INSTITUTO
UNIVERSITÁRIO
DE LISBOA

Determinants of Firm's Capital Structure: An Econometric Study on How Covid-19 Impacted Capital Structure Decisions of Portuguese Touristic Firms

Gonçalo David Antunes Lopes dos Santos

Master in Economics

Supervisor:
Ph.D. Joaquim José dos Santos Ramalho, Full Professor,
ISCTE Business School, ISCTE-IUL

October, 2022

BUSINESS SCHOOL

CIÊNCIAS SOCIAIS E HUMANAS

Department of Economics

Department of Political Economy

Determinants of Firm's Capital Structure: An Econometric Study on How Covid-19 Impacted Capital Structure Decisions of Portuguese Touristic Firms

Gonçalo David Antunes Lopes dos Santos

Master in Economics

Supervisor:
Ph.D. Joaquim José dos Santos Ramalho, Full Professor,
ISCTE Business School, ISCTE-IUL

October, 2022

Acknowledgements

Gostava de agradecer a todos os meus familiares, amigos e colegas, pelo apoio e ajuda que me deram ao longo do processo de realização desta dissertação. E uma palavra de apreço especial ao Professor Joaquim Ramalho por toda a disponibilidade que demonstrou e por estar sempre pronto a esclarecer qualquer dúvida.

Resumo

As dificuldades trazidas pelo covid-19 fizeram-se sentir a todos os níveis sociais e económicos no mundo inteiro e Portugal não foi exceção. Esta dissertação tem como principal objetivo analisar e compreender o impacto do covid-19 nas decisões de estrutura de capital das empresas turísticas Portuguesas. Além de considerar os determinantes tradicionais de estrutura de capital, este estudo também tem em atenção alguns fatores mais específicos ao setor ou à empresa. Os resultados foram obtidos recorrendo a modelos de regressão fracionária, que foram aplicados devido à natureza limitada da variável dependente analisada, alavancagem (Passivo/Ativo), cujos valores estão no intervalo [0,1]. A base de dados utilizada conteve 45 271 observações, que estão compreendidas entre 2018 e 2020, tendo sido consideradas todas as empresas de turismo portuguesas com informação disponível na plataforma Orbis Europe que não apresentassem valores em falta. Os resultados constataram que o covid-19 afetou de forma positiva e significativa a alavancagem das empresas turísticas Portuguesas. Os resultados também mostram que a teoria pecking order parece ser a mais adequada para explicar as decisões de estrutura de capital das empresas turísticas Portuguesas.

Palavras-chave: Estruturas de Capitais; Turismo; Covid-19; Modelos de Regressão Fracionários

JEL Codes: G32; L83

Abstract

The hardships brought on by covid-19 were felt on every societal and economical level throughout the world and Portugal was no exception. This dissertation aims to analyse and understand how covid-19 impacted Portuguese touristic firms' capital structure decisions. In addition to considering the traditional capital structure determinants, this study also controls for some factors more sector or firm specific. The findings were achieved by using fractional regression models, which were applied due to the bounded nature of the dependent variable analysed, leverage (Debt/Assets), whose values are in the [0, 1] range. The dataset used had 45 271 observations, ranging from 2018 to 2020, with all the Portuguese touristic firms with available information in the Orbis Europe platform that had no missing values being considered. The results found that covid-19 positively and significantly affected Portuguese touristic firms' leverage. Results also show that the pecking order theory seem to be the one better suited to explain Portuguese touristic firms' capital structure decisions.

Keywords: Capital Structures; Tourism; Covid-19; Fractional Regression Models

JEL Codes: G32; L83

Table of Contents

List of Tables

List of Figures

List of Acronyms

A.R. Azores	Autonomous Region of Azores
A.R. Madeira	Autonomous Region of Madeira
GDP	Gross Domestic Product
NDTS	Non-Debt Tax Shield
NPV	Net-Present Value
UNTWO	United Nations World Tourism Organization
WTTC	World Travel and Tourism Council

1. Introduction

In 2020, the whole world experienced a pandemic that it had not seen the likes of for at least a century, since the Spanish Flu, talking of course about the coronavirus, also known as covid-19. Covid forced the entire world into a grinding halt, presenting unprecedented challenges, with isolation, social distancing, remote schooling, and remote working becoming the norm. Whole countries were shut down, and whole economies were slowed down in attempts to contain the virus. Portugal was no exception, with its 2020 real Gross Domestic Product (GDP) registering a 7.7 % decrease, in comparison with the 2019 values (WTTC, 2021). Despite the negative trend being general, the challenges faced by each economic sectors were unique, with some facing harsher realities than others. Tourism was picked as the central focus of this dissertation due to being an extremely important sector for the Portuguese economy, and one of the sectors that faced the aforementioned harsher realities, having registered, in 2020, a 56.4% drop in GDP when compared with 2019 values (WTTC, 2021). In this dissertation we will focus on the tourism sector, more specifically, on how covid-19 impacted Portuguese touristic firms' capital structure decisions.

A capital structure is the combination of equity and debt used by a firm to finance its operations and investment projects (Tuovila, 2022). The main financial indicators to measure a firm's capital structure are leverage ratios, with the debt to assets leverage ratio being the one used throughout the dissertation. Capital structures have been the main focus of plenty of academic research over the years, in attempts to better understand and optimize firm's behaviour when it comes to defining their financing strategies. Modigliani and Miller, in 1958, published what is considered to be the seminal paper in the field, where a lot of the groundwork was laid for future research. The main capital structure theories, which will be looked at in closer detail later in the dissertation, are the trade-off theory, the agency costs theory, and the pecking order theory. The first two theories aim to find a perfect capital structure to maximize the firm's value while the latter one explains a firm's capital structure decisions in accordance with the firm's preference towards different financing instruments without assuming an optimal value for a firm's leverage. Throughout the literature there are some factors that are somewhat consensually agreed to be determinant factors of a firms' capital structure, namely: tangibility; firm size; profitability; growth; debt-alternative tax shields; firm's age; and liquidity (Prasad et al., 2001). While considering the traditional capital structure determinants, it is also important to control for some sector or firm specific factors such as firm location, type of touristic firm, firm size classification and its previous leverage status, which will be discussed further into the dissertation.

As stated above, the main focus of this dissertation is to understand how, if at all, covid impacted Portuguese touristic firms' leverage. To do so, we will use fractional regression models, first introduced in Papke and Wooldridge (1996), due to the bounded nature of the dependent variable in analysis, leverage, whose values stay within the unit interval. With this dissertation we hope to add some clarity and give a better understanding of the consequences of one of the more significative global struggles of our lifetimes, in the capital structure field.

The dissertation is structured as follows. In Section 2, there will be a literature review, where the three main capital structure theories will be presented and the tourism sector in Portugal will be discussed in depth with a special attention to covid's general impacts on the sector. In section 3, we will discuss the methodology, specifically the research hypotheses, the scope of the study, the data gathering and cleaning process, and the econometric methodology. In Section 4, basic descriptive statistics will be presented and analysed. In Section 5, the regressions will be presented, and the results discussed. Finally, in Section 6 you will find the dissertation's conclusion, where the main findings are summarized.

2. Literature Review

The content in this section will be centred around the classical capital structure theories and about tourism in Portugal and how it has evolved over the years with a special look at 2020 given that the goal of this paper is to analyse how touristic companies chose to finance themselves during the unpredictable and difficult times that were felt specially in the first year of the pandemic.

2.1 Capital Structure Theories

A capital structure is the particular mixture of equity and debt used by a company to finance its operations and investment projects (Tuovila, 2022). In the coming section there will be an explanation regarding the three main theories, the trade-off theory, the agency costs theory, and the pecking order theory. These three theories were developed as an attempt to explain a firm's decision-making framework when choosing its capital structure.

One of the pioneer papers in this field of capital structure was introduced in the late fifties by Nobel prize winners Modigliani and Miller (1958), in which, in the context of perfect capital markets where there is no taxes, no transaction or bankruptcy costs and no information asymmetry, three key propositions were presented: (i) a firm's market value is completely independent of its capital structure (also known as the Irrelevance Theorem); (ii) there is a positive correlation between debt to equity ratio and cost of equity; (iii) dividend policy does not play a role in the firm's market value. According to Modigliani and Miller, in this theoretical scenario, the firm's value is determined by the income generated by their assets, but even though their work is accepted as a solid framework, it does not properly reflect how real capital markets work (Khan, 2021).

Market imperfections therefore are at the centre of most capital structure theories, since in a world with perfect capital markets said theories would not be necessary. Trade off theory will be the first main capital structure theory covered in this dissertation where taxes and bankruptcy costs are seen as "central to a positive theory of the effect of leverage on the firm's market value" as stated in "A State-Preference Model of Optimal Financial Leverage" by Kraus and Litzenberg (1973).

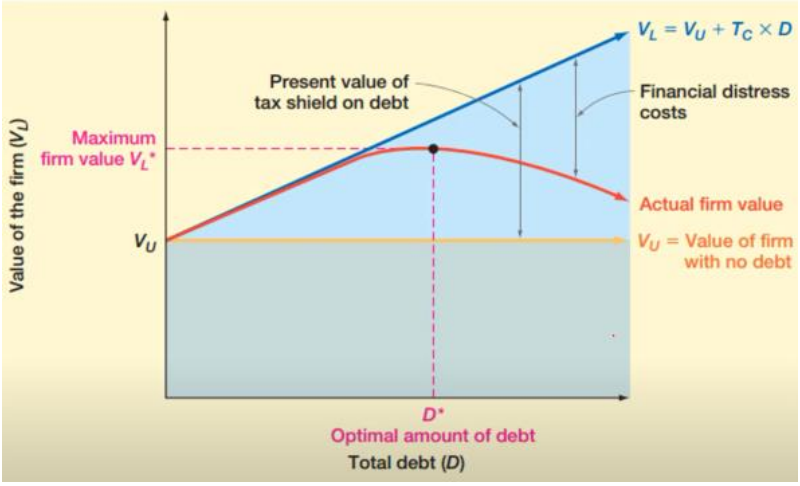
Like the name states, this theory deals with a trade-off, focusing on the costs and benefits of debt. It strives to find an optimal capital structure for a firm by finding out which split between equity and debt would maximize the firm's value.

The main benefit of a firm financing their operations through debt as stated in Modigliani and Miller (1963) - a correction issued five years after the original was published, where they added taxes to provide some real-world application to their theory - is the tax shield effect of debt. This means that

issuing debt, through the payment of interest, “shields” some revenue from being taxed and it would allow for an increase to the firm’s market value, making it advantageous for the firm to finance itself through debt as opposed to equity. Obviously, as the authors also pointed out, this does not mean that a company should finance itself exclusively through debt.

The downside of using excessive amounts of debt comes in the form of bankruptcy costs. Bankruptcy costs, as defined by Warner (1977), can be direct, in the form of for example lawyer and accountant fees that would have to be expended in the bankruptcy process, or indirect, which manifest themselves in the form of a loss of sales, profits or even ability to obtain credit if the firm is in a situation of financial distress. By balancing these opposing effects of debt on a capital structure, we get the trade-off theory (Kraus Litzenberg, 1973).

