

Article

Features of the Association between Debt and Earnings Quality for Small and Medium-Sized Entities

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Abstract: The main source of financing is bank loans for Portuguese small and medium-sized entities (SMEs), which implies several constraints to obtaining additional funds. Relying on the argument of Positive Accounting Theory (PAT) that accounting choices are not neutral and on Agency Theory that information asymmetry prevails between insiders and outsiders, we analyzed the impacts of debt on earnings quality, focusing on its level, its increases, and its term of payment. We estimated econometric regressions using panel data with fixed effects over 2013–2019, using discretionary accruals as an inverse proxy of earnings quality. We found empirical evidence that the relationship between debt and earnings quality tends to vary in sign, as the quality of financial information deteriorates with debt, but as debt becomes high, firms tend to increase the quality of earnings. Furthermore, we found that short-term debt tends to decrease earnings quality more than long-term debt. This article aimed to contribute to the prior literature by collecting evidence that debt levels tend to be an incentive to increase earnings management and fill the gap by analyzing the influence of different debt features. This evidence is useful because earnings management may compromise both stakeholders' confidence and the efficient allocation of capital.

Keywords: earnings management; discretionary accruals; SMEs' debt; non-linear association



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1. Introduction

Financial statements (FS) are the main source of information for analyzing a firm's economic and financial performance, which stakeholders consider to make efficient decisions, as mentioned by Givoly et al. (2010) and Jeon and Oh (2020). However, the FSs are prepared according to flexible accounting regulations applied by a broad number and variety of industries and entities. Nevertheless, they may produce a negative impact on the quality of financial information when misused by managers, as suggested by Mendes and Lima Rodrigues (2007) and Cerqueira and Pereira (2019).

According to Positive Accounting Theory, the decisions of financial information preparers are not neutral, being influenced by several factors, such as debt covenants, compensation contracts, and political costs (Healy and Wahlen 1999; Watts and Zimmerman 1990). These factors become different incentives for earnings management. In the Continental European system, SMEs are predominant in economies, exhibiting a strong link between accounting and taxation and having bank funds as their main source of financing (Nobes 1998; Nobes and Parker 2020; Fearnley and Gray 2015). To obtain better negotiation conditions with creditors, managers may have incentives to engage in earnings management practices as argued by Pereira et al. (2023b). Relying on Agency Theory, given the existence of information asymmetry between the managers (insiders) and the users (outsiders) of accounting information, management may use discretion when preparing and reporting a FS for their benefit (Ghazali et al. 2015). Firms' stakeholders are aware of this information asymmetry. Cerqueira and Pereira (2020) argue that stakeholders look for high-quality

financial information and [Monteiro et al. \(2021\)](#) find that earnings quality determines the usefulness of financial information.

In this study, we focused on debt, which has been documented as a determinant of earnings management, as mentioned by [Fields et al. \(2001\)](#), [Jelinek \(2007\)](#), and [Lazzem and Jilani \(2018\)](#). Meanwhile, [Ghosh and Moon \(2010\)](#) find that high debt has a negative effect on earnings quality because managers may use accruals to avoid covenant violations. These authors document a non-monotonic relationship between debt and earnings quality, which is positive at low levels of debt and negative at high debt levels.

Conversely, the high level of indebtedness of Portuguese SMEs may lead to mitigated earnings management and then become a mechanism of corporate governance to capture creditors' confidence and obtain additional funds, as mentioned by [Pereira et al. \(2023b\)](#). In the same vein, [Ewert and Wagenhofer \(2015\)](#) argued that debt clauses are incentives for decision-makers to manage earnings. Our contribution in this paper is threefold: first, we provide evidence of the impact of banking system dependence on the earnings quality of Portuguese SMEs, taking into account different debt features. Second, we show that this effect varies with the level of debt, which tends to deteriorate earnings quality by leading to more earnings management activities to communicate better performance to externals. While we found evidence that the relationship between debt and earnings management tends to be exacerbated for SMEs with increasing levels of debt, it is mitigated for SMEs with the highest levels of debt. Third, we found that short-term debt is an incentive for decision-makers to engage in earnings management activities in response to the high demand for liquidity by Portuguese SMEs. Then, this study aimed to fill in the lack of evidence regarding the impact of debt and its different features on earnings management for SMEs, which are the most representative firms in several European economies.

