighted Statistics

R-squared	0.011168	Mean dependent var	0.073613
Adjusted R-squared	0.008684	S.D. dependent var	0.249299
S.E. of regression	0.248204	Sum squared resid	49.03768
F-statistic	4.495120	Durbin-Watson stat	1.460517
Prob(F-statistic)	0.011448		

Unweighted Statistics

R-squared	0.011895	Mean dependent var	0.176479
Sum squared resid	78.13017	Durbin-Watson stat	0.916680

According to RE method, Short-term Debt is not statistical important in the 95% significance level, p=0,6229, something that indicates that *there is not significant correlation between ROE and Short-term Debt.*

Last, the Hausman Test applied in order to decide on the best method between RE and FE. According to results that are shown in the appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, there is not a significant correlation between the dependent variable (ROE) and the independent variable (Short-term Debt). Thus, H0 is accepted.

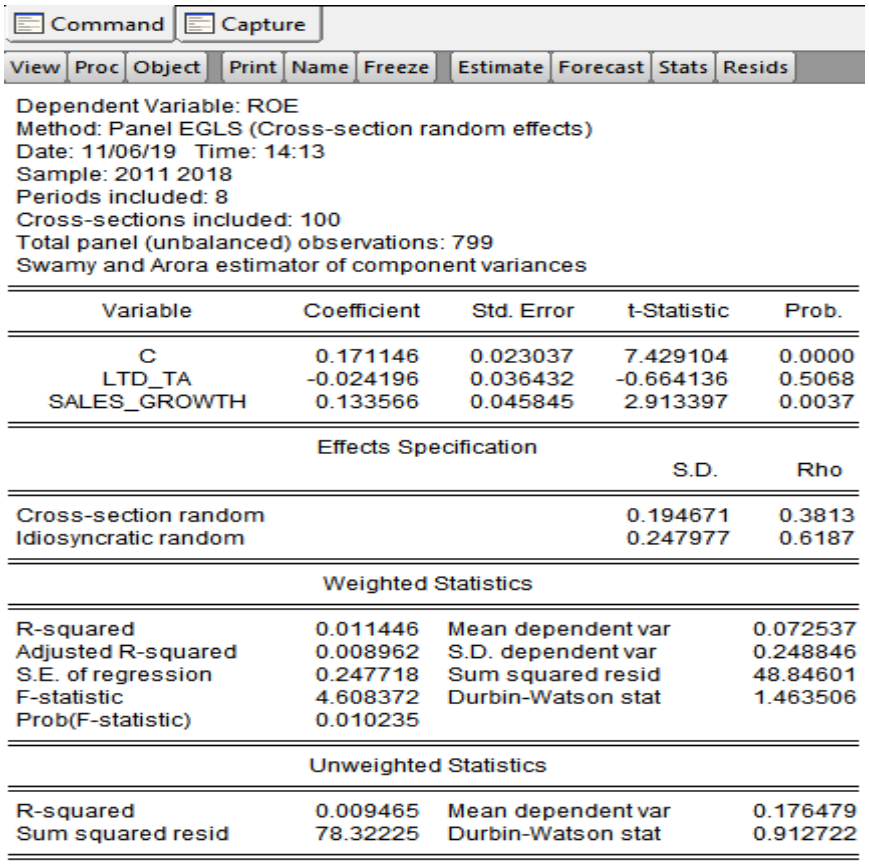
2.2 $ROE_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SG_{it} + e_2$

First, the method OLS is applied in order to estimate the regression function. The results are shown in the appendix. Long-term Debt is not statistical important in the 95% significance level, p=0,5068, something that indicates that *there is no significant correlation between ROE and Long-term Debt,* or in other words; there is not the significant impact of Long-term Debt on ROE.

Next, the method Fixed Effects (FE) was applied, to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are shown in the appendix. According to FE method, Long-term Debt is not statistical important in the 95% significance level, p=0,6846, something that indicates that *there is not a significant correlation between ROE and Long-term Debt.*

Then, the Random Effects method is applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Long-term Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. The results are demonstrated in table 40, below.

Table 40: Regression Analysis Results, ROE/Long-term Debt. Method Random Effects, period 2011-2018, FTSE250



Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 14:13
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.171146	0.023037	7.429104	0.0000
LTD_TA	-0.024196	0.036432	-0.664136	0.5068
SALES_GROWTH	0.133566	0.045845	2.913397	0.0037

Effects Specification	S.D.	Rho
Cross-section random	0.194671	0.3813
Idiosyncratic random	0.247977	0.6187

Weighted Statistics

R-squared	0.011446	Mean dependent var	0.072537
Adjusted R-squared	0.008962	S.D. dependent var	0.248846
S.E. of regression	0.247718	Sum squared resid	48.84601
F-statistic	4.608372	Durbin-Watson stat	1.463506
Prob(F-statistic)	0.010235		

Unweighted Statistics

R-squared	0.009465	Mean dependent var	0.176479
Sum squared resid	78.32225	Durbin-Watson stat	0.912722

According to the RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,5068, something that indicates that *there is no significant correlation between ROE and Long-term Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in the appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is no significant correlation between the dependent variable (ROE) and the independent variable (Long-term Debt). Thus, H0 is accepted.

