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WHAT IS THE IMPACT OF A CAPITAL STRUCTURE CHANGE ON FIRMS' HUMAN CAPITAL?

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Dissertation written under the supervision of Professor Diana Bonfim

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Ana Beatriz Guedes Videira

[152114058]

Abstract

The aim of the present dissertation is to understand how changes in Capital Structure impact firms' Human Capital, focusing essentially on average employees' wages. To gauge this impact, it is analysed an unbalanced panel from the Euronext-100 Index, comprising a sample of 71 firms for the period 2000 to 2015. The empirical results using 1-year independent lagged variables, with *fixed-effects* model specifications, indicate that: i) Capital structure changes, leading to leverage increases, make employees worse off, implying wage reductions; ii) Distressed firms pay higher wages to their employees; iii) Firms within Labor Intensive industries pay higher wages than those within Non-Labor-Intensive industries; and iv) Wages are lower within countries providing higher average unemployment benefits. This study adds to the existing literature for two reasons: i) It tests the existing academic evidence regarding the relation between leverage and human capital for the European case, revealing that the positive effect usually found in the literature does not hold here; and ii) It reinforces the theoretical prediction that labor costs can be considered as a debt limiter.

Professor Diana Bonfim

Supervisor

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Resumo

A presente tese tem como objetivo determinar qual o impacto que uma alteração na estrutura de capital de uma empresa tem no Capital Humano dessa mesma empresa, atribuindo maior ênfase ao nível dos salários médios por colaborador. Para aferir este efeito, foi utilizado um painel de observações, obtido a partir do índice Euronext-100, que permitiu a análise de uma amostra de 71 empresas no período de 2000 a 2015. Os resultados empíricos, obtidos através de modelos que controlam os efeitos fixos de cada empresa e variáveis independentes desfasadas um ano no tempo, indicam o seguinte: i) Alterações de capital que induzam aumentos nos rácios de alavancagem, implicam reduções nos salários; ii) Empresas em stress financeiro tendem a pagar salários mais altos; iii) Empresas a operar em indústrias que requerem muito capital humano, pagam salários mais altos; e iv) Empresas localizadas em países com maiores subsídios de desemprego, pagam salários mais baixos. Esta dissertação acrescenta valor à literatura já existente na área por dois motivos: i) Testando as previsões existentes sobre a relação entre a alavancagem de uma empresa e o seu Capital Humano, para o caso Europeu, mostrando que neste caso a relação positiva não se verifica; e ii) Reforça a evidência existente sobre o poder limitador que os custos com Capital Humano têm no uso de dívida por parte das empresas.

Professora Diana Bonfim

Orientadora

“Ambition is the path to success. Persistence is the vehicle you arrive in.”

Bill Bradley

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To Francisco, thank you for all the love.

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1. Introduction

The aim of the present dissertation is to give continuity to the empirical research developed so far in the firm's capital structure field and better understand one of the variables related to it, the Human Capital. Human Capital not only influences but is also influenced by the firm's capital structure. Hence, the main purpose is to answer the following problem statement: What is the impact of a capital structure change on firms' human capital on quoted firms from Euronext-100? This is disentangled into two research questions: i) Do the capital structure changes of quoted companies impact the Human Capital dimension?; ii) Are the financial distress indirect costs related to human capital more accentuated for certain firms, industries or countries; or are they a generalized fact that always impacts firms in the same way independently of these factors?

To start with, the central concepts used in the thesis are defined. Having clarified those, the main contribution of this thesis is discussed and the hypotheses tested are stated.

1.1 Capital Structure Defined

A firm's capital structure is the mix of debt and equity financing (Bierman, 2003) chosen by a firm. According to Modigliani and Miller (1958), under stringent assumptions, the value of a firm is not affected by its capital structure. However, this is unrealistic and to determine how much debt a company should have, or in other words, what is its optimal leverage ratio, is not a simple task (Bierman, 2003). There are many factors affecting a firm's capital structure such as taxes, costs of financial distress and agency costs. Leverage has become an important concept for research on capital structure (Castro, et al., 2016) and the existing literature has added many potential explanations for capital structure policies in firms (Brounen, et al., 2006).

1.2 Human Capital Defined

Theodore Shultz (1971) created the Human Capital concept to reflect the value of human capacities. The author considered human capital as any other type of capital, through which firms could enhance the quality and level of production, by investing in their employees. In a nutshell, this concept reflects the economic value of an employee's pool of skills.

The acquisition of firm-specific skills by employees is argued to enhance the firm's productivity and is of growing importance these days, as most organizations claim their most powerful business resource is their people (Jaggia & Thakor, 1994). Consequently, a central focus of

organization development today is to "find new ways of getting the most productivity from employees for the least cost to the organization (Wagel & Levine, 1990)".

1.3 Contribution of the present dissertation

This dissertation contributes to the existing academic literature in two main dimensions. Agrawal and Matsa (2013) argue that despite their magnitude, workers' costs of unemployment are largely absent from theories in corporate finance, which do not emphasize labor market frictions. Graham, et al. (2013)[1] reinforce this idea, arguing that the overall economy has not paid much attention to the labor consequences of corporate bankruptcy and financial distress. To the best of my knowledge, this paper is the first to establish a relation between a firm's capital structure, for European firms, and its human capital. Hence, this study aims to add to the existing academic literature by providing empirical evidence on capital structure policies from Euronext-100 listed firms, a characterization of their human capital profiles, a topic that, according to several authors, has been neglected over time, and finally the relation between these two. In addition, this study will try to assess cross-industry and cross-country similarities or differences in these two dimensions. From this dissertation, future research on this topic can be carried and new conclusions can be drawn.

Moreover, this dissertation is also relevant in managerial terms for several reasons. By providing estimates on the impact that (excessive) leverage, and consequent distress costs, have on the firm's human capital, this study will add to the capital structure literature and allow managers to make better informed decisions. In 2013, Agrawal and Matsa found that managers tend to choose their financial policy as a means of mitigating labor's exposure to unemployment risk. This impact that a firm's financial health state has on the firm's human capital is of growing interest as human capital becomes an increasingly critical asset for firms (Rajan & Zingales, 1995), enabling them to enhance their productivity (Schultz, 1971). This study will contribute to improve firm's understanding on to what extent their financial health impacts on their human capital direct and indirect costs, and how this in turn affects the firm performance and the firm's capacity to recover in case of distress.

[1] The authors document that in US, wages account for roughly two-thirds of the national output (Source: Bureau of Economic Analysis).

1.4 Hypothesis Development

One of the most important decisions regarding firms' capital structure concerns the choice of the leverage ratio (Brounen, et al., 2006). According to the trade-off theory, there may be an optimal choice for this ratio, i.e., a target leverage ratio.

To address the problem statement of this dissertation, a first research question about the effects of changes in capital structures of the Euronext-100 quoted companies, from 2000 to 2015, will be answered. In particular, the thesis will focus on the effects on human capital associated with changes in firms' capital structure. What is the impact of increasing leverage on the firms' employees? Hypotheses to answer this were formulated and go as follows:

Hypothesis 1: Employees are better off with higher debt ratios.

Hanka (1998) argues that a high debt ratio may help firms in bargaining with employees for concessions. Highly leveraged firms may argue that they cannot pay higher wages and press their employees, gaining bargaining power to push wages downwards. According to Graham et al. (2013) employees' wages begin to deteriorate one year prior to bankruptcy. In contrast, there are authors (Agrawal & Matsa, 2013; Chemmanur, et al., 2013; Berk, et al., 2010) who argue that highly leveraged firms pay higher wages to their employees in an attempt to compensate them for the unemployment risk they face. The first hypothesis will address this question.

This dissertation will try to answer a second research question: Are the (direct and indirect) costs related to human capital higher for certain firms/industries or countries? To answer this question, the below hypothesis are formulated, based on existing literature.

According to several authors (named in Section2), firms with higher probabilities of default, implicitly increase the risk faced by employees in terms of future unemployment because of the bankruptcy possibility. Thus, following the literature and the rationale that firms tend to compensate employees for this risk in the form of wage premiums, it is expected that Distressed firms bear higher payroll costs. Following this, the second hypothesis become:

Hypothesis 2: The costs of human capital are higher for distressed firms.

Assuming labor as a riskier asset than physical capital (Berk, et al., 2010), a reasonable assumption as the former tend to be more variable and less controllable, firms depending highly on this type of asset, will present higher risks. As so, firms whose outputs depend very much on the firm's workforce and associated skills, seen as Labor-Intensive, will be riskier (Williams,

1995). What these firms could do to reduce their risk, knowing the risk associated to labor exists and cannot be reduced, would be lower their leverage ratios. However, if this is not the case, and they do not opt to "unrisk" themselves by this way, they will find themselves unconsciously offering riskier positions to their employees, bearing in the end higher payroll costs as a compensation mechanism. This, leads to the third hypothesis of this study:

Hypothesis 3: The costs of human capital are higher for labor-intensive industries.

Finally, evidence from Agrawal and Matsa (2013) indicates that firms, within countries with higher unemployment benefits, tend to increase their debt ratios, boosting the mentioned risk. Hence, one can think of this greater unemployment benefits as an indirect source of risk. These firms have to compensate their employees for an increased risk, in the form of even higher wage compensations. This leads to the formulation of Hypothesis 4, which goes as follows:

Hypothesis 4: The costs of human capital are higher in countries with weaker unemployment insurance benefits.

The rest of this dissertation proceeds as follows. The second section documents the previous literature that relates to the addressed problem statement and the main inputs from it. The following section presents the data and sample chosen, the variables used, the methodology adopted to elaborate the study, and the respective descriptive statistics. Section four analyses the data, further discusses the empirical results and presents the robustness checks. The fifth section concludes and finally, the last section presents the limitations and the future research.

2. Literature Review

Some research has already been carried under the broad topic that covers this dissertation, relating a firm's capital structure to its human capital. The existing academic literature, which provided some useful inputs for this paper will be cited in this section.

There are two main distinct streams in the literature. One argues that if human capital costs associated with financial distress are large enough, they can be a disincentive for firms to hold more debt (Berk, et al., 2010). Contrarily, there are authors who say that firms use more debt as a means to gain bargaining power towards their employees (Hanka, 1998), pressing wages downwards.

2.1 Capital Structure

Firm's capital structure is still a puzzle in the corporate finance field, especially on how firms choose the debt, equity or hybrid securities they issue (Majluf & Myers, 1984). What was already proven, in contrast, is that a firm's financial condition has effects on the firm as a whole (Brown & Matsa, 2013; Miller & Modigliani, 1958) and that changes on its capital structure convey information to investors (Majluf & Myers, 1984).

The capital structure of firms can be analysed through two traditional ways of thinking, the static tradeoff theory, through which firms gradually move to an optimal target ratio; and the pecking order theory (Majluf & Myers, 1984) in which firms follow a financing hierarchy. However, according to Myers (1984) if none of these explains the actual behaviour, one could look at the neutral mutations story, according to which firms fall into financing patterns that have no material effect on the firm's value (Miller & Modigliani, 1958).

Each of these models has succeed in explaining a number of patterns in observed capital structures, but neither succeeded in explaining much of the observed heterogeneity in capital structures and leverage changes. Many reasons are pointed as responsible for this failure, including variables' mis-measurement, under-researched features of financial contracts, the capital supply side and the non-financial stakeholders impact, the focus of this study (Graham & Leary, 2011). Myers (1984) stated that before offering advice to managers about an optimal target leverage ratio, one should ask whether these theories explain firms' financing behavior.

2.2 Non-financial stakeholders

One of the explanations for the inadequate performance of the traditional capital structure models is related to non-financial stakeholders, such as employees, customers and suppliers

(Graham & Leary, 2011). Recent work shows that the incentive effects of capital structure can affect contracting between firms and these stakeholders (Graham & Leary, 2011) and that a firm's financial condition itself impacts its ability to attract and retain human capital (Brown & Matsa, 2013).

Since Titman (1984), financial distress indirect costs, such as the losses for employees, are seen as critical and as an explanation for firms' reluctance in using debt, despite its various benefits. According to Agrawal and Matsa (2013) one can understand this impact, through an additional term in the trade-off theory, the labor costs, to balance with the debt benefits and costs. In a nutshell, the risk of losing human capital due to financial distress and bankruptcy is a key driver of corporate leverage choices (Graham, et al., 2013).

A firm's financial leverage influences its probability of entering distress, which in turn increases the risk employees would face in case distress leads to bankruptcy (Graham & Leary, 2011). When a firm is in distress, its high debt ratios deteriorate the financial positions, even if the firm is able to maintain its operations strong (Graham, et al., 2013). Generally, costs of financial distress can deteriorate a firm's value even if formal default is avoided (Majluf & Myers, 1984).

The possibility of losing a job, poses more than one problem for employees. Not only the job loss itself, but also the earnings' instability (Gibbons & Katz, 1991; Jacobson, et al., 1993), the consumption decline (Gruber, 1997), the longer spells before being re-employed (Jacobson, et al., 1993) and the sizeable psychological and social costs (Kalil & Ziol-Guest, 2008; Kalil & DeLeire, 2010).

This unemployment risk creates an indirect cost of financial distress, ultimately borne by the company itself in the form of higher wages (Agrawal & Matsa, 2013) in an attempt to compensate employees for the lack of stability within the firm (Brown & Matsa, 2013). Brown and Matsa (2013) found that, for a given open position, a 10% increase in the firm's probability of default, implies a wage increase equal to 16-to-18-log-points. Graham et al. (2010) concluded that these compensations can be as large as 8% of firms' value. This rationale of having premium wages to compensate workers for the unsafe job positions dates back to Adam Smith (1976). According to the economist, wages have to be higher in two situations. First, for jobs that are difficult to learn, otherwise employees would not be willing to learn them; second for risky positions, associated with future unemployment possibilities. The author concludes that firms have an incentive to mitigate this employees' risk, as means of reducing the compensating premiums due, providing more stable job conditions.

Agrawal and Matsa (2013) document that this premium in wages is lower when firms choose conservative financial policies, which reduce the risk of financial distress and layoffs, being in line with the argument that leverage has a positive effect on average employee pay (Chemmanur, et al., 2013). However, as mentioned before, there are authors (Hanka, 1998; Garvey & Gaston, 2009) who stand in the opposite side, claiming that firms in financial distress present more austere employment conditions, paying lower wages.

The financial situation of distress caused by this indirect cost, not only discourages the use of debt in the static tradeoff theory perspective, but also leads current employees and possibly-future new recruits to focus their attention and searches in "healthier" companies (Brown & Matsa, 2013). Distressed firms may have difficulty recruiting new talent, particularly for positions that require firm-specific investments (Brown & Matsa, 2013) because these firm-specific skills, despite valuable to the firm, are costly for the employee to obtain and not perfectly marketable (Jaggia & Thakor, 1994).

According to Jaggia and Thakor (1994), *ceteris paribus*, an employee who faces the risk of leaving the firm in the near future will not invest much in firm-specific skills. This underinvestment, which on the contrary situation has been proved to enhance a firm's productivity (Schultz, 1971), will now lower it. Jaggia and Thakor (1994) suggest that life-time contracts could deal with this problem. However, these contracts can revel inefficient in the future, implicitly leading firms to prefer wage incentives as also suggested by Berk et al. (2010) and Smith (1976). The problem with these incentives is their expensiveness. Trying to avoid these expenses, firms may opt to sacrifice their ex-post efficiency, obtained with the contracts, as means to demonstrate stability. This sacrifice could lead the firm in the future to a bankruptcy situation, in which ownership would be transferred and the "secure" life-time contracts cancelled.

Though, Jaggia and Thakor (1994), state that employees, as rational agents, anticipate this and look at the corporate leverage level to infer about the bankruptcy probability and consequent ability to honour the contracts. This is where debt forces firms to make a trade-off between the debt-tax advantages and the costs imposed by it on the firm's human capital quality. Chemmanur's et al. (2013) empirical evidence that labor costs limit the use of debt reinforces this prediction.

After all, one can see that a significant literature stream argues that if indirect costs of bankruptcy (into which human capital costs are included and of great importance) are large enough, they may constitute a disincentive for firms to use more debt.

2.3 Unemployment Insurance

There is another variable that impacts the relation between firms' capital structure and human capital, the unemployment insurance. Agrawal and Matsa (2013) find that when a state increases the unemployment insurance benefits, reducing the labor cost of financial distress, companies increase debt usage and benefit from debt tax shields. Workers' sensitivity to potential employers' distress decreases in locations with stronger social safety nets (Brown & Matsa, 2013). According to Agrawal and Matsa (2013), a 100-log-point increase in total unemployment insurance benefits is associated with 4.5% greater average debt to assets ratios. The authors find evidence suggesting that firms actively adjust leverage to account for worker unemployment risk.

Agrawal and Matsa (2013) emphasize that this relation between unemployment insurance generosity and firms' leverage is stronger in two situations. First, in the case of firms within labor-intensive industries; a 100-log-point increase in unemployment insurance benefits is associated with a 4.7% increase in the leverage of these type of firms. These firms' managers are more likely to consider their employees' unemployment costs when making financing decisions, when unemployment risk becomes less costly (Agrawal & Matsa, 2013).

