

## Ownership Structure and Debt Maturity in the Brazilian Market

### Abstract

The study analyzes the effect of ownership structure on the Brazilian firm debt maturity. The sample is an unbalanced panel dataset with 2,643 firm-year observations from 262 firms listed on the Brazilian stock exchange (B3). The results show that the debt maturity of Brazilian firms is influenced by the firm ownership structure. Specifically, ownership concentration, shareholding control configuration, and the identity of the main shareholder impact agency conflicts in the Brazilian firm. The research contributes to the debate on debt maturity by providing additional evidence for an emerging market, where firms are characterized by their dependence on bank credit, high ownership concentration, and low trading volume on the stock exchange. Therefore, analyzing the largest economy in Latin America, Brazil, with its idiosyncrasies, makes the study of the “capital structure puzzle” relevant from a theoretical perspective by deepening theories proposed for firms in developed markets.

**Keywords:** Ownership Structure; Debt Maturity; Brazilian Firms.

### 1 Introduction

Capital structure is the combination of debt (third-party capital) and equity (shareholders' equity), which firms use to finance their growth opportunities (Al-Haddad et al., 2024; Rehan et al., 2023). Regarding debt, firms promise to pay bondholders periodic cash flows through interest payments, in addition to the principal amount, in exchange for the loan received in the present (D'Mello & Gruskin, 2021). Concerning equity, investors who allocate resources to the firm—either through shares (corporations) or capital contributions (limited liability companies)—have the right to claim firm residual profits, as well as to participate and vote in general shareholders' meetings (Brandão & Crisóstomo, 2023).

Capital structure can be considered one of the main topics in corporate finance, influenced by internal factors (e.g., agency problems and corporate governance mechanisms) and external factors (e.g., financing constraints motivated by information asymmetry) (Zhou & Li, 2024). Understanding the scope, relationships, and strength of these factors (both internal and external) may help firms make effective decisions regarding their capital structure, aiming

for financial stability and consistent long-term growth (Mokhova & Zinecker, 2014). In this regard, face the challenge of achieving and sustaining the optimal debt-equity mix, which is a significant and central issue in current corporate finance. The relevance of this topic is explained by the fact that any profit-oriented company's main objective is to maximize shareholder wealth (Kyissima et al. 2020) Rani et al. (2020).

In this sense, a company's capital structure plays a fundamental role in shaping its financial health, encompassing business strategy, risk profile, cost of financing, and performance (Li et al., 2024; Zhao & Zhang, 2024). Therefore, a company needs to carefully and rationally assess its capital structure, as capital efficiency can drive stock prices up and consequently have a positive impact on firm value (Putri & Willim, 2024). However, poor capital structure choices can lead companies to financial difficulties and, ultimately, bankruptcy (Rani et al., 2020).

According to Muhammad et al. (2021), the dilemma regarding which capital structure option a company should adopt has increased researchers' interest in the topic, stimulating the development of various theories that consider market imperfections to determine the optimal capital structure and factors influencing this decision, such as trade-off (Myers, 1984); pecking order (Myers, 1984; Myers & Majluf, 1984); agency (Jensen & Meckling, 1976; Jensen, 1986); and market timing theories (Baker & Wurgler, 2002). Empirically, previous research has confirmed the importance of all these theories in explaining the capital structure of firms in diverse institutional environments (Bilgin & Dinc, 2019; Block et al., 2024; Carvalho et al., 2019; Duppati et al., 2023; Faccio & Xu, 2015; Ramli et al., 2019; Sun et al., 2016).

In light of agency theory, conflicts of interest between owners and managers, as well as between controlling and minority shareholders, can influence a company's financing structure for different reasons. These include the use of debt as a disciplinary mechanism for managerial actions, the pursuit of maximizing the tax shield associated with debt, and the concern—especially among large shareholders—regarding the issuance of new shares due to the risk of losing control (Bastos & Nakamura, 2009; Jensen, 1986; San Martín & Saona, 2017; Stein, 2003; Stulz, 1990; Young et al., 2008). Thus, ownership structure can influence a company's investment and financing policies.

The relationship between ownership structure and capital structure is a topic discussed in the corporate finance literature (Jensen, 1986). Typically, this relationship is addressed in greater volume through the possible effect of ownership concentration on leverage (Bruslerie

& Latrous, 2012; Céspedes et al., 2010; Crisóstomo & Pinheiro, 2015; Feng et al., 2020; Gödecke & Schiereck, 2024; Goergen & Renneboog, 2001). However, there is still a lack of studies qualifying the influence of ownership structure in various aspects, i.e., ownership concentration, shareholding control configuration (dominant, shared, and dispersed), and identity of the main shareholder (non-financial firm, family, government, and institutional investor) on debt maturity. Therefore, based on this research gap, this article aims to analyze the effect of ownership structure on the debt maturity of Brazilian firms.

Analyzing factors such as ownership structure that may influence the way companies finance themselves through debt maturity can be considered relevant research, especially in developing markets such as Brazil, considering that capital structure theories were developed based on developed economies (Farhangdoust et al., 2020; Tran, 2022; Zaighum et al., 2024). In this regard, Bajaj et al. (2021) reinforce the previous idea through a systematic review on the topic of capital structure in high-impact international journals and highlight as a research gap the lack of studies in developing economies, in contrast to the evaluation of developed economies.

## **2 Background and Hypotheses**

To achieve the optimal capital structure, companies need to determine not only the appropriate balance between equity and debt but also the suitable debt maturity. This involves understanding how much and when the company's future cash flows will be used to remunerate its debt holders (Nakamura et al., 2011).

According to Póvoa and Nakamura (2015), empirical studies generally treat debt as a homogeneous source of funds, thus overlooking that a company's debt structure can be composed of different types of financing instruments, which vary among themselves. The authors further highlight that debt instruments differ in several aspects, such as maturity, origin, collateral, ease of access, effects on cash flow, transaction costs, and incentives for managers. Regarding debt maturity, Silva et al. (2017) emphasize that less academic attention has been given to decisions and determinants on this topic.

For Vallelado and Saona (2011), a firm's target debt maturity structure involves balancing the benefits and drawbacks associated with this decision. The authors list, as examples, that long-term debts offer advantages such as greater tax benefits, lower insolvency risk, and the disciplinary effect of debt, while short-term debts result in lower costs, higher risk

of financial distress, and reduce agency problems such as underinvestment and risk shifting. Consequently, the decision on debt maturity implies a trade-off between liquidity risk, associated with short-term debts, and the underinvestment problem, which is more prevalent in the use of long-term debts (Kuroda et al., 2019).

The analysis of bank debt maturity is directly linked to the regulation and institutional context in which the firm operates. It is expected that, in civil law countries (such as Brazil), bank debt terms are shorter than in common law countries (such as the United States) when financing future growth opportunities, due to differences in the quality of institutions and legal systems in both settings (Vallelado et al., 2017). In line with this, Silva et al. (2017) state that access to financial markets in developed countries occurs through greater availability of third-party funds, with lower costs and longer repayment terms.