2.3 $ROE_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied in order to estimate the regression function. The results are shown in the appendix. Total Debt is not statistical important in the 95% significance level, p=0,1307, something that indicates that *there is no significant*

correlation between ROE and Total Debt, or in other words; there is not a significant impact of Total Debt on ROE.

Next, the method Fixed Effects (FE) was applied, in order to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are shown in the appendix. According to FE method, Total Debt is not statistical important in the 95% significance level, p=0,6211, something that indicates that *there is not a significant correlation between ROE and Total Debt.*

Then, the Random Effects method was applied. The results of this method, and specifically the coefficients, take into account the differences among the companies as well as the differences among the years for a specific company. Thus, results show the average impact of the independent variable (Total Debt) on the dependent variable (ROE), when the independent variable changes one unit, through time and among companies. The results are demonstrated in table41 below.

Table 41: Regression Analysis Results, ROE/Total Debt. Method Random Effects, period 2011-2018, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 11/06/19 Time: 14:18
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.172821	0.023293	7.419491	0.0000
TD_TA	-0.028130	0.035304	-0.796801	0.4258
SALES_GROWTH	0.133091	0.045849	2.902815	0.0038

Effects Specification	S.D.	Rho
Cross-section random	0.194349	0.3805
Idiosyncratic random	0.247963	0.6195

Weighted Statistics

R-squared	0.011685	Mean dependent var	0.072634
Adjusted R-squared	0.009201	S.D. dependent var	0.248886
S.E. of regression	0.247728	Sum squared resid	48.85005
F-statistic	4.705431	Durbin-Watson stat	1.463996
Prob(F-statistic)	0.009299		

Unweighted Statistics

R-squared	0.010109	Mean dependent var	0.176479
Sum squared resid	78.27134	Durbin-Watson stat	0.913697

According to RE method, Total Debt is not statistical important in the 95% significance level, p=0,4258, something that indicates that *there is not a significant correlation between ROE and Total Debt.*

Last, the Hausman Test was applied in order to decide on the best method between RE and FE. According to results that are shown in the appendix, there is no significant correlation between FE and RE methods; thus, the Random Effects Model is the most appropriate.

As far as the second Model is concerned, the regression analysis results revealed that there is no significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt, and Total Debt).

Model 3:

H0: There is no significant impact of Independent Variables on Gross Profit Margin

H1: There is a significant impact of Independent Variables on Gross Profit Margin

3.1 $GM_{it} = \beta_0 + \beta_1 SDA_{it} + \beta_2 SG_{it} + e_1$

First, the method OLS is applied to estimate the regression function. The results are shown in the appendix. Short-term Debt is statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between Gross Profit Margin and Short-term Debt.*

Next, the method Fixed Effects (FE) applied, to obtain better results since the bias is minimized (the regression is realized for each data group separately). The results are shown in the appendix. According to FE method, Short-term Debt is not statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between Gross Profit Margin and Short-term Debt.*

Table 42: Regression Analysis Results, Gross Profit Margin/Short-term Debt. Method Fixed Effects, period 2011-2018, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel Least Squares
Date: 11/06/19 Time: 14:29
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.461014	0.007171	64.29293	0.0000
STD_TA	-0.092912	0.023778	-3.907471	0.0001
SALES_GROWTH	-0.024465	0.013006	-1.881074	0.0604

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.933107	Mean dependent var	0.433344
Adjusted R-squared	0.923413	S.D. dependent var	0.249616
S.E. of regression	0.069079	Akaike info criterion	-2.388376
Sum squared resid	3.326061	Schwarz criterion	-1.790500
Log likelihood	1056.156	Hannan-Quinn criter.	-2.158686
F-statistic	96.26295	Durbin-Watson stat	1.256220
Prob(F-statistic)	0.000000		

Then, the Random Effects method is applied. According to RE method, Short-term Debt is not statistical important in the 95% significance level, p=0,00, something that indicates that *there is no significant correlation between Gross Profit Margin and Short-term Debt.*

Last, the Hausman Test applied in order to decide on the best method between RE and FE. According to results that are shown in the appendix, there is a significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

Taking the above under consideration, all the three methods of regression analysis, indicate that there is a significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Short-term Debt). Thus, H0 is rejected. Since the FE model is most appropriate, the equation is the following:

GM_{it}= 0,461014 – 0,092912 SDA_{it}- 0,024465 SG_{it}+e_1

3.2 $GM_{it} = \alpha_0 + \alpha_1 LDA_{it} + \alpha_2 SGit + e_2$

First, the method OLS is applied to estimate the regression function. The results are shown in the appendix. Long-term Debt is statistically important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between Gross Profit Margin and Long-term Debt*, or in other words, there is not the significant impact of Long-term Debt on Gross Profit Margin.