The second situation in which this relation is stronger is in the case of financially constrained firms. When the unemployment risk is boosted by financing frictions, workers require even higher wage premiums to stay at work, pressuring firms to maintain conservative financial policies. As the authors argue, this pressure can be eased with the unemployment benefits because these reduce workers' expected costs of unemployment (Agrawal & Matsa, 2013).

Although much of the academic literature on leverage focuses on the debt-to-asset ratios, Agrawal and Matsa (2013) find that the interest coverage ratio is another important measure of the firm's financial policy, especially when workers are worried about firms' distress. The authors demonstrate that a 100-log-point increase in total unemployment insurance benefits is associated with 15% lower interest coverage.

According to the authors, firms increase total debt when employees are protected by the state during unemployment periods, being entitled to receive higher benefits. These empirical

findings are in line and support the theory that "firms boost their financial leverage when workers are better insulated from unemployment risk (Agrawal & Matsa, 2013)"

2.4 Job applicants

In addition to discourage debt usage, financial distress also makes firms less attractive to workers, reducing labor supply (Brown & Matsa, 2013). The authors find that job seekers' perception is attuned with firm's financial health state, and as a consequence, distressed firms, receive less and with less quality job applicants. And again, if outside job seekers accurately perceive the firm's financial health state, firm's employees likely perceive these changes as well (Agrawal & Matsa, 2013).

Put together, distress reinforces distress and firms enter a vicious cycle, struggling to attract and retain workers who could contribute to recovery. Labor-related costs provide firms with a strong incentive to avoid financial distress. Graham et al. (2010) argue that taking human costs of bankruptcy into account can potentially resolve the "debt conservatism puzzle".

3. Data and Methodology

This section begins with the data description, presenting the sample in detail. Next the variables used in the empirical analysis are described, followed by the methodology applied to assess the studied impact. Finally, the descriptive statistics of these variables are presented.

3.1 Data

For this analysis two types of information were collected from Thomson Reuters in order to determine and characterize the firms' capital structure and their human capital profile. Firstly, firm-level information was collected to create appropriate ratios, such as the book value of assets, debt and equity, property, plant and equipment net profit, total revenue, sales' growth and the firm's industry and country. Secondly, information was collected on workers, such as the payroll costs, the number of employees and the generated revenue per employee.

The sample, covering a period from 2000 to 2015, contains panel data from the Euronext-100 quoted firms. Excluding the financial institutions, due to fairly different capital structures (Hovakimian, et al., 2001), the sample is left with 82 firms. Eleven more companies were excluded due to currency problems (one) or lack of information regarding the human capital (ten). After these exclusions, a final sample of 71 firms was obtained and used throughout the study, resulting in 1136 observations.

For the first hypothesis, all these 71 firms were used.

To test the second hypothesis, the original sample was split into two using the dummy variable *Distress*. The values obtained with Distressed firms were compared against Non-Distressed firms' values, to assess the differences with human capital costs between these two groups.

For the third hypothesis, the Labor-Intensive industries were considered and compared to the Non-Labor-Intensive industries, using the dummy variable *LaborIntensive*, in order to determine the differences between the human capital costs they support.

Finally, to test the last hypothesis, firms were classified according to the generosity of their countries' unemployment benefits, resulting in two groups: High Unemployment Benefits' and Low Unemployment Benefits' countries. This classification is an attempt to assess cross-country differences and determine for which the human capital costs are higher.

3.2 Variables' Description

The initial database comprises 48 variables collected from Thomson Reuters to characterize firms, through created ratios used in the empirical analysis. Yet, these variables had to be winsorized, at a 1% left and right tail of the distribution, in order to avoid outliers which would otherwise bias the results. Appendix 1 summarizes all the dependent and independent variables used for this analysis. Their choice reflects the existing literature which includes Altman (2000), Berger, et al. (1997), Rajan and Zingales (1995), and Welch (2011), among others.

Dependent Variables

The dependent variables may be referred to as Human Capital variables throughout the study, for representative and simplicity purposes.

PayrollEmployee is the ratio that results from the total payroll costs divided by the total number of employees, and is presented in thousands of Euros. *LnPayrollEmp* is the natural logarithm of this variable.

RevenueEmployee, i.e., the total revenue to total number of employees, represents the amount of revenue each employee is capable of generating (presented in thousands of Euros per employee). The *LnRevenueEmp* is the natural logarithm.

NrEmp represents the total number of employees and the *LnNrEmp* is its natural logarithm.

Main explanatory variables

These are the variables used to describe firms' capital structure, and so they may be called from this point onwards variables of interest, as they are the ones whose effect this study tries to grab. These are the variables that will allow us to test hypothesis 1.

TDTA, i.e., the ratio of total liabilities (following Welch (2011) the non-financial liabilities should be considered as debt) to total assets (book values), is one of the most commonly used measures to assess firms' leverage. This indicates how much of the firm's assets are financed with debt. The higher the ratio, the higher the degree of leverage and in turn the higher the financial risk.

TDTE represents the ratio of total liabilities to total equity in book values. Despite using the same input as the previous variable, it gives a different perspective. A *TDTE* equal to 1 would mean that both shareholders and creditors have the same stake in the firm's assets.

NetLev stands for the net leverage which results from Eq. (1). This variable allows for a more realistic perception about the firm's financial situation once it deducts the amount of cash

holdings from the total liabilities and total assets. It is useful to deduct the cash holdings, as they can easily be used to repay part of the outstanding debt (reason why they are seen as negative debt). In case these amounts are used to repay debt, the net leverage does not change.

$$Net\ Leverage = \frac{Total\ Liabilities - Cash\ and\ Cash\ Equivalents}{Total\ Assets - Cash\ and\ Cash\ Equivalents} \quad \textbf{(1)}$$

IntCovRatio, the last measure for firms' financial positions, resulting from Eq. (2), is used to determine how easily firms can pay their non-operating interest expenses. This ratio indicates how many times a firm could pay its fixed debt payments using its operating earnings before interest and taxes. The lower the Interest Coverage Ratio, the larger is the debt expenses' burden. If this ratio is 1.5 or lower, the firm's ability to pay its interest expenses may be questionable.

$$Interest\ Coverage\ Ratio = \frac{EBIT}{Interest\ Expenses} \quad \textbf{(2)}$$

Control Variables

To capture the relationship between capital structure and human capital, it is necessary to control for other firm characteristics that may also influence human capital indicators.

LnTA, the natural logarithm of total assets is used as a proxy to evaluate firms' size. The stylized fact that larger firms pay larger wages is well-accepted and supported by evidence from the World Bank[2]. This may be due to economies of scale, higher profits or access to greater pools of capital. All these factors, when associated with higher wages, will attract more talented applicants, who later on will require again higher wages (Brown & Medoff, 1989).

altZscore represents the modified Altman Z-score, computed according to Altman (2000), in order to assess firms' financial strength. Following some existing literature (Agrawal & Matsa, 2013; MacKie-Mason, 1990), and with the main purpose of studying the impact of capital structure changes, variables used to describe firms' capital structure were inserted directly in the regression analysis, exempting the need for the market value of equity to total liabilities ratio, resulting in Eq. (3):

$$altZscore = 1{,}2 * \frac{Working\ Capital}{Total\ Assets} + 1{,}4 * \frac{Retained\ Earnings}{Total\ Assets} + 3{,}3 * \frac{EBIT}{Total\ Assets} + 1 * \frac{Sales}{Total\ Assets} \quad \textbf{(3)}$$

This variable is used as a proxy for financial distress. For this study, and to better gauge the differences between firms within the sample, the median *altZscore* (1,326) was determined and

[2] Website consulted: http://go.worldbank.org/U7RQ87KTG0

used as cut-off to determine if firms were in Distress (*altZscore* below or equal to the median value) or not (*altZscore* above the median value).

EBITDAtoTA is used as a measure of the firm's profitability, resulting from the division of the Earnings Before Interest, Taxes, Depreciation and Amortization to total assets. The EBITDA represents the firm's ability to generate income from its operations, not taking into consideration the effects of the firm's capital structure. Blanchflower et al. (1996) showed that changes in worker's remuneration occur partly in response to earlier movements in profitability, revealing a positive association between earnings and wages.

GrossAssetTang, following Chemmanur et al. (2013), is used to represent the firms' asset structure. It results from the ratio of gross property, plant and equipment to total assets. The larger the volume of collateralizable assets, the greater the firm's debt capacity (Titman & Wessels, 1988), thereby increasing the firm's wage levels (Berk, et al., 2010).

LnSalesGrowth represents the natural logarithm of sales' growth per year, as a measure of firms' future growth opportunities.

Industry is a qualitative variable that can assume the following names and industry codes, according to Thomson Reuters: Oil & Gas (1), Basic Materials (1000), Industrials (2000), Consumer Goods (3000), Health Care (4000), Consumer Services (5000), Telecommunications (6000), Utilities (7000) and Technology (9000). The Financials industry (8000) was excluded.

Country is a qualitative variable that can assume the following values: Belgium, France, Netherlands and Portugal, according to firms' countries.

Dummy Variables

Distress is a dummy variable created to classify firms according to their probability of default, measured by *altZscore*. If *altZscore* is smaller or equal to the median value, firms are classified as Distressed and the dummy assumes the value 1. On contrary if *altZscore* is greater than 1,326, the firm is not heading for bankruptcy and *Distress* equals 0. According to Agrawal and Matsa (2013), employees in Distressed firms require higher wages, to compensate for the unemployment risk they face. Therefore, it is expected that firms classified as distressed (*Distress* = 1) will present higher payroll costs per employee (Hypothesis 2).

LaborIntensive is a dummy variable created to classify firms as being Labor-Intensive or not, according to the payroll costs per employee they support. Having in mind that Labor-Intensive industries are those requiring a lot of labor to produce outputs, therefore incurring in higher

labor costs, one can say that industries with payroll costs per employee greater or equal to the median value (43 725 Euros), are considered Labor-Intensive industries (dummy = 1). Thereby, under this criterion, Consumer Services, Oil & Gas, Telecommunications and Utilities are considered as Labor-Intensive Industries. On contrary, if *PayrollEmployee* is smaller than 43 725€, *LaborIntensive* equals 0, and industries are classified as Non-Labor-Intensive, which is the case of the Basic Materials, Consumer Goods, Health Care, Industrials and Technology industries. This variable will allow us to test Hypothesis 3.

UnempBenD is a dummy variable created to split the sample into two groups, representing two types of countries. The first, in which *UnempBenD* is equal to 1, is the type of country that provides average unemployment benefits greater or equal than the median unemployment benefits[3], 13 013 Euros. This is the of France and The Netherlands. On the other hand, if the average unemployment benefits provided by the country is below the median value, the country is classified as having low unemployment benefits, *UnempBenD* = 0. This is the case of Belgium and Portugal. This variable will be used to test Hypothesis 4.

3.3 Methodology

To gauge the effects that capital structure changes have on firms' human capital, and consequently try to validate the hypothesis formulated (Section 1.4), multiple regressions were built and tested, as presented in this section.

Despite having run several model specifications, only those with statistically significant variables of interest are presented in the thesis itself. Most of the remaining regressions and respective outputs are presented in the Appendices 4 and 5.

The baseline specification is a general linear regression, where Human Capital variables (*LnPayrollEmp*, *LnRevenueEmp*, *LnNrEmp*) are modelled as a function of the explanatory variables (*TDTA*, *TDTE*, *NetLev*, *IntCovRatio*) and a set of controls (*LnTA*, *altZscore*, *GrossAssetTang* and *EBITDAtoTA*).

In a first stage, regressions were run using contemporaneous variables, as follows:

$$LnPayrollEmp_{i,t} = \alpha + \beta_1 TDTE_{i,t} + \beta_2 LnTA_{i,t} + \beta_3 altZscore_{i,t} + \beta_4 GrossAssetTang_{i,t} + \beta_5 LnSalesGrowth_{i,t} + u_{i,t} \quad \textbf{(1)}$$

[3] Information obtained from OECD website

$$LnRevenueEmp_{i,t} = \alpha + \beta_1 IntCovRatio_{i,t} + \beta_2 LnTA_{i,t} + \beta_3 altZscore_{i,t} + \beta_4 GrossAssetTang_{i,t} + \beta_5 LnSalesGrowth_{i,t} + u_{i,t} \quad \textbf{(2)}$$

$$LnNrEmp_{i,t} = \alpha + \beta_1 TDTA_{i,t} + \beta_2 LnTA_{i,t} + \beta_3 altZscore_{i,t} + \beta_4 GrossAssetTang_{i,t} + \beta_5 LnSalesGrowth_{i,t} + u_{i,t} \quad \textbf{(3)}$$

where the dependent variables try to measure the human capital dimension, in order to determine if employees are better or worse off. From these regressions, and following the literature stream (Berk, et al., 2010; Chemmanur, et al., 2013), which argues that leverage positively impacts employees' wages, it is expected that *TDTE*, *IntCovRatio* and *TDTA* present positive coefficients.

Nevertheless, using only contemporaneous regressors can raise endogeneity concerns: there may be reverse causality (human capital variables may also affect capital structure decisions) and there may be an omitted variables problem (there may exist unobservable factors that simultaneously affect human capital and leverage).

Therefore, in an attempt to isolate the analysis and results from this endogeneity problem, and according to Rajan and Zingales (1995), contemporaneous variables are replaced by 1-year lagged variables, represented by the (*L.*). Regression models become:

$$LnPayrollEmp_{i,t} = \alpha + \beta_1 L.TDTE_{i,t-1} + \beta_2 L.LnTA_{i,t-1} + \beta_3 L.altZscore_{i,t-1} + \beta_4 L.GrossAssetTang_{i,t-1} + \beta_5 L.LnSalesGrowth_{i,t-1} + u_{i,t-1} \quad \textbf{(4)}$$

$$LnRevenueEmp_{i,t} = \alpha + \beta_1 L.IntCovRatio_{i,t-1} + \beta_2 L.LnTA_{i,t-1} + \beta_3 L.altZscore_{i,t-1} + \beta_4 L.GrossAssetTang_{i,t-1} + \beta_5 L.LnSalesGrowth_{i,t-1} + u_{i,t-1} \quad \textbf{(5)}$$

$$LnNrEmp_{i,t} = \alpha + \beta_1 L.TDTA_{i,t-1} + \beta_2 L.LnTA_{i,t-1} + \beta_3 L.altZscore_{i,t-1} + \beta_4 L.GrossAssetTang_{i,t-1} + \beta_5 L.LnSalesGrowth_{i,t-1} + u_{i,t-1} \quad \textbf{(6)}$$

Regressions were run using both *random* (RE) and *fixed effects* (FE) models. However, and after running an Hausman test, results indicate that a FE model is the most appropriate for the study, leading to the abandonment of the former (RE).

Some firm characteristics do not change across time, hence controlling for these features, through a firm FE model, is pertinent. This amendment, is also important to avoid the omitted variables problem. Regressions remain the same but in Stata, (re) is replaced by (fe) in the end of each model. Results are presented for both models in a first stage to give the reader a broader

perspective. The expectation regarding the coefficients and the positive impact of the variables of interest on the dependent variables holds.

Finally, another consideration was made about time effects. To better gauge the effect of capital structure changes on human capital, not only the firm FE were controlled but also the time FE. In an attempt to isolate the studied effect from the macroeconomic conditions and the changes that may have occurred during the period under analysis, 2000-2015, regressions were run using year FE.

To regressions (4), (5), (6) the commands "xi:" and "i.Year" were added in the beginning and end of each line, respectively.

The multiple regressions, accounting for *firm and time* FE with 1-year lagged variables, were the ones used to draw the main conclusions of this study and to validate the hypothesis formulated, trying to answer the problem statement.

3.4 Descriptive Statistics

In this section five tables are presented, providing preliminary statistical analysis of the variables used, in order to understand their behaviour. Tables show the correlation coefficients (Table I), general summary statistics (Table II), summary statistics classified by type of firm (Table III), by Industry (Table IV) and finally by Country (Table V).

Looking at Table I one can understand how *TDTA, TDTE, NetLev* and *IntCovRatio*, vary with the variables used to describe firms' Human Capital.

The correlation matrix (Table I) demonstrates that most of the variables have relatively low linear correlation coefficients among each other. The Human Capital variable that is mostly correlated with the capital structure variables, is the Number of Employees. It can be seen that the *NrEmp* and the leverage proxies, *TDTA*, *TDTE*, *NetLev*, are positively correlated. An increase in these ratios, leads to an increase in the number of employees equal to around 25% (*TDTA, NetLev*) and 13% (*TDTE*). The exception relates to *IntCovRatio*, which is negatively correlated with the number of employees. If the firm's capacity to pay its interest expenses increases, the number of employees will decrease.

When looking at the payroll costs as a fraction of total assets or total operating expenses, it can be seen that, when statistically significant, they are positively correlated with the capital structure variables, suggesting that increases in *TDTA, TDTE, NetLev* and *IntCovRatio*, lead to increases in these ratios.

As per the correlation between the Revenue per Employee and the leverage proxies, it can be understood from Table V that this pair is negatively correlated. If the leverage, measured by *TDTA, TDTE, NetLev*, increases, the revenue per employee decreases, or vice-versa.

Lastly, when analysing how wages, proxied by *PayrollEmp*, vary with leverage, it can be understood that they are positively correlated. As per the results of this matrix, it would be expected that an increase in the leverage ratios, *TDTA, TDTE, NetLev*, would make employees better off, by improving the payroll levels. On contrary, an increase in the interest coverage ratio, tends to make employees worse off, decreasing the ratio of payroll per employee.