### ***2.1 Debt Maturity and Ownership Concentration***

Agency theory provides an appropriate theoretical framework to analyze the possible influence of ownership structure on debt maturity, considering the relationship between different agency conflicts (Feito-Ruiz & Menéndez-Requejo, 2022; Shyu & Lee, 2009; Vallelado et al., 2017). For instance, long-term debt allows managers and owners greater discretion, whereas short-term debt increases external monitoring by creditors and therefore reduces managers' discretion over the firm's free cash flow (Jensen, 1986). Thus, short-term securities are more usual in scenarios of adverse macroeconomic conditions (Mundi et al., 2022) whereas firms in developed countries have easier access to long-term debt (Vallelado & Saona, 2011).

An analysis of 38 countries documented that ownership concentration is an important determinant of debt maturity, and that this effect is influenced not only by the firm's institutional environment but also by differences in shareholders' rights [Martins et al. (2020)]. The authors explain that debt maturity tends to be negatively associated with ownership concentration, with this association being stronger in countries where minority shareholder protection and creditor rights are relatively weak, since in such environments minority shareholders and creditors are presumed unable to adequately monitor firm activities. On the other hand, the researchers observed a positive association between ownership concentration and debt maturity in countries where minority shareholder protection and creditor rights are strong. In this regard, Brazilian firms operate in an environment where minority shareholder protection and creditor rights are

relatively weak (Brandão & Crisóstomo, 2024), resulting in insufficient monitoring of business activities. Accordingly, as proposed by Martins et al. (2020), a negative association between ownership concentration and long-term debt maturity is assumed. Therefore, a general hypothesis (H1) and a specific hypothesis (H1a) are formulated:

***Hypothesis 1:*** *Ownership concentration influences debt maturity in Brazilian firms.*

***Hypothesis 1a:*** *Ownership concentration negatively influences long-term debt maturity in Brazilian firms.*

Nevertheless, despite the proposed hypothesis, empirical evidence on the association between ownership concentration and debt maturity remains inconclusive. Cai et al. (2008), analyzing listed firms in China, found that firms with higher ownership concentration tend to opt for shorter-term debt. Similarly, Deesomsak et al. (2009), studying firms from various Asia-Pacific countries, observed that ownership concentration is inversely related to debt maturity. However, Arslan and Karan (2006), when evaluating Turkish firms, noted that higher ownership concentration increases debt maturity. Supporting this latter study, Shyu and Lee (2009), analyzing Taiwanese companies, also identified a positive relationship between ownership structure and debt maturity. These inconsistent results may be attributed to the fact that previous studies overlooked the nonlinear relationship between ownership concentration and debt maturity.

In line with this, García-Teruel and Martínez-Solano (2010), analyzing Spanish firms, found evidence of a nonlinear (concave) relationship between debt maturity and the presence of a large shareholder. Moreover, the authors state that this relationship is positive when large shareholder ownership concentration is low and becomes negative at higher levels of ownership concentration. Martins et al. (2017), considering companies from Brazil and Chile, also found similar results—that is, a positive association between low ownership concentration and debt maturity. However, this association turns negative when the largest shareholder has a high ownership concentration. The authors suggest that long-term debt and ownership concentration act as substitute monitoring mechanisms.

Based on this scenario, the study proposes the existence of a nonlinear relationship between ownership concentration and debt maturity, as detailed in the hypothesis below:

***Hypothesis 1b:*** *There is a negative quadratic (inverted U-shaped) relationship between ownership concentration and long-term debt maturity. This relationship is positive up to a certain concentration threshold, after which excessive private benefits of*

*control may harm the relationship with the financing market, and the relationship becomes negative.*

## **2.2 Debt Maturity and Shareholding Control Configuration**

Arslan and Karan (2006) found that both ownership concentration and the presence of a large shareholder are related to corporate debt maturity. Their findings support the prediction that as firms become financially stable or have greater growth opportunities, they shorten their corporate debt maturity structure. Moreover, despite having a large controlling shareholder or a concentrated ownership structure, firms with growth opportunities still prefer shorter debt maturities to address underinvestment problems. Therefore, it is proposed that the type of controlling shareholder may be related to debt maturity:

***Hypothesis 2:*** *The type of controlling shareholder influences debt maturity in Brazilian firms.*

Considering the Brazilian context and the arguments presented in Hypothesis 1, it is plausible to believe that high ownership concentration, represented by controlling types such as dominant and shared control, favors short-term debt maturity due to management monitoring. Consequently, these types of control would negatively impact long-term debt maturity. Regarding dispersed ownership, the hypothesis is that, in such firms, corporate governance mechanisms improve minority shareholder protection and creditor rights, resulting in an inverse relationship with debt maturity compared to dominant and shared control.

***Hypothesis 2a:*** *Dominant control **negatively** influences long-term debt maturity in Brazilian firms.*

***Hypothesis 2b:*** *Shared control **negatively** influences long-term debt maturity in Brazilian firms.*

***Hypothesis 2c:*** *Dispersed control **positively** influences long-term debt maturity in Brazilian firms.*

## **2.3 Debt Maturity and Identity of the Main Shareholder**

Debt is one of the primary means of raising capital for firms in Brazil and worldwide, and the debt maturity structure is an essential component in corporate capital structure decisions (Wu et al., 2022). Thus, this study proposes that the identity of the main shareholder (non-financial firm, family, government, and institutional investor) is an aspect of ownership structure that influences debt maturity, according to the hypothesis presented below:

***Hypothesis 3:*** *The identity of the main shareholder influences debt maturity in Brazilian firms.*

According to Nguyen et al. (2022), the type of ownership by non-financial firms acting as large shareholders (blockholders) represents a model of significant interest to researchers. A study by Crisóstomo et al. (2014), analyzing Brazilian companies, showed that the presence of non-financial firms as blockholders can mitigate financial constraints, suggesting that this type of ownership is capable of reducing agency conflicts and information asymmetry, thereby improving the firm's investment capacity and access to external financing.

***Hypothesis 3a: Non-financial firms, as main shareholders, positively influence long-term debt maturity in Brazilian firms.***

Long-term debt is more sensitive to information asymmetries, but family ownership may have a moderating effect on this relationship (Thiele & Wendt, 2017). Thus, family ownership, as an organizational structure, can mitigate agency conflicts between firms and debt-providing financial institutions (Gómez-Mejía et al., 2007). In this regard, Croci et al. (2011) state that credit markets are interested in providing long-term debt to family firms because they perceive these borrowers as less risky compared to other types of firms.

Mundi et al. (2022), through qualitative research with financial managers of family firms in India, found that firms in that context prefer short-term debt over long-term debt. The main reasons for this preference were: i) greater discipline; ii) increased pressure to make payments; iii) financial institutions' regular monitoring; iv) short-term debt being sufficient for the firm; v) less restrictive collateral and bureaucracy requirements; vi) variety of short-term debt instruments; and vii) inflexible payment terms involved in long-term debt financing.