The remainder of this paper is organized as follows. In Section 2, we provide a literature review and then we posit the hypotheses. In Section 3, we explain the empirical methodology design, namely the sample selection procedures, variables definitions, and the empirical model. In Section 4, we present the descriptive statistics and the results of the empirical tests. Finally, in Section 5, we provide our concluding remarks.

2. Literature Review

2.1. Earnings Management

Accounting earnings are a fundamental source of information for decision-making ([Francis et al. 2004](#)). Earnings quality plays a crucial role, especially in controversial financial markets times, allowing investors to make more efficient and less risky decisions as [Kousenidis et al. \(2013\)](#) argued.

According to [Mukhametzyanov and Nugaev \(2016\)](#), the use of financial information reduces uncertainty and leads to better decision-making, thus having a positive impact on company performance. It is possible to find a characteristic for earnings quality in [Dechow and Schrand \(2004\)](#) that in turn is the ability of earnings to feasibly reflect the firm's current performance. [Bhattacharya et al. \(2013\)](#) for the United States find empirical evidence that the quality of accounting information contributes to mitigating information asymmetry. While the IFRS aims to promote greater comparability and quality in financial information, these standards rely on flexibility, which allows earnings management activities ([Toumeh and Yahya 2019](#)). Then, based on PAT, the accounting choices rely on different motivations, such as to avoid political cost, not violate debt contract covenants, or to maximize the manager's bonus ([Watts and Zimmerman 1978](#)).

Earnings management is a globally used tool for long-term profitable firms and the reduction of bankruptcy risk ([Durana et al. 2020](#)). Considering that managers may have incentives to deteriorate earnings' quality, they may engage in earnings management practices by using privileged information to mislead stakeholders about the true performance of firms because they are no longer complete and transparent ([Healy and Wahlen 1999](#)). These authors presented a broader definition, pointing to the existence of earnings management, which is when managers use the subjectivity contained in the accounting standards to act

on the FS to hide the firm's true performance from stakeholders, or to influence the fulfillment of certain contracts that depend on financial information. For [Schipper \(1989\)](#), the activities of managers in the financial reporting process aim at obtaining a private benefit. Based on [Koumanakos et al. \(2005\)](#), earnings management is fundamentally characterized by the process in which managers take intentional actions, within the limits of generally accepted accounting principles, to achieve a desired level of earnings.

It is important to note that earnings management does not cover accounting fraud, but rather the flexibility contained in accounting standards to alter financial information without exceeding the legal limits. In addition, managers often use the flexibility contained in the standards to offer a true and fair view of the firm, allowing the users of financial information to make more educated decisions. Thus, according to [Beneish \(2001\)](#), earnings management can be seen from two perspectives: the opportunistic perspective, which seeks to mislead investors through the misrepresentation of disclosed information; and the informative perspective, in which managers seek to manipulate information to reveal to investors their private expectations about future cash flows.

Earnings management is associated with poor earnings quality. [Monteiro et al. \(2021\)](#) find that the quality of financial reporting is a predictive variable of the usefulness of financial reporting. It is important to analyze which factors may affect earnings quality.

Given that the quality of the earnings is not directly observable, several estimates have been developed in the literature ([Dechow et al. 2010](#); [Schipper and Vincent 2003](#)), including earnings smoothing, conservatism by more timely recognition of losses relative to gains, discretionary accruals, and earnings persistence ([Cerqueira and Pereira 2019](#)). In this study, we used discretionary accruals as a proxy for earnings quality because we aimed to analyze the effect produced by debt on earnings quality.

2.2. Effect of Debt on Earnings Management and Hypothesis Development

Prior studies found conflicting empirical evidence regarding the effects of debt on earnings management.

While debt is associated with managers being engaged in earnings management activities behavior due to the need for additional financing ([Khuong et al. 2022](#); [Ewert and Wagenhofer 2015](#)), earnings management is limited because with debt the supervision by external creditors increases, namely banking institutions ([Mamatzakis et al. 2022](#); [Vakilifard and Mortazavi 2016](#)).

