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Cash holdings and economic performance: the role of socioemotional wealth in distinguishing between family and non-family firms

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Abstract

Objective: This study analyzes the relationship between cash holdings and firm performance (ROA), comparing family and non-family firms from the perspective of Socioemotional Wealth (SEW), with a focus on the distinct effects of extended SEW in family firms. It also assesses the moderating roles of the "family control and influence" (FCI) dimension and high indebtedness.

Method: The analysis adopts a mixed-gamble framework, conceptualizing cash holding decisions as trade-offs between potential gains and losses, and uses regression models with non-linear specifications over the 2010–2019 period. The sample comprises 183 firms listed on B3, classified as family and non-family firms.

Results: The findings indicate a positive linear relationship between cash holdings and performance in family firms, whereas a non-linear inverted U-shaped relationship is observed in both the full sample and non-family firms. Additionally, higher levels of FCI strengthen the positive effects of cash holdings on performance in family firms, consistent with the view that FCI promotes greater alignment between financial and socioemotional objectives. High indebtedness, on the other hand, did not show statistical significance in the investigated relationship.

Practical and Social Implications: The findings suggest that family involvement in top-level governance can function as an effective mechanism in financial decision-making, contributing to improved firm performance. This effect appears to be stronger in contexts characterized by high levels of FCI, where closer alignment between financial and socioemotional objectives enhances the benefits of cash holdings in family firms.

Keywords: Cash holdings; Economic performance (ROA); Family firms; Socioemotional Wealth; Corporate governance.

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1 Introduction

Cash holdings are a strategic decision in financial management that influence a firm's ability to deal with uncertainty, seize investment opportunities, and balance the interests of managers and shareholders. Opler et al. (1999) highlight its benefits, especially for transactional and precautionary motives.

In this context, cash holdings play a crucial role in mitigating costs arising from financial difficulties, particularly when there are funding constraints or operating cash flows do not cover debt obligations (Faulkender & Wang, 2006; Opler et al., 1999). Furthermore, adequate levels of cash holdings allow for strategic investments and reduce underinvestment in projects with high potential returns (Garvey, 1992). Studies indicate that high cash levels are positively associated with economic performance (Fresard, 2010) and firm market value (Faulkender & Wang, 2006).

Despite these benefits, excess cash holdings can generate agency conflicts and managerial opportunism, and impair the effectiveness of financial management. Excess cash reduces investor oversight and increases the likelihood that managers will make unprofitable investments misaligned with shareholder interests (Harford, 1999). Furthermore, excess cash holdings can strengthen managerial entrenchment, hinder the replacement of managers—due to the implementation of power consolidation policies—and favor decisions that do not maximize firm value (Jensen, 1986; Shleifer & Vishny, 1989).

To balance the benefits and costs of cash holdings, studies suggest a curvilinear relationship between cash holdings and firm performance and/or value, indicating that both scarcity and excess levels of this resource are detrimental to financial stability (Kim & Bettis, 2014; La Rocca & Cambrea, 2019; Cambrea et al., 2022). Therefore, careful cash management is essential to optimize performance.

Although the effects of cash holdings are widely studied, there is still room to explore how shareholder identity influences the trade-off between their costs and benefits. This perspective avoids the assumption that all shareholders exclusively prioritize the maximization of financial returns, regardless of ownership composition, and that they always share the same interests (Cambrea et al., 2022). Ozkan and Ozkan (2004) emphasize that ownership and management structures are fundamental to understanding cash holdings policies.

The Socioemotional Wealth Theory (SEW) recognizes the diversity of shareholder interests and highlights that family firms prioritize non-financial objectives, such as preserving identity, family legacy, and control (Gómez-Mejía et al., 2007; Berrone, Cruz & Gómez-Mejía, 2012). These factors affect strategic decisions, such as cash holdings (Cambrea et al., 2022), as such choices are linked to the ownership and control structure (Ozkan & Ozkan, 2004) and are influenced by risk considerations (Kim & Bettis, 2014), which are central elements of SEW, particularly within the "family control and influence" (FCI) dimension.

From this perspective, maintaining control and influence over management decisions is crucial for family firms, which are risk averse regarding their socioemotional assets (Berrone et al., 2012). Miller and Le Breton-Miller (2014) highlight the importance of analyzing SEW priorities in family firms to align business objectives with the interests of non-family stakeholders.

Berrone et al. (2012) and Cambrea et al. (2022) demonstrate that the commitment of family owners to preserving non-financial interests, often placed above strictly financial objectives, affects the strategic choices of firms. This notion reinforces the importance of SEW in formulating cash management policies in family firms.

This study aims to investigate how family ownership moderates the effect of cash holdings on the economic performance of firms from a SEW perspective. This approach broadens the understanding of financial decisions in family firms by incorporating objectives that are not strictly economic and proves especially relevant in the Brazilian context, where preserving control, identity, and family legacy often guides strategic choices and can directly affect cash holdings policies and corporate performance.

We use the mixed-gamble logic to argue that decisions to increase cash holdings can have both positive and negative effects on the economic performance of family firms. While increased cash holdings can benefit SEW, particularly when financial and socioemotional objectives are balanced, excessive cash holdings can create opportunities for opportunistic behavior by family owners. In such cases, families may prioritize the preservation of SEW even if this choice harms firm performance. Thus, in managing cash holdings, family firms weigh potential SEW gains and losses against the financial consequences.

We also investigated the moderating role of two governance-related aspects: the level of family control and influence (FCI) and high indebtedness. Maintaining the SEW perspective, we analyzed how both moderate the relationship between cash holdings and economic performance in family firms. FCI represents a central dimension of SEW, while high indebtedness is considered a governance mechanism that can influence this relationship by reducing conflicts of interest between shareholders and creditors.

Our findings indicate that family firms exhibit a positive linear relationship between cash holdings and performance, while non-family firms show a non-linear, inverted-U shaped pattern. Furthermore, we found that family control and influence moderate this relationship, influencing the transition from extended SEW to restricted SEW in family firms and having implications for corporate governance.

By bringing evidence from the Brazilian context, marked by credit restrictions and high financing costs, this study broadens the understanding of the dynamics between cash holdings and performance in different ownership structures. We also contribute by demonstrating how the level of family control and influence can delay the transition from extended to restricted SEW. Although high indebtedness was explored as a moderator, we did not find a significant effect, suggesting that FCI plays a more decisive role in the financial management of family firms.

2 Theoretical Framework

The relationship between cash holdings and economic performance has been widely interpreted from the perspective of the precautionary motive, which suggests that cash is strategically retained to sustain operations during crises and meet unexpected demands (Opler et al., 1999). This financial prudence protects against insolvency, allows firms to seize opportunities without relying on external financing, and strengthens resilience in critical times, offering adaptive advantages (Kim & Bettis, 2014; Cambrea et al., 2022; Gómez-Mejía, Patel & Zellweger, 2018).

Excessive cash holdings can compromise financial discipline, encourage opportunistic behavior, and harm firm performance though (La Rocca & Cambrea, 2019; Cambrea et al., 2022). Excess cash holdings can lead to value destruction, with resources allocated to risky projects or to those with negative net present value (La Rocca & Cambrea, 2019; Cambrea et al., 2022). Furthermore, the benefits of cash holdings for addressing uncertainty, taking risks, or funding innovation tend to plateau as lucrative opportunities dwindle (Kim & Bettis, 2014). Thus, when cash holdings cease to generate proportional increases in performance, the benefits can turn into disadvantages.

In this context, it is essential that cash management balances the benefits associated with precaution, operational continuity, and taking advantage of investment opportunities with the risks of opportunistic managerial decisions (Kim & Bettis, 2014; Nason & Patel, 2016; Cambrea et al., 2022). Studies indicate a non-linear, inverted-U relationship between cash holdings and performance—economic or market—represented by a positive linear term and a negative quadratic term (Kim & Bettis, 2014; Nason & Patel, 2016; Cambrea et al., 2022).

The non-linear inverted-U pattern reflects the interaction between the precautionary motive theory, which justifies cash accumulation as protection against uncertainty, and the free cash flow theory, which warns of the risks of excessive cash holdings. Excess cash holdings can result in wasted resources (Jensen, 1986), often associated with managerial inefficiency and the prioritization of managers' personal interests over those of shareholders (Kim & Bettis, 2014).