***Hypothesis 3b: Family ownership, as main shareholder, positively influences long-term debt maturity in Brazilian firms.***

Firms whose main shareholder is the government tend to have easier access to bank credit due to governmental involvement (Li et al., 2009; Liang et al., 2023). Since Brazil is characterized by the presence of state financial institutions, including public banks focused on long-term financing, it is expected that firms with the government as the principal shareholder will tend to have longer-term debt, which implies an effect on debt maturity.

***Hypothesis 3c: Government ownership, as main shareholder, positively influences long-term debt maturity in Brazilian firms.***

Wu et al. (2022) highlight that few studies investigate the relationship between debt maturity and institutional investors, who, despite being diversified investors, are often

considered rational investors who actively and consistently monitor their investee firms to balance risk and return. They recommend that future research consider the effect of institutional ownership on debt maturity structure. In this perspective, the present study addresses this recommendation by evaluating the possible relationship between these concepts.

Institutional investors are considered external shareholders interested in the financial return of their own shares and, therefore, may actively participate in the governance of the firms they invest in, possibly impacting agency relationships between managers and shareholders, as well as between majority and minority shareholders (Jara-Bertin et al., 2012). Accordingly, Wang and Zhang (2023) argue that institutional investors with high ownership concentration have strong incentives to monitor firm management, for example, through debt. The authors further highlight that monitoring and discipline associated with shorter-term debt maturity make it an excellent candidate as a complementary monitoring mechanism. This occurs because managers of firms with more short-term debt face greater risk, which can then translate into minimizing excessive perquisite consumption, as detailed by agency theory.

***Hypothesis 3d:** Institutional investors, as main shareholders, positively influence short-term debt maturity in Brazilian firms.*

### 3 Methodology

#### 3.1 Sample

The sample consists of 262 companies listed on the Brazilian stock exchange (Brasil, Bolsa e Balcão – B3), resulting in an unbalanced panel of 2,643 annual observations. The analysis period covers the fiscal years from 2010 to 2022 and includes 16 sectors of the Brazilian economy, as presented in Table 1. The start of the time series is justified by the issuance of a regulatory instruction by the Brazilian Securities and Exchange Commission (CVM), which began requiring listed companies in Brazil to disclose information, including those related to ownership structure. Furthermore, it is worth noting that Brazilian accounting information has been fully aligned with the International Financial Reporting Standards (IFRS) since 2010 (Santos et al., 2014).

**Table 1 – Sample split by sector**

Sector	No. of Obs.	%	No. of Firms	%
Electric Power	366	13.85%	38	14.50%
Construction	220	8.32%	22	8.40%
Retail	203	7.68%	20	7.63%

Steel and Metallurgy	179	6.77%	17	6.49%
Vehicles, Parts, and Industrial Machinery	175	6.62%	16	6.11%
Textile	164	6.21%	14	5.34%
Agribusiness, Fisheries, Food, and Beverages	153	5.79%	15	5.73%
Business and Enterprise Management	141	5.33%	12	4.58%
Transportation Services	138	5.22%	13	4.96%
Electronics, Telecommunications, Software, and Data	128	4.84%	14	5.34%
Chemicals, Pulp and Paper	126	4.77%	12	4.58%
Real Estate Activities	123	4.65%	11	4.20%
Mining and Non-metallic Minerals	57	2.16%	6	2.29%
Oil and Gas	52	1.97%	6	2.29%
Other Services	310	11.73%	33	12.60%
Other Industries	108	4.09%	13	4.96%
<b>Total</b>	<b>2,643</b>	<b>100.00%</b>	<b>262</b>	<b>100.00%</b>

To mitigate potential estimation biases, companies from the financial sector were excluded from the sample. Additionally, observations lacking any of the study's variables were removed, ensuring the inclusion of only firms with complete data. Firms with fewer than three observations across the time series were also excluded, considering the use of panel data.

### 3.2 Variables

Debt maturity is examined from the perspective of debt term, distinguishing between short-term and long-term maturities. Ownership structure is analyzed based on three aspects: ownership concentration, shareholder control configuration, and identity of the main shareholder. The measurement of these variables is presented in Table 2.

**Table 2 – Measurement of debt maturity and ownership structure variables**

Variable	Description	Source	Theoretical Foundation
Short-Term Debt Maturity (DM_ST)	Short-Term Debt / Total Debt	Economática®	Valladolid et al. (2017); Zeitun and Goaid (2022)
Long-Term Debt Maturity (DM_LT)	Long-Term Debt / Total Debt	Economática®	Feito-Ruiz et al. (2023); Martins et al. (2020); Saona and Valladolid (2014)
Ownership Concentration (OWN_CONC)	Percentage of voting shares held by the main shareholder (from 1st (OWN_CONC1) to 5th (OWN_CONC5))	Economática®	Liang et al. (2023); Mbanyele (2020); Sampaio et al. (2024)
Ownership Concentration Squared (OWN_CONC <sup>2</sup> )	Square of the percentage of voting shares held by the main shareholder (from 1st (OWN_CONC1 <sup>2</sup> ) to 5th (OWN_CONC5 <sup>2</sup> ))	Economática®	Crisóstomo and Pinheiro (2015); Mbanyele (2020); Sampaio et al. (2024)

Dispersed (DISP)	Dummy variable equal to 1 if ownership is dispersed, 0 otherwise	CVM Reference Form - Item 15.1 / 2 and 15.5 (from 2016) and 8.1 (before 2016)	Brandão and Crisóstomo (2023, 2024); Crisóstomo et al. (2023)
Shared (SHARED)	Dummy variable equal to 1 if ownership is shared, 0 otherwise		Brandão and Crisóstomo (2023, 2024); Crisóstomo et al. (2023)
Dominant (DOMIN)	Dummy variable equal to 1 if ownership is dominant, 0 otherwise		Brandão and Crisóstomo (2023, 2024); Crisóstomo et al. (2023)
Non-Financial Firm (NONFIN)	Dummy variable equal to 1 if the main shareholder is a non-financial firm, 0 otherwise	Economática®	Crisóstomo et al. (2014); Feito-Ruiz et al. (2023)
Family (FAM)	Dummy variable equal to 1 if the main shareholder is a family/individual, 0 otherwise	Economática®	Boumlik et al. (2024); Feito-Ruiz et al. (2023); Saona et al. (2020)
Government (GOV)	Dummy variable equal to 1 if the main shareholder is a government entity, 0 otherwise	Economática®	Rocha (2022); Saona et al. (2020); Saona and Vallelado (2014)
Institutional Investor (INST)	Dummy variable equal to 1 if the main shareholder is an institutional investor, 0 otherwise	Economática®	Feito-Ruiz et al. (2023); Saona et al. (2020); Saona and Vallelado (2014)

Regarding the control variables used in the article, their operational definitions and the theoretical foundations supporting their inclusion are presented in Table 3.

