

Indebtedness and accounting choices: the nonlinear relation between debt and earnings quality

Endividamento e decisões contábeis: a relação não linear entre dívida e qualidade dos lucros

Cristiano Machado Costa^a; Adriana Machado Matte^a; Danilo Soares Monte-Mor^b

^a Universidade do Vale do Rio dos Sinos

^b Fucape Business School

Keywords

Earnings quality.
Long-term debt.
Nonlinearity.

Palavras-chave

Qualidade dos lucros.
Dívida de longo prazo.
Não linearidade.

Article Information

Received: August 16, 2017
Accepted: May 06, 2018
Published: May 23, 2018

Abstract

Corporate debt contracts generate different incentives for managers to engage in earnings management. According to many studies in the literature, companies would seek to decrease discretionary accruals to decrease information asymmetry and to incur in lower funding costs. Other studies, however, point out that companies with high debt levels can do the opposite by increasing discretionary accruals to avoid covenants. Given these two theories, this paper proposes a nonlinear relationship between debt and the discretionary component of earnings for companies listed on B3 from 2008 to 2015. Evidences indicate a positive relationship between low debt levels and earnings quality, but negative for higher debt levels. It suggests that in higher debt levels, it is preferable to decrease earnings quality than to incur in losses due to contractual breaches. Further analysis indicates that such nonlinear relationship is related to long-term debt rather than to short-term debt.

Resumo

Os contratos de dívidas das empresas podem gerar diferentes incentivos para os gestores praticarem o chamado gerenciamento de resultados. De acordo com a maioria dos estudos presentes na literatura, empresas buscariam reduzir os accruals discricionários para reduzir assimetria de informação e incorrer em menores custos de financiamento. Outros estudos, porém, apontam que empresas com níveis muito elevados de endividamento podem fazer o contrário, aumentando os accruals discricionários para não incorrer em cláusulas restritivas (covenants). Considerando essas duas teorias, este artigo propõe uma relação não linear entre dívida e o componente discricionário dos lucros para as empresas listadas na B3 entre 2008 e 2015. As evidências indicam uma relação positiva entre baixos níveis de dívida e a qualidade dos lucros, mas negativa para níveis maiores de dívida. Esse resultado sugere que em níveis elevados de endividamento, é preferível diminuir a qualidade dos lucros a incorrer em perdas por violações contratuais. Análises adicionais indicam que a relação não linear encontrada está relacionada à dívida de longo prazo, e não à de curto prazo.

Practical Implications

The nonlinear relation between debt and the discretionary component of earnings for open capital companies indicates a redefinition of debt contracts to protect the creditor. The analysis of the inflection point could help financing agents (banks and creditors) to re-adequate protection clauses or interest rates to compensate the risks related to accounting information.

Copyright © 2018 FEA-RP/USP. Todos os direitos reservados

1 INTRODUCTION

Debt contracts, besides generating information that help in evaluating operational decisions, work as a mechanism for managers' discipline (Harris & Raviv, 1990). Notably, covenants in debt contracts can restrict the manager's engagement in higher risk activities (Leland, 1994).

Corresponding author: Phone (51) 3591-1122

E-mail: cristianocosta@unisinos.br (C. M. Costa); adriamatte@unisinos.br (A. M. Matte); danilo@fucape.br (D. S. Monte-Mor)

Universidade do Vale do Rio dos Sinos. Avenida Unisinos, 950 - Cristo Rei, São Leopoldo - RS, 93022-000, Brazil

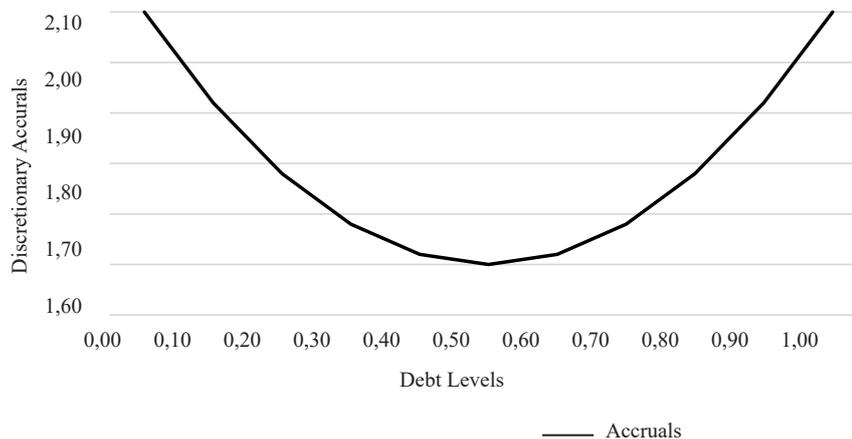
In this case, the information in such contracts may affect the managers' behavior, the companies' operational policy and, thus, the way earnings are reported (Francis et al., 2005; Graham, Li & Qiu, 2008; Bharath, Sunder and Sunder, 2008). In organizations with high debts, it is observed an increase in the discretionary component of earnings (Sengupta, 1998). In these companies, managers have incentives to manage results and report earnings that reduce the probability of accounting covenant violation (Grossman & Hart, 1982; Watts & Zimmerman, 1986, 1986; Healy & Wahlen, 1999; DeFond & Jiambalvo, 1994; Sun & Rath, 2008). While for cases of low debts, organizations are more prone to report earnings with lower discretionary component in order to reduce debt financing resources and to increase the level of information on future cash flow (Smith, 1993; Gosh & Moon, 2010).

