JORGE RAFAEL OLIVEIRA

THE DETERMINANTS OF COMPANIES THAT ENGAGED INTO SPECIAL REVITALIZATION PROCESS: EVIDENCE FROM PORTUGUESE COMPANIES OF THE CONSTRUCTION INDUSTRY

UNIVERSITY OF THE ALGARVE

FACULTY OF ECONOMICS

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Masters in Accounting

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Work Authorship Declaration

I declare to be the author of this work, which is unique and unprecedented. Authors and works consulted are properly cited in the text and are included in the listing of references.

Jorge Rafael Oliveira

(signature)

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This dissertation represents the end of a cycle in my academic life that began when I joined the Faculty of Economics in 2018. This journey has been challenging but above all extremely rewarding. First of all, I would like to express my sincere gratitude, to my supervisor, Professor Rúben Peixinho, who has been following me for a few years now and who immediately accepted my invitation. His experience, advice, the hours he spent meeting with me, and his constant guidance were fundamental to the realization of this thesis, I can say that without his help this thesis would not have been completed and therefore I will always be grateful for the support he gave me.

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SUMÁRIO

A definição de dificuldades financeiras das empresas está relacionada com o insucesso, a insolvência, a falência e o incumprimento. Embora estes termos sejam ocasionalmente utilizados como sinónimos, o seu significado formal é distinto. O insucesso ocorre quando as receitas são insuficientes para pagar as despesas ou quando a taxa de rendibilidade dos investimentos realizados é significativa e continuamente inferior à rendibilidade produzida por investimentos comparáveis após a contabilização dos fatores de risco. O termo "insolvência" descreve as empresas que são incapazes de pagar as suas obrigações correntes, a incapacidade de pagar dividendos aos acionistas e quando o passivo de uma empresa ultrapassa os seus ativos devido a problemas de liquidez (Habib, Costa, Huang, Bhuiyan e Sun, 2020; Levratto, 2013; Altman e Hotchkiss, 2006).

A investigação sobre modelos de previsão de falências teve início na década de 60 com os estudos pioneiros de Beaver (1966) e Altman (1968). Estes dois estudos serviram de base a uma série de trabalhos de investigação sobre a previsão de falências que registaram grandes avanços metodológicos. Os modelos de previsão de falência mais utilizados e investigados atualmente baseiam-se na regressão logística sendo que, infelizmente, a teoria ainda não consegue explicar, exatamente, o como e porquê as empresas entram em falência.

Este estudo centra-se no Processo Especial de Revitalização (PER), que introduz a oportunidade de um devedor possuir um "escudo protetor" (também conhecido como "suspensão automática" no sistema jurídico dos EUA), que suspende todas as ações de execução e impede o início de novas ações, em caso de dificuldades financeiras ou de mera insolvência iminente. Deste modo, o devedor dispõe do tempo necessário para tentar inverter a situação, sem a pressão do mercado e das tentativas de pagamento dos credores. O presente trabalho parte então desta realidade e visa encontrar um modelo que permita discriminar entre empresas que, após um período de dificuldades financeiras, entram em PER e outras que entram diretamente em processo de falência sem passar por esta fase de reestruturação.

Este estudo foca-se em empresas que operam no setor da construção em Portugal. Assim, recorrendo ao portal CITIUS, o qual publica a gestão processual dos tribunais judiciais em Portugal, recolhe-se um conjunto de informação sobre as empresas de interesse no período entre 2014 e 2021. Utiliza-se em seguida a base de dados SABI, a qual possui

informação contabilística sobre 900 mil empresas portuguesas, para recolher os dados contabilísticos necessários para realizar a análise. Resulta deste processo uma amostra final de 271 empresas, as que entraram em PER entre 2014 e 2021 e cujo código CAE é 41,42 e 43. A investigação requer, ainda, um conjunto de empresas de controlo, *i.e*., entidades semelhantes às anteriores, mas que não tenham entrado em PER durante o período de 2014 a 2021. Estas foram então identificadas com o recurso à base de dados ORBIS, utilizando para o efeito o seu código CAE e a classificação "não ativa" desta fonte de informação. A pesquisa ORBIS identifica uma população inicial de 1.509 empresas que cumprem estes critérios sendo que, após a aplicação de vários filtros, este universo se reduz para 636 empresas não PER.

Recorre-se então à regressão, utilizando modelos *logit,* para atingir o objetivo deste trabalho. Em particular, estes modelos visam encontrar a melhor combinação de rácios contabilísticos (relativos às dimensões da rendibilidade, liquidez, alavancagem financeira e ao tamanho das empresas) e de indicadores macroeconómicos para discriminar entre os dois tipos de empresas considerados na amostra. Foi então possível estimar um modelo com uma capacidade preditiva global de 84,2%, 70,8% e 63,9% com base na informação financeira e macroeconómica reportada um, dois e três anos antes do evento. Neste contexto, os resultados sugerem que a liquidez e a alavancagem são fatores de previsão significativos para distinguir, entre as empresas em situação de grande dificuldade financeira, as que entram num processo de reestruturação e as que não recorrem a este processo de reestruturação.

Esta dissertação tem algumas limitações que devem ser tidas em conta na análise e extrapolação de resultados. O facto de as variáveis independentes deste estudo serem constituídas por rácios financeiros calculados com base na informação contabilística das empresas significa que a informação não é a mais fidedigna, uma vez que a informação reportada pode ser manipulada. Por outro lado, este estudo compara dois grupos de empresas que são muito semelhantes. Ambos os grupos são empresas em situação de grande dificuldade financeira, com a principal diferença de que algumas empresas entraram em PER e outras não, facto que dificulta a calibração dos modelos *logit* e a consequente interpretação dos resultados. Soma-se, ainda, a falta de investigação nesta área. De facto, existe um vasto volume de literatura que compara empresas falidas e não falidas. No entanto, não foram encontrados estudos que comparem grupos de empresas em situação semelhante de *stress* financeiro mas que optam por soluções legais distintas

para resolver a questão. Naturalmente, esta é, também, uma oportunidade de investigação futura. De facto, uma das possibilidades de continuação deste trabalho é testar a capacidade de outros modelos de previsão como, por exemplo, os modelos Probit e Gompit. Para além das variáveis estudadas (financeiras e macroeconómicas), poderiam ser ainda consideradas variáveis de governança (como a dimensão do conselho de administração ou a dimensão do comité de auditoria) uma vez que estas podem ajudar a melhorar os resultados obtidos já que também afetam o desempenho das empresas.

Palavras Chave: Falência, Empresas Portuguesas, Reestruturação, Setor da Construção, Processo Especial de Revitalização

ABSTRACT

This thesis contributes to the process of investigating the determinants of companies operating in the Portuguese construction industry that engage in a restructuring process following a period of imminent insolvency. Companies applying for a restructuring process was only possible after 2012 when Portugal changed the bankruptcy law from a liquidation to a restructuring approach with the introduction of the Special Revitalization Process (SRP). The model used in this thesis to identify the determinants of a highly distressed firm to engage in an SRP is based on binary economic response models with *logit* specification given the dichotomous characteristic of the dependent variable. This model allows the understanding of what distinguishes highly distressed firms to enroll in an SRP or not by investigating the statistical significance of the explanatory variables. The independent variables are accounting ratios that proxy for profitability, size, liquidity and leverage together with some macroeconomic indicators. Results show that liquidity and leverage are significant predictors to distinguish between highly distressed companies that go into SRP from those that do not. The highest predictive capacity of our models is 84,2%, when financial and macroeconomic information are combined in the analysis.

Key Words: Bankruptcy, Portuguese Companies, Restructuring, Construction Industry, Special Revitalization Process

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ABBREVIATIONS LIST

CEO – Chief Executive Officer

EBITDA - Earnings Before Interest, Taxes, Depreciation and Amortization

GDP – Gross Domestic Product

GNP - Gross National Product

ICRS – Insolvency and Corporate Recovery Code

NACE - Statistical Classification of Economic Activities in the European Community

SABI - System for Analyzing Iberian Balance Sheets

SPSS - Statistical Package for the Social Sciences

SRP – Special Revitalization Process

CHAPTER 1. INTRODUCTION

Research into bankruptcy prediction models began in the 1960s with the seminal studies of Beaver (1966) and Altman (1968). These two studies are main references for several research papers on bankruptcy prediction that fueled major methodological advancements on this domain. The bankruptcy prediction models that are currently used are mainly based on *logit* and *probit* models as they constitute a powerful tool to investigate the determinants of a binary event. These determinants are mainly based on accounting information although more recent research also test the relevance of non-accounting variables in this setting. Consequently, past research presents evidence on the characteristics of the companies that are more likely to engage in financial distress and bankruptcy. Bellovary, Giacomino, and Akers (2007) review the literature on bankruptcy prediction and conclude that the performance of the prediction models is the primary emphasis of the academic literature on this topic. This study discusses the bankruptcy prediction models and the explanatory variables tested in prior research. Industry studies and country-specific studies are also popular in this setting, such as bankruptcy prediction models in the banking sector (Sinkey, 1975) and different types of models for the United Kingdom (Taffler, 1984).

This work contributes to this ongoing discussion by investigating the determinants of companies operating in the Portuguese construction industry that engage in a restructuring process following a period of imminent insolvency. Companies applying for a restructuring process was only possible after 2012 when Portugal changed the bankruptcy law from a liquidation to a restructuring approach with the introduction of the Special Revitalization Process (SRP). Under this new legal setting, debtors in a difficult financial situation or in a situation of merely impending insolvency are now able to benefit from a "protective shield" (also known as "automatic stay" in the US legal system), which suspends all enforcement proceedings and prevents the start of new proceedings. This gives the debtor the necessary time to try to recover the company, free from the pressure of creditors and other market players.

