An Empirical Analysis of the Determinants of Debt Renegotiation in Brazilian Public Companies

Abstract

Companies form contracts with different types of agents. Employees, suppliers, customers, and creditors are examples of agents who establish contractual relationships within a company. These contracts are considered incomplete since it is impossible to specify all the important contingencies that may arise ex-post. Therefore, agents can incorporate contractual mechanisms that allow them to renegotiate the terms of trade in the future, making the renegotiation assume a relevant role in the firms. Specifically concerning debt renegotiation, recent studies have shown important results in the United States and European contexts. Nevertheless, we know little about debt renegotiations in different contexts, such as those found in emerging economies. Therefore, we aimed to to identify the determinants of debt renegotiation in an emerging economy context based on a renegotiation sample of Brazilian companies. The sample comprises all non-financial companies listed on the Brazilian stock exchange (B3). The period of the analysis is from 2010 to 2021. Data on renegotiation are unprecedented, collected manually from the analysis of more than three thousand of notes to financial statements. The results showed that the change in the financial condition of companies (for example, profitability, leverage, size) increases the probability of debt renegotiation for Brazilian companies. Moreover, the results showed that a loss in the firm's ability to pay (reduction of profitability, cash generation capacity and interest coverage ratio) increases the probability of renegotiation having a counterpart. As a contribution, this result expands knowledge about renegotiation in a context that has not been addressed much in previous studies: an emerging market. Furthermore, this study adds to the literature by exploring counterparts in renegotiations, an aspect little explored in the literature, although it is very present in renegotiations. This study also contributes to the literature by addressing renegotiations with bondholders, which is not done by previous studies.

Keywords: Debt Renegotiation, Renegotiation Counterparts, Debt Contracts.

1. Introduction

Companies form contracts with different types of agents. According to Jensen and Meckling (1976), employees, suppliers, customers, and creditors are some examples of agents that establish contractual relations within a firm. So, essentially, firms are legal fiction that emerges as a connection for contractual relations between different agents (Jensen & Meckling, 1976).

Specifically regarding contractual relations between company and creditor, global data reveal that this relationship has become increasingly intense. The volume of loans and financing

contracted by companies has grown in recent years. In 2021, corporate debt soared to a total of 13.5 billion dollars, an increase of 45% compared to 2014 (Corporate Debt Index, 2021).

Given the expansion of the debt market and its importance in companies' balance sheets, one aspect deserves more attention: debt contract renegotiation. When the borrower and/or lenders are unable or unwilling to commit the contracts' initial terms, they may initiate a process to renegotiate the contract terms. For companies, renegotiation is important as it can improve financial health, for example, by reducing the interest rate or extending payment terms. Given its relevance to firms' financial health, the main focus of this study is to understand the dynamics of debt renegotiation.

For many years, studies have been limited to analyzing renegotiation only within the specific context of companies in default or bankruptcy (e.g., Gilson, 1990; Gilson, John, and Kang, 1990, Chen and Wei, 1993; Chava and Roberts, 2008). Robert and Sufi (2009) emerged intending to fill this gap in the literature. From a sample of U.S. companies' renegotiations, the authors sought to understand the frequency of renegotiations and their determinants. The authors showed that the accrual of new information concerning credit quality and outside options (existence of an alternative source of financing) could be considered predictors of renegotiation and its outcomes.

Unlike Robert and Sufi (2009), in a later study also with U.S. companies, Roberts (2015) examines renegotiations from a dynamic perspective, covering the entire life of loan contracts from origination to termination. According to the results, most renegotiations (46%) result in the modification of covenants. Moreover, in the least part of the cases, the covenant renegotiation occurs due to the borrower's default. For Roberts (2015), most changes occur due to the companies' desire to change their investment, financing, or operational strategies.

Close to Robert and Sufi (2009) and Roberts (2015), studies such as Godlewski (2014) and Godlewski (2015) focus on the renegotiations in European firms. These studies show that the characteristics of the renegotiations are different between the U.S. and European contexts. In short, compared to the U.S. context, renegotiations in Europe occur less frequently, later regarding the loan period, and present a difference in the terms renegotiated.

Despite the importance of these studies, little is known about how renegotiations occur in a context different from U.S. or Europe, for example, in emerging economies. Unlike developed countries, emergents have greater information asymmetry, greater agency costs, and low protection of creditors' rights (La Porta et al. 1998; Machokotoa & Areneke, 2020). Due to these characteristics, the risk for the creditor tends to be greater in emerging economies. And this greater risk can change the dynamics of renegotiations in this context since creditors tend

to be more cautious in their decisions. For this reason, we analyzed renegotiation and its determinants in an emergent market context: Brazilian companies.

This study analysis is based on a hand-collected sample of renegotiations from Brazilian companies not used in any previous study. The sample comprises all companies listed on the Brazilian stock exchange "B3" (Brasil, Bolsa e Balcão) in 2021. The renegotiation data comes from a revision of more than three thousand notes to financial statements between the years 2010 to 2021.