These evidences indicate the relation between debts and the level of the discretionary component (or simply accruals) as nonlinear and concave. That is, as companies increase their debt levels, they reduce accrual levels, which would be caused by an attempt of reducing financing costs (Diamond, 1991; Billett, King and Mauer, 2007). However, after a certain debt level, due to covenant clauses, the earnings from the reduction of debt costs are mitigated by the risks of not complying to clauses, creating incentives to the increase in accruals (Sweeney, 1994; DeFond & Jiambalvo, 1994; Sun & Rath, 2008).

To understand if such nonlinear relation between debts and accruals exists, or if it is a negative and linear relation, as defended by Dechow et al., 2010, is extremely significant for decision-makers who use methods based on information on past cash flow and earnings. The concave shape could point out debt levels in which accruals are higher and, thus, estimations of cash flow are less precise.

This concave relation was shown by Ghosh and Moon (2010) for the North-American market between 1998 and 2004. However, many characteristics of the American market make it different from emerging markets, as the Brazilian one. Particularly, the access to capital market and the deadlines for long-term financing (through debts and debentures), both much smaller and more restricted than the Brazilian market (Funchal & Monte-Mor, 2016). In the case of capital market, Brazilian companies usually have higher debt levels than American ones, which makes the effects of debts on the management of results even more significant. When the debts are high, the shortest financing deadlines in the Brazilian market for long-term contracts could lead to a lower effect of covenant clauses in the choice for managing results when the debts are high.

Graphic 1. Relation between Debt Level and Accruals



Source: Designed by the authors.

To validate the results by Ghosh and Moon (2010) in the Brazilian scenario, this article tests the nonlinear relation between debts and the discretionary component of earnings in Brazilian market. This relation was also tested in Malaysia by Zamri, Rahman and Isa (2013), where they found a negative relation, that is, the higher the debts, the lower the accruals. Based on data from Brazilian companies listed on B3 from 2008 to 2015, it is possible to verify, through Graphic 1, initial evidence of a nonlinear relation between debts and accruals in the Brazilian market.

Another aspect, pointed out by Fung and Goodwin (2013), is that the relation between debts and accruals can vary according to the debt's maturity. For the American market, the authors pointed out that the relation is positive for short-term debts, but much weaker for long-termed ones. However, the authors have not investigated the possibility of nonlinearity. In the Brazilian market, as pointed out by Silva (2008), companies with long-term debts are subjected to many covenant clauses, due to that, the article's second contribution point is to verify if the nonlinear relation between debt and accrual levels is the same when segregating the total debt into short- and long-term debts, complementing the work by Fung and Goodwin (2013).

The study was performed with companies listed on B3 from 2008 to 2015. To estimate the quality of earnings, we considered the models by Jones (1991), Jones modified by Dechow, Sloan and Sweeney (1995), Dechow and Dichev (2002) and McNichols (2002), both based on the importance of the discretionary component of the earnings. A square model was used to measure nonlinearity between debt levels and the quality of earnings on the Brazilian market. As a robustness test, a segmented regression was performed, using a nonlinear specification per parts, in which the debt and square debts were included in the same regression.

After that, the analyses were performed by separating the total debts from short- and long-term debts. This happens because if the company decides to incur in costs associated to the increase in management in self-debt cases, then it is more probable that these costs will be lower than the ones caused by issues of anticipating long-term debts through breach of contract clauses.

2 THEORETICAL BASIS

Among the several approaches to the agency theory, developed by Fama and Jensen (1983), Jensen and Meckling (1976), among others, this particular one can be understood by the current problem between the divergence of interests among company owners (shareholders) and the managers who administrate them. It is observed that the division between control and property happens when the association, through its shares, multiplies its owners and the control is centered in managers or directors.

To ensure the survival of an organization one needs the balance between the managers' decisions and the shareholders' interests, as highlighted by Fama and Jensen (1983). Well-written contracts, which outline the management actions and define an incentive policy, can minimize, for example, the practice of result management. Within this context, accountancy plays the role of not only registering values receive from investors or creditors, but also of informing and monitoring how these resources are being allocated (Bharath et al., 2008; Dichev et al., 2012).

Although accountancy works as a system that creates economic information about the company by releasing accounting reports, explanatory notes and other voluntary releases (Healy & Palepu, 2001), the accountancy can also be used as a tool for management handling, since the manager can take accounting decisions that change the company's results in a certain period, with the intention of obtaining particular gains or complying to contract expectations (Dichev et al., 2012).

The literature shows that the quality of the result may depend on factors as the level of governance and the operational performance (Chiang, Kleinman & Lee, 2017), market expectations (Cormier, Demaria & Magnan, 2017), the debt level (Bharath et al., 2008), among others. In all these analyses, with the presence of result management through earnings discretion, it is observed an increase in costs for the company related to the reduction of earnings quality and its capacity of predicting future changes in cash flow (Dechow et al., 2010).

The decision of incurring such costs, however, is not always favorable to minor shareholders and may be connected to the existing agency conflict caused by the division between control and property (Desender et al., 2013).

In this sense, mechanisms that work as disciplinary factors and monitor managerial decisions can outline the management's actions. The company's debt level is a factor that can affect positively the quality of earnings, as observed in the studies by Grossman and Hart (1982), Jensen (1986), Diamond (1991), Sengupta (1998), Francis et al. (2005), Graham, Li and Qiu (2008), Bharath et al. (2008), and Ghosh and Moon (2010). According to this strand in literature, debt holders demand high quality financial information, specially on earnings, in order to verify the company's solvency. Some private banks, for example, invest high in monitoring borrowers and establish restrictive contract clauses in debt contracts for companies that present worse quality in accounting reports (Bharath et al., 2008). In this case, companies with lower earnings quality usually incur in increases in financing costs, as well as being monitored by creditors (Ghosh & Moon, 2010).

