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THE INFLUENCE OF CEO CHARACTERISTICS ON CORPORATE DEBT

YASMIM CLARICE RAMOS ABREU[1]
Federal University of Pará
https://orcid.org/0009-0009-8186-7725
yasmimclarice66@gmail.com

INAJÁ ALLANE SANTOS GARCIA
Federal University of Alagoas
https://orcid.org/0000-0002-7844-9743
inaja.garcia@santana.ufal.br

RADJA FERREIRA CORRÊA
Federal University of Pará
https://orcid.org/0009-0003-9197-2760
radjaferreira01@gmail.com

ANNANDY RAQUEL PEREIRA DA SILVA
Federal University of Santa Catarina
https://orcid.org/0000-0003-4636-2835
annandyraquel@hotmail.com

ABSTRACT

This study aimed to analyze the relationship between the personal and professional characteristics of CEOs and the corporate debt of publicly traded companies listed on the Brazilian Stock Exchange (*Brasil, Bolsa, Balcão*). The research was grounded in the Upper Echelons Theory and employed a multiple regression empirical model. A total of 444 companies were analyzed over the period from 2010 to 2021. The personal and professional characteristics investigated included age, gender, professional experience, education level, and tenure. To assess corporate debt, six debt metrics were used: short-term debt, long-term debt, total debt-to-total assets, total debt-to-equity, interest-bearing liabilities-to-total assets, and total interest-bearing liabilities. The findings indicate that gender and tenure positively influence corporate debt, confirming hypotheses 2 and 5 of this study. These findings are valuable for organizations, as these characteristics can be carefully observed and considered when hiring CEOs with profiles aligned to organizational parameters. From a stakeholder perspective, the results may inform investment or engagement decisions with a given organization, as CEO profiles could help infer whether their goals align with those of the stakeholders.

Keywords: Debt. Upper Echelons Theory. CEO Characteristics.

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[1] **Correspondence address:** Rua Augusto Corrêa, 01 | Guamá | 66075-110 | Belém/PA | Brazil.

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1 INTRODUCTION

In a competitive market environment, companies must make important strategic decisions, such as product innovation, diversification, acquisitions, capital intensity, new facilities and equipment, vertical and horizontal integration, financial leverage, and administrative complexity (Hambrick & Mason, 1984). According to Frank and Goyal (2009), one such decision involves acquiring resources from third parties, such as debt financing, which entails repositioning the expectation of future cash flows for shareholders in exchange for monetary resources in the present. This decision to increase debt can arise from various factors, such as reinvestment in the organization, avoiding default and the subsequent risk of bankruptcy, or investing in opportunities that may yield long-term returns (Nukala & Prasada, 2021; Ferri et al., 2021; Ding et al., 2020).

The level of indebtedness, for instance, which forms part of a company's capital structure, represents a significant decision, as it can compromise the organization's financial health and potentially lead to bankruptcy (Oliveira & Garcia, 2024). According to Marion (2008), there are two ways to analyze a high level of corporate debt: first, there is healthy debt, where organizations use it to invest in assets, ensuring resources to repay it. On the other hand, there is debt used to settle other obligations, placing the organization in a cycle that can lead to bankruptcy.

To make these strategic choices, organizations rely on Chief Executive Officers (CEOs), who occupy the highest hierarchical position and primarily perform actions that impact both internal and external aspects of the organization (Fralich & Bitektine, 2020). The Upper Echelons Theory (UET) by Hambrick and Mason (1984) focuses on these top executives and posits that their characteristics can influence strategic decision-making and, consequently, organizational outcomes. In this context, Hambrick and Mason (1984) argue that certain sociodemographic and observable characteristics can serve as reasonable proxies to represent differences in cognition, values, and perceptions among senior managers. Bouaziz et al. (2020) concluded that the characteristics and experiences of CEOs influence their decision-making processes and organizational results.

Several studies have empirically analyzed the influence of CEO characteristics, particularly regarding the effects of gender and tenure on organizational outcomes. For instance, Peni (2014) analyzed 305 U.S. companies listed on the Standard & Poor's 500 (S&P 500) index. Bai et al. (2018) investigated 1.479 Chinese companies and found that the education of CEOs significantly affects organizational decisions. Wang et al. (2016) highlighted the importance of these executives' professional experiences in strategic decision-making through an analysis of 308 studies on the subject. Naseem et al. (2020), in a study of 179 Pakistani companies, examined the age of executives and their tendency toward risk-taking behaviors, suggesting that as executives age, they tend to become more risk-averse and conservative compared to their younger counterparts. Oliveira and Garcia (2024) observed that CEOs exhibiting higher levels of narcissistic traits are associated with increased total, short-term, and long-term corporate debt.