Table I

Correlation Matrix between Capital Structure and Human Capital Variables

Table I reports the correlation coefficients between the variables of interest, *TDTA*, *TDTE*, *NetLev* and *IntCovRatio*, and the variables used to characterize firms' Human Capital (*NrEmp, LnNrEmp, PayrollTA, LnPayrollTA, PayrollTOC, RevenueEmployee, LnRevenueEmp, PayrollEmployee, LnPayrollEmp*). The following code applies for the statistical significance of the coefficients: * p<0.05.

Variables	Capital Structure Variables			
	TDTA	*TDTE*	*NetLev*	*IntCovRatio*
Capital Structure proxy	1,0000	1,0000	1,0000	1,0000
NrEmp	0,2546*	0,1294*	0,2490*	-0,1344*
LnNrEmp	0,1740	0,0714*	0,1640*	-0,0787*
PayrollTA	0,0598	-0,0265	0,0363	0,1408*
LnPayrollTA	-0,0053	0,0561	0,0348	-0,1325*
PayrollTOC	0,1117*	0,0343	0,1088*	-0,0163
RevenueEmp~e	-0,0319	-0,0394	-0,0118	0,1321*
LnRevenueEmp	-0,0621*	-0,0357	-0,0384	0,1352*
PayrollEmp~e	0,1123*	0,0434	0,1511*	-0,0690
LnPayrollEmp	0,0770	0,0039	0,0873*	-0,0469

When looking at summary statistics, Panel A of Table II, shows that on average, irrespectively of the capital structure measure used, the 71 firms from Euronext-100 have high debt ratios. For instance, the mean *TDTA* ratio is equal to 0,673, indicating that 67,3% of the firms' assets were financed through debt.

From the *altZscore*'s variable analysis, one can see that the mean value, 1,399 is above the median of the whole sample (1,326). This indicates that on average firms within this sample are not heading to bankruptcy, nor in Distress situation, under the criterion used throughout this study.

When looking at the average firm's profitability, 0,126, measured by the *EBITDAtoTA,* one can see that firms have been able to generate income from their operations, independently of their capital structure.

In terms of firm's growth, by analysing *LnSalesGrowth*, one can understand that on average, firms have been growing their sales at 4,9% per year. However, there are also firms that have not been growing, but rather diminishing their sales volume. The minimum value for this variable is equal to -52,4%.

From Panel B, which presents summary statistics on the firm's Human Capital, one can verify that the average number of employees per firm is equal to more than 84 thousand, and that the mean Payroll Cost per Employee is around 41 thousands of Euros per year. When comparing these Human Capital costs to the firm's structure, one can conclude that Payroll Costs represent almost 15% of the firms' Total Assets (book value), and account for almost 21% of the firm's Total Operating Expenses.

Finally, from Panel C, one can see that the four countries contemplated in the sample, Belgium, France, The Netherlands and Portugal, grant their citizens average unemployment benefits equal to 13 937[4] Euros per year. It is important to highlight that these unemployment benefits were corrected for the countries' purchase power parity and converted into Euros.

[4] Based on OECD information from the Unemployment Benefits Calculator.

Table II

Variables' Summary Statistics

Table II presents summary statistics for the variables used in the regression analysis, splitting them into three panels (A), (B) and (C) according to the type of variables summarized. The summary statistics presented are as follows: mean, number of observations, minimum and maximum values, standard error, standard deviation, kurtosis, skewness and the first, second and third quartiles. The quantile 1 (p1) and the quantile 99 (p99) are omitted because the variables were winsorized at a 1% left and right tail of the distribution.

Variable	**Mean**	**Obs**	**Min**	**Max**	**se(mean)**	**Sd**	**kurtosis**	**Skewness**	**p25**	**p50**	**p75**
Panel A – Firm's characteristics											
TDTA	0,673	1075	0,286	1,093	0,005	0,151	3,018	-0,138	0,578	0,673	0,787
TDTE	2,961	1074	0,457	16,300	0,081	2,658	11,896	2,682	1,380	2,070	3,703
NetLev	0,631	1074	0,103	1,096	0,006	0,181	3,554	-0,487	0,524	0,639	0,763
IntCovRatio	10,760	919	0,425	36,636	0,358	10,857	3,876	1,467	3,646	6,101	13,347
LnTA	16,425	1075	13,011	19,116	0,038	1,234	2,760	-0,146	15,624	16,397	17,303
EBITDAtoTA	0,126	1072	0,018	0,368	0,002	0,063	5,412	1,237	0,081	0,120	0,154
GrossAsset~g	0,561	985	0,032	1,949	0,013	0,400	4,301	1,074	0,223	0,516	0,793
LNSalesGro~h	0,049	1008	-0,524	0,673	0,005	0,151	8,539	0,436	-0,010	0,043	0,102
altZscore	1,399	981	0,112	3,741	0,023	0,724	4,057	0,909	0,890	1,326	1,764
Distress	0,499	981	0,000	1,000	0,016	0,500	1,000	0,002	0,000	0,000	1,000
Panel B – Firm's Human Capital Variables											
NrEmp	84059	1008	794	424868	2824	89648	6,056	1,743	18742	53536	122025
LnNrEmp	10,678	1004	6,944	12,960	0,043	1,349	3,145	-0,728	9,852	10,898	11,714
PayrollTA	0,147	757	0,000	0,725	0,006	0,154	6,777	1,889	0,039	0,117	0,184
LnPayrollTA	2,303	676	0,371	6,549	0,046	1,191	4,906	1,243	1,614	2,024	2,783
PayrollTOC	0,205	764	0,000	0,733	0,006	0,170	4,113	1,113	0,085	0,184	0,267
RevenueEmp~e	299230	1008	27493	1927195	9521	302292	17,050	3,548	163895	218890	308759
LnRevenueEmp	12,328	1008	10,222	14,472	0,023	0,717	4,837	0,100	12,007	12,296	12,640
PayrollEmp~e	41387,96	697	0,00	142902,30	1044,50	27575,48	4,12	0,52	21981,26	43725,37	56651,14
LnPayrollEmp	10,466	619	6,230	11,870	0,042	1,050	9,894	-2,591	10,419	10,736	10,977
Panel C – Country's Variables											
UnempBenefits	13 936,94	924	4492	23573	132,628	4031,544	3,498	0,538	12136	13013	23573

One of the hypotheses to test is related with the role of financial distress. To have some insight on this, we compare Distressed to Non-Distressed firms. This classification and respective results are presented in Table III, including the number of observations and mean value for *TDTA*, *NrEmp, PayrollEmployee, RevenueEmployee, PayrollTA* and *PayrollTOC.*

As expectable, firms classified as Distressed hold on average 9,5% higher leverage ratios, when measured by *TDTA*, than Non-Distressed ones.

From Table III, one can see that on average Distressed Firms have less 5 236 employees than Non-Distressed Firms. However, these mean values are not statistically significant, and therefore should not be considered.

On average, Distressed Firms pay 15 764 Euros more, per year, to their employees, than their counterparts, Non-Distressed Firms. This is in line with Brown and Matsa (2013) and Smith (1976). According to Adam Smith (1976), firms have to offer wage compensations for riskier job positions (in this case, as Distressed firms are financially constrained, their employees face a greater risk than those within Non-Distressed firms, requiring wage premiums).

The Payroll to Total Operating Costs ratio is greater for Distressed rather than Non-Distressed firms. In line with Payroll per Employee, the Revenue per Employee is also smaller for Non-Distressed firms.

The ratio Payroll to Total Assets is greater for Non-Distressed firms.

Table III

Summary Statistics for Distressed vs. Non-Distressed Firms

Table III reports *TDTA* (leverage proxy), and the variables used to represent firms' Human Capital dimension, namely, *NrEmp*, *PayrollEmployee*, *RevenueEmployee, PayrollTA* and *PayrollTOC*. The two sub-groups were obtained using the dummy variable *Distress*, equal to 1 if *altZscore* is smaller or equal to 1,326; and equal to zero in the opposite case. The significance of these coefficients was tested through a t-test, and the mean difference is presented using the following code to highlight its statistical significance: p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Distressed Firms		**Non-Distressed Firms**		**Mean Difference (Non-Distressed - Distressed)**
Variables	Obs	Mean	Obs	Mean	
TDTA	490	0,719	491	0,624	-0,095***
NrEmp	449	82 579	464	87 815	5236
PayrollEmp~e	317	49 381	333	33 617	-15 764***
RevenueEmp~e	449	310 952	464	253 862	-57 090***
PayrollTA	352	0,10319	354	0,19842	0,09522***
PayrollTOC	352	0,22342	354	0,19839	-0,02502*
Obs	490		491		

Another important part of this study, is to determine how changes in firms' capital structure affect human capital, by industry.

Therefore, and to understand how *TDTA, NrEmp, PayrollEmployee, RevenueEmployee, PayrollTA* and *PayrollTOC,* behave per industry and to determine patterns or differences, these variables were summarized by industry and the results are presented in Table IV.

From Panel A of Table IV, one can see that the Utilities industry has the highest leverage ratio (*TDTA* = 0,789), whereas Health Care has the smallest (0,460).

In terms of number of employees, *NrEmp,* one can see that, the industries with the highest and lowest number, are respectively, the Utilities (128 051) and the Health Care (42 757) industries. The industries that present the maximum and minimum Payroll Costs per Employee are the Utilities (55 840 Euros) and the Consumer Goods (29 613 Euros) industries.

This result about the Utilities Industry (highest *TDTA* and *PayrollEmp*) confirms the expectation regarding higher wages being associated with more leverage.

In terms of Revenue per Employee, *RevenueEmployee*, it does not come as surprise that the Oil & Gas industry is the leading one (1 115 088 Euros), as its revenues tend to be the highest among several industries. On the other hand, the Industrials score the lowest, having a Revenue per Employee ratio equal to 201 090 Euros.

Another expectable result regards the Payroll to Total Assets ratio, *PayrollTA*, which has its maximum in the Technology industry (0,227). This may be due to the fact that normally this kind of industries tend to have less assets because of the industry specificity. On the contrary, and for the opposite reason, Oil & Gas is the industry that presents the lowest ratio (0,057), due to its highly valuable infrastructures, increasing the total assets value.

The high value that results from *PayrollTOC* in the Consumer Services industry (0,240) may be explained by the industry specific features. This type of industry requires a huge number of employees to work within firms, thereby increasing the total payroll costs. Once again, Oil & Gas holds the lowest *PayrollTOC* ratio, 0,062.

Finally, from Panel A, and recalling the definition of the *LaborIntensive* dummy variable, one can conclude that 4 out of 9 sectors, excluding the Financials Industry, are Labor-Intensive industries, namely Consumer Services, Oil & Gas, Telecommunications and Utilities.

When observing Table's IV Panel B, the *TDTA* coefficients, indicate that Labor-Intensive industries present on average a relatively higher leverage ratio (0,684), than Non-Labor-Intensive ones (0,656). This result is reasonable as the former group, includes industries with higher leverage ratios, as presented in Panel A. This difference suggests that the Basic

Materials, Consumer Goods, Health Care, Industrials and Technology industries, in Europe, tend to finance their assets with less debt than Labor-Intensive industries.

There is a substantial difference in the Payroll Costs per Employee between the Labor-Intensive and Non-Labor-Intensive firms, where the former pays on average more 41 890 Euros than the latter. The Number of Employees is also significantly different, and on average Non-Labor-Intensive Firms have 31 618 extra employees.

As per the amount of revenue generated by each employee, *RevenueEmp~e*, Labor-Intensive industries present the highest amount, when compared to the Non-Labor-Intensive. On average, in a Labor-Intensive industry, employees generate 190 704 Euros more than in Non-Labor-Intensive industries.

Finally, when comparing the ratios of Payroll to Total Assets (*PayrollTA*) and to Total Operating Expenses (*PayrollTOC*), one can see that the *LaborIntensive* industries score the highest.

Table IV

Summary Statistics by Industry

Table's IV Panel A presents the mean values, according to the firm's Industry, for *TDTA* which stands for leverage, and another five variables, used to characterize industries' Human Capital dimension. The latter include: *NrEmp*, *PayrollEmp~e*, *RevenueEmp~e*, *PayrollTA* and *PayrollTOC*. To save space, the number of observations per variable is omitted. The Financials Industry was excluded from the sample. Panel B presents the mean values for the same variables, and the number of observations per variable, classifying industries as Labor-Intensive or Non-Labor-Intensive. This sample split is possible using the dummy variable *LaborIntensive*, which is equal to 1 if the average *PayrollEmp* of the industry is greater or equal to the median *PayrollEmp* of the whole industry, 43 725 Euros. According to this criterion, Consumer Services, Oil & Gas, Telecommunications and Utilities are considered Labor-Intensive industries, and the remaining Non-Labor-Intensive. The last column of Panel B presents the mean difference and the statistical significance of the mean values. The significance of these coefficients was tested through a t-test, and the difference is presented using the following code: p-values: *** p<0.01, ** p<0.05, * p<0.1.

Panel A

Variables	**Basic Materials**	**Consumer Goods**	**Consumer Services**	**Health Care**	**Industrials**	**Oil & Gas**	**Technology**	**Telecommu-nications**	**Utilities**
TDTA	0,609	0,634	0,716	0,460	0,710	0,662	0,560	0,749	0,789
NrEmp	66 434	98 398	105 054	42 757	76 959	47 093	44 501	76 153	128 051
PayrollEmp~e	41 539	29 613	46 131	40 189	38 408	53 369	29 928	53 968	55 840
RevenueEmp~e	269 272	222 471	299 003	234 387	201 090	1 115 088	284 180	320 620	441 869
PayrollTA	0,119	0,106	0,178	0,101	0,163	0,057	0,227	0,094	0,064
PayrollTOC	0,165	0,146	0,240	0,175	0,233	0,062	0,230	0,187	0,162
Obs	80	176	272	48	272	48	96	64	80

Panel B

Variables	**Labor-Intensive**		**Non-Labor-Intensive**		**Difference Mean (Non-Labor-Intensive – Labor-Intensive)**
	Obs	Mean	Obs	Mean	
TDTA	349	0,684	348	0,656	-0,02745**
NrEmp	349	52 783	348	84 401	31 618***
PayrollEmp~e	349	62 303	348	20 413	-41 890***
RevenueEmp~e	349	405 385	348	214 680	-190 704***
PayrollTA	349	0,158	348	0,137	-0,02129*
PayrollTOC	349	0,272	348	0,140	-0,12381***

Finally, to close this section one can look at Table V to understand how variables behave across countries.

When summarizing statistics by Country, one can conclude from Panel A, that firms are more highly leveraged in Portugal than in Netherlands, France and Belgium, independently of whatever is the leverage proxy used. As per the payroll costs per employee, one can verify that the lowest wages are paid in Portugal, with an average of 35 751 Euros. In contrast, Belgium is the country with the highest wages, followed by The Netherlands and France. Finally, one can see that The Netherlands offer on average, from 2000 to 2015, better unemployment general benefits than France, Belgium and Portugal.

From Panel B one can understand that leverage differences between countries with higher and lower unemployment benefits are not statistically significant and that countries with greater unemployment benefits, on average:

i) Have more 56 009 employees than those with lower unemployment benefits;
ii) Pay less 6 168 Euros per employee than countries with lower unemployment benefits;
iii) Present smaller Revenues per Employee, around 230 thousand Euros, than countries with lower unemployment benefits; and finally
iv) Display a higher *PayrollTOC* ratio than countries with lower benefits.

The *PayrollTA* ratio is not statistically significant in this specific analysis.

Table V

Summary Statistics by Country

Table V presents summary statistics, number of observations and mean values respectively, according to the firm's Country in Panel A, and according to the unemployment benefits dimension in Panel B. The variables described are: *TDTA*, used as leverage proxy; *NrEmp*, *PayrollEmp~e*, *RevenueEmp~e*, *PayrollTA* and *PayrollTOC*. Panel B uses the median unemployment benefits of the whole sample, 13 013 Euros, as criterion to divide the sample in two groups. If the average unemployment benefits of the country are greater or equal to 13 013€, the country is classified as High Unemployment Benefits (*UnempBenD* = 1). This is the case of France and the Netherlands. In contrary, if the country's average unemployment benefits are smaller than 13 013€ (Portugal and Belgium), the country is classified as Low Unemployment Benefits (*UnempBenD* = 0). The significance of the mean values was tested through a t-test. The following code applies for the p-values: *** p<0.01, ** p<0.05, * p<0.1.