By borrowing resources, companies are subjected to complying to the clauses in covenants, which can be related to accounting covenants. For example, many banks use the EBITDA ratio on the Total debts as a restrictive clause in debt contracts as an incentive mechanism and as a way of guaranteeing the company's ability in paying (Citron, 1992). In this case, the debt and the demands caused by it can be the reason for managing results, as observed by Watts and Zimmerman (1986), Healy and Wahlen (1999), Defond and Jiambalvo (1994), Sun and Rath (2008), and Bharath et al. (2008), considering that the management can take accounting decisions to achieve the desired numbers and, thus, affect one or more of the company's operational arrangements. Jha (2013), for example, points out that managers increase accrual levels in trimesters close to the expiration of covenants, showing the opportunistic behavior reviewed by the agency theory (Jensen & Meckling, 1976).

Given the evidences shown, it is expected, therefore, for debts to have a nonlinear relation with earnings quality. That is, it is expected for companies with low debt levels to have access to cheaper credit, but for companies with higher debt levels to be encouraged to report earnings of lesser quality and with a higher discretionary component, aiming to comply to covenant clauses. Specifically, the following hypothesis was formulated.

H1: The relation between debt volume and earnings quality is nonlinear

As mentioned, the rigidity in binding debt contracts can cause result management, since contract costs due to breach of contract can surpass the costs of low earnings quality (Ghosh & Moon, 2010). Given that, companies with high debt levels and a debt profile containing punitive clauses such as covenants, are prone to performing result management. This contract clauses that allow debt anticipation are usually associated to long-term debts. Fung & Goodwin (2013) have found evidence pointing that the relation between accruals and debts can vary according to the debt's maturity.

Silva (2008) has found evidence of Brazilian open capital companies, which have long-term debts, subjected to a series of accounting covenants. Considering that Brazil has laws based on the code law model and with low legal effectiveness (Almeida & Dalmácio, 2015; Lopes & Walker, 2008), it is expected for longer contracts to have clauses aiming to reduce credit risks. Besides that, since 2010, with the adoption of the IFRS in Brazil, the number of contracts with covenants based on accounting (or financial) data remained in use and there was an increase in non-financial covenant contracts (Beiruth et al., 2017). The authors point out that this may be an effect caused not only by the adoption of IFRS, but a reaction of the Brazilian market to the effects of the 2008 crisis).

Due to that, it is expected that, for the Brazilian context, the existing nonlinear relation between debt and earnings quality is mostly associated to long-term debts, and not to short-term ones. Formally, the hypothesis is as follows:

H2: The nonlinear relation between debt volume and earnings quality is associated to long-term debts, and not to short-term ones.

3 DATA AND MODEL

The population of this study was constituted by open companies listed in the B3 that did not belong to the financial and insurance segment due to the specificity of the accounting information of these segments. Sample data were obtained from accounting demonstrations from 2008 to 2015, excluding the companies that had demonstratives presenting incomplete data. The sample resulted on 198 companies in the analyzed period.

The metrics chosen to measure earnings quality were the discretionary accruals. For that end, we used the models by Jones (1991) and Jones modified in order to divide the discretionary component from total accruals, since the models relate the number of normal accruals (non-discretionary) and the total number of accruals. The residuals from these regressions, represented by the error (ϵ) in its absolute value, indicate the levels of discretionary accruals. Likewise in Jones (1991) and in Dechow, Sloan and Sweeney (1995), such accruals were estimated year by year (cross section).

Besides that, discretionary accruals were calculated by the relation between working capital in the operational cash flow performed, according to the methodologies developed by Dechow and Dichev (2002) and McNichols (2002). Such models do not divide discretionary accruals from the ones caused by managerial handling. The number of accruals is measured by absolute residues from the working capital regressed in cross section in the cash flow of t-1, t and t+1. In this case, the bigger the residue is, the lower the quality of accruals is.

Table 1. Models used to estimate the residues from accruals

Equation	Model	Calculation	Method
1	Jones (1991)	$AC_{it} / A_{it-1} = \alpha / A_{it-1} + \beta_1 [\Delta ROL_{it} / A_{it-1}] + \beta_2 [Imob_{it} / A_{it-1}] + \epsilon_{it}$	Calculates the discretionary component of total provisions.
2	Jones Modif. (1995)	$AC_{it} / A_{it-1} = \alpha / A_{it-1} + \beta_1 ([\Delta ROL_{it} / A_{it-1}] - [\Delta CR_{it} / A_{it-1}]) + \beta_2 [Imob_{it} / A_{it-1}] + \epsilon_{it}$	Includes the bills to be received in the period in the model by Jones (1991).
3	Dechow and Dichev (2002)	$\Delta CG_{it} / ATM_{it} = \beta_0 + \beta_1 [FCO_{it-1} / ATM_{it}] + \beta_2 [FCO_{it} / ATM_{it}] + \beta_3 [FCO_{it+1} / ATM_{it}] + \epsilon_{it}$	The residues not related to cash flow are the measure of earnings quality.
4	McNichols (2002)	$\Delta CG_{it} / ATM_{it} = \beta_0 + \beta_1 [FCO_{it-1} / ATM_{it}] + \beta_2 [FCO_{it} / ATM_{it}] + \beta_3 [FCO_{it+1} / ATM_{it}] + \beta_4 [\Delta ROL_{it} / ATM_{it}] + \beta_5 [Imob_{it} / ATM_{it}] + \epsilon_{it}$	Combines the models by Jones (1991) and Dechow e Dichev (2002).