The results showed that the change in the financial condition (e.g., size, leverage and profitability) of companies increases the probability of debt renegotiation for Brazilian companies. In addition, the results also showed that renegotiations are more likely to be accompanied by counterparts when there is a worsening in the companies' ability to pay the debt. In other words, creditors tend to impose stricter conditions on renegotiations when the company has a worsening ability to pay (reduction of profitability, cash generation capacity and interest coverage ratio). Finally, the study also showed that, unlike banks, renegotiations with bondholders are more likely to have counterparts.

This study contributes to the literature in different ways. Firstly, by expanding knowledge about renegotiation in a context that has not been addressed much in previous studies: an emerging market. Although Mourad et al. (2020) developed a study on renegotiations in Brazil, the authors focused on renegotiations of distressed debts. Therefore, this study seeks to analyze renegotiations from a broader perspective (beyond the default context).

Second, this study adds to the literature by exploring counterparts in renegotiations. This issue is very present in renegotiations but little explored in the literature. Third, unlike previous studies, this research considers renegotiations with bondholders, expanding knowledge about debt renegotiations. Fourth, this study contributes to the literature regarding funding sources. More specifically, the study showed that the intrinsic characteristics of the financing sources can be important determinants of renegotiation conditions.

Finally, this study offers a significant practical contribution, especially by showing companies the factors that tend to increase the chances of a counterparty in renegotiations. Therefore, companies can improve their decision-making or at least anticipate some renegotiation results.

2. Theoretical framework and hypothesis development

Firms are a nexus of contracts established between different agents to reduce transaction costs (Coase, 1937; Jensen & Meckling, 1976). Employees, suppliers, customers, and creditors are some examples of agents that establish contractual relations in a firm (Jensen & Meckling, 1976). At the time of drawing up these contracts, it is difficult to specify all the important contingencies that may arise ex-post, originating the so-called incomplete contracts widely discussed in seminal studies such as Grossman and Hart (1986) and Hart and Moore (1988). Therefore, to compensate for contractual incompleteness, agents can incorporate mechanisms for renegotiating future trade terms (Hart & Moore, 1988).

The renegotiation process begins when the borrower and/or lenders are unable or unwilling to commit the contracts' initial terms. Put it another way, the renegotiation begins when the borrower–lender relationship reaches a point where the initial contract terms generate inefficient outcomes (Godlewski, 2014). For example, eventually, borrowers wish to make decisions forbidden by the initial contract terms, such as increasing capital expenditure, undertaking an acquisition, selling assets, or increasing dividend payment (Godlewski, 2015a).

Empirical studies on debt renegotiation determinants are scarce in the literature, highlighting: Robert and Sufi (2009), Roberts (2015), Godlewski (2014) and Godlewski (2015b). Robert and Sufi (2009) analyzed a sample of 1,000 loan contracts from U.S. companies. The authors identified that most contracts (75%) have an important term (maturity, principal, or interest) renegotiated before maturity. More specifically, the authors reveal that renegotiations tend to occur, on average, early in the loan's life. Moreover, less than 18% of renegotiations occur due to a breach of covenant or default. For the authors, the renegotiation is predicted by the accrual of new information concerning credit quality and outside options.

Subsequently, Roberts (2015) adopts a dynamic analysis of renegotiation that involves the entire life of loan contracts. As a result, the study indicated that most loans are renegotiated several times within a relatively short time frame, and each renegotiation triggers significant changes in contractual terms. The study also revealed that covenants tend to be modified much more frequently than other contractual terms during the loans' life. According to Roberts (2015, p.62), "these modifications are driven largely by borrowers' desires to alter their investment, operating, or financing policies and, to a lesser extent, by borrowers' financial distress." Finally, three main factors are related to the timing of renegotiation: i) parties' financial health; ii) borrowers' future profitability uncertainty; and iii) the outcome of renegotiation (Roberts, 2015).

Godlewski (2014) and Godlewski (2015b) differ from the previous studies since the focus is on European companies' renegotiations. To sum up, according to Godlewski (2014), in comparison with the U.S. context, in European companies, multiple renegotiations occur less frequently, and covenants are, on average, less renegotiated. On the other hand, most of the renegotiations (40%) are related to the increase in the loan amount. Besides that, the first renegotiation tends to occur later than in the U.S. In the subsequent study, Godlewski (2015b) identified that factors such as the complexity of the initial contract, the proximity between creditor and borrower, the characteristics of contractual changes and weak legal protection of creditors' rights determine renegotiations of European companies.

Collectively, studies on debt renegotiation focus mainly on companies in developed economies, especially in the United States and Europe. Therefore, we aim to find out the renegotiation determinants in a different context, characterized by information asymmetry and low protection of creditor's rights (La Porta et al., 1998; Machokotoa & Areneke, 2020).

In a scenario of information asymmetry, the creditor finds it challenging to assess the company's real situation and exercise efficient monitoring. In addition, low creditor's rights protection increases the creditor's risk of recovering the borrowed amount in case of borrowers' bankruptcy. For this reason, debt renegotiation can be an important instrument in emerging economies to obtain new information from the borrower (reducing information asymmetry) and to reduce the possibility of borrowers' bankruptcy. Therefore, in an eventual reduction in the firm's ability to pay, lenders could use renegotiations to seek more information about the borrower and avoid his bankruptcy. So, hypothesis 1 of this study is:

H1: the worsening of companies' financial conditions can predict the occurrence of debt renegotiations.