Agency Theory (Jensen & Meckling, 1976) is widely adopted to understand conflicts between shareholders and managers and their impact on governance practices and corporate performance, highlighting the risk of opportunistic behavior by managers who may divert resources for their own benefit. However, by assuming that shareholders are homogeneous and driven exclusively by financial maximization, this theory has limitations in explaining differences related to the identity of the controlling shareholder. This logic is further developed by Free Cash Flow Theory (Jensen, 1986).

From a free cash flow perspective, shareholders would theoretically expect excess cash holdings to be used efficiently or distributed as dividends; however, managerial discretion can lead to inefficient investments, including those with negative net present value, which increase power and prestige at the expense of maximizing value. This formulation makes explicit the tension between the financial return expected by shareholders and managerial opportunism. As Cambrea et al. (2022) point out, however, the free cash flow theory also assumes that all shareholders share the same priority of financial return, neglecting the influence of the controlling shareholder's identity and non-economic objectives.

Within family firms, agency dynamics are shaped not only by traditional conflicts between managers and shareholders but also by relational factors, such as family altruism, which refers to the tendency of controlling members to favor family members, often at the expense of economic efficiency or proper corporate governance (Chrisman, Chua & Sharma, 2005). Furthermore, the tendency toward managerial entrenchment is one of the fundamental forces that distinguish family firms from non-family firms in terms of agency costs, as family members in management positions can use their power and influence to consolidate their control over the company (Chrisman, Chua & Sharma, 2005).

The Socioemotional Wealth Theory provides an alternative framework for family firms, recognizing the importance of preserving the benefits that family owners derive from non-financial aspects of their firms as a key driver of strategic behavior (Gómez-Mejía et al., 2007). These benefits comprise socioemotional wealth, a broad concept encompassing at least five dimensions: 1) family control and influence over the firm; 2) family members' identification with the firm; 3) binding social ties; 4) the emotional attachment of family members to the firm; and 5) the renewal of family ties with the firm through transgenerational continuity (Berrone et al., 2012).

In the cash management literature, Cambrea et al. (2022) argue that the valuation of socioemotional wealth by family owners, a central aspect of the Socioemotional Wealth Theory, distinctly shapes the balance of motivations influencing cash holdings decisions. While the most discussed motivations for retaining cash are associated with the pursuit of financial security and the exploitation of strategic opportunities, the preservation of socioemotional wealth in these firms emerges as a significant additional motivation.

Although aspects such as preserving the family legacy and maintaining family control do not strictly align with traditional financial definitions of precautionary or speculative motives, they represent investments in family priorities and values. These factors broaden the classic motivations for cash holdings, giving them new nuances and justifying the tendency of family firms to maintain higher cash holdings than their non-family counterparts (Ozkan & Ozkan, 2004; Lozano, 2015).

This trend is closely related to the preservation of socioemotional wealth, which influences the balance between precautionary and opportunistic motives in cash management (Cambrea et al., 2022; Gómez-Mejía et al., 2018). SEW reinforces the role of cash holdings both as financial protection and as a strategic resource for investments (Cambrea et al., 2022; Gómez-Mejía et al., 2018), while also helping to understand specific motivations of family firms, such as preserving control, perpetuating legacy, and emotional identification with the business, which directly impact these firms' financial decisions (Chrisman et al., 2005).

Regarding the conflict between majority and minority shareholders, controlling shareholders may maintain high cash holdings and adopt more conservative strategies (Miller, Le Breton-Miller & Lester, 2011) to preserve decision-making autonomy and support a long-term vision (Lozano, 2015). This behavior facilitates responses to investment opportunities and challenges and reduces the influence of minority shareholders (La Rocca & Cambrea, 2019).

Thus, SEW's perspective advances the debate on cash holdings policies by recognizing that family firms may value factors such as preserving legacy, autonomy, and family control, affecting the alignment between financial and socioemotional objectives and reconfiguring the costs and benefits associated with cash holdings. This approach complements traditional approaches by showing that shareholder identity alters assumptions about efficiency and opportunism, and offers a more comprehensive explanation for family firms' financial decisions (Gómez-Mejía et al., 2007; Berrone et al., 2012).

Despite its contribution, SEW has limitations. It is a subjective and multidimensional construct whose empirical measurement is challenging and varies among studies (Berrone et al., 2012). Furthermore, there is a risk of tautological interpretations, since different behaviors can be justified by the pursuit of socioemotional wealth. Recognizing these limitations is important because, although SEW is useful for explaining specificities of family firms, it presents challenges in empirical operationalization. The literature suggests that operationalization through specific dimensions of the construct, such as family control and influence, can reduce subjectivity and support more consistent empirical investigations (Berrone et al., 2012). In this vein, the mixed-gamble model proposed by Gómez-Mejía et al. (2014) reduces the subjectivity of SEW and expands its empirical applicability by capturing the trade-off between financial efficiency and the preservation of socioemotional wealth.

The mixed-gamble model shows that family members consider the economic performance and potential gains and losses of SEW when making strategic decisions. This model highlights that the trade-off between economic and financial and socioemotional objectives can favor the family and compromise the performance and interests of non-family stakeholders (Miller & Le Breton-Miller, 2014).

This trade-off results in two distinct priorities for SEW: restricted and extended (Jiang et al., 2018). Restricted SEW favors immediate benefits for the family, mainly related to socioemotional wealth, such as guaranteed jobs or access to business resources, whether financial, human, physical, and/or educational (Miller & Le Breton-Miller, 2014). However, this priority can lead to favoritism toward family members, managerial entrenchment, and excessive control, thus harming firm performance and the interests of external stakeholders (Miller & Le Breton-Miller, 2014).

Extended SEW, in turn, prioritizes the well-being of future family generations, the firm's continuity and viability (Miller & Le Breton-Miller, 2014). Its implications include the family's pride in its products and relationships with stakeholders and the community, which reinforces the commitment to the firm's reputation. This SEW priority balances socioemotional and financial objectives and benefits not only the controlling family but also external stakeholders, fostering factors such as social responsibility (Dyer & Whetten, 2006), sustainability (Berrone et al., 2012), and long-term value creation (Gómez-Mejía et al., 2007).

Cambrea et al. (2022) highlight that the benefits of extended SEW are unique to family firms, as they result from the interaction between family and business. This involvement favors a more efficient use of cash holdings and reduces the costs associated with its maintenance, by allowing more accurate assessments of managerial decisions and more effective control, which limits opportunistic practices.

In the field of financial management, cash holdings assume a central role, reflecting firms' concerns about vulnerability and guiding strategic choices (Cambrea et al., 2022; Calabrò et al., 2018). In family firms, the presence of SEW intensifies this concern and leads to a more careful analysis of the risks and benefits of holding cash. This need to balance financial and socioemotional objectives encourages the strategic use of cash holdings and reduces the negative effects of excessive holdings, which reinforces, as argued by Gómez-Mejía et al. (2018), the preservation of resources and the adoption of more responsible management practices.

When cash holdings are low or moderate, indicating high financial vulnerability, the continuity of the firm may be threatened. Such pressure in family firms simultaneously affects SEW and financial health, promoting an alignment between both concerns (Gómez-Mejía et al., 2018; Minichilli et al., 2016). This alignment favors more responsible management by the owners and reduces the likelihood of opportunistic decisions (Gómez-Mejía et al., 2018). Under these conditions, the adoption of practices that reconcile socioemotional and financial objectives, in line with the principles of extended SEW, becomes frequent (Cambrea et al., 2022).