Panel A

Variables	Belgium		France		Netherlands		Portugal	
	Obs	**Mean**	**Obs**	**Mean**	**Obs**	**Mean**	**Obs**	**Mean**
TDTA	92	0,642	736	0,667	203	0,692	44	0,753
NrEmp	87	39 885	684	91 615	196	89 419	41	26 092
PayrollEmp~e	59	53 292	469	39 319	130	45 137	39	35 751
RevenueEmp~e	87	337 130	684	279 597	196	242 683	41	816 651
PayrollTA	63	0,175	515	0,153	137	0,134	42	0,070
PayrollTOC	64	0,177	520	0,218	138	0,214	42	0,064
UnempBenef~s	78	9 682	624	13 018	182	20 901	39	4922

Panel B

Variables	High Unemp. Benefits		Low Unemp. Benefits		Mean Difference (Low – High Unemp. Benefits)
	Obs	**Mean**	**Obs**	**Mean**	
TDTA	883	0,670	129	0,679	0,009
NrEmp	825	91 163	122	35 154	-56 009***
PayrollEmp~e	564	40 836	93	47 004	6 168*
RevenueEmp~e	825	272 956	122	503 185	230 229***
PayrollTA	616	0,148	99	0,130	-0,017
PayrollTOC	622	0,218	100	0,130	-0,088***
UnempBenef~s	806	14 790	118	8 108	-6 683***

4 Empirical Analysis and Results

This chapter presents several model specifications, in order to approach the data from different perspectives, and progressively try to reach the most appropriate one to answer the proposed research questions and draw conclusions about the problem statement.

The regressions presented in the methodology section were run in Stata using the *Random* (RE) and the *Fixed Effects* (FE) models. Despite knowing that the latter is the most appropriate for reasons already mentioned in section 3.3, results from the two models are presented in a first stage, to give the reader a broader perspective and allow for easier comparisons.

4.1 Contemporaneous Variables

To start the empirical analysis, simple regressions were estimated using only the variables of interest, *TDTA*, *TDTE*, *NetLev* and *IntCovRatio*, as explanatory variables to understand their impact on the dependent variables, *LnPayrollEmp*, *LnRevenueEmp* and *LnNrEmp.* The results from this analysis are presented in Table VI[5]**.**

As can be observed in Table VI, due to lack of statistical significance, one can conclude that a change in the firm's capital structure, measured by Total Debt to Total Equity (*TDTE*) or Total Debt to Total Assets (*TDTA*), per se does not impact on the employees' wages nor the number of employees firms have. This conclusion applies both to the RE and the FE models. On contrary, what can immediately be understood is that an increase by one unit in the firm's capacity to cope with its debt, proxied by the *IntCovRatio* variable, leads to an increase of 0,7% in the amount of Revenue generated by each Employee. Again, this holds both for the RE and FE models.

[5] Results from all the Direct Effects across all models can be find in Appendix 3

Table VI

Direct Effect of Capital Structure on Human Capital Contemporaneous' Variables

Table VI highlights the direct effect of Capital Structure on firms' Human Capital, using contemporaneous variables on *random* and *fixed effects* models. Firm's capital structure is measured by *TDTA*, *TDTE, NetLev* and *IntCovRatio,* and the Human Capital by *LnPayrollEmp*, *LnRevenueEmp* and *LnNrEmp*. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Random Effects Model			**Fixed Effects Model**		
Variables	LnPayroll Emp	LnRevenue Emp	LnNrEmp	LnPayroll Emp	LnRevenu eEmp	LnNrEmp
TDTA			0,097			0,088
			-(0,437)			(0,443)
TDTE	-0,017			-0,018		
	(0,013)			(0,013)		
IntCovRatio		0,007*			0,007*	
		(0,004)			(0,004)	
Const	10,406***	12,269***	10,541***	10,519***	12,268***	10,619***
	(0,134)	(0,098)	(0,336)	(0,039)	(0,040)	(0,298)
Observations	619	851	1003	619	851	1003
Nr of groups	71	70	71	71	70	71
R-squared (within)	0,0046	0,0401	0,0004	0,0046	0,0401	0,0004
(between)	0,0001	0,0341	0,0059	0,0001	0,0341	0,0059
(overall)	0,0000	0,0183	0,0303	0,0000	0,0183	0,0303
F-statistic	1,78	3,78*	0,05	1,83	3,52*	0,04

After grasping the general impact that the variables of interest have on *LnPayrollEmp*, *LnRevenueEmp* and *LnNrEmp*, additional control variables were included in the regressions in order to get closer to the most appropriate model, using contemporaneous variables.

For the sake of simplicity and consistency throughout the study, only the regression results from models (1), (2) and (3), from all the models run, are reported in Table VII, due to their statistical significance. However, in Appendices 4.1 and 4.2, complete results using all the capital structure variables, can be find.

Analysing the output of these three models in Table VII, one can verify that, with contemporaneous models, the variables of interest, *TDTE* and *IntCovRatio*, do not seem to significantly impact the level of Payroll per Employee nor Revenue per Employee, except for the *TDTA.* This conclusion applies not only for the RE but also for the FE model.

Leverage, when measured by *TDTA*, appears to positively impact the Number of Employees a firm has, *ceteris paribus*, rejecting the null hypothesis that its effect is equal to zero at a 5% significance level.

One can also see that, among the regressors, only *LnTA*, *altZscore* and *LnSalesGrowth,* appear to be mostly significantly different from zero, although for different significance levels.

LnTA, accounting for the size of the firms, appears to be consistently, when statistically significant, positively correlated with the Human Capital descriptors, the dependent variables. This positive relation is in line with the stylized fact that larger firms tend to offer better conditions to their employees. When firms' size increases by 1%, employees are better off, boosting the revenue generated per employee ratio by around 0,17%, and increasing the number of employees within a firm by almost 0,7%, *ceteris paribus*.

The *altZscore*, when statistically significant, seems to have a positive correlation with the *LnRevenueEmp* and *LnNrEmp*. This suggests that, holding everything else constant, on average, an increase by one unit in the firm's probability of default, increases the employee's generated revenue by 13,1% (18,5%) and the number of employees per firm by 20,9% (13,7%) in the RE (FE) model.

As would be expectable, *LnSalesGrowth*, in the model specifications where this variable is statistically significant at a 5% and 1% significance level, has a positive effect on the *LnPayrollEmp* and *LnRevenueEmp*, respectively. In other words, an increase by 1% in the sales growth, leads to an increase in these variables of approximately 0,30%, keeping everything else constant, in the payroll and revenue per employee ratios. Employees are better off when sales grow more.

On contrary, *EBITDAtoTA* and *GrossAssetTang* coefficients suggest that nor profitability nor asset tangibility contribute to explain the changes in the dependant variables, *LnPayrollEmp*, *LnRevenueEmp* and *LnNrEmp,* in none of the effects model presented.

Table VII

Regression Results using Contemporaneous Variables

Table VII presents the results from regressing *PayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on presented explanatory variables, using *random* and *fixed effects* models. *TDTA*, *TDTE*, and *IntCovRatio* are used as proxies for firm's capital structure; *LnTA* stands for the firm's size, *altZscore* proxies the probability of default; *EBITDAtoTA* the profitability; *GrossAssetTang* the firm's asset structure and *LnSalesGrowth* the annual sales growth rate. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Random Effects Model			**Fixed Effects Model**		
Variables	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**
TDTA			0,780**			0,734**
			(0,334)			(0,329)
TDTE	-0,015			-0,018		
	(0,013)			(0,013)		
IntCovRatio		0,006			0,005	
		(0,005)			(0,005)	
LnTA	0,074	0,168**	0,684***	0,101	0,175**	0,661***
	(0,098)	(0,069)	(0,073)	(0,127)	(0,076)	(0,079)
altZscore	-0,060	0,131**	0,209***	0,004	0,185***	0,137*
	(0,083)	(0,055)	(0,070)	(0,094)	(0,057)	(0,073)
EBITDAtoTA	0,335	-0,657	0,396	0,166	-0,969	0,696
	(1,100)	(0,548)	(0,492)	(1,228)	(0,584)	(0,485)
GrossAssetTang	0,156**	0,133	0,076	0,103	0,082	0,142
	(0,080)	(0,098)	(0,099)	(0,072)	(0,105)	(0,114)
LnSalesGrowth	0,311**	0,297***	-0,200*	0,325**	0,282***	-0,160
	(0,154)	(0,104)	(0,099)	(0,158)	(0,103)	(0,098)
Constant	9,224***	9,326***	-1,481	8,824***	9,187***	-1,005
	(1,568)	(1,217)	(1,259)	(2,062)	(1,326)	(1,370)
Observations	511	700	801	511	700	801
Nr of groups	67	68	70	67	68	70
R-squared	0,0392	0,0333	0,5268	0,0096	0,0134	0,4882
Chi^2 (RE)/F-stat (FE)	17,51***	27,35***	132,10***	3,94***	4,92***	19,44***

Before going further on the regression analysis, an Hausman test was performed and the output result lead to the rejection of the null hypothesis of no systematic difference in the coefficients, i.e. RE, at a 99% confidence level. As the result of this test indicates that data is better explained by a FE model, rather than with RE's, from now onwards, the former will be used.

4.2 Lagged Variables

In this phase, contemporaneous variables were replaced by 1-year lagged variables in an attempt to assess whether there is a time delay in the Human Capital variables reaction to changes in the explanatory variables. Recall that using lagged variables helps to minimize the endogeneity problem related to the possible reverse causality between the independent and dependent variables.

The models used in this stage, (4), (5) and (6) with FE presented in the methodology section (3.3), provided the results reported in Table VIII.

From Table VIII, one can immediately see that using 1-year lagged variables allows the variables of interest, *TDTE*, *IntCovRatio* and *TDTA*, to have statistical significance at 5% and 1% significance level respectively.

L.TDTE, consistently negatively impacts the amount of Payroll Costs per employee, suggesting that an increase by one unit in the firm's leverage, as measured by *TDTE,* leads to a decrease of 2,5% in the employees' wages, *ceteris paribus*. This result is against the literature stream in which Agrawal and Matsa (2013) are included, but in line with Hanka (1988), who argues that higher debt ratios help firms "pressure" their employees, gaining bargaining power and paying them less.

L.IntCovRatio and *L.TDTA*, on the other hand, seem to be positively correlated with *LnRevenueEmp* and *LnNrEmp*, respectively. Holding everything else constant, an increase by one unit in the firm's capacity to cope with its debt burden (*IntCovRatio*), leads to a 0,7% increase in the revenues generated per employee, both in the firm FE and firm and time FE model.

When looking at the effect *L.TDTA* has on the Number of Employees, one can see that *ceteris paribus*, an increase in the firm's leverage, is associated with an increase in the firm's volume of employees when using the firm and time FE model.

L.LnTA remains significant in most of the model specifications, with a positive effect on *LnRevenueEmp* and *LnNrEmp*. Holding everything else constant, an increase by 1% in firm's

size is associated with an average increase of almost 0,17% on the employee's generated revenue (FE model) and an increase of approximately 0,7% in the number of employees (0,6%) using the firm and time FE (firm FE) model.

As per the effect of *L.LnSalesGrowth*, which when using contemporaneous variables seemed to be statistically significant, now, when using lagged variables, loses its significance in explaining changes in the Human Capital descriptors.

Looking at *L.altZscore*, one can understand that if the firm's probability of default increases by one unit, the number of employees tend to increase by around 20% on both models, whereas not impacting wages nor generated revenues.

The remaining control variables, *L.EBITDAtoTA* and *L.GrossAssetTang* do not consistently significantly impact the employee's wage level, nor the revenue per employee or even the number of employees firms have, when fixing the firm and time effects.

Results from all regressions run with 1-year lagged variables on FE model can be find in Appendices 5.2 and 5.3.

Table VIII

Regression Results using 1-Year Lagged Variables

Table VIII summarizes the results from regressing *LnPayrollEmployee, LnRevenueEmp,* and *LnNrEmp*, on 1-year lagged variables, using firm and time *fixed effects* models. *TDTA*, *TDTE*, and *IntCovRatio* are used as capital structure proxies; *LnTA* stands for firms' size; *altZscore* for probability of default; *EBITDAtoTA* for profitability, *GrossAssetTang* the asset structure and *LnSalesGrowth* the sales growth rate. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Firm Fixed Effects Model			**Firm and Time Fixed Effects Model**		
Variables	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**
L.TDTA			0,514*			0,466*
			(0,283)			(0,279)
L.TDTE	-0,025**			-0,024**		
	(0,112)			(0,011)		
L.IntCovRatio		0,007*			0,007*	
		(0,004)			(0,004)	
L.LnTA	0,049	0,168**	0,603***	0,013	0,039	0,681***
	(0,105)	(0,073)	(0,067)	(0,084)	(0,069)	(0,080)
L.altZscore	-0,105	0,055	0,172**	-0,122	-0,002	0,206**
	(0,102)	(0,076)	(0,074)	(0,112)	(0,087)	(0,090)
L.EBITDAtoTA	0,045	-0,783	0,904*	0,276	-0,370	0,648
	(1,007)	(0,562)	(0,519)	(1,133)	(0,096)	(0,585)
L.GrossAssetTang	0,134**	0,139	0,112	0,116	0,030	0,170
	(0,058)	(0,098)	(0,097)	(0,070)	(0,096)	(0,104)
L.LnSalesGrowth	0,040	-0,029	0,117	0,061	0,043	0,084
	(0,131)	(0,081)	(0,096)	(0,185)	(0,076)	(0,102)
Constant	9,852***	9,432***	0,054***	10,505***	11,890***	-1,422
	(1,705)	(1,263)	(1,181)	(1,460)	(1,230)	(1,460)
Time Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	473	639	737	473	639	737
Nr of groups	64	66	68	64	66	68
R-squared	0,0474	0,0512	0,4984	0,0471	0,0450	0,5031
F-statistic	2,94	1,88*	19,67***	1,96	6,15***	10,92***

4.3 Distress Analysis

After running the previously mentioned models and collecting important insights about how changes in capital structure may affect the firm's human capital dimension, accounting for the impact of controls, on a broader perspective, it is time to go into more detail and try to answer the other research questions.

To understand how this impact differs according to firms' probability of default, measured by *altZscore*, the whole sample was split into Distressed and Non-Distressed firms. *altZscore* was dropped from these model specifications because of its high correlation (-0,7622) with the dummy created, *Distress*. *Distress* is equal to one if *altZscore* is below or equal to the median *altZscore* (1,326) and equal to zero in the remaining cases. Table IX presents the coefficients that result from applying model (4) to these two groups.

When looking at the results of this sample split, one can see that Distressed firms are significantly negatively impacted by the firm's leverage level, whereas Non-Distressed firms are not, given that the coefficient for the leverage proxy is not statistically different from zero. On average, an increase by one unit in the firm's Total Debt to Total Equity ratio (*L.TDTE*), is associated with 0,85% lower wages in the following year, proxied by the *LnPayrollEmp* variable. Again this is against Agrawal and Matsa's (2013) findings, but in line with Hanka (1998).

By comparing this model specification with the baseline case results (Table's IX fourth column), it can be concluded that the significant impact that leverage (*L.TDTE*) has on the employee's wage, represented throughout this study by *LnPayrollEmp*, is all coming from the Distressed cases.

Except for the *L.GrossAssetTang*, none of the other control variables seem to significantly explain the changes in the dependent variable. The Asset Tangibility is positively associated with the *LnPayrollEmp* variable, reflecting the fact that the greater the collateral value of assets in Distressed firms, the higher the employees' wages. On average, an increase by one unit in the asset tangibility, increases the Payroll Costs per Employee by 9,22%, *ceteris paribus*, resulting in a new payroll per employee equal to 53 933 Euros in the following year, instead of the previous 49 381 Euros.

Finally, when looking at the intercept, one can see that, everything else equal to zero, the Payroll per employee is higher in Distressed Firms, rather than in Non-Distressed ones. This is in line

with what was documented in the descriptive statistics section (Table II) and reinforces Adam Smith's (1976) theory.

After analysing Table IX and recalling the results from Table II and Hypothesis 2, which states that the human capital costs are higher for Distressed firms, one can understand that for this specific panel data, H2 is validated. However, although employees receive higher wages in distressed firms, they do not benefit from further increases in leverage. On the contrary, these higher wages tend to deteriorate.

Table IX

Regression Results for Distressed vs. Non-Distressed Firms on 1-Year Lagged Variables: Firm and Time Fixed Effects Model

Table IX reports the coefficients that result from a sample split, according to firms' probability of default, classifying them as Distressed or Non-Distressed, and comparing these to the Base Line Regression results (4). This is possible due to the dummy variable, *Distress*, equal to 1 if the firm's *altZscore* is smaller or equal to the median Altman Z-score of the whole sample, and to 0 if *altZscore* is greater than 1,326. The independent variables, have a 1-year lag and the regression controls for the firm and time *fixed effects*. The variable *altZscore* was eliminated from the regressions that included the dummy variable, *Distress*, because these two are highly correlated. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1

Variables	LnPayrollEmp		LnPayrollEmp
	Distressed	Non-Distressed	(4)
L.TDTE	-0,0085**	-0,0662	-0,024**
	(0,0036)	(0,0448)	(0,011)
L.LnTA	-0,0188	0,0747	0,013
	(0,0549)	(0,2363)	(0,084)
L.altZscore			-0,122
			(0,112)
L.EBITDAtoTA	-0,5333	0,0854	0,276
	(0,8310)	(1,2414)	(1,133)
L.GrossAssetTang	0,0922**	0,1140	0,116
	(0,0442)	(0,1502)	(0,070)
L.LnSalesGrowth	0,1703	0,1821	0,061
	(0,1388)	(0,5123)	(0,185)
Constant	11,3085***	9,1513**	10,505***
	(0,9765)	(3,7830)	(1,460)
Observations	244	232	473
Nr of groups	45	42	64
R-squared	0,0034	0,0228	0,0471
F-statistic	20,25***	4,35***	1,96*

4.4 Labor Intensity Analysis

The aim of the second phase of this study is to assess whether labor intensity affects or not a firm's human capital dimension, as measured by *LnPayrollEmp.* In an attempt to determine this, a new sample split was made using a different criterion, based on the amount of payroll costs per employee borne by a firm. If the average payroll per employee of the industry exceeds the median value, 43 725 Euros, the industry is classified as *LaborIntensive*, and the dummy equals 1. If this is not the case, the dummy will be equal to zero. It is important to recall that

Labor-Intensive industries comprise: Consumer Services, Oil & Gas, Telecommunications and the Utilities industries, whereas Non-Labor-Intensive group includes the remaining ones, namely, Basic Materials, Consumer Goods, Health Care, Industrials and Technology.