Importantly, the determinants of companies that engage in restructuring plans is very scarce and there is no study exploring similar issues. This thesis contributes to fill this gap by estimating a model that discriminates between companies that, following a period of an acute financial distress, engage in the SRP from the others that file for bankruptcy without applying for a restructure. The list of companies operating in the construction

industry that filed for bankruptcy without applying for the SRP and the list of companies operating in the construction industry that enrolled into the SRP in Portugal between 2014 and 2021 constitute the sample of this study. The list of companies that enrolled into SRP was obtained from the Portal Citius and their accounting information was obtained from the SABI database. The list of companies that failed without enrolling in the SRP and their financial information was obtained from the ORBIS database. The regression *logit* models were estimated using accounting ratios that proxy for profitability, size, liquidity and leverage as well as macroeconomic indicators.

The results of this research suggest that the logistic regression models used to distinguish between SRP companies and non-SRP companies have a global predictive capacity of 84,2% in the one-year prior to the event, 70,8% in the second year prior the event and 63,9% in the third year prior the event. The explanatory variables with statistical significance are associated with profitability, liquidity and leverage. The Cash-Flow/Sales liquidity ratio and the Total Debt/Total Assets leverage ratio are particularly relevant to distinguishing between SRP and non-SRP companies. The positive coefficient associated with these two ratios in the one-year period before the event suggests that firms with higher levels of debt and higher capacity to generate cash flow from sales are more likely to engage in SRP. This thesis presents the first contribution allowing a better understanding of this new legal setting in Portugal and identifies the characteristics that increase companies' chances to benefit from this restructuring approach.

In addition to this introduction Chapter, this thesis has more four Chapters. The second chapter is devoted to a review of the empirical literature, which includes the key theories surrounding this topic, relevant results, and the contextualization of the SRP. The methodological issues are addressed in Chapter 3, including the construction of the sample, the dependent and independent variables, and the models used. The chapter 4 describes and discusses the results. Finally, Chapter 5 concludes and presents suggestions for future research.

CHAPTER 2. LITERATURE REVIEW

2.1 – Financial Distress, Failure, Insolvency and Bankruptcy

The definition of corporate financial distress is related to failure, insolvency, bankruptcy and default. Even though these terms are occasionally used synonymously, their formal meaning is distinct. Failure happens when revenue is insufficient to pay costs or when the realized rate of return on investments is significantly and persistently lower than the returns produced by comparable investments after accounting for risk factors. The term "insolvency" describes companies that are unable to pay their current obligations, the inability to pay dividends to shareholders and when a company´s liabilities outweigh its assets due to issues with liquidity (Habib *et al*., 2020; Levratto, 2013; Altman and Hotchkiss, 2006). Financial trouble is a sign of bankruptcy for a companie, and in most countries, this calls for a court-based formal declaration. Default can take both a legal and technical form. Technical default describes a scenario where a companie violated a contract requirement and a legal default on a debt is more likely to occur if regular payments are not made. A large and ongoing downturn in a company's financial performance may eventually lead to bankruptcy, causing investors and creditors to incur significant financial loss, even though financial distress doesn´t always imply that the troubled firms will fail (Habib *et al*., 2020; Ihua, 2009; Altman and Hotchkiss, 2006).

Thus, companies of all sizes experience failure, but small companies faces more risks because they lack the resources and additional funding that larger companies normally have, as well because they have a more difficulties to obtain financing from the banks (Ropega, 2011). When a companie fails, goes bankrupt, or bursts, the majority, if not all, of the stakeholders will suffer as a result. Employees lose their jobs, society loses a method of producing and distribution products/services. Also, the government loses tax money (Ihua, 2009). Altman and Hotchkiss (2006) state that there are two types of bankruptcy, "one type of bankruptcy refers to the net worth position of an enterprise. A second, more observable type is a firm´s formal declaration of bankruptcy in a federal district court, accompanied by a petition either to liquidate its assets or attempt a recovery program". According to Ross, Westerfield and Jaffe (1999) there are three types of bankruptcy: technical bankruptcy, which refers to the situation where a companie cannot fulfill the contract on schedule to repay principal and interest, accounting-bankruptcy, which refers to the circumstance where a companie is merely showing negative book net assets and legal bankruptcy, which literally means that the companie goes to court for a

declaration of bankruptcy, is one type. A financially distressed companie will have to take drastic measures to meet its obligations, such as filing for bankruptcy, undergoing a troubled debt restructuring, selling assets at "fire-sale" prices, or being acquired by a financially stronger company (Chang, Hayes and Hillegeist, 2016).

2.2 – Determinants Factors of Financial Distress

This section discusses different variables thar are associated with financial distress. These variables are distinguished between internal and firm-level, macroeconomic and governance issues.

2.2.1. Internal and Firm-Level Factors

There are several studies addressing the relationship between accounting information and financial distress (e.g., Beaver, 1966; Altman, 1968). Some of the more recent studies exploring related issues are summarized in Table 2.1. As can be seen, accounting ratios are widely used to investigate the relationship between companies' profitability, size, liquidity and leverage with financial distress. Table 2.1. also provides the signal of the relationship between the accounting ratio and financial distress.

Table 2.1. Summary of Papers Addressing the Relationship between Accounting Information and Financial Distress

Category	Authors	Variables	Description	Signal
Profitability	Pacheco, Rosa and Tavares (2019)	EBITDATA	EBITDA/Total Assets	-
		ROA	Net Income/Total Assets	-
	Gupta, Barzotto and Khorasgani (2018)	EBITDATA	EBITDA/Total Assets	-
	Isayas (2021)	ROA	Net Income/Total Assets	-
	Khurshid (2013)	Net Profit Margin	Net Income/Sales	-
	Altman and Sabato (2007)	-	EBITDA/Total Assets	+
Firm Size	Pacheco, Rosa and Tavares (2019)	EMP	Number of employees	-
	Isayas (2021)	SIZE	Log of Total Assets	-
Liquidity	Pacheco, Rosa and Tavares (2019)	WCTA	Working Capital/Total Assets	-
		TLWC	Total Liabilities/Working Capital	-
	Gupta, Barzotto and Khorasgani (2018)	CFOTA	Cash Flow from operations/Total Assets	-
		CFOCL	Cash Flow from current liabilities/current liabilities	-
		CFOS	Cash Flow from operations/Sales	-
	Isayas (2021)	GL	Current Asset/Current Liability	-
	Altman and Sabato (2007)	-	Cash/Total Assets	+
Leverage	Pacheco, Rosa and Tavares (2019)	FA	Equity/Total Assets	-
	Gupta, Barzotto and Khorasgani (2018)	TDTA	Total Debt/Total Assets	+
	Isayas (2021)	LEV	Total Debt/Total Equity	+
	Khurshid (2013)	LEV	Total Debt/Total Assets	-
	Altman and Sabato (2007)	-	Short term debt/Equity book value	+

Legend:
+ there is a positive correlation between the variable and level of financial distress
- there is a negative correlation between the variable and level of financial distress

Source: Developed based on the literature

2.2.1.1. Profitability

The effectiveness of a company in making profits given sales and/or its capital assets is shown by its profitability ratios, which also assess the companies capacity to create income that exceeds expenses (Isayas, 2021). Lower profitability involving declines in sales or market share will result in a higher degree of financial distress and an increased probability of bankruptcy (Isayas, 2021; Hofer, 1980).

Campbell and Viceira (2005) contends that decreasing profitability and the pricing of financially distressed stocks will result in larger levels of financial distress, which will raise the likelihood of a company filing for bankruptcy. As a result, it suggests that profitability and financial difficulties are inversely related.

As the Table 2.1 shows Isayas (2021), Pacheco, Rosa and Tavares (2019), Gupta, Barzotto and Khorasgani (2018) and Khurshid (2013) have concluded that profitability is

negatively related to financial distress. In contrast Altman and Sabato (2007) show that profitability is positively related to financial distress.

2.2.1.2. Firm Size

Small companies are more likely to fail than large ones because they have less market expertise, fewer connections, and less available financial resources (Honjo, 2000). According to Pacheco *et al*., (2019), the likelihood of bankruptcy in the construction industry increases as a business's age rises until it reaches a peak before declining as a company matures. This early era of increasing risk, known as adolescence, has been said to be more challenging to overcome than the time leading up to market entry. In accordance with Denis and Mihov (2003), a firm's use of public debt is most significantly influenced by its size. But in accordance with Freixas, Parigi and Rochet (2000), company size has a negative correlation with the likelihood that a companie will fail. This is consistent with the results shown by Isayas (2021) and Pacheco *et al*., (2019).

2.2.1.3. Liquidity

The ability of a company to meet short-term maturing commitments, or liquidity, has also been found to be a significant predictor of corporate financial distress (Isayas, 2021; Gupta *et al.*, 2018). According to research on small business capital structures and trade credit, companies with weak cash flow are more vulnerable to financial distress. The companies liquidity position is worse relative to other companies when the rate of conversion of earnings to cash flows is lower (Gupta *et al.*, 2018). This thought is shared by Kristanti, Rahayu and Huda (2016) and Abdullah (2006) which have shown in their studies that corporate financial distress decreases as liquidity increases.

Isayas (2021), Pacheco *et al*., (2019) and Gupta *et al*., (2018) have shown in their studies that there is a negative relationship between liquidity and financial stress. On the other hand, Altman *et al*., (2007) shows in his study that there is a positive relationship between liquidity and financial stress.

2.2.1.4. Leverage

Using several financial instruments or borrowed funds to boost an investment's potential return is known as leverage, and it is a type of investment strategy. The leverage ratio of the company provides information on how much debt the company has and how much leverage it has been using. Financially troubled companies sometimes have heavy debt

loads with high interest rates. When a business borrows money, it makes a commitment to pay back the money borrowed plus interest over time (Isayas, 2021; Khurshid 2013).