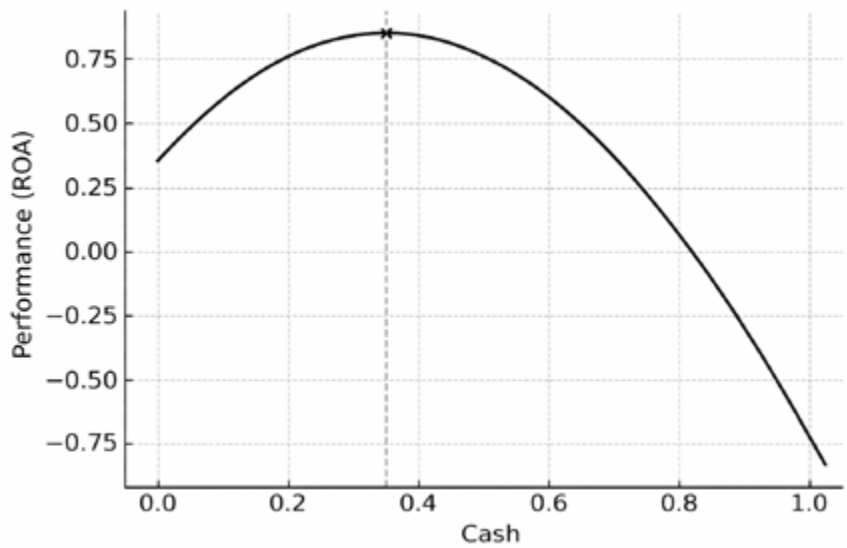
In contrast, when there are excess cash holdings and therefore low vulnerability, conflicts between financial and socioemotional objectives intensify, and the precautionary motive loses relevance as a determinant of cash holdings. This misalignment favors restricted SEW and, as a result, further increases in cash holdings begin to harm firm performance (Cambrea et al., 2022). Without an immediate threat to the survival of the business or to SEW, excess cash holdings can be directed toward restricted family interests, such as favoring relatives, preserving control power, and resisting strategic changes—practices that tend to compromise organizational performance (Schulze et al., 2001). Thus, family firms can, under certain circumstances, suffer more negative effects than non-family firms when restricted family interests prevail.

Although these negative effects may emerge in contexts where restricted family interests gain predominance, concern for business continuity remains a structural element of SEW (Zellweger & Astrachan, 2008; Zellweger et al., 2012; Berrone et al., 2012). In other words, restricted family interests may gain strength in the short term, but they do not negate the broader commitment to survival and transgenerational legacy. Thus, even in scenarios of excess cash holdings, weak economic and financial performance can jeopardize socioemotional benefits, reducing the scope for decisions motivated solely by restricted family interests.

In this sense, family firms often retain cash as a way to preserve autonomy, reduce dependence on external capital, and maintain a safety margin against risks that could compromise both the performance and continuity of SEW over time.

Given the framework presented, this study is based on precautionary and free cash flow motives, articulated with the logic of socioemotional wealth, to argue that the relationship between cash holdings and performance exhibits a non-linear behavior, specifically an inverted-U quadratic shape. This pattern indicates that increases in cash holdings tend to improve firm performance up to a turning point, from which additional cash holdings begin to harm performance.

For illustrative purposes, Figure 1 presents the theoretical representation of the quadratic relationship discussed, which visually demonstrates the direction of the turning point.



Note: The figure is merely illustrative and presents a conceptual representation of the inverted-U shape discussed in the theoretical framework, including a hypothetical turning point from which further increases in cash holdings harm performance.

Source: prepared by the authors.

Figure 1. Theoretical representation of the quadratic relationship between cash holdings and performance.

The initial improvement in performance, observed in the upward phase of the relationship between cash holdings and performance, stems from the protective function of cash holdings, which contribute to reducing the risk of insolvency, lowering external financing costs, and allowing firms to take advantage of investment opportunities without depending on external sources. However, when cash holdings exceed levels considered efficient, additional increases in cash holdings begin to reduce their benefits and may even harm performance. This negative effect is associated with the underutilization of capital, which results in lower returns on assets (Kim & Bettis, 2014). In the case of family firms, the presence of SEW is expected to shift this turning point relative to non-family firms, allowing the positive effects of cash holdings to persist over a wider range, albeit with diminishing marginal returns.

In this sense, hypotheses H_{1a} and H_{1b} presented below:

***H_{1a}*: The benefit of cash holdings on performance is greater in family firms than in non-family firms.**

***H_{1b}*: Variations in cash holdings exert less intense marginal effects on family firms' performance than on non-family firms.**

To corroborate H_{1a}, the results should ideally reveal a higher turning point on the curve relating cash holdings to performance for family firms, indicating that the benefits of cash holdings in these firms are prolonged. To corroborate H_{1b}, the results should reveal a smaller positive coefficient for the linear cash term and a smaller, negative coefficient for the non-linear cash term in family firms relative to non-family firms. These findings would suggest a non-linear function with a smoother curve, indicating a more moderate effect of cash holdings on performance in family firms.

2.1 Moderating effect of family control and influence (FCI) on the relationship between cash holdings and performance

The set of non-economic resources that family firm owners value and seek to preserve comprises what the literature calls socioemotional wealth endowment (Berrone et al., 2012). One of the central dimensions of SEW, the family control and influence (FCI) dimension, is widely used as a proxy to measure the socioemotional wealth endowment that family owners seek to preserve (Berrone et al., 2012; Cennamo et al., 2012).

According to Zellweger et al. (2012), family control and influence reflect the involvement of the owning family in the firm and the importance attributed to SEW. A high level of control and influence amplifies socioemotional benefits, such as a sense of belonging, and also confers on the owning family the power and legitimacy to make strategic decisions based on non-financial criteria, including in traditionally financial areas such as cash management (Zellweger et al., 2012). In this sense, a strong degree of family control and influence intensifies the effects of SEW's priorities, whether restricted or extended (Cambrea et al., 2022).

Cambrea et al. (2022) highlight the role of FCI in strategic decisions, such as cash management, especially in mixed-gamble scenarios, and emphasize its importance in analyzing the heterogeneity of family firms. According to the authors, in contexts of high vulnerability—characterized by low to moderate levels of cash holdings and consequent convergence of financial and socioemotional concerns—a high level of FCI favors this alignment and protects SEW.

In this context, a high level of FCI drives strategies focused on long-term sustainable growth (Prencipe et al., 2011). As a consequence, cash holdings assume an even more relevant role as a source of internal financing, reducing dependence on external capital and associated risks, which favors the preservation of extended SEW (Cambrea et al., 2022). Conversely, under high vulnerability and with a low level of FCI, extended SEW tends to weaken, since family shareholders have less legitimacy to prioritize SEW preservation objectives.

When there are high levels of cash holdings however—indicating low vulnerability and consequently less alignment between financial and socioemotional goals—a high level of FCI favors restricted SEW. In this scenario, family owners may prioritize socioemotional benefits over financial wealth, compromising performance (Cambrea et al., 2022). On the other hand, in the same context of low vulnerability, a low FCI reduces the family's ability to prioritize socioemotional goals over financial performance, thus minimizing the negative effects on performance (Cambrea et al., 2022).

To empirically operationalize this moderating effect, this study adopts the Family Control and Influence Index (FCI), widely used in the literature as a proxy for socioemotional wealth endowment, as it captures the extent of family involvement in the firm's share ownership control, both through share ownership with voting rights and through influence exerted on the board (Berrone et al., 2012; Calabrò et al., 2018). It is recognized, however, that FCI represents only a formal dimension of SEW, not encompassing subjective and relational aspects. This conceptual limitation does not compromise its usefulness, but reinforces the need to interpret it as an empirical approximation of family influence.

In light of these theoretical discussions and the operationalization adopted, this study proposes the following hypothesis:

H_2: **In family firms, high levels of family control and influence intensify the positive effect of cash holdings on performance when cash holdings are low to moderate.**

This hypothesis is based on the premise that the level of control and influence exerted by the family moderates the relationship between cash holdings and performance and has different effects depending on the level of cash holdings.

For H_2 not to be rejected, the interaction between the linear cash term and the proxy for family control and influence is expected to result in a positive and significant coefficient in the statistical model employed. A higher turning point on the curve is also expected, suggesting that, under greater family control and influence, the level at which cash holdings begin to negatively impact firm performance is higher.

In addition to the FCI, this study also considers indebtedness as a moderating variable, presented in the following subsection. Although tested in separate models, both moderators derive from the same research logic, reflecting distinct dimensions that influence cash management: on the one hand, family influence, linked to the preservation of SEW; on the other, the financial discipline imposed by the credit market.