Next, the method Fixed Effects (FE) was applied. Long-term Debt is not statistical important in the 95% significance level, p=0,3168, something that indicates that *there is not a significant correlation between Gross Profit Margin and Long-term Debt.*

Table 43: Regression Analysis Results, Gross Margin/Long-term Debt. Method Fixed Effects, period 2011-2018, FTSE250

Command | Capture

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: GROSS_M_
Method: Panel Least Squares
Date: 11/06/19 Time: 14:34
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.437337	0.003564	122.7093	0.0000
LTD_TA	-0.010972	0.010951	-1.001872	0.3168
SALES_GROWTH	-0.021376	0.013120	-1.629239	0.1037

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.931740	Mean dependent var	0.433344
Adjusted R-squared	0.921848	S.D. dependent var	0.249616
S.E. of regression	0.069782	Akaike info criterion	-2.368146
Sum squared resid	3.394033	Schwarz criterion	-1.770270
Log likelihood	1048.074	Hannan-Quinn criter.	-2.138455
F-statistic	94.19688	Durbin-Watson stat	1.210453
Prob(F-statistic)	0.000000		

Then, the Random Effects method is applied. The results demonstrated in the appendix. According to the RE method, Long-term Debt is not statistical important in the 95% significance level, p=0,4881, something that indicates that there is not a significant correlation between Gross profit Margin and Long-term Debt.

Last, the Hausman Test applied in order to decide on the best method between RE and FE. According to the results shown in the appendix, there is a significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

Taking the above under consideration, there is no significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Long-term Debt). Thus, H0 is accepted.

3.3 $GM_{it} = \lambda_0 + \lambda_1 DA_{it} + \lambda_2 SG_{it} + e_3$

First, the method OLS is applied to estimate the regression function. The results are shown in the appendix. Total Debt is not statistical important in the 95% significance level, p=0,00, something that indicates that *there is a significant correlation between Gross Profit Margin and Total Debt*, or in other words, there is no significant impact of Total Debt on Gross Profit Margin.

Next, the method Fixed Effects (FE) was applied. According to the FE method, Total Debt is not statistical important in the 95% significance level, p=0,17, something that indicates that *there is no significant correlation between Gross Profit Margin and Total Debt.*

Table 44: Regression Analysis Results, Gross Profit Margin/Total Debt, Method FE, period 2011-2018, FTSE250

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Dependent Variable: GROSS_M_
Method: Panel Least Squares
Date: 11/06/19 Time: 14:40
Sample: 2011 2018
Periods included: 8
Cross-sections included: 100
Total panel (unbalanced) observations: 799

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.438533	0.003721	117.8418	0.0000
TD_TA	-0.014566	0.010603	-1.373739	0.1700
SALES_GROWTH	-0.021643	0.013112	-1.650570	0.0993

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.931826	Mean dependent var	0.433344
Adjusted R-squared	0.921947	S.D. dependent var	0.249616
S.E. of regression	0.069738	Akaike info criterion	-2.369411
Sum squared resid	3.389743	Schwarz criterion	-1.771535
Log likelihood	1048.580	Hannan-Quinn criter.	-2.139720
F-statistic	94.32484	Durbin-Watson stat	1.212222
Prob(F-statistic)	0.000000		

Then, the Random Effects method was applied. The results are demonstrated in the appendix.

According to the RE method, Total Debt is not statistical important in the 95% significance level, p=0,2728, something that indicates that *there is no significant correlation between Gross profit Margin and Total Debt.*

Last, the Hausman test was applied to decide on the best method between RE and FE. According to the results shown in the appendix, there is a significant correlation between FE and RE methods; thus, the Fixed Effects Model is the most appropriate.

Taking the above under consideration, *there is not a significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Total Debt). Thus, H0 is accepted.*

6.Conclusions

6.1 Key Results

- For the period 2002 – 2010, for the FTSE100 companies:
    - In respect of the first model is concerned, long term debt and Total Debt have significant, negative impact on ROA, whereas there is no significant impact of short-term debt on ROA. Thus, H0 is partly accepted.
    - As far as the second Model is concerned, the regression analysis results revealed that there is no significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt). Thus, H0 is accepted.
    - There is not a significant correlation between the dependent variable (Gross Profit Margin) and the independent variables. Thus, H0 is accepted
- For the period 2010 – 2018, for the FTSE100 companies:
    - Concerning the first model, all the three methods of regression analysis indicate that there is not significant importance between the dependent variable (ROA) and the independent variables. Thus, H0 is accepted.
    - Towards the second model concerned, there is a significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt), at the 95% and the 90% significance level. These results are under other researchers' findings (Gill et al., 2011).
    - As far as the third Model is concerned, the regression analysis results revealed that there is no significant correlation between Gross Profit Margin and the two independent variables (Long-term Debt and Total Debt). There is a significant correlation between Short-term Debt and Gross Profit Margin.

