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**FACULTAD DE CIENCIAS ECONÓMICAS Y EMPRESARIALES**

## **TRABAJO DE FIN DE GRADO**

Capital structure analysis over the Spanish auxiliar automotive sector

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INDEX

- 1. INTRODUCTION ..... 1
- 2. CAPITAL STRUCTURE. CONCEPTS AND PRINCIPAL THEORIES. .... 1
  - 2.1. TRADE-OFF THEORY..... 2
  - 2.2. PECKING ORDER THEORY ..... 2
  - 2.3. MARKET TIMING THEORY..... 3
  - 2.4. AGENCY THEORY ..... 3
- 3. EMPIRICAL STUDIES ABOUT CAPITAL STRUCTURE. WHAT DO WE KNOW?..... 4
- 4. SAMPLE, MODEL AND METHODS..... 8
- 5. DESCRIPTIVE, CORRELATIVE AND REGRESSION ANALYSIS ..... 11
- 6. CONCLUSIONS, LIMITATIONS AND FUTURE LINES OF INVESTIGATION ..... 26
- 7. BIBLIOGRAPHY..... 28

## ABSTRACT

The aim of this study is to determinate relevant factors of capital structure for the medium and big companies in the auxiliar automotive industry throughout a descriptive, correlative, and regressive analysis regarding data collected in the 2010-2019 period composed by 274 firms and 2324 firm-year observations. By the development of an explanatory model, the core factors set traditionally used in investigation is found to predict in a high proportion the changes in the leverage of these firms with the following relations that fit in the pecking order theory: Tangibility (- effect over leverage), Profitability (-), Dividend Distribution (-), Liquidity (-) and Maturity (-). Nevertheless, this model is found to have a lower explanatory power over financial debt due to its higher level of complexity with the following relations: Size (- effect over financial debt), Tangibility (+), Profitability (-) and Risk (-).

**KEY WORDS:** Capital structure; Auxiliar automotive sector; Medium and big companies; Trade-off theory; Pecking order theory.

## RESUMEN

El objetivo de este trabajo de fin de grado es realizar un estudio de los factores determinantes en la estructura de capital de las medianas y grandes empresas del sector auxiliar de la automoción empleando métodos de análisis descriptivos, correlativos y de regresión compuesto por una muestra de 274 empresas (2324 observaciones). Mediante la creación de un modelo explicativo, se ha concluido que el grupo de variables empleado es capaz de explicar en un elevado grado las variaciones de la deuda total con las siguientes relaciones que se sitúan en línea con la teoría del pecking order: Tangibilidad (- efecto sobre endeudamiento), Rentabilidad (-), Distribución de dividendos (-), Liquidez (-) y Madurez (-). Sin embargo, estas han tenido un bajo valor explicativo en relación con la deuda financiera debido a su mayor complejidad arrojando las siguientes relaciones: Tamaño (- efecto sobre deuda financiera), Tangibilidad (+), Rentabilidad (-) y Riesgo (-).

**PALABRAS CLAVE:** Estructura de capital; Sector auxiliar de automoción; Mediana y grande empresa; Teoría del Trade-off; Teoría del Pecking order.

## **1. INTRODUCTION**

Since the birth of the first capital structure theories in the 1950s by the hand of Durand or Modigliani and Miller, progress in theoretical development and empirical research has been very significant. The main theories of capital structure have not only been developed in detail in theoretical terms but have also been the subject of numerous empirical studies seeking to clarify the conclusions drawn by these theories.

Among these theories, two have been confronted by the scientific community with certain antagonistic nuances due to their differences in the conception of capital structure and its main influences. The trade-off theory and the pecking order theory have captured the attention of the community and concentrated its research efforts. Therefore, a higher number of papers can be found regarding empirical testing of these theories.

There is also a research trend towards a greater depth of analysis by restricting the sample to a specific period and sector to determine the validity of capital structure theories and the main variables affecting capital structure in the sector. Here is why this study is aimed to fit.

The automotive auxiliary industry is one of the main pillars of the Spanish economy. In 2018, it had a turnover of more than 37,000 million euros and a direct and indirect job creation figure of more than 372,800 employees. The importance of the sector over the Spanish economy and the lack of empirical studies regarding its capital structure shows the potential benefits that a deeper knowledge over it can bring to firms improving their decision making.

Consequently, this empirical study aims, after a brief review over the capital structure theories, to perform an analysis of the capital structure of the Spanish companies that belong to the auxiliary automotive sector during the 2010-2019 period. This empirical study will propose an explanatory model over the capital structure of the firms which will include a descriptive study over the mentioned period, a correlation study among the variables of the mode and a regression model to try to predict the variation of the capital structure of these firms.

## **2. CAPITAL STRUCTURE. CONCEPTS AND PRINCIPAL THEORIES.**

Capital structure is the combination of debt and equity that a company uses to finance its business. Although several economists have tried to find an explanation on why companies choose one determinate balance between debt and equity, there are not a consensus in economic literature for this issue.

Modigliani, Miller, Myers, Jensen... Many authors have had an approach on this issue. Nevertheless, the theories that have born from these authors' investigations are widely various. This shows that, maybe, these theories give hints about what companies have into account when decisions about financing are

made but as, Myers (2003, pp. 216-217) stated: "There is no universal theory of capital structure, and no reason to expect one. There are useful conditional theories, however (...) Each factor could be dominant for some firms in some circumstances, yet unimportant somewhere else".

## **2.1. TRADE-OFF THEORY**

The trade-off theory supports that capital structure is determined by the existent relation between the benefits of debt and the costs of debt. Precisely, classic argumentation focusses on the contrast between the tax deductibility (finance expenses that can be deducted from corporate tax) and the increased possibility of insolvency (mostly known as bankruptcy costs).

Although this theory fits in Modigliani and Miller's work (1958) it had received different contributions along the years due to the assumptions made in its birth.

The existence of bankruptcy costs involves a balance between the value of the firm and tax benefit (Stiglitz, 1969).

As Myers stated (1984), companies that act, financially, in concordance to this theory search for a target to reach a concrete level of debt moving from their initial point to it. This target is defined by the quantity of debt in which the company finds a compensation between the costs and benefits derived by a concrete source of funding used by the company.

This hypothesis keeps being tested in empirical studies that are providing new data and still no conclusion has been brought up to discussion. In fact, studies try to estimate through an equation the partial adjustment of debt instead of giving a static target. This adjustment, also known as speed adjustment, transforms the trade-off theory into a dynamic econometric model (Azofra and Rodríguez, 2012).

Nevertheless, this dynamic consideration does not consider the transaction cost derived by bond or shares issues that prevent companies from adjusting their capital structure to an optimal level. Due to this, companies determine an optimal debt range and only adjust when debt exceeds, beyond or underneath, the limits of the range (Fischer, Heinkel and Zechner, 1989; Goldstein, Ju and Leland, 2001).

## **2.2. PECKING ORDER THEORY**

Although many strokes can be found about the Pecking Order Theory along the descriptive literature, Myers (1984) clearly articulated the theory in the field of corporate finance. Pecking order theory states that companies only modify their debt ratios when an imbalance between internal cash flow and real investment opportunities occurs. Hence, changes in capital structure come from

the necessity of obtaining new funds and not from the consecution of an optimal debt level (Shyam-Sunder and Myers, 1999).

This theory defines three main ways in which a company can finance itself – own funds, debt, and equity. Related to this financing methods, the theory states that a company will first use its own resources (for example, retained earnings), then, if it is necessary to attend to external financing the company will issue debt. Lastly, and only as a last resort after reaching its debts limits, the company will raise equity.