Given the unique characteristics of the Brazilian capital market, which is still considered underdeveloped and features concentrated ownership structures in the hands of a few shareholders (Garcia & Silva, 2021), this study investigates Brazilian companies. The goal is to identify evidence and assess whether, despite these limitations, the personal and professional characteristics of CEOs influence the financial performance of organizations.

Regarding this topic, the study by Bortoluzzi et al. (2016) examined the influence of observable characteristics of top executives on the indebtedness of Brazilian companies listed in the cyclical sector of B3. The characteristics analyzed included age, education, and tenure. Similarly, Mouta and Meneses (2021) investigated the impact of CEOs' psychological and observable traits on organizational culture and silos, while Garcia and Silva (2021) focused on characteristics related to financial performance. Lopes (2022) related observable characteristics (age, gender, and financial expertise) and unobservable ones (narcissism) to the tone of narrative disclosures.

In this context, the present study goes beyond the three characteristics analyzed by Bortoluzzi et al. (2016) by examining five: age, tenure, professional experience, education level, and gender. Furthermore, unlike the studies by Mouta and Meneses (2021), Garcia and Silva (2021), and Lopes (2022), this study focuses specifically on the relationship between observable characteristics and corporate indebtedness. It also analyzes a different period, from 2010 to 2021. beginning with the year Brazilian accounting standards aligned with IFRS.

This research aims to analyze the relationship between the personal and professional characteristics of CEOs and the corporate debt of publicly traded companies listed on *Brasil, Bolsa, Balcão* (B3). It is expected that this study will contribute to understanding the impact of CEO characteristics on the indebtedness of Brazilian companies, considering that these executives play a central role in setting organizational goals.

In reviewing the literature, the relationship between CEO characteristics and corporate indebtedness remains unclear. This ambiguity represents one of the innovations of this article, which explores various CEO traits. In the Brazilian context, studies have investigated observable CEO characteristics in relation to organizational performance (Lunkes et al., 2019), earnings management (Silva, 2022; Sprenger et al., 2017), financial performance (Garcia & Silva, 2021), and company survival probabilities (Garcia et al., 2022). This article seeks to address this gap by exploring the characteristics of CEOs and their potential implications for financial behavior. The study is relevant for highlighting the importance of managers in strategic decisions and identifying which of their traits may impact corporate indebtedness. Additionally, studies like this contribute to the literature on Upper Echelons Theory (UET) by emphasizing the relevance of managers.

This article contributes to the existing literature on CEO attributes and capital structure in several ways. First, it analyzes a comprehensive set of CEO characteristics and their influence on financial decisions, expanding the current body of knowledge on the subject and exploring the ideas proposed by the Upper Echelons model. Second, it examines CEO attributes in a developing country where ownership concentration is high, potentially leading to differences compared to industrialized nations (Kaur & Singh, 2021). Currently, there is limited evidence on the relevance of CEO characteristics, particularly in emerging markets like Brazil, with respect to leverage decisions (Corrêa et al., 2024).

The findings of this research are also valuable for companies, as CEO characteristics can be carefully observed and considered when hiring professionals with profiles aligned to organizational standards. This study underscores the strategic and financial importance of CEOs in organizational decision-making, offering insights into how their traits influence corporate financial behavior.

2 THEORETICAL FRAMEWORK

2.1 Upper Echelons Theory and CEO Characteristics

Upper Echelons Theory (UET) was originally introduced by Hambrick and Mason (1984) and serves as a theoretical foundation for explaining the relationship between the Top Management Team (TMT) and organizational performance (Garcia et al., 2022). This theory posits that organizational outcomes and strategic processes are influenced by the managerial characteristics of top executives, including age, education, financial position, and experience (Hambrick & Mason, 1984). UET suggests that CEOs, due to their specific characteristics and skills, have the power to influence a company's value creation, strategic choices, and financial reporting decisions (Rodríguez, Gaspar, & Sánchez, 2020; Silva, 2022).

CEO characteristics can be used to predict behavior and their role in organizational success (Hambrick & Mason, 1984). Supporting this perspective, You et al. (2020) argue that CEO attributes impact strategic decision-making processes. Such information can influence the entire decision-making dynamic and how it affects company performance, particularly in terms of sales

growth, return on investment, and asset returns (Peterson et al., 2003). Consequently, personality traits influence how CEOs process information about their abilities, the company, and the environment (Finkelstein et al., 2009. Bsoul et al., 2022).

2.2 Corporate Debt in Brazilian Companies

To understand how an organization can raise capital to enhance its value, researchers have developed theories explaining the adjustment of corporate debt levels (Hang et al., 2017). In the late 1950s and early 1960s, the studies by Modigliani and Miller (1958; 1963) became foundational for understanding how organizations should structure their financing to maximize value.

Capital structure is considered one of the most complex areas of financial decision-making due to its interaction with other financial decision variables (Gitman, 2010). It can be defined as the combination of debt and equity used by a company, employed in both operational financing activities and investment activities.

