

Master Thesis U.S.E.

“How the choice between bank loan and bond issuance affects the resilience of companies during a crisis”

Student: Mattia Pilati (4434277)

University Supervisor: Dr. Stefano Lugo

University Co-Supervisor: Dr. Labrini Zarpala

Abstract

This thesis aims to examine whether the use of bank loans to finance business activities, as opposed to the issuance of bonds, confers greater resilience to companies during periods of economic crisis, specifically during the subprime mortgage crisis and the Covid-19 crisis. To analyze this relationship, a Difference-in-Differences (DID) model was used, applied to four distinct samples in order to give more robustness to the conclusions. Although a slight statistical significance was detected during the subprime mortgage crisis, the overall results were not sufficiently significant to support the research hypothesis, likely due to the limitations encountered, which made it difficult to completely isolate the "noise" surrounding the relationship between the method of financing and business resilience. Therefore, it cannot be asserted that the use of bank loans is correlated with greater resilience of companies during the economic crises examined.

JEL codes

Topic: G01: Financial Crisis, G21: Banks, H63: Debt

Method: C12: Hypothesis Testing

Key words: Debt Choice, Crisis, Financial Resilience and Banking.

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1. Introduction

Corporate finance plays a central role in economic dynamics, arousing great interest among scholars and experts in the field. One of the most crucial aspects within it is the decision relating to the capital structure, specifically the choice of the financing method to adopt to support the company's activities, as this decision not only influences a series of aspects internal to the company, such as resource allocation and strategic planning, but it can also significantly condition the company's response to periods of crisis and its resilience in such contexts. The two main sources of external financing for companies are bank loans and bonds, which differ in several respects, each of which has significant implications for company management and its ability to manage periods of economic crisis.

The research of this thesis aims to examine the relationship between a company's financing method and its resilience during a crisis, measured in terms of profitability. Specifically, it intends to explore whether the use of bank loans to finance its activities positively influences a company's profitability compared to the use of bond loans. In order to explain any reasons, the impacts that this choice brings to the internal management of the company and the behavior of the latter in the management of the collected resources were analyzed.

The central hypothesis of this research is that companies financed mainly through bank debt show greater financial resilience during crises. This greater resilience could be attributed to several factors. Firstly, as suggested by Ahn & Choi (2009), banks, through a monitoring activity, can promote a more efficient and profitable allocation of resources, positively influencing profitability during a crisis. Access to bank credit lines provides additional liquidity, mitigating the effects of falling revenues or increasing economic uncertainties (Sufi, 2009). Furthermore, bank debt can offer more flexible conditions compared to other forms of financing, allowing better control of payment obligations in times of crisis (Danis et al., 2014). And finally, the last element to consider is the role of the long-term relationship between companies and banks, which facilitate access to bank loans even in times of crisis, as highlighted by the studies of Petersen & Rajan (1994), in which companies that establish a stable and solid relationship with banks are more likely to obtain financing. Therefore, it is argued that reliance on bank debt can contribute to greater financial resilience during periods of crisis.

This provides a solid basis for the research, which specifically involves a comparison between two distinct groups of companies: on the one hand, those that finance themselves mainly through bank loans, and on the other, those that finance themselves more through the issuance of bonds. The main objective is to examine whether, during periods of external shocks such as an economic crisis, companies that finance themselves through bank loans demonstrate greater resilience compared to those that finance themselves with bonds. To measure resilience, we decided to use the EBITDA/Total Assets ratio, as it is an indicator of company profitability and shows how this has been impacted by external events.

The economic crises chosen for this analysis are the subprime debt crisis of 2008, which had a significant impact on the banking sector, and the crisis resulting from the COVID-19 pandemic in 2020, which more directly affected the real economy. The aim is to compare the results obtained in

these two different contexts to draw further conclusions. An economic crisis is a period characterized by a significant contraction in economic activity, often accompanied by a fall in GDP, an increase in unemployment, and a decrease in the value of financial assets (Reinhart & Rogoff, 2009). Crises can have a significant impact on company profitability, as they can reduce demand for goods and services, increase production costs and limit access to credit (Ivashina & Scharfstein, 2010). The subprime debt crisis of 2008 was triggered by problems in the financial sector, particularly related to the subprime mortgage market in the United States (Mian & Sufi, 2009), while the COVID-19 crisis was caused by an external event that led to a blockage of economic activities on a global scale (Baker et al., 2020). Therefore, the nature and effects of these two crises are different, and the comparison of the results obtained can provide new insights into corporate financing strategies in response to external shocks of different kinds.

The methodology adopted provides for a differences-in-differences (DiD) model to evaluate the impact of the crisis on corporate profitability, this model represents an econometric tool that allows measuring the effect of a specific intervention or a change in conditions, in this case, the impact of economic crises on company performance. The application of the DiD model to two crises of different nature provides an opportunity to observe and compare how different types of crises influence financing choices and corporate performance. For the implementation of the model, I have defined two distinct groups of companies, in particular, the treatment group (Loan), which includes companies that have financed themselves mainly through bank loans, and the control group (Bond), which includes companies that have financed themselves mainly through the issuance of bonds. I then defined the two periods, specifically, the pre-treatment period, i.e., the year immediately preceding the start of each crisis, which allows to observe the basic financial conditions of the companies before the onset of the crises. And the post-treatment period, i.e., the period that includes the years during and immediately following each crisis, which allows to observe variations in the financial resilience of companies in response to the crises. Through this methodology, it is possible to quantify the effects of crises on corporate performance, and in particular, to examine whether and how financing choices may have influenced the resilience of companies in the face of such economic shocks.

Although the initial hypothesis suggested a possible correlation between bank financing and corporate resilience, the results have shown a more complex situation than expected. In particular, during the subprime mortgage crisis, a slight statistical significance emerged that seemed to suggest an advantage for companies that had relied on bank loans. However, during the Covid-19 crisis, this correlation was not highlighted. Probably, the limitations occurred in the research made it difficult to completely isolate the "noise" around the relationship between the financing method and corporate resilience, leading to unclear and definitive results. This guides us towards a broader understanding of our research problem and lays the groundwork for further, more in-depth investigations.

The thesis is structured as follows: Section 2 presents a detailed analysis of the existing literature, with particular attention to the key factors that influence the company's choice of debt and the impacts that this choice has on them. Subsequently, Section 3 is dedicated to describing the data and the research model used to conduct the study. We proceed with Section 4, where the results emerged from the analysis are illustrated and discussed. Finally, Section 5 contains the final conclusions, highlighting the implications of the results obtained and outlining possible paths for future research.

2. Literature Review

For a more articulated and understandable presentation of the literature, this section is structured into three subsections. In Section 2.1, the main determinants of the choice between bank debt and bonds by companies are presented, followed by Section 2.2, which discusses how this choice impacts the company, and finally, Section 2.3 presents the research hypothesis formulated based on the existing literature.

2.1 Debt Choice Determinants

The choice between bonds and bank loans is influenced by a series of factors that can be grouped into two main categories: firm characteristics (endogenous determinants) and market conditions (exogenous determinants).

2.1.1 Firm Characteristics and Endogenous Determinants

Internal characteristics of companies, such as the size of the firm, the duration of the debt required, the industrial structure, and the business strategy, play a crucial role in the choice between bank debt and bonds.

One of the main endogenous determinants of the choice between bank and bond debt is a company's credit reputation. Companies with a solid credit reputation tend to have access to more favorable loan conditions on the bond market, while those with a less established credit reputation may find bank debt more advantageous (Diamond, 1991). On the other hand, companies with a longer credit reputation with banks tend to benefit more from continuing to finance through loans, as they allow them larger loans and less collateral (Bharath et al., 2007). Another factor to consider is the size of the company, which represents one of the main determinants. Larger companies, thanks to their better access to capital markets and their ability to dilute the fixed costs associated with issuing bonds, are more inclined to issue bonds than smaller ones (Denis & Mihov, 2003). Moreover, larger companies generally have greater visibility and reputation, which can facilitate access to the bond market (Diamond, 1991). The decision regarding the type of debt to adopt can be strongly influenced by the expected duration of the financing. According to the research by Nguyen & Wald (2022), companies that need long-term financing tend to prefer issuing bonds, which allow them to raise larger sums of money compared to bank loans and at a generally lower interest rate. This element favors greater clarity in planning long-term investments, although it can involve greater complexity and initial costs for the issuance of the bond. Conversely, when the required financing is short-term, companies seem to favor bank loans, which are quicker and less costly to obtain compared to issuing bonds. Typically, smaller companies that require more resources for short-term investments tend to rely on the banking sector. Furthermore, the industrial structure and business strategy can influence the choice of debt. Companies in capital-intensive sectors or with a high degree of asset tangibility tend to prefer bank

debt, which is often secured by real assets (Rajan & Zingales, 1995). In contrast, firms in high-growth sectors or with a strategy oriented towards innovation may prefer the issuance of bonds.