Pacheco *et al*., (2019) and Khurshid (2013) showed that there is a negative relationship between leverage and financial distress. In contrast Isayas (2021), Gupta *et al.*, (2018) and Altman *et al*., (2007) state in their studies that there is a positive relationship between leverage and financial distress.

2.2.1.5. Other Relevant Determinants

Corporate hedging policies, employee relations, management issues, corporate social responsibility activities and qualified audit opinions are additional firm-level variables that have been shown to affect financial distress (Habib *et al*., 2020; Ting, Yen and Chiu, 2008). According to Magee (2013), the extent of foreign currency hedging is related to a greater distance to default and, as a result, a lower probability of financial distress. Hedging also allows an increase in firms' value and reduce the costs of financial distress. Habib *et al*., (2020) argues that "employee relations can be regarded as a component of economic goodwill, yielding future economic benefits for the firm. In the event of adversity, firms can renegotiate with employees to acquire temporary wage concessions". Management problems are also perceived to have a negative impact on firms' dynamics and to increase the likelihood of financial distress (e.g., Balgobin and Pandit, 2001). Companies that are potentially bankrupt are more likely to contain narratives that are centered on their survival and/or turnaround initiatives (Habib *et al*., 2020). According to recent studies, growing and mature firms are more profitable and less risky than introduction and declining firms which means they are more probably to engage in beneficial corporate social responsibility (Habib *et al*., 2020; Al-Hadi, Chatterjee, Yaftian, Taylor and Hasan, 2019). There is also evidence that the higher the gap between book-tax difference grows, *i.e.*, the difference between book income and taxable income, there is more risk of earnings quality deterioration (Habib *et al*., 2020; Noga and Schnader, 2013). In addition, a strong and precise audit opinion could give creditors and investors a crucial and clear signal informing them of which companies pose a greater danger of default (Ting *et al*., 2008).

2.2.2. Macroeconomic Factors

Johnson (1970) argues in favor of using a set of independent variables that included both financial ratios and economic data as financial ratios don't provide enough information

about alternative approaches or the economic circumstances that management and investors must deal with. Corporate profit does not always follow the growth in Gross National Product (GNP), which is traditionally seen as a general indicator of a country's economic health. Gross Domestic Product (GDP) is another highly connected indicator that can be used as a stand-in for macroeconomic conditions. Prior studies suggest that using GDP rather than GNP is a beneficial tool (Liou and Smith, 2007).

A company may be significantly impacted by the interest rates and credit availability, both of which are impacted by the general economic environment. Weakened risk tolerance leads to higher borrowing costs and challenges, which, if they exceed profit margins, could be the tipping point for already fragile companies (Liou and Smith, 2007). Debt and, more especially, bank lending, are the main sources of outside finance for small and medium-sized enterprises. Yet predicting loan success is a challenge for lenders. Due to the occurrence of less favorable economic circumstances over time, notably following the financial crisis in 2008–2009, this problem has gotten worse over time. Credit becomes constrained and expensive because of these conditions. When credit risk is estimated improperly or insufficiently, the consequences for banks, small and medium-sized enterprises, and the overall economy are likely to be unfavorable (Gupta *et al*., 2018).

Due to the obvious correlation between decreasing sales, cash flows, and corporate profitability, financial distress risk is expected to rise during economic downturns (Habib *et al.*, 2020). During an economic downturn, bankruptcy rates dramatically increase. In cycles of economic expansion, recession, contraction, and revival across one or several years, there are significant, correlated fluctuations in interest rates, employment rates, sales, gross national product, and other variables (Liou and Smith, 2007).

2.2.3. Governance Factors

Corporate governance focuses on how financial backers of companies can ensure they will benefit from their investments (Shleifer and Vishny, 1997). Poor corporate governance may lead controlling owners and managers to profit from a corporation at the expenses of non-controlling shareholders (Habib *et al.*, 2020). According to Darrat, Gray, Park and Wu (2016) monitoring and advice are two crucial duties of corporate boards. Companies with a higher percentage of outside directors have a reduced likelihood of going bankrupt in situations where little specialized knowledge is needed to comprehend

the firm's operations. The results are consistent with the idea that outside directors are probably better at the monitoring function of the board, which is more crucial for these companies. On the other hand, companies with a higher number of inside directors have a reduced risk of bankruptcy when significantly more specialized knowledge is needed to fully comprehend the firm's operations. This is consistent with the idea that more insiders are needed for the advising role of the board in more technologically advanced organizations (Habib *et al.,* 2020; Simpson and Gleason, 1999). The failure of the company is the final consequence of an inadequate corporate internal control structure, including a dysfunctional corporate board (Habib *et al.,* 2020; Simpson and Gleason, 1999).

There is also evidence that larger boards are more likely to survive but managing them successfully is more challenging. Researchers could use a comprehensive measure of board capital as a stand-in for the corporate governance role of boards in moderating distress risk rather than focusing solely on board size (Habib *et al.,* 2020). Also, there is evidence that board's inputs are significantly impacted by the gender diversity. When it comes to our measurement of attendance behavior, women seem to behave differently than males. Particularly, women are less likely to experience attendance issues than men. Also, male directors' attendance patterns improve when the percentage of women on the board increases. Keeping all other director traits equal, female directors are also more likely to serve on committees focused on monitoring than male directors. Although females are less likely to serve on remuneration committees than men, women are more likely to be appointed to the audit, nominating, and corporate governance committees (Adams and Ferreira, 2009). Thus, companies with boards that are more diverse (have a higher percentage of women) are less likely to declare bankruptcy (Habib *et al.,* 2020).

Previous studies also suggest that companies with political ties benefit from reduced interest rates in their bank loans. These effects are stronger for companies with better connections (Houston, Jiang, Lin and Ma, 2014). In addition, international cultural factors can anticipate variations in bankruptcy law's effectiveness. While uncertainty avoidance has negative and considerable direct effects on company risk-taking, individualism has beneficial direct effects (Habib *et al.,* 2020; Mihet, 2013).

2.3. Consequences of Financial Distress

Corporate bankruptcy always results in significant financial losses for investors and other stakeholders. In addition, it generates high social and economic costs for the country (Camacho-Miñano, Segovia-Vargas and Pascual-Ezama, 2015; Wu, 2010). According to Edwards, Schwab and Shevlin (2013) financially troubled companies have higher capital costs, less options for outside finance, lower credit ratings, and, generally, managers who are more willing to take on risk. Credit-constrained companies, however, emphasize the necessity of capital preservation, maintaining credit ratings, adhering to loan covenant requirements, and continuing as a going concern. A financial distressed company may also be at risk for harsh repercussions, including reputational damage to the company and its executives, heightened political and media pressure, potential fines and penalties, and even consumer and creditor reprimands (Al-Hadi *et al*., 2019).

As a firm's need for cash becomes urgent, it may be their only alternative to embrace a greater risk appetite and become more tax aggressive. This is especially true given that tax expense still represents a sizable cash outflow for distressed companies, regardless of any bad reputational implications. As a result, when a company is in financial trouble, measures that were previously thought to be riskier or more expensive to implement may become more enticing and realistic as the potential benefits of tax avoidance increase. To avoid defaulting on loans or jeopardizing their capacity to pay creditors, financially troubled companies may modify accounting standards to temporarily enhance operating profits. Companies that are aggressive with their accounting policies, the way they derive their accounting estimates, and their disclosures may also be aggressive with their tax planning (Habib *et al.*, 2020., Richardson, Taylor and Lanis, 2015). Nonetheless, management of financially distressed companies may believe that during tough financial times, the dangers of a tax authority audit or reputational damage following the media's publication of an audit are less important (Habib *et al.*, 2020., Richardson, Lanis and Taylor, 2015).

Trade credit terms may be shortened for struggling companies with cash flow issues. The more consolidated industries, where companies typically have higher market power, provide evidence for this argument. When in financial difficulty, these companies start making significant reductions in trade receivables to their clients. Nevertheless, sales decline an additional 13 to 20 percent for struggling companies with bigger reductions in trade receivables, a pattern that could lead to more distress (Habib *et al.*, 2020).

2.4 Financial Distress and Bankruptcy in the Construction Industry

A modern, efficient infrastructure is widely acknowledged as key to productivity. Therefore, the construction industry greatly contributes to the prosperity and competitiveness of the national economy (Bogdan, 2014). People and companies are dependent on the performance of infrastructure: improved roads, renovated water and sewage systems, modern buildings and multiple shopping malls, hospitals and modern railroads. These infrastructures represent local investment projects for the community and job opportunities for contractors who work in the market (Bogdan, 2014).

Emphasis should be placed on the fact that the construction industry is risky and there is always a chance that a company operating in this industry may face financial distress and go out of business (Pacheco *et al*., 2019; Arslan and Kivrak, 2008). Construction companies are vulnerable to failure because of the fragmented character of the industry, fierce competition, the high level of uncertainty and risk involved, and significant fluctuations in the volume of construction. Throughout the initial years of a firm's existence, the risk of company failure in the construction industry rises, reaches a peak, and then declines as the company ages. In addition, the possibility of an initial assessment period, also known as the adolescence period, can be blamed for the rising risk of failure in the early years of building companies. Also, the chances of a construction company survival are increased by organizational learning and credibility (Pacheco *et al*., 2019; Kale and Arditi, 1999).

2.5. Reorganization and Turnaround

Crises are frequently viewed as catastrophic and horrific situations. These circumstances could, however, provide a chance to improve a flawed system through redesigning and reorganizing (Mayr, Mitter and Aichmayr, 2016; Carmeli and Schaubroeck, 2008). A corporate turnaround is basically the improvement in a company’s financial performance after a life-threatening situation. While the decline could take several years, there are times when unusual events that happen quickly might put a company in danger. In its mildest form, a successful recovery can merely mean surviving with economic performance that the firm's various stakeholders find tolerable. On the other hand, the recovery could, in its best-case scenario, help the company achieve superior, long-term competitive positions in its selected fields of endeavor (Balgobin and Pandit, 2001). On the basis of studies that have attempted to establish the empirical significance of corporate turnaround, two conclusions may be drawn: first, the incidence of turnaround situations

is significant; and second, a greater number of those firms experiencing significant and/or sustained declining performance, proceed to fail instead of recover (Pandit, 2000).