The research conducted by [Lazzem and Jilani \(2018\)](#), applied to a sample of French companies indexed on the CAC All-Tradable, examined the impact of leverage on accruals-based earnings management practices. Their results led to the conclusion that debt has a positive effect on earnings management. Thus, it was found that increases in debt provide an incentive for managers to manipulate results to avoid violating debt contracts. In a study conducted by [Warrad \(2017\)](#) on industrial firms listed on the Amman Stock Exchange (ASE) during the period from 2011 to 2015, it was concluded that there was a significant influence of debt ratio and ROA on earnings quality. Furthermore, [Ewert and Wagenhofer \(2015\)](#) argued that debt clauses are incentives for firms to engage in earnings management activities.

In contrast, firms with high levels of debt tend to avoid earnings management practices given that high levels of debt imply more risk of a firm's default, and thus, they are subjected to greater monitoring and scrutiny from external creditors ([Jensen 1986](#)). Consistently, [Ghosh and Moon \(2010\)](#) argue that high debt has a negative effect on earnings quality because managers may use accruals to avoid covenant violations. These authors document a non-monotonic relationship between debt and earnings quality, which is positive at low levels of debt and negative at high debt levels.

Meanwhile, [Vakilifard and Mortazavi \(2016\)](#) found empirical evidence that debt harms accruals earnings management but has a positive impact on real earnings management. [Inayah et al. \(2021\)](#) analyzed the impact of financial distress, leverage, and free cash flow on earnings management. These authors found evidence that leverage produces a negative impact on earnings management. In the same vein, [Mamatzakis et al. \(2022\)](#) found evidence

of a negative association between debt and earnings management for Greek firms. This negative effect can be explained by the fact that during the period under review, banks or creditors had a lot of control over companies, so managers had less flexibility to focus on managing earnings.

Given this conflicting evidence, we aimed to analyze the impact of debt on earnings management and whether it differs from the intensive level of debt. In addition, we controlled for factors that are likely to affect earnings management practices, in particular firms' features based on fundamentals, focusing on debt. Thus, based on credit agreements and the motivations for obtaining debt at favorable conditions for the company, the following research hypothesis is formulated:

H1. *Debt is positively associated with earnings management activities.*

On the other hand, [Khuong et al. \(2022\)](#) mentioned that firms with a high debt-to-asset ratio tend to have more difficulties in obtaining additional funds, which may be an incentive to increase earnings management. The results of [Pereira et al. \(2023a\)](#) are divergent from this vein by suggesting that debt reduces earnings management due to the high levels of debt of Portuguese SMEs; therefore, these firms have to capture creditors' and investors' confidence to obtain additional funds. In highly indebted firms, the debt levels increase the likelihood of defaults on future debt obligations, so in this situation, external creditors tend to increase monitoring of firms, decreasing opportunistic behavior by managers ([Anagnostopoulou and Tsekrekos 2017](#); [Zamri et al. 2014](#)). Following the most recent trend, we posit the following hypothesis:

H2. *Firms with the highest levels of debt exhibit fewer earnings management activities.*

To further develop this research, we investigated whether firms that exhibit debt increases tend to manage their earnings in a more exacerbated manner than those firms with high leverage levels. [Jelinek \(2007\)](#) and [Lazzem and Jilani \(2018\)](#) found that the impact of debt on earnings management is different in debt-increasing firms and highly indebted firms. These authors found that firms experiencing increases in debt are more likely to engage in accrual-based earnings management practices than firms with consistently high debt because when firms have increases in their levels of debt, they tend to contract new debt. In addition, this enhanced propensity for earnings management is driven by the increased pressure on managers to maintain or improve earnings in response to the debt increase to persuade the lenders of good management. In the same sense, [Khanh and Anh Phung \(2019\)](#) identified a positive relationship between increasing leverage and earnings management. Then, we posit the third hypothesis:

H3. *Firms with increasing debt have higher earnings management activities.*

In addition, debt maturity is indicated as being able to explain the adoption of earnings management practices. Most of the literature focuses on the link between debt and earnings management but does not examine the differences between short-term and long-term debt ([Ghazali et al. 2015](#); [Jelinek 2007](#); [Khanh and Anh Phung 2019](#); [Koumanakos et al. 2005](#); [Lazzem and Jilani 2018](#); [Vakilifard and Mortazavi 2016](#)).