This hierarchy of election is based on the asymmetric information that managers have over external parts like debtors or outside investors. Equity has adverse selection problems; debt does also have them but in a lower level and own funds avoid the problem of adverse selection. This allows managers to use the own funds complete and freely but when it comes to issuing debt and especially equity the asymmetric information leads external investors into discounting bond and stock prices. Therefore, managers will try to avoid issuing undervalued titles and choose to finance their investment with retained earnings and low risk debt (Azofra and Rodríguez, 2012).

### **2.3. MARKET TIMING THEORY**

Market timing theory is first stated by Myers (1984) but is living a “second youth” as its popularity has increased in the academic literature by the hand of Graham and Harvey’s survey (2001) or Baker and Wungler’s study (2002).

The main idea of this theory is that companies will determine to finance themselves by issuing debt or by raising funds by equity looking at current conditions of both markets. The company will choose to finance in the market that offers the best conditions in that moment. If neither market present good conditions, company will defer its payments and if both markets show good conditions the company may raise funds even without needing it.

Even though this idea has strong common-sense pillars, it does not give any explanation about the traditionally considered factors that surround capital structure in the existing academic studies.

### **2.4. AGENCY THEORY**

Agency theory is based on the possible difference of interests between shareholders and managers (Berle and Means, 1932) and states that alternative governance structures can be found to mitigate this conflict. Managers have incentives to develop strategies that aim to increase firm size or might have different tolerance to risk levels that shareholders. This theory assumes that managers will tend to act in their own

benefit at the expense of shareholders' benefits. Particularly, this agency problem can be found in companies that have a positive free cash flow (Jensen, 1986).

The agency theory point of view proposes debt as a government device that can be useful in the reduction of the conflict (Jensen, 1986). This is because debt creates regular debt payments for the company that will reduce the agency costs of free cash flows as managers will be forced to face the repay of debt. This situation will make managers avoid wasteful expenditures in the company's cash flow to maintain their capability of liquidity and prevent a posterior bankruptcy that would make them lose their decision rights, employment in the firm and reputation (Kochhar, 1996).

Hence, the control role of debt is found on the decrease of free cash flow available to managers and the consequent benefit derived to shareholders. (Jensen, 1986).

### **3. EMPIRICAL STUDIES ABOUT CAPITAL STRUCTURE. WHAT DO WE KNOW?**

Empirical studies about capital structure can be directed in to two big research areas. On one hand, researchers focus on testing capital structure theories and common spread believes on capital structure over huge, diversified, and plural samples including companies from many industries.

Mostly, these empirical studies try to find big conclusions over capital structure as a whole rather than searching for concrete and detailed conclusions over it. The most known examples of these kind of studies are the one lead by Rajan and Zingales (1995) and the one directed by Frank and Goyal (2009).

Rajan and Zingales (1995) developed an empirical study to show if companies of the G-7 economies (United States, Japan, Germany, France, Italy, United Kingdom and Canada) had common related factors among capital structure decisions. With a sample of more than 8.000 companies, the study concluded that "at an aggregate level, firm leverage is more similar across the G-7 countries than previously thought, and the differences that exist are not easily explained by institutional differences."

On their behalf, Frank and Goyal (2009) conducted an empirical study to determine "the relative importance of many factors in the capital structure decisions of publicly traded American firms from 1950 to 2003". Although this study did its empirical research only over American firms, it settled the groundings of knowledge over the relevance of these factors and its positive or negative effect on leverage.

This study stated that median industry leverage, tangibility, size of the company and expected inflation are relevant factors that affect positively to the explanation of market leverage. Also, market-to-book assets ratio, profits and rate of dividends paid were found to be relevant factors that affect negatively to the explanation of market leverage of a company.

Median industry leverage, measured by the median relation between total debt to market value of assets, affects positively to market leverage. This relation fits in the static trade-off theory, as Ogden and Shanhong (2013) stated, “has the greatest explanatory power, even though this variable is a simply proxy for otherwise omitted leverage determinants that have a strong industry component”. According to pecking order theory, the industry will only have importance as it may serve as a proxy for the firm’s financing deficit. Also, “under market timing theory, the industry should matter only if valuations are correlated across firms in an industry” (Rajan and Zingales, 1995)

Tangibility, defined through net properties, plant and equipment of companies, affects positively to the explanation of market leverage. Companies that have greater tangibility find facilities of financing thought out debt as these tangibles can be used as collaterals in debt assumption or even in cases of bankruptcy. This finding fits in the trade-off theory as companies that have lower cost of debt due to its tangible collaterals tend to assume more debt by following the principle of balancing benefits and costs of debt. Nevertheless, pecking order suggest, as Rajan and Zingales (1995) showed, “a negative relationship between leverage and asset tangibility” due to the “negative influence of information asymmetric on the firm’s value”. Nevertheless, for the pecking order theory, tangibility creates an ambiguous prognostic as having low information asymmetry due to the tangibility of assets imply less debt. Also, tangibility is seen to be the pecking order theory as a source of adverse selection that may lead into higher debt.

For the trade-off theory, Total assets, as a measure for size of the company, is expected to affect positively in relation of total debt as big companies tend to have less bankruptcy risks due to a higher diversification of investment. Also, big companies may experience lower transaction costs related with debt and less information costs. Despite that, Rajan and Zingales (1995) determined that the size has ambiguous prognostics over its relationship with debt as, based on the pecking order theory, they might tend to opt for increasing their equity rather than their debt. Several empirical studies as the ones carried by Ocaña et al. (1994), Berger and Udell (1998) or Romano et al. (2001) have come up with the conclusion that size of the company affects positively to the total debt.

Regarding profitability, the pecking order theory predicts a negative relation between profitability and debt as companies will prefer to finance themselves with their own cash flows rather than external debt to maintain independence and avoid their exposition to information asymmetry. In the other hand, the trade-off theory predicts a positive relation as debt will improve tax benefits for profitable companies and, as lenders perceive a profitable company as healthier and more reliable, the cost of debt for the company will decrease. Empirical studies like the ones carried out by Ziane (2004), Dufour and Molay (2010) and Adair and Adaskou (2015) support the pecking order theory predictions and reject trade-off theory ones as find a negative relation between profitability and debt.



Risk is understood by the trade-off theory to have a negative correlation regarding debt as companies with more volatile cash flows face higher expected costs of financial distress. Also, more volatile cash flows tend to diminish the probability of tax shield being fully used. Frank and Goyal (2009) supported this prediction in their study as their findings showed a negative correlation between the variables.

The maturity of the firm is a relevant factor regarding capital structure decisions as companies that have been longer in the market had time to build a better reputation and, "as long as creditors believe that the firm will not undertake projects that imply the substitution of assets", they will have access to lower costs of debt than younger companies (Ramalho and Silva, 2009).

Regarding dividend distribution, Myers (1984) stated that the pecking order theory does not explain why dividends are distributed. Nevertheless, the trade-off theory and the pecking order theory agrees in the fact that profitable firms and firms with fewer investments would have higher dividends pay out. These predictions were confirmed by Fama and French (2002).