2.1.2 Market Conditions and Exogenous Determinants

One of the main exogenous determinants of the choice of debt type is the general economic environment, where in periods of economic stability, companies might be more inclined to issue bonds, as the favorable economic environment can increase investor confidence and facilitate access to capital markets (Becker & Ivashina, 2014). On the other hand, in periods of economic instability or uncertainty, companies might prefer bank loans, which can offer more flexible loan conditions and can be more easily negotiable. Another significant exogenous factor is interest rates, when they are low, companies might be incentivized to issue bonds to finance their investments, as financing costs are relatively lower. Conversely, when they are high, companies might be deterred from issuing bonds and might prefer bank loans, which could offer more favorable interest rates. Lastly, the prevailing conditions in the credit market can significantly influence the choice between bank debt and bonds. When the credit market is tight and access to loans is complex, companies might feel compelled to turn to the bond market to finance their capital needs. This trend is supported by studies such as that of Ivashina & Scharfstein (2010), which highlights how stringent credit market conditions can push firms towards bond issuance. On the contrary, if the credit market is liquid and access to loans is easy, companies might preferentially lean towards bank loans. This choice can be motivated by various factors, including the possibility of obtaining financing in quicker times compared to bond issuance, and a lower burden in terms of disclosure requirements and reporting associated with bank debt compared to bond debt.

2.1.3 Limitations and Constraints in the Choice of Debt Type

The choice between bank debt and bonds can also be influenced by a series of constraints and limitations that operate at the level of the individual company or the economic system in which it operates.

One of the main constraints is access to capital markets. Not all companies have the necessary size or reputation to successfully access the bond market. In a study by Denis & Mihov (2003), it is highlighted how small and medium-sized companies, which may not have the visibility or credibility sufficient to attract a broad pool of investors, tend to rely on bank loans. At the same time, larger and more established companies can leverage their reputation to obtain more favorable conditions through bond issuance. In addition, transaction costs and information costs can represent another significant factor in the choice of debt type. Issuing bonds often involves higher transaction costs than bank loans, such as underwriting costs and those related to the dissemination of information necessary for investors (Diamond, 1991). These costs can be particularly burdensome for smaller companies, making bank loans a more economical choice. Finally, companies can face significant information costs when trying to access the bond market. The need to disclose detailed information about their

financial situation may deter some firms from issuing bonds, particularly if they believe that such information could be used by the competition to their disadvantage (Myers & Majluf, 1984).

In conclusion, the choice between bank debt and bonds depends on a series of factors that include the individual characteristics of the company, market conditions, and a series of limitations and constraints. These factors interact with each other in complex ways and can lead to different debt choices depending on the specific circumstances of the company.

2.2 Impact of Financing Choice on the Company

The choice of debt financing methods can have a significant impact on many internal dynamics of a company. Decisions related to capital structure can affect not only short-term financial health, but also its competitive position and its ability to create value in the long term. In this section, we address the main factors that impact the company, from its performance to the impact of bank monitoring on it, and how this choice can influence resilience in times of economic crisis.

2.2.1 Impact on the Company's Valuation and Financial Performance

At a market valuation level, there are studies showing how the decision on the type of debt chosen can impact the performance of companies on financial markets, as the approval of a bank loan can be seen as a signal of the bank's trust in the company's solvency and future prospects (Billett et al., 1995). On the other hand, the issuance of bonds can be interpreted as a signal of the company's financial stability, and consequently, it can increase the company's market value, as suggested by the study by Hong (2016). The choice of the type of debt can also significantly influence the financial performance of companies, as highlighted by several academic studies. Specifically, the study conducted by Davydov (2009), companies that primarily rely on the bond market tend to have a higher leverage ratio. This ratio indicates the proportion of debt to equity used to finance the company's activities, a higher leverage ratio can be associated with higher *ROE (Return on Equity)* and *ROA (Return on Assets)*. This suggests that companies that effectively use bond debt can generate higher returns on investments and exploit growth opportunities. On the other hand, bank debt can offer greater financial flexibility to companies, as highlighted by the study by Danis et al. (2014). Companies that have a higher level of bank debt can enjoy greater flexibility in financial decisions. For example, when they sell assets, they can reinvest the proceeds more freely and appropriately, without having to follow specific restrictions or obligations as bond debt may require. This flexibility can help improve the overall operational performance of the company and, consequently, financial results. In summary, the choice of the type of debt can have a significant impact on the financial performance of companies. While bond debt may be associated with a higher leverage ratio, bank debt can offer greater financial flexibility and favor a more agile management of resources.

2.2.2 How Banking Monitoring Affect the Company

Bank monitoring has been widely recognized as a key factor in optimizing corporate performance. The literature on the subject is vast, and several studies have analyzed the role of bank monitoring in different contexts.

In particular, bank monitoring encourages companies to allocate acquired resources more efficiently, positively impacting the company's value, improving its efficiency in capital allocation, making them more profitable and solid. Generally, companies with bank monitoring are more likely to adopt profitable investment policies and to reduce unnecessary expenses (Ahn & Choi, 2009), as the bank has an interest in protecting its loan and reducing the company's risk of failure, improving financial stability and its credit reputation. In conclusion, the study results suggest that bank monitoring can be an effective alternative to the corporate governance mechanism to improve the value of debtor companies.

As highlighted by Petersen & Rajan (1994), stable and lasting relationships between banks and small businesses can lead to lower interest rates on loans. This happens thanks to the reduction of information asymmetry between the parties, an effect that increases the efficiency of capital allocation. Information asymmetry occurs when companies have access to more detailed information on their performance and future prospects than external investors. In these circumstances, investors may not be able to adequately assess the value of proposed investment projects, which can lead to suboptimal investment decisions. However, banks, through their monitoring, can gain a deeper understanding of the company's conditions and prospects, thus reducing information asymmetry and improving the efficiency of capital allocation.

Another fundamental aspect of bank monitoring is its ability to discourage opportunistic behavior by companies. Banks, thanks to their ability to collect and analyze information about companies, can prevent opportunistic behaviors that could jeopardize the company's solvency. This ensures that the company's resources are used in a way that maximizes its long-term value. Further, bank monitoring is not limited to discouraging opportunistic behavior and reducing information asymmetry, but banks can also provide valuable feedback to companies on their performance and strategy. This feedback can help companies identify and correct errors in their investment decisions, thus improving the efficiency of resource allocation (Ahn & Choi, 2009).

The importance of loan relationships in facilitating bank monitoring was also highlighted by Drucker & Puri (2009), who observed that banks that have established long-term loan relationships with companies are able to monitor their activities more effectively. This allows them to offer more favorable loan conditions, thus improving the financial performance of companies.

In conclusion, the literature highlights the crucial role of bank monitoring in promoting business efficiency. Companies that benefit from effective monitoring tend to manage resources more efficiently, adopting more profitable investment policies and reducing unnecessary expenses. Furthermore, bank monitoring contributes to improving the company's financial stability and protecting its credit reputation. However, it is important to note that the effectiveness of bank

monitoring can vary depending on a number of factors, including the quality of the relationship between the bank and the company, the competence and resources of the bank, and the specific conditions of the market and sector in which the company operates.

2.2.3 Financial Resilience: How Debt Choice Affects a Company's Ability to Deal with Economic Crises

A company's financial resilience, or its ability to withstand and recover from financial shocks or economic crises, can be significantly influenced by the choice between bonds and bank loans. Economic literature indirectly tends to support that companies that opt for financing through bank loans may display greater resilience during periods of crisis. This resilience can be attributed to several key factors. Firstly, the established relationship with banks provides companies with significant financial flexibility. Banks are known to provide lines of credit that can serve as a liquidity reserve during periods of financial stress (Sufi, 2009). These credit lines can be vital for companies' survival during crises, allowing them to access funds quickly when other sources of financing may be less available. As a result, access to these credit lines can enhance companies' financial resilience during periods of economic turmoil. In addition, the close relationship with banks allows for effective monitoring of the company by the credit institution, such monitoring can lead to better resource allocation and more informed investment decisions (Ahn & Choi, 2009), thus helping to improve financial performance and company resilience during crises. On the other hand, companies that issue bonds may find themselves in a more precarious position during financial crises, as the structure of bond debts is generally more rigid compared to bank loans, making debt restructuring more challenging in case of financial difficulties, moreover, market conditions can influence the availability and costs of financing through bonds (Becker & Ivashina, 2014).

In summary, the choice of debt type can have a significant impact on a company's financial resilience. Empirical evidence suggests that companies with a higher level of bank debt may be more resilient during economic crises, thanks to the greater flexibility offered by bank loans, closer bank monitoring, and the availability of credit lines that can provide vital liquidity in times of crisis.

2.2.4 Risks and Costs Associated with Debt Choice

The decision between the use of bank loans or bonds involves an evaluation of several risks and costs, as highlighted by various academic studies.

Starting with bank loans, insolvency represents one of the major risks; covenant clauses in loan contracts can lead to an early recall of funding in case of non-compliance, thus increasing the risk of insolvency. Another fundamental risk is related to liquidity, Sufi (2009) emphasizes that, in case banks decide not to renew a loan or a credit line, the company's liquidity could be compromised. Lastly, a variable-rate loan exposes the company to the risk of a rise in interest rates, which would increase the costs for debt service. On the other hand, the issuance of bonds is not without risks. Insolvency is a danger for companies that decide to issue bonds, particularly if the company struggles to generate sufficient cash flows to meet the commitments related to the payment of interest and

capital. The liquidity risk is closely related to the company's ability to repay the bonds at their maturity; if the company were not able to obtain sufficient liquidity, it could find itself forced to refinance the debt, an operation that could prove difficult or costly in periods of market crisis (Becker & Ivashina, 2014). Companies that issue fixed-rate bonds expose themselves to the risk of a decrease in interest rates, which would increase the opportunity cost of debt, while in the case of variable-rate bonds, a rise in interest rates could lead to an increase in the cost of debt. In conclusion, the decision regarding the type of debt to use must be made considering a series of factors, including the company's risk tolerance, its ability to generate stable cash flows, the quality of relations with banks and investors, and the general conditions of the financial market.