**Table 3 – Measurement of control variables**

Variable	Description	Source	Theoretical Foundation
Profitability (ROA)	Earnings Before Interest and Taxes (EBIT) / Total Assets	Economática®	Farooq et al. (2025); Zaman et al. (2023); Zeitun and Goaid (2021)
Firm Size (SIZE)	Natural logarithm of total assets	Economática®	Brandão et al. (2024); Jara et al. (2019); Safiullah et al. (2022)
Tangibility (TANG)	Fixed Assets / Total Assets	Economática®	Cid et al. (2022); Liang et al. (2023); Pinheiro et al. (2017)
Growth Opportunities (GR_OPP)	(Market Value + Liabilities) / Total Assets	Economática®	Crisóstomo et al. (2021); Saona et al. (2020, 2024)
Risk (RISK)*	Altman Z-Score = 6.56(Working Capital / Total Assets) + 3.26(Retained Earnings / Total Assets) + 6.72(Operating Income / Total Assets) + 1.05(Book Value of Equity / Total Liabilities) + 3.25	Economática®	Altman (2005); Ntoug et al. (2020); Saona et al. (2024)
Industry Sector (IND_SECTOR)	Dummy variables indicating the industry sector	Economática®	-
Year of Observation (YEAR)	Dummy variables indicating the year of each observation	-	-

Note: \* By definition, higher values of the RISK variable (Altman Z-Score) indicate a lower likelihood of firm default, reflecting an inverse relationship in the interpretation of this variable's results.

### 3.3 Econometric Models and Procedures

To analyze the effect of ownership structure (OWN\_STRUCT) on debt maturity (DM), the econometric model corresponding to Equation 1 is developed.

$$DM_{i,t} = \beta_0 + \beta_1 OWN\_STRUCT_{i,t} + \beta_2 \sum CONTROLS_{i,t} + \varepsilon \quad (1)$$

Equation 1 is further detailed in subsequent equations to better clarify the hypotheses. Equation 1.1 tests the possible effect of ownership concentration (OWN\_CONC) and its square (OWN\_CONC<sup>2</sup>) on debt maturity. Equation 1.2 assesses whether the shareholding control configuration (CTRL\_TYPE) influences debt maturity. Finally, Equation 1.3 tests whether the identity of the main shareholder (MAIN\_SHR) influences debt maturity.

$$DM_{i,t} = \beta_0 + \beta_1 OWN\_CONC_{i,t} + \beta_2 OWN\_CONC^2_{i,t} + \beta_3 \sum CONTROLS_{i,t} + \varepsilon \quad (1.1) \text{ (Hypothesis: 1)}$$

$$DM_{i,t} = \beta_0 + \beta_1 CTRL\_TYPE_{i,t} + \beta_2 \sum CONTROLS_{i,t} + \varepsilon \quad (1.2) \text{ (Hypothesis: 2)}$$

$$DM_{i,t} = \beta_0 + \beta_1 MAIN\_SHR_{i,t} + \beta_2 \sum CONTROL_{i,t} + \varepsilon \quad (1.3) \text{ (Hypothesis: 3)}$$

In all models,  $\beta_0$  is the intercept,  $\beta$  are the slope coefficients, and  $\varepsilon$  is the error term. A regression model was estimated for each ownership structure variable ( $OWN\_STRUCT_{i,t}$ ), that is, ownership concentration ( $OWN\_CONC$ ) and ownership concentration squared ( $OWN\_CONC^2$ ) for the first ( $OWN\_CONC1 / OWN\_CONC1^2$ ) through the fifth largest shareholder ( $OWN\_CONC5 / OWN\_CONC5^2$ ); shareholding control configuration - dominant ( $DOMIN$ ), shared ( $SHARED$ ), dispersed ( $DISP$ ); and identity of the main shareholder - non-financial firm ( $NONFIN$ ), family ( $FAM$ ), government ( $GOV$ ), and institutional investor ( $INST$ ).

The models include control variables ( $CONTROLS$ ) associated with firm  $i$  in period  $t$ , which are: profitability ( $ROA$ ), firm size ( $SIZE$ ), asset tangibility ( $TANG$ ), growth opportunities ( $GR\_OPP$ ), risk ( $RISK$ ), industry sector ( $IND\_SECTOR$ ), and year of observation ( $YEAR$ ).

Initially, estimations were conducted using pooled OLS (Ordinary Least Squares), fixed effects, and random effects models. Subsequently, the Breusch-Pagan Lagrange Multiplier (LM) test indicated that random effects models are more appropriate than pooled OLS. Following that, the Hausman test suggested that the fixed effects model is the appropriate specification for the panel data. However, tests for heteroscedasticity on the fixed effects models rejected the null hypothesis of constant variance (homoscedasticity), indicating heteroscedasticity. Furthermore, the ownership structure of Brazilian firms, the main variable in this research, varies little over time; therefore, fixed effects and first-difference methods may yield imprecise estimates (Wooldridge, 2002). Given these considerations, this study employs the Feasible Generalized Least Squares (FGLS) method for panel data regression. FGLS estimations are used when the error variance is heteroscedastic and there is autocorrelation in the model (Wooldridge, 2002). Additionally, the application of FGLS to panel data allows control for heterogeneity among individual firms, i.e., it considers firm-specific characteristics in the panel data (Arellano & Bover, 1990; Bond, 2002). Finally, FGLS estimations have been used in finance research (Hasan et al., 2021; Sun et al., 2025; Zhao et al., 2024).

## 4 Analysis of Results

### 4.1 Descriptive Analysis

Table 4 presents the descriptive statistics for the debt maturity variables (DM\_LT and DM\_ST) and ownership structure variables (ownership concentration; shareholding control configuration; and identity of the main shareholder).

**Table 4 – Descriptive statistics of debt maturity and ownership structure**

<b>Panel A: Debt maturity</b>							
Variable	No. of Obs.	Mean	Std. Dev.	Coefficient of Variation	Median	Minimum	Maximum
DM_LT	2,643	0.5737	0.3661	0.6381	0.6922	0.0000	1.000
DM_ST	2,643	0.2572	0.2837	1.1028	0.1663	0.0000	1.000
<b>Panel B: Ownership concentration</b>							
Variable	No. of Obs.	Mean	Std. Dev.	Coefficient of Variation	Median	Minimum	Maximum
OWN_CONC1	2,643	0.4610	0.2638	0.5723	0.4359	0.0354	1.000
OWN_CONC2	2,643	0.5878	0.2526	0.4298	0.5874	0.0532	1.000
OWN_CONC3	2,643	0.6455	0.238	0.3687	0.6478	0.0546	1.000
OWN_CONC4	2,643	0.6778	0.2274	0.3356	0.6825	0.0554	1.000
OWN_CONC5	2,643	0.6965	0.2209	0.3172	0.7026	0.0554	1.000
<b>Panel C: Shareholding control configuration</b>							
Dispersed		Shared			Dominant		
379 (14.34%)		591 (22.36%)			1,673 (63.30%)		
<b>Panel D: Identity of the main shareholder</b>							
Non-Financial Firm		Family		Government		Institutional Investor	
1,837 (69.50%)		360 (13.62%)		149 (5.64%)		297 (11.24%)	

Note: The sum of long-term debt maturity (DM\_LT) and short-term debt maturity (DM\_ST) does not equal 1 because, in cases where total debt equaled zero, the corresponding maturity was recorded as zero. This approach was adopted to avoid losing observations.