The trade-off theory suggests a positive relationship between liquidity and leverage, since "the trade-off theory proposes that firms with higher liquidity ratios should borrow more in order to be able to meet their current contractual obligations when it is due" (Rajan and Zingales, 1995). However, the pecking order theory and the agency cost theory suggest a negative relation. The pecking order theory argues that companies with high liquidity will prefer to finance themselves through own resources rather than debt. For the agency theory, the point is that the negative relation is based on the potential conflict between shareholders and debtholders (Jensen and Meckling, 1976; Myers, 2003). Their argumentation is verified by three that have concluded that, in fact, the relation between liquidity and debt ratios is negative (Deesomsak et al., 2004; Mazur, 2007; Viviani, 2008).

This set of core factors is used by the authors and defined as the most useful factors for identifying reliable data in the data. This control factors are based on the ones used by Rajan and Zingales (1995) (market-to-book, profit, tangibility, and sales) but authors explain that the omission of the two missing factors in this study (Industry median leverage and expected inflation) "can materially change inferences on other factors that are included in the model" (Frank and Goyal, 2009)

These studies were promoted more frequently in the 90's and 00's decades where common bases and conceptions over capital structure were weak due to the lack of empirical studies. In this context, they fulfilled this necessity and set an empirical support for the theoretical framework over capital structure internationally.

Many empirical studies about capital structure can be found regarding a wide variety of industries and countries. From Norway to Malaysia, manufacturing, or petrochemical industry. Most of the studies, even

when having diverse geographical or industrial situation, find a common target. Find the determinants of capital structure for that concrete industry in a concrete geographical location.

Nevertheless, a limited number of empirical studies regarding the capital structure of, rather the automotive industry or the automotive auxiliar industry, can be found nowadays. Also, almost no studies regarding empirical investigations in the Spanish economy can be found in the existent economic literature. This reality shows that an empirical study over the automotive auxiliar sector in Spain might give a new point of view to the already existent papers over this issue in the national and global literature regarding capital structure.

Regarding empirical studies that cover the automotive industry, Sekar, Gowri and Ramya (2014) developed a study over the role and future expectations of capital structure for a concrete company, the Indian Tata Motors Limited. One of the main findings of the study is that there are three factors identified by the authors as responsible for selection of capital structure. The first factor is the relation of equity costs and debt costs, which fits perfectly in the market timing theory as it is stated that the company changes its preference from issuing equity to issuing debt according to the costs implied by every type of financing. The second factor responsible for selection of capital structure is the existence of savings in corporate tax on interest throughout the study period. Lastly, the interest cover ratio was found to be relevant. Although this study is linked to the automotive industry, the fact that only covers one single company implies that the findings reached might not be extrapolated for the whole industry.

In respect of the empirical studies that make an analysis over capital structure over Spanish industries, two papers stand out. Moya-Martinez and Del Pozo-Rubio (2020) developed a study over the capital structure of SME's that belong to the Spanish tourist sector. The study reaches two main conclusions. First, regarding the size of the companies that are part of the sample of their study, they found it to be one of the most significant factors and to have a positive relationship with the leverage of the firms. This supports the trade-off theory predictions regarding this variable. Secondly, according to Myers (1984), they found an inverse relationship between profitability and indebtedness. This relationship appeared to be larger in medium-sized companies rather than smaller ones.

Also, Lurrari, Arijia and Del Campo (2019) developed a study over the explanatory factors of capital structure for Spanish manufacturing firms where two mayors finding regarding capital structure were found. The study conclusion states that it exists a regional difference regarding the probabilities for a company to assume excessive levels of debt being the Basque Country the Spanish region with less probability. Also, it is suggested that, needing the corroboration of future investigations, the level of independence of the administrators from the ownership of the company affects negatively to the

probability of assuming excessive indebtedness ratios (principles from the Agency Theory might be found in this observation).

Nevertheless, both studies give huge importance to the risk related to debt in Spain. This importance included in the Spanish studies and which is not found in international studies shows a national approach difference. This difference might be influenced by the depth experienced in the country with respect to the 2008 credit crisis.

In the case of the first study, although it has been published recently, the studied period is the onset of the economic crisis that took place in 2008 in the whole world and in which Spain was one of the most affected countries. This highly related to debt crisis could be a huge influence in Spanish studies over capital structure and the reason why those studies had an approach over the risk of debt rather than other capital structure factors.

#### **4. SAMPLE, MODEL AND METHODS**

The sample used for this empirical study is formed by Spanish companies that belong to the automotive auxiliar industry and are medium or big size. The final sample is formed by 274 companies for the period 2010 to 2019 (10 firm-year observations).

This companies and its financial information are obtained from the data base “Sistema de Análisis de Balances Ibéricos (SABI)” from Bureau Van Dijk.

To filter all companies that belong to the automotive auxiliar industry, it has been used the National Classification of Economic Activities (CNAE-2009) that collect all economic sectors and assign a code to each one. The codes in this system that fit better for the automotive auxiliar industry are 2931 – Manufacture of electrical and electronic equipment for motor vehicles and 2932 – Manufacture of other components, parts, and accessories for motor vehicles.

In relation with the size of the companies that are part of the sample, the aim of the study is to focus on medium and big companies. According to SME’s standards defined by the European Union set out in Recommendation 2003/361/EC of the European Commission of 6 May 2003, companies will not be considered as small whenever they have more than 50 workers, a turnover greater than 10 million euros or a total balance sheet that exceed 10 million euros.

**Table 1.** SME Definition

Company Category	Staff Headcount	Turnover	or Balance Sheet total
Medium-Sized	< 250	< € 50 M	< € 43 M
Small	< 50	< € 10 M	< € 10 M
Micro	< 10	< € 2 M	< € 2 M

**Source:** User Guide 2020- SME Definition, European Union

The application of these filters leaves us a final sample of 363 companies that will be the base of the empirical study.

Nevertheless, after a depuration of the database eliminating companies that were inactive, in payment suspension or insolvency proceedings and deleting companies that showed anomalous values for any variable during a continuous period of years (for example, negative equity or inexistence of tangible assets) the sample was left with 274 companies.

The model considered in this study is based on Rajan and Zingales (1995) study and is completed with some additions from other studies. The factors included are total debt and financial debt as variables to be studied and size, tangibility, profitability, risk, growth opportunities, dividends, liquidity, maturity, industry, and year as explanatory variables. So, we present the following model:

$$\text{INDEBTEDNESS}_i = \alpha_i + \beta_1 \text{SIZE}_i + \beta_2 \text{TANG}_i + \beta_3 \text{PRF}_i + \beta_4 \text{RSK}_i + \beta_5 \text{GRW}_i + \beta_6 \text{MAT}_i + \beta_7 \text{LIQ}_i + \beta_8 \text{DIV}_i + \text{INDUSTRY} + \text{YEAR} + \epsilon_i$$

In this model,  $\alpha_i$  is the model's constant and  $\epsilon_i$  is the regression residual.

The variables used are measured in the following way:

Firm debt is measured in two different ways. First, total debt (LEV) by the relation between total debt and total assets and Financial debt (DEBT) is measured by the relation between the debt that generates interests (for example, excludes suppliers) and total assets.

Firm size is measured by the total assets of the company. To avoid the bias generated by "big numbers" in the database, SIZE is included as the logarithm of total assets.

Tangibility (TANG) appears to be better represented while measured as the relation between Non-current assets and total assets.

Although profitability (PRF) can be measured in different ways and Rajan and Zingales (1995) proposed to measure it by EBITDA over total assets, in this study profitability will be measured by the Return Over Total Assets (ROTA), EBIT over total assets (to harmonize the use of EBITDA or EBIT as risk is commonly calculated with EBIT).