As for costs, both through bank loans and bonds, companies have to face a series of costs that can influence the choice between these two instruments. Bank loans involve a series of costs including transaction costs, which include expenses related to the management of the loan application and the processing of the loan itself. Interest costs, or the most direct and immediate costs of a loan, the interest rate is determined by the bank based on various factors, including the credit risk of the company and market conditions (Berg et al., 2016). On the other hand, bonds also involve a series of costs, including underwriting costs, which are costs associated with the bond issuance process and are often paid to an investment bank. Rating costs, as in order to sell bonds, a company must obtain a credit rating from a rating agency. Interest costs, as with bank loans, companies that issue bonds also have to pay interest on the amounts they have borrowed. Finally, call provision costs: some bonds include early redemption clauses, or "call provisions", which can entail additional costs for the issuer. In both cases, another consideration is the risk and potential cost of financial failure, which could lead to further legal and reputational burdens, to conclude, the choice between bank loans and bonds can be strongly influenced by the relative weight of these costs in different contexts.

2.3 Hypothesis Formulation

The research hypothesis postulates that companies that predominantly resort to bank debt may exhibit greater financial resilience during periods of crisis. This hypothesis is based on various mechanisms that, according to the existing literature, link bank debt to increased resilience.

Firstly, bank monitoring can improve resource allocation within the company. As suggested by Ahn & Choi, 2009, banks, through monitoring activity, can influence companies' resource allocation decisions, as banks, having an in-depth knowledge of companies' operations and their market prospects, can prevent opportunistic behavior on the part of companies (Diamond, 1984), and guide a more efficient and profitable allocation of resources raised as debt, playing a role of control and supervision over companies' resource allocation decisions, ensuring that they are based on efficiency and profitability criteria. In addition to discouraging opportunistic behavior and reducing information asymmetry between companies and creditors, banks can also provide valuable feedback to companies on their performance and strategy. Through reports and periodic assessments, banks can help companies identify strengths and weaknesses in their way of operating, identify errors in investment decisions, and suggest possible improvements (Ahn & Choi, 2009). This type of feedback can be

extremely valuable for companies, as it allows them to make corrections and adopt a more effective strategy in resource allocation.

Furthermore, bank debt can provide companies with preferential access to credit lines. As indicated by Sufi (2009), credit lines can provide an additional source of liquidity during financial crises, allowing companies to manage periods of reduced revenues or increased economic uncertainty. Credit lines can be used to cover operating expenses, pay suppliers, maintain continuity of operations, and finance strategic growth opportunities. Bank debt also offers a degree of flexibility that can be particularly advantageous during periods of crisis. The terms of bank loans can be negotiated and customized to the specific needs of the company, offering flexibility in debt repayment, adapting contractual conditions to the financial situation of the company, and offering the possibility of debt modifications or restructurings in case of financial difficulties (Danis et al., 2014).

A final key element in support of our research hypothesis is the role of the long-term relationship between companies and banks in facilitating access to bank loans even in times of crisis. Studies, including those conducted by Petersen & Rajan (1994), have highlighted that companies that establish a stable and solid relationship with banks are more likely to obtain financing. A long-term relationship allows banks to acquire in-depth knowledge of companies, including their activities, risks, and prospects. This allows banks to more accurately assess the company's ability to repay debt and evaluate proposed investment projects. Furthermore, the long-term relationship reduces information asymmetry between the company and the bank, increasing confidence in granting loans. Companies that have a solid relationship with banks can benefit from more favorable loan conditions, such as lower interest rates, reduced fees, and longer repayment periods. In addition, they are more likely to obtain new financing when they need it, as banks are more willing to offer additional financial support. In summary, building a strong, long-term relationship with banks facilitates access to bank loans, thanks to in-depth knowledge of the company, reduced information asymmetry, more favorable loan conditions, and access to new financing.

In summary, our research hypothesis is that companies that primarily resort to bank debt are able to show greater financial resilience during periods of crisis, thanks to bank monitoring, which allows for greater efficiency in resource allocation, preferential access to credit lines, flexibility in financing conditions, and established relationships with banks.

3. Data and Methodology

3.1 Data Description

The data collection for this research was conducted using FactSet, a consolidated financial data platform, to obtain accurate and up-to-date information over various periods of time. Companies were selected from a broad sample of all publicly traded and active companies in the United States of

America. Specifically, we can divide the data collection into four different samples, each used for a specific purpose of analysis.

For the first regression analysis, a highly specific sample was constructed through a multi-stage selection process from all companies listed on the U.S. stock market, active during the 2019-2022 period. The first selection criterion is that companies must have the majority of their data available on FactSet for the variables considered. Then, further filtering was done to select only those companies that had the United States as their core geographical business. This ensured that the selected companies were equally influenced by the internal economic conditions of the United States, making the analysis more homogeneous in relation to economic crises. The final stage of the selection process led to the formation of 40 pairs of twin companies, each pair composed of two companies similar in terms of operating sector and market capitalization, with one primarily financed through bank loans (loan group) and the other through bond issues (bond group). This criterion was met using the "Sector" indicator from FactSet for the sector and market capitalization as a measure of the company's size. This led to the selection of a total of 80 companies operating in 15 different sectors. For the second analysis, a broader sample of companies was created, including 412 companies, maintaining the same reference period 2019-2022. Companies were selected based on the availability of sufficient data for all control variables, seeking the right balance between the number of companies and the number of control variables. This sample allowed us to perform a robustness check on our first analysis, as, compared to the first sample, more companies and more control variables were taken into account. The third sample was built by collecting data from 307 companies during the 2006-2009 period, with the aim of creating a sufficiently large sample of companies that had a wide range of data available for the control variables, in order to allow a comparison between two crises of different nature. Finally, the last sample, composed of 392 companies, takes the temporal reference the period 2013-2016, as this period boasts relative economic stability, and this allows the implementation of the "placebo test", which gives greater robustness to the research results. In general, each dataset has its own role and reflects the evolution of market dynamics during a specific time period.

3.2 Variables

The research is structured by examining a series of fundamental variables:

EBITDA/Total Assets

The chosen indicator to measure a company's resilience during a crisis is *EBITDA/Total Assets*, as it represents the company's profitability or its ability to transform investments in tangible and intangible assets into actual operating income. In the research, it is used as the dependent variable, representing the measure of a company's success in navigating the turbulent economic environment generated by a crisis.

The choice of *EBITDA/Total Assets* is not arbitrary and is based on several reasons. Firstly, *EBITDA* (Earnings Before Interest, Taxes, Depreciation, and Amortization) is a measure of a company's operating profitability that excludes non-operating and non-cash expenses such as depreciation and

financial expenses, making it a purer measure of a company's operating income or net profit. Dividing it by *Total Assets* serves to normalize *EBITDA*, making the ratio more comparable across companies of different sizes. Total assets include all tangible and intangible assets owned by the company and represent the total investments that a company has made to support its operations. The *EBITDA/Total Assets ratio*, therefore, reflects how effectively a company can generate operating returns from its investments. In the research, the *EBITDA/Total Assets ratio* represents the resilience of a company during a crisis. A company is considered resilient if it can maintain or even improve its operating productivity - as indicated by a stable or increasing *EBITDA/Total Assets ratio* - despite adverse economic conditions. Therefore, an increase in the *EBITDA/Total Assets ratio* suggests greater resilience, while a decrease indicates lower resilience (Altman et al., 2017). The calculation of the *EBITDA/Total Assets ratio* is straightforward. For each year, a company's *EBITDA* is divided by the total assets at the end of the year. This provides a single measure of operating productivity for each year, which can then be tracked over time to assess the company's resilience during the crisis.

Loan and Bond

The independent variable of our research focuses on the financing method chosen by companies, specifically bank debt and bond debt. The determination of the group (Loan or Bond) for each company was calculated as follows: if the ratio of a company's *Total Bank Debt to the sum of its Total Bank Debt and Total Bond Debt exceeded 70%*, the company was labeled as belonging to the Loan group. Similarly, if the ratio of *Total Bond Debt to the sum of Total Bank Debt and Total Bond Debt exceeded 70%*, the company was classified as belonging to the Bond group. Furthermore, a dummy value was assigned to each company based on its category: *1* for Loan group companies and *0* for Bond group companies.

In this procedure, it is important to note a significant limitation. FactSet, the reference database, does not provide a total value of bank debt that includes, for example, lines of credit. As a result, a proxy had to be used to calculate *Total Bank Debt*. Specifically, the *Total Long-Term Debt* of the company was subtracted from the *Total Debt*, assuming that any long-term debt not represented by bonds corresponds to bank debt.

These independent variables - *Loan and Bond* - represent the main axis of the analysis, as they allow for the evaluation of the performance of Loan group companies compared to Bond group companies during a crisis, examining the impact of the choice of financing method on corporate resilience.