2.2 The role of debt in cash holding decisions

Given that high levels of cash holdings attract the attention of investors and analysts, this section discusses the role of debt as a factor that can influence the relationship between cash holdings and performance in low-vulnerability contexts.

Substantial cash holdings can function as a safety mechanism in highly indebted firms, protecting against unforeseen risks and financial difficulties. Under these conditions, debt can enhance the benefits of cash holdings and contribute to financial viability and corporate performance (La Rocca & Cambrea, 2019).

High indebtedness can also generate conflicts between managers and creditors, however, and encourage opportunistic decisions. Managers may use cash to finance risky projects or meet short-term interests, compromising the firm's financial stability. When debt intensifies agency problems, cash holdings may, instead of strengthening the financial position, favor opportunistic decisions that are detrimental to performance (La Rocca & Cambrea, 2019). Debt, therefore, plays an ambiguous role: it may act either as an external governance mechanism by disciplining managerial behavior, or, conversely, increase the risk of inefficient resource allocation, depending on the organizational context.

The relationship between debt, cash holdings, and performance can vary according to the firm's structural and strategic characteristics. In family firms, particularly when the founding family maintains significant share ownership, the overlap between ownership and control reduces the divergence of interests with creditors, which reinforces commitment to the firm and mitigates the risks of opportunistic behavior (Anderson, Mansi & Reeb, 2003). Such an alignment contributes to reducing agency conflicts and is associated with lower debt costs (Anderson et al., 2003).

Family activism, characterized by the direct participation of the family in the firm's management and control, can also mitigate internal agency problems and promote more conservative and predictable governance. As a result, indebtedness loses relevance as a disciplinary mechanism for the discretionary behavior of managers and, therefore, as an instrument of external governance to limit the agency costs of equity capital (López-Gracia & Sánchez-Andújar, 2007).

In this sense, the influence of SEW suggests that indebtedness can affect the relationship between cash holdings and performance differently in family-owned and non-family-owned firms. In family-owned firms, the relationship between cash holdings, debt, and performance tends to be shaped by long-term objectives, family values, and the internal dynamics among owners, which should reduce the disciplining role of debt. In non-family firms, cash holdings and debt management tend to be more driven by financial efficiency and value maximization goals, resulting in more predictable relationships between these variables.

Based on these considerations, this study proposes the following hypothesis:

***H_3*: The effect of indebtedness as a moderator of the relationship between cash holdings and performance is less pronounced in family firms than in non-family firms.**

For H_3 not to be rejected, the coefficients of the interactions between indebtedness and the linear and quadratic cash terms are expected to show lower magnitude or reduced significance in family firms than in non-family firms that in the estimated models. This would indicate that debt plays a less disciplining role in the relationship between cash holdings and performance in family firms.

The inclusion of FCI and indebtedness as moderating variables strengthens the theoretical logic of this study by articulating internal and external dimensions that condition cash management, both discussed in light of the SEW framework, even if analyzed separately. Unlike the level of indebtedness, FCI, adopted as a proxy for one of the SEW dimensions, can be interpreted as an internal governance mechanism, reflecting the family's formal capacity to direct corporate decisions aligned with socioemotional objectives. Thus, the joint consideration of these moderators within the research framework broadens the understanding of how internal and external mechanisms condition cash management and its effect on the performance of family firms.

3 Data and Method

3.1 Sample and data

The sample was limited to publicly traded firms listed and active on the Brazilian Stock Exchange (B3), due to the availability and reliability of information publicly disclosed by the Brazilian Securities and Exchange Commission (CVM), which allows for the accurate identification of the ownership structure and family participation in voting capital (common shares).

The initial sample comprises 286 non-financial firms not belonging to the public utilities sector. Annual financial data were extracted from Economática©, considering consolidated financial statements for the fourth quarter, corrected by the Extended National Consumer Price Index (Índice Nacional de Preços ao Consumidor Amplo – IPCA). To mitigate the effect of extreme values, we applied the winsorization technique at 3% to the tails of the continuous variables. Observations corresponding to firm-years with negative net worth were excluded to avoid distortions in the financial indicators.

The models adopted are based on the Generalized Method of Moments (GMM), which uses lagged variables. To reduce bias arising from missing data, firms without sufficient records of the dependent variable, return on assets (ROA), for at least four consecutive periods and three consecutive periods for the independent variables were excluded. Based on these criteria, the final sample consisted of 183 firms.

3.2 Classification criteria for family nature and other study variables

3.2.1 Classification criteria for family nature

The definition of family firm was based on family ownership, considered when members of a family hold at least 20% of the common stock. This criterion is supported by the literature, which adopts thresholds between 10% and 25% (La Porta, Lopez-de-Silanes & Shleifer, 2002; Goes, Martins & Machado Filho, 2017; Beuren, Pamplona & Leite, 2020).

Family firms were classified year by year, since the share ownership data was collected manually on a firm-by-year basis from the "15.1/2 – Shareholding Position" files of the B3 Reference Forms. For this reason, the family firm status may vary throughout the period analyzed, depending on the share ownership movements that occurred in each fiscal year.

Reference Forms, widely used in Brazilian research (Goes, Martins & Machado Filho, 2017; Beuren, Pamplona & Leite, 2020), are mandatory according to Law No. 11,638 of December 28, 2007, and ensure high reliability of information. The classification considered both direct and indirect holdings through holding firms or other corporate structures.

The identification of family members was done by analyzing the surnames of shareholders in the records, supplemented by online research when necessary. In cases of chain ownership structures, where ownership and control occur indirectly through cross-share ownerships between firms, we verified whether the family held at least 50% of the last firm in the chain for it to be considered in the proportional calculation of indirect share ownership in each year of analysis. After this assessment, the final percentages of indirect share ownership were calculated based on the proportional share ownerships held by the family in the firm in the specific year under analysis.

In cases where a single shareholder owned more than 20% of the common stock, classification as a family firm was conditional upon the presence of family ties on the board of directors, in addition to the minimum percentage of shares. This criterion ensured a clear family influence in terms of both ownership and corporate governance. When this condition was not met, the firm was only classified as a family firm if the aforementioned shareholder held at least 50% of the common stock. The identification of family relationships was based on the "12.9 – Family Relationships" section of the Reference Forms.

For firms with shareholders from different families, we individually analyzed the share ownerships of each family to determine whether any of them held at least 20% of the voting shares on their own. In cases where no family reached this percentage, the firm was classified as non-family-owned; otherwise, it was considered family-owned, indicating significant control by at least one family. This criterion allowed us to capture family influence even in diversified share ownership structures.

3.2.2 Dependent variable

The performance measure used was return on assets (), calculated as the ratio between earnings before interest and taxes and net assets (total assets minus cash and cash equivalents). This metric is widely used in the financial literature because it reflects the ability to use assets to generate profit, is less vulnerable to accounting manipulation, and provides a solid basis for analytical comparisons.

Although many studies (Baños-Caballero et al., 2014; Nguyen et al., 2016; Nason & Patel, 2016; Deb et al., 2017; Cambrea et al., 2022) use market indicators, either as a single measure or together with accounting performance, this option was not adopted due to the limitations of the Brazilian capital market. Low liquidity and the restricted availability of quotation data reduce the applicability of market metrics, especially in models that require lags (such as t-2), which could increase biases and compromise the robustness of the results.

3.2.3 Explanatory variables of interest

The basic empirical model incorporates the central variables of the research, while additional models include interactions that allow testing the conditional effects of specific firm characteristics.

The main explanatory variables considered, in addition to the control variables, were:

- Cash holdings ($Cash_{it}$): sum of cash and cash equivalents, scaled by total assets (Ozkan & Ozkan, 2004);
- Family firm dummy ($Famp_{it}$): dummy variable (1 = family firm; 0 = non-family firm);
- Family control and influence proxy (FCI_{it}): semi-continuous variable that measures the degree of family control and influence in the firm; and
- High indebtedness dummy ($HDebt_{it}$): dummy variable (1 = indebtedness above the sample median for the year; 0 = indebtedness less than or equal to the median).