Brito et al. (2007) argue that capital structure refers to how companies use equity and debt to finance their assets. According to the authors, equity refers to resources provided by the company's partners or shareholders, while debt comprises funds obtained through short- or long-term liabilities. In this context, companies across different countries, markets, or sectors may adopt distinct capital structures depending on their capital needs to carry out their activities (Brito et al., 2007). Supporting this view, Myers (2020) analyzes how the relationship between capital cost and the risks associated with debt influences a company's capital structure. While Modigliani and Miller (1963) offer a classic analysis of how leverage can impact a company's value, emphasizing that increased debt can enhance firm value due to tax benefits, they also highlight the heightened risk of bankruptcy associated with higher leverage.

Capital structure decisions often consider tax implications, as organizations may favor debt over equity due to the tax benefits of interest payments (Pamplona et al., 2020). The trade-off theory of capital structure has been further developed to recognize that companies have an optimal level of debt determined by the costs and benefits of borrowing. This balance reflects a trade-off between the tax advantages of interest payments and the costs of bankruptcy or financial distress (Myers, 1984; Naseem et al., 2020; Loukil & Yousfi, 2023). Bankruptcy costs increase with higher debt levels: the more leveraged a company is, the greater its bankruptcy costs (Modigliani & Miller, 1963).

Additionally, the higher a company's debt levels, the greater its insolvency risk for creditors (Bortoluzzi et al., 2016). Financial distress can also negatively impact shareholders (Durand, 1952). Therefore, it can be inferred that greater financial leverage increases the likelihood of a company failing to meet its debt obligations (Pour, 2015).

The discussions sparked by Modigliani and Miller's (1958; 1963) seminal studies on corporate debt determinants have sought to identify relationships between debt levels and market, company, and sector characteristics. Consequently, there has been a growing body of literature on the importance of the CEO and the potential adverse consequences of their influence on the organization (Schopohl et al., 2021. Asiamah et al., 2023; Corrêa et al., 2024; Heriyanto, 2024).

2.3 The Influence of CEO Characteristics on Corporate Debt

In a study from the 1980s, the pioneering authors of UET, Hambrick and Mason (1984), emphasized that debt decisions can be influenced by the personal characteristics and specific skills of CEOs. According to Harris and Raviv (1991), raising funds through debt financing is partially driven by CEOs' concerns about their reputation. They noted that CEOs tend to prefer projects that enhance their personal success over those that align with shareholder preferences, potentially leading to higher debt levels. Consequently, Mogha and Williams (2020) highlight that both financial and human capital significantly impact a company's choice of capital structure.

The study by Silva (2022) highlights that companies led by younger executives tend to experience higher growth rates and greater variability in profitability. According to Naseem et al. (2020), CEO age influences their propensity to engage in risk-taking behaviors. Over time, as CEOs age, they typically become less inclined to take risks, exhibiting behavior opposite to that of younger executives. Similarly, Hambrick and Mason (1984) argue that younger CEOs are more likely to make riskier decisions than their older counterparts, a tendency reflected in their strategic behavior and, over time, in company performance. Based on this, the following research hypothesis is proposed:

Hypothesis 1: CEO age is negatively related to corporate debt.

This proposition suggests that younger CEOs are more prone to risk-taking, tend to be overly confident, and often overestimate their managerial capabilities (Tee et al., 2021). Previous studies indicate that younger CEOs are associated with riskier corporate policies (Serfling, 2014; Yeoh & Hooy, 2020) and lower earnings quality (Huang et al., 2012; Davis & García-Cestona, 2023) compared to older CEOs.

CEO Tenure refers to the total period an individual has served in the CEO role. According to Ting et al. (2015), tenure significantly influences decision-making, particularly in financial leverage decisions. Luo et al. (2014) examined how CEO tenure affects firm performance, finding a positive relationship with the strength of relationships between the company and its employees and a negative relationship with customer relationships. Additionally, CEO tenure impacts firm performance. Other studies have revealed that CEO tenure is negatively related to strategic behavior and positively related to the company's future performance (Wang et al., 2016). This characteristic can shape internal organizational factors, such as risk-taking, communication, and social integration (Eisenhardt & Schoonhoven, 1996).

As tenure increases, CEOs develop greater confidence and become more skilled in addressing challenges in financial decision-making (Naseem et al., 2020). With this growing confidence, they tend to take greater financial risks, employing higher debt leverage to optimize the company's financial performance (Heriyanto, 2024). Based on this evidence, the following research hypothesis is proposed:

Hypothesis 2: CEO tenure is positively related to corporate debt.