- For the period 2002-2010, for FTSE250 companies:
    - Because of the first Model, the regression analysis results revealed that there is a significant negative correlation between ROA and two of the three independent variables (Long-term Debt and Total Debt), whereas there is a significant positive correlation between ROA and Short-term Debt. These results are in consistence with other researchers' results (Chen & Chen, 2011; Tailab, 2015; Vaicondam & Ramakrishnan, 2017).
    - As far as the second Model is concerned, the regression analysis results revealed that there is not a significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt).
    - For the third model, all three methods of regression analysis indicate that there is not a significant correlation between the dependent variable (Gross Profit Margin) and the independent variables. Thus, H0 is accepted.
- For the period 2011-2018, for FTSE250 companies:
    - As far as the first Model is concerned, the regression analysis results revealed that there is a significant negative correlation between ROA and two of the three independent variables (Short-term Debt and Total Debt).
    - As far as the second Model is concerned, the regression analysis results revealed that there is no significant correlation between ROE and the three independent variables (Short-term Debt, Long-term Debt and Total Debt).
    - All the three methods of regression analysis indicate that there is a significant correlation between the dependent variable (Gross Profit Margin) and the independent variable (Short-term Debt), whereas there is not significant correlation between Gross Profit Margin and the other two independent variables. Previous research has revealed an only positive correlation between gross profit margin and long-term debt (Voulgaris, 2002).

These results reveal that profitable firms do not rely on debt to finance their operations. The fact that ROA is the ratio that is correlated with profitability, maybe since most of the companies in the sample belong to the industrial sector. On the other hand, the positive correlation between profitability and short – term debt is since companies, in the short term, want to borrow from banks because of the benefits they receive since interest tax is deductible (Sibindi, 2016).

The correlation, even if it exists, it is not always important in terms of percentage. The important correlation applies to the following cases:

i. Short term debt (62,4%), Long-term debt (88,2%), and Total debt (79,5%) to ROE, for the period 2011-2018 for the companies of the FTSE100 Index, something that shows that debt structure choice for firms can alter their operating profit significantly.
ii. Short –term debt (19,3% & 38,2%) to Gross Profit Margin for the period 2011-2018 for the companies of the FTSE100 and the FTSE250 Index respectively, something that shows that the capital structure choice for these firms can alter their operating profit.

Also, as far as the two different periods of investigation are concerned, for FTSE100 Index companies, results are almost the same, i.e., only ROA is correlated with firms Capital Structure. The difference is that short-term debt is not significantly correlated with ROA for the years before the crisis, whereas it positively correlated with ROA during the years of crisis. This may be since during crisis, firms needed to borrow to increase their profitability, since revenues decreased. For the FTSE250 Index, during the years of crisis, only one dependent variable, Gross Profit Margin, is negatively correlated with one of the independent variables, Short-term debt. For the years before the crisis, ROA correlated with long-term debt and total debt. These results indicate that the effect of capital structure on profitability changed during the years of crisis.

Last, between the two periods, descriptive statics reveal that all dependent variables changed. It is indicative that the companies of the FTSE100 Index were more affected than the companies of the FTSE250 Index.

Generally, the results indicate that capital structure affects profitability, to a greater or lower extent. There is not a specific rule for firms to follow since the

capital structure is also an internal decision and can be affected by several factors. Nevertheless, the present study adds in the existing literature by confirming previous research results as well as by revealing new relationships between the variables selected for the research.

6.2 Further Research

Eventually, wider research on this topic could be done by adding more independent variables and presenting Total Assets instead of Total Debt. It would still be possible to add additional control variables to be more stable in our sample. Moreover, the balanced participation of all sectors in the research it would be an extra clue about the needs of each business area separately.