Previous studies (Berrone et al., 2012; Calabrò et al., 2018; Cambrea et al., 2022) show that the FCI variable is constructed based on whether the chair of the board belongs to the controlling family, which is used as a key indicator of family control and influence at the governance level. The variable assumes a value of zero when the chairman of the board does not belong to the controlling family, indicating a low level of family influence. When the board is chaired by a family member, FCI is calculated by multiplying a family chairmanship indicator (equal to 1 when the chairman is a family member) by the percentage of common share ownership held by the family.

Thus, when the chairman of the board is a family member, the FCI corresponds to the percentage of common share ownership held by the family. In these cases, the variable assumes values between 0.20 and 1.00, reflecting a high, but variable, level of family control and influence, with increasing intensity as share ownership increases. The lower limit of 0.20 reflects the family classification criterion, which requires a minimum participation of 20% of common shares. This proxy allows for an empirical analysis of the effect of socioemotional wealth endowment on the relationship between cash holdings and performance, reflecting the degree of family involvement in corporate governance and its potential moderating effect on this relationship.

3.3 Empirical analysis methodology

To examine the non-linear relationship between cash holdings and performance, we used a quadratic regression model with linear ($Cash_{it}$). and quadratic ($Cash^2_{it}$) terms. An inverted-U-shaped relationship implies that the positive effect of cash holdings on performance persists up to a turning point, from which further increases in cash holdings become detrimental. This pattern is verified by the signs and statistical significance of the $Cash_{it}$ and $Cash^2_{it}$ coefficients.

The approach adopted follows Cambrea et al. (2022), who use cash holdings as an indicator of vulnerability. High levels of cash holdings indicate low vulnerability and favor restricted SEW in family firms. Low to moderate levels indicate high vulnerability and favor extended SEW in family firms.

To validate the inverted-U relationship, we applied the Lind and Mehlum U-test (2010) and the Sasabuchi test, with Fieller's interval, to verify the significance of the turning point in the sample interval. Control variables were selected based on previous studies (Baños-Caballero, García-Teruel & Martínez-Solano, 2014; Nguyen, Nguyen & Le, 2016). The econometric model, applied to the total sample and subsamples of family firms, is presented below:

$$ROA_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 Cash^2_{it} + \beta_3 Nwc_{it} + \beta_4 Size_{it} + \beta_5 Lev_{it} + \beta_6 GWoP_{it} + \beta_7 Capex_{it} + \beta_8 Crisis_{it} + \varepsilon_{it} \quad (1)$$

Where:

- ROA_{it}: return on assets.
- $Cash_{it}$ and $Cash^2_{it}$: linear and quadratic terms of cash holdings.
- Nwc_{it}: net working capital, excluding cash and cash equivalents, divided by total assets (Martínez-Sola et al., 2018).
- $Size_{it}$: natural logarithm of net cash assets (La Rocca & Cambrea, 2019).
- Lev_{it}: ratio between total short-term and long-term loans and financing and total assets (Bates et al., 2009).
- $GWoP_{it}$: annual sales growth (Nguyen et al., 2016; Cambrea et al., 2022).
- $Capex_{it}$: ratio between cash flow allocated to the net purchase of fixed assets and total assets (Kim & Bettis, 2014).
- $Crisis_{it}$: dummy for crisis years, which assumes the value 1 for the years 2014 to 2016 and 0 for the remaining years of the analysis period.

3.3.1 Subsamples and moderating effects

The estimation model presented in Equation (1) was applied to the total sample (183 firms), including the family firm dummy, as detailed below, and additionally to the subsamples of family firms (103) and non-family firms (73). The construction of these subsamples was based on a permanent classification criterion, such that only firms maintaining a stable ownership identity throughout the analysis period (2010–2019) were included, mitigating the influence of transient ownership changes.

Although share ownership information was collected annually for all firms in the sample (dynamic classification), the permanent classification for the creation of the subsample of family firms required that the condition of family ownership be met in at least n−2 years of the analysis period, where is the total number of years with available family classification data. Similarly, the subsample of non-family firms included those that did not meet the condition of family ownership in at least n−2 years.

As a result, a firm was classified as family-owned if, over the analyzed period and considering the available data, the number of years in which it met the family ownership criterion exceeded by at least two the number of years in which it did not meet the criterion. Firms that did not show a clear predominance of family ownership—that is, that did not meet the necessary criteria to be included in any of the groups—were excluded from the subsample formation stage. For this reason, the total number of firms in the subsamples is less than the total sample size.

To investigate whether certain characteristics alter the relationship between cash holdings and performance, a model with interaction terms between the linear and quadratic components of cash holdings and each moderating variable (Mod) was estimated, as presented in Equation (2):

$$ROA_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 Cash^2{}_{it} + \beta_3 Mod_{it} + \beta_4 Mod_{it} * Cash_{it} + \beta_5 Mod_{it} * Cash^2{}_{it} + \beta_6 Nwc_{it} + \beta_7 Size_{it} + \beta_8 Lev_{it} + \beta_9 GWoP_{it} + \beta_{10} Capex_{it} + \beta_{11} Crisis_{it} + \varepsilon_{it} \quad (2)$$

The moderator model was applied to the total sample and to subsamples, depending on the nature of each moderator variable. Equation (2) serves as a general framework for examining how each moderator reconfigures the slope and curvature of the cash-performance relationship.

The moderating variable $Famp_{it}$ captured differences between family and non-family firms in the total sample, complementing the analysis based on subsamples. The variable $HDebt_{it}$ was analyzed in the total sample and in the subsamples of family and non-family firms. The variable FCI_{it}, available only for family firms, was investigated only in that group. To analyze the moderating effect of FCI_{it}, we restricted the subsample of family firms to firms that had at least three consecutive years of data available for this variable, resulting in a subsample of 98 firms.

Using subsamples of family-owned and non-family-owned firms allows for a comparison of average performance between these groups, highlighting the heterogeneity between them. The use of a family dummy variable as a moderating variable in the model applied to the total sample allows us to verify whether these differences also manifest conditionally, by evaluating how family presence modifies the slope of the relationship between cash holdings and performance even after controlling for other factors. The two procedures are therefore complementary: while the analysis of subsamples reveals average differences between groups, the model with moderators tests whether family status reconfigures this relationship in the total set. This combined approach ensures greater theoretical consistency and lends robustness to the study's inferences.

3.3.2 Estimation and control of endogeneity

Panel data were used to estimate the models in order to control for individual heterogeneities and reduce biases from unobserved variables. Based on previous studies (Ozkan & Ozkan, 2004; Baños-Caballero et al., 2014; Nguyen et al., 2016; La Rocca & Cambrea, 2019; Cambrea et al., 2022), the two-step difference GMM estimator was applied, correcting for endogeneity with instruments derived from the orthogonality between the lagged variables and the error term (Arellano & Bond, 1991).

Endogeneity is a challenge because unobservable factors can simultaneously influence performance and explanatory variables, and generate correlation with the error term (Nguyen et al., 2016; Baños-Caballero et al., 2014). Furthermore, there is a risk of reverse causality, since performance can also influence the independent variables (Baños-Caballero et al., 2014; La Rocca & Cambrea, 2019).

All independent variables were treated as endogenous in the implementation of the GMM in this study, and their t-2 lags were used as instruments for the difference equations (Ozkan & Ozkan, 2004). This lag was chosen to avoid excessive instrumentation and sample loss. Generally, the second lag is not correlated with the current error term, ensuring the validity of the instruments. To validate the estimates, the Arellano-Bond second-order serial autocorrelation test was applied, whose null hypothesis assumes the absence of autocorrelation in the errors. The Hansen test was used for overidentifying restrictions, with the null hypothesis assuming the exogeneity of the instruments.

Although we did not include explicit sectoral variables, the econometric strategy adopted contributes to substantially mitigating potential biases associated with structural differences between sectors. Estimation in differences removes time-invariant effects, which includes constant sectoral characteristics such as average liquidity patterns, capital structure, or technological intensity. Furthermore, the inclusion of time dummies allows us to control for macroeconomic shocks common to all firms. Thus, the combination of these methodological elements considerably reduces the possibility that the results reflect structural sectoral biases, even though specific cyclical shocks in certain sectors in particular years are not fully captured, an aspect we acknowledge as a limitation of this study.