[Trung et al. \(2020\)](#) argue that short-term debt is substantially different from long-term debt because the former presents a greater propensity for liquidity risk. Thus, short-term debt increases a firm's liquidity risk because cash flows are needed sooner to pay off that debt. Based on this theory, a positive relationship is expected between short-term debt and earnings management.

[Fields et al. \(2012\)](#) conclude that increasing short-term debt is associated with greater discretionary accruals, in particular for firms that are about to obtain new loans. These harmful repercussions are anticipated according to financial crisis theory ([Fung and Goodwin 2013](#); [Gupta et al. 2008](#)). Since short-term debt is linked to liquidity risk, compared to long-term

debt, the positive correlation between short-term debt and earnings manipulation should be greater compared to (the more intensely investigated) relationship with the general debt. Taking these studies into account, the following hypothesis was formulated:

H4. *The positive impact of short-term debt on earnings management is more substantial compared to long-term debt.*

El-Rabat et al. (2023) argue that large firms have better internal control mechanisms and more experienced internal auditors compared to smaller ones, leading to disclosing more accurate financial information. Consistently, Kalbuana et al. (2021) mention that external auditors give more attention to larger firms, and consequently, these firms tend to engage less in earnings management activities. In the case of return on assets and interest expenses, firms engage in earnings management activities to meet contractual debt obligations and to mitigate the negative effects of interest on net income (Anagnostopoulou and Tsekrekos 2017; Zamri et al. 2014). In this empirical study, we controlled for the effect of firm size and the amount of interest expense on earnings management.

3. Results

3.1. Descriptive Statistics

For the statistics work, we used RStudio software version 2022.07.2, namely to estimate the econometric regressions. Table 1 presents the descriptive statistics for the dependent and independent variables included in the models, which are all based on annual financial reporting:

The mean absolute value of the discretionary accruals, which are not the result of economic activity but of managers' discretionary actions, represent 8% of the total assets. Although slightly higher, this is consistent with that shown by Cerqueira and Pereira (2015) for a previous Portuguese case (4.45%).

Regarding the Debt variable, the total debt scaled by total assets, we can conclude that in general, Portuguese SMEs are not highly leveraged, with an average value of 32%. However, the sample period coincides with the aftermath of the global financial crisis, which was characterized by a lack of liquidity in the economy, particularly in the Portuguese financial market. In this table, the variable Size is presented in euros instead of its log to be clearer in its interpretation. The variation in size by company is high, as can be seen from the standard deviation. The minimum size is around 5 million and the maximum is 107 million. This value is above the 20 million for the maximum value for assets, but the two other limits, turnover and the number of employees, are below the maximum values allowing the entity to be classified as an SME. In addition, these firms have a low ROA, 3% on average. This suggests that these firms have little ability to finance their assets through their resources, often leading them to opt for borrowed capital to the detriment of equity. In addition, the short-term debt scaled by total assets is 14%, while the long-term, most suitable for investment, is higher (19%).

Table 1. Descriptive statistics.

Variable	Mean	Median	Min	Max	Std
Debt	0.32	0.30	0	1.04	0.21
DebtH	0.5	0	0	1	0.5
DebtST	0.14	0.10	0	0.61	0.13
DebtLT	0.19	0.14	0	0.87	0.18
Size	9845	5457	507	107,838	14,927
ROA	0.03	0.02	−0.20	0.26	0.07
IntExp	0.05	0.04	0	0.52	0.07
DAC	0.08	0.05	0.00	0.54	0.09

Source: Authors' calculations.

Table 2 documents the correlations between the variables used in the models.

Table 2. Correlation matrix.