Figure 1- Graphical Representation of trade off theory



Source: Fundamentals of Corporate Finance by Ross (2015)

Figure 1 is a good visual representation of the trade-off theory. On the x-axis we have the level of debt the firm has and, on the y-axis, we have the market value of the firm. The yellow line (Vu) reflects the original Modigliani and Miller proposition in which the capital structure is irrelevant to the firm’s market value, where the value of the company remains constant regardless of the level of debt. The blue line (VL) reflects the Modigliani and Miller 1963 correction where the taxes were added but bankruptcy costs were not taken into consideration, so there is a positive linear correlation between the variables. The red line represents trade-off theory as we know it: due to the tax shield effect of debt, the firm’s valuation goes up as debt increases until a certain point where the pressures of bankruptcy costs push the valuation down if debt keeps increasing, and at the apex of the inverted U-shaped line we find the optimal capital structure that maximizes the firm’s value.

The next main theory that will be discussed is the agency costs theory popularized by the work of Jensen and Meckling (1976) and Jensen (1986) in which they introduce the concept of agency costs in

a capital structure framework. Agency costs arise from the existence of conflicts of interest within a firm between the different agents involved like the ones between shareholders and managers and the one between shareholders and debtholders. Agency costs as defined by Jensen and Meckling (1976) include: (i) opportunity costs that result from the role of debt to smooth the conflict of interests between principal and agent; (ii) bonding and monitoring costs; (iii) bankruptcy and reorganisation costs.

As stated above, one of the interactions this theory looks at is the one between shareholders and managers. Problems can stem from this interaction since their interests might not align, since while the shareholders' priority is to increase the firm's value and profits, the managers' interest is their own welfare which might push them to use shareholder money in a way that is inefficient and not aligned with the owners' desire. The less ownership the manager has the more severe these conflicts of interest are. The owners can mitigate this problem by giving incentives to the managers and incurring in monitoring costs, which are costs designed to guarantee that the manager is behaving in a way that is aligned with the shareholders priorities (Jensen & Meckling, 1976), like third party audits for example. These costs shareholders incur to mitigate the conflicts of interest between the two parties are called the agency costs of equity, because the more dependent a company is on equity-based financing, the more necessary it is for them to make sure the managers have the proper incentives to act in an efficient way.

That is where debt comes into play in this theory, the more equity a firm has in their capital structure the more agency costs of equity they will have to incur, so using debt mitigates these costs. If a firm chooses to finance itself through debt, the manager has less shareholder money at their disposal and has an added pressure to produce results and to meet debt obligations. Thus, if a firm finance itself with debt, as opposed to financing its operations exclusively with equity, it reduces the risk of said manager engaging in superfluous spending with the "free" money they would get from shareholders, resulting in reducing the conflict of interests between managers and shareholders, and therefore minimizing the agency costs of equity (Jensen et al., 1992).

However, like in the trade-off theory, even if issuing debt has some benefits it also has its downsides. In this theory the problem with contracting too much debt manifests itself in the form of agency costs of debt that are necessary to mitigate the conflicts of interests between shareholders and debtholders, the other major relationship this theory focuses on. A debtholder's incentive to lend funds to a firm is to receive the interest associated whit it, so to make sure they attain this goal the firm cannot default. A shareholders' incentive is to maximize the value of the firm and their own profits, which might lead the firm to engage in asset substitution, underinvestment, and claim dilution with the debtholder's funds. All these actions shift risk and wealth in the favour of the shareholder and in detriment of the debtholder. The more debt present in a firm's capital structure the more likely this

undesirable scenario becomes and the greater the value of the agency costs of debt that a firm must incur to offer some guarantees to potential lenders (Smith & Warner, 1979) (Prasad et al., 2001).

Similarly, to trade-off theory, there is an optimal capital structure that a firm should have to maximize their market value, and that capital structure is the one where agency costs are minimized, forcing the firm to find the perfect balance that would therefore maximize their value (Prasad et al., 2001).

The last main theory is the pecking order theory introduced by Myers (1984) and Myers and Majluf (1984), which mainly focuses on the existence of information asymmetry in the market and costs associated with it. Information asymmetries happen in the market since managers and shareholders have access to privileged information about their own company that are a mystery to other potential external investors. Information asymmetries can lead to situations of adverse selection and moral hazard, and this fact is considered by outside investors, which could lead to an under-pricing of a company's new shares issued in the market. From the previous sentence we can conclude that it is implied that the bigger the level of information asymmetry, the greater the likelihood of new shares being mispriced.

The under-pricing of equity makes issuing new shares an unattractive financing option to existing shareholders, even if this means declining a project with positive net present value (NPV) that would bring value to the firm. New shareholders will benefit more than the older ones as result of receiving higher capitalized cash flows since they invested in an under-priced commodity. The opposite applies to the pre-existing shareholders given the fact that their firm was not correctly valued by the market and therefore they would see some of their wealth transferred to the new shareholders. For the reasons stated above the authors argue that issuing new shares is at the bottom of the pecking order of firms when it comes to choosing their preferred financing method and only as a last resort will they do it (Prasad et al., 2001).

In "The Capital Structure Puzzle" (Myers, 1984) the Pecking Order Theory got summarised in four parts: (i) when available, firms will opt to finance themselves through retained earnings (equity), since they will suffer no negative impact from information asymmetries; (ii) managers will adjust their target dividend pay-out rates in order to guarantee that they can have enough internal funds to finance their investments; (iii) if a company has more retained earnings that it needed to fund their projects they will pay off debt or invest in other assets; if a company's investment projects were superior to the value of their retained earnings than they sell marketable securities at their disposal to finance themselves; (iv) once the financial slack is used up they will have no other option but to turn to outside investors to finance their projects, first by resorting to debt followed by hybrid securities, and only when their debt capacity is exhausted will the firms turn to issuing new shares.

The Pecking Order Theory differs from the other two because it does not assume an optimal capital structure, since equity is both at the top and the bottom of the pecking order, making an optimal capital structure impossible to determine.

2.2 Tourism in Portugal

According to the United Nations World Tourism Organization (UNWTO), tourism can be defined as "the set of activities of a person travelling to and staying in places outside his/her usual environment for less than one year and whose primary purpose of travel is, other than the exercise, an activity remunerated from within the place visited" (UNWTO, 2019). However, it is not a consensual definition, and it is not entirely possible to find a definition without its limitations when it comes to trying to conceptualize a tourism sector or industry (Ioannides & Debbage, 1998).

The Eurostat definitions, also used in Caires et al. (2018), for which firms belong in a "tourism sector" will be used in this dissertation, which makes the distinction between "mainly tourism" firms and "partially tourism" firms. Mainly tourism firms, or intensive tourism firms, refers to firms whose activities directly and almost exclusively rely on touristic activity, like travel agencies, air travel companies and the accommodation sector – with special emphasis on hotels, camping sites and other short-term accommodations. Partially tourism firms on the other hand encompasses firms whose activities are somewhat exposed to, and benefit from, touristic activity, but that at the same time do not rely entirely on touristic activity, including activities from such sectors as transportation, restaurants, and such other services like car rentals for example (this subject will be discussed more in-depth in chapter 3).

2.2.1 Tourism in Portugal - History and Characteristics

Historically, tourism started to gain some traction in Portugal in the sixties and has over time become one of Portugal's most important contributors to the GDP and job creation for the Portuguese economy (Daniel, 2010). As of 2018 the sector was responsible for a quarter of the foreign investment the country receives (Caires et al., 2018).

When talking about tourism in Portugal it makes sense to separate the country regionally, as in most places, since tourism, both in the types of tourism practiced and overall expression and economic importance, vary depending on the region we are focusing on. Turismo de Portugal (2017) in "Tourism Strategy 2027" looks at the country in NUTS 2 (nomenclature of territorial units for statistics),

separating it in 7 regions: the North Region; the Centre Region; Lisbon Metropolitan Area; Alentejo; Algarve; Madeira; and Azores. Looking through a NUTS 2 or even NUTS 3 perspective when discussing tourism makes sense due to regional asymmetries within the country.

As it was mentioned above, there are different types of tourism, and some regions have characteristics that the others do not have that allows them to better specialize in a certain type of tourism. Some types of tourism that you can find in Portugal include, among others, religious tourism; golf tourism; food and wine tourism; health tourism; nature tourism; cultural tourism; and for last and most important, sun and sea tourism (Costa, 2021).

Portugal as a country is in a very attractive location, with its islands being in the Atlantic Ocean and the mainland being surrounded by the Mediterranean Sea in the south and Atlantic Ocean to the west so it comes as no surprise that tourism in Portugal is characterized by being mostly dependent on sun and sea tourism, with Algarve being the preferred destination for most tourists. In 2016, 58.3% of overnight stays in Portugal were concentrated in Algarve (33.7%) and the Lisbon Metropolitan Area (24.6%), whereas in Alentejo, Centre Region, Azores, North Region, and Madeira the rates were 3%, 9.2%, 2.9%, 12.9% and 13.7%, respectively. Despite Algarve being the region that benefits the most from sun and sea tourism, it is not the only one. If we narrow the scope and look at the country from a NUTS 3 perspective and consider the percentage of overnight stays from the coastal regions in comparison with interior regions, we see that in 2014 a whopping 90.3% of overnight stays (in the mainland) were in NUTS 3 that in some way border either the Atlantic Ocean or the Mediterranean Sea (Turismo de Portugal, 2017; Daniel, 2010).

Despite its incredible importance to the Portuguese economy, this type of tourism is also characterized for being incredibly seasonal, and with seasonality being such a big factor it leads to some of the jobs created in the sector being unstable, since they are created mostly so demand can be met in the summer periods, which is by far the busiest part of the year, with the winter being the least, as it would be expected from a sector that reliant on sun and sea tourism. In 2019, 38.4% of overnight stays were registered between the months of July and September, with August being the most popular month registering numbers slightly above 15%. Thus, it comes with no surprise that the months that registered the lower numbers were January, February, and December, with each month sitting below 5% when it comes to total overnight stays in Portugal (INE, 2020).

Over the years there have been some government efforts to mitigate the effects of seasonality, and the country's dependence on Algarve, by promoting other types of tourism and developing the rest the country. The "Plano Estratégico Nacional do Turismo 2006-2015" is a past example of such an initiative, but, even though some progress was made, Algarve and sun and sea tourism are still, by and large, the more important type and region for touristic activity (Daniel, 2010). The government's

strategic tourism program currently in place, detailed thoroughly in “Tourism Strategy 2027” by Turismo de Portugal (2017), looks to potentialize each region focusing on their individual strengths.

In the last decade or so, due to government programmes and incentives, the surge of services like Airbnb and an increasing international recognition, an environment has been fostered in which the number of businesses that are a part of mainly or intensive tourism have grown. In the period of 2012-2017 the number of companies in this subsector has doubled, a much higher growth rate than every other sector. As for mortality rates, in comparison with Industry and Services (excluding tourism), between 2011 and 2015 intensive tourism showed the lowest, with 5.91% in 2015, and total tourism was the highest with 7.79%. Within the sector, firms that are in more prominent markets are less likely to go under, when compared to their counterparts located in smaller markets. The same goes for firms that are already established in the sector, which seem to have a better chance at survival than newer and smaller companies, since the older and bigger firms have more resources and expertise in the field that gives them an advantage (Caires et al., 2018).