Bibliography

1. Abeywardhana, D.K.Y. (2015). Capital Structure and Profitability: An Empirical Analysis of SMEs in the UK, *Journal of Emerging Issues in Economics, Finance and Banking*, 4(2), 1-14
2. Abor, J., (2005). "The effect of capital structure on profitability: empirical analysis of listed firms in Ghana". Journal of Risk Finance, 6(5), pp. 438-45.
3. Addae, A.A., Baasi, M.N. & Hughes, D. (2013). The Effects of Capital Structure on Profitability of Listed Firms in Ghana, *European Journal of Business and Management*, 5 (31), 215-229
4. Ahmad, T. (2014). Impact of Capital Structure on Profitability: An Empirical Analysis of Cement Sector of Pakistan, *Research Journal of Finance and Accounting*, 5(17), 49-54
5. Ahmed, N., Ahmed, Z. & Ahmed, I. (2010). Determinants of Capital Structure: A Case of Life Insurance Sector of Pakistan. European Journal of Economics, *Finance and Administrative Sciences*, 24, 7-12
6. Al Kahtani, N. and Al Eraij, M. (2018). Does capital structure matter? Reflection on capital structure irrelevance theory: Modigliani-Miller theorem (MM 1958). International Journal of Financial Services Management, 9(1), p.39.
7. Antoniou, A., Guney, Y. & Paudyal, K. (2008). The Determinants of Capital Structure: Capital Market Oriented Versus Bank-Oriented Institutions, *Journal of Financial and Quantitative Analysis*, 43(01), 59-92
8. Baker, M., Wurgler, J., (2002), 'Market Timing and Capital Structure', The Journal of Finance, 57, pp.1-32.
9. Baltagi, B., 2008. Econometric analysis of panel data. John Wiley & Sons.
10. Barclay, M.J. & Smith, C.W. (2005). The Capital Structure Puzzle: The Evidence Revisited, *Journal of Applied Corporate Finance*, 17(1), 8-17
11. Bennett, M., Donnelly, R., (1993), 'The Determinants of Capital Structure: Some UK Evidence', The British Accounting Review, 25, pp. 43-59.
12. Bolton, Patrick, and David S Scharfstein, 1996, Optimal debt structure and the number of creditors, Journal of Political Economy, pp.1–25.
13. Chen, L.J. & Chen, S.Y. (2011). The influence of profitability on firm value with capital structure as the mediator and firm size and industry as moderators, *Investment Management and Financial Innovations*, 8(3), 121-129
14. Chisti, K.A., Ali, K. & Sangmi, M.D. (2013). Impact of capital structure on profitability of listed companies (evidence from India), *The USV Annals of Economics and Public Administration*, 13(1), 183-191
15. Chou, S. R., Yang, J. A. and Lee, C. H. (2011) Determinants of capital structure in Taiwan 50: a structure equation modeling approach, Sun Yat-Sen Management Review, 19, pp. 225–77.
16. Claver, E., Molina, J., & Tari, J. (2002). Firm and industry effects on firm profitability: a Spanish empirical analysis. European Management Journal, 20(3). pp. 321-328.

17. de Mesquita, J.M.C. & Lara, J.E. (2015). Capital Structure and Profitability: The Brazilian Case, [online] available at: https://www.researchgate.net/publication/265235369_CAPITAL_STRUCTURE_AND_PROFITABILITY_THE_BRAZILIAN_CASE, accessed: November 10, 2019
18. Deesomsak, R., Paudyal, K., Pescetto, G., (2004), 'The Determinants of Capital Structure: Evidence from the Asia Pacific Region', Journal of Multinational Financial Management, 14, pp. 387-405.
19. Eriotis, N. P., Frangouli, Z., & Ventoura-Neokosmides, Z. (2011). Profit margin and capital structure: An empirical relationship. The Journal of Applied Business Research, 18(2), pp. 85-88.
20. Fama, E. F., French, K. R., (2002), 'Testing Trade-Off and Pecking Order Predictions about Dividends and Debt', Review of Financial Studies, 15, pp. 1-33.
21. Frank, M.Z. & Goyal, V.K. (2009), Capital Structure Decisions: Which Factors Are Reliably Important? *Financial Management*, 38(1), 1-37
22. Friend, I., & Lang, L. H. P. (1988). An empirical test of the impact of managerial self-interest on corporate capital structure. Journal of Finance, 43, pp. 271– 281.
23. Gill, A., Biger, N. & Mathur, N. (2011). The Effect of Capital Structure on Profitability: Evidence from the United States, *International Journal of Management*, 28(4), 3-15
24. Hamid, M.A., Abdullah, A. & Kamaruzzaman, N.A. (2015). Capital Structure and Profitability in Family and Non-Family Firms: Malaysian evidence, *Procedia Economics and Finance*, 31, 44-55
25. Harris, M. & Raviv, A. (1991). The Theory of Capital Structure, *The Journal of Finance*, 46(1), 297-355
26. Jong, A., Kabir, R., Nguyen, T. T., (2008), 'Capital structure around the world: The roles of firm- and country-specific determinants', Journal of Banking & Finance, Volume 32, Issue 9, September 2008, pp. 1954-1969.
27. Keith, G. (1998). Determinants of growth and profitability in small entrepreneurial firms. International Journal of Entrepreneurial Behavior & Research, 4(1), pp. 18-27
28. Leary, M. T., Roberts, M. R., (2005), 'Do Firms Rebalance Their Capital Structures?'
29. Mashavave, F. & Tsaurai, K. (2015). Capital Structure and Porfitability, A case of JSE Listed Companies, Risk governance & control: financial markets & institutions, 5(1), 81-93
30. Modigliani, F., Miller, M. H., (1958), 'The cost of capital, corporation finance and the theory of investment', The American Economic Review, 261-297.
31. Modigliani, F., Miller, M. H., (1963), 'Corporate income taxes and the cost of capital: A correction', The American Economic Review, 53, 433-443.
32. Myers, S. C., (1984), 'The capital structure puzzle', The Journal of Finance, 39, pp. 575-592.
33. Myers, S.C. (2001). Capital Structure, *The Journal of Economic Perspectives*, 15(2), 81-102