This relationship is expected to be positive, as longer tenure in the CEO role increases the likelihood that the CEO will influence the organization’s ability to develop internal coordination competencies (Mouta & Meneses, 2021). This characteristic impacts the organization's capacity to create and foster informal networks, reflected in how employees interact to perform their tasks regardless of departmental or organizational boundaries. It also influences how the company is perceived within its industry (Mouta & Meneses, 2021).

Professional experience refers to the expertise gained by CEOs through significant roles in the industry or other organizational settings, often involving strategic actions. Prior career experience in any area of specialization or function better prepares a CEO to develop and implement strategic initiatives for their company (Wang et al., 2016). This experience can influence an organization's strategic decision-making, as more seasoned CEOs tend to be increasingly concerned with their legacies, making them less likely to pursue new initiatives or take on risky investments that might jeopardize those legacies (Matta & Beamish, 2008). On average, inexperienced CEOs tend to be more conservative than their more experienced counterparts. As a CEO’s experience grows, their aversion to debt tends to decrease (Lauson, 2022). Additionally, CEO experience has been shown to be negatively correlated with the cost of debt (Matemilola et al., 2018). his relationship is expected to be negative because greater professional experience provides CEOs with a broader range of expertise, enabling more thorough and comprehensive evaluations of alternatives. With access to a wider array of perspectives and skills, experienced CEOs are better equipped to make informed decisions, including those related to corporate debt (Simons et al., 1999).

Hypothesis 3: CEO professional experience is negatively related to corporate debt.

Formal education of a CEO is most often defined by their level of academic attainment. The academic background of a leader reveals the knowledge, values, and skills that can influence organizational performance, particularly by equipping them to better interpret the external environment (Hambrick & Mason, 1984). While highly educated CEOs are considered valuable assets for managing organizations, their influence can sometimes negatively impact organizational performance (Chua et al., 2022). Zhou and Wang (2014) assert that education represents a personal investment for CEOs, creating an expectation of returns proportional to their qualifications. Consequently, these leaders may adopt riskier financial strategies. Under such conditions, highly educated CEOs may exhibit overconfidence, taking unnecessary risks that could compromise the company's overall performance (Sitthipongpanich & Polsiri, 2015). Ting et al. (2015), in their analysis of Malaysian companies, found that higher levels of education were associated with increased organizational debt. Thus, education level and corporate debt are interconnected; CEOs with higher education levels tend to incur more debt as they are better equipped to implement high-risk financial strategies (Chua et al., 2021). Studies such as those by Frank and Goyal (2007) and Chua et al. (2020) underscore the positive relationship between CEOs' knowledge levels and corporate debt. Based on this evidence, the following research hypothesis is proposed:

Hypothesis 4: Education level is positively related to corporate debt.

Regarding gender, Faccio et al. (2016) argue that female CEOs avoid riskier investment and financing opportunities. Schubert (2006) similarly states that female CEOs tend to be more conservative and risk-averse compared to their male counterparts. Ashafoke et al. (2021) highlight that ethical differences between genders have been widely studied, with men and women differing in values and interests regarding their propensity for unethical behavior in companies. Men are often more focused on potential benefits and their own success, even to the point of breaking rules to achieve business success, whereas women prioritize harmonious relationships, enjoy helping others, and are generally more sociable and less unethical in their values (Silva, 2022).

Women tend to take on less debt due to greater risk aversion and/or their preference to replace debt as a tool for addressing agency problems. This, in turn, can influence strategic organizational decisions and corporate leverage policies (Schopohl et al., 2021). Based on this scenario, the following research hypothesis is proposed:

Hypothesis 5: Male gender is positively related to corporate debt.

3 METHODOLOGICAL PROCEDURES

3.1 Definition of the Study Sample and Data Collection

The population for this study comprises publicly traded companies listed on the *Brasil, Bolsa, Balcão* (B3) stock exchange with active shares in 2022. Companies in the financial sector were excluded due to the specific nature of their accounting standards and capital structures, following the approach of Oliveira and Garcia (2024). Additionally, companies lacking all required data were excluded. As a result, the final sample consisted of 444 companies. Data for CEO characteristic variables were manually collected from the Reference Form (RF) on a company-by-company and year-by-year basis. Financial data for the companies were obtained using the Economática database®.

The research period spans from 2010 to 2021. The starting year, 2010. was chosen because it marked the mandatory adoption of the International Financial Reporting Standards (IFRS) by Brazilian companies, which introduced changes to certain accounting methods. Additionally, 2010 was the first year the Reference Form (RF) became mandatory, requiring the disclosure of most executive-related data. The end year, 2021. was selected as it was the most recent year with complete annual financial information available at the time of data collection in 2023.