4 Empirical Evidence

4.1 Descriptive Statistics

The Shapiro-Wilk and Breusch-Pagan/Cook-Weisberg tests were performed to verify the statistical assumptions of the regression models, which indicated that the variables do not meet the criteria for normality and homoscedasticity. The Spearman correlation matrix confirmed the absence of significant multicollinearity. The results of these tests are not reported due to space constraints.

Table 1 presents the descriptive statistics of the winsorized data from the total sample, before separating family and non-family firms. Table 3 presents the means of the variables for the subsamples of family and non-family firms.

Furthermore, in order to improve transparency regarding the dynamics of family classification throughout the study period, Table 2 presents detailed annual statistics of the family characterization variables between 2010 and 2019. The annual number of family firms reflects the dynamic classification, based on the criterion of ≥20% common share ownership in the respective year.

Table 1
General descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum	1st Quartile	Median	3rd Quartile
ROA	0.025	0.244	-1.202	0.254	0.020	0.065	0.115
Cash	0.113	0.160	0.002	0.806	0.024	0.065	0.130
Nwc	0.093	0.177	-0.243	0.475	-0.032	0.072	0.209
Size	14.632	2.610	5.051	18.448	13.715	15.021	16.097
Lev	0.265	0.179	0	0.629	0.113	0.269	0.396
GwOp	0.046	0.239	-0.436	0.759	-0.080	0.028	0.133
Cpx	0.047	0.049	-0.024	0.202	0.011	0.036	0.066
FCI*	0.455	0.324	0	1	0.203	0.510	0.699

Note. ***, ** and * indicate significance at 1%, 5%, and 10%, respectively.

Source: developed by the authors

In the total sample, 58.75% of the firms were classified as family firms. Due to the classification criteria, some firms could not be definitively categorized, resulting in the exclusion of certain observations from the subsamples. Return on assets (ROA) has a mean of 2.45% and a median of 6.54%, suggesting a left-skewed distribution. As shown in Table 3, the average profitability of non-family firms is negative and statistically lower, with a difference of -1.49 percentage points compared to family firms.

Table 2

Annual evolution of family characterization variables (2010–2019)

Year	No. of firms in sample	No. of family firms	Family share ownership (Mean%)	No. of family firms with a family member as Chair of the Board	Annual mean FCI >0 (%)
2010	183	88	59.91	67	59.42
2011	183	91	59.75	71	60.76
2012	183	94	58.90	74	59.63
2013	183	93	59.80	67	61.19
2014	183	91	59.37	66	59.78
2015	183	91	59.72	63	61.38
2016	183	92	57.48	64	59.35
2017	183	98	57.48	69	60.40
2018	183	97	57.42	68	59.51
2019	183	93	54.61	67	55.48

Note. [1] "Family share ownership (Mean%)" corresponds to the annual average percentage of common shares held by the family among firms classified as family firms in that year, considering the dynamic firm-year classification. [2] "Number of family firms with a family member as Chair of the Board" includes family firms in which the chairmanship of the board of directors is held by a member of the controlling family, according to information from the Reference Forms. [3] "Annual mean FCI" corresponds to the average value of the FCI indicator among family firms with FCI > 0 in that year. For these firms, the FCI ranges from 0.20 to 1.00, reflecting increasing levels of family control and influence as the family's share ownership increases. At this stage, all firms classified as family firms under the dynamic criterion in each year are considered.

Source: developed by the authors.

It is important to note that, in none of the years, does the number of firms classified as family firms under the dynamic classification reach 103 firms in the subsample of family firms. As previously detailed in Section 3.3.1, this difference results from the use of a permanent classification criterion for the subsample, which requires that the family-firm condition be met in at least n−2 years. This methodology ensures that the regression analysis focuses on firms with a long-term, stable, and structurally sound family ownership identity.

Additionally, the table presents the annual evolution of the average family share ownership and the number of firms with a family member as Chair of the Board of Directors, and describes the dynamics of family ownership and influence over the period.

In Table 3, the descriptive statistics by subsample of family and non-family firms correspond to the mean values of the variables after winsorization, performed separately within each group. This table shows systematic differences between the two types of firms before estimating the models, highlighting relevant variations in performance, liquidity, indebtedness, and investment.

Table 3

Descriptive statistics by subsample

Variables	Means		Difference	t-statistic
	Family firms	Non-family firms		
ROA	0.072	-1.420	1.491***	6.198
Cash	0.088	0.142	-0.054***	-5.897
Nwc	0.118	0.067	0.051***	5.695
Size	14.586	14.529	0.056	0.339
Lev	0.276	0.237	0.039***	4.308
GwOp	0.035	0.056	-0.021*	-1.528
Cpx	0.044	0.051	-0.007***	-2.758
No. of firms	103	73		

Note. ***, **, and * indicate significance at 1% , 5%, and 10%, respectively.

Source: developed by the authors.

In the total sample, the mean cash holdings as a percentage of total assets is 11.31%, consistent with the 11.20% observed by Cambrea et al. (2022) for firms in Italy. Among family firms, the mean is 8.88%, considerably lower than the 14.20% recorded in non-family firms. The mean net working capital is 9.32% in the total sample, 11.83% in family firms, and 6.70% in non-family firms.

4.2 Effects of cash holdings on performance

The results of the relationship between cash holdings and performance are reported in Table 4. The analysis includes the total sample (Model 1) and subsamples of non-family (Model 2) and family (Model 3) firms. Model 4, based on Equation (2), assesses the moderating effect of family ownership. All models were validated by the Arellano-Bond (AR(2)) and Hansen tests, confirming the absence of autocorrelation and the exogeneity of the instruments.

In Model 1, a non-linear effect of cash holdings on performance is observed. The *Cash* coefficient is positive and significant (β_1= 1.014, p < 0.01), indicating an initial positive effect. In turn, presents a negative and significant coefficient (β_2= -1.913, p < 0.05), suggesting that, beyond an optimal level, further increases in cash holdings harm performance. The U test and Fieller's method confirm an inverted U-shaped relationship (p < 0.05), with an estimated turning point of 0.265, similar to that found by Cambrea et al. (2022) for non-family firms.

Table 4

GMM Regressions: Effect of cash holdings on performance (ROA)

Panel A – Models with time dummy for economic crisis				
Dependent variable ROA	**(1) Total sample**	**(2) Non-family firms**	**(3) Family firms**	**(4)a Total sample with interaction (Famp)**
Cash	1.014*** (0.308)	0.554* (0.321)	0.652*** (0.255)	0.295* (0.163)
Cash²	-1.913** (0.855)	-1.131* (0.598)	-1.122 (0.790)	6.271 (11.484)
Famp				0.102 (0.068)
Cash*Famp				-0.010 (0.151)
Cash²*Famp				-9.286 (10.773)
Nwc	0.349*** (0.105)	0.232* (0.146)	0.263*** (0.084)	0.188*** (0.060)
Size	-0.047 (0.032)	-0.053 (0.039)	-0.031 (0.022)	-0.025 (0.025)
Lev	0.041 (0.119)	0.233 (0.198)	-0.040 (0.096)	0.028 (0.082)
GwOp	0.167*** (0.035)	0.003 (0.092)	0.145*** (0.029)	0.122*** (0.030)
Cpx	-0.453* (0.233)	-0.395 (0.404)	-0.185 (0.174)	-0.077 (0.159)
Crisis	-0.001 (0.005)	-0.014 (0.013)	0.001 (0.006)	-0.006 (0.004)
ROA_{it-1}	0.426*** (0.057)	0.383*** (0.032)	0.473*** (0.102)	0.415*** (0.073)
Const	0.671 (0.473)	0.772 (0.593)	0.435 (0.329)	0.331 (0.004)
Prob > chi2	0.000	0.000	0.000	0.000
AR(1)	0.000	0.028	0.000	0.000
AR(2)	0.277	0.297	0.635	0.275
Hansen	0.252	0.298	0.415	0.611
Observations	1308	491	764	1291
Highest VIF value	4.20	5.04	8.89	2.96
Panel B – Lind and Mehlum (2010): U test				
Teste U (p-valor)	0.042	0.045	0.317	
IL Inferior	1.006***	0.550**	0.646***	
IL Superior	-2.072**	-1.554**	-	
Ponto de inflexão	0.265	0.245		

Note. Robust standard errors in parentheses. Orthogonal deviations were applied to mitigate the effect of missing data. The Cash variable was centered in all models, affecting the linear and quadratic terms.
a In model (4), the Cash variable was centered, impacting the linear and quadratic terms.
***, **, and * indicate significance at 1%, 5%, and 10%, respectively.
IL = Slope at the interval limit.