2.2.2 Covid-19 and Tourism

On the 31 December 2019, the first case of coronavirus (COVID-19) was reported to the World Health Organization, which was registered in the city of Wuhan, China. The virus is airborne and highly contagious which forced worldwide leadership to take action to fight it and try to contain it. By March 2020 the virus had reached the West, and around mid-March Portugal started its first lockdown. Even though the restrictions have been getting adjusted since the first lockdown, depending on the state of said pandemic, the world has not been the same since then and the economy as a whole took a huge hit, specifically in 2020 when the virus was a novelty and there were not any available vaccines.

In 2020, the measures to fight the pandemic centred around nonpharmaceutical interventions (NPI), such as keeping social distance, avoiding great concentration of people, restricting travel, closing of schools, and cancelling events, which was a huge blow to the whole economy but specially to the tourism sector, since these measures forced a slowdown of the normal activities this sector has to offer (Gössling et al., 2021). Air travel, hotels, restaurants all took a huge hit in 2020, hence why this dissertation will focus on the effects of the pandemic and the restrictions that came with it regarding the tourism sector.

In times of adversity, businesses worldwide were forced to adapt to try and stay afloat, restaurants started to focus on take away and delivery for example, but still there were a huge number of workers laid-off and companies that could not survive bankruptcy in the sector, since most businesses that focus on accommodation and air travel for example, due to unsold capacity, suffered huge losses of revenue (Gössling et al., 2021).

In 2020, as reported by the World Travel and Tourism Council (WTTC), 61.6 million jobs were lost in the sector worldwide, which represented a 18.5% decrease in relation to 2019, and the total contribution to the world's Gross Domestic Product (GDP) from the sector dropped 49.1% in comparison to the previous year. In contrast, the whole worldwide GDP only dropped 3.7%, which is still significant but also points to the fact that most sectors did not suffer as harshly as travel and tourism.

In Portugal the numbers followed the worldwide trend. In 2019 travel and tourism accounted for 17.1% of the country's GDP, which nominally translate to around 37.5 billion euros. In 2020 the same sector only accounted for 8.1% of the Portuguese GDP, which totalled in 16.4 billion euros, a drop of 56.4%, in contrast to the overall Portuguese economy which dropped 7.7%. As for jobs the sector employed 16% less people in 2020, comparing to 2019 (WTTC, 2021). The number of overnight stays followed the same trend registering a drop of 63% from 70.2 million to 26 million, with the Metropolitan Area of Lisbon being the region who registered the biggest drop (71,5%) (Costa, 2021).

3. Methodology

In this section, the methodology of the dissertation will be presented. More specifically, the research hypotheses will be presented and explained, the scope of the study will be narrowed down by properly defining which firms will be taken into consideration, the formulas of the variables will be presented, the data gathering processes described, and the econometric methodology will be explained.

3.1 Research Hypotheses

To pin down the questions and expected results this dissertation is looking to answer, we first need to determine the research hypotheses. This section will be divided in two sub-sections. In the first we will look at traditional research hypotheses, which regards the variables that are at the core of capital structure theory. The second subsection will focus on hypotheses that are specific to this research and the core question at hand.

3.1.1 Traditional Research Hypotheses

As it was mentioned above in this section, we will be going over the traditional hypotheses that are at the core of capital structure literature, and the expected effects of certain variables on leverage (debt/assets). To find the relevant variables we will be guiding ourselves according to a few selected papers on the subject, namely: Prasad et al. (2001); Ramalho and Silva (2009); Rajan and Zingales (1995) and Kumar et al. (2017).

Some variables' impact on leverage is consistent across the literature, both in theoretical and empirical studies, specifically referring to tangibility, non-debt tax shields and size, while others are a bit more divisive, both on empirical studies and depending on which theory you look at, specifically referring to profitability, growth opportunities and age. In the cases where the variable's effect on leverage is not consensual, the research hypothesis presented will be the one most in line with the four reference papers in the paragraph above and either both sides of the argument will be presented or some empirical studies that show the opposite of the expected effect will be cited to better give the full picture.

Traditional Hypothesis 1: Tangibility is positively related with leverage

Tangibility, given by the firm's proportion of tangible assets in relation to total assets, is considered in literature to have a positive effect on leverage, since tangible assets can be more easily given as collateral to the lenders, because they can be more accurately appraised than intangible assets, and therefore hold their value if the firm bankrupts and liquidates, making lenders more comfortable with lending funds to these firms (Myers, 1977). Prasad et al. (2001) and Kumar et al. (2017), in their work, both look at dozens of empirical studies, and both found that an overwhelming majority of said empirical studies confirm the hypothesis at hand, such as Michaelas et al. (1999) and Sogorb-Mira (2005).

Traditional Hypothesis 2: Size is positively related with leverage

Trade-off theory supports this hypothesis, as Rajan and Zingales (1995) stated: "size may be an inverse proxy for the expected costs of bankruptcy". Therefore, the bigger the company, the lesser the pressure from possible bankruptcy costs, since bigger firms tend to be more diversified than smaller ones and therefore more stable, which allows them to contract debt in a more comfortable way when compared to smaller firms. There is also the argument that supports the hypothesis at hand, more in line with pecking order theory, that states that large firms have an easier time contracting debt due to facing less informational asymmetries when compared with smaller firms (Myers, 1984). When it comes to empirical studies, the vast majority support the hypothesis above as we can see in Prasad et al. (2001) and Kumar et al. (2017).

Traditional Hypothesis 3: Profitability is negatively related with leverage

According to the pecking order theory (Myers & Majluf, 1984), firms that can finance themselves with internal funds will choose to do so over contracting debt, therefore the more profitable they are, the more internal resources they will possess and use in their financing operations, not having a need to use external financing. More in line with trade-off theory, there is the argument that lending institutions will not lend funds to unprofitable firms, and therefore there should be a positive relation between profitability and leverage Prasad et al. (2001).

In Prasad et al. (2001) they find a similar number of empirical studies supporting a positive and a negative relation between profitability and leverage (12 for negative and 11 for positive). Kumar et al. (2017) however finds more empirical evidence supporting the research hypothesis, as well as both Ramalho and Silva (2009) and Rajan and Zingales (1995). Therefore, even though there are both theoretical and empirical arguments to support both a negative and a positive relation between

profitability and leverage, we will choose the negative relation for the research hypothesis since there are more evidence pointing that way.

Traditional Hypothesis 4: Growth is positively related with leverage

Growth, or growth opportunities as it is often mentioned in literature, splits opinions both theoretically and empirically when it comes to their relationship with leverage. Pecking order theory assumes a positive relation between growth and leverage since to take advantage of said growth opportunities a firm needs to invest, and in the process are more likely to use outside financing. A quote that encapsulates this argument pretty well can be found in Shyam-Sunder and Myers (1999), which goes as follows: "Firms whose investment opportunities outrun internally generated funds borrow more and more".

On the opposite side of the coin and more in line with trade-off theory and agency costs theory we have the arguments that firms with growth opportunities are expected to be less leveraged than the ones who do not have said opportunities. In Jensen (1986), it is proposed that debt might be use as a mechanism to mediate possible conflicts of interest between managers and shareholders and as Myers (2001) says it is a way of "putting the firm on a diet" by reducing the available cashflow but at the same time reducing the threat of the managers engaging in superfluous spending. In high growth firms it is argued that there is less of a necessity to use debt this way, leading to less leverage. According to trade-off theory growth opportunities are expected to have a negative relation with leverage, since highly levered firms tend to not engage in investment projects. In fact, even if said projects have positive NPV, due to the higher risk of debt overhang and subsequential bankruptcy and financial distress costs, it is expected that firms with growth opportunities will not choose to finance themselves with debt (Myers, 1977; Myers, 2001). In Myers (2001), it is stated that firms with growth opportunities tend to prefer equity financing since debt overhang is a threat to the firm's value and lending institutions are more hesitant to lend to these firms due to it.

When it comes to empirical evidence, as it was already stated, there is also a split on the issue, with Prasad et al. (2001) showing similar number of empirical studies supporting each argument. However, Kumar et al. (2017) shows more studies supporting a positive relation, and individual empirical studies such as Ramalho and Silva (2009) and Sogorb-Mira (2005) show the same positive relation justifying the research hypothesis in use in this dissertation.

Traditional Hypothesis 5: Non-Debt Tax Shields (NDTS) are negatively related to leverage

Non-Debt Tax Shields (NDTS), as the name indicates, refers to other mechanisms at the firm's disposal to shield income from taxes that are not debt's interest payment, such as depreciation deductions (Prasad et al., 2001). According to DeAngelo and Masulis (1980), the more debt a firm contract, the lesser will be the marginal value of the tax shield, so having alternative tax shields mechanisms is beneficial to firms. The theoretical argument for why they should have a negative relation with leverage stems from the fact that they give firms an alternative to reduce their tax payments without having to highly lever themselves, and firms will take advantage of this, given that as it was discussed in the previous section there are risks that come with contracting too much debt (Warner, 1977). Most empirical evidence points in this direction somewhat consensually, saving a few exceptions.

Traditional Hypothesis 6: Age of the firm is negatively related to leverage

In line with pecking order theory, the older a firm is the more opportunities the firm had throughout the years to build some financial slack through accumulation of retained earnings, and therefore there would be less propensity to use external financing in their capital structure (Petersen and Rajan, 1994). In Diamond (1989) the role of reputation in a relationship between lender and borrower is analysed, being concluded that firms that have a good track record of repaying their debt will face less difficulties in borrowing money. Therefore, reputation is seen as an asset itself that can be used to reduce the conflict of interest between lenders and borrowers that was discussed more in depth in the previous chapter when discussing agency costs theory. With that argument in mind, it would be expected that, conversely to what is postulated by the pecking order theory, age would have a positive relationship with leverage, since older firms would be able to build that reputation.

Because in Kumar et al. (2017) most empirical evidence analysed supports a negative relation between age and leverage, the research hypothesis in use in this dissertation considers a negative relationship.

Traditional Hypothesis 7: Liquidity is negatively related to leverage

The likelihood of a firm resorting to debt when they possess a high proportion of liquid assets is expected to be lower than firms that have less liquidity according to the pecking order theory, since they would prefer to use their internal resources (Myers, 1984). Empirical evidence points to the relation stated above as it can be seen in Kumar et al. (2017).

3.1.2 Specific Research Hypotheses

In this coming section we will explore the research hypotheses that are more specific to the subject at hand, namely the tourism sector and the covid-19 pandemic and some of the nuances those two factors might bring into the research.

Specific Hypothesis 1: Covid is positively related with leverage of touristic firms

As reported by the WTTC (2021), and stated in more detail in section 2.2.2, the contribution of the touristic sector to the Portuguese GDP dropped 56.4% from 2019 to 2020, with covid-19 being the obvious culprit, hence the proposed hypothesis. Since the sector took such a hit during the pandemic, if we follow the pecking order theory, it is expected that firms took on more debt to survive the difficulties that arose during that period.