An important aspect of debt renegotiation dynamics concerns the increase in creditor control through the imposition of a counterpart. In some cases, the acceptance of the renegotiation by the creditor may be subject to a restriction. For example, the renegotiation reduces the interest rate, but at the same time, the creditor imposes a more restrictive covenant. It is expected that a worsening in the companies' financial conditions could trigger the counterparty in the renegotiation as a way to reduce the creditors' risks. Therefore, hypothesis 2 of this study is:

H2: the worsening of companies' financial conditions is positively related to the imposition of a counterpart in the renegotiation.

According to Armstrong, Guay and Weber (2010), the way creditors choose to exercise decision-making rights over the life of the contract depends on the formal terms of the contract and, in addition, on the information relationship established between the creditor and borrower. For this reason, the imposition of counterparts in a renegotiation can also be related to the type of creditor.

Berlin and Loyes (1988) and Chemmanur and Fulghieri (1994) argue that banks operate from a long-term perspective, thus seeking to establish a closer relationship with borrowers. Nikolaev (2018) adds that being close to the borrower allows the lender to access informal information about the borrower, obtaining an informational advantage over external lenders. For this reason, banks are expected to be less willing to impose counterparts on their borrowers. On the other hand, bondholders, in addition to having a shorter-term view (Lou & Otto, 2020), tend to have less access to soft information. Therefore, bondholders are more likely to demand compensation. So, hypothesis 3 of this study is:

H3: there is a positive and significant relationship between renegotiation with bondholders and the imposition of counterparts.

3. Methods

3.1.Data and Sample

The analysis period covers all quarters between 2010 and 2021 for all non-financial companies listed in the Brazilian stock exchange “B3” (Brasil, Bolsa e Balcão). We chose 2010 because it was the starting period of Brazilian companies' full IFRS adoption, thus making the time-series comparable. In short, we analyzed more than three thousand notes to financial statements to identify whether and when renegotiation occurred and the renegotiation outcomes. Finally, we combined this data with quarterly accounting data from Capital IQ.

Initially, the base consisted of 16,608 observations (346 companies). we exclude all observations that: i) do not have any accounting information; ii) with total assets equal to zero; iii) the companies are undergoing judicial reorganization; iv) do not present details regarding the renegotiation; v) companies that did not show revenue in any of the sample periods. Therefore, 11,602 observations (326 companies) remained.

3.2.Renegotiation variables

We collected information about the renegotiations from the companies' notes to the financial statements. Firstly, we analyzed annual financial statements to identify any renegotiation, searching for words as "renegotiation", "financial restructure", "covenants", "waiver", "reclassified debt", "consent", "renegotiated conditions", "debt restructuring", "addition" among others. After that, we identified the quarter of the renegotiation occurrence.

When the renegotiation date was not available on the financial statement, we considered the quarter of the statement where renegotiation was first mentioned. For example, if the renegotiation appears on the financial statement of 2º, 3º and 4º quarter, we considered the 2º quarter as occurrence period because it is the first in which renegotiation is mentioned.

After identifying all renegotiations, we analyzed the notes to financial statements, Relevant Facts ("Fatos Relevantes"), Notice to the Market ("Comunicado ao Mercado"), Debenture Holders Meeting Minutes ("Ata da Reunião de Debenturistas") and Reference Form ("Formulário de Referência"). Based on Roberts and Sufi (2009) and Roberts (2015) studies, we searched to identify all contractual terms changed (e.g., loan amount, interest rate, extension of maturity or grace period and covenant waiver). This information is not standardized. It means that some firms offered greater detail than others. Finally, when more than one renegotiation was disclosed in the same quarter, we collected information about renegotiation only from the highest-value renegotiation.

In Brazil, two norms govern the disclosure of renegotiations. Securities Commission Resolution – SCR - nº 44 (Resolução da Comissão de Valores Mobiliários - CVM – nº 44) deals with the rules for disclosing information on material acts or facts. Debt renegotiation is considered by the resolution as a material fact to be disclosed widely and immediately by companies.

Technical pronouncement of financial instruments "Accounting Pronouncements Committee – APC 40" (Comitê de Pronunciamentos Contábeis - CPC 40) deals with disclosing a contractual commitment breach in a note to the financial statement. Following that standard, an entity must disclose details of any breach of contract relating to loans. In addition, in case of contract renegotiation, the company must disclose the terms of such renegotiation.