Source: developed by the authors.

To strengthen the findings, the model was reapplied using the logarithm of sales as an alternative proxy for firm size (Baños-Caballero et al., 2014; Nguyen et al., 2016; Nason & Patel, 2016; Cambrea et al., 2022), confirming the inverted U-shaped relationship (β_1= 0,989, p < 0,01; β_2= -1,845, p < 0,05; $U - test$ < 0,05), with an estimated turning point of 0.268.

This result is consistent with previous research that also identifies positive marginal effects of cash holdings up to an optimal level, followed by diminishing returns when accumulation exceeds this limit (Baños-Caballero et al., 2014; Nguyen et al., 2016; Nason & Patel, 2016; Cambrea et al., 2022; Loncan & Caldeira, 2014). Thus, the findings converge with the literature in indicating that financial slack contributes to performance only up to a certain point, after which it tends to generate inefficiencies, a behavior reflected in the turning point observed in our models.

The positive coefficient of the variable may indicate a precautionary motive, whereby firms maintain cash holdings in order to avoid cash deficits and preserve financial stability. It may also be related to a transaction motive, reflecting the need for liquidity for daily operations. Conversely, the negative coefficient of suggests that the benefits of cash holdings diminish as profitable investment opportunities are exhausted (Cambrea et al., 2022). This behavior is consistent with the free cash flow hypothesis, according to which excess cash can generate agency costs due to inefficient investment decisions or decisions misaligned with shareholder interests (Jensen, 1986).

In Model 2, applied to the subsample of non-family firms, the coefficient *Cash* (β_1= 0,554, p < 0,10) and the *Cash²* (β_2= -1,131, p < 0,10) reinforce the existence of an optimal cash holdings level (0.245), which is lower than that observed for the total sample. Since the total sample includes both family and non-family firms, this result suggests that non-family firms are more sensitive to variations in cash levels and experience negative effects from cash holdings even at relatively low levels. This finding supports hypothesis , which predicts a greater benefit from cash holdings in family firms.

Model 3, applied to the subsample of family firms, indicates a positive linear relationship between cash and performance (β_1= 0,652, p < 0,01), with no statistical significance for the quadratic term *Cash²*. The lack of significance of this coefficient implies that there is no evidence of an inverted U-shaped relationship for family firms and, therefore, no statistically valid turning point is identified. This suggests that, even at high levels, increases in cash holdings tend not to negatively affect performance.

Although the expected quadratic shape is not confirmed, the result supports H_{1a} by indicating that family firms benefit more from cash holdings than non-family firms. However, it contradicts H_{1b}, which predicted a more moderate marginal effect of variations in cash holdings among family firms, since the linear coefficient found for this group is higher than that of non-family firms. This pattern differs from that observed in Cambrea et al. (2022), who identify quadratic relationships for both groups, albeit with higher turning points in family firms.

According to Cambrea et al. (2022), the positive relationship between cash holdings and performance stems from the predominance of extended SEW, since, at this stage, there is an alignment between financial and socioemotional concerns, allowing cash holdings to contribute positively to performance. In this sense, a possible explanation for the divergence found lies in the institutional and economic differences between the contexts analyzed. In Brazil, where access to credit is more restricted and external financing costs are high, family firms may depend more on internal resources to ensure liquidity and operational continuity. This context may prolong the predominance of extended SEW, since cash holdings continue to be perceived as an essential factor for financial resilience, without reaching a level at which they become detrimental to performance.

In addition, descriptive statistics indicate that the family firms in the sample have, on average, lower cash holdings (8.8%) and higher net working capital (11.8%). This profile suggests a preference for liquidity management via operating assets, focused on keeping the company's operations agile and responsive, rather than large cash holdings. If cash is not excessively retained, the turning point may not occur because there is not a sufficient level of "unproductive" cash to reverse the positive impact on performance. Non-family firms in the sample, on the other hand, have higher cash holdings (14.2%) and lower net working capital (6.7%). These firms showed lower performance on average compared to their family-firm counterparts.

No statistically significant interactions were found in Model 4, which assesses the moderating effect of family ownership on the relationship between cash holdings and performance. To mitigate multicollinearity, we centered the *Cash* variable and reset its mean to zero. This reduced the correlation between linear and quadratic terms and improved the numerical stability of the model without affecting the variability of the data. This technique is useful in models with polynomial and interactive terms, as it facilitates the interpretation of coefficients and improves the accuracy of estimates. Although the model's interaction term was not significant, the analysis of subsamples indicates that the relationship between cash holdings and performance differs between family and non-family firms. This suggests that family ownership may influence this relationship indirectly or in combination with other moderators not yet tested.

4.3 Moderation of FCI level and high indebtedness

Models 1, 3, and 4, and Model 2 (Table 5) analyze the moderating effect of high indebtedness (HDebt) and the level of family control and influence (FCI), respectively, on the relationship between cash holdings and performance. To mitigate multicollinearity problems arising from the presence of quadratic terms and interactions, we centered the variable to ensure greater accuracy in the interpretation of the coefficients. The Arellano-Bond AR(2) and Hansen tests validate the adequacy of the models.

Table 5
GMM Regressions: moderating effects in the relationship between cash holdings and performance (ROA)

Panel A	**(1)**	**(2)**	**(3)**	**(4)**
		Models with time dummy for economic crisis		
Dependent variable: ROA	**Interaction (HDebt)[a]**	**Interação (FCI)[b]**	**Interação (HDebt)[b]**	**Interação (HDebt)[c]**
(HDebt)a	Interaction	0,412* (0,225)	0,407** (0,207)	0,806** (0,346)
(FCI)b	Interaction	-8,000** (3,262)	-5,587* (3,09)	1,699 (5,123)
(HDebt)b	Interaction		0,040* (0,024)	-0,030 (0,040)
(HDebt)c		-0,021 (0,033)		
Cash*FCI		-0,185 (0,346)		
Cash*HDebt	-0,469 (0,310)		-0,284 (0,250)	-0,808 (0,504)
Cash²*FCI		12,066** (5,653)		
Cash²*HDebt	0,512 (4,025)		1,804 (3,387)	-1,284 (7,168)
Nwc	0,232*** (0,079)	0,191** (0,079)	0,164** (0,069)	0,149 (0,224)
Size	-0,034 (0,028)	-0,021 (0,023)	-0,019 (0,023)	-0,032 (0,036)
Lev	0,022 (0,152)	-0,048 (0,086)	-0,173 (0,151)	0,213 (0,275)
GwOp	0,122*** (0,034)	0,133*** (0,027)	0,142*** (0,025)	0,030 (0,060)
Cpx	-0,129 (0,117)	-0,134 (0,135)	-0,156 (0,134)	-0,379 (0,491)
Crisis	-0,005 (0,006)	-0,003 (0,005)	-0,001 (0,005)	-0,016 (0,011)
ROA_{it-1}	0,398*** (0,067)	0,386*** (0,091)	0,354*** (0,103)	0,450*** (0,082)
Constant	0,539 (0,399)	0,355 (0,331)	0,346 (0,323)	0,506 (0,541)
Prob > chi2	0,000	0,000	0,000	0,000
AR(1)	0,000	0,001	0,000	0,012
AR(2)	0,267	0,952	0,659	0,302
Hansen	0,773	0,227	0,468	0,972
Observations	1308	711	764	491
Highest VIF value	3,49	3,00	3,57	3,67
		Panel B – Lind and Mehlum (2010): U test		
U test (p-value)		0,020	0,071	
Lower (IL)		1,854***	1,473**	
Upper (IL)		-1,296**	-0,871*	
Turning point		0,026**	0,036**	
Turning point with interaction		0,319***		

Note. Robust standard errors in parentheses. Orthogonal deviations were applied to mitigate the effect of missing data. The *Cash* variable was centered in all models, affecting both linear and quadratic terms.
[a] Total sample. [b] Family firms. [c] Non-family firms.
***, **, and * indicate significance at 1%, 5%, and 10%, respectively.
IL = Slope at the interval limit.