3.2 Econometric Model and Research Variables

In light of the Upper Echelons Theory developed by Hambrick and Mason (1984), the aim was to analyze the influence of observable CEO characteristics on corporate debt. Table 1 highlights all the independent variables of the study, along with the respective metrics and authors who have previously utilized these variables, as follows:

Table 1
Independent Variables Representing CEO Characteristics

Variables	Metrics	Authors
Age (IDA)	Age of the CEO in years	Bortoluzzi et al. (2016); Sprenger et al. (2017); Garcia e Paulo (2019); Bouaziz et al. (2020); Silva (2022).
Tenure (TEM)	Number of years the CEO has held the position.	Huang et al. (2012); Naseem et al. (2020), Garcia e Silva (2021).
Professional Experience (EXP)	Dummy variable: 1 if the CEO held the position previously, 0 if not	Ting et al. (2015); Sprenger (2017).
Education Level (ESC)	Classification: 0 if no degree, 1 if bachelor's degree, 2 if specialization and/or MBA, 3 if master's degree, and 4 if doctorate.	Bortoluzzi et al. (2016); Garcia e Silva (2021).
Gender (GEN)	Dummy Variable, being 1 if the CEO is male, and 0 if the CEO is female.	Sprenger et al. (2017); Bouaziz et al. (2020); Eriandani (2021); Silva (2022).

In Table 2. the dependent and control variables are presented, along with the calculation method for each one and the authors who used these measures in previous studies. The dependent variables are the corporate debt metrics: Short-Term Debt (END_CP), Long-Term Debt (END_LP), Total Debt to Total Assets (ET_AT), Total Debt to Equity (ET_PL), Interest-Bearing Liabilities to Total Assets (PO_AT), and Interest-Bearing Liabilities (PO_CI). The control variables are: Asset Tangibility (TANG), Return on Assets (ROA), Market to Book (MTB), and Size (*TAM)*.

Table 2
Dependent and Control Variables Used in the Research

Variables	Descriptions	Metrics	Authors
Dependent Variables			
*END*_CP	Short-Term Debt	Current Liabilities / Total Assets	Brito et al. (2007); Costa et al. (2019); Souza et al. (2022).
END_LP	Long-Term Debt	Non-Current Liabilities / Total Assets	Brito et al. (2007); Costa et al. (2019); Fonseca et al. (2021); Costa et al. (2019); Souza et al. (2022).
*ET*_AT	Total Debt (in relation to total assets)	Current Liabilities + Non-Current Liabilities / Total Assets	Berger et al. (1997); Brito et al. (2007); Costa et al. (2019); Souza et al. (2022).
ET_PL	Total Debt (in relation to equity)	Current Liabilities + Non-Current Liabilities / Equity	Berger et al. (1997); Brito et al. (2007); Deangelo e Roll (2015); Bortoluzzi et al. (2016).

PO_AT	Interest-Bearing Liabilities (in relation to total assets)	Interest-Bearing Liabilities / Total Assets	Machado et al. (2010).
PO_CI	Interest-Bearing Liabilities	Interest-Bearing Liabilities / Invested Capital	Machado et al. (2010); Cavalcanti et al. (2018).
Control Variables			
TANG	Asset Tangibility	Fixed Assets / Total Assets	Cavalcanti et al. (2018); Avelar et al. (2019); Oliveira e Garcia (2024); Heckenbergerová e Honkova (2023).
ROA	Return on Assets (ROA)	Operating Income / Total Assets	Nakamura et al. (2007); Ndaki et al. (2018); Quiraque et al. (2022); Heckenbergerová e Honkova (2023).
MTB	Market to Book	Market Value / Equity	Nakamura et al. (2007); Cavalcanti et al. (2018); Quiraque et al. (2022).
TAM	Size	Ln (Total Assets)	Avelar et al. (2019); Quiraque et al. (2022); Oliveira e Garcia (2024); Silva e Banda (2022).

After the collection of the variables, the Multiple Regression model was used, applying the Ordinary Least Squares (OLS) method with panel data. To make this possible, 6 equations were estimated, one for each measure of debt, as shown in the following equations:

$$END\_CP = \alpha + b_1IDA + b_2TEM + b_3EXP + b_4ESC + b_5GEN + b_6TANG + b_7ROA + b_8MTB + b_9TAM + \varepsilon$$

(Equation 1)

$$END\_LP = \alpha + b_1\ IDA + b_2\ TEM + b_3\ EXP + b_4\ ESC + b_5\ GEN + b_6\ TANG + b_7\ ROA + b_8\ MTB + b_9\ TAM + \varepsilon$$

(Equation 2)

$$ET\_AT = \alpha + b_1IDA + b_2TEM + b_3EXP + b_4ESC + b_5GEN + b_6TANG + b_7ROA + b_8MTB + b_9TAM + \varepsilon$$

(Equation 3)

$$ET\_PL = \alpha + b_1IDA + b_2TEM + b_3EXP + b_4ESC + b_5GEN + b_6TANG + b_7ROA + b_8MTB + b_9TAM + \varepsilon$$

(Equation 4)

$$PO\_AT = \alpha + b_1IDA + b_2TEM + b_3EXP + b_4ESC + b_5GEN + b_6TANG + b_7ROA + b_8MTB + b_9TAM + \varepsilon$$

(Equation 5)

$$PO\_CI = \alpha + b_1IDA + b_2TEM + b_3EXP + b_4ESC + b_5GEN + b_6TANG + b_7ROA + b_8MTB + b_9TAM + \varepsilon$$

(Equation 6)

For the estimation of the equations outlined previously, all tests were conducted to verify the statistical assumptions, which were found to be appropriate for the panel with fixed and robust effects. The results of the equations are presented in the results analysis.