Throughout the previous decades, few boards have successfully completed their task in the absence of external problems. This is especially regrettable given that the internal control mechanism's primary function is to act as an early warning system to help the organization get back on track before problems develop into crises (Jensen, 1993). Companies must do the following to restructure. First, prevent CEOs from wielding influence over the board and avoiding accountability and modify board culture to place a greater emphasis on transparency and truth than on politeness and kindness. Second, rather than rely exclusively on CEO information, board members must have unrestricted access to all pertinent information. The board members must then possess the necessary knowledge to assess this data. Thirdly, the environment needs to be changed so that directors are properly motivated to act in a way that adds value to the company. Fourth, to encourage the maximizing of value for shareholders, managers and board members should have sizable equity stakes in the company. Fifth, boards should be maintained small (seven or eight members), as this will enable them to operate more effectively and free themselves from the CEO's influence. The CEO should also be the only insider since he or she has too much influence over other insiders. Sixth, the board should not be based on the democratic political system, which also represents parties and groups other than shareholders. Seventh, there shouldn't be a conflict of interest between the CEO and board chairman. In conclusion, the role of investors who actively strive to influence the strategic direction of the company and have significant debt or equity stakes in it should also be enlarged (Simpson and Gleason, 1999; Jensen, 1993).

2.6. Corporate Restructuring

This subsection discusses alternative restructuring processes in some major economies worldwide. In addition, it presents the new bankruptcy law in Portugal which changed from a liquidation to a restructuring approach with the introduction of the Special Revitalization Process (SRP) in 2012.

2.6.1. Corporate Restructuring Law: Perspectives from Different Countries

Corporate restructuring law is country dependent. For instance, the court's declaration of bankruptcy kicks off the bankruptcy process in Spain. After that, the economic and financial position of the company is examined. The Bankruptcy Act (Ley Concursal) LC

22/2003 of July 9th, which became effective in 2004, is legal framework that controls this process in Spain (Camacho-Miñano *et al*, 2015). This framework is based on a single judicial hearing that evaluates whether a firm qualifies for a going-concern agreement, a straightforward reorganization, or liquidation. This bankruptcy avoidance technique is known as "prebankruptcy" (preconcursal in Spanish), and it prevents the legal creditor requirements and reorganizes the company in four months. This procedure is also used in Italy and Finland. A company qualifies for "prebankruptcy" if demonstrates that it is solvent and is only momentarily unable to pay its debts (Denning, Ferris and Lawless, 2001). As a result, a speedy reorganization agreement would spare managers from going through the bankruptcy process, associated expenses, delays, and company closure. The second method of reorganization calls for companies and creditors to file for bankruptcy. Companies and creditors can negotiate the conditions of reorganization after the court determines that a company is solvent (Camacho-Miñano *et al*, 2015; Denning *et al*., 2001).

France, Germany, and the United Kingdom - three European nations with radically diverse bankruptcy laws. The state enforces court-administered bankruptcy processes under France's creditor-unfriendly code with the express purpose of keeping the company as a going concern and retaining employment. French bankruptcy courts are granted authority over the bankruptcy procedure and are not required to sell company assets to the highest bidder to accomplish these goals (Davydenko and Franks, 2008). Creditors now only have an advising role to play; the court no longer needs their consent to approve a reorganization plan. In contrast, secured creditors in the United Kingdom have the right to oppose state-provided court-managed bankruptcy procedures and execute the default clauses as laid out in the loan contract. In administrative receivership, the primary bankruptcy procedure for small companies in the United Kingdom, secured lenders have complete discretion to sell the defaulted firm's assets as they see fit to ensure repayment of their claims, with little to no interference from the courts (Davydenko and Franks, 2008). Germany offers an intermediate level of creditor protection, imposing on the parties involved in bankruptcy collective court-administered processes, but retaining significant creditor influence over the restructuring process and requiring their consent to approve any reorganization plan (Davydenko and Franks, 2008).

The European Commission recently examined the restructuring and bankruptcy framework and put forth important improvements; however, none of these proposed

amendments have yet been made into law. The adaption (and implementation) of several Chapter 11 provisions of the United States (US) Bankruptcy Law 1978 (Bankruptcy Code), which are largely considered as pro-debtor, pro-restructuring, and extremely flexible, is the core topic of all the proposed reforms (Merton and Thakor, 2022; McCormack and Wan, 2019). The restructuring laws around the world have been reformed using Chapter 11 as a model. The goal of Chapter 11 is to give a debtor the legal protection essential to allow it the opportunity to reorganize, and so to provide creditors with going-concern value rather than the potential of a more meager settlement of existing debts by liquidation. To achieve this objective, Chapter 11 has a few key components, including a "strong" automatic stay of creditor actions against the debtor company, a debtor-in-possession regime where the management continues to run the debtor company and oversee its restructuring efforts, the availability of super priority financing, and a cross-creditor cram-down procedure (Merton and Thakor, 2022; McCormack and Wan, 2019).

Many factors contribute to the perception that the US Chapter 11 is in favor of restructuring. The debtor can easily access it because they simply must submit a petition with the court giving certain financial and other details. Nonetheless, the process can begin without a court order, and there are no other onerous requirements that must be met. Second, Chapter 11 also adheres to the "debtor in possession" standard, which means that, at least initially, the current management team continues to run the company's operations rather than being replaced by an outside manager or administrator. The court may name a bankruptcy provisional judicial administrator to replace current management in specific, but constrained situations. The court may also name an outside examiner to look into specific issues and report back (McCormack and Wan, 2019).

Instead of a standard negotiated restructuring when debt is converted to equity through the reorganization process, almost two-thirds of all significant bankruptcy outcomes involve the sale of the company (McCormack and Wan, 2019). The related statistics can be interpreted in a variety of ways. A corporation may undergo significant changes during the course of the Chapter 11 procedure, which makes it challenging to analyze the pertinent facts. It could be sold to a different owner, split into multiple companies, become smaller, change its name, management team, and/or company model (McCormack and Wan, 2019).

2.6.2. Special Revitalization Process (SRP)

The paradigm that had been in place in Portugal under the Insolvency and Corporate Recovery Code (ICRS) since 2004 was reformed by the Special Revitalization Process (SRP), which was established by Law 16/2012, on the 20th April, 2012. The focus has shifted from a process that was designed to satisfy creditors by liquidating the insolvent company to one that is now focused on the company's recovery, which must be accomplished through an insolvency plan. The new paradigm is clear: SRP introduces the possibility for a debtor in a difficult financial situation or in a situation of merely impending insolvency to benefit from a "protective shield" (also known as "automatic stay" in the US legal system), which suspends all enforcement proceedings and prevents the start of new proceedings. This gives the debtor the necessary time to try to recover the company, free from creditors pay attempts and from the market. On the one hand, the firm must be bankrupt or facing imminent insolvency to have the insolvency plan authorized, whereas the SRP may and should act earlier. While the insolvency plan allows for the negotiation of the company's liquidation, the plan that comes from it is binding because it can only guide the company's recovery. The primary reason for the SRP's adoption was to prevent the "bankruptcy of bankruptcy" that would have occurred due to legal shortcomings and a lack of measures to save the failing enterprise. Prior to the law's implementation, only an insolvency plan with this goal could be approved to accomplish such a recovery (Oliveira, 2012).

2.6.2.1. Purpose, Application and Formalities

According to Article 17-A, a company that is demonstrably in a precarious financial situation, one that will likely lead to insolvency, or one that is merely about to enter insolvency may use the special revitalization process to engage in negotiations with its creditors to reach a revitalization agreement. Any company that presents a statement signed in the prior 30 days by a certified accountant or statutory auditor, whenever the auditing of accounts is legally required, attesting that it meets the requirements for its recovery may use this new framework. For the purposes of this Code, a corporation is in a difficult economic situation if it experiences significant challenges in meeting its commitments on time, specifically due to a lack of liquidity or an inability to acquire financing (Article 17-B).

Thus, according to Article 17-C, the special revitalization process starts when the company and creditors who, while not particularly connected to the company and hold at

least 10% of unsubordinated claims, express their desire to engage in negotiations towards company's revitalization through the approval of a recovery process. With this request, the debtor must also provide the court with a list of his creditors and the remaining information and documentation required under article 24 no. 1 of the ICRS. The provisions of Articles 32 to 34 of the ICRS are applicable, with the appropriate modifications, if the lawsuit is admitted, and a court is responsible for immediately appointing the provisional judicial administrator. Subsequently, the notifications and summonses referred to in Article 37 are served, specifically by identifying the five largest known creditors and publishing notices and announcements for the information of the remaining creditors and interested parts.

2.6.2.2. Subsequent Processing

The debtor shall tell the other creditors of the situation by registered letter after receiving notice of the order and, in accordance with Article 17-D of the ICRS, letting them know that it has started the revitalization negotiations and inviting them to be part of the process. After the order is published in Citius, creditors have 20 days to file their claims, and the provisional judicial administrator has five days to compile a provisional list of claims. The debtor and creditors have two months to complete the initial conversations after the deadlines for challenging claims have passed; this time frame may be extended for an extra month with prior written consent from the debtor and the provisional judicial administrator. The participants to the negotiations must act in line with the guiding principles and the provisional administrator must guide and supervise the course of the work. The debtor must cooperate actively in the negotiation plan and provide all the information that creditors or the temporary administrator may need.