Risk (RSK), as mentioned before, is calculated by the standard deviation of EBIT in the last 3 years. Also, Growth Opportunity (GRW) is calculated as the variation of sales from the before the actual year). In this case, even though most studies tend to measure growth opportunity as the market to book ratio, for a sample in which most of the companies are not quoted is more useful to give a proxy to this variable throughout variation of sales.

Maturity (MAT) is measured by the natural logarithm of the quantity of years that the company has been working.

Liquidity (LIQ), after the implementation of several measurements in the model, appears to be better represented by the difference of current assets to current liabilities to total assets.

Dividends (DIV) are measured as a dummy variable that takes value of 0 when the company has not given any dividends and takes value of 1 when the company has distributed dividends.

Also, a dummy variable related to CNAE's code (IND) is introduced to enable a potential comparison between different codes of the industry.

Finally, the dummy variable YEAR is introduced to allow the differentiation between the years that have been part of the study.

Regarding the methodology that is going to be applied for the analysis of the observations, three principal tools are going to be used for it. Dispersion measures, correlation, and linear regression models.

First, although measures of central tendency are not the most adequate tool for developing the final analysis of a database, they help to understand the sample and make a description of the data that is going to be analysed by the consequent methods of analysis.

Then, the correlation study helps the researcher to analyse the relation between two variables. It allows to state, throughout a bivariate correlation analysis, whether two variables change in the same or opposite direction. Hence, if two variables have a positive bivariate correlation, it can be assumed that both will variate in the same direction but is not possible to determine with this study which is influencing the other to change.

Lastly, a linear regression analysis will be developed throughout the Ordinary Least Squares (OLS) method. The main objective that a researcher has when applying this tool is to model the relationship between a dependent variable and one or more independent variables. Specifically, the OLS is a type of linear least squared method which aims to estimate the unknown parameters in a linear regression model. According to Hayashi (2000): "...the OLS estimator is consistent when the regressors are exogeneous, homoscedastic and serially uncorrelated...". Then, he presents the Variance Inflation Factor (VIF) as a measurement that determines the amount of multicollinearity in a set of multiple regression variables (It

is generally accepted to interpretate it as: lower than one no multicollinearity; between 1 and 3: moderate multicollinearity; higher than 3: high multicollinearity). Also, Hayashi states that, although several conclusions can be obtained from the OLS, “the  $R^2$  is a measure of the explanatory power of the nonconstant regressors” which is key in the understanding of the whole analysis. As a higher  $R^2$  is found in an OLS study, that linear regression can explain in a higher grade the dependent variable. Then, a high  $R^2$  is aimed as it will imply that the model is relevant over the explanation of the dependent variable and the researcher has made a good variable selection. Nevertheless, it has to be taken into account that economic studies involve human behaviour which cannot be accurately predicted. This implies that extremely high  $R^2$  values might not be expected in this field of investigation.

The program provided by the University of Burgos is called STATA and is the software that will be used in this study to develop the three analysis already mentioned.

## 5. DESCRIPTIVE, CORRELATIVE AND REGRESSION ANALYSIS

Table 2. Dispersion measures summary.

Variable	Mean	Median	Std. Dev.	Min	Max
LEV	0.5967	0.5804	0.2826	0.0008	3.0076
DEBT	0.1211	0.0569	0.1568	0	2.6795
SIZE	10.217	10.236	1.0282	5.8652	13.218
GRW	0.1614	0.0449	1.5007	-0.9561	57.402
TANG	0.5158	0.3993	0.1951	0.0012	0.9647
MAT	27.052	24	15.647	0	88
LIQ	0.1201	0.1155	0.2779	-2.0102	0.9215
PRF	0.0627	0.0566	0.1288	-2.8264	0.6481
RISK	1,915.7	908.24	3026.9	1.1103	36,514.81

Source: Own sources

As Table 2 shows, the medium value of LEV is 0.62 and the standard deviation for this variable is 0.46. This states that the medium company of the auxiliar automotive industry has a capital structure composed in 62% by debt and 38% own resources. The minimum observation of this variable can be found in 2010 for the company *Gestamp Global Tooling* which had a total debt ratio of 0.07%. This is explained by the fact that the company was founded in the same year and the total debt ratio was unusual due to the lack of development. This fact can be seen as the company, after some years, reached the medium of the sector in 2013 and went even further in the later years. The maximum observation belongs to *ARK Plásticos SL* which in 2019 reached a Total Debt Ratio of 3. Although companies with negative equity have been eliminated from the database as they represent a non-representative reality and maximum

debt ratio should be 1, companies with some negative equity years can be found if they have most years with a positive equity in the period studied (2010-2019). In this example *ARK Plásticos* went from a 0.61 Total Debt Ratio in 2010 to the mentioned data in 2019 therefore becoming an interesting example of total debt increase.

Nevertheless, the following percentile analysis should show that negative equity companies are a non-common observation in this database.

**Table 3.** LEV percentiles

	LEV
Percentile 10	0.26
Percentile 25	0.41
Percentile 50	0.58
Percentile 95	0.98

Source: Own sources

Attending to the percentile distribution showed in Table 3, companies that belong the first decile have a 25% leverage ratio or lower. Also, 50% of the companies have a 58% total debt or less. Regarding the negative equity issue, less than 5% of the observations have negative equity as only that part of the sample assumes a leverage ratio over 1 (implying that debt is financing the total assets of the firm and part of the negative equity).

In relation with DEBT, the mean observation made is 0.1211 and the standard deviation is 0.28 as it can be observed in Table 2. This implies that a medium company of the sector has a 12% of its capital structure in financial debt. The minimum observation for the DEBT is 0, companies that do not have any financial debt in its balance composition. Although it is not common to find companies with zero financial debt, several firms with low levels of financial debt can be found. *Mahle Behr SA* or *Vibracoustic SAU* are some of the companies that are not making use of financial debt in its capital structure composition. *Cooper-Standard Automotive Spain SL* is an interesting observation as has both, maximum and minimum, financial debt ratios over the period. In 2010, the company reached an untenable situation regarding negative equity and a financial debt ratio of 2,67. After a debt restructuration and a capital increase, the company was able to reduce its total and financial debt until reaching, in 2018, a total lack of financial debt.

**Table 4.** DEBT percentiles

	DEBT
Percentile 25	0.0094
Percentile 50	0.0568
Percentile 75	0.1869
Percentile 90	0.3408
Percentile 95	0.4351

Source: Own sources

As shown in Table 4, the first quartile has a DEBT ratio of 1% or less while the second quartile has a 5.6% or low and the third quartile a 18% or less. The top 5% companies with higher financial debt reported having 43% of financial debt over total assets or more and top 10% are showing DEBT rates of 34% or higher.

Regarding SIZE, the medium size is 27,200,000€. The company with the higher amount of assets was *Lear European Holding SLU* with total assets with value over 55,000,000 € in 2019. By contrast, *Outsourcing For The Automotive Industry 2007 SL* reported only 352,500€ of assets in 2012.

According to TANG, a mean observation of 0.41 with a standard deviation of 0.19 is found. This means that an average company of the sector will have 41% of its assets as non-current assets. The minimum observation belongs to *Monvir Martos SL* which only has over 1% of its assets as non-current assets in 2013. This unusual asset structure is explained because this company was born in that same year and did not have a final structure defined. As years passed by, *Monvir Martos* reached a normal ratio of tangibility in 2018 despite that it was still under the mean of the sample (35%). TANG has a maximum observation in 2016 where *Plastic Omnium Equipamientos Exteriores S.A.* had an unusual 96.46% of non-current assets over total assets. This might have diverse explanations as the company only showed these ratios in 2015 and 2016 while before and after those years the company tend to get closer to the mean as, in 2017, had a ratio of 44% of non-current assets (only 3 percentage points over the medium, way less than the 50 percentage points showed in previous years).