3.3.Models

To identify determinants of renegotiation in the Brazilian context (Hypothesis 1), we estimate a logit model presented in Equation 1.

$$Reneg_{(i,t)} = \beta_0 + \beta_1 Size_{(i,t-1)} + \beta_2\, Lev_{(i,t-1)} + \beta_3\, Ebitda_{(i,t-1)} + \beta_4\, MB_{(i,t-1)} + \beta_5\, Var\_Ebitda_{(i,t-1)} + \beta_6\, ROE_{(i,t-1)} + \beta_7\, IC\_Ratio_{(i,t-1)} + \beta_8\, Asset\_Int_{(i,t-1)} + \mu_i\, Industry\ FE + \sigma_i\, Time\ FE + e_{i,t} \quad (1)$$

Where the dependent variable ($Reneg_{(i,t)}$) is one when any renegotiation is observed and zero otherwise; $Size_{(i,t-1)}$ is measured by natural logarithm of total assets; $Lev_{(i,t-1)}$ is leverage, obtained from interest-bearing liabilities over total assets; $Ebitda_{(i,t-1)}$ measured by Earnings Before Interest, Taxes, Depreciation and Amortization over total assets; $MB_{(i,t-1)}$ is Market-to-book, measured by market value of equity over book value of equity; $Var\_Ebitda_{(i,t-1)}$ is variation of EBITDA ($Ebitda_{(t)} - Ebitda_{(t-1)}$) over total assets; $ROE_{(i,t-1)}$ is Return of Equity, measured by net income over market value of equity; $IC\_Ratio_{(i,t-1)}$ is interest coverage ratio, measured by EBIT over financial expense; and $Asset\_Int_{(i,t-1)}$ is asset intensity, measured by net property, plant, and equipment divided by total assets. Finally, we included dummies to control for the fixed effects of firm and time.

To test Hypothesis 1 that the worsening of companies' financial conditions can predict the occurrence of debt renegotiations, it is expected that the betas of the variables $Size_{(i,t-1)}$, $Ebitda_{(i,t-1)}$, $MB_{(i,t-1)}$, $ROE_{(i,t-1)}$, $IC\_Ratio_{(i,t-1)}$ and $Asset\_Int_{(i,t-1)}$ are negative and significant. On the other hand, the betas of the variables $Lev_{(i,t-1)}$ and $Var\_Ebitda_{(i,t-1)}$ are expected to be positive and significant.

Further, to test Hypothesis 2 and 3, we estimated the following logit model:

$$\mathrm{Counterpart}_{(i,t)} = \beta_0 + \beta_1 Size_{(i,t-1)} + \beta_2\, Lev_{(i,t-1)} + \beta_3\, Ebitda_{(i,t-1)} + \beta_4\, MB_{(i,t-1)} + \beta_5\, Var\_Ebitda_{(i,t-1)} + \beta_6\, ROE_{(i,t-1)} + \beta_7\, IC\_Ratio_{(i,t-1)} + \beta_8\, Asset\_Int_{(i,t-1)} + \beta_9\, Bank_{(i,t-1)} + \beta_8\, Capt_{(i,t-1)} + \mu_i\, Industry\ FE + \sigma_i\, Time\ FE + e_{i,t} \quad (2)$$

Where the dependent variable ($\mathrm{Counterpart}_{(i,t)}$) is a dummy that assumes value one when the renegotiation has a counterpart and zero otherwise; $Size_{(i,t-1)}$ is measured by natural logarithm of total assets; $Lev_{(i,t-1)}$ is leverage, obtained from interest-bearing liabilities over total assets; $Ebitda_{(i,t-1)}$ measured by Earnings Before Interest, Taxes, Depreciation and

Amortization over total assets; $MB_{(i,t-1)}$ is Market-to-book, measured by market value of equity over book value of equity; $Var\_Ebitda_{(i,t-1)}$ is variation of EBITDA ($Ebitda_{(t)} - Ebitda_{(t-1)}$) over total assets; $ROE_{(i,t-1)}$ is Return of Equity, measured by net income over market value of equity; $IC\_Ratio_{(i,t-1)}$ is interest coverage ratio, measured by EBIT over financial expense; and $Asset\_Int_{(i,t-1)}$ is asset intensity, measured by net property, plant, and equipment divided by total assets; $Bank_{(i,t-1)}$ is a dummy that assumes value one when a bank debt (not subdivided) renegotiation occurs and zero otherwise; $Capt_{(i,t-1)}$ is a dummy that assumes value one when a market capital debt renegotiation occurs and zero otherwise. Finally, we included dummies to control for the fixed effects of firm and time.

To test Hypothesis 2 that the worsening of companies' financial conditions is positively related to the imposition of a counterpart in the renegotiation. it is expected that the betas of the variables $Size_{(i,t-1)}$, $Ebitda_{(i,t-1)}$, $MB_{(i,t-1)}$, $ROE_{(i,t-1)}$, $IC\_Ratio_{(i,t-1)}$ and $Asset\_Int_{(i,t-1)}$ are negative and significant. On the other hand, the betas of the variables $Lev_{(i,t-1)}$ and $Var\_Ebitda_{(i,t-1)}$ are expected to be positive and significant.

Finally, to test Hypothesis 3 that there is a positive and significant relationship between renegotiation with bondholders and the imposition of counterparts, it is expected that the beta of the variable $Capt_{(i,t-1)}$ is positive and significant.

Table 1 presents each variable of the econometric model and its operationalization in detail.

