

ARTICLE

The moderating effect of CEO's financial expertise on the relationship between managerial entrenchment and asymmetric cost behavior

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ABSTRACT

This study analyzed the moderating effect of CEO's financial expertise on the relationship between managerial entrenchment and the asymmetric cost behavior of Brazilian public companies, analyzing 178 companies in the period between 2012 and 2021. Descriptive statistics, a correlation matrix, and regressions using the GMM technique were used. The results showed that entrenched managers with financial expertise increase COGS and TC more quickly in periods of sales growth and reduce them more slowly when sales decline. From the perspective of Agency Theory, these results suggest signs of empire building, which could be harmful to the company in the long term. This study contributes by bringing a new perspective on the risks related to managers' characteristics, suggesting that financial expertise can be used as a mechanism for entrenched managers to strengthen their control. In this way, shareholders can demand mechanisms to promote greater vigilance over the influence of managers on the company's cost structure.

KEYWORDS

Asymmetric Cost Behavior. Managerial Entrenchment. CEO's Financial Expertise. Agency Theory.

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Received: 25/01/2024
Reviewed: 02/07/2024
Accepted: 17/11/2024
DOI: <https://doi.org/10.15728/bbr.2024.1858.en>



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Efeito moderador da *expertise* financeira do CEO na relação entre o entrincheiramento gerencial e o comportamento assimétrico dos custos

RESUMO

Essa pesquisa analisou o efeito moderador da *expertise* financeira do CEO na relação entre o entrincheiramento gerencial e o comportamento assimétrico dos custos de companhias abertas brasileiras, sendo analisadas 178 empresas no período 2012-2021. Utilizou-se de estatística descritiva, matriz de correlação e regressões pela técnica GMM. Os resultados apresentaram que gestores entrincheirados com *expertise* financeira aumentam mais rapidamente o CPV e o CT em períodos de crescimento nas vendas, e os reduzem mais lentamente quando as vendas diminuem. Sob a perspectiva da Teoria da Agência, esses resultados sugerem indícios de construção de impérios, o que pode ser prejudicial para a empresa no longo prazo. Este estudo contribui ao trazer uma nova perspectiva sobre os riscos relacionados às características dos gestores, sugerindo que a *expertise* financeira pode ser utilizada como um mecanismo para gestores entrincheirados fortalecerem o seu controle. Desse modo, acionistas podem exigir mecanismos visando promover uma maior vigilância sobre a influência dos gestores na estrutura de custos da empresa.

PALAVRAS-CHAVES

Comportamento Assimétrico dos Custos. Entincheiramento Gerencial. *Expertise* Financeira do CEO. Teoria da Agência.

1. INTRODUCTION

Unlike the traditional view of cost accounting, the cost asymmetry approach considers that managerial decisions affect the behavior of companies' costs (Anderson et al., 2003; Banker et al., 2018). Previous research has identified that managers' decisions to maintain or reduce idle resources in periods of declining sales may be motivated by personal interests (Chen et al., 2012; Bugeja et al., 2015; Lopatta et al., 2020; Richartz & Borgert, 2021). From the point of view of Agency Theory, where the principal (owner) and the agent (manager) have different interests, managerial decisions arise from the desire of managers to obtain benefits for themselves, which results in agency problems (Berle & Means, 1932; Jensen & Meckling, 1976), such as managerial entrenchment (Salehi et al., 2021).

Managerial entrenchment is an agency problem that occurs when managers manage to preserve their positions in companies (Morck et al., 1988; Shleifer & Vishny, 1989; Keil et al., 2017), by engaging in practices that neutralize corporate governance disciplines and control mechanisms (Shleifer & Vishny, 1989; Lin et al., 2014). Managerial ownership, the accumulation of the position of Chief Executive Officer (CEO), on the board of directors, and the CEO's tenure in the company are some indications that the manager may be entrenched in his position (Salehi et al., 2021).

Among the agency problems analyzed in the literature on asymmetric cost behavior, studies on empire building predominate, which refers to the tendency of managers to expand the company beyond its ideal size (Chen et al., 2012; Brügggen & Zehnder, 2014; Bugeja et al., 2015; Lopatta et al., 2020). Thus, the analysis of managerial entrenchment as an agency problem that can cause asymmetric behavior of costs is found to be a gap in the literature.

The Brazilian market is characterized by a concentrated ownership structure (Machado, 2023), which can increase the risk of managerial entrenchment. In addition, publicly held companies, by virtue of the separation of ownership and control, provide a more conducive environment

for managerial entrenchment than in other types of organizations (Salehi et al., 2021). Thus, it becomes relevant to analyze the effect of managerial entrenchment on the asymmetric cost behavior in the context of Brazilian publicly held companies.

In addition to the above, it is understood that the CEO's financial expertise has the potential to moderate the relationship between managerial entrenchment and asymmetric cost behavior. Financial expertise refers to academic knowledge and knowledge arising from the CEO's professional experience that is related to finance (Bortoli & Soares, 2021). In cases of financial scandals, such as those of Enron and WorldCom, the managers, firmly entrenched, used their financial expertise to carry out high-risk deals, aiming only at maximizing their own profits (Arnold & De Lange, 2004). In this context of agency problems, the entrenched CEO is expected to use his financial expertise to pursue personal interests, which consequently impacts the cost structure of companies.

It is important to investigate the personal characteristics of CEOs, since these professionals act as decision-makers in relation to corporate strategies (Custódio & Metzger, 2014), and their decisions have an impact on the behavior of companies' costs (Anderson et al., 2003). Based on the above, this study aims to evaluate the moderating effect of CEO's financial expertise on the relationship between managerial entrenchment and asymmetric cost behavior in the context of Brazilian publicly held companies. The asymmetric cost behavior was analyzed based on the Cost of Goods Sold (COGS), Selling, General and Administrative Expenses (SG&A) and Total Cost (TC), which comprises the sum of COGS and SG&A.

Descriptive, documentary, and quantitative research was carried out in a balanced sample of 178 Brazilian publicly held companies in the period between 2012 and 2021, and the data were analyzed through descriptive statistics, a correlation matrix, and regressions by the Generalized Moment Method. The results presented evidence that entrenched CEOs with financial expertise impact the asymmetric behavior in sticky cost direction for COGS and TC. In this way, COGS and TC increase faster in periods of increased sales than they do in relation to decreases of the same proportion in sales.

As a theoretical contribution, this study offers a new perspective on the risks associated with the CEO's qualifications, suggesting that financial skills can serve as a mechanism for the entrenched manager to reinforce his control, having repercussions on the company's cost structure. In addition, this study contributes by analyzing not only the asymmetric cost behavior in the sticky direction, but also in the anti-sticky direction, which, according to Ibrahim et al. (2022), is still little addressed in the literature on asymmetric cost behavior.