In relation with PRF, the average EBIT over Total Assets ratio is 0.0627 and a standard deviation of 0.12. This means that, even when the median profitability of the sector is over 6%, some companies are not being profitable. The posterior percentile analysis should clarify how many companies are profitable and how many are not.

The minimum observation regarding profitability belongs to a company that has been already mentioned in this descriptive analysis, *Cooper-Standard Automotive España SL*. In 2010, the company undertook a capital increase and, probably, one of the reasons that lead to it was the huge losses experienced by the



company in the period. A PRF of -2.82, which means losses of 282% over assets or over 5 million euros of losses in absolute terms. The most profitable year for a company of the sample was 2017 where, also a company that has already made its appearance on this descriptive study, Outsourcing For The Automotive Industry 2007, S.L., reached a ROTA of 64,8%, A good EBIT added to the minimum size of the sample is the combination that allows this company to have such a high an unusual profitability ratio.

**Table 5.** PRF percentiles

	PRF
Percentile 25	1,43%
Percentile 50	5,65%
Percentile 75	11,61%
Percentile 90	19,57%
Percentile 95	24,80%

Source: Own sources

According to the percentile study, only less than 25% of the observations regarding profitability present a negative ROTA. 50% of the observations are reporting a ROTA of 5.65% or less. The top 10% of higher ROTA observations present a profitability of 19.57% or higher and the top 5% firms regarding profitability present a 24.8% or more.

RSK, measured as the standard deviation of three last year’s profit, has a medium observation of 1915 and a standard deviation of 3026. The company with the most stable profits figures is *VibraAcoustic Cascante S.A.* and the one with the most variable profit figures is *Lear European Holdings SLU*.

GRW of the sector is 16%, measured as the increase of sales, with a standard deviation of 1.5. The observation with a lower growth opportunity belongs to *Benteler Ibérica Holding SLU* which experimented a 95% decrease of sales in 2019. In the other hand, *Outsourcing For The Automotive Industry 2007 SL* experience an increase of 5700% in sales, which implied a tremendous increase that would allow the company to reach the previous mentioned ratio of profitability.

In relation with DIV, in 34% of observations dividends were distributed among the ownership while in 64% of the observation they were not. This means that dividend distribution is not a widespread practice among companies of the sector with the implication this might have over the resources the companies have regarding intern funding.

Also, LIQ, measured as the difference between current assets and current liabilities over total assets, has a mean value of 0.12 and a standard deviation of 0.27. A minimum value is found for *Cooper-Standard*

*Automotive España SL* regarding a ratio value of -2.01. This observation is contemporary to the minimum observation of profitability and might also be another reason why the company decided to take over a capital increase operation. The maximum value for LIQ is 0.92 which was observed in the company *Industrias Amaya Tellería, S.A.* in the year 2013.

Regarding the maturity (MAT) of the studied companies, the medium age of the sample is 27 years (which means that an average company was founded in 1992, considering that the last year in which data is available is 2019). Also, the standard deviation of this observations is 15.6. The oldest company of the sample is *Standar Profil Spain SL* who has been operating in the sector since 1931. However, some companies of the sample started their business journey during the studied period. For example, *Aptiv S&P Mobility Services Spain S.L.* was founded in 2016, *Gestamp Global Tooling S.L.*, in 2010 or *Auria Solutions Vitoria S.L.* in 2017.

Based on the descriptive study, a picture of a hypothetical average company can be created. As it can be seen in Table 6, this company would have total assets over 27,000,000€ of which 41%, 11,070,000€ would be non-current assets. Its financing would come 60% from external funds (debt) and 40% from own funds. Its total debt would be 16,200,000€ and the financial debt of the company would be about 3,240,000€.

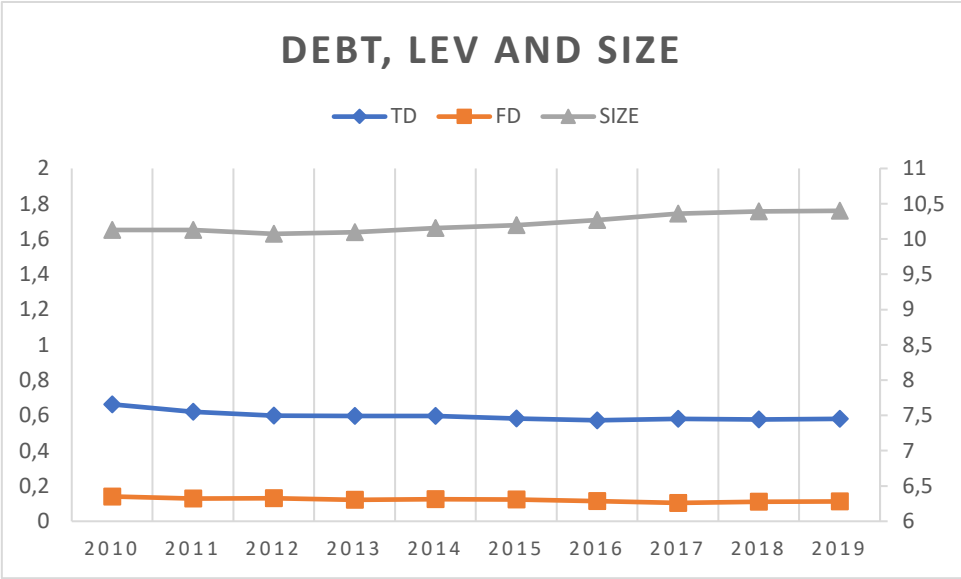
**Table 6. Balance sheet composition for an average company of the sector**

<b>Assets</b>	
27,000,000 €	
Non-current assets	11,070,000 €
Current assets	15,930,000 €
<b>Liabilities and Equity</b>	
27,000,000 €	
Total Debt (LEV)	16,200,000 €
Equity	10,800,000 €

Source: Own sources

With an increase of sales over last year of 16% and a Return Over Total Assets of 6,27%, the company would have a good liquidity situation with an immediate liquidity ratio of 0,2, an Acid Ratio of 1,28 and a difference of current assets and current liabilities over total assets of 0,12.

Figure 7. Evolution for DEBT, LEV, and SIZE over the period



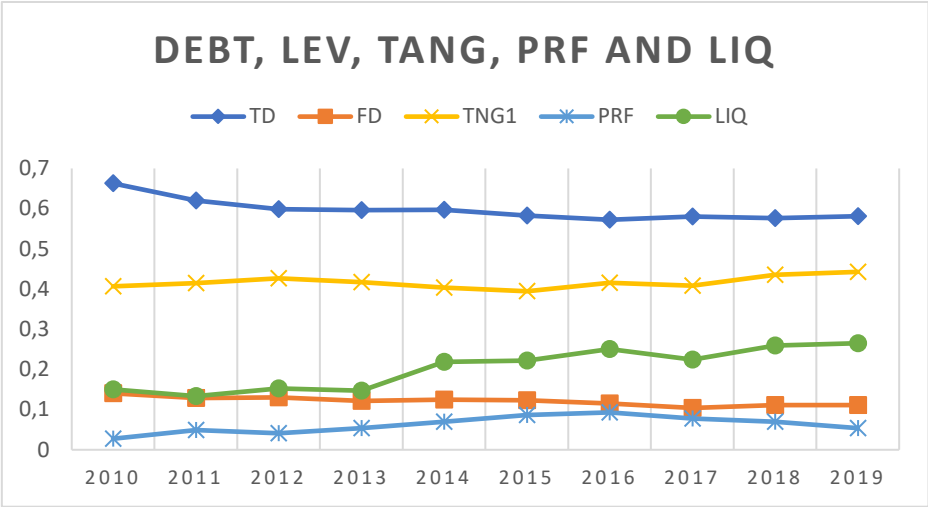
Source: Own source

In 2010, DEBT observations had an average of 0.66. Since then, it started dropping yearly in a gradual way until reaching its minimum quantity in 2016 with a debt ratio of 0.57. Nevertheless, after that year neither relevant increases nor decreases were experimented as the debt ratio was stable in the 0.57 to 0.58 range.