Specific Hypothesis 2: The effects of covid on leverage were more intensely felt on mainly/intensive tourism firms when compared with partially tourism firms

This hypothesis arises from the fact that intensive tourism firms are, by definition, more dependent on touristic activity, and since there was a huge downturn in said activity, it is reasonable to assume that the challenges faced by those firms during the pandemic were stronger than the ones faced by partially tourism firms. That is what this hypothesis is looking to test, if in the face of the pandemic there was a significant difference between how intensive tourism firms and partially tourism firms dealt with the adversities, regarding their capital structures.

Specific Hypothesis 3: The effects of covid on leverage were felt differently across the country

This hypothesis looks to test if location is a relevant factor to explain firm's capital structure decisions during the pandemic. As it was mentioned in the literature review when discussing tourism in Portugal, there are notable regional asymmetries within the county, with some regions being more developed and established as hotspots for touristic activity than others, like Algarve and the Metropolitan Area of Lisbon. This hypothesis means to test if said regional asymmetries extended to the pandemic response in regard to capital structure decisions.

Specific Hypothesis 4: The effects of covid on a firm's leverage were felt differently depending on whether the firm was previously levered or unlevered

With this hypothesis we mean to test how a firm's financing was impacted during covid depending on its previous leverage status. The main answer we are looking to find is if the levered firms took on more additional debt relative to unlevered firms, due to fact that unlevered firms, if we are going by the pecking order theory, have some degree of financial slack and are financing themselves with their own internal funds. Therefore, in the face of difficulties that arose as a consequence of the pandemic, it is expected that that "cushion" might have soften the blow of unlevered firms when it comes to contracting debt. It is also possible that firms that were already levered could not risk taking on much more additional debt to avoid incurring in bankruptcy costs, with unlevered firms in comparison having more freedom in that regard and being able to contract debt more freely, given that they had not even tapped into that form of financing yet.

Specific Hypothesis 5: The effects of covid on leverage were felt differently across firms depending on the firm's size classification, with smaller firms feeling those effects more intensely

In Ramalho and Silva (2009), it was shown that the significance of the capital structure determinants, listed in the traditional research hypothesis, varies according to the size classification of the firm. In the same vein we will be looking at how the effect of covid on a firms' capital structure varied according to its size classification, making a distinction between large firms, medium firms, small firms, and micro firms. We are here hypothesising that the smaller the firm, the greater the covid effect on leverage will be, given that, as stated above, larger firms tend to have more stability and be more diverse and therefore more capable of dealing with an external shock.

3.2 Defining Sample and Variables

Now that the hypotheses have been defined, we will focus on gathering the sample needed to test them, specifically, the subset of firms we will be looking at, the variables needed and how to calculate them, and the data collection process.

3.2.1 Defining the touristic sector

To isolate the firms that we will be looking at and gathering data from, we will use the NACE codes that the Eurostat attributes to the touristic sector. NACE codes belong to the industry classification system standardly used in the European Union that aggregates firms based on their activity under a label, i.e.,

the NACE code, for statistical purposes. In Table 1 you can find every code attributed to the touristic sector and its respective label. The codes are composed of a letter, which broadly identifies a specific economic activity, and 4 numbers to better specify different subsectors within the economic activity specified. The sectors listed below belong to section H, I and N, which, respectively, refer to: Transportation and storage; Accommodation and food service activities; Administrative and support service activities.

As it was mentioned in the previous chapter, Eurostat makes a distinction between firms based on their degree of exposure and dependence on touristic activity, with firms that belong to a subsector with high exposure being labelled intensive tourism firms and the ones that belong to a subsector that is less dependent on touristic activity being labelled partially tourism firms. The subsectors that belong to mainly tourism firms are as follows: passenger air transport (H5110); hotels and similar accommodation (I5510); holiday and other short-stay accommodation (I5520); camping grounds, recreational vehicle parks and trailer parks (I5530); travel agency and tour operator activities (N7910).

NACE CODE	DESCRIPTION	TYPE OF SUBSECTOR
H4910	Passenger rail transport, interurban	Partially Tourism
H4932	Taxi operation	Partially Tourism
H4939	Other passenger land transport n.e.c.	Partially Tourism
H5010	Sea and coastal passenger water transport	Partially Tourism
H5030	Inland passenger water transport	Partially Tourism
H5110	Passenger air transport	Intensive Tourism
I5510	Hotels and similar accommodation	Intensive Tourism
I5520	Holiday and other short-stay accommodation	Intensive Tourism
I5530	Camping grounds, recreational vehicle parks and trailer parks	Intensive Tourism
I5610	Restaurants and mobile food service activities	Partially Tourism
I5630	Beverage serving activities	Partially Tourism
N7710	Renting and leasing of cars and trucks	Partially Tourism
N7721	Renting and leasing of recreational and sports goods	Partially Tourism
N7910	Travel agency and tour operator activities	Intensive Tourism
N7990	Other reservation service and related activities	Partially Tourism

Table 1 - Tourism Sector

3.2.2 Variables

The main dependent variable this study focuses on is leverage, calculated by the ratio between debt and total assets. As for the explanatory variables traditionally associated with leverage in capital structure theory, we will use the ones already mentioned in the traditional research hypotheses and presented in more detail in Table 2 with the respective formula. Also, in the same table, you will find the dummy variables.

Type of variable	Variable	Formula
Dependent Variable	Leverage	**(Loans + Long Term Debt)/ Total Assets**
Explanatory Variables	Tangibility	**Tangible fixed assets/ Total Assets**
	Size	**Natural logarithm of SALES (lnSALES)**
	Profitability	**EBIT/ Total Assets**
	Growth Opportunities	**[Total Assets(t)-Total Assets(t-1)] / Total Assets(t-1)**
	Non-Debt Tax Shield	**Depreciation and Amortization / EBITDA**
	Liquidity	**Cash and cash equivalents/ Total Assets**
	Age	**Age of the firm in years**
Explanatory Dummy Variables	Covid	**Equal to 1 if the observation belongs to the year 2020**
	Intensive Tourism	**Equal to 1 if the firm belongs to the intensive tourism firms**
	Geographical	**7 dummy variables. Equal to 1 if the firm is in the corresponding location (NUTS 2)**
	Previously levered	**Equal to 1 if the firm was levered in the previous year**
	Size classification	**4 dummy variables. Equal to 1 if it fits the size classification criteria**

Table 2 - Variables

As it is possible to see in Table 2, we will use the sum of long-term debt and loans as the proxy for debt. Traditionally in literature either total debt or only long-term debt is used, however we decided to include loans to try to capture the short-term impact of covid on debt, given that we only have one period that is relevant to the analysis of said impact.

The explanatory variables are calculated in line with what you would find in Kumar et al. (2017) and Ramalho and Silva (2009), although some alternative formulas could have been used that are somewhat interchangeable with the ones above - just as an example for tangibility using fixed assets instead of tangible fixed assets, for size using the natural logarithm of total assets instead of sales and for NDTS some divide by total assets instead of EBITDA.

As for the dummy variables, covid is equal to one in observation that were registered in 2020, given that the first official reported covid case happened in the thirty-first of December 2019, while intensive tourism is equal to one if the firm in question belongs to one of the five NACE codes identified as mainly tourism (H5110, I5510, I5520, I5530 and N7910). The geographical variable is meant to control for the firm's location, given that a sector like tourism, and as we saw in the literature review, is incredibly location dependent. There will be seven dummy variables for each respective NUTS 2, which are: North of Portugal; Central Portugal; Lisbon Metropolitan Area; Alentejo; Algarve; Azores; Madeira. The size classification variable is meant to control whether the firm observed is micro, small, medium, or large according to the standards set by the European Commission (2004), in which: firms that employ under 10 employees and present an annual turnover or total assets inferior to 2 million euros are considered micro firms; firms that employ less than 50 people and have an annual turnover or total assets inferior to 10 million euros are considered small firms, excluding the ones that fall under the micro firm criteria; medium firms employ less than 250 people and have an annual turnover inferior to 50 million or total assets inferior to 43 million, but also not counting the firms that are considered micro or small ; and firms who employ over 250 people or have an annual turnover superior to 50 million euros or total assets over 43 million are considered large firms. These dummy variables will be calculated independently for each individual year meaning that the same firm might have a different size classification in different years. The variable named "Previously levered" is equal to one if the firm had any debt in its capital structure in the previous year.

To test for the specific research hypotheses is also important to define interaction variables between the covid variable and the other dummy variables, since the specific hypotheses tests for possible changes in the effects said variables had on leverage during the pandemic. In Table 3, you will find said interaction variables and a brief description.

Interaction Variables	Description
Covid x Intensive tourism	Controls for observations from 2020 that pertain to intensive tourism firms
Covid x NUTS 2	7 dummy variables. Controls for observations from 2020, for each individual NUTS 2
Covid x Previous leverage status	Controls for observations from 2020 that pertain to firms who were levered in 2019
Covid x Size classification	4 dummy variables. Controls for observations from 2020, for each individual size classification (micro, small, medium, and large)

Table 3 - Interaction Variables

3.3. Defining the Dataset

Now that the research hypotheses, the specific firms that will be looked at and the variables needed are described, it is time to collect the data. The data we will be looking for is from the years 2018, 2019 and 2020, with some 2017 accounts needed to calculate some variables that require previous information, like growth opportunities and the previous leverage status, for example. The Orbis Europe platform will be used to collect the necessary data to test the hypotheses. The platform belongs to Bureau Van Dijk, a Moody's Analytics firm, with data available for hundreds of millions of firms.

To filter for the type of firms and data needed we start by defining the country from which the companies are from, in this case Portugal, and filter for the NACE codes relevant for the firms we want to look at, which were described in Table 1. To better narrow down the search, a filter to exclude firms that did not have available information regarding the accounts needed to calculate the dependent variable (total assets, long term debt and loans) in any of the years required was added. After all these filters were applied, we were left with 42 367 individual firms. The next step was adding the accounts needed to compute the variables needed to test the hypotheses, which were already named in the previous subsection.

Once the dataset was extracted from Orbis, all the necessary variables were calculated in Stata, for the three available years, leaving the panel with a total of 127 101 observations. However, that

number is misleading since there is a plethora of missing values throughout the data set, some due to lack of information others due to irregularities that will be discussed in more detail later. The dataset can be described as an unbalanced panel given that the firms are the same for the three individual years with some firms having useful observations for the model in all or some of the three years and some having none, again due to the existence of some key missing values. To estimate the model, we use a pooled estimator for the coefficients and a cluster-robust estimator for the variance.

Once the variables were calculated, it was time to drop the observations with key missing values, which saw the dataset going from 127 101 observations to 51 337. Thus, 75 764 observations were eliminated due to having a missing value, or multiple, in either the dependent variable (leverage) or some of the explanatory variables (tangibility, size, profitability, growth, NDTS, liquidity, previous leverage status or size classification), which stem from lack of available information for accounts necessary to calculate said variables. The next step in cleaning the dataset involves looking for any irregularities in the variables' values, specifically in variables like liquidity, tangibility, and leverage, which theoretically should be bounded in the [0, 1] range, and delete the observations that have values outside of said range. In that process 6 066 observations were deleted leaving the dataset with 45 271 observations.