In a practical way, the results of this study can be useful for shareholders, members of audit committees, and members of boards of directors of organizations, in the sense of being more aware of the characteristics that the CEO may be entrenched in, such as managerial ownership, CEO duality, and tenure (Salehi et al., 2021). In addition, the possibility of entrenched managers using their financial knowledge to increase the company's structure for their own benefit, as in cases that occurred at Enron and WorldCom (Arnold & De Lange, 2004), is emphasized. Thus, shareholders may require mechanisms to restrict the CEO's opportunistic behavior, such as the formulation of corporate policies that promote greater vigilance over the influence of managers on the cost structure, in order to safeguard the company's long-term survival and protect its interests. This study also contributes to auditors, market analysts, and regulators in the sense that their work procedures can be enhanced by a better understanding of how costs behave according to the level of managerial entrenchment and CEO's financial expertise.

Publicly held companies are characterized by the separation of ownership and control (Jensen & Meckling, 1976; Fama, 1980). The first to discuss the potential costs of the separation between ownership and control were Berle and Means (1932), who analyzed that this separation would give greater power to managers, increasing the possibilities for them to act opportunistically, instead of acting in accordance with the interests of shareholders (Saito & Silveira, 2008). Thus, when shareholders do not have an active role in the management of the company, agency problems arise (Healy & Palepu, 2001).

Corporate governance emerged as a response to the agency problem arising from the conflict of interest between shareholders and managers, since it is concerned with the need to monitor management, aiming at the company's long-term survival and the protection of shareholders' interests (Salehi et al., 2018). A relevant corporate governance mechanism for monitoring the behavior of managers is the board of directors (Eisenhardt, 1989). Boards of directors with independent members are considered one of the most influential corporate governance mechanisms, in the sense of restricting the manager's opportunistic behavior (Fama & Jensen, 1983; Salehi et al., 2021).

However, there are mechanisms by which managers can maintain control and protect their positions, increase personal status and prestige, and decrease the oversight power of the board of directors (Florackis & Ozkan, 2009). That is, because of the possibility of being penalized for their opportunistic behavior, managers may opt for entrenchment to protect their position in the company (Shleifer & Vishny, 1989).

In this scenario, the agency problem resulting from the conflict of interest between shareholders and managers is exacerbated when managers are entrenched, because, through entrenchment, managers have a lower risk of dismissal and can preserve their positions in companies (Morck et al., 1988; Shleifer & Vishny, 1989; Keil et al., 2017). Among the indications that managers may be entrenched, stands out the managerial ownership, which refers to the company's shares held by managers (Morck et al., 1988; Shuto & Takada, 2010; Beyer et al., 2012), the accumulation of the position of CEO and membership in the board of directors (Hu & Kumar, 2004; Florackis & Ozkan, 2009; Lin et al., 2014; Salehi et al., 2018, 2020, 2021) and the length of tenure in the position of CEO (Salehi et al., 2018, 2020, 2021). Managerial entrenchment facilitates a manager's quest for empire building (Jensen, 1986; Stulz, 1990; Aggarwal & Samwick, 2006; Humphery-Jenner, 2012), which refers to the expansion of the company beyond its ideal capacity, with the aim of increasing the personal utility of status, power, remuneration, and prestige (Jensen, 1986; Chen et al., 2012).

Managers' decisions made based on their own benefit consequently have an impact on the cost structure of companies (Anderson et al., 2003; Chen et al., 2012; Bugeja et al., 2015). According to Anderson et al. (2003), one of the reasons for the occurrence of asymmetric cost behavior in organizations refers to managers' decisions about resource adjustments that are motivated by personal interests, such as the fear of dismissing family employees or the loss of status when a branch is restructured.

Chen et al. (2012) identified that the degree of cost asymmetry increases with the length of the CEO's tenure and decreases in the years of the CEO's change or in the years immediately before his change. In this sense, Chen et al. (2012) argue that managers with power in the company have a greater tendency to seek empire building. Thus, managers increase the company's resources more quickly in periods of sales growth, but decrease resources more slowly in periods of sales reductions, which impacts the asymmetric cost behavior (Chen et al., 2012). Along the same

lines, Lopatta et al. (2020) found that managers with power are associated with a higher level of asymmetry in companies' costs.

Regarding the accumulation of the position of CEO and membership of the board of directors, Ibrahim (2018) brought evidence that this accumulation of positions influences the asymmetric cost behavior of companies. In this way, this accumulation of positions, due to the concentration of power, allows managers to make adjustments in the company's resources so that they meet their personal interests (Ibrahim, 2018).

Dierynck et al. (2012) concluded that incentives to meet or exceed outcome targets motivate managers to reduce labor costs in periods of declining sales and not to increase those costs when sales increase again. In this context, Kama and Weiss (2013) also presented evidence that incentives to achieve result goals make managers more likely to reduce idle resources when sales fall, which impacts on asymmetric cost behavior.

In view of the above, it is understood that the manager who owns shares in the company (Beyer et al., 2012), who also holds the position of board member (Lin et al., 2014) and who has a long tenure in the company has greater control over the board of directors (Salehi et al., 2021). In addition, boards that do not have independent members become less effective in monitoring managers' activities, as do boards that have low-skilled members, which provides managers with an environment conducive to entrenchment (Salehi et al., 2021). Consequently, in this scenario, managers have greater security to pursue personal interests, such as seeking empire building (Chen et al., 2012; Lopatta et al., 2020) or making sharp cuts in costs aimed at higher remuneration for achieving goals for the result (Dierynck et al., 2012; Kama & Weiss, 2013), thus giving rise to the asymmetric cost behavior. Thus, the first research hypothesis was formulated:

H₁: Managerial entrenchment has an effect on asymmetric cost behavior.

Financial expertise refers to knowledge related to finance, acquired throughout the manager's academic and professional career (Bortoli & Soares, 2021). Regarding the factors of financial expertise that influence the decisions of professionals who occupy the position of CEO, the literature presents: (i) academic background (Bertrand & Schoar, 2003; Custódio & Metzger, 2014; Bortoli & Soares, 2021); (ii) experience in the financial sector (Bortoli & Soares, 2021; Li et al., 2023); (iii) experience as a chief financial officer (Bassouly et al., 2020; Bortoli & Soares, 2021; Li et al., 2023); and (iv) the length of experience in the position of CEO (Custódio & Metzger, 2014; Bortoli & Soares, 2021).