LEV followed almost the same pattern, starting in 2010 with a financial debt ratio of 0.14 and stating its minimum in 2017 with 0.104. After that, it established in the range of 0.10 to 0.11.

Regarding size (SIZE), the sample’s medium size did not stop increasing any year since its start in 2010 with a natural logarithm of total assets of 10.13. In 2019, it found it highest average with an observation of 10.4. Hence, it can be said that total assets in the sector increased throughout the period.

Figure 8. Evolution of DEBT, LEV, TANG, PRF and LIQ.



Source: Own source

Companies of the industry had an average tangibility (TANG) of 0.41 in 2010. The following years the tangibility ratios of the sector were in the range of 0.40 to 0.42 finding their lowest value in 2015 were the tangibility ratio dropped from the 0.40 levels. 2018 and 2019 were years of intensification of the relative importance on tangible assets on companies' balances as the tangibility ratio increased to 0.44.

The liquidity (LIQ) situation of these companies improved yearly over the period. In 2010, the average cash ratio was 0.15 and over the period it increased 11 percentage points until reaching it maximum average observation in 2019 with a cash ratio of 0.26. A huge increase in liquidity was experimented by the companies of the sector over the period which could be an implied factor on the decrease of debt ratios.

Profitability (PRF) ratios did not have a clear tendency over the period. In 2010, companies had a profitability of 0.02. Although it was low, the profitability started to increase unevenly throughout the 2010-2016 period until reaching a peak value of 0.09. After that year, profitability ratios dropped year over year to levels experimented in 2013. In 2019, the average profitability of the sector was 0.05 (while in 2013 it was 0,05 also).

**Correlation study**

To know the correlation between the explained and explanatory variable, Pearson's variable coefficient states these correlations. Although correlation studies explain the relation between variables, they do not have enough power to explain casual relationships between variables.

This coefficient measures the association between variables and will advance some information that is going to appear in the regression study. Also, it will help us to determine which of the multiple options given in the tangibility and liquidity measurement is the most optimum for the regression model.

**Table 9 Bivariate correlation**

	LEV	DEBT
SIZE	0,0422	-0,1907
TANG	0,0639	0,1642
PRF	-0,4419	-0,2933
RSK	0,133	-0,1759
GRW	0,0217	0,0093
DIV	-0,2165	-0,126
LIQ	-0,6915	-0,1841
MAT	-0,1557	-0,0598

**Source: Own Source**

The variable that has a higher correlation with the LEV is LIQ. This variable has a negative correlation of 0.6915. Regarding TANG, it presents a positive correlation of 0.1642, respectively.

PRF does also show a relatively high negative correlation with both explained variables. The Pearson's coefficient for the relation of Leverage and Profitability is -0.44 and the one for the relation of Debt and Profitability is 0.2933.

DIV has a negative correlation with Leverage of 0.2165 and with Debt of 0.126. In case of MAT, the correlation is also negative being of 0.2165 regarding Leverage and 0.126 regarding Debt. Also, for GRW the correlation is almost inexistant as it is 0.0217 and 0.0093 for Leverage and Debt, respectively. Regarding Maturity, the negative correlation with Leverage is 0.1557 and it is also negative but less strong in relation with Debt as its negative correlation is 0.0598.

RSK and SIZE have a special situation regarding its correlation study. Both show a positive correlation with Leverage but a negative correlation with Debt. In respect of RSK, the positive correlation with Leverage is 0.133 and the negative correlation with Debt is 0.1759. Regarding SIZE, it has a positive correlation of 0.0422 with Leverage and a negative correlation of 0.1759 with Debt. Even though size of the firm is considered as a key explanatory variable for most econometric models that study capital structure, it seems to have an almost inexistant relation with debt in this sector. Nevertheless, none of these correlations imply causality or are definitive findings as the regression model will increase the information among the relation and reality between the variables of the model.

After the descriptive and correlative study of the sample, the next step is the regression study to fully understand the relation of every explanatory variable with our explained variables. Also, it will state if the model previously proposed is useful or not regarding the capital structure of this concrete sector and period.

Two regression models are going to be studied over. First, the model will be proposed to explain the total debt of the firms, which is the most traditional approach of the existent economic literature. Also, in a second regression study, this model will be tested on its capacity to explain the financial debt of the firms which tend to have a higher complexity due to the higher factors that surround the decision making over financial debt. Both models will be nurtured, as mentioned before, with the measurement that showed a higher correlation with the explained variables.

Then, the mode is expected to explain in a deeper way the Leverage rather than the Debt variable. Also, all explanatory variables are expected to be relevant over the model as they have been selected among a huge pool of factors due to their relevance and the widespread use, they have had in the previous capital structure empirical studies.

**Table 10. Model estimations**

	LEV	DEBT
	-1	-2
SIZE	0,0013 (0,0040)	-0,0232 *** (0,0035)
TANG	-0,7169 *** (0,0221)	0,1276 *** (0,0194)
PRF	-0,3076 *** (0,0297)	-0,3137 *** (0,0262)
RSK	1,42E-06 (1,29E-06)	-5,86E-06 *** (1,14E-06)
GRW	-0,0022 (0,0023)	0,0006 (0,0021)
DIV	-0,0299 *** (0,0074)	-0,0094 (0,0065)
LIQ	-0,9197 *** (0,0166)	-0,0161 (0,0146)
MAT	-0,0192 *** (0,0054)	-0,0045 (0,0047)
IND	0,0183	0,3487

	(0,0169)	(0,0369)
<i>Constant</i>	1,0597	0,3487
	(0,0419)	(0,0369)
<i>Industry</i>	Included	Included
<i>Year</i>	Included	Included
Number of obs	2324	2324
Methodology	OLS	OLS
Test F	270,97	24,94
Prob F	(0.0000)	(0.0000)
R-squared	0,6791	0,1630
VIF	1,7	1,7
<i>Note: Standard error in parentheses; * p&lt;0.1, ** p&lt; 0.05, *** p&lt;0.01.</i>		

**Source: Own Source**

The first regression model is based on 2324 observations. Firstly, the F test (Prob>F) states that the model is significant over the explanation of the leverage. Although this does not state that every variable included in the model is relevant, it is a good first sign of the significance of the model.

Moreover, the Adjusted R-Squared of the regression model is 0.6771. This means that the 67.71% of the variation of the explained variable is determined by the variables included in the model while 32.29% is not. Although a high Adjusted R-Squared value (close to 100%) implies a higher goodness of fit of the model, these levels are acceptable as high levels are hard to reach in economic and social science studies in which human decisions, and its irrationality, are included.

Also, regarding a variable that is affected by tens, or even hundreds, of variables, it is a good finding to realize that a model composed by only 8 of those variables can explain over two thirds of its variation. In addition, this shows that literature has already find the set of capital structure core factors and, this sector is not one in a kind.