Table 1. Summary of Models' Variables

Dependent Variable	**Acronym**	**Description**	**Basis' studies**
Renegotiation	$Reneg_{(i,t)}$	Dummy 1 when any renegotiation is observed and 0 otherwise	Roberts and Sufi (2009), Roberts (2015) and Nikolaev (2018).
Counterpart	$\mathrm{Counterpart}_{(i,t)}$	Dummy 1 when the renegotiation has a counterpart and 0 otherwise	Roberts and Sufi (2009), Roberts (2015) and Nikolaev (2018).
Explanatory Variables			
Size	$Size_{(i,t-1)}$	Natural logarithm of total assets	Roberts and Sufi (2009) and Nikolaev (2018).
Leverage	$Lev_{(i,t-1)}$	interest-bearing liabilities over total assets	Roberts and Sufi (2009) and Godlewski (2015).

Ebitda	$Ebitda_{(i,t-1)}$	Earnings Before Interest, Taxes, Depreciation and Amortization over total assets	Roberts and Sufi (2009) and Roberts (2015).
Market-to-Book	$MB_{(i,t-1)}$	Market value of equity over book value of equity	Roberts and Sufi (2009), Godlewski (2015) and Nikolaev (2018).
Ebitda Volatility	$Var\_Ebitda_{(i,t-1)}$	Variation of EBITDA ($Ebitda_{(t)} - Ebitda_{(t-1)}$) over total assets	Roberts and Sufi (2009) and Dou (2019).
Return on Equity	$ROE_{(i,t-1)}$	Net income over market value of equity	Roberts and Sufi (2009).
Asset Intensity	$Asset\_Int_{(i,t-1)}$	Net property, plant, and equipment divided by total assets	Nikolaev (2018).
Interest Coverage Ratio	$IC\_Ratio_{(i,t-1)}$	EBIT over financial expense	Dyreng, Hillegeist and Penalva (2020).
Bank Debt	$Bank_{(i,t-1)}$	Dummy 1 when a bank debt (not subdivided) renegotiation occurs and 0 otherwise	Póvoa and Nakamura (2015) and Ivashina, Iverson and Smith (2016)
Market Capital Debt	$Capt_{(i,t-1)}$	Dummy 1 when a market capital debt renegotiation occurs and 0 otherwise	Póvoa and Nakamura (2015) and Ivashina, Iverson and Smith (2016)

Following Roberts and Sufi (2009) and Roberts (2015), we lag all firm characteristics proxies in one-quarter relative to the renegotiation. In addition, all variables were winsorized (2.5 – 97.5) to mitigate the effect of outliers.

4. Results

4.1. Descriptive Statistics

Table 2 presents the descriptive statistics. The table is divided into three parts: total sample, sample with renegotiations and sample without renegotiations.

Table 2. Descriptive Statistics

Total Sample					
Variables	Obs	Mean	Std. Dev.	Min	Max

Size	11,602	7.805	1.808	3.796	11.222
Asset_int	11,602	0.263	0.233	0.000	0.805
IC_Ratio	11,149	6.661	17.420	-15.163	90.451
Lev	11,602	0.325	0.220	0.000	0.987
Ebitda	11,602	0.024	0.025	-0.037	0.089
MB	11,602	1.746	2.186	-0.978	9.319
Var_Ebitda	11,193	0.001	0.020	-0.056	0.058
ROE	10,281	-0.024	0.153	-0.758	0.161
With Renegotiation					
Variables	Obs	Mean	Std. Dev.	Min	Max
Size	299	8.440	1.297	4.077	11.222
Asset_int	299	0.288	0.250	0.000	0.805
IC_Ratio	295	1.865	10.356	-15.163	90.451
Lev	299	0.463	0.237	0.000	0.987
Ebitda	299	0.016	0.026	-0.037	0.089
MB	299	1.060	1.877	-0.978	8.879
Var_Ebitda	292	0.000	0.022	-0.056	0.058
ROE	259	-0.111	0.251	-0.758	0.161
Without Renegotiation					
Variables	Obs	Mean	Std. Dev.	Min	Max
Size	11,303	7.788	1.816	3.796	11.222
Asset_int	11,303	0.263	0.233	0.000	0.805
IC_Ratio	10,854	6.791	17.554	-15.163	90.451
Lev	11,303	0.321	0.218	0.000	0.987
Ebitda	11,303	0.024	0.025	-0.037	0.089
MB	11,303	1.764	2.191	-0.978	9.319
Var_Ebitda	10,901	0.001	0.020	-0.056	0.058
ROE	10,022	-0.022	0.149	-0.758	0.161

Note: *Size* is measured by natural logarithm of total assets; *Asset_int* is asset intensity, measured by net property, plant, and equipment divided by total assets; *IC_Ratio* is interest coverage ratio, measured by EBIT over financial expense; *Lev* is leverage, obtained from interest-bearing liabilities over total assets; *Ebitda* measured by Earnings Before Interest, Taxes, Depreciation and Amortization over total assets; *MB* is Market-to-book, measured by market value of equity over book value of equity; *Var_Ebitda* is absolute variation of EBITDA; and *ROE* is Return of Equity, measured by net income over market value of equity.