From the perspective of the Agency Theory, it is understood that the CEO who is entrenched (Shleifer & Vishny, 1989) and who has financial expertise (Custódio & Metzger, 2014; Bortoli & Soares, 2021) uses his financial knowledge for his own benefit. In this context, in the late 1990s, Enron's managers, firmly entrenched by weak monitoring mechanisms, used their financial expertise to conduct high-risk deals, especially with continued pressure to exceed analysts' quarterly expectations (Arnold & De Lange, 2004). The actions taken by managers as part of the company's expansion strategy were initially seen as highly entrepreneurial (Keil et al., 2017). However, after the company's bankruptcy, it became evident that the managers had planned the company's expansion only to maximize their own profits (Gillan & Martin, 2007). Other similar cases have occurred with the companies WorldCom and Nortel Networks (Arnold & De Lange, 2004).

In this way, the expansion of the company beyond its ideal capacity can provide personal benefits to the manager (Jensen, 1986; Chen et al., 2012). For example, after the acquisition

of a company has been completed, the manager may argue that he now has a greater domain to manage, so he should have an increase in compensation due to the increase in responsibility (Davis et al., 2013). Thus, even in periods of declining sales, managers may decide to keep idle resources for personal interests, which leads to the asymmetric cost behavior for organizations (Anderson et al., 2003; Chen et al., 2012; Richartz & Borgert, 2021).

Thus, it is understood that entrenched managers who have financial expertise have more capacity to make decisions aimed at personal interests, which consequently has repercussions on the company's cost structure. Thus, the CEO's financial expertise is expected to influence the relationship between managerial entrenchment and asymmetric cost behavior. In view of the above, the second research hypothesis was elaborated:

H₂: CEO's financial expertise moderates the relationship between managerial entrenchment and asymmetric cost behavior.

3. METHODOLOGICAL PROCEDURES

3.1. POPULATION AND SAMPLE

The population consists of Brazilian companies listed on the B3 (Brasil, Bolsa, Balcão), stock exchange, belonging to all sectors of activity, with the exception of financial institutions, as they have specific regulations and have a different operating structure from non-financial companies, which makes it difficult to compare the results (Richartz & Borgert, 2021). The study's analysis period involves the years 2012 to 2021.

Table 1 shows the composition of the companies in the sample in Panel A. Panel B shows the composition of the companies in the sample by sector, according to the Global Industry Classification Standard (GICS) classification of the Refinitiv database.

In this study, the panel was used in a balanced way. In all, 480 companies listed on B3 were available in the Refinitiv database. Initially, 79 companies belonging to the financial sector were excluded. Subsequently, all companies that did not show movement in at least one year of the analysis period were excluded for the Net Sales Revenue (NSR), Cost of Goods Sold (COGS) or Selling, General and Administrative Expenses (SG&A) accounts. Of the remaining companies, those that presented negative values for these accounts were excluded.

The cost asymmetry model of Anderson et al. (2003) considers the logarithm of the ratio of costs and revenues in the current period in relation to the previous period. Thus, when a company does not present NSR, COGS or SG&A values in one period, this also makes it impossible to calculate the asymmetry for the following period. In addition, the presentation of negative values for the NSR, COGS, and SG&A accounts also makes it impossible to calculate the asymmetry of the current period and the following period, since it is not possible to calculate logarithms on negative values. Thus, it was decided to calculate the asymmetric cost behavior only with companies that presented values (or that did not present negative values) of NSR, COGS, and SG&A during the entire analysis period.

It should be noted that the companies that did not present NSR, COGS and SG&A values refer to companies that were not listed on the B3 in at least one year of the analysis period. Thus, the financial statements of these companies in the periods in which they were not listed on the B3 are not publicly available.

Regarding the exclusion of outliers, in the present study, variations above 100 % in NSR compared to the previous year were considered as the cutoff point, both for increases and decreases

Table 1

*Companies in the study sample***Panel A – Composition of the companies in the sample**

Companies	AF	RF
(+) Companies listed on B3	480	100.0 %
(-) Companies in the financial sector	79	16.5 %
(=) Subtotal	401	83.5 %
(-) Companies with periods of no movement for NSR, COGS or SG&A	191	39.8 %
(-) Companies with periods with negative values for NSR, COGS or SG&A	4	0.8 %
(-) Companies with periods with variation above 100 % in NSR	28	5.8 %
(=) Total	178	37.1 %

Panel B – Composition of companies by sector

Sectors	AF	RF
Health care	5	2.8 %
Real estate	17	9.6 %
Cyclical consumption	39	21.9 %
Non-cyclical consumption	20	11.2 %
Energy	4	2.2 %
Industry	29	16.3 %
Basic materials	24	13.5 %
Educational and academic services	3	1.7 %
Utilities	31	17.4 %
Technology	6	3.4 %
(=) Total	178	100.0 %

Legend: AF: Absolute Frequency; RF: Relative Frequency; B3: Brasil, Bolsa, Balcão; NSR: Net Sales Revenue; COGS: Cost of Goods Sold; SG&A: Selling, General and Administrative Expenses.

Source: Research data (2023).

in NSR, as adopted by Balakrishnan et al. (2014) and Pamplona et al. (2018). It is considered that companies that presented a variation above 100 % in the NSR had some eventual change, such as a merger or incorporation, which affects the cost structure and its analysis in that period (Pamplona et al., 2018). Thus, the balanced sample comprised 178 companies, which contained the necessary information for the period analyzed, totaling 1,780 observations for the period from 2012 to 2021.

3.2. MEASUREMENT OF MANAGERIAL ENTRENCHMENT

To measure managerial entrenchment, a set of corporate governance characteristics was considered, as used in previous studies, as well as characteristics adapted according to the context of the Brazilian capital market. Table 2 presents the variables related to the construct of managerial entrenchment.

Studies have used the percentage of shares held by the CEO to measure the level of managerial entrenchment (Hu & Kumar, 2004; Florackis & Ozkan, 2009; Lin et al., 2014). However, because this information is not available in the Brazilian scenario, the total number of shares held by the executive board (EXSH variable) was used.

The independence of the board of directors (BIND variable) and the compensation of the board of directors (BCOM variable) are considered as indicators that help mitigate the level of managerial entrenchment (Salehi et al., 2021). Regarding the duality of the CEO (DCEO variable), it is argued in the literature that it decreases the independence and effectiveness of the board and increases the power of the CEO (Hu & Kumar, 2004; Lin et al., 2014).

Regarding the time in the company in the position of CEO (ECEO variable), studies have included this characteristic in the constructs of managerial entrenchment through a dichotomous variable. Salehi et al. (2018, 2020, 2021) considered that CEOs with at least three years in the position in the position in category 1, and 0 (zero), otherwise. To avoid subjectivity in the use of the dichotomous variable, it was decided to measure this characteristic through a continuous variable.