Table X presents the output of applying model (4) to both the Labor-Intensive and Non-Labor-Intensive groups, presenting as well the base line regression to allow the reader to more easily compare the two situations.

Table X

Regression Results based on Labor Intensity on 1-Year Lagged Variables: Firm and Time Fixed Effects Model

Table X presents the regression results on 1-year lagged variables through a firm and time *fixed effects* model. The two sub-samples were created using the dummy variable, *LaborIntensive*, which is equal to 1 if *PayrollEmployee* is greater or equal to the median value, 43 725€ and equal to 0 if *PayrollEmployee* is smaller than 43 725€. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

Variables	LnPayrollEmp		LnPayrollEmp
	Labor-Intensive	Non-Labor-Intensive	(4)
L.TDTE	-0,0078***	-0,0357	-0,024**
	(0,0023)	(0,0291)	(0,011)
L.LnTA	-0,0663**	-0,0401	0,013
	(0,0316)	(0,1291)	(0,084)
L.altZscore	-0,0631	-0,4427	-0,122
	(0,0637)	(0,2768)	(0,112)
L.EBITDAtoTA	-0,6452	3,3555	0,276
	(0,5622)	(2,6902)	(1,133)
L.GrossAssetTang	0,0050	0,4038	0,116
	(0,0233)	(0,3532)	(0,070)
L.LnSalesGrowth	0,0277	0,3929	0,061
	(0,0602)	(0,4141)	(0,185)
Constant	12,1431***	10,8756***	10,505***
	(0,5463)	(2,0497)	(1,460)
Observations	268	205	473
Nr of groups	44	43	64
R-squared	0,0836	0,0026	0,0471
F-statistic	21,40***	2,93***	1,96**

From Table X, one can conclude that in the case of *LaborIntensive* firms, leverage is associated with a negative change in the employee's wages. In other words, and holding everything else constant, increasing leverage (*L.TDTE*) by one unit results in a decrease of the payroll costs per employee, borne by firms, equal to almost 0,8% (5 Euros less per year).

Again, the general effect that leverage has on this human capital variable, depicted by the baseline regression in the fourth column, is coming only from the *LaborIntensive* industries. In this study and using this panel data it can be concluded that wages in firms within *Non-LaborIntensive* industries are not affected by the firm's leverage level.

What the results indicate as well, is that in case of *LaborIntensive* industries, the larger the firm's size, the smaller the employees' wages. This is against the stylized fact that larger firms tend to pay higher wages. More specifically, holding everything else constant, if size increases by 1%, the payroll per employee decreases by approximately 0,07%, which corresponds to 1 Euro less per year.

Lastly, by observing the constant term, one can verify that, everything else equal to zero, firms within *LaborIntensive* industries, present higher payroll costs per employee than firms within Non-Labor-Intensive industries. This result, reinforces what was found in Table IV, Labor-Intensive firms pay on average, more 41 890 Euros than Non-Labor-Intensive ones.

4.5 Country Analysis

Until this point of the study, no considerations, in terms of regression results, were made regarding the type of Country where firms are located. However, the existing academic literature provided reasons to believe that employees' wages are not only determined at a firm level, but also influenced by the country and its macroeconomic conditions. As such, the sample was split according to the average unemployment benefits[6] offered by a country to its population, using as a threshold the median unemployment benefits of the whole sample, 13 013 Euros.

Table XI presents the regression output, that results from applying model (4) to these sub-sample groups, including once again the base line case in the fourth column.

By analysing Table XI, one can directly see that for firms within countries that present higher unemployment benefits, leverage (*L.TDTE*) negatively impacts the payroll per employee; whereas in *Low Unemp. Benefits* countries (Belgium and Portugal), there is no statistically significant impact.

In other words, with a 90% confidence level and holding everything else constant, increasing the *L.TDTE* ratio by 1 unit, leads to a decrease in employees' wages equal to 3,33% (a loss equal to 1 351 Euros). The Payroll per Employee decreases like this, from 40 836 to 39 476 Euros, in High Unemployment Benefits Countries (France or Netherlands), with an increase by one unit in leverage.

[6] Based on OECD information.

This result, when combined with what was found in Table IV, suggests that countries offering higher unemployment benefits, thereby reducing the layoff risk employees face and consequently the wage premium they require, pay lower wages. This is in line with what Agrawal and Matsa (2013) documented. In addition to the low wages, results indicate that an increase in these firms' leverage ratio, within France and The Netherlands, make employees worse off, reducing even more their low wages.

Moreover, one can see that this negative impact that leverage has on Payroll per Employee on the base line case (4) is all coming from the High Unemployment Benefits group.

Table XI

Regression Results based on Unemployment Benefits using 1-Year Lagged Variables: Firm and Time Fixed Effects Model

Table XI reports the coefficients that result from a sample split using as criterion the value of unemployment benefits. If the average unemployment benefits of one country is smaller than the median unemployment benefits of the whole sample, 13 013 Euros, the country is classified as "Low Unemployment Benefits" (Portugal and Belgium). On contrary, if the average value of unemployment benefits is greater or equal to 13 013 Euros, they are classified as "High Unemployment Benefits" (France and Netherlands). Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

Variables	LnPayrollEmp		LnPayrollEmp
	High Unemp. Benefits	Low Unemp. Benefits	(4)
L.TDTE	-0,0333*	-0,0005	-0,024**
	(0,0188)	(0,0083)	(0,011)
L.LnTA	-0,0019	0,0604	0,013
	(0,0982)	(0,1736)	(0,084)
L.altZscore	-0,1651	-0,0138	-0,122
	(0,1240)	(0,0606)	(0,112)
L.EBITDAtoTA	1,4455	-1,1181**	0,276
	(1,3242)	(0,4569)	(1,133)
L.GrossAssetTang	0,0266	0,0721	0,116
	(0,1355)	(0,0940)	(0,070)
L.LnSalesGrowth	0,0129	0,3016*	0,061
	(0,1949)	(0,1556)	(0,185)
Constant	10,7525***	9,8921***	10,505***
	(1,6190)	(2,8251)	(1,460)
Time Fixed Effects	Yes	Yes	Yes
Observations	392	81	473
Nr of groups	55	9	64
R-squared	0,0089	0,0265	0,0471
F-statistic	1,14	.	1,96*

4.4 Robustness Checks

Throughout this study, several specifications were tried to improve the robustness of the results obtained. Among these, alternative measures of capital structure were considered; two regressions methods were applied, and FE and RE models, and two types of variables

(contemporaneous and lagged) were used. The main results of this dissertation hold, as can be confirmed in the Appendices section, when these variations were tried.

Nevertheless, two more robustness checks were tried and with these, results differed, becoming partially counter-intuitive.

Firstly, the modified Altman Z-score was replaced by the Altman Z-score formula[7], and results indicate that Distressed firms and Countries with High Unemployment Benefits do not suffer from changes in the leverage ratio.

Secondly, another measure was used to determine industries' Labor Intensity[8] and the results suggest that Labor-Intensive Industries are not impacted by leverage changes.

[7] Formula and results presented in Appendix 6
[8] Formula and results presented in Appendix 7

5 Conclusions

This dissertation conducted an empirical analysis in order to examine if employees tend to benefit or not from higher leverage ratios, and how they are affected when a change in the firm's capital structure occurs. Going into more detail, it also examines how this effect differs according to the firm's probability of default, according to the type of industry and to the country it belongs to, using Euronext-100 firms as sample.

From the descriptive statistics section, and combining the information conveyed from Table I one can conclude that, though firms under analysis present high leverage ratios, they are not heading for bankruptcy, under the used Altman Z-score criterion limits. From Table II, it can be understood that wages are higher within *Distressed* firms, than within Non-Distressed firms, leading to the confirmation of Hypothesis 2. By analysing Table III, and not surprisingly, it can be seen that employees within *LaborIntensive* industries, represented in this study by Consumer Services, Oil & Gas, Telecommunications and Utilities, tend to be better off. This comes as a confirmation of Hypothesis 3. From Table IV, one can observe the tendency that confirms Hypothesis 4, which indicates that firms within countries that provide weaker unemployment benefits, pay on average higher wages.

However, the main results of this study, come from the regression output, focusing on the results obtained with lagged variables and FE model, and go as follows:

Regarding the comparison of the firms' Human Capital costs between *Distressed* and *Non-Distressed* firms, other things controlled for, the former when increasing their leverage ratios, bear lower payroll costs. When considering the Human Capital costs of *LaborIntensive* versus *Non-LaborIntensive* industries', again, if Labor-Intensive "firms" increase their leverage ratios, wages will decrease. Finally, when looking at countries, for firms located in those providing higher unemployment benefits, an increase in the leverage ratio, will reduce wages. In a nutshell, it can be understood that on average employees do not benefit from increases in the leverage ratios, being in the end worse off, rejecting Hypothesis 1.

The empirical analysis clearly demonstrates that the negative effects of leverage on wages, proxied by Payroll per Employee, persist after controlling for

- Firm's probability of default (Distress *versus* Non-Distress firms)
- Differences within industries (Labor-Intensive *versus* Non-Labor-Intensive industries)
- Country unemployment insurance benefits (High *versus* Low Unemployment Benefits' Countries)

The central result of this dissertation advance the literature by showing that despite firms in *Distress* situation, within *LaborIntensive* industries and within countries that provide weaker unemployment insurance benefits, bear higher direct costs of Human Capital, presenting higher payroll costs, implying greater wages per employee, their employees do not benefit from increases in the leverage ratio.

Therefore, and because firms know their employees are aware of the firm's financial state, and they do not want to offset the benefits of increasing debt, with the labor costs, these can be seen as debt limiter, a reasoning that is in line with Chemmanur et al. (2013).

6 Limitations and Future Research

6.1 Limitations

Many firms opt to not disclose much information on their human capital, preventing more and more accurate studies over the firms' human capital. This barrier, the lack of data availability, was present in this study, precluding the analysis' results to be more robust. Was the size of the sample bigger, results would have provided a stronger understanding about the effects capital structure changes may have on European Firms' Human Capital.

In addition, this lack of data may pose another problem. As some labor expenses from a number (10) of firms was missing, this might have created a potential sample-selection bias (Heckman , 1979).

6.2 Future Research

Although evidence provided by this study indicates that capital structure changes negatively impact employees' wealth, on Euronext-100 firms, there is no complete proof that this impact is significant for firms to rethink their financial decisions.

The main question remains, are the costs, borne by employees in the form of lower wages resulting from leverage increases, strong enough to make firms think they may be indirectly sending their employees to better paying firms? Ending up, consequently, with low-skilled employees who have no better choice, and entering a bankruptcy vicious cycle?

Are these costs of financial distress a first-order capital structure driver? Are these significant to the firms' value?

7 References

Articles, Books, Working Papers and Dissertations consulted

Agrawal, A. K. & Matsa, D. A., 2013. Labor unemployment risk and corporate financing decisions. *Journal of Financial Economics, Forthcoming.*

Altman, E. I., 2000. *Predicting financial distress of companies: Revisiting the Z-score and ZETA models,* s.l.: Stern School of Business, New York University.

Balakrishnan , S. & Fox, I., 1993. Asset Specificity, Firm Heterogeneity and Capital Structure. *Strategic Management Journal,* 14(1), pp. 3-16.

Berger, P. G., Ofek, E. & Yermack, D. L., 1997. Managerial Entrenchment and Capital Structure Decisions. *The Journal of Finance,* LII(4), pp. 1411-1438.

Berk, J. B., Stanton, R. & Zechner, J., 2010. Human Capital, Bankruptcy and Capital Structure. *The Journal of Finance,* 65(3), pp. 891-926.

Bierman, H. J., 2003. *The Capital Structure Decision.* 1 ed. s.l.:Springer US.

Blanchflower, D. G., Oswald, A. J. & Sanfey, P., 1996. Wages, Profits ad Rent-Sharing. *Quarterly Journal of Economics,* CXI(1), pp. 227-252.

Brounen, D., Jong, A. d. & Koedijk, K., 2006. Capital structure policies in Europe: Survey Evidence. *Journal of Banking & Finance,* Volume 30, pp. 1409-1442.

Brown, C. & Medoff, J. L., 1989. The Employer Size - Wage Effect. *Journal of Political Economy,* 97(5), pp. 1027-1059.

Brown, J. & Matsa, D. A., 2013. Boarding a Sinking Ship? An Investigation of Job Applications to Distressed Firms. *The National Bureau of Economic Research, No 18208.*

Buyon, S., 2008. How and when do firms adjust their capital structures toward targets?. *Journal of Finance ,* 63(6), pp. 3069-3096.

Campello, M. & Giambona, E., 2010. *Asset Tangibility and Capital Structure,* s.l.: Working Paper, University of Illinois.

Castro, P., Fernández, M. T. T., Amor-Tapia, B. & Miguel, A. d., 2016. Target leverage and speed of adjustment along the life cycle of European listed firms. *BRQ Business Research Quarterly* , 11 January.

Chemmanur, T. J., Cheng, Y. & Zhang, T., 2013. Human capital, capital structure, and employee pay: An empirical analysis. *Journal of Financial Economics,* 110(2), pp. 478-502.

Dou, Y., Khan, M. & Zou, Y., 2016. Unemployment Insurance, Recall Expectations, and Unemployment Outcomes. *Journal of Accounting and Economics,* 61(1), pp. 166-184.

Garvey, G. & Gaston, N., 2009. Getting Tough with Workers: More on the Strategic Role of Debt. Em: D. Basu, ed. *Advances in Development Economics.* Singapore: World Scientific Publishing Co. Pte. Ltd., p. 87.

Gibbons, R. & Katz, L. F., 1991. Layoffs and Lemons. *Journal of Labor Economics,* Volume 9, pp. 351-380.

Gill, B. S., 2014. *Are human capital costs associated with bankruptcy large enough to be a disincentive for unlisted firms to use more debt? An Empirical Analysis,* Ghent : Ghent University.

Graham , J. & Harvey, C., 2002. How do CFOs Make Capital Budgeting and Capital Structure Decisions?. *Journal of Applied Corporate Finance,* 15(1).

Graham, J. R., Kim, H. K., Li, S. & Qiu, J., 2013. Human Capital Loss in Corporate Bankruptcy. *Johnson School Research Paper Series,* Volume 24.

Graham, J. R. & Leary, M. T., 2011. A Review of Empirical Capital Structure Research and Directions for the Future. *Annual Review of Financial Economics,* Volume 3, pp. 309-345.

Gruber, J., 1997. The Consumption Smoothing Benefits of Unemployment Insurance. *The American Economic Review,* 87(1), pp. 192-205.

Hanka, G., 1998. Debt and the terms of employment. *Journal of Financial Economics,* 48(3), pp. 245-282.

Heckman , J. J., 1979. Sample Selection Bias as a Specification Error. *Econometrica,* 47(1), pp. 153-161.

Hovakimian, A., Opler, T. & Titman, S., 2001. The Debt-Equity Choice. *Journal of Financial and Quantitive Analysis ,* 36(1), pp. 1-24.

Jacobson, L. S., LaLonde, R. J. & Sullivan , D. G., 1993. Earnings Losses of Displaced Workers. *American Economic Review ,* 83(4), pp. 685-709.

Jaggia, P. B. & Thakor, A. V., 1994. Firm-Specific Human Capital and Optimal Capital Structure. *International Economic Review,* 35(2), pp. 283-308.

Kalil , A. & Ziol-Guest, K., 2008. Parental job loss and children's academic progress in two-parent families. *Social Science Research,* Volume 37, pp. 500-515.

Kalil, A. & DeLeire, T., 2010. Involuntary job transitions and subjective well-being in later life. *Unpublished working paper. University of Chicago.*

MacKie-Mason, J. K., 1990. Do Taxes Affect Corporate Financing Decisions?. *The Journal of Finance,* 45(5), pp. 1471-1493.

Majluf, N. S. & Myers, S. C., 1984. Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have. *Journal of Financial Economics,* 13(2), pp. 187-221.

Miller, M. H. & Modigliani, F., 1958. The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review,* 48(3), pp. 261-297.

Myers, S. C., 1984. The Capital Structure Puzzle. *The Journal of Finance,* 39(3), pp. 575-592.

Palacios, M., 2013. *Labor Intensity, Risk and Return,* s.l.: Vanderbilt Owen Graduate School of Management, Research Paper 2024365.

Rajan, R. G. & Zingales, L., 1995. What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance,* 50(5), pp. 1421-1460.

Schultz, T. W., 1971. *Investment in Human Capital: The role of Education and of Research.* New York : Free Press.