Table 2 shows that renegotiated companies tend to be larger and more leveraged on average. The average of the Size variable is 8.44 for the observations that presented renegotiation, while for the observations without renegotiation, this variable drops to 7.78. The leverage is 32.5% for the general sample and 46.3% for the observations with a renegotiation.

On the other hand, Table 2 also shows that the renegotiated sample has lower profitability (more negative profitability), lower market-to-book ratio and lower interest coverage ratio. The ROE of all companies, on average, is negative at -2.4%. For companies that renegotiated, this average goes to -11.1%. The market-to-book ratio and interest coverage are 1.86 and 1.06, respectively, for renegotiated companies. Whereas, for the sample that did not present renegotiation, these variables are 6.79 and 1.74, respectively. Roughly speaking, the

results seem to show that companies that renegotiated their debts are larger but are going through a financially bad moment.

4.2.Analysis of Econometric Models

Table 3 presents the results of the logit model estimation (equation 1) where the dependent variable is a dummy that assumes value one when a renegotiation occurs and zero otherwise. In column I, the model was estimated without the fixed effects of time and industry. On the other hand, in column 2 are the model estimation with the time and industry fixed effects control.

Table 3. Determinants of Renegotiation

Variables	(1) Logit	(II) Logit
Size	**0.271*** **	**0.192*** **
	(0.0393)	**(0.0559)**
Asset_int	0.266	**0.639***
	(0.277)	**(0.332)**
IC_Ratio	-0.0115	-0.00846
	(0.00879)	(0.00831)
Lev	**2.050*** **	**0.807** **
	(0.286)	**(0.358)**
Ebitda	**-12.11*** **	**-11.16** **
	(3.958)	**(4.454)**
MB	**-0.130*** **	**-0.138*** **
	(0.0424)	**(0.0448)**
Var_Ebitda	**7.110** **	3.455
	(3.555)	(4.138)
ROE	**-1.076*** **	**-1.147*** **
	(0.329)	**(0.377)**
Constant	**-6.290*** **	**-3.960*** **
	(0.370)	**(0.800)**
Industry FE	NO	YES
Time FE	NO	YES
Observations	9,653	8,230
Pseudo R2	0.081	0.203
Prob	0.000	0.000
LRoc	0.730	0.834

Note: The dependent variable *Reneg* is a dummy that assumes value one when a renegotiation occurs and zero otherwise; *Size* is measured by natural logarithm of total assets; *Asset_int* is asset intensity, measured by net property, plant, and equipment divided by total assets; *IC_Ratio* is interest coverage ratio, measured by EBIT over financial expense; *Lev* is leverage, obtained from interest-bearing liabilities over total assets; *Ebitda* measured by Earnings Before Interest, Taxes, Depreciation and Amortization over total assets; *MB* is Market-to-book, measured

by market value of equity over book value of equity; *Var_Ebitda* is absolute variation of EBITDA; and *ROE* is Return of Equity, measured by net income over market value of equity; ***p < 0.01, **p < 0.05, *p < 0.10.

The results of models I and II are in line with those obtained by descriptive statistics. The Lev variable showed a positive relationship with the renegotiation, while the Ebitda, MB and ROE variables showed a negative relationship. These results may indicate that a lower borrower's ability to repay the loan may trigger debt renegotiation with creditors. We can not reject hypothesis 1 that the worsening of companies' financial conditions can predict the occurrence of debt renegotiations.

Lenders tend to avoid the bankruptcy of companies. Firstly, due to the high costs involved in the bankruptcy process (Silaghi et al., 2022). Second, due to the low protection of creditor's rights in emerging countries (Machokotoa & Areneke, 2020). Therefore, faced with a situation in which the company loses its ability to pay, creditors tend to agree to renegotiate the debt with the borrower.

Contrary to what was expected, the Size variable showed a positive relationship with renegotiations as in Roberts and Sufi (2009). This result may indicate the greater bargaining power of companies that manage to renegotiate. In other words, as the company's size grows, it tends to demand larger amounts of financing, thus increasing its bargaining power with creditors.

In general, these results were close to those found by Robers and Sufi (2009) and demonstrate that not only the loss of payment capacity is the factor that triggers renegotiation. The increase in bargaining power also increased the likelihood of debt renegotiation.

In a second test, we analyzed the determinants of renegotiation counterparts. So, we kept only observations with renegotiation and created a dummy that assumes value one when the renegotiation has a counterpart and zero otherwise. The results are shown in table 3.4. In column I, the model was estimated without the fixed effects of time and industry. Column 2 presented the model estimation with the time and industry fixed effects control.