2.6.2.3. Effects

According to article 17-E, some of the outcomes following the judge's order and the request to begin the revitalization process involve:

- The suspension of legal proceedings and the filing of new actions to collect debts by creditors;
- The suspension of insolvency proceedings as long as the insolvency decision is in effect;

- The prohibition of the debtor company from performing acts of special relevance without prior authorization from the provisional judicial administrator, such as: sales of assets, of participations, and acquisition of real estate, among others.

2.6.2.4. Conclusion of Negotiations with the Approval of a Recovery Plan Leading to the Revitalization of the Company

According to article 17-F, the recovery plan may be accepted either unanimously or by a majority. The plan is deemed approved if the following requirements are met: a) there are voting creditors whose credits account for at least one-third of all voting rights-holding credits; b) there are approval votes representing more than two-thirds of all votes and more than half of all total votes correspond to unsubordinated credits, abstentions not being counted as such.

The court has the authority to approve or reject the reorganization plan within ten days of receiving the paperwork attesting the approval of the revitalization plan. If there is a non-negligible procedural breach, the court has the authority to refuse the homologation: a) officially, where there has been a flagrant violation of a regulation pertaining to procedure or content, when the plan's suspensive conditions have not been met, or when additional acts or measures that should have come before the homologation; b) Upon the request of the interested parts, if they can show that the plan is predictably less advantageous than it would be in the absence of any plan, or if the plan gives greater economic value to a creditor than the nominal amount of his or her claims on the insolvency plus the value of any contributions he is required to make. The judge's homologation decision is binding on all creditors, even if they did not participate in the negotiations.

2.6.2.5. Conclusion of the Negotiation Process without the Approval of the Recovery Plan

Article 17-G anticipates that the recovery plan may not be approved. In these situations, the provisional judicial administrator must inform the debtors who have not yet reached insolvency of the rejection and the ensuing extinction of the SRP and all its ramifications. The SRP is attached to the insolvency process when the judge declares the debtor to be insolvent within three days of the condition becoming apparent. A new Special Revitalization Process cannot be used by the debtor within two years.

2.6.2.6. Approval of Out-of-Court Reorganization Agreements

The SRP may start as soon as the debtor submits an out-of-court reorganization agreement that has been approved by creditors representing at least a majority of votes, in accordance with the legal framework set forth in Article 17-I. The provisional list of claims is published in Citius, the provisional judicial administrator is established, and any non-participating creditors are informed. Following this stage, the same steps as in the judicial process are followed, with the necessary legal modifications. Without the necessity for homologation, this process is quicker and more straightforward.

CHAPTER 3. METHODOLOGY

3.1. Research Hypotheses

The literature review was important to identify the determinants of financial distress. However, there is no studies investigating the determinants of financial distressed firms that subsequently engage in a restructuring process. Considering that SRP firms are required to have perceived future viability, the research hypotheses of this thesis assume that SRP firms are in better financial position than non-SRP firms. The potential determinants that are tested are related with accounting ratios that proxy for profitability, size, liquidity and leverage together with some macroeconomic indicators. Other potential internal determinants (e.g., employee relationship, management issues, corporate social responsibility activities or audit opinions) and corporate governance issues are not tested due to data availability.

The first research hypothesis is related with firms' profitability. Most of the papers addressing the relationship between profitability and financial distress suggest a negative relationship (e.g., Isayas, 2021; Pacheco et al., 2019; Gupta *et al.*, 2018; Khurshid, 2013), *i.e.*, companies with higher profitability are less likely to be financially distressed. In contrast Altman and Sabato (2007) show that profitability is positively related to financial distress. Therefore, we speculate that, in the reorganization scenario, profitability contributes positively to firms enrolling in reorganization processes. The first research hypothesis is defined as follows:

Hypothesis 1: There is a positive and statistically significant relationship between firm profitability and the likelihood of enrolling in a Special Revitalization Process.

The second research hypothesis is related with firms' size. Most of the papers addressing the relationship between firm size and financial distress suggest a negative relationship (e.g., Isayas, 2021; Pacheco et al., 2019), *i.e.*, larger companies are less likely to be financially distressed. Therefore, we speculate that, in the reorganization scenario, firm size contributes positively to firms enrolling in reorganization processes. The second research hypothesis is defined as follows:

Hypothesis 2: There is a positive and statistically significant relationship between firm size and the likelihood of enrolling in a Special Revitalization Process.

The third research hypothesis is related with firms' liquidity. Most of the papers addressing the relationship between liquidity and financial distress suggest a negative

relationship (e.g., Isayas, 2021; Pacheco et al., 2019; Gupta *et al*., 2018), *i.e*., companies with higher liquidity are less likely to be financially distressed. On the other hand, Altman and Sabato (2007) shows in his study that there is a positive relationship between liquidity and financial stress. Therefore, we speculate that, in the reorganization scenario, liquidity contributes positively to firms enrolling in reorganization processes. The third research hypothesis is defined as follows:

Hypothesis 3: There is a positive and statistically significant relationship between liquidity and the likelihood of enrolling in a Special Revitalization Process.

The fourth research hypothesis is related with firms' leverage. Most of the papers addressing the relationship between leverage and financial distress suggest a positive relationship (e.g., Isayas, 2021; Gupta *et al*., 2018; Altman and Sabato, 2007), *i.e*., companies with higher leverage are more likely to be financially distressed. The opposite is shown by Pacheco *et al*., (2019) and Khurshid (2013) that shows there is a negative relationship between liquidity and financial stress. Therefore, we speculate that, in the reorganization scenario, liquidity contributes positively to firms enrolling in reorganization processes. The fourth research hypothesis is defined as follows:

Hypothesis 4: There is a negative and statistically significant relationship between leverage and the likelihood of enrolling in a Special Revitalization Process.

The fifth research hypothesis is related with macroeconomic variables. Most of the papers show that macroeconomic variables influence the level of financial distress to which a company may be exposed. Addressing the relationship between macroeconomic variables and financial distress suggest a positive relationship (e.g., Habib *et al.*, 2020; Gupta *et al*., 2018; Liou and Smith, 2007), *i.e*., higher interest, mortality and unemployment rates increase a company´s financial distress. We speculate that, in the reorganization scenario, macroeconomic variables contributes positively to firms enrolling in reorganization processes. The fifth research hypothesis is defined as follows:

Hypothesis 5: There is a positive and statistically significant relationship between macroeconomic variables and the likelihood of enrolling in a Special Revitalization Process.

3.2. Database and Sample

This study requires the identification of firms operating in the construction industry in Portugal that engage in SRP. The identification of these companies is made using the official online Portuguese source (CITIUS Portal) that publishes the procedural management of judicial courts in Portugal. This CITIUS Portal identifies all the Portuguese companies that engaged in the SRP and provides important information such as the name and the fiscal number of the company, the court where the request was made, the date the process was concluded, the date it was approved and the list of debtors that are part of the process. Considering data availability issues, this thesis collects information about the companies that enroll in this process from 2014 to 2021.

The identification of SRP companies starts with the selection of all the Portuguese courts that have their SRP approved from 2014 to 2021. This search identifies 1991 companies in this situation. The accounting data of this companies is a crucial issue in this research. Therefore, the SABI database, which has accounting information on 900 thousand Portuguese companies, was used to collect all the accounting data of such companies based on the fiscal number of SRP companies. The following step ensures that all the companies in the sample are classified as operating in the construction industry. Therefore, all the companies classified outside the construction industry on the Statistical Classification of Economic Activities in the European Community (NACE) were removed. The NACE codes of the sample companies are listed on Table 3.1.

Table 3.1. NACE Code and Description

NACE Code	Description
41	Construction of buildings
42	Civil engineering
43	Specialised construction activities

Source: Own Elaboration

After this step, the sample end up with a total of 271 companies that joined the SRP for which their NACE code is 41,42 and 43. For robustness purposes, the estimation of the models to investigate the determinants of companies engaging in the SRP requires accounting information for the 3 years prior to the event (SRP approval). Under this framework, the event year is considered year N whereas the accounting information used as independent variables are from years N-1, N-2 and N-3. Therefore, all the companies

that do not have accounting information for each year are removed. In the end of this process, the sample companies (SRP companies) consist of 194 companies in year N-1, 216 companies in year N-2 and 197 companies in year N-3.

The investigation of the determinants of companies engaging in the SRP also requires a set of similar firms that do not enroll in the SRP during the period from 2014 to 2021. To accomplish this objective, this study defines these firms as those operating in the construction industry and classified in the ORBIS database as not active. The status of these companies are the following: Default of payment, dormant, administratively non-compliant, insolvency proceedings, reorganization, rescue plan, administratively suspended, dissolved, demerger, liquidation, in liquidation, dissolved and inactive. Companies in this situation are likely to be highly financial distressed and near insolvency. Importantly, all the SRP companies are removed from this sample in a following stage to ensure that the same company is not classified in both samples (SRP and non-SRP). The ORBIS search identifies 1.509 companies operating in the construction industry whose NACE Code is 41,42 or 43 with one of the above statuses. The status date of each firm allows the exclusion of all the cases classified before 2014 and between 2022-2023. After this step, 808 companies remain in the non-SRP sample search. Considering the need of accounting information for the 3-years prior to the status of the company, this process excludes all the companies that do not match this criterion, leading to 636 companies that are classified as not active during the 2014-2021 period. Similar to the SRP sample definition, all the companies that do not have accounting information for each year (N-1, N-2 and N-3) are removed. In the end of this process, the sample of non-SRP companies consist of 71 companies in year N-1, 167 companies in year N-2 and 243 companies in year N-3.

3.3. Definition of the Model, Dependent and Independent Variables

The model used in this thesis to identify the determinants of a highly distressed firm to engage in an SRP is based on binary economic response models with *logit* specification given the dichotomous characteristic of the dependent variable. This model allows the understanding of what distinguishes highly distressed firms to enroll in an SRP or not by investigating the statistical significance of the explanatory variables.