Source: Designed by the authors.

Note: AC = total accruals; A= total assets; ATM = average total assets; ΔROL = variation of the net operational sales receipt; ΔCR = variation of the bills to be received; Imob = balance of fixed assets, intangible and deferred (gross); ΔCG = Variation of working capital; FCO = Operational cash flow; and ϵ = Error term. Subscribed: company i, year t.

Each accrual model (see Table 1) was estimated for each sample year. This procedure was adopted since we understand that there is not a sufficiently large number of companies for each segment. Thus, the models were estimated year by year, using all companies. This approach also implies on having an intercept estimated for each year. Therefore, any concerns regarding the changes in general accrual levels resulting from the adoption of IFRS are mitigated, since the intercepts of each model and each year catch this effect at each estimation.

Even though some evidences point out that the adoption of IFRS in Brazil has resulted on a change in the level of discretionary accruals (as highlighted by Martinez, 2013, p. 21-22), there is still no consensus, since there are results of lack of effect, as in Joia (2012) and Joia and Nakao (2014), and of an increase, as in Klann (2011) and Cupertino (2013). The use of year by year estimations reduces this effect, if there has been a change in the level of accruals (see Doukakakis, 2014; Soderstrom and Sun, 2007; and Van Tendeloo and Vanstraelen, 2005).

Once the residues were estimated for each model, the relation between earnings quality and debt level was estimated by the equation:

$$Discretionary\ Accruals_{it} = \beta_0 + \beta_1 Debt_{it} + \beta_2 Debt_{it}^2 + \beta_3 Operational\ Cycle_{it} + \beta_4 Size_{it} + \beta_5 Receipt_{it} + \beta_6 Cash\ Flow_{it} + \beta_7 Loss_{it} + \beta_8 Debt\ Cost_{it} + \beta_9 Z\ score_{it} + \beta_{10} Growth_{it} + \beta_{11} Gross\ Margin_{it} + \beta_{12} Age_{it} + \beta_{13} ROA_{it} + \beta_{14} Corporate\ Gov_{it} + \beta_{15} Audited\ Big\ 4_{it} + \sum_j \beta_j Segment_j_{it} + \epsilon_{it}$$

The independent debt variable was added to the model in level and in the square form so that the nonlinear relation between debt and the dependent variable, discretionary accruals, could be tested. According to H1, it is expected for this relation to be nonlinear and, thus, that the estimated coefficient β_2 to be significant.

To reduce the heterogeneity in the sample, control variables were used, as in Ghosh and Moon (2010), namely: operational variables (Operational Cycle, Size, Receipt, Cash Flow, loss indicating Dummy, and Debt Cost); Z-score as the indicator of financial health and; growth factors (Growth and Gross Margin). Additionally, it was also used variables explaining the relation between debt levels and earnings quality in the Brazilian context (Company's age, ROA, Corporate Governance Levels, BIG4 indicating Dummy). The definition of the independent and control variables, as well as the respective references, are described in Table 2.

Table 2. Independent and control variables

Variable	Signal	Source	Calculation
Independent			
Debt	-	Dechow <i>et al.</i> (2010), Dechow and Dichev (2002), Ghosh and Moon (2010)	$Debt_{it} = (EmpFinCP_{it} + EmpFinLP_{it}) / Asset_{it}$
Debt ²	+	Ghosh and Moon (2010)	Squared $Debt_{it}$
Control			
Operational Cycle	+	Dechow <i>et al.</i> (2010), Dechow and Dichev (2002)	$Cycle_{it} = \text{Log} [360 / (\text{Sales}_{it-1} / \text{Average CR}_{it})] + [360 / (\text{CPV}_{it} / \text{Stock Average}_{it})]$
Size	-	Dechow <i>et al.</i> (2010), Francis <i>et al.</i> (2005)	$Size_{it} = \text{Log}(Asset_{it})$
Receipt	-	Dechow <i>et al.</i> (2010), Dechow and Dichev (2002)	$Receipt_{it} = Receipt_{it} / Asset_{it}$
Cash Flow	-	Dechow <i>et al.</i> (2010), Dechow and Dichev (2002)	$Cash\ Flow_{it} = FCO_{it} / ATM_{it}$
Loss	+	Dechow <i>et al.</i> (2010), Francis <i>et al.</i> (2005)	Dummy: 1 = loss; zero = earnings
Debt Cost	+	Ghosh and Moon (2010), Francis <i>et al.</i> (2005)	$Debt\ Cost_{it} = Desfin_{it} / DebtM_{it}$
Altman Z-score	-	Ghosh and Moon (2010)	$Z = -1,84 - 0,51X_1 + 6,32X_3 + 0,71X_4 + 0,56X_5$
Growth	+	Dechow <i>et al.</i> (2010)	$Growth = (\text{Sales}_{it} / \text{Sales}_{it-1}) - 1$
Gross Margin	-	Dechow <i>et al.</i> (2010), Healy and Wahlen (1999)	$Gross\ Margin_{it} = \text{Gross Earnings}_{it} / Receipt_{it}$
Age	+	Dechow <i>et al.</i> (2010), Gu, Lee and Rosett (2005)	Data available at CVM – Date t of observation
ROA	-	Dechow <i>et al.</i> (2010), Dechow and Dichev (2002)	$ROA_{it} = \text{Net Earnings}_{it} / \text{Total Assets}_{it}$
Corporate Gov.	-	Dechow <i>et al.</i> (2010), Martinez (2013)	Dummy: 1 = belongs to New Market; zero = Does not
Audited by Big 4	-	Dechow <i>et al.</i> (2010), Martinez (2013)	Dummy: 1 = Audited by Big 4; zero = No
Segment	+/-	Control	19 dummies were created for sample segments

Source: Designed by the authors.