Table 2

Variables of managerial entrenchment construct

Variable	Description	ES	Author(s)
EXSH	Variable calculated by the number of shares held by the members of the executive board.	+	Adapted from: Hu & Kumar (2004); Florackis & Ozkan (2009); Lin et al. (2014)
BIND	Variable calculated by the number of independent members of the board of directors in relation to the total numbers of board members.	-	Hu & Kumar (2004); Florackis & Ozkan (2009); Salehi et al. (2018, 2020, 2021)
BCOM	Variable based on the natural logarithm of the board of directors' compensation.	-	Salehi et al. (2018, 2020, 2021)
DCEO	Dichotomous variable, where 1 if the CEO is also a member of the board of directors, and 0 (zero), if not.	+	Hu & Kumar (2004); Florackis & Ozkan (2009); Lin et al. (2014); Salehi et al. (2018, 2020, 2021)
ECEO	Variable calculated by the number of years the CEO held the position in the company continuously.	+	Adapted from: Salehi et al. (2018, 2020, 2021)

Legend: EXSH: Shares held by the executive board; BIND: Board of directors' independence; BCOM: Board of directors' compensation; DCEO: CEO duality; ECEO: Number of years continuously in the position of CEO; ES: Expected signal.

Source: elaborated by the authors.

To obtain a managerial entrenchment index, which covers all five variables specified in Table 2, Principal Component Analysis (PCA) was used. For the operationalization of the PCA, initially, data were collected from the five variables of the managerial entrenchment construct through the reference forms of publicly held companies and organized in an electronic spreadsheet. Subsequently, the Stata® software was used for data import and PCA, as well as for PCA validation tests (Kaiser-Meyer-Olkin Statistics (KMO) and Bartlett Sphericity Test).

The KMO statistic varies between 0 and 1, and the values of this test that indicate whether the factor analysis is appropriate vary among authors. According to Hair et al. (2009), KMO values below 0.50 are considered unacceptable, between 0.50 and 0.69 as acceptable and above 0.70 are considered desirable. The Bartlett Sphericity Test tests the hypothesis that the variables are not correlated in a correlation matrix, and the null hypothesis indicates that the factorial model is inappropriate (Hair et al., 2009).

3.3. MEASUREMENT OF CEO'S FINANCIAL EXPERTISE

To measure the CEO's financial expertise variable, an adaptation of the Bortoli and Soares (2021) model was used. Table 3 identifies the variables that make up the construct of the CEO's financial expertise.

Table 3

Variables of CEO's financial expertise construct

Dimension	Variable	Item measurement
Academic	BF	Dichotomous variable, where 1 is considered if the CEO has academic background (undergraduate and/or graduate) related to finance (courses in Administration, Accounting, Economics and Finance), and 0 (zero), otherwise.
	EFS	Dichotomous variable, where 1 is considered if the CEO has professional experience in companies in the financial sector, and 0 (zero), otherwise.
Professional	EFD	Dichotomous variable, where 1 is considered if the CEO has professional experience as a financial director, and 0 (zero), otherwise.
	EC	Continuous variable, which refers to the number of years the CEO has experience in this position.

Legend: BF: Academic background in finance; EFS: Experience in the financial sector; EFD: Experience as a financial director; EC: Years of experience in the position of CEO.

Source: Adapted from Bortoli and Soares (2021).

The procedures for obtaining an index of the CEO's financial expertise, presented in Table 3, were the same as those adopted for measuring managerial entrenchment. Thus, initially, the data on the variables of the construct of CEO's financial expertise were collected through reference forms and organized in an electronic spreadsheet. Subsequently, the *Stata*® software was used to operationalize the PCA, as well as the KMO statistics and the Bartlett sphericity test to validate the use of the PCA of the CEO's financial expertise.

Since the construct of the CEO's financial expertise comprises three dichotomous variables (BF, EFS, and EFD) and one continuous variable (EC), the continuous variable EC was transformed into nominal for a better association between the components of the PCA. The length of experience in decades was used as a parameter, as adopted by Bortoli and Soares (2021). Thus, "1" was adopted for observations between 1 and 10 years old, "2" for observations between 11 and 20 years old, and "3" for observations over 20 years old.

3.4. CONTROL VARIABLES

As control variables, the size of the company (SIZ), the age of the company (AGE) and leverage (LEV) were used. The SIZ variable was measured based on the logarithm of the total asset, as used in previous studies (Bosch & Blandón, 2011; Richartz & Borgert, 2021). The AGE variable was calculated through the date of foundation of the company until the year 2021. According to Chen et al. (2012), mature companies have a greater tendency to retain idle resources even in periods of declining sales, which causes asymmetric cost behavior. The LEV variable was measured by dividing total liabilities by shareholders' equity. The company's total assets, total liabilities, shareholders' equity, and age information were collected through the Refinitiv database.

The data analysis procedures were operationalized using the Stata® software. Initially, the following preliminary procedures were carried out: (i) Descriptive statistics and correlation matrix of the variables of managerial entrenchment and CEO's financial expertise; (ii) PCA for grouping the variables of managerial entrenchment in a single index, as well as the variables of CEO's financial expertise; (iii) Tests for PCA validation (KMO Statistics and Bartlett Sphericity Test); (iv) Descriptive statistics and correlation matrix of the variables used in the regressions.

Subsequently, the regressions of the relationships of Hypotheses 1 and 2 were operationalized based on the Anderson et al. (2003) model to identify the asymmetric cost behavior. Regressions were performed using the Generalized Method of Moments (GMM) of data in a dynamic Arellano-Bover/Blundell-Bond panel, used to deal with endogeneity problems. This method fits a linear dynamic panel data model where unobserved effects at the panel level are correlated with dependent variable lags (Arellano & Bover, 1995; Blundell & Bond, 1998).

For the analysis of the relationship between managerial entrenchment and the asymmetric cost behavior, as outlined in Hypothesis 1, the regressions were operationalized according to Equation 1.

$$\begin{aligned} \log \left\{ \frac{Costs_{i,t}}{Costs_{i,t-1}} \right\} \\ = \beta_0 + \beta_1 \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} + \beta_2 dNSR * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} + \beta_3 dNSR \\ * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * EN_{i,t} + \beta_4 dNSR * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * SIZ_{i,t} + \beta_5 dNSR \\ * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * AGE_{i,t} + \beta_6 dNSR * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * LEV_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Where:

Costs = equivalent to the different dependent variables on the study (COGS, SG&A and TC);

NSR = Net sales revenue;

dNSR = Dichotomous variable of NSR decrease;

EN = Managerial entrenchment;

SIZ = Company size;

AGE = Company age;

LEV = Leverage;

= Regression error.