In this setting, the dependent variable assumes 0 value in the case of companies classified as “non active” without enrolling in an SRP (non-SRP companies) and 1 if the company

engaged in an SRP (SRP companies). The independent variables are accounting ratios that proxy for profitability, size, liquidity and leverage together with some macroeconomic indicators. Three models are estimated considering different lags of the independent variables related to the even: 1 year prior the event (N-1), 2 years prior the event (N-2) and 3 years prior the event (N-3).

The accounting ratios that proxy for profitability, size, liquidity and leverage are listed in Table 3.2. Data availability represents an important issue in this setting as financial databases do not contain all the necessary information to compute all accounting ratios that could proxy for the abovementioned dimensions. In addition, it was decided not to include return on equity (ROE) ratio as a proxy for profitability. In fact, many of these companies (SRP and non-SRP) are simultaneously not profitable and present negative equity, leading the ROE to be positive because of the negative numerator and denominator of the ratio. This is misleading as other companies that present positive ROE are in the opposite situation, *i.e.*, profitable and present positive equity.

Table 3.2. Independent Variables to Consider in the Model

Category	Variables	Description	Expected Signal
Profitability	EBITDAS	EBITDA/Sales	+
	ROA	Net Income/Total Assets	+
	Net Profit Margin	Net Income/Sales	+
Firm Size	SIZE	Log of Total Assets	+
Liquidity	WCTA	Working Capital/Total Assets	+
	CFS	Cash Flow/Sales	+
	GL	Current Assets/Current Liabilities	+
Leverage	TDTA	Total Debt/Total Assets	-

Legend:

+	there is a positive relationship between the variable and the likelihood of enrolling in a Special Revitalization Process
-	there is a negative relationship between the variable and the likelihood of enrolling in a Special Revitalization Process

Source: Own Elaboration

The independent variables tested in this thesis also contain macroeconomic information. The macroeconomic information analyzed in this setting is the GDP growth of the Portuguese economy, the interest rate (Euribor 12m) at the end of the year, the Portuguese

unemployment rate and the mortality rate of the construction industry defined at the end of the year. Table 3.3 resumes this macroeconomic information.

Table 3.3. GDP Growth, Interest, Unemployment and Mortality Rate in the Period of Analysis

Year	GDP Growth	Interest Rate (Euribor 12m)*	Unemployment Rate	Mortality Rate
2011	-1,70%	2,030%	13,4%	17,1%
2012	-4,06%	0,574%	16,5%	16,8%
2013	-0,92%	0,502%	17,1%	12,8%
2014	0,79%	0,330%	14,5%	11,3%
2015	1,79%	0,045%	12,9%	10,5%
2016	2,02%	-0,079%	11,5%	9,3%
2017	3,51%	-0,188%	9,2%	8,9%
2018	2,85%	-0,143%	7,2%	8,4%
2019	2,68%	-0,270%	6,6%	8,6%
2020	-8,30%	-0,487%	7,0%	8,4%

Source: PORDATA and Euribor Rates EU*

3.4. Estimation of *Logit* Model

Three logistic regression models are estimated based on the dependent and independent variables defined above. The independent variables are determined at three different moments: one year, two years, and three years prior to the event (SRP approval date in the case of SRP companies and ORBIS status date in the case of non-SRP companies). Following this procedure, some tests for one, two, and three years prior to the event are operated. The Hosmer-Lemeshow goodness of fit test evaluates how well the model fits the data by comparing the observed and expected frequency of events and non-events. The significance of each model obtained is evaluated using the Omnibus test and the overall fit of the model is evaluated using the Cox & Snell measures. Finally, the performance of the models is estimated by calculating the percentage of errors generated in the classification of the observed data under study.

The model general specification is as follows:

$$\log\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta' x + u \quad (1)$$

where π is the likelihood of a highly distressed firm to enroll in an SRP; α is the model's intercept; β and x are vectors of coefficients and predictors, respectively; and u is the model's error term.

CHAPTER 4. RESULTS AND DISCUSSION

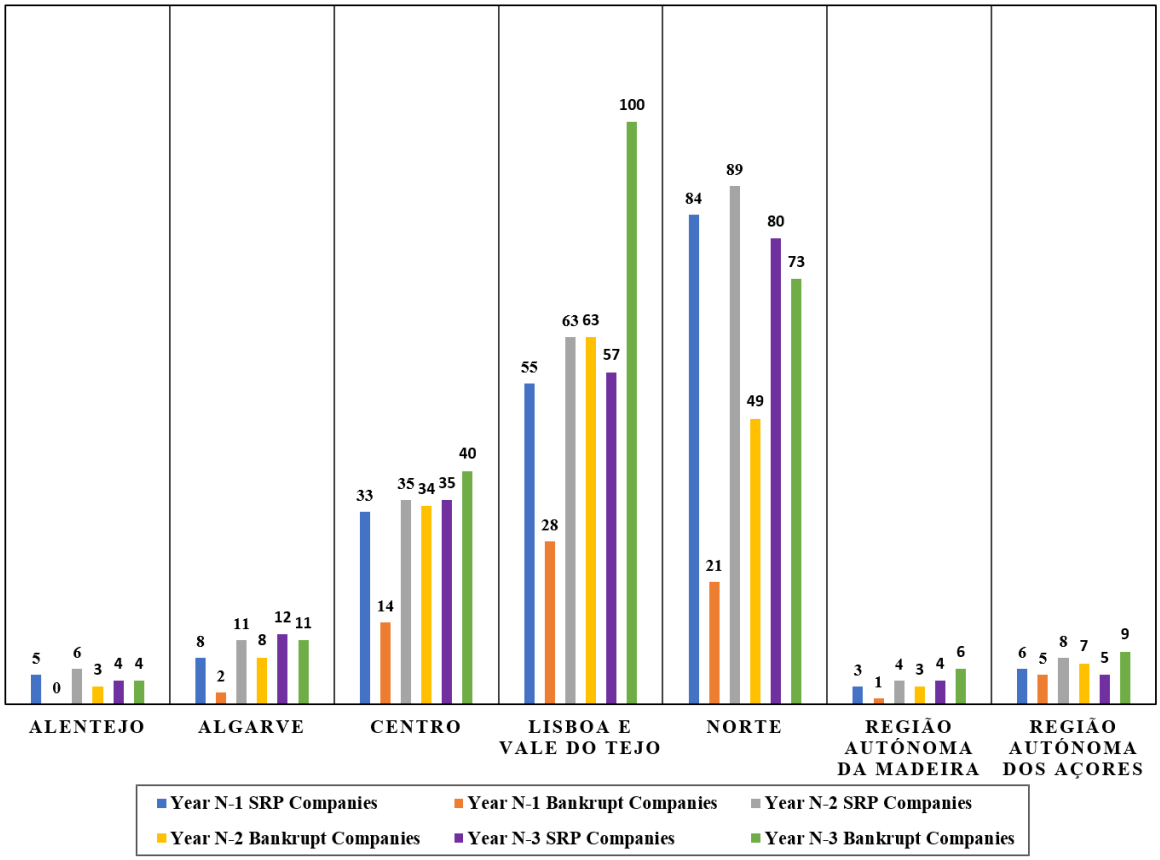
This chapter presents and discusses the results of this work and can be divided in two major blocks: the descriptive statistics of the data and the estimation of the three logistic models using N-1, N-2 and N-3 data.

4.1. Descriptive Statistics

Figure 4.1 shows the number of companies with high levels of financial distress classified by event-year and region and divided into two groups: those that enroll in an SRP (SRP companies) and those which do not (non-SRP companies). As can be seen for the year N-1, the "Norte" region is the that with the highest number of SRP companies (84, representing 43,30% of the total SRP sample), followed by "Lisboa e Vale do Tejo" (55, 28,35% of the total SRP sample) and "Centro" (33, representing 17,01% of the SRP sample). Regarding the non-SRP companies, "Lisboa e Vale do Tejo" is the region with more cases (28, 39,44% of the non-SRP sample), followed by the "Norte" region (21, 29,58% of the non-SRP sample) and "Centro" region (14, 19,72% of the sample). There are no companies from the “Alentejo” region in the non-SRP sample in the year N-1.

Considering the year N-2 the "Norte" region is that with the highest number of companies that have enrolled into SRP (41,20% of the total SRP sample), followed by "Lisboa e Vale do Tejo" (29,17% of the total SRP sample) and "Centro" (16,20% of the SRP sample). Regarding the non-SRP companies, "Lisboa e Vale do Tejo" is the region with more cases (37,72%), followed by the "Norte" region (29,34%) and "Centro" region (20,36%). Results for N-3 are similar, with North having the most SRP firms (40,61% of the total SRP sample) and "Lisboa e Vale do Tejo" having the most non-SRP firms (41,15%).

Figure 4.1. SRP and non-SRP Companies per Region



Source: Own Elaboration

Accounting ratios are prone to present outliers given their accumulative characteristics. In this work's case, the standard deviation, minimum and maximum values of each ratio suggest that averages are potentially influenced by such problem. Therefore, it is important to deal with this issue to minimize the contamination of the information (Ezzamel and Mar-Molinero, 1990) and to promote the estimation of better prediction models. There is no consensus about the best way to deal with outliers. Winsorizing (Lev and Sunder, 1979), is one of the most used techniques in the context of accounting ratios. It involves limiting extreme observations to reduce the impact of outliers by winsorizing the extreme values of a percentile of both tails of the distribution. Hence, in this work, all accounting ratios are winsorized at the 5th percentile of both tails of the distribution. The exception is SIZE as it is already transformed by a natural logaritmization.

Table 4.1 presents the descriptive statistics for the accounting ratios that proxy for profitability, size, liquidity and leverage after the winsorization and the two-tailed t-test and the Mann-Whitney U test to investigate the mean and median differences between SRP and non-SRP companies respectively.