As shown in Table 4 (Panel A), debt maturity reflects a greater accumulation in the long term (57.37%), indicating that Brazilian firms are opting for longer-term financing (DM\_LT) over short-term debt (DM\_ST). This result contrasts with findings from Chinese firms, which hold more short-term than long-term debt (Wang et al., 2019). In addition, the largest voting shareholder (OWN\_CONC1) holds, on average, 46.10% of the ordinary shares in Brazilian companies. The third largest voting shareholders (OWN\_CONC3) collectively hold, on average, 64.55% of voting shares, while the five largest shareholders (OWN\_CONC5) together own, on average, 69.65% of ordinary shares. Therefore, ownership concentration (OWN\_CONC) is notably high in the Brazilian market, confirming findings from other studies

in the region (Brandão & Crisóstomo, 2024; Dias *et al.*, 2021; Pellicani & Kalatzis, 2019; Sampaio *et al.*, 2024).

Most of the firms analyzed are characterized by the presence of a single controlling shareholder—referred to in this study as dominant control—representing 63.30% of the sample. This finding reflects the prevalence of concentrated control structures in the Brazilian environment, in line with the previously reported result on ownership concentration (OWN\_CONC). In addition, 22.36% of the sample exhibits strategic decision-making guided by shareholder agreements, classified in this study as shared control, in which certain shareholders collaborate to align interests and consolidate the company’s decision-making power. Conversely, 14.34% of the observations feature dispersed ownership structures, indicating fragmented ownership more aligned with the control patterns found in developed capital markets. The results related to the type of control are consistent with previous studies that examined firms listed on Brazil’s stock exchange (Brandão & Crisóstomo, 2023, 2024).

As shown in Table 4, Panel D, regarding the identity of the main shareholder, non-financial firms account for the majority of the sample, representing 69.50% of the cases and standing out as the most prominent group. This result supports the argument made by Crisóstomo *et al.* (2014), who state that there has been an increase in group-based ownership by non-financial firms in Brazil. Following them are families, which hold 13.62% of the control positions, followed by institutional investors, responsible for 11.24%. Lastly, government shareholders account for the smallest share, controlling only 5.64% of the sample.

To better understand the behavior of long-term debt maturity (DM\_LT) and short-term debt maturity (DM\_ST) in relation to the types of ownership control, a descriptive and variance analysis was conducted. The results are presented in Table 5.

**Table 5 – Mean debt maturity by shareholding control configuration**

Variable	Statistic	Shareholding control configuration			Test mean difference among the three groups
		Dispersed [D]	Shared [S]	Dominant [DO]	
DM_LT	Mean	0.5774 [S]	0.6703 [D, DO]	0.5387 [S]	28.86***
	Standard Deviation	0.3647	0.3258	0.3737	
	Minimum	0.0000	0.0000	0.0000	
	Median	0.692	0.7891	0.6545	
	Maximum	1.0000	1.0000	1.0000	
DM_ST	Mean	0.2510	0.2231 [DO]	0.2707 [S]	6.27***

Standard Deviation	0.2773	0.2416	0.2976
Minimum	0.0000	0.0000	0.0000
Median	0.1658	0.1532	0.1763
Maximum	1.0000	1.0000	1.0000

Note: \*\*\* denotes statistical significance at the 1% level. Brackets [ ] indicate statistically significant differences at the 1% level according to the Tukey-Kramer post-hoc test.

As shown in Table 5, there are statistically significant differences in the means of debt maturity (both long-term and short-term) across types of ownership control. Regarding long-term debt maturity (DM\_LT), firms with shared control exhibit a higher mean compared to those with dispersed or dominant control structures. In terms of short-term debt maturity (DM\_ST), a statistically significant difference is observed only between firms with shared and dominant control, with the latter presenting a higher average. Table 6 presents the descriptive statistics of debt maturity (long- and short-term) by the identity of the main shareholder.

**Table 6 – Mean debt maturity by identity of the main shareholder**

Variable	Statistic	Identity of the main shareholder				ANOVA
		Non-Financial Firm [N]	Family [F]	Government [G]	Institutional Investor [I]	
DM_LT	Mean	0.5782	0.5712	0.5155	0.5775	1.37
	Standard Deviation	0.3625	0.3573	0.4066	0.3762	
	Minimum	0.0000	0.0000	0.0000	0.0000	
	Median	0.6900	0.6908	0.7570	0.6994	
	Maximum	1.0000	1.0000	1.0000	1.0000	
DM_ST	Mean	0.2612 [G]	0.2983 [G. I]	0.1624 [N. F. I]	0.2306 [F. G]	9.14***
	Standard Deviation	0.2837	0.3032	0.2254	0.2734	
	Minimum	0.0000	0.0000	0.0000	0.0000	
	Median	0.1728	0.2003	0.1151	0.1243	
	Maximum	1.0000	1.0000	1.0000	1.0000	

Note: \*\*\* denotes statistical significance at the 1% level. Values in brackets [ ] indicate statistically significant differences at at least the 10% level, based on the Tukey-Kramer post-hoc test.

According to the information in Table 6, there are no statistically significant differences between the mean long-term debt maturity (DM\_LT) and the identities of the main shareholders. However, for short-term debt maturity (DM\_ST), differences in means are observed among the groups of main shareholder identities. The family-owned group presents the highest mean, followed by non-financial firms and institutional investors, while the government-owned group registers the lowest mean.

#### 4.2 Influence of Ownership Structure on Debt Maturity

Table 7 presents the estimations of the models related to short-term debt maturity (DM\_ST) and ownership concentration. It is observed that ownership concentration, measured by the shareholding of the three largest shareholders (OWN\_CONC3) and the four largest shareholders (OWN\_CONC4), has a negative effect, suggesting that higher levels of concentration may hinder short-term debt maturity.

Additionally, a positive quadratic effect of ownership concentration is verified through the variables  $OWN\_CONC3^2$ ,  $OWN\_CONC4^2$ , and  $OWN\_CONC5^2$ , with inflection points at 52.57%, 56.66%, and 58.70%, respectively. This indicates that ownership concentration initially constrains short-term debt maturity up to the aforementioned inflection points, but beyond these levels, greater concentration tends to support longer short-term debt maturity. Therefore, this quadratic relationship assumes a U-shape.