Having a deeper look at the regression coefficient of every variable interesting and unexpected findings appear.

Attending the  $P > |t|$  (which, as generally accepted, defines that a variable is acceptable for the model if it has a value of 0.05 or lower) three variables do not meet the minimum standards to explain any variation of the model and their null hypothesis is rejected.

In this case, Size (SIZE), Risk (RSK), Growth (GRW) and Industry (IND) are identified by the model as non-explanatory variables as their null hypothesis (being an explanatory factor over total debt of the firms in the auxiliar automotive industry in 2010-2019 period) is rejected.

The rejection of Size is almost total and could be expected as, according to the correlation study, it does have an almost inexistant correlation regarding total debt. Nevertheless, this is an unexpected result as all capital structure empirical studies are including size as an almost vital variable and all of them tend to give it explanatory power over the leverage.

Even showing lower levels, Growth and Risk are also clearly determined as non-explanatory variables in this study. This, while being not as unexpected of size case, is still an interesting conclusion regarding leverage decision of the firms that appear to have no consideration regarding the growth opportunities available for the company neither the existent risk in the variation of their profitability. Neither it appears to have relevance the specialization inside the sector as the difference between CNAE 2931 (electronic equipment) and CNAE 2932 (other equipment) do not have explanatory power over the leverage of the firms.

Then, the variables that have an impact over the leverage are tangibility, profitability, dividends, liquidity, and maturity. Among them, Maturity is the one with less impact over the explained variable as its regression coefficient is -0.00081. Despite that the effect is small, as a company is more mature it tends to have lower leverage. This is stating that as a company increases its lifetime tends to incur in lower levels of total debt. Nevertheless, this tendency is contrarian to the positive relation presented by Ramalho and Silva (2009) and might be based on the increasing capacity over year to generate own funds that allows them to not increase their debt levels. It also must be considered that, over the 2010-2019 period, the average profitability of the sector was positive and the average total debt decreasing.

In relation with dividend distribution, it is found to have a negative relation with total debt as its regression coefficient is -0.3351. This means that an increase over dividend distribution of the firms that belong to the sector would imply a decrease of the leverage. Here, the predictions made by the pecking order theory are verified as companies will increase dividend distribution when they are able to reduce its debt as their fund's needs are covered by the part of the benefits that are not distributed.

Regarding tangibility, the regression model predicts a negative relation of -0.7154. As a company tends to increase its tangibility, it will tend to decrease its leverage. Hence, a contradiction in relation with the predictions made by the trade-off theory is found. According to trade off theory, a higher tangibility implies higher collaterals that will diminish the costs of debt and then, affect positively to the increment of leverage. Nevertheless, although the pecking order theory predicts ambiguous prognostics over the relation of



leverage and tangibility, this result fits with Rajan and Zingales (1995) findings regarding negative effect of tangibility over leverage due to the “negative influence of information asymmetry on the firm’s value”.

The regression model estimates a negative relation between profitability and leverage as the regression coefficient for profitability is -0.3114. This, in fact, supports the pecking order theory and rejects the predictions of the trade-off theory about profitability. The regression model predicts a decrease of debt when an increase of profitability occurs as it might be due to the increase of cash flows that allow a better and more efficient own funding.

The variable with a higher regression coefficient is liquidity with a negative coefficient of -0.9202. This means that higher levels of liquidity imply lower levels of leverage. This relation fits in pecking order and agency cost theories that predict a negative relation between liquidity and debt ratios and stays in the line of several empirical studies that aim in the same direction. Also, this conclusion goes against the prediction that the trade-off theory supplies for this relation, as it expects a positive relation rather than a negative one.

Then, the model would be determined as follows:

$$LEVi = 1.05494 - 0.00016 * SIZEi - 0.71539 * TANGi - 0.31147 * PRFi - 0.000001 RSKi - 0.00165 * GRWi - 0.00081 * MATi - 0.92021 LIQi + \epsilon_i$$

As mentioned before, this model can predict with a good level of significance the 67% of the variations experimented by the variable Leverage. It is remarkable that every variable included in the model affects, in higher or lower grade, negatively to the total debt. This might be related to the fact stated in the descriptive study that the total debt decreased permanently over the period study and this reality might have, in some way, distorted the predictions of a model that has not included data from a wider range of years (although 2010-2019 is a quite wide period it does not belong to a full economic cycle as over these years the economy experienced a post-crisis and an economic growth.).

Regarding multicollinearity, the Variance Inflation Factor (VIF) states a low moderate linear relation between the variables used in the model as it has a value of 1,3. Then, we can state that the variables that are part of the model are not explaining the same variation of the dependent variable and the multicollinearity problem where inputs are influencing each other does not exist in this regression model.

The second regression model has been created among 2324 observations. In this case, the model tries to explain the financial debt (DEBT) that medium and big companies that belong to the auxiliar automotive industry have. This model can be determined as significant over the explanation of the variable as Prob > F is lower than 0,0001 which means the model is significant at a 99.9%.

Nevertheless, this model can only explain the 16,13% of the variation of the dependent variable. This goodness of fit is considered as low even when attending an economical variable. Also, the regression model has a higher percentage of explanation over Leverage than over Debt. This fact is going to be considered and covered in the later comparison of both regression models.

Getting back to the regression model analysis, it stands out that only four variables over the nine that has been proposed are actually explaining any variation over financial debt. Growth opportunities, Dividends distribution, Liquidity, Maturity and Industry are found as non statistically significant as their p-value is greater than the commonly accepted significance level of 0.05. That is why their null hypothesis is rejected by the model.

Then, the variables that remain as statistically significant are size, tangibility, profitability and risk. Those four variables can explain the 16.13% of the variation experimented by the dependent variable. Therefore, a deeper look over the statistically significant variables will shed light over the model explanation.

Regarding size, the regression coefficient showed is -0.0232. This states that an increase in the total assets would imply a decrease in the financial debt ratio of the company. Then, the relation with financial debt found in the sector fits in the pecking order theory and rejects the trade-off theory prediction on the positive relation between debt levels and size. Although the trade-off theory does not mention anything particularly related with financial debt, it is understandable that an increase of debt levels means an increase on both, financial and non-financial debt.

Tangibility has a positive coefficient of 0.0126. This fits in the trade-off theory predictions as, due to an increase on the tangibility of the assets and the collaterals of the company, the costs of debt are lower and the company will tend to increase its total debt. This, might have an even clearer explanation over financial debt that, most of the times, is money that has been lent by banks and credit institutions which are more sensible to the collaterals and bank sureties that can be found on the company.

According to the regression coefficient obtained, the profitability of the firm has a negative relation with the financial debt (-0.3112). This matches with the pecking order theory and keeps on the line defined for the relation between profitability and debt by other empirical studies mentioned before. In the case of financial debt, higher cash flows allow to avoid accruing interest loans.

The last variable that is found to be statistically significant in this regression model is risk. Its regression coefficient is  $-5.91E-06$  which implies a negative relation between risk and financial debt. This finding fits in the trade-off theory and supports Frank and Goyal's findings (2009) over the relation between risk and debt. Specially, financial debt might be sensible to the risk increase, as it is the debt that could cause higher problems for the firm in a case in which the variation of the earnings is high.