Table 4.1. Comparing the Mean and Median Values of the Ratios of SRP and non-SRP Companies after Winsorization

Variable	SRP Companies (n=194)			non-SRP Companies (n=71)			t-test		Mann-Whitney U test	
	Mean	Median	St. Deviation	Mean	Median	St. Deviation	Mean Diference	p-value	Median Diference	p-value
EBITDAS	-0,28	-0,03	0,61	-0,58	-0,12	1,17	-0,30	(<0,001)	-0,09	(0,220)
ROA	-0,09	-0,03	0,14	-0,13	-0,05	0,20	-0,04	(<0,001)	-0,02	(0,191)
NET PROFIT MARGIN	-0,47	-0,15	0,78	-0,83	-0,23	1,50	-0,36	(<0,001)	-0,08	(0,217)
SIZE	6,35	6,34	0,81	6,55	6,56	0,62	0,20	(0,023)	0,22	(0,015)
WCTA	0,24	0,18	0,36	0,27	0,29	0,37	0,22	(0,532)	0,11	(0,676)
CFS	-0,02	-0,08	0,08	-0,76	-0,20	1,45	-0,74	(<0,001)	-0,12	(<0,001)
GL	1,94	1,29	2,04	3,55	1,45	5,73	1,61	(<0,001)	0,16	(0,159)
TDTA	0,98	0,89	0,43	0,94	0,90	0,42	-0,04	(0,763)	0,01	(0,941)

Source: Own Elaboration

The results show that both SRP and non-SRP companies are not profitable as all the accounting ratios that proxy for profitability (EBITDAS, ROA and NET PROFIT MARGIN) are negative for both mean and median values. These ratios assess a company's ability to generate a profit from its sales or operations and balance sheet assets. Importantly, the results provide some evidence that SRP companies are less unprofitable that non-SRP companies given the significance of the differences at the mean EBITDAS and NET PROFIT MARGIN. However, the median differences of these ratios are not significant at conventional levels. The results also show that non-SRP companies are significantly larger than SRP companies given the significance (p-value < 0,05) of the differences when both the two-tailed t-test and the Mann-Whitney U test are performed. The liquidity analysis, that describe the short-term financial profile of companies, reveals mixed evidence. On the one hand, the mean CFS liquidity ratio is significantly higher (p-value < 0,001) for SRP companies than for non-SRP companies. On the other hand, the mean current liquidity ratio (GL) that examine company's ability to meet its short-term commitments, is significantly higher for the non-SRP companies (p-value < 0,001). Importantly, there are no significant differences (mean and median values) for WCTA ratio and when the Mann-Whitney U test is performed for the median differences between

CFS and GL ratios. Finally, there are no significant differences when one compares the leverage of these two groups of companies using mean or median values.

The two-tailed t-test and the Mann-Whitney U test to investigate the mean and median differences between SRP and non-SRP companies was also performed for the N-2 and N-3 data. The results are materially the same.

4.2. Correlation Matrix

Table 4.2 shows the correlation matrix between the dependent (binary variable for the SRP classification) and independent variables (accounting ratios and macroeconomic variables) that are used in this thesis. The results show that there are variables with high levels of correlation. For instance, it can be noticed that the EBITDAS ratio is highly correlated with the NET PROFIT MARGIN ratio (0,963) and the CFS ratio (0,760). The NET PROFIT MARGIN ratio is also highly correlated with the CFS ratio (0,765). As for the macroeconomic variables, the Interest Rate variable (Euribor 12m) is highly correlated with the Unemployment Rate (0,939) and the Mortality Rate (0,955). Finally, the macroeconomic variable Unemployment Rate is highly correlated with the Mortality Rate (0,968). Therefore, the combination of variables used in the regression models takes this into account to prevent problems of multicollinearity.

Table 4.2. Correlation Matrix with Financial Ratios and Macroeconomic Variables

	Dependent Variable	EBITDAS	ROA	Net Profit Margin	SIZE	WCTA	CFS	GL	TDTA	GDP Growth	Interest Rate (Euribor 12 m)	Unemployment Rate	Mortality Rate
Dependent Variable	1	,162**	,130*	,157*	-0,111	-0,027	,400**	-,204**	0,045	,137*	0,058	0,051	0,015
EBITDAS		1	,320**	,963**	-,180**	0,004	,760**	-,166**	-,133*	0,100	-0,061	-0,077	-0,084
ROA			1	,226**	,153*	,346**	,134*	,192**	-,475**	0,098	-0,059	-0,074	-0,083
Net Profit Margin				1	-,258**	-0,053	,765**	-,228**	-0,116	0,082	-0,078	-0,095	-0,099
SIZE					1	0,100	-,185**	0,102	-,266**	0,045	,168**	,160**	,163**
WCTA						1	-0,039	,390**	-,400**	0,005	0,103	0,084	0,086
CFS							1	-,339**	0,007	0,119	-0,024	-0,021	-0,048
GL								1	-,288**	-,143*	-0,034	-0,020	-0,019
TDTA									1	0,002	0,050	0,099	0,065
GDP Growth										1	0,091	-0,031	-0,104
Interest Rate (Euribor 12 m)											1	,939**	,955**
Unemployment Rate												1	,968**
Mortality Rate													1

**. Correlation is significant at the 1%

*. Correlation is significant at the 5%

Source: Own Elaboration

4.3. Estimation of the *Logit* Model

This section presents the results of estimating the l*ogit* models to distinguish between SRP companies and non-SRP companies using a sample of Portuguese companies operating in the construction industry. Several tests will be presented to validate the model's effectiveness, considering the best combination of accounting ratios that proxy for profitability, size, liquidity and leverage together with macroeconomic indicators. These models are estimated using three different time windows: one, two and three years before the event (*i.e*., the SRP approval for SRP companies and status date of non-SRP companies).

4.3.1. Model 1 - Estimation of the *Logit* Model with Financial Information Reported One Year Prior to the Event

The estimation of the first *logit* model considers the information (accounting and macroeconomic data) of the companies in the year prior to the event and uses a sample of 194 SRP companies and 71 non-SRP companies operating in the construction industry. We discuss several specification tests before going into the estimation results.

Table 4.3 presents the present the diagnostic tests. As can be seen, the chi-square result is highly significant (chi-square = 87,656; df = 6; p-value < 0,001) suggesting an adequate fit of the model. Therefore, the adjusted model is better than the that with no independent variables. As is shown, the Cox & Snell adjustment measure of the model´s overall fit suggests that the model explains 28,2% of the variability of the dependent variable. The result of the Nagelkerke R square is even better: 41,0%. The Hosmer-Lemeshow test additionally evaluates how well the data fits the model. In particular, it tests whether there are significant differences between the model's classifications and the real classification of the observations, which suggest that the model nicely fits the data (p=0,227). The model generates a Type I Error of 56,3% and a Type II Error of 1,00%. These results suggest that the model is particularly good at finding SRP-like companies. Overall, its accurateness rate is 84,2%, *i.e.*, it correctly classifies 223 companies in the sample.

Table 4.3. Diagnostic Tests - Model 1

Omnibus Test				
		Chi-square	df	Sig.
Step 1	Step	87,656	6	<,001
	Block	87,656	6	<,001
	Model	87,656	6	<,001

Evaluation of general adjustment			
	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
Step 1	220,372	,282	,410

Hosmer and Lemeshow Test			
	Chi-square	df	Sig.
Step 1	10,556	8	0,227

Classification results				
			Predicted Dependent Variable	
	Observed		0	1	Percentage Correct
Step 1	Dependent Variable	0	31	40	43,7
		1	2	192	99,0
	Overall Percentage				84,2

Given the above, one can concluded that model 1 is able to distinguish highly distressed companies that go into SRP from those that do not. The model is as follows (Table 4.4.):

Table 4.4. *Logit* Coefficients - Model 1

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ROA	-2,485	1,832	1,840	1	,175	,083
	SIZE	,199	,246	,659	1	,417	1,221
	WCTA	,117	,536	,047	1	,828	1,124
	CFS	8,191	1,897	18,640	1	<,001	3608,452
	TDTA	1,185	,606	3,829	1	,050	3,271
	GDP Growth	,072	,060	1,433	1	,231	1,074
	Constant	-,872	1,761	,245	1	,620	,418

a. Variable(s) entered on step 1: ROA, SIZE, WCTA, CFS, TDTA, GDP Growth

Source: IBM SPSS

Results suggest that liquidity and leverage are the relevant predictors in our context as their estimated coefficients are statistically significant at normal levels. In particular, ceteris paribus, an increase in both liquidity or leverage increases the likelihood of the distressed firm filing for SRP. These results leads us not to reject our research hypothesis number 3. We reject hypothesis number 4 because the coefficient has the opposite sign

to that initially expected. In contrast, Table 4.4 shows that profitability and size together with macroeconomic indicators are not relevant to distinguish between SRP and non-SRP firms. In effect, their estimated coefficients are never statistically significant even at the 10% level. Hence, based on this evidence, we reject research hypothesis 1, 2 and 5.

4.3.2. Model 2 - Estimation of the *Logit* Model with Financial Information Reported Two Years Prior to the Event

This section replicates the results considering data from N-2. For this purpose, this paper uses a sample of 216 SRP companies and 167 non-SRP companies. Table 4.5 present the diagnostic tests. As can be seen, the chi-square of the model is highly significant (chi-square = 81,193; df = 6; p-value < 0,001) but the results for the Cox & Snell adjustment measure and the Nagelkerke R square are relatively low (19,1% and 25,6%, respectively). Yet, the p-value of the Hosmer-Lemeshow test is 0,067 ant the model generates Type I Error of 62,9% and a Type II Error of 3,20%, which leads to an overall accuracy rate of 70,8% (*i.e.*, the model correctly classifies 271 companies in the sample).