Regarding the NDTS variable, due to the way that it was calculated, by dividing depreciation and amortization by the EBITDA (earnings before interest taxes depreciation and amortization), the values are distributed across a broad range, in part due to the EBITDA variable used as the denominator, since it can take any positive or negative value or be even equal to zero. However, for what the variable is trying to capture it makes the most sense to bound the variable between [0, 1], since the variable is trying to gage how much of the firms' earnings are "covered" by depreciation and amortization and therefore how much of the earnings are shielded from taxes due to means other than interest payment from debt (as the name non-debt tax shield implies). If NDTS is negative, that means that the EBITDA is negative and therefore there are no earnings to be shielded meaning that the variable NDTS should effectively read 0. Indeed, since of the EBITDA is already negative, there are no earnings to be shielded from taxes to begin with. Furthermore, it does not make theoretical sense to have a negative shield. If, on the other hand, NDTS is superior to 1, that means that the value of the firms' depreciation and amortization are superior to the earnings, which therefore signifies that the shield has been fully maximised. In other words, the EBIT (EBITDA – depreciation and amortization) will be negative meaning that there was not any incentive to contract debt to take advantage of any possible debt tax shield, which is in line with the theory stated in DeAngelo and Masulis (1980), also stated above in the research hypothesis section, that the greater the NDTS the lesser the incentive is to contract debt. Thus, any value below zero will be set equal to zero and every value superior to one will be set equal to one.

Regarding other non-bounded variables, such as profitability and size, and upper or lower-bounded variables, such as growth, which is lower bounded at -1, there are still some possible irregularities that should be addressed, one of them being the presence of outliers, specifically in variables like growth and profitability. In Aguinis et al. (2013), the subject of outliers is discussed in depth due to the risks and problems they represent to regression analysis, since outliers, as they put it, "usually exert disproportionate influence on substantive conclusions regarding relationships among variables". The paper also comments in depth about a lack of consensus in literature when it comes to better identify and deal with outliers, and presents various techniques on how to handle them, 20 to be exact. The one that will be used here is called winsorization or winsorizing, in which values at the tail ends of the distribution are transformed to a specific percentile of the data. When it comes to growth and profitability variables, the winsorizing method will be used at the 0.5% level, where the most extreme observations will be transformed to be equal to the 0.5 percentile in the lower end of the distribution, and on the top end the values will be equal to the 99.5 percentile, making the data more robust and eliminating the extreme values at the tail of the distribution. The size variable did not show any significant outliers meaning that no data cleaning operations were necessary.

3.4 Econometric Methodology

In Ramalho and da Silva (2009) a good case is made as to why a fractional model should be used when doing a regression analysis regarding leverage. The main arguments are centred around the fact that: leverage is, by definition, concentrated in the [0,1] interval, which is not a guaranteed result for the fitted dependent variable if we use OLS, given that, due to its linear nature, the estimates produced by this method are not bounded; and due to some specificities with the leverage variable it is not correct to assume that the linearity assumption would hold, making OLS a poor estimation method for leverage.

First introduced in Papke and Wooldridge (1996), fractional models are presented as an alternative to linear regressions when the dependent variable (Y), is bounded between 0 and 1. In their paper, the dependent variable used to illustrate the properties of the fractional model was employee participation rates in 401k pension plans, and when comparing the results of a fractional model versus an OLS estimation for said variable, the former showed better results with the OLS regression being strongly rejected, since the RESET test showed improper model specification, with Papke and Wooldridge concluding that the linear model "misses some potentially important nonlinearities" that on the other hand a fractional model does not and is better equipped to handle. The RESET test for

the fractional model did not show signs of model misspecification, with the r-squared of said model even outperforming the one from their linear counterpart.

In fractional models, constraints are put on the Y to guarantee that the results lie in the unit interval, with:

$$E(Y|X) = G(x\beta) \quad (1)$$

where G(·) is a known non-linear function satisfying 0<G(·)<1. In Papke and Wooldridge (1996), G(·) took the form of a logistic function, where in Papke and Wooldridge (2008) it took the form of a probit function, which are the two types of fractional models more commonly used in literature, to the best of my knowledge. In this dissertation G(·) will assume both, the form of a probit function:

$$G(x\beta) = \int_{-\infty}^{x\beta} \frac{1}{\sqrt{2\pi}} \; e^{-\frac{(x\beta)^2}{2}} \quad (2)$$

and the form of a logit function:

$$G(x\beta) = \frac{e^{x\beta}}{1+ e^{x\beta}} \quad (3)$$

to present more robust results.

As for goodness of fit tests, Papke Wooldridge (1996) propose an alternative RESET test that is an extension of the classic Ramsey's RESET test. However, in more recent literature some limitations have been pointed at this test, specifically, that it is overly sensitive to any possible misspecification and could lead to the rejection of a model' functional form, even if the impact of said possible misspecification is minor or relatively inconsequential to the results (Ramalho et al., 2011). Therefore, and as stated above, to make sure the results are robust multiple models will be presented.

4. Descriptive Statistics

In this coming section we will look at some basic descriptive statistics regarding the dataset. The main goal is to perform a preliminary analysis where we test if there were significant differences in the variable's values from the non-pandemic years to 2020.

4.1 Leverage and Traditional Explanatory Variables

In Table 4 we can see the descriptive statistics for the dependent variable and the explanatory variables associated with the traditional research hypotheses mentioned in chapter 3, for both the non-pandemic years, 2018 and 2019, and the pandemic year, 2020. In this dataset, 29 543 observations are relevant to the non-pandemic years, which accounts for 65.3% of the sample, with 15 728 observations being relevant for 2020, which, in its turn, accounts for 34.7% of the sample.

		Mean	Standard Deviation	Minimum	Median	Maximum	T test (p-value)
Leverage	**2018-2019**	0,2749	0,2758	0	0,2018	0,9997	0.0000***
	2020	0,3587	0,2957	0	0,3345	0,9998	
Tangibility	**2018-2019**	0,4300	0,3004	0	0,4044	0,9995	0.3060
	2020	0,4270	0,2995	0	0,3998	0,9983	
Size	**2018-2019**	5,2553	1,4303	-3,0587	5,2268	15,0091	0.0000***
	2020	4,6066	1,5058	-3,8957	4,6616	13,8740	
Growth	**2018-2019**	0,2225	0,7828	-0,6555	0,0304	6,5090	0.0000***
	2020	0,1220	0,6241	-0,6555	-0,0032	6,5090	
Profitability	**2018-2019**	0,0050	0,3960	-3,3089	0,0434	0,8454	0.0000***
	2020	-0,2074	0,4827	-3,3089	-0,0710	0,8454	
NDTS	**2018-2019**	0,3777	0,3407	0	0,3032	1	0.0000***
	2020	0,2804	0,3855	0	0	1	
Age	**2018-2019**	16,1644	15,8361	1	11	190	0.0198**
	2020	15,8005	15,8150	1	10	191	
Liquidity	**2018-2019**	0,2268	0,2368	0	0,1344	0,9965	0.0060***
	2020	0,2206	0,2261	0	0,1376	0,9989	

***, **, * denote statistically significant differences at 1, 5 and 10% levels, respectively, for the t tests for the mean differences between both periods.

Table 4 - Descriptive Statistics

In Table 4 we can see, for each variable, its mean, its median, the standard deviation, its minimums and maximums, and the p-values for the t tests which were performed to compare the means of each respective variable for both the non-covid and covid periods and see if there was a statistically significant difference between the two periods.

As we can see in Table 4, the dependent variable, leverage, saw a significant increase in its mean from the observations regarding 2018 and 2019 to the ones from 2020 of 8.38 percentage points. The median leverage for 2020 is also superior to the one from the non-pandemic years by 13.27 percentage points. This seems to go in line with the specific hypothesis 1 mentioned in the previous chapter where it was stated that a positive relation between covid and leverage was expected.

Contrary to leverage, the rest of the variables saw decreases in their mean and median values when comparing their 2018-2019 values to the 2020 ones, apart from the median liquidity who saw a slight increase in 2020 of 0.32 percentage points. Moreover, most of those decreases were relevant, since tangibility was the only variable whose mean did not show statistically significant changes from 2018-2019 to 2020 at any significance level, as we can see by looking at the t-test result. Liquidity and age, although significant, did not show pronounced changes in their mean and median between the two periods, while, on the other hand, the other variables showed more distinct differences that merit further in-depth analysis.

When it comes to size, both its mean and median saw an almost identical drop, from 5.2553 to 4.6066 in the mean and from 5.2268 to 4.6166 in the median, a decrease which was completely expected, given that size is computed by calculating the natural logarithm of sales and said sales took a hit during the pandemic as we already saw in chapter 2.

From 2018-2019 to 2020, NDTS saw its median go from 0.3032 to 0, which means that at least 50% of the firms observed in 2020 either had no debt-alternative tax shielding mechanism or had no use for it. As we saw in the previous chapter, if a firm registered a negative EBITDA, they would not have any earnings to shield from taxation, so any amount of depreciation and amortization would not fulfil the tax-shielding function that this variable pretends to capture for those firms. After taking a deeper look at the data it is possible to see that 54.8% of the 2020 observations are related to firms where that was the case, when, in comparison, only 19.16% of the observations in 2018-2019 are related to firms with negative EBITDA's. The mean also showed a significant drop going from 0.3777 to 0.2804. Since there are no observations with a zero in the depreciations and amortizations account throughout the whole sample, we can conclude that the drop in the median and mean of NDTS in 2020 is largely due to the firms having no use for the tax-shielding capabilities of amortizations and depreciations, since there are no earnings to be shielded from taxes in 54.8% of firms in 2020.

Regarding growth, in 2018-2019, the median firm saw their total assets increase by 3.04% from one year to the next, while in 2020 the median firms saw a decrease of 0.32%, which means that at

least 50% of the observations regarding 2020 showed a negative growth in total assets, which was, once again, expected given the difficulties firms faced during the pandemic. Also not surprising is the drop in profitability, from an average profitability of 0.5% in 2018-2019 to an average of negative 20.74%, with the median also exhibiting a drop, even if less pronounced, from 4.34% to -7.1%. By taking a deeper look at the data we can see that 68.38% of observations in 2020 were from unprofitable firms, 10 755 to be exact, while during the non-pandemic periods only 28.49% of observations were from firms with a negative EBIT.

4.2 Specific Explanatory Variables

In the coming section we will look at descriptive statistics regarding the dummy and interaction variables used to test for the specific research hypotheses. More specifically, we will look at how the sample is broken down in terms of the types of touristic firms, the region the firm is from, its previous leverage status and its size classification, and will also look at the dependent variable for each dummy variable and its evolution between the non-pandemic years of 2018 and 2019, when compared with 2020.

4.2.1 Type of Touristic Firm

As it was previously discussed, there are, within the touristic sector, intensive/mainly tourism firms and partially tourism firms that are distinguished by their degree of exposure and dependence to touristic activity. As we can see in Figure 2 most observations are related to partially tourism firms, accounting for 74.8% of observations, with the remaining 25.2% being related to mainly tourism firms. In Table 5 we can also see the breakdown of observations for the non-covid periods of 2018-2019 and for the pandemic period of 2020, and we can conclude that the interaction variable of “Covid x Intensive Tourism” will be one for 3 967 observations.