Anderson et al. (2003) model consists of capturing the variations in costs for each 1 % variation in the NSR. The NSR is used as an approximation of the production volume of the companies. The dichotomous variable assumes the value of 1 when the NSR of company *i* in period *t* is less than the NSR of period *t-1* and, 0 (zero), otherwise.

The asymmetric cost behavior was analyzed separately based on the COGS, SG&A, and TC accounts (sum of COGS and SG&A). The values of COGS, SG&A and NSR accounts were obtained from the Refinitiv database. Financial expenses were not considered, as they are not directly related to the production volume, which can make it difficult to analyze the asymmetric cost behavior (Richartz & Borgert, 2021).

Anderson et al. (2003) model allows the addition of other variables to examine the effect on the asymmetric cost behavior, through terms of interaction. Thus, in compliance with the provisions of Hypothesis 1, the independent variable of Managerial Entrenchment (EN) was inserted in the Anderson et al. (2003) model, multiplied by the dichotomous variable of NSR decrease and by the logarithm of the NSR ratio, which refers to the β_3 coefficient, as shown in Equation 1. The same procedure was adopted for the inclusion of the control variables SIZ, IDA, and LEV in the model.

The concepts of asymmetric sticky and anti-sticky cost behavior refer to the way costs respond to changes in NSR. When costs increase from the 1 % increase in NSR greater than a reduction in costs from the 1 % reduction in NSR, sticky asymmetric behavior occurs. In other words, costs are more resistant to falling than rising. Thus, the behavior is sticky when the coefficient β_1 is greater than the sum of the coefficients β_1 and β_3 ($\beta_1 > \beta_1 + \beta_3$). Thus, this behavior can be identified through the negative sign of the β_3 coefficient.

On the other hand, when the reduction in costs relative to the 1 % reduction in NSR is greater than the increase in costs relative to the 1 % increase in NSR, the asymmetric anti-sticky behavior is demonstrated. In this sense, costs fall faster when the NSR falls but increase more slowly when the NSR increases. Thus, the behavior is anti-sticky when the sum of the coefficients β_1 and β_3 is greater than the coefficient β_1 ($\beta_1 + \beta_3 > \beta_1$). Thus, this asymmetric behavior is identified based on the positive sign of the β_3 coefficient. For Hypothesis 1 of this study to be accepted, both β_1 and β_3 coefficients must be significant.

For the analysis of the moderating effect of CEO's financial expertise on the relationship between managerial entrenchment and asymmetric cost behavior, according to Hypothesis 2, the regressions were operationalized as represented by Equation 2.

$$\begin{aligned} \log \left\{ \frac{Costs_{i,t}}{Costs_{i,t-1}} \right\} \\ = \beta_0 + \beta_1 \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} + \beta_2 dNSR * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} + \beta_3 dNSR \\ * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * (EN * FE)_{i,t} + \beta_4 dNSR * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * SIZ_{i,t} + \beta_5 dNSR \\ * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * AGE_{i,t} + \beta_6 dNSR * \log \left\{ \frac{NSR_{i,t}}{NSR_{i,t-1}} \right\} * LEV_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

Where:

FE = CEO's financial expertise

In accordance with what was outlined in Hypothesis 2, the variable of CEO's financial expertise (FE) was multiplied by the variable EN, by the dichotomous variable of NSR decrease and by the logarithm of NSR ratio, which refers to the coefficient β_3 , as shown in Equation 2. The logic for identifying sticky and anti-sticky asymmetric behavior is the same as demonstrated for Equation 1. Thus, for Hypothesis 2 of this study to be accepted, both coefficients β_1 and β_3 must be significant.

4.1. DESCRIPTIVE STATISTICS AND CORRELATION MATRIX

Table 4 presents the descriptive statistics for the variables analyzed in this study. In general, it is observed that the variables of this study presented similar behaviors, such as a high standard deviation in relation to the mean. It should be noted that the sample includes all companies that met the necessary requirements for this study. Thus, no differentiation was made in size, sector or any other characteristics that could differentiate one company from another. Thus, the sample is heterogeneous, which thus justifies the standard deviation higher than the mean presented in the variables of this study.

Table 4*Descriptive statistics of the variables*

Panel A: Dependent variables							
Variables	Mean	SD	Minimum	Maximum	P25	P50	P75
logCOGS	0.0263	0.1271	-1.4925	1.4122	-0.0094	0.0314	0.0737
logSG&A	0.0212	0.1163	-1.3039	1.3636	-0.0172	0.0261	0.0673
logTC	0.0261	0.1060	-1.3025	1.0893	-0.0074	0.0307	0.0696
Panel B: Independent variables							
Variables	Mean	SD	Minimum	Maximum	P25	P50	P75
logNSR	0.0249	0.1136	-1.1804	0.2991	-0.0082	0.0338	0.0721
EN	0.0000	1.2976	-2.4871	8.4539	-0.8225	-0.2161	0.5056
FE	0.0000	1.1794	-1.9220	3.0122	-0.8070	-0.0217	0.2628
Panel C: Control variables							
Variables	Mean	SD	Minimum	Maximum	P25	P50	P75
TAM	21.8413	1.8656	16.5333	27.6184	20.5469	21.8990	23.0625
IDA	47.3596	28.4359	2.0000	149.0000	21.0000	48.0000	67.0000
ALA	1.9854	26.6463	-774.1732	412.7411	0.6327	1.2580	2.4199
Panel D: P&L accounts							
Accounts	Total (R\$ Million)	Mean (R\$ Million)		% TC		% NSR	
COGS	11,636,104.49	6,537.14		86.53 %		70.30 %	
SG&A	1,811,776.64	1,017.85		13.47 %		10.95 %	
TC	13,447,881.13	7,554.99		100.00 %		81.25 %	
NSR	16,551,637.65	9,298.67		-		100.00 %	
Observations: 1,780							

Legend: *logCOGS*, *logSG&A*, *logTC* and *logNSR*: log of the ratio ($t/t-1$) of the Costs of Goods Sold (COGS), Selling, General and Administrative Expenses (SG&A), Total Costs (TC) and Net Sales Revenue (NSR), respectively; *EN*: Managerial Entrenchment measured by PCA; *FE*: CEO's Financial Expertise measured by PCA; *SIZ*: Company size; *AGE*: Company age; *LEV*: Leverage; *SD*: Standard Deviation; *P*: Percentile.