Note: EmpFinCP= short-term loans; EmpFinLP= long-term loans; Cyclep = Operational Cycle; Sales= sale receipt; Average CR = Average of bills to be received; CPV = cost of sold product; Stock Average = average of staoock; FCO = Operational cash flow; ATM = Average total assets; Desfin = Financial Dispenses; DebtM = Average total debts; X1 = Net Working Flow/ Asset; X3 = Earnings before Interests and Taxes /Asset; X4 = Net Wealth /Asset; X5 = Sales/Asset. Subscribed: company i, year t. The expected variable signs were defined according to the following articles: Dechow and Dichev (2002), Francis *et al.* (2005), Gu, Lee and Rosett (2005), Ghosh & Moon (2010), Healy and Wahlen (1999), Martinez (2013), and Dechow *et al.* (2010), specially Section 5 of the last article.

It is important to highlight that estimated models include segment dummies (one for each of the 19 sample segments), but no year dummy was included, since accrual models were already estimated year by year. Thus, any variations in accrual levels caused by common variations in the companies in a certain year were already captured by accrual estimations. Estimated models comply to the requirement of lack of multicollinearity, a presupposition verified by VIF tests. Estimated standard deviations were corrected by heteroscedasticity and autocorrelation.

Statistical averages were obtained after winsorizing data at 1% and 99% to reduce the effects of discrepant values in observations and to allow comparability with other literature results. Table 3 presents descriptive statistics.

Table 3. Descriptive Statistics

	Obs.	Average	Standard deviation	Min	Max
Residues per model					
Jones	1256	0.079113	0.121976	0.0001149	1.789235
Jones Modified	1256	0.080810	0.125993	0.0001503	1.812205
Dechow and Dichev	1049	0.064163	0.073361	0.0000761	0.672447
Dechow and Dichev Modified	1049	0.058465	0.066107	0.0001036	0.601141
Control Variables					
Debt	1256	0.317113	0.186979	0.0000401	2.428471
Operational Cycle	1256	4.764208	0.87268	-1.679977	9.636482
Size	1256	14.63718	1.611414	9.981929	18.70509
Receipt	1256	0.7159337	0.5471304	0.0208878	5.837755
Cash Flow	1256	0.0735159	0.0959118	-1.17195	0.434859
Loss	1256	0.2300955	0.4210614	0	1
Debt Cost	1256	1.428304	33.87979	-0.4095891	1192.12
Z-score	1256	0.723397	0.597284	-0.8963824	5.528129
Growth	1256	0.178848	1.423779	-0.9726202	48.02996
Gross Margin	1256	0.3115392	0.1975047	-0.5206292	1
Age	1256	20.4371	14.94081	2	78
ROA	1256	0.0374563	0.1345675	-1.515778	1.019286
Corporate Gov.	1256	0.383758	0.4864938	0	1
Audited by Big 4	1256	0.7428344	0.4372456	0	1

Source: Designed by the authors.

It is possible to observe that average values of accrual residues in the four models are similar and consistent to results in previous studies. As the main control variable of this study, the debt presented an average of 0.317113, similar to the result presented by Ghosh and Moon (2010). The averages of the variables: operational cycle (transformed into logarithm values), Cash Flow and Loss, are also similar to the previous study. As for the Z-score, its result, higher than zero, indicated the perspective of operational continuity, according to Altman, Baidva and Dias (1979). Thus, it is possible to conclude that the companies in the sample tend to be financially healthy, since the present Z-score average of 0.723397.

4 RESULT ANALYSIS

4.1 Basic Model

Based on the estimations of variables for earnings quality, as described in Section 3, it was then estimated its relation with debts. The estimations for the regression considering each of the four earnings quality models are presented in Table 4.

The results indicate that earnings quality has a nonlinear and concave relation with debt. With confirms the hypothesis H1. Besides, such relation is robust for the four models used to estimate earnings quality. Specifically, the square coefficients of the debt variable suggest that as companies increase their debt levels, they reduce accrual levels (which is consistent to evidences in Diamond (1991) and Billett et al. (2007)), which could be caused by an attempt of reducing financing costs. However, after a certain debt level, due to covenant clauses, the gains from the reduction of debt costs are mitigated by the risks of not complying to the clauses, creating incentives to the increase in accruals (Sweeney, 1994; DeFond & Jiambalvo, 1994; Sun & Rath, 2008).

Nonlinearity, then, suggests that gains caused by the reduction of debt costs may be mitigated for companies that already have high debt levels. Such result is consistent to evidences obtained by Ghosh and Moon (2010) and may suggest that the risks of not complying to covenant clauses may be surpassing the benefits of reporting higher quality earnings for companies with high debts.