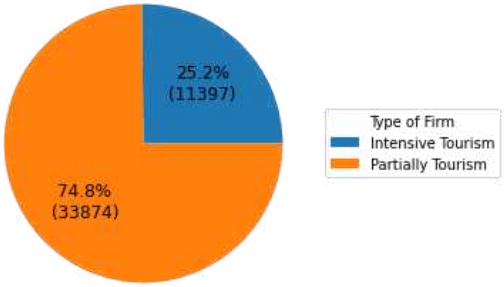


Figure 2 - Breakdown of Observations per Firm Type

Type of firm	2018-2019	2020	Total
Intensive Tourism	7430	3967	11397
Partially Tourism	22113	11761	33874

Table 5 - Number of Observations per Firm Type and Period

In Table 6 we can see the average leverage for each type of touristic firm for the 2018-2019 years and 2020, the difference between those periods and its respective significance. As we can see, both types of firms saw a significant increase in their leverage from one period to the other, with intensive tourism firms showing higher leverage pre-pandemic than partially tourism firms, which was something that carried through to 2020. However, the increase in average leverage was superior in partially tourism firms than in intensive tourism firms, with the former seeing an average increase of 8.88% in debt in their capital structure during the pandemic, while on the other hand intensive tourism firms had around 6.87% more in theirs, in the same period. Any further analysis regarding the correlation or possible impact the type of touristic firm can have on the dependent variable will be done on the next chapter during the regression analysis.

Type of firm	2018-2019	2020	Difference
Intensive Tourism	0,329758	0,398434	0,068676***
Partially Tourism	0,256452	0,345298	0,088846***

***, **, * denote statistically significant differences at 1, 5 and 10% levels, respectively, for the t tests between both periods.

Table 6 - Average Leverage per Firm Type

4.2.2 Region

In Figure 3, we can see the distribution of observations per NUTS 2. The Lisbon Metropolitan Area is the most represented with 31.1% of observations, closely followed by the North region with 27.6%, in large part due to the Porto metropolitan area being located there, which on its own accounts for 56.3% of the North's observations. Algarve, despite being the most popular Portuguese touristic hotspot, only accounts for 11.3% of observations. Unsurprisingly both Autonomous Regions of Azores and Madeira are the least represented in the sample with 2.5% and 3.8% respectively. In Table 7 we can see in

absolute terms the distribution of observations per region, in total and divided by non-pandemic and pandemic periods. In the column relative to 2020 we can see the number of ones for each individual interaction variable resulting of multiplying the covid dummy with each regional dummy.

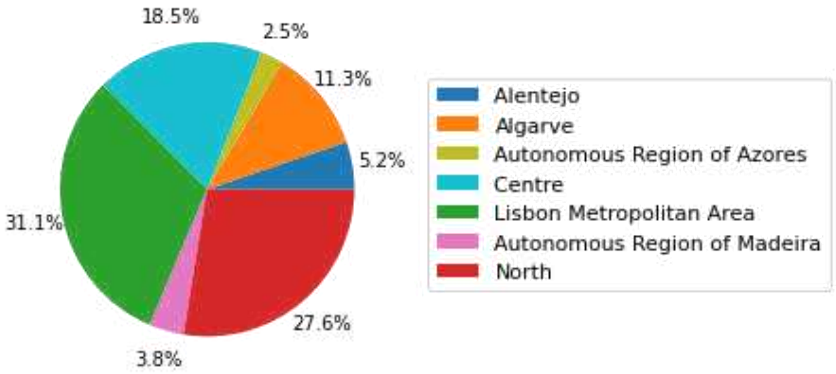


Figure 3 - Breakdown of Observations per Region

Region	2018-2019	2020	Total
Alentejo	1524	837	2361
Algarve	3362	1747	5109
Autonomous Region of Azores	733	400	1133
Centre	5464	2903	8367
Lisbon Metropolitan Area	9210	4886	14096
Autonomous Region of Madeira	1150	578	1728
North	8100	4377	12477

Table 7 - Number of Observations per Region and Period

In Table 8 we can see the average leverage of firms for each region, both in 2018-2019 and 2020, the difference between the two periods and its significance. As we can see all regions show a significant leverage increase between both periods. Pre-pandemic, Lisbon's Metropolitan Area had the lowest average leverage with around 25.72%, with the Autonomous Region of Azores recording the highest with 32.28%. Both these facts remained in 2020 with Azores once again having the highest amount of average leverage and Lisbon the lowest, with 39.89% and 34.38% respectively. When looking at the difference column, Madeira's observation stands out. While in the other 6 regions, all saw an increase in leverage in the 7-8 percentage point range, Madeira saw a 11.59 percentage point increase, which

implied Madeira going from the region with the second lowest average leverage pre-pandemic to the second highest in 2020.

Region	2018-2019	2020	Difference
Alentejo	0,284318	0,370431	0,086113***
Algarve	0,286829	0,365746	0,078917***
Autonomous Region of Azores	0,322773	0,398887	0,076114***
Centre	0,275078	0,349051	0,073973***
Lisbon Metropolitan Area	0,257172	0,343759	0,086587***
Autonomous Region of Madeira	0,258958	0,374875	0,115917***
North	0,286104	0,370916	0,084812***

***, **, * denote statistically significant differences at 1, 5 and 10% levels, respectively, for the t tests between both periods.

Table 8 - Average Leverage per Region

4.2.3 Previous Leverage Status

In Figure 4, we see the distribution of observations regarding their previous leverage status. We can see that most observations, 73.8% to be exact, belong to firms who already had debt in their capital structure in the previous year to the recorded observation, while 26.2% of firms had previously zero debt in theirs. In Table 9 we can see the distribution of observations per previous leverage status and period, similar to the two previous subsections, and we can see that the interaction variable "Covid x Previously Levered" will be equal to one for 11 711 observations.

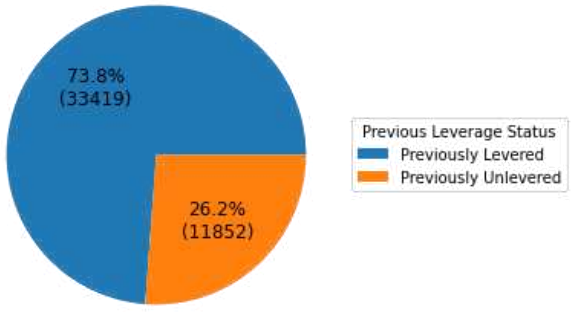


Figure 4 - Breakdown of Observations per Previous Leverage Status

Previous Leverage Status	2018-2019	2020	Total
Previously Levered	21708	11711	33419
Previously Unlevered	7835	4017	11852

Table 9 - Number of observations per Previous Leverage Status and Period

In Table 10 we have the number of observations per year for levered and unlevered firms, as well as the relative number of unlevered firms per year. In 2020, it was recorded the smallest number of firms with zero debt in their capital structure both in absolute and relative terms, which given the difficulties faced by touristic firms during this period is not all that surprising. In the non-pandemic years, the percentage of unlevered firms was 26.11% in 2018, and 25.34% in 2019, while in 2020 the number is considerably smaller, sitting at 19.32%.

Leverage Status	2018	2019	2020	Total
Levered	10555	11391	12690	34636
Unlevered	3730	3867	3038	10635
Unlevered firms(t)/Total(t)	0,2611	0,2534	0,1932	0,2349

Table 10 - Breakdown of Levered vs Unlevered Firms

In Table 11 we can see the average leverage for each period according to their previous leverage status. As expected, previously levered firms display a much larger amount of average leverage when compared with previously unlevered firms, with the former being superior to the latter in 2018-2019 by over 30 percentage points, a gap that extended in 2020 to a little over 33 percentage points. Despite the widening of the gap, both types of firms saw a significant increase in their average leverage in 2020, with firms that had zero leverage in 2019 averaging 11.24% of debt in their capital structure, an increase of 6.04 percentage points when comparing with the average for the non-pandemic years, and firms that were already previously levered increasing 8.79 percentage points in their average leverage, going from 35.53% to 44.32%.

Previous Leverage Status	2018-2019	2020	Difference
Previously Levered	0,355331	0,443193	0,087861***
Previously Unlevered	0,05201	0,112376	0,060366***

***, **, * denote statistically significant differences at 1, 5 and 10% levels, respectively, for the t tests between both periods

Table 11 - Average Leverage per Previous Leverage Status

.4.2.4 Size Classification

In Figure 5, we see the breakdown of observations in the sample according to the size classification of firms. As expected, micro firms represent the grand majority of observations, with 76.6% of observations belonging to them, followed by small firms with 19.9% of observations, medium firms with 3% and, lastly, large firms only representing 0.5% of observations. In Table 12 we can see in absolute terms how many observations correspond to each firm size for both 2018-2019 and 2020, and in the latter column we can see the number of ones of each variable interacting covid and size classification.

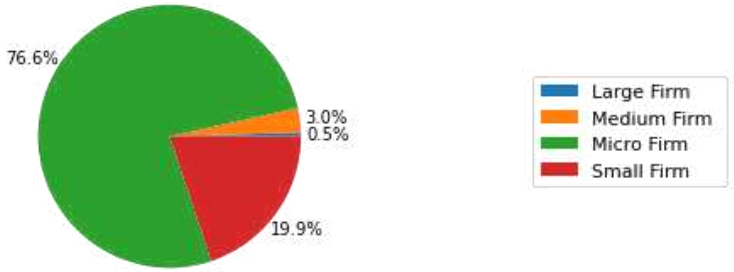


Figure 5 - Breakdown of Observations by Firm Size

Size Classification	2018-2019	2020	Total
Micro Firm	22295	12403	34698
Small Firm	6138	2858	8996
Medium Firm	960	407	1367
Large Firm	150	60	210

Table 12 - Number of Observations per Firm Size

In Table 13 we can see the average leverage for each size firm for both relevant periods, pre-pandemic and pandemic years, and the difference and respective significance between both. By looking at the "Difference" column we can see that large firms were the only sub-group to not show significant changes between the pre-pandemic years and 2020, at any significance level, while the other three sub-groups show significant changes at the 1% level. Micro firms between 2018-2019 and 2020 saw a statistically significant increase in their leverage of 7.818 percentage points while small firms and medium firms saw an increase of 11.03 percentage points and 10.10 percentage points respectively. Further analysis on the subject and its effects on leverage will be done in the next chapter.

Size Classification	2018-2019	2020	Difference
Micro Firm	0,270361	0,348542	0,078181***
Small Firm	0,286280	0,396549	0,110270***
Medium Firm	0,308534	0,409503	0,100968***
Large Firm	0,266342	0,311053	0,044711

***, **, * denote statistically significant differences at 1, 5 and 10% levels, respectively, for the t tests between both periods.

Table 13- Average Leverage per Firm Size

5. Regression Analysis

In Tables 14 and 15 we can see the econometric regressions, both the probit fractional model and the logit fractional model referenced in subsection 3.4. Due to the number of variables present in the model the regressions will be split in two tables, in Table 14 will be all the variables relevant to the traditional research hypotheses and the variables relevant to Specific Hypotheses 1 and 2, and in Table 15 you will be able to see the variables relevant to Specific Hypotheses 3 through 5, the constant, and the pseudo R-squared for both models. In the tables, you can see the estimated coefficient associated with each variable with an indicator of significance next to it, and in parenthesis the robust standard deviation for each estimated coefficient.