Control Variables

To ensure the accuracy and robustness of the research model, a series of control variables were integrated. These variables help mitigate any distortions and consider other significant aspects that may influence a company's resilience during a crisis. Each of these variables represents a fundamental aspect in understanding corporate performance and provides additional contextual information in the analysis of corporate resilience. Specifically:

- *Capital Expend CF/Total Assets*: This indicator represents the amount of capital invested relative to total assets over a given period of time. It provides significant insight into the extent of

investment a company is making compared to its overall resources, offering a glimpse into its future growth strategy. Companies with high levels of capital expenditure relative to total assets may be more inclined to navigate through crisis periods, having invested a significant portion of their total resources in long-term assets (Campello et al., 2010).

- *Current Ratio*: This parameter expresses a company's short-term financial solvency, namely its ability to repay short-term debts using current assets. A high Current Ratio is interpreted as an indication of greater short-term solvency of the company. It suggests that the company has higher financial strength and greater ability to meet its immediate obligations, thus highlighting stronger financial resilience. As suggested by Altman (1968), companies with a high Current Ratio tend to have greater resistance during economic crises, as they are better equipped to handle any financial contingencies. To calculate the Current Ratio, the formula of current assets divided by current liabilities is used. This measure reflects the ability of a company to maintain short-term liquidity, which is essential to ensure its operational continuity in times of economic uncertainty.
- *Asset Turnover Ratio (Net Sales/Total Assets)*: This indicator measures the efficiency with which a company utilizes its assets to generate sales. Specifically, it indicates how many times a company generates sales equal to the value of its total assets over a given period. A high ratio suggests that the company is able to generate a significant volume of sales for each unit of asset, indicating high operational efficiency. During crises, a high Asset Turnover Ratio can be seen as a factor of resilience, as it demonstrates that the company is capable of maintaining a high level of operational efficiency and competitiveness, generating significant sales despite economic challenges (Richards & Laughlin, 1980). Therefore, it may signal greater resilience in economically unfavorable contexts.
- *Total Debt/Equity*: This ratio indicates the level of indebtedness of a company relative to its equity. It is a fundamental indicator of the company's financial structure and financing strategy. A high value of this ratio may indicate that a company is heavily debt-financed, which could make it more vulnerable during crisis periods as companies with high levels of debt may have less financial flexibility and a higher risk of insolvency. On the other hand, a lower debt/equity ratio can indicate greater solvency and lower dependence on debt, which may be considered signs of greater financial resilience (Frank & Goyal, 2009).
- *Sector*: Represents the industrial or market sector in which a company operates. This variable was selected as a control variable based on the "Sector" indicator provided by FactSet. The reason for choosing the sector as a control variable lies in the fact that economic conditions and performances vary significantly across different sectors. Some industries may be more resilient to certain types of economic or financial crises, while others may be more vulnerable. Additionally, growth strategies, levels of competition, business models, and regulations can differ significantly across sectors, influencing the financial and operational decisions of companies (Fama & French, 1997). Therefore, considering the sector as a control variable allows us to account for these potential inter-sector differences during the analysis.
- *Dividend Yield*: This indicator represents the dividend yield generated per unit of investment in the company. Dividend Yield was chosen as a variable of study because it can provide insights into the stability or maturity of a company. Indeed, a company that can generate consistent profits to distribute dividends to its shareholders is perceived as a stable and mature economic entity. As suggested by DeAngelo et al. (2006), a high Dividend Yield could indicate greater resilience in crisis periods. This is because companies that can maintain or even increase dividends during such periods are often those with solid fundamentals and good risk management. Therefore,

analyzing Dividend Yield provides a glimpse into a company's ability to generate value for shareholders and its likely resilience to economic challenges.

- *Market Value*: Represents the market capitalization of the company, i.e., the total value of its outstanding shares. For this research, the natural logarithm of the market value ($\ln(\text{Market Value})$) was used, a common practice in empirical studies that helps reduce the impact of extreme fluctuations and makes the data distribution more manageable. A high market value can reflect how the market perceives the financial health and future prospects of a company. In particular, a high market value may indicate a company with a solid reputation and strong investor confidence, potentially making it more resilient during crisis periods (Damodaran, 2009).

3.3 Analysis Method

The research employs the *difference-in-difference (DiD)* method to analyze the financial resilience of companies during an economic crisis in relation to their main financing method (*Loan or Bond*). This methodology allows estimating the causal effect of an intervention or "*treatment*" on a group of observations, considering the temporal evolution (Almeida et al., 2011). This method is based on the idea of comparing the change over time between two groups of observations: one that received a certain "*treatment*" (treatment group) and another that did not receive it (control group). In my specific case:

- *Treatment Group (Loan)*: Includes companies that primarily financed themselves through loans ($\text{Total Bank Debt} / \text{Total Bank Debt} + \text{Total Notes Bonds} > 70\%$).
- *Control Group (Bond)*: Includes companies that primarily financed themselves through bond issuance ($\text{Total Notes Bonds} / \text{Total Bank Debt} + \text{Total Notes Bonds} > 70\%$).
- *Pre-Treatment Period*: This is the year immediately before the onset of the crisis, which allows to observe the basic financial conditions of companies before the crisis occurred.
- *Post-Treatment Period*: This period includes the years during and after the crisis, allowing to observe changes in the financial resilience of companies during and after the crisis.

The choice of the *DiD* method is particularly suitable for this study, given the sudden and unexpected nature of the crisis. We can reasonably consider it as an external event or "shock" that has affected all companies regardless of their financing choice. This allows to interpret the differences in financial resilience between the treatment and control groups as effects caused by the financing method choice. The estimated treatment effect represents the expected difference in the outcome of interest between the treatment and control groups attributable to the intervention, where a statistically significant treatment effect suggests that the intervention had a relevant effect on the outcome of interest. It is important to emphasize that the *DiD* model relies on three fundamental assumptions (Bertrand et al., 2004), each of which plays a crucial role in ensuring the validity and robustness of the obtained results, specifically:

- *Parallel Trends Assumption*: According to this assumption, in the absence of the intervention in question, the treatment and control groups would have followed the same temporal trends. If the

trends were different, the estimation of the intervention effect would be distorted as it would reflect both the impact of the intervention and the difference in temporal trends. The parallel trends assumption can be tested by examining the pre-intervention trends in the treatment and control groups.

- *No Composition Change Assumption*: This assumption suggests that the composition of the treatment and control groups should not change during the study period. If there were substantial changes in the composition of either group, the estimates of the intervention effect could be distorted. This is because such changes in the group composition could reflect variations in the outcome of interest independent of the intervention.
- *Independence of Errors Assumption*: Finally, this assumption assumes that the errors in the observations are independent of each other. In practice, this means that the error associated with a particular observation should not influence or be influenced by the error of another observation. If the errors were correlated, the standard estimates could be distorted, leading to misleading conclusions about the statistical significance of the results.

These assumptions form the core of the *DiD* model, and their validity needs to be carefully considered when interpreting the results of a *DiD* analysis (Bertrand et al., 2004).

Specifically, my research focuses on examining corporate resilience over three different periods:

I) During the Covid-19 crisis, conducting an analysis on two distinct samples of companies to analyze financial resilience during this period of turbulence caused by dynamics related to the real economy. In particular, I implemented an analysis method structured into three different regressions, each comparing the year prior to the crisis with one of the years following the crisis:

- *2019 vs 2020*: This analysis allows observing the immediate impact of the crisis on the financial resilience of companies, comparing the period immediately before the crisis with the first year of the crisis.
- *2019 vs 2021*: With this analysis, we can observe how companies have adapted to the crisis over time, examining changes in financial resilience one year after the onset of the crisis.
- *2019 vs 2022*: This final analysis provides a longer-term perspective, allowing the study of the implications of the crisis on the financial resilience of companies two years after its onset.

During the examined period, I conducted two distinct analyses to evaluate the financial resilience of companies during the Covid-19 crisis. The first analysis was performed on a sample of "matched companies" consisting of 80 companies selected for their similarity in terms of market capitalization and sector of operation. In this phase, control variables such as *Capital Expend CF/Total Assets*, *Current Ratio*, *Asset Turnover Ratio*, *Total Debt/Equity*, and *Sector* were considered. Subsequently, I expanded the analysis by including a larger sample of 412 companies and introducing additional control variables such as *Dividend Yield* and *Market Value*. This extended analysis approach allowed me to compare the results obtained from the "matched companies" sample with those obtained from the larger and more diversified sample, increasing the robustness and generalizability of the results. The conducted *Robustness Check* was fundamental to confirm that the trends and relationships identified in the initial analysis were also present in a broader context, ensuring the solidity and reliability of the conclusions. In this way, I could ensure that the research results were based on solid

evidence and not influenced by randomness or peculiarities of the statistical model used (Woodbridge, 2015).

2) During the Subprime mortgage crisis, I examined a sample of 307 companies with the aim of understanding how the financial resilience of companies may have been influenced by a banking-related shock. To achieve this goal, I organized the analysis by conducting three different regressions, each comparing the year before the crisis with one of the subsequent years. This approach allowed to track the evolution of financial resilience over time.