Table 4. Debt and Discretionary Accruals

Variables	Jones	Jones Modified	Dechow and Dichev	McNichols
Debt	-0.273*** (0.0499)	-0.251*** (0.0504)	-0.0442 (0.0283)	-0.0244 (0.0257)
Debt ²	0.317*** (0.0447)	0.298*** (0.0443)	0.0403** (0.0190)	0.0328** (0.0165)
Economic characteristics of the Companies				
Op. Cycle	-0.0214*** (0.00758)	-0.0221*** (0.00744)	0.00478 (0.00361)	0.00267 (0.00325)
Size	-0.0121*** (0.00311)	-0.0132*** (0.00315)	-0.00600*** (0.00196)	-0.00742*** (0.00187)
Receipt	-0.00316 (0.00961)	-0.00413 (0.0102)	0.0231*** (0.00865)	0.0130** (0.00615)
Cash Flow	-0.0381 (0.0521)	-0.0674 (0.0561)	-0.0119 (0.0370)	-0.00694 (0.0395)
Loss	-0.0195 (0.0133)	-0.0156 (0.0140)	0.0156** (0.00734)	0.0187* (0.00697)
Debt Cost	0.0000504** (0.0000228)	0.0000809*** (0.0000237)	0.0000680 (0.000101)	0.000258** (0.00011)
Financial Health				
Z-score	-0.0194** (0.00807)	-0.0189** (0.00813)	-0.0147*** (0.00560)	-0.0135** (0.00542)
Growth Factors				
Growth	0.00450 (0.00388)	-0.0132*** (0.00315)	0.00376** (0.00189)	-0.00135* (0.00072)
Gross Margin	-0.00569 (0.0207)	-0.0195 (0.0213)	-0.0255 (0.0186)	-0.0419** (0.0163)
Age	-0.000201 (0.000263)	-0.000187 (0.000269)	0.000331** (0.000164)	0.000299** (0.00015)
ROA	-0.188* (0.108)	-0.155 (0.112)	0.0276 (0.0480)	0.0763* (0.0413)
Corporate Gov.	0.00367 (0.00769)	0.00256 (0.00803)	0.0117** (0.00481)	0.00635 (0.00429)
Audited Big4	0.0129 (0.00875)	0.0146 (0.00908)	-0.0172** (0.00687)	-0.0161*** (0.00585)
Dummy segment	Included	Included	Included	Included
Constant	0.439*** (0.0767)	0.459*** (0.0766)	0.133*** (0.0394)	0.153*** (0.0372)
Observations	1256	1256	1049	1049
R ² Adjusted	0.186	0.177	0.187	0.177
Statistics F	12.650	16.335	7.321	13.407

Source: Designed by the authors.

Note: Standard deviations robust to heteroscedasticity and autocorrelation in parenthesis. Significance Levels: * p<0.10; ** p<0.05; and *** p<0.01.

Since this is the result of an emerging country with a more restricted access to capital market and shorter financing deadlines, researches involving the quality of accounting information highlight another justification for the significance of debt levels (Funchal & Monte-Mor, 2016). In this case, debt levels can bring forth information related to managerial decision of reporting earnings with higher or lower quality, also affecting the prediction of future cash flows (Smith, 1993; Ghosh & Moon, 2010).

This result also presents a difference in relation to the analyses carried out by Zamri, Rahman and Isa (2013), who investigate only a linear relation between debt and accruals for Malaysian companies. Considering the effects of earnings quality regarding control variables, it is verified that bigger companies, with better financial health (Z-score) and higher growth rates report higher quality earnings. On the other hand, companies that have higher debt costs report earnings with higher discretionary component, which is also consistent to results obtained by Diamond (1991) and Sun and Rath (2008). Other control variables did not present robust influence over earnings quality for most specifications. An important point to be highlighted is the fact that the accrual metrics used in this work follow the main metrics used in literature. However, these metrics can present limitations by not capturing relevant aspects in the calculation of accruals.

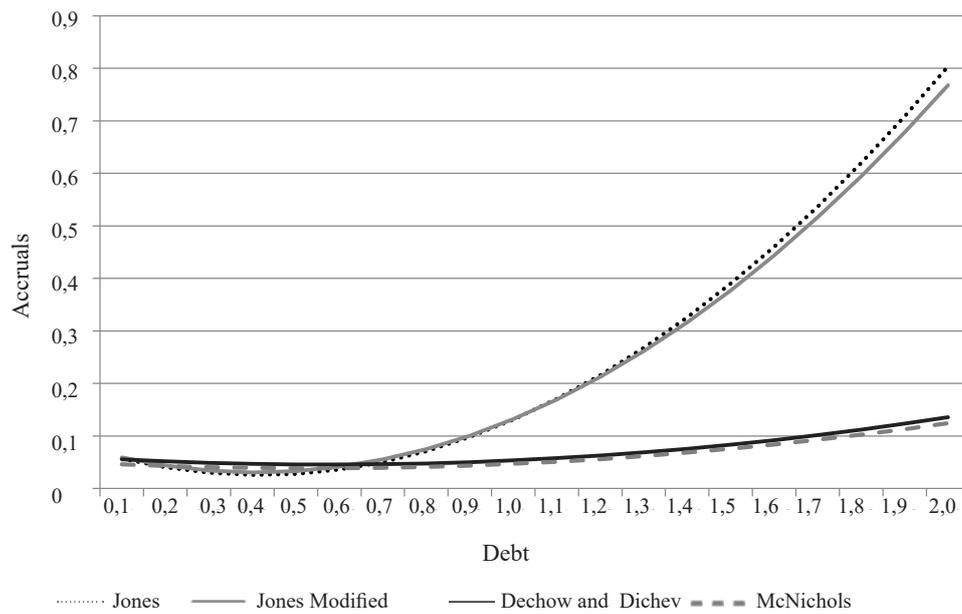
According to Larson, Sloan & Zha Giedt (2017), metrics based on the variation of working capital are less economically significant than non-current operation accrual metrics. Just as incorporating measures of acquisitions and disinvestment and/or fixed capitalizations. In this sense, it is understood that the results in this study must be cautiously interpreted, in light of recent critiques to the accrual measures chosen. This can be one of the reasons for diverging results between the models by Jones and Jones Modified, based in capital variation, against the models by Dechow and Dichev and McNichols, which are based on cash flow fluctuations.