Regarding the control variables, also reported in Table 7, larger firm size (SIZE) and asset tangibility (TANG) are associated with shorter short-term debt maturity. In contrast, firms with higher risk tend to present longer maturity for this type of debt.

Additionally, Table 8 presents the regression models related to long-term debt maturity (DM\_LT) and ownership concentration. As observed in short-term debt maturity (DM\_ST), ownership concentration (OWN\_CONC) has a negative effect on long-term debt maturity (DM\_LT), with significant results for the variables OWN\_CONC1, OWN\_CONC2, and OWN\_CONC3. Quadratic ownership concentration, represented by  $OWN\_CONC1^2$  and  $OWN\_CONC2^2$ , also affects long-term debt maturity (DM\_LT) through a positive effect—again indicating a U-shaped relationship.

Regarding the control variables presented in Table 8, firm size (SIZE) and asset tangibility (TANG) show a positive relationship with long-term debt maturity (DM\_LT), a result opposite to that found for short-term debt maturity (DM\_ST). Risk, on the other hand, remained consistent across both maturities: firms with higher risk tend to have longer debt maturity, regardless of whether it is short-term or long-term.

**Table 7 – Models of short-term debt maturity and ownership concentration**

Variables	DM ST	DM ST	DM ST	DM ST	DM ST
OWN_CONC1	0.0398				
	(0.0791)				
OWN_CONC1 <sup>2</sup>	-0.0468				
	(0.0728)				

OWN_CONC2		-0.0781 (0.0971)			
OWN_CONC2 <sup>2</sup>		0.0791 (0.0814)			
OWN_CONC3			-0.1945* (0.1124)		
OWN_CONC3 <sup>2</sup>			0.1850** (0.0900)		
OWN_CONC4				-0.2257* (0.1239)	
OWN_CONC4 <sup>2</sup>				0.1991** (0.0964)	
OWN_CONC5					-0.2011 (0.1301)
OWN_CONC5 <sup>2</sup>					0.1713* (0.0993)
ROA	-0.0466 (0.0488)	-0.0475 (0.0488)	-0.0484 (0.0487)	-0.0477 (0.0487)	-0.0474 (0.0487)
SIZE	-0.0260*** (0.0032)	-0.0252*** (0.0032)	-0.0246*** (0.0032)	-0.0246*** (0.0032)	-0.0247*** (0.0033)
TANG	-0.0816*** (0.0316)	-0.0885*** (0.0316)	-0.0929*** (0.0315)	-0.0923*** (0.0316)	-0.0910*** (0.0316)
GR_OPP	-0.0061 (0.0082)	-0.0044 (0.0083)	-0.0027 (0.0083)	-0.0029 (0.0083)	-0.0034 (0.0083)
RISK	-0.1465*** (0.0106)	-0.1460*** (0.0106)	-0.1456*** (0.0106)	-0.1456*** (0.0106)	-0.1455*** (0.0106)
Intercept	0.9322*** (0.0630)	0.9358*** (0.0659)	0.9509*** (0.0692)	0.9641*** (0.0719)	0.9632*** (0.0737)
Sector dummies	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES
No. of Obs.	2,643	2,643	2,643	2,643	2,643
No. of Firms	262	262	262	262	262
Wald-chi <sup>2</sup>	627.78***	628.65***	634.28***	633.43***	631.30***
Utest (t)	0.49	0.78	1.69**	1.79**	1.53*
Turning point	0.4255	0.4931	0.5257	0.5666	0.5870

Notes: The dependent variable is short-term debt maturity (DM\_ST). Independent variables include ownership concentration of the main shareholder and its squared term (OWN\_CONC1 / OWN\_CONC1<sup>2</sup>) up to the five largest shareholders and their squared terms (OWN\_CONC5 / OWN\_CONC5<sup>2</sup>). Control variables: profitability (ROA); firm size (SIZE); asset tangibility (TANG); growth opportunities (GR\_OPP); risk (RISK). The models were estimated using Feasible Generalized Least Squares (FGLS) for panel data. Estimated coefficients and standard errors are reported in parentheses. The Wald-chi<sup>2</sup> refers to the test of model significance. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively.

**Table 8 – Models of long-term debt maturity and ownership concentration**

Variables	DM_LT	DM_LT	DM_LT	DM_LT	DM_LT
OWN_CONC1	-0.5251*** (0.0932)				
OWN_CONC1 <sup>2</sup>	0.3686*** (0.0858)				
OWN_CONC2		-0.3600***			

		(0.1147)			
OWN_CONC2 <sup>2</sup>		0.1755*			
		(0.0961)			
OWN_CONC3			-0.2511*		
			(0.1330)		
OWN_CONC3 <sup>2</sup>			0.0726		
			(0.1065)		
OWN_CONC4				-0.2373	
				(0.1467)	
OWN_CONC4 <sup>2</sup>				0.0690	
				(0.1142)	
OWN_CONC5					-0.2432
					(0.1541)
OWN_CONC5 <sup>2</sup>					0.0781
					(0.1177)
ROA	0.0747	0.0708	0.0666	0.0625	0.0607
	(0.0574)	(0.0576)	(0.0576)	(0.0577)	(0.0577)
SIZE	0.0825***	0.0813***	0.0806***	0.0805***	0.0805***
	(0.0038)	(0.0038)	(0.0038)	(0.0038)	(0.0039)
TANG	0.1600***	0.1712***	0.1790***	0.1816***	0.1840***
	(0.0372)	(0.0373)	(0.0373)	(0.0374)	(0.0375)
GR_OPP	-0.0005	-0.0015	-0.0013	0.0001	0.0009
	(0.0097)	(0.0098)	(0.0098)	(0.0098)	(0.0098)
RISK	-0.2056***	-0.2054***	-0.2051***	-0.2048***	-0.2048***
	(0.0124)	(0.0125)	(0.0125)	(0.0125)	(0.0125)
Intercept	-0.0968	-0.0731	-0.0715	-0.0719	-0.0680
	(0.0742)	(0.0778)	(0.0818)	(0.0851)	(0.0873)
Sector dummies	YES	YES	YES	YES	YES
Year dummies	YES	SIM	YES	YES	YES
No. of Obs.	2,643	2,643	2,643	2,643	2,643
No. of Firms	262	262	262	262	262
Wald-chi <sup>2</sup>	1.283.05***	1.264.38***	1.257.20***	1.246.00***	1240.59***
Utest (t)	2.48***	-	-	-	-
Turning point	0.7124	-	-	-	-

Notes: The dependent variable is long-term debt maturity (DM\_LT). Independent variables include ownership concentration of the main shareholder and its squared term (OWN\_CONC1 / OWN\_CONC1<sup>2</sup>) up to the five largest shareholders and their squared terms (OWN\_CONC5 / OWN\_CONC5<sup>2</sup>). Control variables: profitability (ROA); firm size (SIZE); asset tangibility (TANG); growth opportunities (GR\_OPP); risk (RISK). The models were estimated using Feasible Generalized Least Squares (FGLS) for panel data. Estimated coefficients and standard errors are reported in parentheses. The Wald-chi<sup>2</sup> refers to the test of model significance. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9 presents the estimation models of debt maturity (short and long term) and shareholding control configuration.