- 2006 vs 2007 (*observation of the immediate impact after the crisis*)
- 2006 vs 2008 (*observation of the impact one year after the crisis*)
- 2006 vs 2009 (*observation of the impact two years after the crisis*)

The analysis within the Subprime crisis played a crucial role in the context of the entire research as it differs substantially in nature from the Covid-19 crisis, and comparing the data collected in these two periods offered the opportunity to evaluate if the type of crisis could further impact the obtained results. This comparison between two different crises enriched the understanding of the effect of economic crises on the dynamics of financial resilience of companies. Additionally, the ability to compare two crises separated in time strengthened the validity of the analysis approach, allowing to verify the presence of similarities or differences in the results between the two crises, thereby confirming or questioning the findings and further strengthening the conclusions reached. Consequently, the comparative approach not only expanded the scope of the investigation but also increased the credibility of the model, demonstrating the adaptability and relevance of the analytical tools used in different crisis situations.

3) Hypothetical crisis, during a period of economic stability between 2013 and 2016, 392 companies were analyzed to assess their financial resilience, assuming an economic crisis in 2014. During this time frame, a "*Placebo Test*" was conducted, which is widely used in economics to test the robustness of results and eliminate alternative explanations for the observed results (Card & Krueger, 1994).

- 2013 vs 2014 (*observation of the immediate impact after the hypothetical crisis*)
- 2013 vs 2015 (*observation of the impact one year after the hypothetical crisis*)
- 2013 vs 2016 (*observation of the impact two years after the hypothetical crisis*)

During this "*Placebo Test*" phase, the pre-crisis year was compared to each of the subsequent years (2014, 2015, and 2016). This allowed measuring the financial resilience of companies as if an actual crisis had occurred, even though there was none. The results obtained during the "*Placebo Test*" represent what we would expect to see under normal conditions, without the external stress of an economic crisis. By comparing these results with those obtained during actual crisis periods, it is possible to better isolate the effect of crises on the financial resilience of companies. This test plays a key role in the validity of the analysis model because if the results during the "*Placebo Test*" show similar variations to those observed during the crisis periods, it may suggest that the conclusions could be influenced by factors unrelated to the crises. Conversely, if the "*Placebo Test*" results are significantly different from those of the crisis periods, it reinforces the assertion that crises have a significant impact on the financial resilience of companies. Therefore, the "*Placebo Test*" contributes

to ensuring that the conclusions are not the result of specific economic circumstances or randomness but instead reflect broader and generalizable trends.

Overall, each regression provided distinct results that contributed to painting a comprehensive picture of the effect of financing method choice on the financial resilience of companies during and after a crisis, thus capturing the evolution of corporate dynamics throughout the crisis. In summary, the *DiD* analysis method provides a robust framework for examining the effect of financing method choice on the financial resilience of companies during an economic crisis, allowing for the isolation of the causal effect of this choice and controlling for other factors that may influence financial resilience.

3.4 Regression Formula

Two different regression formulas were used, with the second one including two additional control variables.

- Regression formula implemented in the analysis of the "matched companies" sample during the period 2019-2022:

$$Y = \alpha + \beta_1(\text{Treatment}) + \beta_2(\text{Post}) + \beta_3(\text{Treatment} * \text{Post}) + \beta_4(\text{CapitalExpendCF/TotalAssets}) + \beta_5(\text{CurrentRatio}) + \beta_6(\text{NetSales/TotalAssets}) + \beta_7(\text{TotalDebt/Equity}) + \beta_8(\text{Sector}) + \varepsilon$$

- Regression formula implemented in the other analyses:

$$Y = \alpha + \beta_1(\text{Treatment}) + \beta_2(\text{Post}) + \beta_3(\text{Treatment} * \text{Post}) + \beta_4(\text{CapitalExpendCF/TotalAssets}) + \beta_5(\text{CurrentRatio}) + \beta_6(\text{NetSales/TotalAssets}) + \beta_7(\text{TotalDebt/Equity}) + \beta_8(\text{Sector}) + \beta_9(\text{DividendYield}) + \beta_{10}(\text{MarketValue}) + \varepsilon$$

Where:

- Y represents the dependent variable EBITDA / Total Assets, which measures financial resilience.
- '*Treatment*' is a dummy variable that distinguishes companies based on their main financing method (Loan=1, Bond=0).
- '*Post*' is a temporal variable indicating whether the observation is for the pre-crisis period (2019, Post=0) or the post-crisis period (2020, 2021, and 2022, Post=1).
- '*Treatment*Post*' is an interaction variable between '*Treatment*' and '*Post*,' allowing us to examine the differential effect of treatment in the pre- and post-crisis periods.
- *CapitalExpendCF/TotalAssets*, *CurrentRatio*, *NetSales/TotalAssets*, *TotalDebt/Equity*, *Industry*, *DividendYield*, and *MarketValue* are the control variables discussed earlier.
- Finally, ε is the error term, representing the set of all other unobserved variables that could influence the financial resilience of companies.

These regression formulas allow examining the differences in financial performance between companies that primarily finance themselves through loans or bonds, both before and during the crisis, while accounting for basic firm characteristics and temporal evolution.

3.5 Expectations

Based on my research hypothesis and the existing evidence in the literature, I expect to find a positive interaction between treatment (prevalent use of bank debt) and the post-crisis period. This would be indicated by a positive coefficient for the interaction term "*Treatment*Post*" in my DiD regression. Specifically, the "*Treatment*Post*" interaction term should reflect the additional effect on financial performance for companies that primarily rely on bank debt during the crisis period compared to those that do not. A positive coefficient would suggest that companies relying primarily on bank debt tend to exhibit greater financial resilience during crisis periods compared to those relying primarily on bond debt. Referring to the existing literature, this expectation is based on various mechanisms theorized in the works of Ahn & Choi (2009), Sufi (2009), Danis et al. (2014), and Petersen & Rajan (1994), as explained in detail in my research hypothesis. In particular, the greater financial resilience should stem from the benefits of bank monitoring, preferential access to credit lines, flexible terms of bank loans, more efficient resource allocation, and established relationships with banks. Regarding the other coefficients, I expect variables such as *Capital Expend CF/Total Assets*, *Current Ratio*, *Asset Turnover Ratio*, *Total Debt/Equity*, *Dividend Yield*, and *Market Value*, which represent key aspects of firm financial structure and performance, to have a significant impact on financial resilience, reflecting their importance in the existing financial literature. However, the main focus is on the "*Treatment*Post*" interaction term as it represents the causal effect of interest for this research.

4. Results

For a more comprehensive and understandable presentation of the results, this section has been structured into four subsections. Firstly, the results obtained from the analysis of the two datasets related to the Covid-19 crisis are examined and discussed. Next, the results from the investigation of the subprime mortgage crisis are analyzed for a comparison between two crises of different nature. Thirdly, the implementation of a "*Placebo Test*" within the research is illustrated to strengthen the robustness of our results and eliminate possible alternative explanations. Then, an overall overview of the results achieved through the four conducted analyses is provided, offering a complete summary of the key findings. Finally, the main limitations of our research method are examined, which is essential for fully understanding the context and conditions under which the results were obtained, allowing for a more precise and accurate picture of the factors that may have influenced the results.

4.1 Covid-19 Crisis

Based on the results reported in Table 1, we can draw initial conclusions about the research hypothesis formulated. Starting from the "*Treatment*" variable, referring to the period before the crisis, companies that finance themselves mainly through bank loans show a lower EBITDA/Total Assets ratio compared to those that finance themselves primarily through bonds, proving consistent across

all three years taken into analysis. This variable assumes a statistically relevant coefficient of: -0.0427, -0.0502 and -0.0386. This suggests that in a normal economic context, generally companies that finance themselves mainly through bond issuance have a higher profitability rate than those financed through the banking sector. Regarding the temporal effect of the crisis without making distinctions between the two groups (*Post variable*), we find a negative value of 0.0263 during the economic crisis year, then returning positive in the following two years, with a slightly significant value of 0.0380 in the time period 2019-2022. Analyzing the key variable of the research, namely the interaction between the financing method and the temporal effect of the crisis (*Treatment*Post*), we notice that in the year of the crisis (2020), the coefficient assumes a negative value of 0.0159, then becoming positive at 0.0164 one year from it, and then returning negative again at 0.0380 (2019-2022). This could suggest that immediately after the crisis and two years from it, the loan group companies experienced a greater reduction of the EBITDA/Total Assets ratio, but a year later they experienced a smaller contraction of this ratio, even though these results do not assume statistically significant values in any of the three years, even using a larger sample of companies (as can be seen in Table 2). In summary, these results suggest that although companies that mainly finance themselves through bank loans tend to have a lower EBITDA/Total Assets ratio compared to those that finance themselves mainly through bonds during a normal economic period, the effect of the crisis does not seem to differ significantly between the two groups of companies in the different periods considered. Therefore, based on this initial analysis, we can infer that the choice of financing method does not have a statistically significant impact on the financial resilience of companies during the crisis, at least based on the EBITDA/Total Assets measure. Regarding the control variables, the Current Ratio, as expected based on the expectations suggested by Altman (1968), shows a positive impact on EBITDA/Total Assets for all three periods, with a coefficient of ~ 0.092 . This suggests that companies with a higher ability to pay current liabilities with current assets tend to have a higher EBITDA/Total Assets during the crisis, this could indicate that corporate liquidity plays a crucial role in financial resilience during an economic crisis context. The "Net Sales/Total Assets" indicator, known as Asset Turnover Ratio, turns out to be significant and positive in all regression models, suggesting that there is a positive association between the efficiency with which a company uses its assets to generate sales and its EBITDA/Total Assets ratio. More specifically, an increase in the asset turnover ratio is associated with an increase in the EBITDA/Total Assets ratio, i.e., companies that are more efficient in using their assets to generate sales tend to have a higher EBITDA relative to total assets. Finally, the high value of R-Square and Adjusted R-Square (~ 0.80 and ~ 0.78 respectively) indicates that our model explains a significant portion of the variation of the EBITDA/Total Assets ratio, this means that the variables included in the model, along with the temporal effect and specific sector factors (as indicated by the sector fixed effects), explain a large part of the observed variation in the financial performance of companies in our sample.