In Brazil, many covenants are based on asset fixation metrics or have additional clauses that state them as guarantee in short-term loans, specially due to the weak legal environment. Thus, the results suggest that high debt levels could lead managers to administrate metrics that are somehow related to fixed account, creating more absolute residues in the models by Jones and Jones Modified, as the debts increase. In this sense, we understand that our results bring a new discussion forth in literature, once the article by Ghosh and Moon (2010) uses only the models by Dechow and Dichev, altered by McNichols, and the article by Zamri, Rahman and Isa (2013) measures earnings quality through earnings real management metrics.

4.2 Segmented regression

The results in the previous section are based on a nonlinear specification that includes Debt and Debt2 in the same regression. As a robustness test, the specification by Spline was used as an alternative statistical tool. Splines are segmented regression functions. The cutting point of segmentation is defined according to the format of the relation of the dependent variable with the independent one.

Therefore, we chose to divide the debt in two segments, using as a cutting point the inflexion point of the parable estimated in previous equations. Based on the coefficients estimated in section 4.2, it is concluded that the relation between earnings quality and debt is curvilinear, being a concave parable. The inflexion point is around 0.43 for the model by Jones (1991), 0.42 for the Jones Modified model (1995), 0.59 for the model by Dechow and Dichev (2002), and 0.54 for the model by McNichols (2002). Graphic 2, bellow, shows this relations. It can be observed in the graphic that, despite the inflexion points being relatively close, the effect of debt on accruals is stronger in the models by Jones and Jones Modified. It is important to highlight that the difference observed is caused by the fact that, unlike other models based on cash flow, the models by Jones and Jones Modified incorporate measures of acquisitions and disinvestments and/or fixed capitalization. Thus, the difference in the sensibility of the models to debt levels reflects basically the differences in the calculation of accruals and, exactly for that reason, we have chosen to present the results for all models.

Graphic 2. Relation between Discretionary Accruals and Debt

Source: Designed by the authors.

Thus, using as debt inflexion point the respective Spline(Sp) points, the following model is estimated:

$$Discretionary\ Accruals_{it} = \beta_0 + \beta_1 Debt_{(0,Sp)} + \beta_2 Debt_{(Sp,1)} + \beta_3 Operational\ Cycle_{it} + \beta_4 Size_{it} + \beta_5 Receipt_{\sigma_{it}} + \beta_6 Cash\ Flow_{\sigma_{it}} + \beta_7 Loss_{it} + \beta_8 Debt\ Cost_{it} + \beta_9 Z-score_{it} + \beta_{10} Growth_{it} + \beta_{11} Gross\ Margin_{it} + \beta_{12} Age_{it} + \beta_{13} ROA_{it} + \beta_{14} Corporate\ Gov_{.it} + \beta_{15} Audited\ Big\ 4_{it} + \sum \beta_j Segment_j_{it} + \varepsilon_{it}$$

In which: $Debt_{(0,Sp)}$ = debt situated between 0 and the Spline Sp point (low); $Debt_{(Sp,1)}$ = debt above the Spline Sp point (high). The results are shown in Table 5.

When estimating the model, it can be observed that the results, as presented in Table 4, indicate that only the estimations of residues in the models Jones and Jones Modified, in relation to debt, are significant. Again, the nonlinear debt relation (H1) is partially confirmed.

Table 5. Debt and Earnings Quality: Segmented Regression

Variable	Jones	Jones Modified	Dechow and Dichev	McNichols
Debt _(0,Sp)	-0.113** (0.0508)	-0.103** (0.0519)	-0.0149 (0.0197)	-0.00215 (0.0191)
Debt _(Sp,1)	0.282* (0.157)	0.261* (0.145)	0.0460 (0.0496)	0.045 (0.0389)
Economic Characteristics of the Companies				
Operational Cycle	-0.0214*** (0.00760)	-0.0220*** (0.00746)	0.00470 (0.00361)	0.00257 (0.00324)
Size	-0.0124*** (0.00322)	-0.0135*** (0.00324)	-0.00746*** (0.00211)	-0.00739*** (0.00188)
Receipt	-0.000843 (0.0100)	-0.00194 (0.0106)	0.0233*** (0.00869)	0.0131** (0.00612)
Cash Flow	-0.0853 (0.0622)	-0.113* (0.0653)	-0.0157 (0.0373)	-0.0106 (0.0395)
Loss	-0.0158 (0.0136)	-0.0121 (0.0143)	0.0164** (0.00723)	0.0193*** (0.0069)
Debt Cost	0.000077*** (0.0000234)	0.000106*** (0.0000246)	0.000116 (0.000101)	0.000293*** (0.00012)
Financial Health				
Z-score	-0.0132 (0.00832)	-0.0131 (0.00843)	-0.0135** (0.00552)	-0.0125** (0.00538)
Growth Factors				
Growth	0.00391 (0.00410)	0.00383 (0.00342)	0.00369* (0.00190)	-0.00141** (0.00071)
Gross Margin	-0.0111 (0.0221)	-0.0253 (0.0227)	-0.0253 (0.0186)	-0.0419*** (0.0161)
Age	-0.000100 (0.000268)	-0.0000969 (0.000274)	0.000354** (0.000163)	0.000318*** (0.00015)
ROA	-0.124 (0.119)	-0.0934 (0.121)	0.0337 (0.0470)	0.0820** (0.0403)
Corporate Gov.	0.00331 (0.00792)	0.00220 (0.00824)	0.0117** (0.00480)	0.00634 (0.00426)
Audited Big4	0.0109 (0.00898)	0.0127 (0.00929)	-0.0178*** (0.00685)	-0.0164*** (0.00586)
Dummy segment	Included	Included	Included	Included
Constant	0.418*** (0.0769)	0.440*** (0.0768)	0.127*** (0.0400)	0.149*** (0.0376)
Observation	1256	1256	1049	1049
R2 Adjusted	0.137	0.135	0.185	0.175
Statistics F	7.618	8.660	5.379	5.938

Source: Designed by the authors.