**Table 9 – Models of debt maturity and shareholding control configuration**

Variables	Panel A			Panel B		
	DM_ST	DM_ST	DM_ST	DM_LT	DM_LT	DM_LT
DOMIN	0.0227**			-0.0721***		

	(0.0110)			(0.0131)		
SHARED		-0.0241*			0.0723***	
		(0.0126)			(0.0149)	
DISP			-0.0072			0.0288*
			(0.0147)			(0.0175)
ROA	-0.0559	-0.0496	-0.0484	0.0704	0.0498	0.0483
	(0.0488)	(0.0486)	(0.0488)	(0.0577)	(0.0575)	(0.0580)
SIZE	-0.0253***	-0.0251***	-0.0257***	0.0828***	0.0823***	0.0842***
	(0.0032)	(0.0032)	(0.0032)	(0.0038)	(0.0038)	(0.0038)
TANG	-0.0863***	-0.0839***	-0.0851***	0.1747***	0.1671***	0.1717***
	(0.0314)	(0.0314)	(0.0314)	(0.0371)	(0.0371)	(0.0373)
GR_OPP	-0.0027	-0.0036	-0.0053	-0.0002	0.0030	0.0079
	(0.0082)	(0.0082)	(0.0082)	(0.0098)	(0.0097)	(0.0097)
RISK	-0.1464***	-0.1462***	-0.1465***	-0.2046***	-0.2050***	-0.2043***
	(0.0106)	(0.0106)	(0.0106)	(0.0125)	(0.0125)	(0.0125)
Intercept	0.9079***	0.9250***	0.9323***	-0.1774**	-0.2330***	-0.2563***
	(0.0612)	(0.0602)	(0.0603)	(0.0723)	(0.0713)	(0.0716)
Sector dummies	YES	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES	YES
No. of Obs.	2,643	2,643	2,643	2,643	2,643	2,643
No. of Firms	262	262	262	262	262	262
Wald-chi <sup>2</sup>	632.26***	631.59***	627.33***	1.254.66***	1.244.62***	1.214.17***

Notes: The dependent variables are short-term debt maturity (DM\_ST) and long-term debt maturity (DM\_LT). Independent variables: dominant ownership control (DOMIN), shared ownership control (SHARED), and dispersed ownership control (DISP). Control variables: profitability (ROA); firm size (SIZE); asset tangibility (TANG); growth opportunities (GR\_OPP); and risk (RISK). The models were estimated using Feasible Generalized Least Squares (FGLS) for panel data. Estimated coefficients and standard errors are reported in parentheses. The Wald-chi<sup>2</sup> refers to the test of model significance. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Based on the information in Table 9, Panel A, dominant control (DOM) has a positive effect on short-term debt maturity (DM\_ST). Shared control has a negative influence on DM\_ST. Meanwhile, in Panel B, dominant control (DOMIN) negatively affects long-term debt maturity (DM\_LT). A positive effect is also observed for both shared and dispersed control types on DM\_LT. These results demonstrate that the shareholding control configuration are determining factors of debt maturity in the Brazilian market, whether through short- or long-term debt maturity.

Table 10 presents the estimation models of debt maturity (short and long term) and the identity of the main shareholder.

**Table 10 – Models of debt maturity and the identity of the main shareholder**

Variables	Panel A				Panel B			
	DM ST	DM ST	DM ST	DM ST	DM LT	DM LT	DM LT	DM LT
NONFIN	-0.0136				0.0208			
	(0.0113)				(0.0134)			
FAM		0.0281*				0.0596***		

		(0.0152)				(0.0181)		
GOV			-0.0015				-0.2356***	
			(0.0244)				(0.0287)	
INST				-0.0030				-0.0069
				(0.0165)				(0.0196)
ROA	-0.0455	-0.0491	-0.0464	-0.0469	0.0388	0.0343	0.0437	0.0389
	(0.0486)	(0.0486)	(0.0486)	(0.0487)	(0.0577)	(0.0577)	(0.0570)	(0.0579)
SIZE	-0.0257***	-0.0250***	-0.0256***	-0.0256***	0.0841***	0.0855***	0.0896***	0.0840***
	(0.0032)	(0.0032)	(0.0032)	(0.0032)	(0.0038)	(0.0038)	(0.0038)	(0.0038)
TANG	-0.0861***	-0.0854***	-0.0842***	-0.0845***	0.1712***	0.1665***	0.1994***	0.1684***
	(0.0314)	(0.0314)	(0.0315)	(0.0314)	(0.0373)	(0.0372)	(0.0370)	(0.0373)
GR_OPP	-0.0054	-0.0058	-0.0057	-0.0055	0.0087	0.0089	-0.0090	0.0095
	(0.0081)	(0.0081)	(0.0083)	(0.0082)	(0.0097)	(0.0096)	(0.0098)	(0.0097)
RISK	-0.1469***	-0.1458***	-0.1464***	-0.1463***	-0.2038***	-0.2031***	-0.1982***	-0.2043***
	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0126)	(0.0125)	(0.0124)	(0.0126)
Intercept	0.9422***	0.9144***	0.9300***	0.9305***	-0.2674***	-0.2841***	-0.3404***	-0.2500***
	(0.0609)	(0.0608)	(0.0609)	(0.0602)	(0.0724)	(0.0722)	(0.0715)	(0.0716)
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES
No. of Obs.	2,643	2,643	2,643	2,643	2,643	2,643	2,643	2,643
No. of Firms	262	262	262	262	262	262	262	262
Wald-chi <sup>2</sup>	628.84***	631.24***	627.04***	627.07	1213.74***	1226.04***	1308.52***	1210.40***

Notes: The dependent variables are short-term debt maturity (DM\_ST) and long-term debt maturity (DM\_LT). Independent variables: main shareholder is a non-financial firm (NONFIN); main shareholder is a family (FAM); main shareholder is the government (GOV); main shareholder is an institutional investor (INST). Control variables: profitability (ROA); firm size (SIZE); asset tangibility (TANG); growth opportunities (GR\_OPP); and risk (RISK). The models were estimated using Feasible Generalized Least Squares (FGLS) for panel data. Estimated coefficients and standard errors are reported in parentheses. The Wald-chi<sup>2</sup> refers to the test of model significance. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The data presented in Table 10 show that family ownership (FAM), when occupying the position of principal shareholder, positively influences both short-term (DM\_ST) and long-term (DM\_LT) debt maturity in Brazilian firms. This result is consistent with hypothesis 3b proposed in the study. It is also observed that government ownership (GOV) as the principal shareholder negatively affects long-term debt maturity (DM\_LT).