	DAC	Debt	DebtST	DebtLT	DebtH	Size	ROA	IntExp	Growth
DAC	1								
Debt	0.08 ***	1							
DebtST	0.14 ***	0.51 ***	1						
DebtLT	−0.02 ***	0.77 ***	−0.13 ***	1					
DebtH	−0.01	0.55 ***	0.21 ***	0.47 ***	1				
Size	−0.08 ***	0.12 ***	−0.05 ***	−0.17 ***	0.13 ***	1			
ROA	0.03 ***	−0.24 ***	−0.14 ***	0.17 ***	−0.14 ***	0.00 ***	1		
IntExp	0.07 ***	−0.25 ***	−0.13 ***	−0.2 ***	−0.08 ***	−0.02 ***	−0.02 ***	1	
Growth	0.16 ***	0.21 ***	0.15 ***	0.13 ***	0.00	0.16 ***	0.00 ***	−0.13 ***	1

*** represents the level of significance at 1%.

The correlations between the dependent variable and the independent (no control) variable vary from −8% (Size) to 14% (DebtST).

The highest correlation coefficients between the independent variables are observed between Debt variables, but the coefficients between Debt and the other independent variables are low, suggesting that this sample has no multicollinearity problems.

3.2. Econometric Regressions Results

We analyzed the association between earnings quality and indebtedness features by estimating the dynamic fixed models using the generalized method of moments (GMM) in two-stage squares (2SLS) with the instrumental variable discretionary accruals lagged, which is a way of dealing with potential endogeneity issues. Table 3 documents the results with panel data using fixed effects for a sample period of seven years.

Table 3. Impact of debt on discretionary accruals.

Variables	Predicted Sign	Model 1	Model 2	Model 3	Model 4
Lag (DAC;1)		0.0438 *** (2.8779)	0.05 *** (3.2573)	−0.0656 (−1.6282)	0.0447 *** (2.9425)
Debt	(+)	0.0486 *** (3.9656)			
DebtH	(−)		−0.0083 ** (−2.2706)		
DebtInc	(+)			−0.0021 (−0.1803)	
DebtST	(+)				0.0543 *** (3.435)
DebtLT					0.0347 ** (2.5449)
ROA	(+)	0.0128 (0.5867)	0.0100 (0.4562)	−0.0649 (−19.0943)	0.0124 (0.5679)
IntExp	(+)	0.0849 *** (4.4899)	0.0646 *** (3.4676)	0.4912 ** (2.1561)	0.0832 *** (4.4131)
Size	(−)	−0.0369 *** (6.3371)	−0.0356 *** (−6.0678)	−0.0241 (−1.2919)	−0.0370 *** (−6.3543)
Growth	(+)	0.0723 *** (0.5257)	0.0881 *** (14.0256)	0.1142 *** (7.5963)	0.07472 *** (11.1280)
Firm-year obs.		32,788	32,788	6186	32,788
Sargan test (X^2)		19.6970	18.5972	15.0375	19.1865
Autocorrelation (1)		−27.5684 ***	−27.5145 ***	−6.6673 ***	−27.5442 ***
Autocorrelation (2)		2.5350 **	2.6643 ***	−0.1908	2.5650 **
Wald test (X^2)		240.336 ***	244.5344 ***	71.1135 ***	236.4554 ***

***, **, represent the level of significance at 1%, 5% respectively. The statistics given in the parentheses under the coefficients of independent variables are Z-values. Source: Authors' calculations.

To test the robustness of the results, we used Sargans' over-identification of restrictions test under the null hypothesis that the restrictions imposed are valid. The results led to the acceptance of the null hypothesis, concluding that the restrictions are valid and the results are robust for all models. We also tested the null hypothesis of the absence of the first and second order autocorrelation. These results mostly rejected the null hypothesis. Finally, to test the quality of the adjustment of the independent variables as a whole in relation to the dependent variable, we carried out a Wald test. The results rejected the null hypothesis, suggesting that the independent variables are statistically significant to globally explain the model.

The Debt variable in model 1 is statistically significant at the 1% level and its estimated sign is positive, as expected. This result suggests that debt positively affects earnings management, which in turn means that debt is negatively related to earnings quality. This evidence empirically supports our first hypothesis and is consistent with [Kalbuana et al. \(2021\)](#), [Khanh and Anh Phung \(2019\)](#), and [Lazzem and Jilani \(2018\)](#).