4. PRESENTATION AND ANALYSIS OF RESULTS

4.1 Descriptive Statistics

Regarding age (IDA), the average age of the CEOs in the sample is 53 years, with a minimum of 24 years and a maximum of 91 years. Naseem et al. (2020), in their study of Pakistani

companies, found an average age of 46 years, with a minimum of 32 and a maximum of 69. based on a sample of 179 companies. Vintila and Gherghina (2012), when analyzing companies listed on the New York Stock Exchange, found a minimum age of 34 and a maximum age of 75. with an average of 54 years. It can be observed that CEOs of companies listed on B3 tend to assume the role at a younger age, with the minimum age found being 24 years.

Table 3

Descriptive Statistics of the Final Sample

Variables	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
TEM	1.283	4.686	3.795	1	26
IDA	1.283	53.477	9.275	24	91
GEN	1.283	0.957	0.200	0	1
EXP	1.283	0.871	0.334	0	1
ESC	1.283	1.523	0.829	0	4
END_CP	1.283	0.307	0.290	0.001	3.055
END_LP	1.283	0.346	0.285	0	4.300
ET_AT	1.283	0.653	0.449	0.847	5.086
ET_PL	1.283	1.893	5.472	-73.385	57.772
PO_AT	1.283	0.286	0.217	0	3.025
PO_CI	1.283	0.362	1.549	-33.865	22.182
TANG	1.283	0.229	0.208	0	0.826
ROA	1.283	0.679	0.127	-1.418	1.240
MTB	1.283	1.770	2.842	-28.626	39.033
TAM	1.283	15.060	1.949	9.088	20.725

Table 3 presents the descriptive statistics for CEO characteristics, including mean values, standard deviation, minimum, and maximum. Regarding the tenure variable (TEM**)**, the range is from 1 to 26 years, with an average of 4.7 years of service in the company. This indicates that, on average, a CEO stays in the role for approximately 4.5 years.

The gender variable (GEN) takes the value 0 for female CEOs and 1 for male CEOs. The mean value of 0.957 indicates that the majority of CEOs (approximately 95.7%) are male, while around 4.3% are female. The professional experience variable (EXP) takes the value 0 for CEOs with no previous experience in the role and 1 for those with prior CEO experience. The mean value of 0.871 suggests that around 87.1% of CEOs have held the position previously, while approximately 12.9% have no prior experience as a CEO. The education level variable (ESC) ranges from 0 to 4, indicating that the sample includes CEOs without a degree as well as CEOs with a doctorate. The average is close to "bachelor's degree" (group 1), but it is important to note that this average is a general metric and does not reflect the exact distribution across categories.

Regarding the dependent variables, Short-Term Debt (END_CP) has an average of 0.307, meaning that, on average, short-term liabilities represent about 30.7% of total assets. For Long-Term Debt (END_LP), the minimum value is 0, indicating that some companies have no long-term debt and concentrate all their obligations in the short term. The maximum value of 4.300 suggests that some companies have a high level of debt relative to their assets.

In the Total Debt to Total Assets (ET_AT), the average result shows that, on average, current liabilities plus non-current liabilities represent approximately 65.3% of total assets. This indicates that the companies in the sample have a moderate level of debt relative to their assets. Regarding Total Debt to Equity (ET_PL), the average was 1.893; this result indicates that, on average, the companies in the sample have total debt higher than their equity.

The average Interest-Bearing Liabilities to Total Assets (PO_AT) was 0.286, indicating a relatively conservative financial profile. On the other hand, the Interest-Bearing Liabilities to Invested Capital (PO_CI) had an average of 0.362. The minimum value observed in the sample was 33.865, while the maximum value was 22.182, revealing that some companies have interest-

bearing liabilities greater than their invested capital. This factor could be alarming in terms of their financial health.