### 4.3 Discussion of the Results

The study found that Brazilian firms exhibit a higher average maturity of long-term debt compared to short-term debt, a result that remains consistent when analyzed by industry. This suggests that most Brazilian firms are more likely to adopt long-term financing strategies, relying on long-term debt to fund their needs, likely associated with business growth.

Typically, in scenarios of adverse macroeconomic conditions, short-term debt is more frequently used (Mundi et al., 2022). However, high levels of short-term debt may expose firms to financial distress, such as credit and liquidity shocks (Custódio et al., 2013). Thus, the financial position of Brazilian firms may be considered relatively favorable, as the average long-term debt maturity, over the time series, is more than twice that of short-term debt.

Regarding the descriptive results of ownership structure, the data reveal a high ownership concentration among Brazilian firms, with the largest voting shareholder holding, on average, 46.10% of shares. High ownership concentration has been a long-standing feature in Brazil. For example, Iturriaga and Crisóstomo (2010), analyzing listed Brazilian firms from 1995 to 2004, found that the largest shareholder held, on average, 60% of shares. Holanda and Coelho (2014), evaluating listed and non-listed companies between 1998 and 2012, reported an average majority ownership of approximately 65%. Similarly, Crisóstomo and Pinheiro (2015), studying Brazilian companies from 1996 to 2012, observed that the largest voting shareholder held, on average, 57.25% of common shares. These findings indicate a decline in ownership concentration over time, although it remains high by international standards.

The result of high ownership concentration is further supported by the shareholding control configuration observed in Brazil. According to the sample, 63.30% of firms are under dominant control. The situation becomes more pronounced when considering shared control, which accounts for 22.36% of the sample. In total, more than 85% of firms in the sample are characterized by strategic decisions being made by a small number of shareholders. It is also worth noting that dispersed control remained relatively stable throughout the study period, representing 13% of firms in 2010 and 14% in 2022.

In terms of main shareholder identity, the most prominent group is non-financial firms, accounting for nearly 70% of the sample. This category mainly comprises holding companies, which represent over 50% of observations and are commonly associated with pyramidal ownership structures. Following non-financial firms, the most prevalent types are family, institutional investors, and government.

It is important to highlight that studies assessing Brazilian firms through pyramidal ownership structures—where the main shareholder's identity was thoroughly traced to identify ultimate ownership—have found that family ownership is predominant in Brazil (Pinheiro et al., 2022; Rocha, 2022). Thus, some of the holding companies identified in this study might be reclassified as family-owned firms if a pyramidal structure analysis were applied.

To assess the effect of ownership structure on corporate debt maturity in Brazilian firms, which is the central objective of this study, three hypotheses were developed and tested using regression analysis based on FGLS modeling. Table 11 compares the expected and observed results, as per the proposed hypotheses.

**Table 11 - Hypotheses and key findings**

Hypothesis	Expected Results	Empirical Findings	Conclusion
Hypothesis 1	H1a: OWN_CONC $\Rightarrow$ - DM_LT	Negative effect	Confirmed
	H1b: OWN_CONC <sup>2</sup> $\Rightarrow$ - DM_LT	Positive quadratic (U-shaped) relationship	Not confirmed
Hypothesis 2	H2a: DOMIN $\Rightarrow$ - DM_LT	Negative effect	Confirmed
	H2b: SHARED $\Rightarrow$ - DM_LT	Positive effect	Not confirmed
	H3c: DISP $\Rightarrow$ + DM_LT	Positive effect	Confirmed.
Hypothesis 3	H3a: NONFIN $\Rightarrow$ + DM_LT	No effect	Not confirmed
	H3b: FAM $\Rightarrow$ + DM_LT	Positive effect	Confirmed
	H3c: GOV $\Rightarrow$ + DM_LT	Negative effect	Not confirmed
	H3d: INST $\Rightarrow$ + DM_ST	No effect	Not confirmed

The findings for long-term debt maturity confirm that ownership concentration negatively affects debt maturity, aligning with the argument that in countries with weak minority shareholder protection and creditor rights, minority shareholders and creditors are less able to monitor corporate activities (Martins et al., 2017). A positive quadratic effect of ownership concentration was also found, indicating that ownership concentration initially reduces debt maturity up to a certain threshold, after which the excessive private benefits of control may enhance long-term credit relationships, leading to a positive effect on debt maturity.

Regarding shareholding control configuration, all categories were found to influence long-term debt maturity. Dominant control has a negative effect, whereas shared and dispersed control are positively associated with long-term debt maturity. The hypotheses had expected similar effects for dominant and shared control, as both are linked to concentrated control groups. However, shared control showed behavior similar to dispersed control.

In terms of main shareholder identity, the most notable result was that family ownership positively affects long-term debt maturity, as predicted in the hypothesis. This may indicate that the Brazilian credit market prioritizes long-term financing for family firms, perceiving them as less risky (Croci et al., 2011).

## 5 Conclusion

This study aimed to analyze the effect of ownership structure on debt maturity in Brazilian firms. To this end, the sample consisted of an unbalanced panel of data covering 262 companies listed on the Brazilian stock exchange (B3), totaling 2,643 observations for the period from 2010 to 2022.

The findings confirm that debt maturity in Brazilian firms is influenced by the configuration of their ownership structure. As expected, the configuration of ownership structure emerges as a relevant determinant of debt maturity across the Brazilian corporate sector. The results demonstrate that ownership concentration, shareholding control configuration, and the identity of the main shareholder all impact the agency conflicts present in the Brazilian capital market. These effects, in turn, influence corporate financing policy decisions through the choice of debt maturity.

This study contributes to the debate on debt maturity by providing additional evidence for an emerging market context, where firms are typically dependent on bank credit to finance their investments, exhibit high ownership concentration, and operate in a stock market with low trading volume and liquidity. Therefore, analyzing the largest economy in Latin America and the Southern Hemisphere—Brazil—and its particular institutional characteristics renders the investigation of the “capital structure puzzle” theoretically relevant, as it deepens the understanding of theories originally developed for firms in developed markets.

From a managerial perspective, this study contributes to the improvement of corporate financial management by identifying that ownership structures in Brazil significantly influence debt maturity. This raises an important question regarding the extent to which corporate managers have autonomy to make financing decisions that maximize value for all shareholders. Agency problems between controlling and minority shareholders remain a salient issue in Brazil. For investors, the research offers insights into the real conditions of debt maturity in Brazilian firms, supporting their evaluation of future financing decisions.

Finally, future research is encouraged to expand the sample by incorporating other emerging economies, such as South American countries and Latin American nations, in order to better assess the influence of institutional environments on debt maturity. Additionally, further investigation into the heterogeneity of debt in Brazil is recommended—particularly in terms of the maturity structure of subsidized loans, which may exhibit specific features when compared to traditional bank debt.

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