Table 1 – Results 2019-2022*

| EBITDA/Total Assets | 2019-2020* | | 2019-2021* | | 2019-2022* | |
|-------------------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| <i>Treatment</i> | -0.0427 ** | 0.0170 | -0.0502 *** | 0.0170 | -0.0386 ** | 0.0170 |
| <i>Post</i> | -0.0263 | 0.0228 | 0.0098 | 0.0228 | 0.0380 * | 0.0228 |
| <i>Treatment Post</i> | -0.0159 | 0.0320 | 0.0164 | 0.0323 | -0.0318 | 0.0322 |
| <i>CapExCF/Total Assets</i> | -0.2983 | 0.2614 | -0.2200 | 0.2638 | -0.2736 | 0.2617 |
| <i>Current Ratio</i> | 0.0921 *** | 0.0088 | 0.0920 *** | 0.0089 | 0.0920 *** | 0.0089 |
| <i>Net Sales/Total Assets</i> | 0.0393 *** | 0.0129 | 0.0425 *** | 0.0129 | 0.0403 *** | 0.0129 |
| <i>Total Debt/Equity</i> | 0.0004 | 0.0010 | 0.0004 | 0.0010 | 0.0005 | 0.0010 |
| <i>Dividend Yield</i> | - | - | - | - | - | - |
| <i>Market Value</i> | - | - | - | - | - | - |
| <i>Constant</i> | 0.0024 | 0.0385 | -0.0125 | 0.0387 | -0.0156 | 0.0383 |
| <i>R square</i> | 0.7953 | | 0.7931 | | 0.7941 | |
| <i>R square Adjusted</i> | 0.7809 | | 0.7785 | | 0.7795 | |
| <i>Observations</i> | 320 | | 320 | | 320 | |
| <i>Industry FE</i> | Yes | | Yes | | Yes | |

4.1.1 Robustness Check

A second analysis was performed on a larger sample of companies and with a greater number of control variables with the aim of verifying whether the results obtained in our main analysis remained valid even when considering a larger sample and a broader set of variables, in other words, to verify whether the conclusions of the first analysis are robust with respect to variations in the sample of companies and in the variables considered. This is particularly important because it allows us to understand if the results of the first sample are "real" or if they are the result of a particular choice of sample or of the variables taken into consideration. In general, the results of our robustness check support the conclusions of our main analysis, reinforcing our confidence that the type of corporate financing does not cause a significant variation of EBITDA/Total Assets before and after the crisis between the two groups of companies, however emphasizing the generalized negative impact on all companies after the crisis, as expected. In fact, the "Post" coefficient also remains negative and statistically significant in all three periods in this analysis, indicating that, regardless of the type of financing used, companies in our sample generally experienced a worsening of their financial

performance during the crisis period. This is intuitive and in line with general economic logic: during periods of crisis, it is common for companies to experience a contraction of their EBITDA due to a decrease in revenues and/or an increase in costs (Khodavandloo et al., 2017). At the same time, the total assets could remain stable or even increase, due to investments made before the crisis or attempts to acquire assets during the crisis in anticipation of a future recovery, this combination of factors would lead to a drop in the EBITDA/Total Assets ratio. Specifically, as can be seen in Table 2, the coefficients of "Treatment" and "Treatment*Post" did not show statistical significance, in particular, contrary to the first analysis, the "Treatment" coefficient suggests that the effect of financing through loans versus bonds on the EBITDA/Total Assets ratio is not robust when considering a larger sample and a more complete set of control variables, as positive and statistically relevant coefficients are found in the analysis on all three years. Finally, the coefficient for the "Treatment*Post" interaction assumes positive values of 0.0019, immediately after the crisis (2019-2022) and negative at one and two years from it, respectively of -0.0029 and -0.0043, suggesting greater resilience of the "loan group" companies immediately after the outbreak of the crisis and less resilience at one and two years from it. In any case, such coefficients do not have an adequate degree of statistical significance, remaining not significant in all three periods considered, suggesting the absence of a different effect of the intervention on the EBITDA/Total Assets ratio depending on the type of financing adopted. Supporting the previous analysis, even in this case we have results related to the coefficient of Current Ratio positive, ~ 0.018 on all three years, agreeing with what was said in the analysis of the previous sample. We also find significant values for the Market Value variable (0.014), suggesting that a greater capitalization and credibility in the stock market has a slight impact on the profitability rate of the company even in times of economic crisis, as supported by Damodaran (2009). In addition, contrary to the expectations suggested by Frank Goyal (2009), we find slightly positive values of Total Debt/Equity, which amount to 0.0015 over all three periods, suggesting a positive impact between total debt used on equity and company resilience. Generally, even in this case the model has a relatively high R-square, around ~ 0.40 , indicating that the model explains about 40% of the variance in the EBITDA/Total Assets ratio.

Table 2 – Results 2019-2022

| EBITDA/Total Assets | 2019-2020 | | 2019-2021 | | 2019-2022 | |
|-------------------------------|-------------|-----------|-------------|-----------|-------------|-----------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| <i>Treatment</i> | 0.0101 ** | 0.0050 | 0.0114 ** | 0.0051 | 0.0116 ** | 0.0050 |
| <i>Post</i> | -0.0167 *** | 0.0035 | 0.0101 *** | 0.0035 | 0.0188 *** | 0.0035 |
| <i>Treatment Post</i> | 0.0019 | 0.0093 | -0.0029 | 0.0093 | -0.0043 | 0.0092 |
| <i>CapExCF/Total Assets</i> | 0.6656 *** | 0.0536 | 0.7001 *** | 0.0538 | 0.6749 *** | 0.0534 |
| <i>Current Ratio</i> | 0.0184 *** | 0.0017 | 0.0182 *** | 0.0017 | 0.0181 *** | 0.0017 |
| <i>Net Sales/Total Assets</i> | 0.0275 *** | 0.0031 | 0.0291 *** | 0.0031 | 0.0275 *** | 0.0031 |
| <i>Total Debt/Equity</i> | 0.0015 *** | 0.0004 | 0.0015 *** | 0.0004 | 0.0015 *** | 0.0004 |
| <i>Dividend Yield</i> | -0.0009 | 0.0008 | -0.0009 | 0.0008 | -0.0012 | 0.0008 |
| <i>Market Value</i> | 0.0140 *** | 0.0011 | 0.0141 *** | 0.0011 | 0.0140 *** | 0.0011 |
| <i>Constant</i> | -0.1191 *** | 0.0123 | -0.1295 *** | 0.0123 | -0.1276 *** | 0.0122 |
| <i>R square</i> | 0.4027 | | 0.3965 | | 0.4051 | |
| <i>R square Adjusted</i> | 0.3924 | | 0.3861 | | 0.3948 | |
| <i>Observations</i> | 1648 | | 1648 | | 1648 | |
| <i>Industry FE</i> | Yes | | Yes | | Yes | |

4.2 Subprime Mortgage Crisis

Focusing on the results of a banking crisis, in order to compare any differences with the results obtained from a real crisis, we can notice that the "Treatment" coefficient, contrary to the two previous analyses, does not assume statistical validity, assuming positive values immediately after the crisis and two years after it. As for the "Post" variable, it assumes a significantly significant value only in the 2006-2009 reference period, assuming a negative coefficient of 0.0189, highlighting the negative effect of the crisis on corporate profitability, generalized on companies in both groups. The Treatment*Post variable, which represents the key variable in our research, assumes a statistically significant value in the 2006-2008 period, with a positive coefficient of 0.0215, indicating a minor reduction in the EBITDA/Total Assets ratio of companies belonging to the "loan group" compared to those belonging to the "bond group". We can interpret this result in support of our research hypothesis, as it indicates that in the 2006-2008 reference period, companies that primarily finance through the banking system have shown greater resilience during this time of crisis. Contrarily, in the period after the crisis and two years after it, the coefficients are slightly negative, but not statistically significant (respectively: -0.0019 and -0.0093). Regarding control variables, the coefficients all

represent statistical significance, in particular, the Current Ratio also assumes positive values here (~ 0.01), underlining and confirming the importance of liquidity in a moment of economic turbulence. Dividend Yield also assumes positive values (~ 0.02) in all three years, in line with the expectations suggested by DeAngelo et al. (2006), as companies with a higher dividend yield may indicate greater stability and therefore greater resilience during crisis phases. Instead, contrary to previous analyses, the Total Debt/Equity ratio highlighted a negative impact on corporate profitability, in line with the expectations suggested by Altman (1968), who claims that companies with a higher level of indebtedness may have greater difficulties in contexts of economic turbulence. The coefficient of CapExCF/Total Assets is statistically relevant and positive (~ 0.30) in all three years, demonstrating that companies with high levels of invested capital may be more prepared to go through periods of crisis, as they have invested more in long-term resources (Campello et al., 2010).