Concerning the control variables, the coefficients are statistically significant at a 1% level, except for ROA, which is not statistically significant. Moreover, the estimated coefficient exhibits the expected sign: IntExp is positive, suggesting that firms with higher interest expenses are associated with greater earnings management. This result is in line with [Jelinek \(2007\)](#), [Vakilifard and Mortazavi \(2016\)](#), [Anagnostopoulou and Tsekrekos \(2017\)](#), and [Kalbuana et al. \(2021\)](#). Furthermore, managers are also attempting to meet the expectations of creditors ([Lazzem and Jilani 2018](#)). In the case of Size, its estimated coefficient is negative. Larger firms have stronger internal control systems and are audited by external organizations, justifying the decrease in earnings management activities ([El-Rabat et al. 2023](#); [Kalbuana et al. 2021](#)). The coefficient of the variable associated with Growth is positive, as expected, and statistically significant at 0.1%. This result suggests that firms with higher business growth have higher levels of discretionary accruals, in line with [Al-Najjar and Riahi-Belkaoui \(2001\)](#). This result shows that firms with greater growth opportunities increase their flexibility to adopt earnings management practices.

Model 2 analyzed the impact of high levels of corporate debt on earnings management activities, focusing on the variable DebtH. Its estimated coefficient is statistically significant at a 5% level, with a negative sign, as expected. This is consistent with high-debt firms engaging in fewer earnings management activities, which is in line with [Anagnostopoulou and Tsekrekos \(2017\)](#), [Jensen \(1986\)](#), and [Zamri et al. \(2014\)](#). This evidence empirically supports H2, suggesting that increasing leverage tends to increase earning quality as it reduces managers' opportunistic behavior, as it increases the likelihood of defaulting on debt services in the future, thereby increasing monitoring by external creditors. This means that the need to meet interest and debt payment obligations reduces the flexibility of managers' decisions. This result is in line with the finding of a non-monotonic relationship between debt and earnings quality reported by [Ghosh and Moon \(2010\)](#), although with opposite signs because these authors found that the relationship is positive at low levels of debt and negative at high debt levels.

The results for the control variables are consistent with the expected and similar to model 1 and to the prior literature in the case of IntExp with [Jelinek \(2007\)](#), [Vakilifard and Mortazavi \(2016\)](#), [Anagnostopoulou and Tsekrekos \(2017\)](#), and [Kalbuana et al. \(2021\)](#); for Size with [El-Rabat et al. \(2023\)](#) and [Kalbuana et al. \(2021\)](#); and for Growth with [Al-Najjar and Riahi-Belkaoui \(2001\)](#).

Model 3 analyzed the impact of the increase in debt on earnings management activity, focusing on the variable DebtInc. Its estimated coefficient is not statistically significant, which does not allow us to empirically support H3.

Regarding the control variables, the IntExp variable and Growth are statically significant at a 5% and a 1% level, respectively. Their estimated signs are positive as expected.

Model 4 analyzed the impact of the existence of short-term debt on earnings management activity. The estimated coefficient of the DebtST variable is statistically significant at the 1% level and the sign is positive, as expected, suggesting that short-term debt increases

earnings management activities, thus harming earnings quality. In the case of DebtLT, it is significant at a 5% level, also exhibiting a positive sign. As both the significance and coefficient of DebtST are higher than DebtLT, these findings allow us to empirically support H4, that the positive impact of short-term debt on earnings management is more substantial than that of long-term debt. The short-term need of liquidity is associated with greater discretionary accruals, particularly for firms that intend to obtain new loans, consistent with Fields et al. (2012).

For the control variables, the results are consistent with the expected and similar to model 1 and to the prior literature in the case of IntExp with Jelinek (2007), Vaklifard and Mortazavi (2016), Anagnostopoulou and Tsekrekos (2017), and Kalbuana et al. (2021); for Size with El-Rabat et al. (2023) and Kalbuana et al. (2021); and for Growth with Al-Najjar and Riahi-Belkaoui (2001).