34. Nasimi, A.N. (2016). Effect of Capital Structure on Firm Profitability (An Empirical Evidence from London, UK), Global Journal of management and Business research: C Finance, 16(4), 9-19

35. Nishanthini, A. and Nimalathasan, B. (2014). Determinants of profitability: a case study of listed manufacturing companies in Sri Lanka. Journal of Management, 8(1), p.42.

36. Oino, I. & Ukaegbu, B. (2015). The impact of profitability on capital structure and speed of adjustment: An empirical examination of selected firms in Nigerian Stock Exchange, *Research in International Business and Finance*, 35, 111-121

37. Oino, I. and Ukaegbu, B. (2015). The impact of profitability on capital structure and speed of adjustment: An empirical examination of selected firms in Nigerian Stock Exchange. Research in International Business and Finance, 35, pp.111-121.

38. Ozkan, A., (2001), 'Determinants of Capital Structure and Adjustment to Long Run Target: Evidence from UK Company Panel Data', Journal of Business Finance & Accounting, 28, pp.175-198.

39. Pasiouras, F. & Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union, Research in International Business and Finance, 21, 222-237

40. Petria, N., Capraru, B. & Ihnatov, J. (2015). Determinants of banks' profitability: evidence from EU 27 banking systems, Procedia Economics and Finance, 20, 518-524

41. Rasiah, D. & Kim, P.K. (2011). A Theoretical Review on The Use of The Static Trade Off Theory, The Pecking Order Theory and The Agency Cost Theory of Capital Structure, *International Research Journal of Finance and Economics*, 63, 150-159

42. Scott, J. H., (1976), 'A theory of optimal capital structure', The Bell Journal of Economics, 7, pp.33-54.

43. Sharma, A. and Kumar, S. (2010). Effect of Working Capital Management on Firm Profitability. Global Business Review, 12(1), pp.159-173.

44. Shubita, M.F. & Maroof, J.A. (2012). The Relationship between Capital Structure and Profitability, International Journal of Business and Social Science, 3(16), 104-112

45. Sibindi, A.B. (2016). Determinants of Capital Structure: A Literature Review, Risk Governance & Control: Financial Markets & Institutions, 6(4), 227-238

46. Singh, N.P. & Bagga, M. (2019). The Effect of Capital Structure on Profitability: An Empirical Panel Data Study, *Jindal Journal of Business Research*, 1–13

47. Soultan, A.S. & Adam, M.H.M. (2015). The effect of Capital Structure on Profitability: An empirical Analysis of Listed Firms in Iraq, *European Journal of Accounting, Auditing and Finance Research*, 3(2), 61-78

48. Stekla, J. & Grycova, M. (2015). The Relationship between Capital Structure and profitability of the Limited Liability Companies, *Acta universiatis Bohemiae Meridionalis*, 18(2), 32-41

49. Tailab, M.M.K. (2014). he Effect of Capital Structure on Profitability of Energy American Firms, International *Journal of Business and Management Invention*, 3(12), 54-61The Journal of Finance, 60, pp. 2575-2619.

50. Titman, S. & Wessels, R. (1988). The determinants of Capital Structure Choice, *The journal of finance*, 43(1), 1-19

51. Vaicondam, Y. & Ramakrishnan, S. (2017). Capital Structure and Profitability Across Malaysian Listed Firms, *Advanced Science Letters*, 23, 9275-9278

52. Voulgaris, F., Asteriou, D. & Agiomirgianakis, G. (2002). Capital structure, asset utilization, profitability and growth in the Greek manufacturing sector, *Applied Economics*, 34(11), 1379-1388

53. Williams, R., 2015. Panel data 4: Fixed effects vs random effects models. University of Notre Dame

54. Zaid, N. A. M., Ibrahim, W. M. F. W., & Zulqernain, N. S. (2014). The Determinants of profitability: Evidence from Malaysian construction companies. Proceedings of 5th Asia-Pacific Business Research Conference. Kuala Lumpur, Malaysia

55. Information about Indexes are taken from London Stock Exchange: https://www.londonstockexchange.com/home/homepage.htm

Appendix

The tables below summarize the above-described results for all the methods, for the two periods and the two different companies' groups.