Generally, based on the reported results we cannot draw clear and definitive conclusions on the differences between the two crises, what we can emphasize is that contrary to our initial expectations, we found a more significant and marked positive impact of the EBITDA/Total Assets ratio for companies that primarily rely on bank financing, compared to those that have obtained financing through bond issuance. As, we expected a positive impact, but of lesser relevance, given the nature of the subprime mortgage crisis, which severely hit banks and led to a considerable contraction of credit issued to companies, firms that mainly relied on bank loans should have suffered a greater impact. However, when we compare the results of the two crises, we observe that during the subprime mortgage crisis (2006-2008), the "Treatment*Post" coefficient was positive and significant, unlike what emerged during the COVID-19 crisis. This suggests that, despite the subprime crisis having had a devastating impact on the banking sector, companies that belonged to the "loan group" in the 2006-2008 period suffered a lesser impact on their corporate profitability, compared to what happened during the COVID-19 crisis. As for R-Square, the model reported lower levels than the previous analyses, respectively over the three years of: ~ 0.30 , ~ 0.30 and ~ 0.31 .

Table 3 – Results 2006-2009

| EBITDA/Total Assets | 2006-2007 | | 2006-2008 | | 2006-2009 | |
|-------------------------------|-------------|-----------|-------------|-----------|-------------|-----------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| <i>Treatment</i> | 0.0047 | 0.0070 | -0.0014 | 0.0069 | 0.0062 | 0.0069 |
| <i>Post</i> | 0.0034 | 0.0042 | 0.0062 | 0.0044 | -0.0189 *** | 0.0042 |
| <i>Treatment Post</i> | -0.0019 | 0.0128 | 0.0215 * | 0.0128 | -0.0093 | 0.0126 |
| <i>CapExCF/Total Assets</i> | 0.3199 *** | 0.0408 | 0.3141 *** | 0.0409 | 0.2878 *** | 0.0409 |
| <i>Current Ratio</i> | 0.0086 *** | 0.0027 | 0.0084 *** | 0.0027 | 0.0100 *** | 0.0027 |
| <i>Net Sales/Total Assets</i> | 0.0157 *** | 0.0029 | 0.0149 *** | 0.0030 | 0.0141 *** | 0.0029 |
| <i>Total Debt/Equity</i> | -0.0071 *** | 0.0018 | -0.0075 *** | 0.0018 | -0.0071 *** | 0.0018 |
| <i>Dividend Yield</i> | 0.0023 ** | 0.0010 | 0.0017 * | 0.0010 | 0.0022 ** | 0.0009 |
| <i>Market Value</i> | 0.0131 *** | 0.0013 | 0.0134 *** | 0.0013 | 0.0131 *** | 0.0012 |
| <i>Constant</i> | -0.0518 *** | 0.0140 | -0.0506 *** | 0.0140 | -0.0439 *** | 0.0139 |
| <i>R square</i> | 0.2984 | | 0.3021 | | 0.3127 | |
| <i>R square Adjusted</i> | 0.2826 | | 0.2864 | | 0.2972 | |
| <i>Observations</i> | 1228 | | 1228 | | 1228 | |
| <i>Industry FE</i> | Yes | | Yes | | Yes | |

4.3 Placebo Test

During the period 2013-2016, a placebo test was conducted, which is a widely used method in economics to test the robustness of results and eliminate alternative explanations for the observed results (Lucca et al., 2017). The placebo test was implemented during this time period as it is not associated with any significant economic crisis, which is useful to verify the validity of the effects observed in the previous two crises. Specifically, if we were to observe a significant effect in the placebo test, it could indicate issues in the analysis model, such as an uncontrolled temporal or sector effect, or a spurious correlation. As can be seen in Table 4, based on expectations, the coefficients of "Treatment*Post" are not significant. Furthermore, the coefficients for "Post" are positive, indicating the absence of any crisis, but at the same time, they remain statistically insignificant. This suggests a certain validity of the placebo test, as the results align with the expectations. Overall, we can see that during this time period, the values related to Current Ratio and Market Value had a slight positive impact on the dependent variable (~0.0022 and ~0.0104 for all three years), with high significance.

This highlights that even in periods of tranquility, companies with higher liquidity and greater market capitalization and credibility experienced a slight increase in profitability.

Table 4 – Results 2013-2016

| EBITDA/Total Assets | 2013-2014 | | 2013-2015 | | 2013-2016 | |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | Coef. | Std. Err. | Coef. | Std. Err. | Coef. | Std. Err. |
| <i>Treatment</i> | 0.0035 | 0.0054 | 0.0017 | 0.0054 | 0.0002 | 0.0054 |
| <i>Post</i> | 0.0014 | 0.0032 | 0.0009 | 0.0032 | -0.0035 | 0.0032 |
| <i>Treatment Post</i> | -0.0033 | 0.0100 | 0.0040 | 0.0101 | 0.0099 | 0.0100 |
| <i>CapExCF/Total Assets</i> | 0.4191 *** | 0.0376 | 0.4186 *** | 0.0377 | 0.4171 *** | 0.0378 |
| <i>Current Ratio</i> | 0.0022 ** | 0.0009 | 0.0022 ** | 0.0009 | 0.0022 ** | 0.0009 |
| <i>Net Sales/Total Assets</i> | 0.0198 *** | 0.0022 | 0.0198 *** | 0.0022 | 0.0197 *** | 0.0022 |
| <i>Total Debt/Equity</i> | 0.0004 | 0.0003 | 0.0004 | 0.0003 | 0.0004 | 0.0003 |
| <i>Dividend Yield</i> | -0.0001 | 0.0006 | -0.0001 | 0.0006 | -0.0001 | 0.0006 |
| <i>Market Value</i> | 0.0104 *** | 0.0010 | 0.0104 *** | 0.0010 | 0.0104 *** | 0.0010 |
| <i>Constant</i> | -0.0459 *** | 0.0108 | -0.0457 *** | 0.0108 | -0.0447 *** | 0.0108 |
| <i>R square</i> | 0.3092 | | 0.3093 | | 0.3098 | |
| <i>R square Adjusted</i> | 0.2971 | | 0.2971 | | 0.2977 | |
| <i>Observations</i> | 1568 | | 1568 | | 1568 | |
| <i>Industry FE</i> | Yes | | Yes | | Yes | |

4.4 Results Overview

Generally, the analyses on the four samples did not lead to a clear and definitive conclusion regarding our initial research hypothesis. Specifically, the investigations conducted on the two datasets concerning the Covid-19 crisis period did not reveal any significant relationship between the financing method adopted and corporate resilience (as indicated by the Treatment*Post variable). However, during the subprime mortgage crisis, we noticed slight statistical significance in the coefficients linked to the "Treatment*Post" variable during the period 2006-2008. This suggests that companies that relied on the banking system to finance their activities experienced a lesser reduction in the EBITDA/Total Assets ratio compared to those that obtained financing through bond issuance. Another observation comes from the analysis of the signs of the coefficients across the various samples and through different time periods after the crisis, where we can notice discontinuity, with coefficients that in some cases assume positive values and in others negative. This variation in signs may suggest that the impact of the type of financing on corporate resilience might have been influenced by the limitations encountered during this research, which did not allow me to fully isolate

the relationship that ties financing methods with corporate profitability. Given these results, we cannot accept our initial hypothesis (H1), as on the one hand we can confirm that, a year after the subprime mortgage crisis, companies that had resorted to bank loans ("*loan group*") showed greater corporate resilience, but we cannot extend this conclusion to all crises and to all time periods after the crisis. In conclusion, the results do not provide convincing support for our research hypothesis, as they do not show a solid and unequivocal response to the fact that companies that finance themselves through bank loans demonstrate greater resilience compared to companies that have relied on bond issuance in times of economic crisis. Certainly, there are premises for future analysis on the subject, trying to better isolate the relationship that ties the financing method with corporate resilience.