Source: Research data (2023).

Table 5 shows the Pearson (lower axis) and Spearman (upper axis) correlation matrix for the variables of the relationships investigated in this study.

It is noteworthy that in appendix I, II, and III, descriptive statistics, correlation matrix, and principal component analysis related to managerial entrenchment are presented, respectively. Appendix IV, V and VI display descriptive statistics, correlation matrix and the principal component analysis corresponding to CEO's financial expertise, respectively.

Table 5

Correlation matrix

Variables	logCOGS	logSG&A	logTC	logNSR	EN	FE	SIZ	AGE	LEV
logCOGS	1	0.42***	0.94***	0.84***	-0.04*	0.03	0.14***	-0.05**	0.07***
logSG&A	0.35***	1	0.60***	0.50***	-0.04*	0.03	0.13***	-0.07***	0.06***
logTC	0.95***	0.52***	1	0.86***	-0.05**	0.03	0.17***	-0.06**	0.08***
logNSR	0.79***	0.44***	0.83***	1	-0.05**	0.04*	0.14***	-0.03	0.08***
EN	-0.03	-0.03	-0.03	-0.03	1	-0.30***	-0.37***	0.13***	-0.14***
FE	0.00	0.02	0.02	0.00	-0.31***	1	0.14***	-0.15***	0.10***
SIZ	0.11***	0.07***	0.12***	0.12***	-0.38***	0.14***	1	-0.23***	0.44***
AGE	-0.04	-0.06***	-0.05*	-0.03	0.17***	-0.16***	-0.20***	1	-0.09***
LEV	0.00	0.01	0.00	-0.01	0.00	0.00	0.03	-0.01	1

Note: ***significance at the level of 1 %; **5 %, *10 %.

Source: Research data (2023).

4.2. EFFECT OF MANAGERIAL ENTRENCHMENT ON ASYMMETRIC COST BEHAVIOR

Table 6 presents the results of the regressions of the relationship between managerial entrenchment and asymmetric cost behavior.

Table 6

Regressions of the relationship between managerial entrenchment and asymmetric cost behavior

Variables	Dependent = logCOGS		Dependent = logSG&A		Dependent = logTC	
	Coefficient	z	Coefficient	z	Coefficient	z
Constant	0.0009	0.22	0.0137***	2.75	0.0027	0.86
logNSR	0.9213***	17.06	0.3556***	5.23	0.8120***	19.81
d-logNSR	-1.1608**	-2.44	-1.9291***	-3.20	-1.5798***	-4.36
d-EN	0.0789**	2.08	0.0403	0.83	0.0527*	1.81
d-SIZ	0.0519**	2.33	0.0840***	2.98	0.0657***	3.87
d-AGE	-0.0007	-0.45	0.0037*	1.83	0.0019	1.53
d-LEV	-0.0031**	-2.28	-0.0004	-0.24	-0.0016	-1.57
Wald chi2	1,042.47		184.74		1,311.72	
Prob > chi2	0.0000		0.0000		0.0000	

Note: ***significance at the level of 1 %; **5 %, *10 %.

Legend: d-logNSR: Dichotomous variable of NSR decrease multiplied by the log of NSR ratio ($t/t-1$); d-EN, d-SIZ, d-AGE and d-LEV: Variables of managerial entrenchment (EN), company size (SIZ), company age (AGE) and leverage (LEV) multiplied by the dichotomous variable of NSR decrease and by the log of NSR ratio ($t/t-1$), respectively.

Source: Research data (2023).

The independent variable d-EN indicated significance for the relationships with the dependent variables logCOGS and logTC. Thus, it is verified that managerial entrenchment impacts the asymmetric behavior of COGS and TC, and the anti-sticky behavior is identified in both situations. Thus, it is understood that the higher the level of managerial entrenchment, the greater the reduction in COGS and TC in the face of reductions in NSR. Such findings, therefore, make Hypothesis 1 of this study accepted.

Table 7 presents a summary of the results regarding the impact of managerial entrenchment on the asymmetric behavior of the three dependent variables analyzed in this research.

Table 7

Summary of the impact of managerial entrenchment on asymmetric cost behavior

Dependent variables	1 % Variation on NSR			Asymmetric Behavior	Conclusion Hypothesis 1
	Increase	Decrease			
	logNSR (i)	d-EN (ii)	Total (i + ii)		
logCOGS	0.9213***	0.0789**	1.0002**	Anti-sticky	Accepted
logSG&A	0.3556***	0.0403	0.3959	Not significant	Rejected
logTC	0.8120***	0.0527*	0.8647*	Anti-sticky	Accepted

Note: ***significance at the level of 1 %; **5 %; *10 %.

Source: Research data (2023).

As outlined in Hypothesis 1, entrenched managers have greater security to pursue personal interests, such as empire building (Chen et al., 2012; Lopatta et al., 2020) or make cuts more sharply aiming at greater remuneration for achieving goals for the result (Dierynck et al., 2012; Kama & Weiss, 2013), which consequently can have repercussions on the behavior of companies' costs (Anderson et al., 2003). As the search for empire building is related to the expansion of the company beyond its ideal capacity, the effect on cost behavior occurs in a sticky way, that is, costs increase faster for increases in NSR than they reduce in relation to decreases in NSR of the same proportion (Chen et al., 2012; Ibrahim et al., 2022).

On the other hand, the cuts made more sharply aiming at greater remuneration for achieving goals for the result cause asymmetric behavior in the anti-sticky direction, where costs reduce faster in relation to falls in NSR than they increase for growth in NSR of the same proportion (Kama & Weiss, 2013; Ibrahim et al., 2022). It is observed that, in the results of the relationship between managerial entrenchment and the asymmetric cost behavior, no evidence of empire building was found, since COGS and TC showed anti-sticky behavior and SG&A did not present significance.

In this study, managerial entrenchment was measured by including two characteristics of the board of directors, board independence and board compensation, which help to mitigate the level of CEO entrenchment (Salehi et al., 2021). From the perspective of Agency Theory (Jensen & Meckling, 1976), a possible explanation for the anti-sticky behavior of COGS and TC may be due to the effective monitoring of the board of directors over the activities of the CEO, thus hindering the search for empire building. In this context, an entrenched CEO may have a harder time arguing to qualified board members about an expansion of the company that is not beneficial to the interests of shareholders (Salehi et al., 2021).