Table 4. Determinants of Renegotiations Counterparts

VARIABLES	(I) Logit	(II) Logit
Size	0.146	0.134
	(0.116)	(0.172)
Asset_int	-0.432	-0.935
	(0.586)	(0.888)
IC_Ratio	**-0.110****	**-0.0647****
	(0.0478)	**(0.0294)**
Lev	-0.373	-1.569
	(0.623)	(1.059)

Ebitda	**35.11*** **	**26.84** **
	(9.846)	**(11.13)**
MB	**-0.177** **	-0.156
	(0.0809)	(0.107)
Var_Ebitda	-6.586	-3.628
	(7.294)	(8.485)
ROE	**-1.383** **	**-1.781** **
	(0.683)	**(0.865)**
Bank	0.259	0.566
	(0.419)	(0.563)
Capt	**1.403*** **	**2.049*** **
	(0.438)	**(0.587)**
Constant	**-2.349** **	-2.366
	(1.126)	(2.475)
Industry FE	NO	YES
Time FE	NO	YES
Observations	254	233
Pseudo R2	0.114	0.222
Prob	0.000	0.000
LRoc	0.732	0.814

Note: The dependent variable Counterpart is a dummy that assumes value one when the renegotiation has a counterpart and zero otherwise; *Size* is measured by natural logarithm of total assets; *Asset_int* is asset intensity, measured by net property, plant, and equipment divided by total assets; *IC_Ratio* is interest coverage ratio, measured by EBIT over financial expense; *Lev* is leverage, obtained from interest-bearing liabilities over total assets; *Ebitda* measured by Earnings Before Interest, Taxes, Depreciation and Amortization over total assets; *MB* is Market-to-book, measured by market value of equity over book value of equity; *Var_Ebitda* is absolute variation of EBITDA; *ROE* is Return of Equity, measured by net income over market value of equity; *Bank* is a dummy that assumes value one when a bank renegotiation occurs and zero otherwise; and *Capt* is a dummy that assumes value one when a market capital renegotiation occurs and zero otherwise. ***p < 0.01, **p < 0.05, *p < 0.10.

According to table 4, the variables MB, IC_Ratio and ROE were negatively significant. As these variables are reduced, the chance of renegotiation with counterpart increases. This result may indicate a greater imposition of restrictions by the creditor due to the increased risk promoted by the reduction in the firm's ability to pay. In other words, the increase in control through the imposition of the counterpart can be a mechanism the creditor uses to reduce the risks of reducing the firms' ability to pay. Therefore, we can not reject hypothesis 2 of this study that worsening companies' financial conditions is positively related to the imposition of a counterpart in the renegotiation.

On the other hand, contrary to what was expected, the Ebitda variable is statistically positive. This result can be interpreted in the light of agency theory. With a greater volume of available cash, the possibility of having unnecessary expenses, inefficient investments or transferring wealth to shareholders increases, thus may expropriate creditors (Jensen, 1986). To avoid the possibility of expropriation, creditors can establish, for example, covenants that restrict the use of resources by the company as a counterpart of the renegotiation. It is important

to mention the high magnitude of the coefficient in both models (35.1 and 26.8, respectively), which denotes the economic significance of this variable in predicting the occurrence of renegotiation.

Finally, this model included two variables representing the type of creditor granted the renegotiation. The results showed that renegotiations with bondholders increase the chances of renegotiations with a counterpart, while there was no significance for banks.

Armstrong et al. (2010) argue that the informal relationship between creditors and borrowers can influence aspects related to debt contracts. Therefore, this result can be explained by the characteristics of the relationship promoted by these two types of creditors. On the one hand, banks seek to establish a closer relationship with borrowers since they operate with a long-term perspective (Berlin & Loyes, 1988; Chemmanur & Fulghieri, 1994). For this reason, banks are expected to be less willing to impose counterparts on their borrowers. On the other hand, bondholders have a short-term view and have less access to soft information than banks (Lou & Otto, 2020). So, bondholders are expected to be more willing to impose counterparts in debt renegotiation. Based on this result, we cannot reject hypothesis 3 of this study: there is a positive and significant relationship between renegotiation with bondholders and the imposition of counterparts. As far as we know, these results are unprecedented in the debt renegotiation literature and contribute to the discussion about the impacts of different creditors on firms.

4.3.Additional Analysis: Determinants of the Counterparts' Intensity

As an additional analysis, we estimate a model to test the determinants of the "intensity" of the counterpart. The models' dependent variable is the number of existing counterparts in a single renegotiation. Table 5 presents some characteristics of renegotiations with counterparts.

Table 5. Characteristics of Counterparts Renegotiations

Total Companies that Renegotiated	Companies that Renegotiated with Counterpart	Total Renegotiations with Counterparts	Minimum Renegotiations with Counterpart	Maximum Renegotiation with Counterpart
110	65	119	1	18

Note: The total number of renegotiations with a counterpart exceeds the total number of companies that renegotiated, given that there are companies that renegotiated more than once.

According to table 5, of the 110 companies that renegotiated, 65 (59%) renegotiated with counterparts. The total number of renegotiations with counterparts in the period was 119. A single company in the sample ("Gol Linhas Aéreas S.A") presented 18 renegotiations with

counterparts. Due to the crisis suffered by the company in recent years, the counterparts may have been a way of reducing creditors' risks.

The model estimation was performed using a Poisson regression. The beta coefficient of the test proposed by Cameron and Triverdi (1990) (p-value 0.197) was not statistically significant. This shows that the model has no variance overdispersion, therefore the Poisson model is preferable to the Negative Binomial model. Table 6 presents the results of the Poisson estimation.