Period 2002 – 2010, FTSE100

	ROA					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,085	0,00	0,090	0,00	0,090	0,00
STD/TA	-0,020	0,20	-0,025	0,06	-0,024	0,06
SALES_GROWTH	0,055	0,00	0,018	0,22	0,023	0,11
Constant	0,095	0,00	0,095	0,00	0,096	0,00
LDA/TA	-0,072	0,00***	-0,058	0,00***	-0,060	0,00***
SALES_GROWTH	0,056	0,00	0,018	0,21	0,024	0,10
Constant	0,097	0,00	0,097	0,00	0,097	0,00
TD/TA	-0,066	0,00***	-0,050	0,00***	-0,053	0,00***
SALES_GROWTH	0,055	0,00	0,018	0,22	0,023	0,10
	ROE					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,350	0,00	0,568	0,00	0,441	0,00
STD/TA	0,237	0,44	-0,508	0,15	-0,071	0,82
SALES_GROWTH	-0,176	0,63	-0,102	0,79	-0,153	0,67
Constant	0,396	0,00	0,434	0,00	0,410	0,00
LDA/TA	0,121	0,74	-0,084	0,86	0,037	0,93
SALES_GROWTH	-0,188	0,60	-0,108	0,76	-0,148	0,68
Constant	0,395	0,00	0,455	0,00	0,420	0,00
TD/TA	0,096	0,77	-0,141	0,74	-0,003	0,99
SALES_GROWTH	-0,187	0,61	-0,108	0,78	-0,148	0,68
	GROSS PROFIT MARGIN					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,666	0,00	0,560	0,00	0,570	0,00
STD/TA	-0,357	0,12	0,015	0,93	-0,021	0,90
SALES_GROWTH	0,055	0,84	-0,010	0,96	-0,003	0,98
Constant	0,492	0,00	0,524	0,00	0,520	0,00
LDA/TA	0,293	0,29	0,185	0,43	0,196	0,39
SALES_GROWTH	0,072	0,79	-0,012	0,95	-0,005	0,98
Constant	0,528	0,00	0,560	0,00	0,557	0,00
TD/TA	0,101	0,68	0,017	0,93	0,0256	0,90
SALES_GROWTH	0,0746	0,78	-0,009	0,96	-0,003	0,98

Period 2011 – 2018, FTSE100

	ROA					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,059	0,00	0,060	0,00	0,059	0,00
STD/TA	0,027	0,09	0,024	0,14	0,027	0,09
SALES_GROWTH	0,069	0,02	0,060	0,06	0,069	0,02
Constant	0,071	0,00	0,072	0,00	0,072	0,00
LDA/TA	-0,021	0,53	-0,022	0,53	-0,022	0,53
SALES_GROWTH	0,067	0,02	0,060	0,07	0,065	0,03
Constant	0,074	0,00	0,075	0,00	0,075	0,00
TD/TA	-0,028	0,33	-0.030	0,31	-0,029	0,32
SALES_GROWTH	0,067	0,02	0,059	0,07	0,065	0,03
	ROE					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,192	0,04	0,183	0,06	0,192	0.05
STD/TA	0,624	0,01***	0,655	0,01***	0,624	0,01***
SALES_GROWTH	-0,086	0,85	-0,082	0,87	-0,086	0,85
Constant	0,176	0,19	0,184	0,17	0,176	0,19
LDA/TA	0,882	0,10**	0,840	0,11	0,882	0,09**
SALES_GROWTH	-0,110	0,80	-0,091	0,85	-0,110	0,80
Constant	0,156	0,25	0,162	0,24	0,156	0,25
TD/TA	0,795	0,07**	0,771	0,08**	0,795	0,07**
SALES_GROWTH	-0,103	0,82	-0,086	0,86	-0,103	0,82
	GROSS PROFIT MARGIN					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,502	0,00	0,505	0,00	0,502	0,00
STD/TA	-0,193	0,00***	-0,199	0,00***	-0,193	0,00***
SALES_GROWTH	-0,083	0,48	-0,110	0,39	-0,083	0,48
Constant	0,439	0,00	0,439	0,00	0,439	0,00
LDA/TA	0,035	0,80	0,040	0,77	0,034	0,80
SALES_GROWTH	-0,074	0,53	-0,105	0,41	-0,074	0,54
Constant	0,036	0,00	0,048	0,00	0,481	0,00
TD/TA	0,115	0,27	-0,127	0,28	-0,127	0,28
SALES_GROWTH	0,119	0,52	-0,107	0,41	-0,076	0,52