4.2 Inferential Statistics

It is noted that for Equation 1, which refers to Short-Term Debt (END_CP), none of the CEO characteristic variables were significant. However, regarding the control variables, ROA and TAM were significant at the 1% level, while MTB was relevant at the 5% level. As for Equation 2, which refers to Long-Term Debt (END_LP), among the CEO characteristic variables, only gender (GEN) and education level (ESC) were significant, both at the 1% level. Regarding the control variables, only MTB was not significant. In Equation 3, which concerns Total Debt to Total Assets (ET_AT), of the CEO characteristics variables, only TENURE (TEM) and GEN showed statistical significance, both at the 5% level. For the control variables, as in Equation 2, TANG, ROA, and TAM were significant, with TANG at 5%, and ROA and TAM at 1%.

Table 4

Inferential statistics of the model for the period 2010 to 2021

Variáveis Dependentes						
	(Equation 1) END_CP	***(Equation 2) END_LP***	***(Equation 3) ET_AT***	***(Equation 4) ET_PL***	***(Equation 5) PO_AT***	***(Equation 6) PO_CI***
TEM	0.001	0.004	0.005**	0.071*	0.010***	0.015**
	(0.92)	(1.71)	(2.46)	(1.88)	(5.04)	(2.26)
IDA	0.000	0.001	0.001	0.002	-0.001***	-0.005**
	(1.02)	(1.74)	(1.30)	(0.17)	(-4.55)	(-2.28)
GEN	0.017	0.043***	0.064**	-1.025	0.029**	0.028
	(1.01)	(3.16)	(2.46)	(-1.52)	(2.47)	(0.47)
EXP	-0.005	-0.019	-0.023	-0.172	-0.004	-0.070
	(-0.28)	(-0.84)	(-0.84)	(-0.47)	(-0.31)	(-0.66)
ESC	-0.002	0.021***	0.017	-0.099	0.006	-0.059***
	(-0.25)	(3.86)	(1.54)	(-1.19)	(0.87)	(-3.59)
TANG	0.018	0.108***	0.126**	-0.486	0.115***	-0.248
	(0.50)	(3.86)	(2.44)	(-1.11)	(4.29)	(-1.36)
ROA	-0.646***	-0.837***	-1.499***	-4.209*	-0.313**	1.524
	(-3.44)	(-4.49)	(-5.36)	(-1.87)	(-2.78)	(1.63)
MTB	-0.003**	-0.000	-0.003	0.663***	0.003	-0.013**
	(-2.60)	(-0.06)	(-0.98)	(8.59)	(1.27)	(-2.50)
TAM	-0.025***	0.015***	-0.010***	0.240***	0.023***	0.059**
	(-9.48)	(6.06)	(-4.27)	(4.31)	(9.67)	(2.87)
Const.	0.686***	0.017***	0.724***	-1.680	-0.080**	-0.226
	(11.54)	(0.32)	(8.42)	(-1.06)	(-2.31)	(-0.53)
Observ.	1.283	1.283	1.283	1.283	1.283	1.283
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00
R²	0.11	0.16	0.18	0.13	0.12	0.02

Legend: *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Tenure (TEM), CEO Age (IDA), CEO Gender (GEN), CEO Experience (EXP), CEO Education (ESC), Asset Tangibility (TANG), Return on Assets (ROA), Market-to-Book (MTB), Company Size (TAM), Short-Term Debt (END_CP), Long-Term Debt (END_LP), Total Debt to Total Assets (ET_AT), Total Debt to Equity (ET_PL), Interest-Bearing Liabilities to Total Assets (PO_AT), and Interest-Bearing Liabilities (PO_CI).

The results of the inferential statistics from the multiple regressions are presented in Table 4, highlighting the relationships between CEO characteristics and corporate debt.

In Equation 4, where the dependent variable is Total Debt to Equity (ET_PL), the results indicated a significant relationship only for the variable TEM (tenure), with significance at the 10% level. The variables IDA (age), GEN (gender), EXP (experience), and ESC (education) did not show statistical significance. Among the control variables, ROA, MTB, and TAM were

significant at the 10%, 1%, and 1% levels, respectively, while TANG (asset tangibility) was not significant.

In Equation 5, related to Interest-Bearing Liabilities to Total Assets (PO_AT), significance was observed for the variables TEM and IDA at the 1% level and GEN at the 5% level. Finally, in Equation 6, concerning Interest-Bearing Liabilities to Invested Capital (PO_CI), the variables TEM, IDA, and ESC were significant. TEM and IDA were significant at the 5% level, while ESC was significant at the 1% level.

Based on the results, Hypothesis 1, which predicted a significant negative relationship between CEO age and the debt levels of Brazilian companies, could not be confirmed, as only Equations 5 and 6 demonstrated the expected relationship. However, it was observed that the significant relationships were found in equations where the dependent variable involved interest-bearing debt. This suggests that in these types of debt, CEO age has a negative influence, meaning that younger CEOs are more likely to contract debts with interest. This finding aligns with the existing literature, such as Bortoluzzi et al. (2016) and Cavalcanti et al. (2018), which suggest that CEOs' personal and professional characteristics impact companies' capital structure. On the other hand, other studies, such as Garcia and Silva (2021), indicate that CEOs' demographic characteristics, including age, can influence companies' willingness to take financial risks, reflecting a possible resistance to higher debt levels among older leaders. Thus, although the initial hypothesis could not be confirmed, the results suggest that CEO age may play a relevant role, particularly concerning interest-bearing debt, while also highlighting the complexity of this relationship across different contexts and types of debt.