4. Empirical Methodology

4.1. Sample Selection

This study focused on a sample of Portuguese SMEs taking into account national accounting standards, which must meet two of these three requirements: total assets between 350,000 EUR and 20,000,000 EUR; turnover between 700,000 EUR and 40,000,000 EUR; and annual average number of employees between 10 and 50 (at the end of the year). All of the financial data were collected using the SABI database (Iberian Balance Sheet Analysis System). The sample period covered 7 years for the estimation of econometric regressions, covering the years 2013 to 2019 to avoid the COVID-19 pandemic effect. To include a firm in the sample it must report data for the variables under study for the entire analysis period. In addition, we excluded financial and insurance firms as they have specific regulations, and industries with less than 30 firms.

After the selection procedures, the final sample consisted of 4684 firms, representing 32,788 firm-year observations.

4.2. Empirical Models

Consistent with previous studies, discretionary accruals were used as a proxy for earnings management.

To obtain the discretionary accruals, we first computed total accruals through Equation (1):

$$TA_{i,t} = NI_{i,t} - FCO_{i,t} \quad (1)$$

where:

i, t represents firm i for period t .

TA is total accruals for firm I in year t .

NI is the variation in net income between periods, given by the net income of year t minus the net income in the previous year ($t - 1$).

FCO is the cash flow from operating activities of year t .

After obtaining the total accruals, we estimated the discretionary accruals based on the Jones model modified by Dechow et al. (1995) with the return on assets from the previous period as proposed by Kothari et al. (2005). The discretionary accruals were the residuals of the cross-section estimation of Equation (2). These residuals represent the component of accruals that remains after controlling for firm performance, economic activity, and investment in tangible fixed assets, and are likely to be associated with managers' discretionary choices:

$$TA_{i,t} = \alpha_0 + \alpha_1 Rev_{i,t} + \alpha_2 PPE_{i,t} + \alpha_3 ROA_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

where:

TA is the value of total accruals computed by Equation (1).

Rev is the change in sales, given by the difference between sales in the current year (t) and sales in the previous year ($t - 1$), minus the change in accounts receivable, given by the difference between accounts receivable in the current year and accounts receivable in the previous year.

PPE is the tangible fixed assets.

ROA is the return on assets in the previous period ($t - 1$).

All variables are scaled by the total assets of year $t - 1$.

$\varepsilon_{i,t}$ are the residuals of the regression estimation.

After estimating the residuals, $\varepsilon_{i,t}$ we tested the hypotheses, namely regarding the relationship between different levels of debt and discretionary accruals as a proxy for earnings management. Furthermore, discretionary accruals are an inverse proxy for the earnings quality because the residuals from accrual models represent management discretion or estimation errors, both of which reduce decision usefulness (Dechow et al. 2010).

In addition, we controlled for the firm's size and the level of interest expenses. For that purpose, we estimated four regressions, using panel data with fixed effects, whose selection was based on the Hausman test:

$$|DAC_{i,t}| = \alpha_0 + \beta_1 Debt_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 IntExp_{i,t} + \beta_5 Growth_{i,t} + \mu_{i,t} \quad (3)$$

where:

$|DAC|$ is the absolute value of the residuals of the total accruals (discretionary accruals) scaled by the average total assets¹.

$Debt$ is the amount of total indebtedness over the total assets for the previous year ($t - 1$). To support our first hypothesis, it is expected that the coefficient β_1 in Equation (3) will be positive and statistically significant.

In addition, based on prior literature regarding the determinants of discretionary accruals, we included the following control variables:

ROA is the return on total assets as measured by net income divided by average total assets. We expect a positive sign in the relationship because firms with high ROA tend to engage in earnings management activities to pay less taxes (Anagnostopoulou and Tsekrekos 2017; Jelinek 2007; Kalbuana et al. 2021; Vakilifard and Mortazavi 2016);

$Size$ corresponds to firms' size measured by the logarithm of total assets in the previous year ($t - 1$). We expect a negative sign in the relationship because larger firms have better internal controls and are audited by more experienced auditors (El-Rabat et al. 2023; Kalbuana et al. 2021; Vakilifard and Mortazavi 2016);

$IntExp$ is given by interest expense and other financial costs scaled by the total debt of the previous year ($t - 1$). Managers have to satisfy the expectations of creditors and investors, leading them to engage in earnings management activities (Lazzem and Jilani 2018);

$Growth$ corresponds to the company's growth proxy, measured by the percentage growth of total assets. This variable is expected to have a negative coefficient, consistent with the studies by Khanh and Anh Phung (2019) and Jelinek (2007);

$\mu_{i,t}$ are the residuals of the regression estimation.