Smith, A., 1976. *An inquiry into the Nature and Causes of the Wealth of Nations.* Chicago: University of Chicago Press.

Titman, S., 1984. The Effect of Capital Structure on a Firm's Liquidation Decision. *Journal of Labor Economics,* Volume 13, pp. 137-51.

Titman, S. & Wessels, R., 1988. The Determinants of Capital Structure Choice. *The Journal of Finance,* XLIII(1), pp. 1-19.

Wagel, W. H. & Levine, H. Z., 1990. HR '90: Challenges and Opportunities. *Personnel ,* 67(6).

Welch, I., 2011. Two Common Problems in Capital Structure Research: The Financial-Debt-To-Asset Ratio and Issuing Activity Versus Leverage Changes. *International Review of Finance,* 11(1), pp. 1-17.

Williams, J. T., 1995. Financial and Industrial Structure with Agency. *The Review of Financial Studies ,* 8(2), pp. 431-474.

Websites consulted

OECD – Benefits and Wages: Tax Benefit Calculator, last modified May, 2016

http://www.oecd.org/social/soc/benefitsandwagestax-benefitcalculator.htm

8 Appendices

Appendix 1: Variables for Analysis of Capital Structure and Human Capital

Definitions of the variables used throughout this study. The sample of 71 firms, analysed from 2000 to 2015, comprises 1136 observations. The information used to create these variables, was obtained from Thomson Reuters. The variables proceeded by Ln are the natural logarithm of the "normal" variable presented above. Finally, all the variables represent book values.

Variable	Definition	Units
Panel A - Dependent Variables		
PayrollEmployee [LnPayrollEmp]	Payroll Costs / Number of Employees	Thousands of Euros
RevenueEmployee [LnRevenueEmp]	Total Revenue / Number of Employees	Thousands of Euros
NrEmp [LnNrEmp]	Total Number of Employees	
Panel B - Explanatory Variables		
TDTA	Total Liabilities / Total Assets	Ratio
TDTE	Total Liabilities / Total Equity	Ratio
NetLev	(Total Liabilities - Cash and Cash Equivalents) / (Total Assets - Cash and Cash Equivalents)	Ratio
IntCovRatio	Interest Coverage Ratio = EBIT / Interest Expenses	Ratio
Panel C - Control Variables		
LnTA	Ln (Total Assets). Stands for firm's size.	
altZscore	1,2 * [(Working Capital) / (Total Assets)] + 1,4 * [(Retained Earnings) / (Total Assets)] + 3,3 * [EBIT / (Total Assets)] + 1 * [Sales / (Total Assets)]. Stands for the Altman Z-score, reflecting the firm's probability of default.	
EBITDAtoTA	EBITDA/Total Assets. Used as a proxy for firm's profitability.	Ratio

GrossAssetTang	Gross Property, Plant and Equipment / Total Assets. Used as a proxy for the firm's asset structure and the collateralizable value of assets.	Ratio
LNSalesGrowth	Ln (Sales $_{t}$ / Sales $_{t-1}$)	
Industry	Qualitative variable which represents the industry name that the firm belongs to. Can assume the following values: Oil & Gas, Basic Materials, Industrials, Consumer Goods, Health Care, Consumer Services, Telecommunications, Utilities, Financials (excluded), Technology.	
Country	Qualitative variable, representing the Country to which the firm belongs to.	
Panel D - Dummy Variables		
Distress	Equal to one if the Altman Z-score is smaller than the median Altman Z-score, which is equal to 1,326; and equal to zero in the contrary situation.	Binary
LaborIntensive	Equal to 1 if payroll costs per employee are greater or equal to the median value (43 725 Euros). On contrary, if PayrollEmployee is smaller than 43 725€, *LaborIntensive* will equal 0.	Binary
UnempBenD	Equal to 1 if the country provides average unemployment benefits greater or equal than the median unemployment benefits[9] of the whole sample, 13 013 Euros. This is the case in which France and The Netherlands are included. On the other hand, if the average unemployment benefits provided by the country, is below the median value, the country is classified as having low unemployment benefits, *UnempBenD* = 0. This is the case of Belgium and Portugal.	Binary

[9] Information obtained from OECD website

Appendix 2: Regressions used to determine the Direct Effects of Capital Structure on Human Capital

In this appendix, the regressions used to determine the effect that capital structure, proxied by TDTA, TDTE, IntCovRatio and NetLev, per se, has on firms' Human Capital dimension. In the below regressions, and for the sake of simplicity, the variable HumanCapital, represents the three Human Capital variables, used throughout this study, *LnPayrollEmp, LnRevenueEmp, LnNrEmp*. In total, 64 regressions were run.

Contemporaneous Variables

Random Effects:

xtreg HumanCapital TDTA, robust

xtreg HumanCapital TDTE, robust

xtreg HumanCapital IntCovRatio, robust

xtreg HumanCapital NetLev, robust

Fixed Effects:

xtreg HumanCapital TDTA, fe robust

xtreg HumanCapital TDTE, fe robust

xtreg HumanCapital IntCovRatio, fe robust

xtreg HumanCapital NetLev, fe robust

Firm and Time Fixed Effects

xi: xtreg HumanCapital TDTA i.Year, fe robust

xi: xtreg HumanCapital TDTE i.Year, fe robust

xi: xtreg HumanCapital IntCovRatio i.Year, fe robust

xi: xtreg HumanCapital NetLev i.Year, fe robust

Lagged Variables

Random Effects:

xtreg HumanCapital L.TDTA, robust

xtreg HumanCapital L.TDTE, robust

xtreg HumanCapital L.IntCovRatio, robust

xtreg HumanCapital L.NetLev, robust

Fixed Effects:

xtreg HumanCapital L.TDTA, fe robust

xtreg HumanCapital L.TDTE, fe robust

xtreg HumanCapital L.IntCovRatio, fe robust

xtreg HumanCapital L.NetLev, fe robust

Firm and Time Fixed Effects:

xi: xtreg HumanCapital L.TDTA i.Year, fe robust

xi: xtreg HumanCapital L.TDTE i.Year, fe robust

xi: xtreg HumanCapital L.IntCovRatio i.Year, fe robust

xi: xtreg HumanCapital L.NetLev i.Year, fe robust

Appendix 3: Direct Effect of Capital Structure on Human Capital Results

Appendix 3, reports the partial results from regressing all Capital Structure variables, *TDTA, TDTE, IntCovRatio and NetLev*, over Human Capital proxies, *LnPayrollEmp, LnRevenueEmp* and *LnNrEmp.* The coefficients depict the effect that Capital Structure, per se, has on Human Capital. For the sake of simplicity, this table only displays the variables' coefficients, hiding the intercept term, r-squared, number of observations and of groups, and the significance of the whole regression. Highlighted in grey are the regression results presented in Table VII. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

Panel A – Contemporaneous Variables

	Random Effects Model			Fixed Effects Model			Firm and Time Fixed Effects Model		
Variables	LnPayroll Emp	LnRevenue Emp	LnNrEmp	LnPayroll Emp	LnRevenue Emp	LnNrEmp	LnPayroll Emp	LnRevenue Emp	LnNrEmp
TDTA	-0,602	-0,488*	0,097	-0,628	-0,498*	0,088	-0,554	-0,283	0,443
	(0,502)	(0,266)	(0,437)	(0,525)	(0,270)	(0,443)	(0,471)	(0,266)	(0,398)
TDTE	-0,017	-0,008	-0,021	-0,018	-0,008	-0,021	-0,014	0,001	-0,009
	(0,013)	(0,009)	(0,021)	(0,013)	(0,009)	(0,022)	(0,011)	(0,008)	(0,020)
IntCovRatio	0,004	0,007*	-0,006	0,004	0,007*	-0,006	0,003	0,007**	-0,005
	(0,011)	(0,004)	(0,004)	(0,011)	(0,004)	(0,004)	(0,011)	(0,004)	(0,004)
NetLev	-0,388	-0,332*	0,238	-0,4	-0,341*	0,233	-0,333	-0,182	0,494
	(0,411)	(0,193)	(0,354)	(0,426)	(0,195)	(0,360)	(0,373)	(0,188)	(0,324)
Time Fixed Effects	No	No	No	No	No	No	Yes	Yes	Yes

Panel B – Lagged Variables

	Random Effects Model			Fixed Effects Model			Firm and Time Fixed Effects Model		
Variables	LnPayroll Emp	LnRevenue Emp	LnNrEmp	LnPayroll Emp	LnRevenue Emp	LnNrEmp	LnPayroll Emp	LnRevenue Emp	LnNrEmp
L.TDTA	-0,416	-0,520**	-0,071	-0,443	-0,532**	-0,082	-0,359	-0,309	0,236
	(0,493)	(0,238)	(0,365)	(0,509)	(0,240)	(0,370)	(0,420)	(0,237)	(0,332)
L.TDTE	-0,015	-0,011	-0,021	-0,015	-0,011	-0,021	-0,013	-0,001	-0,009
	(0,011)	(0,007)	(0,017)	(0,011)	(0,007)	(0,017)	(0,009)	(0,006)	(0,016)
L.IntCovRatio	0,003	0,005*	-0,003	0,003	0,005	-0,003	0,003	0,005*	-0,002
	(0,008)	(0,003)	(0,003)	(0,008)	(0,003)	(0,003)	(0,007)	(0,003)	(0,003)
L.NetLev	-0,182	-0,349**	0,052	-0,196	-0,359**	0,046	-0,133	-0,196	0,271
	(0,421)	(0,177)	(0,303)	(0,430)	(0,179)	(0,308)	(0,351)	(0,176)	(0,276)
Time Fixed Effects	No	No	No	No	No	No	Yes	Yes	Yes

Appendix 4: Regression used with Contemporaneous Variables

Appendix 4 presents all the regressions run using Contemporaneous Variables, with random effects (4.1), firm fixed effects (4.2) and firm and time fixed effects (4.3) models. These regressions' results are reported below in Appendices 4.1, 4.2 and 4.3 respectively.

4.1. Regression Method: Random Effects Model

LnPayrollEmp

xtreg LnPayrollEmp TDTA LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnPayrollEmp TDTE LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnPayrollEmp IntCovRatio LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnPayrollEmp NetLev LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust

LnRevenueEmp

xtreg LnRevenueEmp TDTA LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnRevenueEmp TDTE LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnRevenueEmp IntCovRatio LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnRevenueEmp NetLev LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust

LnNrEmp

xtreg LnNrEmp TDTA LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnNrEmp TDTE LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnNrEmp IntCovRatio LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust
xtreg LnNrEmp NetLev LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, robust

4.2. Regression Method: Firm Fixed Effects Model

Regressions are the same as presented in point 1, with the slightly difference that before the robust word, "**fe**" is added, as follows:
Example: xtreg LnPayrollEmp TDTA LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth, fe robust

4.2. Regression Method: Firm and Time Fixed Effects Model

Regressions are the same as presented in point 1, with two differences: before xtreg, one should add "**xi:**" and before the comma "**i.Year**", as follows:
Example: xi: xtreg LnPayrollEmp TDTA LnTA altZscore EBITDAtoTA GrossAssetTang LNSalesGrowth i.Year, fe robust

Appendix 4.1: Regression Results using Contemporaneous Variables – Random Effects Model

The table below presents the results from regression the three dependent variables, *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on the previously presented explanatory contemporaneous variables, on a Random Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* and the *GrossAssetTang* proxies the firm's asset structure. More detailed information on the variables is presented on section 3.3 of the present study. Highlighted n grey are the regression results presented in the dissertation itself. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp				**LnRevenueEmp**				**LnNrEmp**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
TDTA	-0,717				-0,355				0,780**			
	(0,515)				(0,280)				(0,334)			
TDTE		-0,015				0,005				0,003		
		(0,013)				(0,011)				(0,013)		
IntCovRatio			0,004				0,006				0,006	
			(0,013)				(0,005)				(0,005)	
NetLev				-0,490				-0,261				0,609**
				(0,412)				(0,199)				(0,256)
LnTA	0,065	0,074	0,135	0,073	0,145**	0,165***	0,168**	0,150**	0,684***	0,652***	0,648***	0,674***
	(0,092)	(0,098)	(0,113)	(0,096)	(0,061)	(0,063)	(0,069)	(0,063)	(0,073)	(0,069)	(0,079)	(0,073)
altZscore	-0,060	-0,060	-0,124	-0,061	0,119**	0,156***	0,131**	0,119**	0,209***	0,152**	0,189***	0,213***
	(0,084)	(0,083)	(0,083)	(0,080)	(0,053)	(0,059)	(0,055)	(0,052)	(0,070)	(0,060)	(0,070)	(0,067)
EBITDAtoTA	0,433	0,335	0,976	0,415	-0,030	-0,169	-0,657	-0,046	0,396	0,620	0,895	0,418
	(1,155)	(1,100)	(1,031)	(1,139)	(0,487)	(0,500)	(0,548)	(0,484)	(0,492)	(0,509)	(0,679)	(0,493)
GrossAssetTang	0,185**	0,156**	0,231***	0,182**	0,115	0,099	0,133	0,115	0,076	0,110	0,092	0,073
	(0,079)	(0,080)	(0,071)	(0,075)	(0,074)	(0,074)	(0,098)	(0,073)	(0,099)	(0,103)	(0,125)	(0,099)
LnSalesGrowth	0,310**	0,311**	0,341**	0,314**	0,290***	0,288***	0,297***	0,290***	-0,200*	-0,199**	-0,182**	-0,201**
	(0,149)	(0,154)	(0,140)	(0,152)	(0,102)	(0,103)	(0,104)	(0,102)	(0,099)	(0,096)	(0,085)	(0,100)
Constant	9,785***	9,224***	8,085***	9,481***	9,940***	9,341***	9,326***	9,790***	-1,148	-0,416	-0,366	-1,197
	(1,293)	(1,568)	(1,867)	(1,400)	(1,046)	(1,115)	(1,217)	(1,077)	(1,259)	(1,203)	(1,380)	(1,256)
Observations	511	511	459	511	801	801	700	801	801	801	700	801
Nr of groups	67	67	65	67	70	70	68	70	70	70	68	70
R-squared	0,0081	0,0392	0,0484	0,0143	0,0274	0,0174	0,0333	0,0262	0,5268	0,4991	0,4894	0,5251
Chi^2	18,39***	17,51***	28,08***	17,78***	23,35***	25,52***	27,35***	23,55***	132,10***	116,04***	122,89***	126,50***

Appendix 4.2: Regression Results using Contemporaneous Variables – Fixed Effects Model

Appendix 4.2 presents the results from regression the three dependent variables, *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on the previously presented explanatory contemporaneous variables, on a Firm Fixed Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* and the *GrossAssetTang* proxies the firm's asset structure. More detailed information on the variables is presented on section 3.3 of the present study. Highlighted n grey are the regression results presented in the dissertation itself. Robust Standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp				**LnRevenueEmp**				**LnNrEmp**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
TDTA	-0,802				-0,348				0,734**			
	(0,541)				(0,282)				(0,330)			
TDTE		-0,018				0,005				0,002		
		(0,013)				(0,012)				(0,0133)		
IntCovRatio			0,004				0,006				-0,005	
			(0,014)				(0,005)				(0,005)	
NetLev				-0,543				-0,254				0,570**
				(0,417)				(0,198)				(0,250)
LnTA	0,083	0,101	0,180	0,096	0,150**	0,172**	0,175**	0,155**	0,661***	0,627***	0,624***	0,652***
	(0,118)	(0,127)	(0,144)	(0,122)	(0,066)	(0,068)	(0,076)	(0,068)	(0,079)	(0,076)	(0,089)	(0,080)
altZscore	0,006	0,004	-0,081	0,004	0,156***	0,194***	0,185***	0,156***	0,137*	0,080	0,099	0,139*
	(0,095)	(0,094)	(0,091)	(0,090)	(0,054)	(0,062)	(0,057)	(0,053)	(0,073)	(0,064)	(0,072)	(0,070)
EBITDAtoTA	0,262	0,166	0,987	0,241	-0,214	-0,362	-0,969	-0,230	0,696	0,925*	1,323*	0,717
	(1,281)	(1,228)	(1,125)	(1,265)	(0,487)	(0,506)	(0,534)	(0,485)	(0,485)	(0,508)	(0,705)	(0,488)
GrossAssetTang	0,143*	0,103	0,197***	0,140**	0,078	0,061	0,082	0,078	0,143	0,177	0,181	0,141
	(0,076)	(0,072)	(0,063)	(0,070)	(0,078)	(0,080)	(0,105)	(0,077)	(0,114)	(0,117)	(0,140)	(0,113)
LnSalesGrowth	0,320**	0,325**	0,370**	0,327**	0,270***	0,269***	0,282***	0,270***	-0,160	-0,159*	-0,147*	-0,161
	(0,153)	(0,158)	(0,144)	(0,156)	(0,101)	(0,102)	(0,103)	(0,101)	(0,098)	(0,095)	(0,084)	(0,098)
Constant	9,575***	8,824***	7,380***	9,179***	9,821***	9,188***	9,187***	9,663***	-1,005	0,074	0,092	-0,719
	(1,807)	(2,062)	(2,378)	(1,862)	(1,126)	(1,190)	(1,326)	(1,156)	(1,370)	(1,297)	(1,531)	(1,367)
Time Fixed Effects	No	No	No	No	No	No	No	No	No	No	No	No
Observations	511	511	459	511	801	801	700	801	801	801	700	801
Nr of groups	67	67	65	67	70	70	68	70	70	70	68	70
R-squared	0,0001	0,0096	0,0033	0,0004	0,0114	0,0064	0,0134	0,0109	0,4882	0,4563	0,4339	0,4857
F-statistic	3,45***	3,94***	4,95***	3,39***	3,89***	4,31***	4,92***	3,97***	19,44***	15,23***	14,93***	18,58***