Then, the model would be determined as follows:

$$DEBT_i = 0.3479 - 0.0232 * SIZE_i + 0.0126 * TANG_i - 0.3112 * PRF_i - 5.91E-06 RSK_i + 0.0008 * GRW_i - 0.00022 * MAT_i - 0.01707 LIQ_i + \epsilon_i$$

As mentioned before, the model is only able to explain the 16.13% of the financial debt variation. This is due to the higher complexity that inherently this type of debt has. Also, the variables used for the study are a set of core factors that have proven success over explaining leverage (as shown in the first regression model). Nevertheless, this core of factors have failed to explain financial debt that is determined by other variables different that the one commonly proposed in the existant literature.

Attending to the VIF, as the variables are the same in both studies, it reflects the same reality regarding multicollinearity. Although the independent variables have a certain grade of relation between them, the regression model shows no evidence of muticolinearity problems.

It is interesting to compare the result of the regressions made over leverage and debt in order to clearly specify the main findings of each one and spot the differences and some thoughts over them that might lead to future lines of investigation.

**Table 11. Summary for significance and relation of both regression models**

	LEV		DEBT	
	Significant	Relation	Significant	Relation
SIZE	NO	-	YES	Negative
TANG	YES	Negative	YES	Positive
PRF	YES	Negative	YES	Negative
RSK	NO	-	YES	Negative
GRW	NO	-	NO	-
DIV	YES	Negative	NO	-
LIQ	YES	Negative	NO	-
MAT	YES	Negative	NO	-
IND	NO	-	NO	-

**Source: Own source.**

The first main difference are the variables that are statistically significant regarding the dependent variable. For the Leverage regression, the five significant variables are Tangibility, Profitability, Dividend

distribution, Liquidity and Maturity. In the other hand, the four significant variables for Debt regression are Size, Tangibility, Profitability and Risk.

Then, we can state that only two of the variables are shown to be significant in both regression models (Tangibility and Profitability) and only one variable is not significant in none of the two regressions; Growth opportunities.

Also, Growth opportunities and Industry seem to not have been factors that affect debt levels of the firms in the sector. This might be explained as companies do not significantly adapt their investments to the increase or decrease of sales over the period and debt assumptions between the different subindustry groups is similar and does not affect directly to be part of any specific subindustry.

Regarding the effect of the common variables over each dependent variable we have two major findings: While profitability affects in the same direction to leverage and debt, Tangibility have different direction effects over the two dependent variables.

Then, whenever a increase of profitability occurs, the regression models predict a decrease of total debts and financial debts of the firm. Nevertheless, in view of a increase of the tangibility of the assets that belong to the company, models predicts a decrease of total debt but an increase of financial debts.

A comparison among Adjust R-squared of both regression shows that the variables included can explain a way higher variation of the Leverage (67.6%) rather than Debt (15.84%). Hence, we can state that this set core of factors have a good level of prediction over leverage but fail to predict Debt. This is due to two principal reasons; the predominance of total debt explanation in literature and the complexity regarding financial debt.

On one hand, the traditional literature have tend to find regression models that predict total debt variations and financial debt has not usually been included on this studies. For example, Frank and Goyal (2009), set a similar set of core factors to predict leverage. This might be a reason that explains the difference found in the Adjusted R-squared as these core factors are proven to be significant over total debt but their significance has not been proven over financial debt.

On the other hand, financial debt has a higher grade of complexity than leverage as it is affected by multiple factors and is way less studied. Then, due to this lack of investigation over the factors that regard the variation of financial debt. it is harder to build a regression model that explains its variation in a higher grade.

## 6. CONCLUSIONS, LIMITATIONS AND FUTURE LINES OF INVESTIGATION

In this study, we have developed a study over the determinant factors regarding capital structure for medium and big companies of the auxiliar automotive sector covering a sample of 274 companies that have been analysed for the 2010-2019 period and coming to the following conclusions.

The descriptive and correlation studies and the regression models have showed a clear view on what the auxiliar automotive sector is regarding capital structure. Nevertheless, the study has also opened diverse lines of investigation to nurture the knowledge about the sector and its relationship with debt and financing.

Foremost, the descriptive study has stated that this sector is composed by firms (within the consideration of medium and big companies) that tend to prefer external funding rather than own funding (60% of total debt, 40% of own resources) but have a low dependence over financial debt (a financial debt of only 12%). Also, the sector appear to has a high tangibility with more than half of its assest as material assets that might be determined by the productive nature of the sector in which machinery and industrial plants are indispensable. Also, among the period, this sector has showed its capacity to generate benefits as the average return has been over 6% and had a crescient tendency over the period.

Furthermore, the correlation study and the regression models does also present interesting conclusions regarding the relation of different variables with the leverage and debt of the firms. Regarding leverage, the regression model explains more than two thirds of the variation of total debt having only 5 statistically significant variables. Tangibility, Profitability, Dividend distribution, Liquidity and Maturity by themselves are able to aport the explanatory power previously mentioned. However, Size, Risk and Growth Opportunities, while being variables that are considered by the literarture covering the topic as relevant, do not have explanatory over the leverage of the firms of the sample.

In addition, the regression model that predicts the variation of financial debt has a prediction power of only 15,84%. For this model, only four of the variables included (Size, Tangibility, Profitability and Risk) are statistically significant and have explanatory power while the other four (Growth Opportunities, Dividend Distribution, Liquidity and Maturity) are not providing explanatory power to the model as are considered as statistically insignificant.

Therefore, many relations have been made and external and internal agents of the sector are provided with useful tools to implement in their decision making process as they are allowed to predict changes in leverage and debt based on their future strategies or prognostics.

For example, investor that base their investment strategy on only buying companies that distribute divididends may know that, when investing in the auxiliary automotive sector, they will find that companies that fit in their strategy tend to have lower levels of total debt than the ones that do not fit. Also, directors

with estimations of an increasing profitability of their firm will be also capable to foretell a decrease over total and financial debt of their firm. Additionally, financial debt providers (as banks or investment funds) will know that companies that are developing strategies in order to increase its size may probably make use of their debt services rather than other companies in the sector. As this examples, many others predictions may help industry participants to predict changes in the capital structure of a firm regarding their estimations or strategies.

Although this empirical study has had some limitations that are going to be described over this section, it has been posible to developed it in a correct and proper way that ensures the validity of its results and findings.

The information provider, Sistemas de Análisis de Balances Ibéricos (a Bureau Van Dijk product that the University of Burgos sings on), has been a good source of information that has allowed the creation of a defined database including the principal figures that are involved in the measurement of every variable of the model. Nevertheless, the information of some years of companies that were operative before and after that concrete year was missing in a very low percentege of the sample. Also, and which has afected the sample in a deeper way, the information regarding the year 2019 was missing in 64 of the companies that were part of the sample. This impliest that 2019 was nurtured with 25% less of observations than 2018.

As mentioned before, this study proposed an empirical study to determinate the most significant variables that affect capital structure as the ones that have been carried out by many investigators within other countries and sectors. However, this study proposes the introduction of this arquetype of investigation in a sector that hardy ever has been submitted to it with the consequences this has.

This study has opened a line of investigation in order to derterminare what other variables are responsible for the variation of the part that has not been explained in the leverage regression model. It would help to determine, by adding new variables to the ones that have already been proposed and tested, an enrichment of the model that would be able to reach higher rates of explanation over the dependent variable.

Also, the fact that the financial debt regression model poorly explained the dependent variable, also shows a line of investigation in which new variables could be proposed and tested to find its capacity to explain the financial debt assumed by a company. This could be the starting point of a better understanding over financial debt and the beginning of the unravelling of the complexity observed in this variable.

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