We then ran the following regression to test our second hypothesis:

$$|DAC_{i,t}| = \alpha_0 + \beta_1 DebtH_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 IntExp_{i,t} + \beta_5 Growth_{i,t} + \mu_{i,t} \quad (4)$$

where:

$DebtH$ is a dummy variable that takes the value 1 if the firm's debt ratio, the ratio of debt to assets, is above the third quartile, ranging between 75% and 100%, and 0 otherwise. We divide the sample into quartiles based on the ratio of debt to assets, and then firms whose ratio is at the upper limit of a data set, i.e., in the third quartile, are considered to be highly indebted.

This hypothesis is supported if the coefficient β_1 is statistically negative because firms with high levels of debt tend to decrease their earnings management activities to capture creditors' confidence and obtain additional funds, thereby improving earnings quality.

All of the other variables present the same definition.

The third hypothesis is tested by the following regression:

$$|DAC_{i,t}| = \alpha_0 + \beta_1 DebtInc_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 IntExp_{i,t} + \beta_5 Growth_{i,t} + \mu_{i,t} \quad (5)$$

where:

DebtInc is a dummy variable that takes the value 1 if the firm exhibits an increase in debt from year $t - 2$ to year t and 0 otherwise. A company is classified as having increased its indebtedness if it is in the first quartile in year $t - 2$ and moves to the third or fourth quartile in year t , or if it is in the second quartile in year $t - 2$ and moves to the fourth quartile in year t . This variable analyzes the impact of the increase in debt in a static way without the occurrence of debt variations.

This hypothesis is supported if the coefficient β_1 is statistically positive.

All of the other variables have the same definition.

Concerning the impact of debt maturity, to test hypothesis 4, we estimated the following equation:

$$|DAC_{i,t}| = \alpha_0 + \beta_1 DebtST_{i,t} + \beta_2 DebtLT_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Size_{i,t} + \beta_5 IntExp_{i,t} + \beta_6 Growth_{i,t} + \mu_{i,t} \quad (6)$$

where:

DebtST is the short-term debt ratio, measured by the total value of current financing scaled by total assets in the previous period;

DebtLT is the long-term debt ratio, measured by the total value of long financing scaled by total assets in the previous period;

All of the other variables have the same definition.

5. Conclusions

In this study, our main objective consisted of analyzing the effects of debt levels on earnings quality. Our results showed a significant and positive association between the levels of debt and earnings management. This may be due both to the need to obtain additional funds and to have better credit covenants, which is consistent with the PAT. Furthermore, our results show that firms with increasing debt tend to engage in more earnings management practices, producing negative impacts on the quality of financial information and then increasing information asymmetry between outsiders and insiders. However, our empirical evidence suggests that this association is non-linear because when firms have extreme levels of debt, they tend to mitigate earnings management activities to capture their creditors' and investors' confidence. In addition, we found evidence that short-term debt increases in a more substantial manner in earnings management activities than long-term debt, as firms that increase this type of debt tend to have higher discretionary accruals to obtain new loans, which allows them to fulfill commitments that require high liquidity.

Thus, this paper shows that debt levels do not tend to be a mechanism for regulating the managers' activities to increase the quality of financial information. On the contrary, they contribute to increased earnings management, compromising the confidence of stakeholders as well as efficient decision making, except for firms with high levels of debt.

These results are important for creditors and investors, but also for managers, as they contribute to an alignment of interests with the respective mitigation of agency costs. Furthermore, this empirical evidence can be particularly useful for managers of SMEs, mostly in European economies, to consolidate more responsible management behavior toward society.

A major limitation of this study is the exclusion of more recent years aiming to avoid possible bias in the empirical results due to the dramatic effects of the COVID-19 pandemic on the economy.

For future research, we propose to split the sample by quantiles to analyze the non-linear effect of debt as well as including larger firms with other sources of financing as the capital markets.

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Note

- ¹ It should be noted that our aim is not to analyze whether earnings management activities are motivated by the willingness to increase or reduce earnings, but rather the magnitude of earnings management.

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