Table 6. Determinants of Renegotiations Counterparts Intensity

Variables	(I) Poisson
Size	**0.173****
	(0.0737)
Asset_int	0.0158
	(0.387)
IC_Ratio	**-0.0721*****
	(0.0270)
Lev	-0.468
	(0.400)
Ebitda	**13.67****
	(5.688)
MB	**-0.119****
	(0.0593)
Var_Ebitda	4.228
	(4.762)
ROE	**-0.715***
	(0.388)
Bank	0.1000
	(0.307)
Capt	**0.748****
	(0.300)
Constant	**-2.456*****
	(0.728)
Observations	254
LR chi2	34.97***
Pseudo R2	0.074

Note: The dependent variable Counterparts_Intensity represents the number of counterparties in a renegotiation; *Size* is measured by natural logarithm of total assets; *Asset_int* is asset intensity, measured by net property, plant, and equipment divided by total assets; *IC_Ratio* is interest coverage ratio, measured by EBIT over financial expense; *Lev* is leverage, obtained from interest-bearing liabilities over total assets; *Ebitda* measured by Earnings Before Interest, Taxes, Depreciation and Amortization over total assets; *MB* is Market-to-book, measured by market value of equity over book value of equity; *Var_Ebitda* is absolute variation of EBITDA; *ROE* is Return of Equity, measured by net income over market value of equity; *Bank* is a dummy that assumes value one when a bank renegotiation occurs and zero otherwise; and *Capt* is a dummy that assumes value one when a market capital renegotiation occurs and zero otherwise. ***p < 0.01, **p < 0.05, *p < 0.10.

The variables IC_Ratio, MB and ROE were negatively significant. It means that creditors tend to impose more counterparts in the face of a possible greater loss in the firm's ability to pay, reducing their risks.

The Capt variable was also significant and positive. Therefore, bondholders tend to impose more counterparts when renegotiating with the borrower. The results also showed a positive relationship between Ebitda and renegotiation intensity. This result may be a response by creditors to the increased shareholders' expropriation risk in the face of greater cash generation potential. Finally, contrary to what might be expected, the size variable was also positive and significant. It means that, the larger the company's size, the greater the amount of counterpart the creditor imposes. This result may indicate that larger companies renegotiate more and in greater volume, requiring more counterparts to provide security to the creditor

In general, this study presented unprecedented results in the literature, opening up an avenue of possibilities for further research. In addition, based on these results, companies can improve their decision-making regarding renegotiation or at least anticipate some renegotiation results.

5. Concluding Remarks

Given the existence of incomplete contracts (where it is impossible to specify all the contingencies that may occur in the future), debt renegotiation is an important instrument to guarantee the maintenance of long-term contracts. Previous studies have shown that debt renegotiation is common in companies' reality and may occur several times throughout the contract. However, most of these studies have focused on renegotiation in specific contexts, such as U.S. and European.

Characteristics typical of emerging economies, such as the low protection of the creditor's rights, underscore the importance of researching debt renegotiations in a context different from that of developed economies. Therefore, this study was born to offer empirical evidence about debt renegotiation in an emerging economy country: Brazil. For the preparation of this study, we built a hand-held data collection database of publicly held Brazilian companies' renegotiations between 2010 and 2021.

The results showed that the change in the financial condition of companies increases the probability of debt renegotiation for Brazilian companies. In addition, renegotiations are more likely to be accompanied by counterparts when there is a worsening in the companies' ability to pay the debt. In other words, creditors tend to impose stricter conditions on renegotiations

when the company has a worsening ability to pay (lower interest coverage ratio and return on equity). However, in addition, the study showed that the increase in potential cash flow (Ebitda) also tends to increase the probability of counterparty in renegotiations (as a way of reducing the risk of creditors' expropriation) Finally, the study also showed that, unlike banks, renegotiations with bondholders are more likely to have counterparts.

To sum up, the results related to the counterparts are in line with the context in which the research was developed. In the context of low protection of the creditor's rights and high information asymmetry, the counterpart in renegotiations can reduce the creditor's risk. Future studies could investigate the counterparts in contexts different from those of this study in order to expand the empirical evidence.

This study contributes to the literature by considering a context little explored in studies on renegotiation: emerging economy. In addition, this study innovates by addressing the counterparts in renegotiations, which is also little explored in the literature. Furthermore, unlike previous studies, we collected data from renegotiations with bondholders, making it possible to identify differences between renegotiations of different types of creditors.

Finally, this study offers a significant practical contribution, especially by showing companies the factors that tend to increase the chances of a counterparty in renegotiations. Therefore, companies can improve their decision-making or at least anticipate some renegotiation results.

It is important to mention that this study has some limitations. The first limitation concerns the quality of the information collected. Although there is a rule that requires renegotiation disclosure in case of a covenants' breach, there is no requirement regarding what information to publish. This may have biased the database. Furthermore, considering there is no exogenous shock in the econometric tests, there may be a bias in the firm's decision to seek to renegotiate the contracts, undermining the attribution of causality in the tests.

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