In this way, the entrenched CEO can use other means to seek personal benefits. For example, the CEO may reduce production expenses more sharply in periods of declining NSR, due to less monitoring by the board of directors of COGS expenditures than SG&A expenditures, in order to obtain his or her own benefits, such as higher compensation resulting from the achievement of goals for the result (Dierynck et al., 2012; Kama & Weiss, 2013). It should be noted that, despite increasing the company's results in the short term, the cuts in COGS promoted by the CEO may prove to be detrimental when NSR increases again, since reinvestments are necessary for increases in NSR, which impact on the significant increase in COGS.

The non-significance of the effect of managerial entrenchment on the asymmetric behavior of SG&A may also be related to an effective control of the board of directors over the behavior of the CEO. SG&A-related expenses typically comprise advertising and R&D expenses, commissions, and travel expenses (Chen et al., 2012) and are easier for the board of directors to monitor than COGS-related expenses, since the latter comprises several production-related accounts. As a result, the CEO may be forced by the board of directors to adjust SG&A expenses according to variations in NSR.

4.3. MODERATING EFFECT OF CEO'S FINANCIAL EXPERTISE ON THE RELATIONSHIP BETWEEN MANAGERIAL ENTRENCHMENT AND ASYMMETRIC COST BEHAVIOR

Table 8 shows the results of the regressions of the moderating effect of CEO's financial expertise on the relationship between managerial entrenchment and asymmetric cost behavior.

Table 8

Regressions of moderating effect of CEO's financial expertise

Variables	Dependent = logCOGS		Dependent = logSG&A		Dependent = logTC	
	Coefficient	z	Coefficient	z	Coefficient	z
Constant	0.0011	0.28	0.0140***	2.79	0.0032	1.01
logNSR	0.9200***	17.00	0.3538***	5.21	0.8078***	19.69
d-logNSR	-1.0768**	-2.25	-1.8858***	-3.11	-1.5013***	-4.12
d-(EN*FE)	-0.0602**	-2.14	-0.0284	-0.79	-0.0515**	-2.42
d-SIZ	0.0464**	2.07	0.0812***	2.86	0.0610***	3.57
d-AGE	-0.0005	-0.33	0.0039*	1.91	0.0019	1.62
d-LEV	-0.0028**	-2.01	-0.0003	-0.15	-0.0013	-1.28
Wald chi2	1,040.08		184.81		1,314.77	
Prob > chi2	0.0000		0.0000		0.0000	

Note: ***significance at the level of 1 %; **5 %; *10 %.

Legend: d-logNSR: Dichotomous variable of NSR decrease multiplied by the log of NSR ratio ($t/t-1$); d-EN, d-FE, d-SIZ, d-AGE and d-LEV: Variables of managerial entrenchment (EN), CEO's financial expertise (FE), company size (SIZ), company age (AGE) and leverage (LEV) multiplied by the dichotomous variable of NSR decrease and by the log of NSR ratio ($t/t-1$), respectively.

Source: Research data (2023).

The $d-(EN*FE)$ interaction showed significance for the relationships with the dependent variables $\log COGS$ and $\log TC$. Thus, it is concluded that the CEO's financial expertise acts as a moderator in the relationship between managerial entrenchment and the asymmetric behavior of $COGS$ and TC , and sticky behavior is identified in both situations. Thus, the higher the level of the moderating effect of financial expertise in this relationship, the greater the increase in $COGS$ and TC in the face of increases in NSR . Thus, Hypothesis 2 of this research is accepted.

Table 9 presents a summary of the results regarding the impact of the moderation of CEO's financial expertise on the asymmetric behavior of the three dependent variables analyzed in this fourth stage of the research.

Table 9

Summary of the impact of the moderating effect of CEO's financial expertise

Dependent variables	1 % Variation in NSR			Asymmetric Behavior	Conclusion Hypothesis 2
	Increase	Decrease			
	logNSR (i)	d-(EN*FE) (ii)	Total (i + ii)		
logCOGS	0.9200***	-0.0602**	0.8598***	Sticky	Accepted
logSG&A	0.3538***	-0.0284	0.3254	Not significant	Rejected
logTC	0.8078***	-0.0515**	0.7563**	Sticky	Accepted

Note: ***significance at the level of 1 %; **5 %; *10 %.

Source: Research data (2023).

According to the results presented for Hypotheses 1 and 2, it is verified that there is a pattern of cost behavior for the three variables dependent on this study ($COGS$, $SG\&A$ and TC). Specifically with respect to $COGS$ and TC , the relationship between managerial entrenchment and the asymmetric behavior of these two variables changes direction (from anti-sticky to sticky) when the entrenched CEO has financial expertise. One explanation for the fact that these variables followed the same direction in the results of the two hypotheses is that $COGS$ comprises most of the TC .

According to what is exposed in Hypothesis 2, from the perspective of the Agency Theory, it is understood that the entrenched CEO (Shleifer & Vishny, 1989) who has financial expertise (Custódio & Metzger, 2014; Bortoli & Soares, 2021) is better able to make decisions that benefit their personal interests, due to their financial knowledge, as occurred in cases of well-known financial scandals such as Enron and WorldCom (Arnold & De Lange, 2004). Thus, this CEO profile is better able to seek empire building, which impacts on the asymmetric cost behavior in sticky direction (Chen et al., 2012), which was identified in the results of Hypothesis 2, as shown in Table 9.

Thus, the results presented in Hypothesis 2 indicate that entrenched managers who have financial expertise increase production expenses more quickly than reduce them for variations in NSR of the same proportion. Thus, these results suggest evidence of empire building, according to the perspective of the Agency Theory (Jensen, 1986; Chen et al., 2012; Lopatta et al., 2020).

Regarding the dependent variable $SG\&A$, there was no evidence that the CEO's financial expertise acts as a moderator in the relationship between managerial entrenchment and asymmetric cost behavior. This result agrees with what was presented in Hypothesis 1, where no significance was found for the $SG\&A$, which reinforces the argument that this type of expenditure is easier to monitor by the board of directors than production expenditures. Consequently, CEOs are forced to adjust $SG\&A$ expenditures according to variations in NSR .

This paper aimed to evaluate the moderating effect of CEO's financial expertise on the relationship between managerial entrenchment and asymmetric cost behavior of Brazilian publicly held companies. To this end, 178 companies were analyzed in the period between 2012 and 2021 through descriptive statistics, a correlation matrix, and regressions using the Generalized Moment Method.

The relationship between managerial entrenchment and asymmetric cost behavior showed significance in the anti-sticky direction for COGS and TC. On the other hand, the moderating effect of the CEO's financial expertise in this relationship was also significant for the asymmetry of COGS and TC, however, in this case the asymmetric behavior in the sticky direction was identified. Thus, managers who are entrenched and have financial expertise increase COGS and TC faster in periods of growth in NSR than they decrease in periods when NSR decreases. Thus, from the perspective of the Agency Theory (Jensen & Meckling, 1976), these results suggest evidence of empire building (Chen et al., 2012; Lopatta et al., 2020), which can prove detrimental to the company's long-term survival (Jensen, 1986).