Appendix 4.3: Regression Results using Contemporaneous Variables – Firm and Time Fixed Effects Model

Appendix 4.3 presents the results from regressing *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on the explanatory contemporaneous variables, using Firm and Time Fixed Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* proxy firm's leverage; *LnTA* firm's size; *altZscore* the probability of default; *EBITDAtoTA* the profitability and the *GrossAssetTang* the firm's asset structure. Highlighted in grey are the regression results presented in the dissertation itself. Robust Standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp				**LnRevenueEmp**				**LnNrEmp**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
TDTA	-0,789				-0,229				0,617**			
	(0,575)				(0,268)				(0,307)			
TDTE		-0,018				0,007				-0,003		
		(0,014)				(0,009)				(0,011)		
IntCovRatio			0,002				0,005				-0,004	
			(0,014)				(0,004)				(0,005)	
NetLev				-0,520				-0,148				0,465**
				(0,440)				(0,186)				(0,229)
LnTA	0,057	0,065	0,061	0,064	0,006	0,016	0,040	0,009	0,787**	0,774***	0,750***	0,780***
	(0,092)	(0,097)	(0,118)	(0,095)	(0,067)	(0,067)	(0,070)	(0,068)	(0,096)	(0,090)	(0,096)	(0,096)
altZscore	-0,011	-0,017	-0,116	-0,015	0,102*	0,132*	0,127**	0,104*	0,181**	0,134*	0,154*	0,183**
	(0,109)	(0,105)	(0,085)	(0,103)	(0,059)	(0,064)	(0,063)	(0,058)	(0,083)	(0,072)	(0,081)	(0,081)
EBITDAtoTA	0,528	0,447	1,572	0,505	0,204	0,094	-0,414	0,188	0,318	0,501	0,808	0,339
	(1,430)	(1,392)	(1,241)	(1,414)	(0,498)	(0,509)	(0,545)	(0,494)	(0,537)	(0,552)	(0,651)	(0,540)
GrossAssetTang	0,148	0,104	0,127	0,139	-0,037	-0,057	-0,037	-0,040	0,249*	0,293**	0,293*	0,250**
	(0,104)	(0,098)	(0,087)	(0,100)	(0,090)	(0,093)	(0,106)	(0,090)	(0,126)	(0,133)	(0,144)	(0,126)
LnSalesGrowth	0,342*	0,359*	0,412**	0,350*	0,305***	0,308***	0,303***	0,305***	-0,180*	-0,187*	-0,172*	-0,180*
	(0,189)	(0,195)	(0,163)	(0,189)	(0,097)	(0,097)	(0,103)	(0,097)	(0,104)	(0,097)	(0,092)	(0,104)
Constant	10,088***	9,489***	9,208***	9,799***	12,111***	11,746***	11,371***	12,001***	-2,990*	-2,304	-1,954	-2,751*
	(1,407)	(1,652)	(2,036)	(1,441)	(1,144)	(1,155)	(1,221)	(1,153)	(1,652)	(1,519)	(1,622)	(1,628)
Observations	511	511	459	511	801	801	700	801	801	801	700	801
Nr of groups	67	67	65	67	70	70	68	70	70	70	68	70
R-squared	0,0000	0,0117	0,0343	0,0010	0,0003	0,0000	0,0010	0,0002	0,4917	0,4665	0,4429	0,4894
F-statistic	3,63***	3,25***	6,20***	3,41***	25,22***	22,16***	23,03***	26,11***	14,60***	15,59***	14,78***	14,66***

Appendix 5: Regression used with 1-Year Lagged Variables

Appendix 5 presents all the regressions run using Contemporaneous Variables, with random effects (5.1), firm fixed effects (5.2) and firm and time fixed effects (5.3) models. These regressions' results are reported below in Appendices 5.1, 5.2 and 5.3 respectively.

5.1. Regression Method: Random Effects Model

LnPayrollEmp

xtreg LnPayrollEmp L.TDTA L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnPayrollEmp L.TDTE L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnPayrollEmp L.IntCovRatio L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnPayrollEmp L.NetLev L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust

LnRevenueEmp

xtreg LnRevenueEmp L.TDTA L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnRevenueEmp L.TDTE L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnRevenueEmp L.IntCovRatio L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnRevenueEmp L.NetLev L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust

LnNrEmp

xtreg LnNrEmp L.TDTA L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnNrEmp L.TDTE L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnNrEmp L.IntCovRatio L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust
xtreg LnNrEmp L.NetLev L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth , robust

5.2. Regression Method: Firm Fixed Effects Model

Regressions are the same as presented in point 1, with the slightly difference that before the robust word, "**fe**" is added, as follows:
Example: xtreg LnPayrollEmp L.TDTA L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth, fe robust

5.3. Regression Method: Firm and Time Fixed Effects Model

Regressions are the same as presented in point 1, with two differences: before xtreg, one should add "**xi:**" and before the comma "**i.Year**", as follows:
Example: xi: xtreg LnPayrollEmp L.TDTA L.LnTA L.altZscore L.EBITDAtoTA L.GrossAssetTang L.LNSalesGrowth i.Year, fe robust

Appendix 5.1: Regression Results using 1-Year Lagged Variables – Random Effects Model

Appendix 5.1 presents the results from regressing *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on the 1-Year Lagged variables, using Random Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* and the *GrossAssetTang* proxies the firm's asset structure. Highlighted in grey are the regression results presented in the dissertation itself. Robust Standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp				**LnRevenueEmp**				**LnNrEmp**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
L.TDTA	-0,516				-0,548**				0,591*			
	(0,499)				(0,267)				(0,293)			
L.TDTE		-0,022*				-0,011				0,006		
		(0,012)				(0,009)				(0,010)		
L.IntCovRatio			0,004				0,008*				-0,004	
			(0,011)				(0,004)				(0,004)	
L.NetLev				-0,317				-0,420**				0,436**
				(0,428)				(0,202)				(0,221)
L.LnTA	0,048	0,046	0,098	0,054	0,127**	0,140**	0,164**	0,133**	0,629***	0,609***	0,593***	0,621***
	(0,075)	(0,078)	(0,099)	(0,079)	(0,059)	(0,062)	(0,662)	(0,060)	(0,062)	(0,063)	(0,068)	(0,063)
L.altZscore	-0,131	-0,150*	-0,251***	-0,132	0,015	0,003	0,018	0,0127	0,230***	0,201***	0,215***	0,231***
	(0,081)	(0,085)	(0,086)	(0,085)	(0,062)	(0,070)	(0,076)	(0,061)	(0,073)	(0,061)	(0,071)	(0,071)
L.EBITDAtoTA	0,176	0,157	1,031	0,152	0,020	-0,034	-0,549	-0,0005	0,648	0,741	1,015*	0,676
	(0,932)	(0,873)	(0,783)	(0,934)	(0,497)	(0,521)	(0,537)	(0,498)	(0,521)	(0,530)	(0,616)	(0,521)
L.GrossAssetTang	0,188***	0,168**	0,223***	0,184***	0,152**	0,132*	0,184*	0,154**	0,049	0,072	0,052	0,048
	(0,071)	(0,072)	(0,077)	(0,069)	(0,074)	(0,070)	(0,094)	(0,074)	(0,083)	(0,085)	(0,102)	(0,082)
L.LnSalesGrowth	0,050	0,040	-0,042	0,055	0,010	0,005	-0,024	0,010	0,093	0,098	0,117	0,093
	(0,130)	(0,128)	(0,119)	(0,131)	(0,082)	(0,081)	(0,081)	(0,083)	(0,098)	(0,096)	(0,077)	(0,098)
Constant	10,037***	9,827***	8,857***	9,804***	10,482***	9,925***	9,485***	10,280***	-0,431	0,293	0,558	-0,183
	(1,041)	(1,267)	(1,631)	(1,154)	(1,01)	(1,100)	(1,157)	(1,029)	(1,105)	(1,109)	(1,173)	(1,096)
Observations	473	473	420	473	737	737	639	737	737	737	639	737

Nr of groups	64	64	62	64	68	68	66	68	68	68	66	68
R-squared	0,0370	0,0651	0,0762	0,0485	0,0617	0,0491	0,0736	0,0583	0,5328	0,5140	0,5025	0,5299
Chi^2	16,31**	18,84***	20,62***	15,70**	14,00**	12,91**	12,98**	14,24**	149,61***	130,90***	168,91***	142,79***

Appendix 5.2: Regression Results using 1-Year Lagged Variables – Firm Fixed Effects Model

Appendix 5.2 presents the results from regressing *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on 1-year lagged variables on a Firm Fixed Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* and the *GrossAssetTang* proxies the firm's asset structure. Highlighted n grey are the regression results presented in the dissertation itself. Robust Standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp				**LnRevenueEmp**				**LnNrEmp**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
L.TDTA	-0,686				-0,537**				0,514*			
	(0,501)				(0,270)				(0,283)			
L.TDTE		-0,025**				-0,010				0,003		
		(0,012)				(0,009)				(0,010)		
L.IntCovRatio			0,005				0,007*				-0,004	
			(0,108)				(0,004)				(0,004)	
L.NetLev				-0,457				-0,412**				0,0372*
				(0,420)				(0,204)				(0,211)
L.LnTA	0,044	0,0486	0,120	-0,054	0,127**	0,144**	0,168**	0,134**	0,603***	0,579***	0,566***	0,595***
	(0,096)	(0,105)	(0,130)	(0,100)	(0,064)	(0,068)	(0,073)	(0,066)	(0,067)	(0,069)	(0,075)	(0,068)
L.altZscore	-0080	-0,105	-0,228**	-0,083	0,037	0,058	0,055	0,035	0,172**	0,139**	0,142**	0,171**
	(0,094)	(0,102)	(0,109)	(0,099)	(0,062)	(0,072)	(0,078)	(0,061)	(0,073)	(0,062)	(0,069)	(0,072)
L.EBITDAtoTA	0,088	0,045	1,125	0,065	-0,112	-0,181	-0,783	-0,132	0,904*	1,010*	1,375**	0,928*
	(1,063)	(1,007)	(0,935)	(1,069)	(0,500)	(0,526)	(0,562)	(0,503)	(0,519)	(0,528)	(0,624)	(0,520)
L.GrossAssetTang	0,163**	0,134**	0,206**	0,160**	0,119	0,097	0,140	0,120	0,112	0,132	0,131	0,111
	(0,067)	(0,059)	(0,079)	(0,065)	(0,074)	(0,073)	(0,098)	(0,074)	(0,097)	(0,097)	(0,113)	(0,095)
L.LnSalesGrowth	0,051	0,040	-0,025	0,057	-0,001	-0,006	-0,029	-0,001	0,116	0,121	0,131*	0,116
	(0,132)	(0,131)	(0,121)	(0,134)	(0,081)	(0,079)	(0,081)	(0,081)	(0,096)	(0,094)	(0,075)	(0,096)
Constant	10,270***	9,852***	8,549***	9,934***	10,483***	9,872***	9,432***	10,270***	0,054	0,796	0,986	0,291
	(1,422)	(1,705)	(2,162)	(1,515)	(1,086)	(1,180)	(1,263)	(1,105)	(1,181)	(1,176)	(1,276)	(1,170)

Time Effects	Fixed	No	No	No	No	No	No	No	No	No	No	No	No
Observations		473	473	420	473	737	737	639	737	737	737	639	737
Nr of groups		64	64	62	64	68	68	66	68	68	68	68	68
R-squared		0,0071	0,0474	0,0700	0,0161	0,0440	0,0320	0,0512	0,0413	0,4984	0,4757	0,4538	0,4949
F-statistic		2,13*	2,94**	2,31**	1,86*	2,11*	1,81	1,88*	2,19*	19,67***	15,48***	18,87***	18,44***

Appendix 5.3: Regression Results using 1-Year Lagged Variables – Firm and Time Fixed Effects Model

Appendix 5.3 presents the results from regressing *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on the explanatory variables with 1-year lag, using the Fixed and Time Fixed Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* and the *GrossAssetTang* proxies the firm's asset structure. More detailed information on the variables is presented on section 3.3 of the present study. Highlighted n grey are the regression results presented in the dissertation itself. Robust Standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp				**LnRevenueEmp**				**LnNrEmp**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
L.TDTA	-0,653				-0,406				0,466*			
	(0,440)				(0,262)				(0,279)			
L.TDTE		-0,024**				-0,004				0,0009		
		(0,011)				(0,007)				(0,008)		
L.IntCovRatio			0,003				0,007*				-0,004	
			(0,010)				(0,004)				(0,004)	
L.NetLev				-0,424				-0,293				0,326
				(0,354)				(0,199)				(0,208)
L.LnTA	0,010	0,013	0,200	0,015	-0,008	-0,001	0,039	-0,003	0,681***	0,670***	0,635***	0,676***
	(0,081)	(0,084)	(0,108)	(0,083)	(0,064)	(0,069)	(0,069)	(0,065)	(0,080)	(0,080)	(0,076)	(0,079)
L.altZscore	-0,096	-0,122	-0,263**	-0,101	-0,008	0,009	-0,002	-0,009	0,206**	0,178**	0,181**	0,205**
	(0,109)	(0,112)	(0,104)	(0,113)	(0,069)	(0,079)	(0,087)	(0,067)	(0,090)	(0,081)	(0,090)	(0,088)
L.EBITDAtoTA	0,314	0,276	1,518	0,288	0,195	0,137	-0,370	0,178	0,648	0,736	1,039	0,670
	(1,185)	(1,133)	(1,037)	(1,185)	(0,508)	(0,525)	(0,542)	(0,510)	(0,585)	(0,602)	(0,647)	(0,588)
L.GrossAssetTang	0,144**	0,116	0,132*	0,137**	0,010	-0,013	0,030	0,009	0,170	0,198*	0,185	0,172
	(0,071)	(0,070)	(0,071)	(0,068)	(0,079)	(0,079)	(0,096)	(0,079)	(0,104)	(0,107)	(0,114)	(0,104)
L.LnSalesGrowth	0,065	0,061	0,026	0,077	0,074	0,077	0,043	0,075	0,084	0,081	0,100	0,083)
	(0,184)	(0,185)	(0,179)	(0,185)	(0,079)	(0,076)	(0,076)	(0,079)	(0,102)	(0,098)	(0,086)	(0,102)
Constant	10,859***	10,505***	10,236***	10,617***	12,961***	12,600***	11,890***	12,804***	-1,422	-0,941	-0,355	-1,232
	(1,297)	(1,460)	(1,715)	(1,336)	(1,118)	(1,236)	(1,230)	(1,127)	(1,460)	(1,414)	(1,320)	(1,422)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Observations	473	473	420	473	737	737	639	737	737	737	639	737
Nr of groups	64	64	62	64	68	68	66	68	68	68	66	68
R-squared	0,0062	0,0471	0,0709	0,0152	0,0203	0,0174	0,0450	0,0218	0,5031	0,4843	0,4634	0,4999
F-statistic	1,94**	1,96**	3,12***	1,84**	6,64***	7,10***	6,15***	6,67***	10,92***	12,25***	16,18***	11,03***

Appendix 6: Robustness Check using the complete Altman Z-score equation

As a robustness check, all the study was repeated using instead of the modified Altman Z-score, as suggested by Agrawal and Matsa (2013), the complete formula for the Altman Z-score, as follows:

$$altZscore = 1{,}2 * \frac{Working\ Capital}{Total\ Assets} + 1{,}4 * \frac{Retained\ Earnings}{Total\ Assets} + 3{,}3 * \frac{EBIT}{Total\ Assets} + 1 * \frac{Sales}{Total\ Assets} + 0{,}6 * \frac{Market\ Value\ of\ Equity}{Total\ Liabilities}$$

Using this new formula, provides us with new values for the variable *altZscore,* and consequently new thresholds for the dummy variable *Distress*, as explained in the following Table. In this part (Appendix 8), the tables which suffer changes are presented.

Appendix 6.1: New Variables' Summary Statistics using the complete Altman Z-score formula

Appendix 6.1 presents the new summary statistics obtained through Stata for the new *altZscore* and *Distress* variables, following the new criterion. The summary statistics presented are as follows: mean, number of observations, minimum and maximum values, standard error, standard deviation, kurtosis, skewness and the first, second and third quartiles. The quantile 1 (p1) and the quantile 99 (p99) are omitted because the variables were winsorized at a 1% left and right tail of the distribution. All the other variables presented in Table I, remain unaltered, under this new criterion for the Altman Z-score.