Period 2002 – 2010, FTSE250

	ROA					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,041	0,00	0,048	0,00	0,044	0,00
STD/TA	0,053	0,00***	0,031	0,04***	0,043	0,00***
SALES_GROWTH	0,058	0,00	0,046	0,00	0,051	0,00
Constant	0,072	0,00	0,075	0,00	0,073	0,00
LDA/TA	-0,067	0,00***	-0,078	0,00***	-0,071	0,00***
SALES_GROWTH	0,057	0,00	0,049	0,00	0,052	0,00
Constant	0,077	0,00	0,084	0,00	0,080	0,00
TD/TA	-0,078	0,00***	-0,104	0,00***	-0,088	0,00***
SALES_GROWTH	0,057	0,00	0,050	0,00	0,053	0,00
	ROE					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,125	0,33	0,201	0,22	0,129	0,33
STD/TA	0,458	0,14	0,143	0,75	0,439	0,17
SALES_GROWTH	-0,027	0,94	0,164	0,69	-0,010	0,97
Constant	0,177	0,16	0,069	0,71	0,171	0,20
LDA/TA	0,381	0,36	0,811	0,27	0,403	0,35
SALES_GROWTH	0,011	0,97	0,153	0,71	0,028	0,94
Constant	0,167	0,23	0,149	0,50	0,165	0,26
TD/TA	0,364	0,38	0,394	0,60	0,367	0,39
SALES_GROWTH	0,011	0,97	0,157	0,70	0,026	0,94
	GROSS PROFIT MARGIN					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,492	0,00	0,408	0,00	0,413	0,00
STD/TA	-0,279	0,00***	-0,014	0,51	-0,029	0,17
SALES_GROWTH	-0,029	0,43	-0,010	0,60	-0,010	0,58
Constant	0,316	0,00	0,413	0,00	0,405	0,00
LDA/TA	0,407	0,00***	-0,041	0,25	-0,003	0,93
SALES_GROWTH	-0,022	0,55	-0,010	0,61	-0,012	0,54
Constant	0,317	0,00	0,415	0,00	0,407	0,00
TD/TA	0,345	0,00***	-0,041	0,25	-0,001	0,80
SALES_GROWTH	-0,025	0,51	-0,001	0,63	-0,012	0,55

Period 2011 – 2018, FTSE250

	ROA					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,069	0,00	0,077	0,00	0,075	0,00
STD/TA	-0,013	0,28	-0,035	0,04***	-0,027	0,07**
SALES_GROWTH	0,063	0,00	0,041	0,00	0,045	0,00
Constant	0,075	0,00	0,070	0,00	0,071	0,00
LDA/TA	-0,043	0,00***	-0,012	0,12	-0,019	0,01***
SALES_GROWTH	0,059	0,00	0,042	0,00	0,044	0,00
Constant	0,077	0,00	0,070	0,00	0,072	0,00
TD/TA	-0,047	0,00***	-0,013	0,08**	-0,021	0,00***
SALES_GROWTH	0,058	0,00	0,042	0,00	0,045	0,00
	ROE					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,123	0,00	0,185	0,00	0,156	0,00
STD/TA	0,149	0,00***	-0,068	0,42	0,033	0,62
SALES_GROWTH	0,147	0,00	0,132	0,00	0,137	0,00
Constant	0,171	0,00	0,169	0,00	0,171	0,00
LDA/TA	-0,024	0,51	-0,016	0,68	-0,024	0,51
SALES_GROWTH	0,133	0,00	0,134	0,00	0,133	0,00
Constant	0,179	0,00	0,170	0,00	0,172	0,00
TD/TA	-0,053	0,13	-0,018	0,62	-0,028	0,43
SALES_GROWTH	0,127	0,00	0,134	0,00	0,133	0,00
	GROSS PROFIT MARGIN					
	OLS		FE		RE	
	coefficient	p value	coefficient	p value	coefficient	p value
Constant	0,454	0,00	0,461	0,00	0,465	0,00
STD/TA	-0,382	0,00***	-0,093	0,00***	-0,0106	0,00***
SALES_GROWTH	-0,076	0,06	-0.024	0,06	0,025	0,05
Constant	0,402	0,00	0,437	0,00	0,436	0,00
LDA/TA	0,155	0,00***	-0,010	0,32	-0,007	0,49
SALES_GROWTH	-0,023	0,58	-0,021	0,10	-0,021	0,10
Constant	0,403	0,00	0,438	0,00	0,437	0,00
TD/TA	0,134	0,00***	-0,014	0,17	-0,011	0,27
SALES_GROWTH	-0,023	0,58	-0,021	0,09	-0,021	0,09