Table 4.5. Diagnostic Tests - Model 2

Omnibus Test				
		Chi-square	df	Sig.
Step 1	Step	81,193	6	<,001
	Block	81,193	6	<,001
	Model	81,193	6	<,001
Evaluation of general adjustment				
		-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
Step 1		443,471	,191	,256
Hosmer and Lemeshow Test				
		Chi-square	df	Sig.
Step 1		14,617	8	,067
Classification results				
			Predicted Dependent Variable	
	Observed		0	1	Percentage Correct
Step 1	Dependent Variable	0	62	105	37,1
		1	7	209	96,8
	Overall Percentage				70,8

Source: Own Elaboration

Table 4.6. now presents the estimated coefficients for this model:

Table 4.6. *Logit* Coefficients - Model 2

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ROA	-4,807	1,666	8,328	1	,004	,008
	SIZE	,007	,158	,002	1	,967	1,007
	WCTA	,283	,374	,570	1	,450	1,327
	CFS	5,560	1,166	22,755	1	<,001	259,877
	TDTA	,996	,459	4,708	1	,030	2,708
	GDP Growth	-,025	,051	,236	1	,627	,975
	Constant	-,580	1,142	,258	1	,611	,560

a. Variable(s) entered on step 1: ROA, SIZE, WCTA, CFS, TDTA, GDP Growth

Source: Own Elaboration

Profitability, liquidity and leverage are the only variables that have associated estimated coefficients that are statistically significant at normal levels. However, the profitability variable estimated coefficient have a opposite sign to that initially expected. In particular, ceteris paribus, an increase in profitability decreases the likelihood of the distressed firm filing for SRP. This provides further support for our previous conclusions (*i.e.*, for year N-1) and lead us to reject research hypothesis number 1, 2, 4 and 5 and not reject research hypothesis 3.

4.3.3. Model 3 - Estimation of the *Logit* Model with Financial Information Reported Three Years Prior to the Event

This section replicates the results considering data from N-3. For this purpose, this paper uses a sample of 197 SRP companies and 243 non-SRP companies. Table 4.7 present the diagnostic tests. As can be seen, the chi-square of the model is highly significant (chi-square = 91,741; df = 6; p-value < 0,001) but the results for the Cox & Snell adjustment measure and the Nagelkerke R square are relatively low (18,8% and 25,2%, respectively). Yet, the p-value of the Hosmer-Lemeshow test is 0,418 ant the model generates Type I Error of 31,3% and a Type II Error of 42,1%, which leads to an overall accuracy rate of 63,9% (*i.e.*, the model correctly classifies 281 companies in the sample).

Table 4.7. Diagnostic Tests - Model 3

Omnibus Test				
		Chi-square	df	Sig.
Step 1	Step	91,741	6	<,001
	Block	91,741	6	<,001
	Model	91,741	6	<,001

Evaluation of general adjustment			
	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
Step 1	513,411	,188	,252

Hosmer and Lemeshow Test			
	Chi-square	df	Sig.
Step 1	8,165	8	,418

Classification results				
			Predicted Dependent Variable	
	Observed		0	1	Percentage Correct
Step 1	Dependent Variable	0	167	76	68,7
		1	83	114	57,9
	Overall Percentage				63,9

Source: Own Elaboration

Table 4.8. *Logit* Coefficients - Model 3

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ROA	-8,634	1,827	22,342	1	<,001	,000
	SIZE	-,029	,141	,042	1	,837	,971
	WCTA	-,165	,363	,207	1	,649	,847
	CFS	7,027	1,183	35,258	1	<,001	1127,139
	TDTA	1,179	,550	4,593	1	,032	3,251
	GDP Growth	-,134	,042	10,221	1	,001	,875
	Constant	-,965	,974	,981	1	,322	,381

a. Variable(s) entered on step 1: ROA, SIZE, WCTA, CFS, TDTA, GDP Growth

Source: Own Elaboration

Results suggest that profitability, liquidity and leverage are the relevant predictors in our context as their estimated coefficients are statistically significant at normal levels. However, the estimated coefficient for the macroeconomic variable GDP Growth is statistically significant and negative, the opposite to that initially expected. Therefore, a

growing economy is less likely to lead financially distress companies into SRP proceedings. This provides further support for our previous conclusions (*i.e.*, for year N-2) and lead us to reject hypothesis 1, 2, 4 and 5 and not reject hypothesis 3.

4.4. Discussion

Table 4.9 summarizes the sign of the coefficients obtained in Model 1, Model 2 and Model 3:

Table 4.9. Explanatory Variables

Variables considered in the model	Category	Expected Sign	Sign (Model 1)	Sign (Model 2)	Sign (Model 3)
ROA	Profitability	+	n.s.	-	-
SIZE	Firm Size	+	n.s.	n.s.	n.s.
WCTA	Liquidity	+	n.s.	n.s.	n.s.
CFS	Liquidity	+	+	+	+
TDTA	Leverage	-	+	+	+
GDP Growth	Macroeconomic	+	n.s.	n.s.	-

Legend:

+	there is a positive relationship between the variable and the likelihood of enrolling in a Special Revitalization Process
-	there is a negative relationship between the variable and the likelihood of enrolling in a Special Revitalization Process
n.s.	not significant

Source: Own Elaboration

The information in Table 4.9 highlights the following:

- The CFS and TDTA ratios are statistically significant in all the models estimated in this study. The sign of CFS coefficient is in line with what was initially expected and, as a result, the evidence leads us not to reject hypothesis number three. The TDTA coefficient, however, has the opposite sign to that initially expected, leading us *to reject* research hypothesis number four. These results suggest that, ceteris paribus, the probability of a Portuguese company operating in the construction industry going into SRP increases when the cash-flow generated from sales and the total debt (over total assets) increases. The magnitude of the estimated coefficients for these variables is high and, as a result, a small variation in their value significantly affects the likelihood firms facing SRP, a result that holds irrespective of the particular year (*i.e.*, N-3, N-3 or N-1) one considers.

- In Model 2, the coefficient estimated for ROA is statistically significant (unlike what we document for Model 1) and negative. This does not confirm this work's initial expectations, suggesting that, all else being equal, the more return the sample companies get from their assets the less likely they are to go into SRP.
- Furthermore, in Model 3, the estimated coefficient for the macroeconomic variable GDP Growth is statistically significant and negative. Hence, ceteris paribus, a booming economy is less likely to lead financially distressed companies into SRP proceedings. This result is contrary to our initial expectations and, as such, this work rejects research hypothesis number five.

In light of the results, it is clear that financially distressed companies choose restructuring processes when their liquidity and leverage levels are high. The decision to engage the company in a restructuring process, specifically in SRP, is heavily swayed by the creditors, requiring the approval of at least 10% of the unsubordinated claims. From the creditors' perspective, a company with high levels of leverage, TDTA, is in a very troubling situation, as the debts may never be settled. However, taking into account that these companies also have high levels of liquidity, specifically CFS, it will allow to create wealth to pay off these debts. It is important to emphasize that during the process all debts are "frozen" so that the company has a chance to restructure. It seems straightforward that the company's high levels of profitability influences this decision, thus allowing to pay debts to creditors without applying for the SRP, validating the negative sign that this variable has in the tests carried out. Finally, GDP growth will influence any decision that a company makes, because in a recession, decisions are more cautious. In a booming economy, it is essential to take advantage of the opportunities to boost the company's results, showing that financially distressed companies will be capable of boosting their results and, in turn, settling their debts with their creditors without applying for the SRP, validating the negative sign that this variable has in the tests carried out.

CHAPTER 5. CONCLUSION

5.1. Key Findings

This study uses a sample 271 Portuguese companies (SRP sample) operating in the construction industry during the period 2011-2021 that engage in a restructuring process following a period of imminent insolvency. For the sake of comparison this work discriminates between companies that, following a period of an acute financial distress, engage in SRP from the others that file for bankruptcy without applying for a restructure. A sample 636 of Portuguese companies operating in the construction industry that filed for bankruptcy without applying for the SRP constitute the non-SRP sample of this study.

The work resorts to regression analysis using logit models, which consider as explanatory variables a combination of accounting ratios (proxying for profitability, size, liquidity and leverage) and macroeconomic indicators. Results suggest that accounting information is particularly relevant in distinguishing between SRP and non-SRP companies since 6 (out of 12) ratios are statistically significant at least in one of the estimations that this work carries out. On the other hand, this work's finds that the logit model is able to accuracy separate between the two groups of firms one year before the event (84,2% of overall accuracy) but it does not perform very well in years N-2 (70,8%) and, especially, N-3 (63.9%). Nonetheless, the empirical evidence collected in this work does allow identifying a set of characteristics that seem to be instrumental in defining whether a Portuguese company competing in the construction industry is more likely to resolve a situation of financial distress via an SRP or make use of some other legal instrument.

5.2. Limitations

This dissertation has some limitations that should be taken into account when analyzing and extrapolating results. For instance, accounting information may be manipulated, which could affect this work's findings. On the other hand, this study compares two groups of companies that are remarkably similar. As such, using the logit approach to separate between groups could be problematic. In addition, given that we are interested in highly distressed companies, several firms had to be eliminated during the sample's selection process because of poor (or inexistent) accounting data. Finally, this work was developed based solely on a handful of previous papers. In fact, although one can find many articles looking at bankrupt and non-bankrupt companies, there is a dearth of evidence when the focus is on distressed firms that choose to deal with such issue using different legal strategies.

5.3. Future Contributions

One of the possibilities for continuing this work is to test the ability of other bankruptcy prediction models in the industry, using, for example, the *Probit* and *Gompit* models. In addition to the variables studied (financial and macroeconomic), governance variables could be studied, such as board size, board independence, outside directors, audit committee size, audit committee meeting and audit quality, since these could improve the results obtained by the models, because these variables also affect the performance of the companies.

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