	Fractional Probit	**Fractional Logit**
Tangibility	0.51124***	0.84958***
	(0.01926)	*(0.03224)*
Size	-0.02655***	-0.04739***
	(0.00450)	*(0.00750)*
Profitability	-0.12320***	-0.21661***
	(0.01208)	*(0.02045)*
Growth	0.15101***	0.24825***
	(0.00683)	*(0.01229)*
NDTS	0.07815***	0.12867***
	(0.01178)	*(0.01949)*
Age	-0.00446***	-0.00769***
	(0.00034)	*(0.00058)*
Liquidity	-0.26772***	-0.45971***
	(0.02466)	*(0.04224)*
Covid	0.41785***	0.79407***
	(0.02545)	*(0.04998)*
Intensive Tourism	0.03869***	0.06636***
	(0.01275)	*(0.02124)*
Covid x Intensive Tourism	-0.08261***	-0.14166***
	(0.01423)	*(0.02303)*

***, **, * denote variables statistically significant at 1, 5 and 10% levels, respectively.

Table 14 – Regression Results

	Fractional Probit	Fractional Logit
North	-0.00863	-0.01929
	(0.01449)	*(0.02437)*
Covid x North	0.02944*	0.04896*
	(0.01757)	*(0.02876)*
Centre	-0.06856***	-0.11676***
	(0.01585)	*(0.02666)*
Covid x Centre	0.01181	0.02396
	(0.01867)	*(0.03054)*
Alentejo	-0.06372**	-0.10697**
	(0.02607)	*(0.04394)*
Covid x Alentejo	0.04217	0.06902
	(0.02927)	*(0.04797)*
Algarve	-0.02759	-0.04983
	(0.01904)	*(0.03186)*
Covid x Algarve	0.02593	0.04408
	(0.02222)	*(0.03606)*
A.M. Azores	-0.09685***	-0.17261***
	(0.03311)	*(0.05512)*
Covid x A.M. Azores	0.00912	0.01454
	(0.03615)	*(0.05805)*
A.M. Madeira	-0.14938***	-0.25601***
	(0.02809)	*(0.04708)*
Covid x A.M. Madeira	0.17921***	0.29344***
	(0.03467)	*(0.05667)*
Previously Levered	1.28432***	2.33288***
	(0.01706)	*(0.03521)*
Covid x Previously Levered	-0.22882***	-0.49188***
	(0.02464)	*(0.04899)*
Small Firm	-0.04333***	-0.06515***
	(0.01416)	*(0.02354)*
Covid x Small Firm	0.10789***	0.17486***
	(0.01475)	*(0.02394)*
Medium Firm	-0.02628	-0.02742
	(0.03014)	*(0.04971)*
Covid x Medium Firm	0.11168***	0.18450***
	(0.02687)	*(0.04343)*
Large Firm	0.02249	0.05026
	(0.07992)	*(0.13372)*
Covid x Large Firm	-0.01780	-0.01031
	(0.07352)	*(0.11890)*
Constant	-1.65982***	-2.91323***
	(0.03044)	*(0.05495)*
Nº of Observations	45 271	45 271
Pseudo R-squared	0.1213	0.1209

***, **, * denote variables statistically significant at 1, 5 and 10% levels, respectively.

Table 15 – Regression Results (Continuation)

In Table 14, the results for both models validate Traditional Hypothesis 1, which stated that tangibility would have a positive relation with leverage, as both the estimated coefficients exhibit a statistically significant positive effect on the dependent variable. This is not surprising when considering both the theoretical and empirical studies regarding the subject. As it was already stated in chapter 3, firms with higher proportions of tangible assets tend to have more ease of access to credit, since those tangible assets can more easily be given as collateral (Myers, 1977).

On the other hand, the results of the models lead us to reject Traditional Hypothesis 2, given that size shows a negative relation with leverage, which contradicts most of the theoretical and empirical literature. Although unexpected, it is not unheard of to find a similar result in literature as we can see in Chakraborty (2010) and Titman & Wessels (1988) for example. Titman & Wessels (1988) state that this negative relation between size may be justified by the fact that smaller firms face bigger costs when issuing equity or contracting long-term debt, which pushes these firms to incur in short-term debt in the form of loans, leading to smaller firms having higher leverage since short-term debt would be their most viable external financing instrument when compared with larger firms. However, after performing some alternative regressions where leverage would be calculated by dividing long-term debt by total assets, removing the short-term debt element, the same negative relation was still found, and furthermore when running a regression where leverage's numerator would only have loans, size was found to have a positive effect on leverage, dispelling the argument provided by Titman and Wessels (1988).

The results also confirm Traditional Hypothesis 3, given that profitability shows a negative relation with leverage, which is in line with the pecking order theory, since, according to it, firms would prefer to use internal funds instead of outside financing to fund their operations and therefore profitable firms would have less leverage than less profitable ones (Myers, 1984).

Traditional Hypothesis 4 is also validated by the model since the estimated coefficient for growth exhibits a positive relation with the dependent variable. In chapter 3, both arguments for and against a positive relation between growth and leverage were presented, since its effects on leverage is not consensual within the literature, depending on which theory you are following. The results here go in line with the pecking order theory since, as stated in Hall et al. (2004), "growth is likely to put a strain on retained earnings and push the firm into borrowing". In other words, growth pushes the firm into the next step of the pecking order.

The model strongly rejects Traditional Hypothesis 5, which states that NDTS has a negative effect on leverage. This argument stems from a trade-off theory perspective where debt-alternative tax shields would disincentivise debt contraction, since NDTS could serve as less risky substitute to the tax-shielding capabilities of interest deduction payments, since it would not put the firm in possible risk of default (DeAngelo and Masulis, 1980). In Chakraborty (2010), a similar positive relation between NDTS

and leverage was also discovered. To make sure that this result is not a consequence of the formula used in this dissertation and subsequent alterations made to the variable as described in chapter 3, auxiliary models were performed where different constraints were applied, to see if it would change the result in any way, like excluding observations that were artificially equalled to 0 or 1 and using alternative formulas considered in other papers like dividing depreciation and amortization by total assets. In all cases the coefficient remained positive and significant at the 1% level. The results do not really go in line with any of the main capital structure theories, and there is not an argument in any of the main theories to support this relation, to the best of my knowledge.

The results in Table 14 also validate both Traditional Hypothesis 6 and Traditional Hypothesis 7, since, in both models, age and liquidity exhibit a negative effect on leverage. This was the expected result and very much in line with pecking order theory, since older firms and firms with higher proportions of liquid assets would have more internal funds at their disposal, and therefore having less of a need to contract debt.

Regarding the central question this dissertation was looking to answer, we can see, in both models, that covid-19 did in fact have a positive effect on touristic firms' leverage that was not captured by the traditional capital structure determinants, supporting Specific Hypothesis 1. By looking at the results regarding the traditional hypothesis, the pecking order theory seems to be the one that better explains firms' capital structure decisions. Under the same theory we can assume that to combat the difficulties the pandemic caused, firms chose to contract more debt since their internally generated funds took a considerable hit during the pandemic due to being forced by outside factors to put a strain on their normal business practice.

Regarding Specific Hypothesis 2, which stated that the covid effect on leverage would be more intensely felt on intensive/mainly tourism firms, we can see that it is rejected by looking at the signal of the "Covid x Intensive Tourism" interaction variable which shows a negative effect, opposite to the one expected, which means that partially tourism firms felt the covid effect on leverage more intensely. This hypothesis arose from the expectation that intensive tourism firms, due to the higher exposure to/dependence from touristic activity, would have struggled to a higher degree, pushing those firms to contract more debt in comparison with partially tourism firms. A possible reason to justify the rejection of the hypothesis might be that, since partially tourism firms are less levered than intensive tourism firms, as shown by the positive, significant coefficient of the variable "Intensive Tourism", they had more freedom to contract debt in the face of the adversities brought on by the pandemic, while on the other hand intensive tourism firms had to be more cautious in comparison, due to the threat of bankruptcy costs.

In order to avoid collinearity problems, one of the regional variables and its respective interaction variable with covid had to be omitted to serve as a baseline for the remaining regional coefficients.

Due to having the bigger number of observations we choose to exclude the Lisbon Metropolitan Area dummy variable and the "Covid x Lisbon Metropolitan Area" interaction variable, so any coefficient relative to the other 6 regions is given in comparison to the Lisbon Metropolitan Area. As we can see in both models, by looking at the individual regional dummies in Table 15, the estimated coefficients for the Centre region and both Autonomous Regions show significant negative impacts on leverage at the 1% level that are not captured by the traditional explanatory variables in the model, when comparing with Lisbon's Metropolitan Area, while Alentejo also exhibits the same negative relation significant at the 5% level. On the other hand, the North's and Algarve's coefficient shows no statistical significance which means that there are no significant differences between North's and Algarve's touristic firms' capital structure decisions, in comparison with Lisbon's firms, that are not already captured by the variables in the model. These results show that firm´s capital structure decisions are not regionally homogeneous for the entire country. However, the important variables needed to test Specific Hypothesis 3 are the interaction variables and, as we can see, only the "Covid x A.M. Madeira" and "Covid x North" estimated coefficients are statistically significant, the first at the 1% significance level and the latter at the 10% level. This means that, with the exception of those two regions, covid's effect on leverage was felt similarly throughout the regions of the country, which contradicts the stated hypothesis and shows that the regional asymmetries that characterize the touristic sector did not for the most part influence the response to the pandemic, again, with the mentioned exceptions of Madeira and North, which showed a significant increase in leverage when compared with the rest of the NUTS 2 in Portugal. The goal of this hypothesis was mainly to see if the regional asymmetries that characterize the sector extended to the pandemic response when it came to capital structure decisions, and for the most part said asymmetries did not manifest themselves.

In Table 15, as expected, we can see that previously levered firms show a significantly more leverage than previously unlevered firms. We can also see that previously unlevered and levered firms were differently affected by covid's effect on leverage, since the "Covid x Previously Levered" shows a significant negative impact on the dependent variable. This could be due to the fact that previously levered firms could not risk incurring in much more debt due to the threat of bankruptcy costs, where on the other hand previously unlevered firm have more wiggle room in that department since they have not tapped into that form of financing. Hence, results confirm Specific Hypothesis 4.

Like the regional dummy variables, for the size classification ones, the "Micro Firm" and "Covid x Micro Firm" variables were left out to avoid collinearity. Micro firms were selected to be the baseline because they gathered most of the observations, as we saw in the previous chapter. By looking at the size classification dummy variables we can see that the results tell us that medium and large firms' capital structure decisions do not show any significant differences, in comparison with micro firms, that are not already captured in the model's explanatory variables. On the other hand, the estimated

coefficient for small firms, which has a negative sign, shows a statistically significant difference from micro firms at 1% significance level. Regarding the interaction variables between the different size classifications and the covid observations, we can see that medium and small firms felt the covid effects on leverage more intensely in comparison with micro firms. On the other hand, large firms did not show any significant difference in their response to the pandemic in comparison with micro firms. The results reject Specific Hypothesis 5, since we expected the intensity of the effects of the pandemic on leverage to be felt inversely given the firms size classification, which was not the case.