Variable	**Mean**	**Obs**	**Min**	**Max**	**se(mean)**	**Sd**	**kurtosis**	**Skewness**	**p25**	**p50**	**p75**
Panel A – Firm's characteristics											
altZscore	2,394	1036	0,603	7,534	0,042	1,357	5,663	1,561	1,453	2,110	2,845
Distress	0,382	1036	0,000	1,000	0,015	0,486	1,231	0,480	0,000	0,000	1,000

Appendix 6.2: New Summary Statistics for Distress vs. Non-Distressed Firms

Appendix 6.2 reports the variables that represent the Human Capital firm's dimension, namely, the number of employees, *NrEmp*; the payroll costs per employee, *PayrollEmployee*; the revenue per employee, *RevenueEmployee*, and the ratios Payroll to Total Assets (*PayrollTA*) and to Total Operating Expenses (*PayrollTOC*). These two sub-groups were obtained using the dummy variable *Distress*. Distress is equal to 1 if *altZscore* is smaller or equal to 1,81, and is equal to zero in the opposite case. The significance of these coefficients was tested through a t-test, and the mean difference is presented using the following code to highlight its statistical significance: p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Distressed Firms		**Non-Distressed Firms**		**Mean Difference (Non-Distressed - Distressed)**
Variables	Obs	Mean	Obs	Mean	
TDTA	370	0,734	620	0,625	-0,109***
NrEmp	345	88 666	595	84 366	-4 300
PayrollEmp~e	239	43 707	396	38 345	-5 362**
RevenueEmp~e	345	297 698	595	281 037	-16 661
PayrollTA	258	0,111	420	0,181	0,070***
PayrollTOC	259	0,213	425	0,208	0,005
Obs	397		639		

Appendix 6.3: New Regressions Results using Contemporaneous Variables

Appendix 6.3 presents the results from regressing three dependent variables, *LnPayrollEmployee, LnRevenueEmp* and *LnNrEmp*, on the previously presented explanatory variables, using first the Random Effects Model and then the Fixed Effects Model. *TDTA*, *TDTE*, *NetLev* and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* the profitability; and *GrossAssetTang* the firm's asset structure. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Random Effects Model			**Fixed Effects Model**		
Variables	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**
TDTA			0,676**			0,656**
			(0,324)			(0,329)
TDTE	-0,162			-0,014		
	(0,014)			(0,118)		
IntCovRatio		0,006			0,006	
		(0,004)			(0,004)	
LnTA	0,098	0,176***	0,609***	0,118	0,171**	0,603***
	(0,109)	(0,066)	(0,070)	(0,141)	(0,071)	(0,073)
altZscore	-0,041	-0,016	-0,003	-0,048	-0,019	-0,004
	(0,050)	(0,019)	(0,018)	(0,043)	(0,020)	(0,019)
EBITDAtoTA	0,110	0,239	1,023**	0,080	0,154	0,998**
	(0,798)	(0,524)	(0,465)	(0,857)	(0,519)	(0,466)
GrossAssetTang	0,101	0,152	0,098	0,053	0,104	0,147
	(0,071)	(0,097)	(0,104)	(0,067)	(0,104)	(0,111)
LnSalesGrowth	0,277*	0,283***	-0,147*	0,304**	0,282***	-0,137
	(0,154)	(0,103)	(0,088)	(0,149)	(0,102)	(0,086)
Constant	8,891***	9,283***	0,048	8,698***	9,400***	0,207
	(1,858)	(1,163)	(1,159)	(2,379)	(1,229)	(1,212)
Time Fixed Effects	No	No	No	No	No	No
Observations	491	707	814	491	707	814
Nr of groups	67	66	68	67	66	68
R-squared	0,0396	0,1453	0,4638	0,0359	0,1310	0,4465
Chi^2 (RE)/F-stat (FE)	18,86***	25,76***	152,07***	3,24***	3,80***	22,59***

Appendix 6.4: Regression Results using 1-Year Lagged Variables

Appendix 6.4 summarizes the results from regressing the dependent variables, *LnPayrollEmployee*, *LnRevenuEmp* and *LnNrEmp*, on the previously presented explanatory variables with 1-year lag, using a firm and time Fixed Effects Model. *TDTA*, *TDTE*, and *IntCovRatio* are used as proxies for firm's leverage; *LnTA* stands for the firm's size; *altZscore* proxied the probability of default; *EBITDAtoTA* is used to proxy profitability and the *GrossAssetTang* proxies the firm's asset structure. Robust Standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	Firm Fixed Effects Model			**Firm and Time Fixed Effects Model**		
Variables	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**	**LnPayrollEmp**	**LnRevenueEmp**	**LnNrEmp**
TDTA			0,447*			0,368
			(0,251)			(0,237)
TDTE	-0,018*			-0,018*		
	(0,011)			(0,010)		
IntCovRatio		0,006*			0,005*	
		(0,003)			(0,003)	
LnTA	0,093	0,191**	0,538***	0,059	0,066	0,595***
	(0,122)	(0,073)	(0,062)	(0,098)	(0,066)	(0,068)
altZscore	-0,050	-0,036	-0,005	-0,039	-0,038	-0,001
	(0,041)	(0,026)	(0,022)	(0,045)	(0,029)	(0,024)
EBITDAtoTA	-0,439	-0,276	1,345***	-0,325	-0,154	1,268**
	(0,635)	(0,612)	(0,509)	(0,703)	(0,615)	(0,534)
GrossAssetTang	0,083	0,145	0,106	0,073	0,043	0,143
	(0,054)	(0,093)	(0,092)	(0,055)	(0,094)	(0,095)
LnSalesGrowth	0,011	-0,025	0,129	0,016	0,047	0,103
	(0,126)	(0,076)	(0,097)	(0,176)	(0,071)	(0,095)
Constant	9,175***	9,189***	1,391	9,798***	11,549***	0,323
	(2,035)	(1,256)	(1,039)	(1,602)	(1,091)	(1,136)
Time Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	461	656	761	461	656	761
Nr of groups	65	66	68	65	66	68
R-squared	0,0474	0,1167	0,4256	0,0422	0,0885	0,4233
F-statistic	1,75	2,54*	23,40***	1,37	6,56***	10,30***

Appendix 6.5: Regression Results for Distressed vs. Non-Distressed Firms on 1-Year Lagged Variables - Firm and Time Fixed Effects Model

Appendix 6.5 reports the coefficients that result from a sample split, according to the probability of default of the firms, classifying them as Distressed or Non-Distressed, and comparing these to the Base Line Regression results (4). This sample split was possible due to the dummy variable, *Distress*, which is equal to 1 if the firm's *altZscore* is smaller or equal to the median Altman Z-score of the whole sample, 1,81. *Distress* is equal to zero if *altZscore* is greater or equal to 1,81. The independent variables, *L.TDTE*, *L.LnTA*, *L.altZscore, L.EBITDAtoTA, L.GrossAssetTang* and *L.LnSalesGrowth* have a 1-year lag and the regression controls for the firm and time fixed effects. The variable *altZscore* was eliminated from the regressions that included the dummy variable, *Distress*, because these two are highly correlated. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

Variables	LnPayrollEmp		LnPayrollEmp
	Distressed	**Non-Distressed**	**(4)**
L.TDTE	-0,008	-0,045**	-0,018*
	(0,006)	(0,022)	(0,010)
L.LnTA	0,096	-0,033	0,059
	(0,072)	(0,210)	(0,098)
L.altZscore			-0,039
			(0,045)
L.EBITDAtoTA	0,544	-0,733	-0,325
	(1,370)	(1,027)	(0,703)
L.GrossAssetTang	0,038	0,029	0,073
	(0,041)	(0,108)	(0,055)
L.LnSalesGrowth	0,175	-0,034	0,016
	(0,321)	(0,245)	(0,176)
Constant	9,344***	11,157***	9,798***
	(1,256)	(3,429)	(1,602)
Time Fixed Effects	Yes	Yes	Yes
Observations	168	282	461
Nr of groups	33	50	65
R-squared	0,0319	0,0001	0,0422
F-statistic	232,04***	3,55***	1,37

Appendix 6.6: Regression Results based on Labor Intensity on 1-Year Lagged Variables - Firm and Time Fixed Effects Model

The table below presents the regression results on a 1-year lagged variables through a firm and time fixed effects model. These coefficients result from a sample split based on the Payroll Costs per Employee, resulting in two categories, the Labor-Intensive and the Non-Labor-Intensive Industries. The two sub-samples were created using the dummy variable, *LaborIntensive,* which is equal to 1 if *PayrollEmployee* is greater or equal than the median value, 43 725€ and is equal to 0 if *PayrollEmployee* is smaller than 43 725€. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

Variables	LnPayrollEmp		LnPayrollEmp
	Labor-Intensive	**Non-Labor-Intensive**	**(4)**
L.TDTE	-0,006**	-0,0242	-0,018*
	(0,002)	(0,022)	(0,010)
L.LnTA	-0,499	0,132	0,059
	(0,030)	(0,187)	(0,098)
L.altZscore	0,035	-0,061	-0,039
	(0,022)	(0,060)	(0,045)
L.EBITDAtoTA	-0,687**	1,283	-0,325
	(0,260)	(1,724)	(0,703)
L.GrossAssetTang	-0,018	-0,005	0,073
	(0,027)	(0,166)	(0,055)
L.LnSalesGrowth	0,019	0,113	0,016
	(0,055)	(0,429)	(0,176)
Constant	11,796***	8,098**	9,798***
	(0,507)	(3,089)	(1,602)
Time Fixed Effects	Yes	Yes	Yes
Observations	257	204	461
Nr of groups	46	42	65
R-squared	0,0269	0,0239	0,0422
F-statistic	7,07***	6,75***	1,37

Appendix 6.7: Regression Results based on Unemployment Benefits on 1-Year Lagged Variables - Firm and Time Fixed Effects Model

Appendix 6.7 reports the coefficients that result from a sample split using as criterion the value of Unemployment Benefits. If the average Unemployment Benefits of one country is smaller than the median Unemployment Benefits of the whole sample, equal to 13 013 Euros (Table I), then this country is classified as "Low Unemployment Benefits". This is the case of Portugal and Belgium. On contrary, as France and Netherlands have an average value for their unemployment benefits that is bigger or equal to 13 013 Euros, they are classified as "High Unemployment Benefits". Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

	LnPayrollEmp		**LnPayrollEmp**
Variables	**High Unemp. Benefits**	**Low Unemp. Benefits**	**(4)**
L.TDTE	-0,025	0,008	-0,018*
	(0,017)	(0,008)	(0,010)
L.LnTA	0,060	0,088	0,059
	(0,120)	(0,192)	(0,098)
L.altZscore	-0,068	-0,051**	-0,039
	(0,058)	(0,020)	(0,045)
L.EBITDAtoTA	0,486	-1,929***	-0,325
	(0,819)	(0,536)	(0,703)
L.GrossAssetTang	-0,033	0,638	0,073
	(0,145)	(0,071)	(0,055)
L.LnSalesGrowth	-0,022	0,391*	0,016
	(0,195)	(0,195)	(0,176)
Constant	9,798***	9,636**	9,798***
	(1,951)	(3,198)	(1,602)
Time Fixed Effects	Yes	Yes	Yes
Observations	388	73	461
Nr of groups	56	9	65
R-squared	0,0610	0,0134	0,0422
F-statistic	0,72	.	1,37

Appendix 7: Robustness Check 2 using an alternative Labor Intensity measure

As a second robustness check, all the study was repeated using as Labor Intensity proxy, the ratio of Total Payroll Costs to the Total Revenues (Palacios, 2013), instead of the payroll per employee level. The new variables generated and used were:

$$LaborIntensity2 = \frac{Total\ Payroll\ Costs}{Total\ Revenue}$$

and the dummy variable to allow for the sample split, *LabIntD2*. This dummy is equal to 1 if the average *LaborIntensity2* of the industry is greater or equal to the median *LaborIntensity2* of the whole sample, 0,175, and equal to 0 in the contrary case.

Using this new ratio to measure Labor Intensity, provides us with summary statistics as presented in the following appendix. In the remaining appendices the whole study is replicated, presenting only the tables with changes.

Appendix 7.1: New Variables' Summary Statistics using *LaborIntensity2*

Appendix 7.1 presents the new summary statistics obtained through Stata for the new *LaborIntensity2* and *LabIntD2* variables, following the new criterion. The summary statistics presented are as follows: mean, number of observations, minimum and maximum values, standard error, standard deviation, kurtosis, skewness and the first, second and third quartiles. The quantile 1 (p1) and the quantile 99 (p99) are omitted because the variables were winsorized at a 1% left and right tail of the distribution. All the other variables presented in Table I, remain unaltered, under this new criterion for the Altman Z-score.

Variable	**Mean**	**Obs**	**Min**	**Max**	**se(mean)**	**Sd**	**kurtosis**	**Skewness**	**p25**	**p50**	**p75**
Panel A – Industry's characteristics											
LaborIntensity2	0,205	677	0	0,786	0,006	0,146	4,951	1,363	0,121	0,175	0,255
LabIntD2	0,501	677	0	1	0,019	0,500	1,000	-0,003	0	1	1

Appendix 7.2: New Summary Statistics by Industry

Appendix 7.2 reports the mean values, according to the firm's Industry, for *TDTA*, leverage proxy, and other five variables, to characterize Human Capital. The latter include, *NrEmp*, *PayrollEmp~e, RevenueEmp~e*, *PayrollTA* and *PayrollTOC*. To save space, the number of observations per variable is omitted from this Table. The Financials Industry was excluded from the sample. Panel B presents the mean values for the same variables, and the number of observations per variable, classifying industries as Labor-Intensive or Non-Labor-Intensive. This sample split is possible using the dummy variable *LabIntD2*, which is equal to 1 if the average *LaborIntensity2* of the industry is above or equal to the median *LaborIntensity2* of the whole industry, 0,175. According to this new criterion, **Basic Materials, Consumer Services, Industrials, Technology and Telecommunications** are considered **Labor-Intensive** industries, and the remaining Non-Labor-Intensive. The last column of Panel B presents the mean difference and the statistical significance of the mean values. The significance of these coefficients was tested through a t-test, and the difference is presented using the following code: p-values: *** p<0.01, ** p<0.05, * p<0.1.

Panel A

Variables	**Basic Materials**	**Consumer Goods**	**Consumer Services**	**Health Care**	**Industrials**	**Oil & Gas**	**Technology**	**Telecommu-nications**	**Utilities**
TDTA	0,609	0,634	0,716	0,460	0,710	0,662	0,560	0,749	0,789
NrEmp	66 435	98 399	105 054	42 757	76 959	47 093	44 501	76 153	128 051
PayrollEmp~e	41 539	29 613	46 131	40 189	38 408	53 369	29 928	53 968	55 840
RevenueEmp~e	269 273	222 471	299 003	234 387	201 090	1 115 088	284 180	320 620	441 869
PayrollTA	0,119	0,106	0,178	0,101	0,163	0,057	0,227	0,094	0,064
PayrollTOC	0,165	0,146	0,240	0,175	0,233	0,062	0,230	0,187	0,162
LaborIntensity2	0,180	0,155	0,211	0,150	0,236	0,059	0,348	0,161	0,145
Obs	80	176	272	48	272	48	96	64	80

Panel B

Variables	**Labor-Intensive**		**Non-Labor-Intensive**		**Difference Mean (Non-Labor-Intensive – Labor-Intensive)**
	Obs	Mean	Obs	Mean	
TDTA	339	0,678	338	0,690	0,012
NrEmp	308	71 296	312	65 297	-5 999
PayrollEmp~e	308	53 123	312	40 018	-13 106***
RevenueEmp~e	308	203 558	312	435 513	231 955***
PayrollTA	339	0,234	338	0,094	-0,139***
PayrollTOC	339	0,343	338	0,120	-0,223***
LaborIntensity2	339	0,307	338	0,103	-0,204***

Appendix 7.3: Regression Results based on Labor Intensity2 on 1-Year Lagged Variables - Firm and Time Fixed Effects Model

Appendix 7.3 presents the regression results on a 1-year lagged variables through a firm and time fixed effects model. These coefficients result from a sample split based on LaborIntensity2 ratio (Payroll Costs/Total Revenue) resulting in two categories, the Labor-Intensive and the Non-Labor-Intensive Industries. The two sub-samples were created using the dummy variable, *LabIntD2,* which is equal to 1 if *LaborIntensity2* is greater or equal than the median value, 0,175 and is equal to 0 if *LaborIntensity2* is smaller than 0,175. Robust standard errors are reported in parenthesis and the following code applies for p-values: *** p<0.01, ** p<0.05, * p<0.1.

Variables	LnPayrollEmp		LnPayrollEmp
	Labor-Intensive	**Non-Labor-Intensive**	**(4)**
L.TDTE	-0,004	-0,009**	-0,024**
	(0,004)	(0,004)	(0,011)
L.LnTA	-0,117***	-0,055	0,013
	(0,042)	(0,055)	(0,084)
L.altZscore	-0,190***	-0,023	-0,122
	(0,050)	(0,068)	(0,112)
L.EBITDAtoTA	0,489	-0,433	0,276
	(0,485)	(0,777)	(1,133)
L.GrossAssetTang	0,042	0,103**	0,116
	(,045)	(0,051)	(0,070)
L.LnSalesGrowth	-0,047	0,065	0,061
	(0,066)	(0,148)	(0,185)
Constant	12,707***	11,344***	10,505***
	(0,700)	(0,959)	(1,460)
Time Fixed Effects	Yes	Yes	Yes
Observations	236	237	473
Nr of groups	39	40	64
R-squared	0,0290	0,0000	0,0471
F-statistic	10,23***	31,27***	1,96**