Hypothesis 2 predicts that CEO tenure is positively related to corporate debt, and this was confirmed in Equations 3, 4, 5, and 6. This result may be attributed to the longer time a CEO spends in the company, which contributes to greater alignment with the institution. As their tenure increases, they tend to take on more debt, likely as a means to expand services (Ndaki et al., 2018). These findings align with the study by Ndaki et al. (2018), which highlighted a positive relationship between CEO tenure and the debt proportion in microfinance institutions. Similarly, the research by Nessem et al. (2019) supports this relationship, suggesting that the confidence to make decisions that enhance company value grows with time in the role.

Regarding Hypothesis 3, a negative relationship between professional experience and corporate debt was expected. However, the EXP variable was not significant in any of the equations, leading to the rejection of this hypothesis. Studies supporting this finding emphasize that CEO experience, particularly prior experience as a CEO, often does not appear as a significant factor in companies' capital structures. For example, Abughniem et al. (2020) pointed out that characteristics such as education and CEO equity participation can influence debt levels, but prior experience did not show a statistically significant correlation. Jiang et al. (2024) examined CEO compensation structures and their impact on debt decisions, finding that factors like stock-based compensation could lead to riskier financial decisions. However, prior CEO experience had no direct significant impact on debt leverage decisions.

Hypothesis 4, based on the inferential results, could not be confirmed, as it predicted a significant and positive relationship between education level and corporate debt. Given that statistical significance was observed only in Equations 2 and 6, with opposing signs, it is evident that the relationship between debt and education level remains inconclusive. This is also supported by the literature, with varied findings reported by Bortoluzi et al. (2016), Cavalcanti et al. (2018), and Naseem et al. (2020).

For Hypothesis 5, it was expected that male gender would be positively related to corporate debt. This relationship was confirmed in Equations 2, 3, and 5, aligning with the findings of Silva and Banda (2022), which indicated a positive relationship between gender and corporate debt levels.

5 FINAL CONSIDERATIONS

This study aimed to analyze the relationship between the personal and professional characteristics of CEOs and the debt levels of publicly traded companies listed on the *Brasil, Bolsa, Balcão* (B3). A total of 444 companies were examined, focusing on CEO characteristics such as age, gender, tenure, professional experience, and education level, grounded in the Upper Echelons Theory by Hambrick & Mason (1984).

Regarding debt, six equations were estimated, each corresponding to a specific metric, using a multiple regression econometric model applied through the ordinary least squares (OLS) method with panel data.

The analysis revealed that certain CEO characteristics, such as tenure and gender, influence corporate debt, supporting research hypotheses 2 and 5. However, not all characteristics impacted all debt metrics, as each metric reflects a specific type of debt. This finding suggests that companies may be more susceptible to certain types of debt over others. Additionally, as proposed by Naseem et al. (2020), the relationship between these characteristics may vary by sector and period, leading to changes in capital structure.

The contributions of this study are significant, as they can assist companies in hiring new CEOs by enabling the identification of managerial profiles that align more closely with their objectives and needs. For CEOs, the analyzed characteristics can serve as a guide to aligning their profiles with the companies they wish to attract. From the stakeholders' perspective, the study's results can influence investment or relationship decisions with specific organizations, as the CEO profile may indicate whether their objectives align with those of investors, in addition to enabling predictions about future returns.

A limitation of this research concerns its focus on the Brazilian context and the selected variables, such as gender, age, and education, meaning the findings cannot be generalized to other contexts. Future studies should consider analyzing additional characteristics, such as the influence of different undergraduate courses, and investigate the perspective of sectoral differences. This sectoral analysis could provide a more detailed view of how the chosen variables affect debt levels, identifying areas where this influence is more significant.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest regarding this submitted work.

AUTHOR CONTRIBUTIONS

Roles	1ª Author	2ª Author	3ª Author	4ª Author
Conceptualization	♦	♦	♦	♦
Data Curation	♦	♦		♦
Formal Analysis	♦	♦	♦	♦
Funding Acquisition			♦	
Investigation	♦	♦		♦
Methodology			♦	♦
Project Administration	♦		♦	
Resources	♦	♦	♦	♦
Software			♦	♦
Supervision			♦	
Validation			♦	
Visualization	♦	♦	♦	♦
Writing – Original Draft	♦	♦		
Writing – Review & Editing		♦	♦	♦