By looking at the results, we can see that the pecking order theory seems to be the one that better describes capital structure decisions of Portuguese touristic firms. Other studies about Portuguese firms reached similar conclusions such as Ramalho & Silva (2009) and Ramalho et al. (2018)

6. Conclusion

This dissertation aimed to study how covid-19 and the difficulties brought on by the pandemic impacted the leverage decisions of Portuguese touristic firms. To answer those questions, we used fractional regression models, due to the bounded nature of the leverage ratio (Debt/Total Asset). Results indicate that, in the face of the pandemic, firms took on more debt in their capital structures. Results also point to the pecking order theory being the one that more accurately describes the capital structure decisions of Portuguese touristic firms, since most of the traditional variables' estimated coefficients' signals go in line with it. More specifically, in the estimated models, tangibility and growth display a positive relation with leverage, while profitability, age, and liquidity exhibit a negative one.

In this dissertation we also try to control for some factors more sector or firm specific, such as the firm's region, the type of touristic firm, the firm's size classification and the firm's previous leverage status and see how those impact the capital structure decisions of touristic firms, both in general and more specifically during the pandemic. Results tell us that intensive tourism firms show a higher leverage than partially tourism firms. However, during covid, partially tourism firms saw a more significant increase in debt in their capital structure that was not captured by the traditional capital structure determinants. Results also show that, despite there being significant regional asymmetries when it comes to tourism, firm's response to the pandemic did not reflect said asymmetries, with most regions showing no significant difference in reaction to the pandemic, with the exception of the Autonomous Region of Madeira and the North Region who saw a significant increase. The models also show that previously levered firms took on less additional debt when compared with previously levered firms during the pandemic. At last, results also show that small and medium firms had a stronger reaction to the pandemic than micro and large firms.

Analysing covid's effect on touristic firms' leverage decisions in other countries could be an interesting direction to do some further research on. Another topic that could merit further research is the analysis of the tourism bounce-back in Portugal, since early numbers for the summer of 2022 point to a full recovery of pre-pandemic levels of touristic activity (Neto, 2022), and see how said bounce-back might have affected the leverage decisions of touristic firms: did it return to pre-pandemic levels or were the capital structure changes registered during the pandemic here to stay?

7. References

Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-Practice Recommendations for Defining, Identifying, and Handling Outliers. *Organizational Research Methods*, *16*(2), 270–301. https://doi.org/10.1177/1094428112470848

Chakraborty, I. (2010). Capital structure in an emerging stock market: The case of India. *Research in International Business and Finance*, *24*(3), 295–314. https://doi.org/10.1016/j.ribaf.2010.02.001

Caires, F. B., Reis, H., & Rodrigues, P. M. (2018). "7.5. O que distingue as dinâmicas empresariais no turismo das de outros setores?". Banco de Portugal, 267-277. https://www.bportugal.pt/sites/default/files/anexos/cep_7_5_pt.pdf

Costa, C. (2021). The impact of the COVID-19 outbreak on the tourism and travel sectors in Portugal: Recommendations for maximising the contribution of the European Regional Development Fund (ERDF) and the Cohesion Fund (CF) to the recovery. Report produced to the Directorate-General Regional and Urban Policy (DG REGIO), European Commission. https://www.portugal2020.pt/wp-content/uploads/ccosta_for_ec.covid-19.report_txt.final_.pdf

Daniel, A.C.M. (2010). Caracterização do Sector Turístico em Portugal. *Tékhne - Revista De Estudos Politécnicos*, *14*, 255–276. https://paperity.org/p/266161264/caracterizacao-do-sector-turistico-em-portugal

DeAngelo, H., & Masulis, R. W. (1980). Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics*, *8*(1), 3–29. https://doi.org/10.1016/0304-405x(80)90019-7

Debbage, K. G., & Ioannides, D. (1998). *The Economic Geography of the Tourist Industry: A Supply-Side Analysis* (1st ed.). Routledge.

Diamond, D. W. (1989). Reputation Acquisition in Debt Markets. *Journal of Political Economy*, *97*(4), 828–862. https://doi.org/10.1086/261630

European Comission (2003). EUROPA - Enterprise - SMEs in Europe 2003 (ISBN 92-894-5996-4). Observatory of European SMEs. https://acci.gr/wp-content/uploads/2022/01/SMES-OBSERVATORY.pdf

Eurostat (2019). Glossary: Tourism industries - Statistics Explained. Retrieved July 18, 2022, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Tourism_industries

Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism*, *29*(1), 1–20. https://doi.org/10.1080/09669582.2020.1758708

Hall, G. C., Hutchinson, P. J., & Michaelas, N. (2004). Determinants of the capital structures of European SMEs. *Journal of Business Finance & Accounting*, *31*(5-6), 711–728. https://doi.org/10.1111/j.0306-686x.2004.00554.x

Instituto Nacional de Estatística (2018). Estatísticas do Turismo - 2019 (ISBN 978-989-25-0542-8). https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOEStipo=ea&PUBLICACOEScoleccao=107668&selTab=tab0&xlang=pt

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. https://doi.org/10.1016/0304-405x(76)90026-x

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323–329. https://econpapers.repec.org/article/aeaaecrev/v_3a76_3ay_3a1986_3ai_3a2_3ap_3a323-29.htm

Jensen, G. R., Solberg, D. P., & Zorn, T. S. (1992). Simultaneous Determination of Insider Ownership, Debt, and Dividend Policies. The Journal of Financial and Quantitative Analysis, *27*(2), 247. https://doi.org/10.2307/2331370

Khan, M. A. (2021). Capital Structure Theories: A Comprehensive Review. *Revista Gestão Inovação E Tecnologias*, *11*(3), 1562–1574. https://doi.org/10.47059/revistageintec.v11i3.2031

Kraus, A., & Litzenberger, R. H. (1973). A State-Preference Model of Optimal Financial Leverage. *The Journal of Finance*, *28*(4), 911–922. https://doi.org/10.1111/j.1540-6261.1973.tb01415.x

Kumar, S., Colombage, S., & Rao, P. (2017). Research on capital structure determinants: a review and future directions. *International Journal of Managerial Finance*, *13*(2), 106–132. https://doi.org/10.1108/ijmf-09-2014-0135

Michaelas, N., Chittenden, F., & Poutziouris, P. (1999). Financial policy and capital structure choice in UK SMEs: Empirical evidence from company panel data. *Small business economics*, *12*(2), 113-130. https://doi.org/10.1023/a:1008010724051

Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *Source: The American Economic Review*, *48*(3), 261–297. https://www.mendeley.com/catalogue/american-economic-association-cost-capital-corporation-finance-theory-investment/

Modigliani, F., & Miller, M. H. (1963). CORPORATE INCOME TAXES AND THE COST OF CAPITAL: A CORRECTION. (1963). *The American Economic Review*, *53*(3), 433–443. http://lib.cufe.edu.cn/upload_files/other/4_20140512101629_02.pdf

Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, *5*(2), 147–175. https://doi.org/10.1016/0304-405x(77)90015-0

Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, *39*(3), 574–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Myers, S. C. (2001). Capital structure. *Journal of Economic Perspectives*, *15*(2), 81-102. http://dx.doi.org/10.1257/jep.15.2.81

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221. https://doi.org/10.1016/0304-405x(84)90023-0

Neto, R. (2022), "De 2,7 a 545,4 milhões. Os números do turismo até junho", Eco. https://eco.sapo.pt/2022/09/27/de-27-a-5454-milhoes-os-numeros-do-turismo-ate-junho/

Papke, L. E., & Wooldridge, J. M (1996). Econometric methods for fractional response variables with an application to 401(k) plan participation rates. *Journal of Applied Econometrics*, *11*(6), 619–632. https://doi.org/10.1002/(sici)1099-1255(199611)11:6

Papke, L. E., & Wooldridge, J. M. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics*, *145*(1–2), 121–133. https://doi.org/10.1016/j.jeconom.2008.05.009

Petersen, M. A., & Rajan, R. G. (1994). The Benefits of Lending Relationships: Evidence from Small Business Data. *The Journal of Finance*, *49*(1), 3–37. https://doi.org/10.1111/j.1540-6261.1994.tb04418.x

Prasad, S., Green, C. J., & Murinde, V (2001b). Company Financing, Capital Structure, and Ownership: A Survey, and Implications for Developing Economies. *Chapters in SUERF Studies*, 7–101. https://ideas.repec.org/b/erf/erfstu/12.html

Rajan, R. G., & Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance*, *50*(5), 1421–1460. https://doi.org/10.1111/j.1540-6261.1995.tb05184.x

Ramalho, J. S., & da Silva, J. V. (2009). A two-part fractional regression model for the financial leverage decisions of micro, small, medium and large firms. *Quantitative Finance*, *9*(5), 621–636. https://doi.org/10.1080/14697680802448777

Ramalho, E. A., Ramalho, J. J., & Murteira, J. M. (2011). Alternative Estimating and Testing Empirical Strategies for Fractional Regression Models. *Journal of Economic Surveys*, *25*(1), 19–68. https://doi.org/10.1111/j.1467-6419.2009.00602.x

Ramalho, J. J., Rita, R. M., & da Silva, J. V. (2018). The impact of family ownership on capital structure of firms: Exploring the role of zero-leverage, size, location and the global financial crisis.

International Small Business Journal: Researching Entrepreneurship, *36*(5), 574–604. https://doi.org/10.1177/0266242617753050

Ross, S. (2015). Fundamentals of Corporate Finance (The Mcgraw-hill/Irwin Series in Finance, Insurance, and Real Estate) (11th ed.). McGraw-Hill Higher Education.

Shyam-Sunder, L., & Myers, S. C. (1999). Testing static tradeoff against pecking order models of capital structure. Journal of financial economics, *51*(2), 219-244. https://doi.org/10.1016/S0304-405X(98)00051-8

Smith, C. W., & Warner, J. B. (1979). On financial contracting. *Journal of Financial Economics*, *7*(2), 117–161. https://doi.org/10.1016/0304-405x(79)90011-4

Sogorb-Mira, F. (2005). How SME Uniqueness Affects Capital Structure: Evidence From A 1994–1998 Spanish Data Panel. *Small Business Economics*, *25*(5), 447–457. https://doi.org/10.1007/s11187-004-6486-8

Titman, S., & Wessels, R. (1988). The Determinants of Capital Structure Choice. *The Journal of Finance*, *43*(1), 1–19. https://doi.org/10.1111/j.1540-6261.1988.tb02585.x

Turismo de Portugal (2017). Portuguese tourism strategy 2027 Leading the tourism of the future. Worldwide Hospitality and Tourism Themes, *9*(6), 646–652. https://doi.org/10.1108/whatt-09-2017-0052

Tuovila, A. "Capital Structure Definition, Types, Importance, and Examples". (2022, June 18). Investopedia. https://www.investopedia.com/terms/c/capitalstructure.asp

World Tourism Organization (2019). UNWTO Tourism Definitions. *UNWTO*. Madrid. https://doi.org/10.18111/9789284420858

Warner, J. B. (1977). Bankruptcy Costs: Some Evidence. *The Journal of Finance*, *32*(2), 337. https://doi.org/10.2307/2326766

World Travel and Tourism Council (2021). PORTUGAL 2021 Annual Research: Key Highlights. https://wttc.org/research/economic-impact