Source: developed by the authors.

In Model 2, which examines the effect of FCI, the $Cash_{it}$ coefficient is positive and significant (β_1 = 0,412, p < 0,1), suggesting that cash holdings contribute positively to performance. Due to the centering of the cash holdings variable, the estimated coefficients capture the effects of variations in the variable relative to its sample mean. The $Cash^2_{it}$ coefficient is negative and significant (β_2 = -8,000, p < 0,05), indicating that, starting from the average value of the h variable, the positive effect of cash holdings on performance decreases and may eventually become negative as cash holdings continue to increase.

The interaction between $Cash^2_{it}$ and FCI_{it} is positive and significant (β_5 = 12,066, p < 0,05), indicating that firms with a high level of family control and influence do not experience a clear negative impact from cash holdings on performance. This suggests that, in family firms with high FCI, cash tends to be better managed, aligning financial and socioemotional benefits, which reinforces extended SEW.

The results show that when family control and influence are high ($0,2 \leqq FCI_{it} \leqq 1$), increases in cash holdings continue to improve performance, even at substantial levels. By contrast, when the FCI is low ($FCI_{it} = 0$), the linear *Cash* coefficient remains positive and significant, but the quadratic term $Cash^2$ becomes negative and statistically significant, suggesting an inverted U-shaped relationship, with a turning point beyond which further increases in cash harm performance.

The turning point estimated with interactions (0.319) is substantially higher than that calculated without interactions (0.025), indicating that family firms with high *FCI* are able to maintain higher cash holdings without suffering the negative effects of excessive holdings. In contrast, those with low *FCI* experience these effects earlier.

Analyses suggest that, in family firms with high FCI, extended SEW favors a balance between financial and socioemotional wealth, and mitigates the negative effects of excess cash holdings. However, in family firms with low FCI, extended SEW does not fully compensate for these effects, resulting in an inverted U-shaped relationship between cash holdings and performance.

These findings differ in part from those of Cambrea et al. (2022), who identify an inverted U-shaped relationship between cash holdings and performance in family firms regardless of FCI. However, as in this study, firms with high FCI have a higher turning point, suggesting prolonged benefits of cash holdings. These results reinforce the notion that the heterogeneity of family firms cannot be explained solely by whether they are family firms. According to Nason and Patel (2016), the relationship between family characteristics and performance should be analyzed from a contingency perspective, that is, conditioned by specific factors that shape how the family influences the firm. In this sense, the FCI adopted in this study can be understood as one of these contingencies, since it captures variations in the degree of family control and influence and explains why not all family firms exhibit the same behavioral patterns regarding cash holdings.

The evidence of greater benefit from cash holdings in firms with high FCI does not reject hypothesis. On the contrary, it suggests that greater family control and influence favor the reconciliation between financial and socioemotional objectives, thus promoting value creation and neutralizing the negative effects of excess cash holdings. This alignment encourages a more strategic use of cash, maximizing its contribution to performance.

In the total sample of family firms and in the subsample with high FCI, the linear and positive relationship between cash holdings and performance indicates that the transition from extended SEW to restricted SEW occurs later than observed by Cambrea et al. (2022). This result may be associated with the Brazilian institutional environment—characterized by credit restrictions and high financing costs—which prolongs the perception of financial vulnerability and delays the predominance of restricted SEW, even at high cash levels.

Regarding indebtedness, Models 1, 3, and 4 did not indicate a significant moderating effect on the relationship between cash holdings and performance, either in the total sample or in the subsamples of family and non-family firms. Therefore, hypothesis H_3 was rejected.

Although classic literature (Jensen, 1986) argues that debt can act as a governance mechanism, the lack of significance in our results may reflect the specificities of the Brazilian context. Loncan and Caldeira (2014) argue that, in emerging markets like Brazil, characterized by high capital costs, less developed credit markets, and low legal protection for creditors, the relationship between liquidity, leverage, and firm value differs from that observed in developed economies. While they do not directly analyze the disciplining role of debt, their findings suggest that, in Brazil, debt can reduce the need to maintain cash holdings, indicating a substitution relationship between the two and weakening its expected effect as a governance mechanism.

In the case of family firms, the high concentration of ownership and the presence of socioemotional objectives also reduce the disciplinary function of debt, as well as shifting the focus to preserving liquidity as a way to ensure continuity and autonomy. When the family maintains a significant share ownership, the overlap between ownership and control reduces agency conflicts with creditors, reinforces commitment to the firm, and mitigates risks of opportunistic behavior (Anderson, Mansi, & Reeb, 2003). Furthermore, when family members participate directly in management and on the board, so-called family activism also tends to mitigate internal agency problems (López-Gracia & Sánchez-Andújar, 2007). Under these circumstances, debt loses relevance as an external disciplinary instrument for the discretionary behavior of managers.

Together, these factors help to explain why, in emerging markets like Brazil, debt does not fully play its role in external governance, which justifies the lack of effect identified in this study.

5 Final Considerations

This study investigated the relationship between cash holdings and performance in family and non-family firms, in light of Socioemotional Wealth Theory and the mixed-gamble approach. The evidence indicated that, while non-family firms exhibit the traditional non-linear inverted U-shaped relationship, family firms show a positive linear relationship, suggesting that cash holdings in these firms tend to contribute more sustainably to performance. This difference may be associated with how the financial vulnerability of firms influences the predominance of extended or restricted SEW, as discussed by Cambrea et al. (2022).

The results show that, in Brazil, the transition from extended SEW to restricted SEW, in line with the increase in cash holdings, occurs later in family firms compared to the study by Cambrea et al. (2022). This behavior may be related to restrictions in the credit market and high external financing costs in Brazil, compared to developed markets, which prolong the perception of financial vulnerability in family firms.

The analyses showed that the effect of family ownership on cash management varies according to the level of control and influence exerted by the family. Specifically, our analyses indicate that, in family firms with high FCI, increases in cash holdings tend not to negatively affect firm performance, reflecting a positive linear relationship between cash holdings and performance. By contrast, family firms with low FCI exhibit an inverted U-shaped relationship similar to that observed in non-family firms, indicating that excessive increases in cash holdings impair performance beyond a certain level. These findings show that greater family involvement favors the reconciliation between financial and socioemotional objectives and prolongs the benefits of cash holdings.

These results confirm that the degree of family control and influence is decisive in explaining the heterogeneity among family firms. Conversely, indebtedness did not show a significant moderating effect, which may reflect Brazilian institutional conditions, marked by credit restrictions and high financing costs that limit the disciplining role of debt.

From a practical standpoint, these findings indicate that family involvement in senior corporate governance can, under certain conditions, enhance the benefits of cash holdings on performance. In firms with a high level of family control and influence, cash holdings have a positive effect on performance, even at high levels, suggesting that structured family governance favors the alignment between socioemotional and financial objectives. This result reinforces the idea that simply being a family firm is insufficient; the way the family exercises its control matters decisively.

In this sense, evidence suggests that formal governance mechanisms can play a complementary role in preserving this alignment. The adoption of boards of directors with independent members, transparent succession rules, and explicit policies for cash holdings and use are examples of practices that can strengthen the positive role of family involvement and mitigate risks such as nepotism or opportunistic decisions. Furthermore, robust internal audit mechanisms and financial controls can ensure that cash is used efficiently, reconciling the pursuit of financial resilience with the creation of long-term value.

This study has limitations. For example, SEW was modeled indirectly using FCI, which does not capture its full conceptual complexity. Similarly, although methodological safeguards against endogeneity were adopted, it is impossible to eliminate it completely. It should also be noted that, despite the precautions taken – such as differentiating variables to eliminate fixed sector-invariant effects, and using time dummies to capture common macroeconomic shocks – the model does not control for specific shocks that affect only certain sectors at specific times. Thus, sector-specific events, such as regulatory changes or localized crises, may not be fully reflected in the analysis. Such a limitation suggests caution in the generalization of results, while also pointing to opportunities for future research to explore more detailed sectoral controls and interactions between sector and time, as well as alternative measures of SEW and comparisons between different institutional contexts, including at the international level.

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