Theoretically, this study brings a new perspective on the risks related to the characteristics of managers, suggesting that financial knowledge can be used as a mechanism for the entrenched manager to strengthen his control, which consequently impacts the company's cost structure. In a practical way, this study serves for shareholders, board members, and audit committee members to better understand the characteristics that their CEO may be entrenched in, as well as the possibility of entrenched managers who have financial expertise to use their financial knowledge for personal benefits, as in cases that occurred at Enron and WorldCom (Arnold & De Lange, 2004). Thus, shareholders may demand mechanisms with the objective of restricting the opportunistic behavior of managers, such as the formulation of corporate policies that promote greater vigilance over the influence of managers on the company's cost structure.

This study has some limitations. Regarding the measurement of managerial entrenchment, it should be noted that situations may occur in which the CEO may be entrenched, but which are not possible to be captured, such as the appointment of a member of the board of directors who is close to the CEO. Another limitation of this study refers to the use of the NSR as an approximation of volume, since in this case the price variation is not considered.

As a recommendation for future studies, it is suggested to analyze the relationships investigated in this study, separating the samples between family and non-family businesses, with the objective of verifying whether the effect of managerial entrenchment on asymmetric cost behavior occurs differently among these companies. Family businesses have attributes that distinguish them from non-family businesses and that can affect cost behavior, such as that they suffer less from conflicts between shareholders and managers and demonstrate a strong motivation to preserve the company's long-term survival (Abudy & Shust, 2025). It is also suggested that future studies analyze the direct effect of CEO's financial expertise on asymmetric cost behavior, as well as the mediating effect of CEO's financial expertise on the relationship between managerial entrenchment and asymmetric cost behavior.

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Table I

Descriptive statistics of managerial entrenchment variables

Panel A: Continuous variables							
Variables	Mean	SD	Minimum	Maximum	P25	P50	P75
EXSH	1.0825	5.2870	0.0000	0.6241	0	0	0.0859
BIND	22.9779	24.2202	0.0000	100.0000	0	19.5408	40.0000
BCOM	13.2449	3.2920	0.0000	18.0890	12.9152	13.9523	14.7876
ECEO	7.4472	9.3149	0	66	2	4	9
Observations: 1,780							
Panel B: Dichotomous variables							
Variables	Category		Observations		Frequency (%)		
DCEO	1		836		46.97 %		
	0		944		53.03 %		
Total	1,780		100.00 %				

Legend: EXSH: Shares held by the executive board; BIND: Board of directors' independence; BCOM: Board of directors' compensation; ECEO: Number of years continuously in the position of CEO; DCEO: CEO duality; SD: Standard deviation, P: Percentile.

Source: Research data (2023).

Table II

Correlation matrix of managerial entrenchment variables

Variables	EXSH	BIND	BCOM	DCEO	ECEO
EXSH	1	0.18***	0.23***	-0.07***	0.15***
BIND	-0.08***	1	0.40***	-0.08***	-0.12***
BCOM	-0.18***	0.30***	1	-0.28***	-0.10***
DCEO	0.10***	-0.08***	-0.15***	1	0.26***
ECEO	0.25***	-0.16***	-0.10***	0.30***	1

Note: ***significance at the level of 1 %.

Legend: EXSH: Shares held by the executive board; BIND: Board of directors' independence; BCOM: Board of directors' compensation; DCEO: CEO duality; ECEO: Number of years continuously in the position of CEO.

Source: Research data (2023).

Table III*Principal component analysis of managerial entrenchment*

Bartlett Sphericity Test				
Chi-square	577.798		<i>p-value</i>	0.000
Kaiser-Meyer-Olkin (KMO)	0.5681			
Factor analysis for principal component factor – Number of extracted components (<i>eigenvalues</i>)				
Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	1.68365	0.623633	0.3367	0.3367
Factor 2	1.06002	0.152459	0.2120	0.5487
Factor 3	0.907562	0.139252	0.1815	0.7302
Factor 4	0.768309	0.187855	0.1537	0.8839
Factor 5	0.580455	-	0.1161	1.0000

Source: *Research data (2023).***Table IV***Descriptive statistics of the variables of CEO's financial expertise*

Panel A: Continuous variable – transformed into nominal							
Variables	Mean	SD	Minimum	Maximum	P25	P50	P75
EC	1.3753	0.7142	0	3	1	1	2
Observations: 1,780							
Panel B: Dichotomous variables							
Variables	Category		Observations		Frequency (%)		
BF	1		1,218		68.43 %		
	0		562		31.57 %		
	Total:		1,780		100.00 %		
EFS	1		273		15.34 %		
	0		1,507		84.66 %		
	Total:		1,780		100.00 %		
EFD	1		344		19.33 %		
	0		1,436		80.67 %		
	Total:		1,780		100.00 %		

Legend: EC: Years of experience in the position of CEO; BF: Academic background in finance; EFS: Experience in the financial sector; EFD: Experience as a financial director; SD: Standard deviation; P: Percentile.

Source: Research data (2023).

Table V*Correlation matrix of the variables of CEO's financial expertise*

Variables	BF	EFS	EFD	EC
BF	1	0.18***	0.13***	-0.05**
EFS	0.18***	1	0.22***	-0.05**
EFD	0.13***	0.22***	1	-0.04*
EC	-0.08***	-0.06**	-0.07***	1

Note: ***significance at the level of 1 %; **5 %; *10 %.**Legend:** BF: Academic background in finance; EFS: Experience in the financial sector; EFD: Experience as a financial director; EC: Years of experience in the position of CEO.**Source:** Research data (2023).**Table VI***Principal component analysis of CEO's financial expertise*

Bartlett Sphericity Test				
Chi-square	181.651		<i>p-value</i>	0,000
Kaiser-Meyer-Olkin (KMO)	0,5852			
Factor analysis for principal component factor – Number of extracted components (<i>eigenvalues</i>)				
Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	1.3911	0.4206	0.3478	0.3478
Factor 2	0.9705	0.1026	0.2426	0.5904
Factor 3	0.8679	0.0974	0.2170	0.8074
Factor 4	0.7705	-	0.1926	1.0000

Source: Research data (2023).**CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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DATA AVAILABILITY DECLARATION

The datasets related to this article will be available upon request to the first author.

ACKNOWLEDGMENTS

The authors thank FAPESC (Foundation for Research and Innovation of the State of Santa Catarina) for the financial and institutional support for this research.