4.5 Limitations

This research presents several limitations that must be considered in order to correctly interpret the results. First, the analysis may be subject to "selection bias", as companies that opt for financing through bonds or loans may systematically differ in various aspects that were not considered in the model used, for example, they may have different risk management strategies, contrasting growth prospects, or different balance sheet structures. These unaccounted differences could influence the obtained results, introducing bias in the estimate of the effect of interest. Second, the measure of the effect of interest used in this analysis, the EBITDA/Total Assets ratio, may not be fully effective in capturing differences in companies' performance based on their type of financing. Other financial performance measures, such as return on investment, operating cash flow, or capital, may yield different results. Therefore, future studies might consider the use of alternative or additional measures of financial performance to provide a more complete view of the effect of the source of financing on companies' resilience. Another limitation is the data, as constructing a sufficiently broad dataset composed of a considerable number of companies listed on regulated markets that finance themselves through loans (with an upper threshold above 70%) and for which data on multiple control variables are available, proved to be a difficult task, especially taking only the United States as the geographical reference. Therefore, for future research, we recommend expanding the geographical area of interest, for example by including global data, moreover, it may be useful to reconsider the threshold used to classify companies based on their financing method, lowering it to 60%, so as to considerably increase the companies in the "loan group" in the sample to be analyzed. Another element that may have influenced the results is the potential presence of active credit lines for companies classified as financed through bonds. In our research, indeed, bank debt was calculated as *Total Long-Term Debt* minus *Bond Debt*, assuming that any long-term debt not derived from bonds was of a banking type. This methodology did not allow us to specify and calculate credit lines for individual companies. Consequently, there may be companies with active credit lines that were classified within the bond group. Access to such additional funds could have provided a financial buffer that allowed these companies to maintain operations, cover costs, and manage cash flow fluctuations during periods of economic crisis. In this context, classifying a company as financed via bonds might not fully reflect the reality of its financial situation and its ability to withstand economic shocks. This potential distortion factor might have mitigated the differences observed in our study between companies resorting to bonds and those resorting to loans, thus providing unclear results in support of the

research hypothesis. For this reason, in future studies, it would be useful to examine in more detail the global financial structure of companies, in order to better understand the dynamics of corporate resilience during periods of economic crisis. Finally, it's important to consider that some of the control variables have shown to have a significant effect on the EBITDA/Total Assets ratio. This suggests that there are numerous factors that influence this ratio, besides the source of financing, making it difficult to isolate the specific effect of the financing source. In the future, it would therefore be useful to explore other control variables that might have a significant impact on this ratio. In conclusion, the combination of these limitations could have led to an unclear and decisive response from the obtained results, compromising the clarity in supporting our thesis.

5. Conclusion

Through an in-depth and careful analysis of the available data and relationships between variables in the context of economic crises, this thesis has examined the financial resilience of companies in relation to different sources of funding, specifically comparing companies that finance themselves with bonds and those that finance themselves with loans. The main hypothesis was that companies that rely primarily on bank debt demonstrate greater financial resilience during such periods, given the monitoring activity carried out by banks, preferential access to credit lines, flexibility of loan conditions, and the established relationship with financial institutions. However, the results obtained from this study do not provide a clear and definitive answer to this hypothesis. Despite the subprime mortgage crisis showing a certain positive relationship between resorting to bank debt and companies' financial resilience, the data regarding the Covid-19 pandemic period do not confirm this trend. These results suggest that such a conclusion may not be applicable to all crisis contexts, and do not allow us to fully and definitively accept the initial hypothesis. A point of particular relevance that emerged from the analysis is the discontinuity in the signs of the coefficients across different data sets and different time periods following the crisis, in which, in some cases, the coefficients assume positive values and in others negative. This could suggest that the impact of the type of financing on corporate resilience may have been influenced by the limitations that occurred during this research, which did not allow me to completely isolate the relationship that links financing methods with corporate profitability from all the surrounding "noise". In particular, the limitations that occurred can be summarized as: "selection bias", financial performance measure used (EBITDA/Total Assets), the difficulty of constructing an adequate dataset, and the lack of detailed information on companies' global financial structure. These factors may have influenced the results and limited our ability to draw definitive conclusions. In conclusion, the results do not provide empirically convincing support to our research hypothesis, as they do not show a solid and unambiguous response to whether companies that finance themselves through bank loans demonstrate greater resilience than companies that rely on bond issuance, in times of economic crisis. Therefore, in light of all this, we can confirm that the initial research hypothesis cannot be accepted. Nonetheless, this study offers a valuable perspective on the complex issue of companies' financial resilience during economic crises, which can provide valuable insights for future research and offer useful guidance for corporate executives, guiding them in more conscious choices in the type of financing to adopt. In the future, it is suggested to conduct further research on the topic, expanding the geographical area of reference, using different

measures of financial performance, examining in more detail the financial structure of companies and considering other factors that could influence financial resilience.

6. Appendix

Table 5 – Samples Distribution

| | <i>2019-2022*</i> | <i>2019-2022</i> | <i>2006-2009</i> | <i>2013-2016</i> |
|-------------------------------|-------------------|------------------|------------------|------------------|
| <i>Loan</i> | 160 | 228 | 128 | 160 |
| <i>Bond</i> | 160 | 1420 | 1100 | 1408 |
| <i>Commercial services</i> | 8 | 56 | 28 | 40 |
| <i>Communications</i> | - | 8 | 8 | 8 |
| <i>Consumer Durables</i> | - | 64 | 32 | 52 |
| <i>Consumer Non-Durables</i> | - | 108 | 108 | 108 |
| <i>Consumer services</i> | 64 | 60 | 60 | 72 |
| <i>Distributin Services</i> | 16 | 44 | 32 | 32 |
| <i>Eletronic Technology</i> | 8 | 148 | 56 | 120 |
| <i>Energy Minerals</i> | 8 | 88 | 80 | 88 |
| <i>Finance</i> | 48 | 20 | 12 | 16 |
| <i>Health Services</i> | 24 | 12 | 12 | 12 |
| <i>Health Technology</i> | 8 | 80 | 48 | 80 |
| <i>Industrial Services</i> | 32 | 100 | 60 | 92 |
| <i>Non-energy Minerals</i> | - | 40 | 52 | 56 |
| <i>Process Industries</i> | 32 | 172 | 136 | 148 |
| <i>Producer Manufacturing</i> | 32 | 228 | 172 | 232 |
| <i>Retail Trade</i> | 8 | 80 | 76 | 88 |
| <i>Technology Services</i> | 8 | 48 | 8 | 52 |
| <i>Transportation</i> | 8 | 60 | 32 | 64 |
| <i>Utilities</i> | 16 | 232 | 216 | 208 |
| <i>Observations</i> | 320 | 1648 | 1228 | 1568 |

Notes: This table displays the distribution of companies by sector for the four champions.

Table 6 – Descriptive Statistics

| 2006-2009 | Obs | Mean | Std. Dev. | Min | Max |
|-------------------------------|------------|-------------|------------------|------------|------------|
| <i>EBITDA/Total Assets</i> | 1228 | 0.1489 | 0.0699 | 0.0018 | 0.5813 |
| <i>Current Ratio</i> | 1228 | 1.5891 | 0.7874 | 0.1172 | 7.5192 |
| <i>CapEXCF/Total Assets</i> | 1228 | 0.0631 | 0.0536 | 0.0000 | 0.5244 |
| <i>Dividend Yield</i> | 1228 | 2.5741 | 2.0582 | 0.0640 | 21.1082 |
| <i>Market Value</i> | 1228 | 8.4401 | 1.5891 | 3.8565 | 13.1459 |
| <i>Net Sales/Total Assets</i> | 1228 | 1.0859 | 0.7645 | 0.0837 | 5.7449 |
| <i>Total Debt/Equity</i> | 1228 | 0.8922 | 1.0230 | 0.0020 | 19.4121 |
| 2013-2016 | | | | | |
| <i>EBITDA/Total Assets</i> | 1568 | 0.1371 | 0.0620 | 0.0002 | 0.3797 |
| <i>Current Ratio</i> | 1568 | 1.8309 | 1.6018 | 0.2337 | 32.7043 |
| <i>CapEXCF/Total Assets</i> | 1568 | 0.0528 | 0.0446 | 0.0007 | 0.4385 |
| <i>Dividend Yield</i> | 1568 | 2.4098 | 2.3862 | 0.0435 | 45.2756 |
| <i>Market Value</i> | 1567 | 9.0478 | 1.4976 | 4.2541 | 13.3807 |
| <i>Net Sales/Total Assets</i> | 1568 | 0.9359 | 0.7804 | 0.0210 | 8.4658 |
| <i>Total Debt/Equity</i> | 1568 | 1.4481 | 3.9309 | 0.0009 | 110.1905 |
| 2019-2022 | | | | | |
| <i>EBITDA/Total Assets</i> | 1648 | 0.1350 | 0.0721 | 0.0021 | 0.8473 |
| <i>Current Ratio</i> | 1648 | 1.6580 | 1.0100 | 0.2776 | 7.6738 |
| <i>CapEXCF/Total Assets</i> | 1648 | 0.0432 | 0.0336 | 0.0014 | 0.2716 |
| <i>Dividend Yield</i> | 1648 | 2.5478 | 2.2905 | 0.0403 | 19.8244 |
| <i>Market Value</i> | 1648 | 9.3839 | 1.5687 | 5.0551 | 14.8848 |
| <i>Net Sales/Total Assets</i> | 1648 | 0.7679 | 0.6030 | 0.0517 | 5.8044 |
| <i>Total Debt/Equity</i> | 1648 | 1.6193 | 3.3092 | 0.0120 | 72.5043 |
| 2019-2022* | | | | | |
| <i>EBITDA/Total Assets</i> | 320 | 0.0654 | 0.2650 | -2.5142 | 0.4088 |
| <i>Current Ratio</i> | 320 | 0.0331 | 0.0350 | 0.0000 | 0.3355 |
| <i>CapEXCF/Total Assets</i> | 320 | 1.7808 | 0.9965 | 0.0406 | 9.2319 |
| <i>Net Sales/Total Assets</i> | 320 | 0.7091 | 0.7391 | 0.0250 | 5.5154 |
| <i>Total Debt/Equity</i> | 320 | 2.4425 | 7.5301 | 0.0000 | 100.4908 |

Notes: This table displays the mean, the minimum (Min) and maximum (Max) values and the standard deviation (Std. Dev.) of the variables used in the models, as well as the total number of observations.

7. References

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