Note: The dependent variable of each column is the residue estimated by the accrual models described in Section 3. Standard-deviations robust to heteroscedasticity and autocorrelation in parenthesis. Significance Levels: * p<0.10; ** p<0.05; e *** p<0.01.

4.3 Short-term versus Long-term debt

In Table 6 are shown the results of the relation between short-term and long-Term debt with earnings quality (H2).

Table 6. Effect of Short-term and Long-Term Debt on Earnings Quality

Variables	Jones	Jones Modified	Dechow and Dichev	McNichols
Short-Term Debt	0.00419 (0.0721)	0.0404 (0.0721)	0.00418 (0.0778)	-0.0698 (0.0602)
Short-Term Debt ²	0.0604 (0.142)	0.0381 (0.135)	-0.00611 (0.185)	0.178 (0.138)
Long-Term Debt	-0.349*** (0.0516)	-0.341*** (0.0518)	-0.0714** (0.0345)	-0.0373 (0.0315)
Long-Term Debt ²	0.546*** (0.0652)	0.525*** (0.0638)	0.0857*** (0.0329)	0.0558* (0.0296)
Economic Characteristics of the Companies				
Operational Cycle	-0.0209*** (0.00735)	-0.0221*** (0.00721)	0.00451 (0.00361)	0.00248 (0.00325)
Size	-0.0114*** (0.00316)	-0.0121*** (0.00320)	-0.00708*** (0.00207)	-0.00747*** (0.00187)
Receipt	-0.00425 (0.00947)	-0.00580 (0.0104)	0.0226** (0.00881)	0.01186* (0.00614)
Cash Flow	-0.0237 (0.0534)	-0.0532 (0.0575)	-0.00793 (0.0363)	-0.007 (0.0385)
Loss	-0.0231* (0.0128)	-0.0203 (0.0135)	0.0146** (0.00727)	0.0173** (0.00688)
Debt Cost	0.0000572** (0.0000228)	0.0000852*** (0.0000239)	0.0000569 (0.000105)	0.000215* (0.00011)
Financial Health				
Z-score	-0.0153* (0.00827)	-0.0153* (0.00831)	-0.0146** (0.00571)	-0.0150*** (0.0056)
Growth Factors				
Growth	0.00484 (0.00387)	0.00473 (0.00324)	0.00383** (0.00191)	-0.00140* (0.00073)
Gross Margin	-0.000738 (0.0208)	-0.0131 (0.0214)	-0.0238 (0.0184)	-0.0431*** (0.0158)
Age	-0.000339 (0.000262)	-0.000331 (0.000267)	0.000301* (0.000165)	0.000274* (0.00015)
ROA	-0.200* (0.112)	-0.167 (0.116)	0.0237 (0.0492)	0.0787* (0.0422)
Corporate Gov.	0.00161 (0.00764)	0.000648 (0.00799)	0.0115** (0.00476)	0.006854 (0.0043)
Audited by Big 4	0.0148* (0.00877)	0.0173* (0.00911)	-0.0164** (0.00686)	-0.0155*** (0.00575)
Dummy segment	Included	Included	Included	Included
Constant	0.418*** (0.0773)	0.436*** (0.0772)	0.130*** (0.0401)	0.164*** (0.0377)
Observation	1256	1256	1049	1049
R ² Adjusted	0.192	0.186	0.188	0.180
Statistics F	13.377	16.728	12.665	10.901

Source: Designed by the authors

Note: The dependent variable of each column is the residue estimated by the accrual models described in Section 3. Standard-Deviation robust to heteroscedasticity and autocorrection in parenthesis. Significance Levels: * p<0.10; ** p<0.05; and *** p<0.01.

It is possible to observe that the estimated results establish that the nonlinear relation in the regressions of the four models is significant only for long-term debts, even though the evidences are little robust for the McNichols model.

Therefore, it was verified that the nonlinear relation between debt volume and earnings quality is associated to long-term debts, and not to short-term ones, confirming H2. This result suggests that the decision of incurring costs caused by the decrease in earnings quality is related to long-term debts, which is also consistent to previous results showing that inflexibility in debt contract binding can result on result management (Ghosh & Moon, 2010).

Our results are similar to the ones by Fung & Goodwin (2013). Using data for the American market, the authors have estimated a positive relation for short-term debts, but a much weaker one for long-term debts. However, the authors did not investigate the possibility of nonlinearity. The difference between results depicts not only the effect of not incorporating nonlinearity in estimations, but also the different characteristics of the financing markets for long- and short-term in Brazil and in the U.S.

The result of our article is also consistent to other evidences in Brazilian literature, such as Silva (2008), who demonstrated that Brazilian open capital companies that have long-term debts are subjected to a series of accounting covenants, which can be explained by the low legal effectivity environment (Almeida & Dalmácio, 2015; Lopes & Walker, 2008). As contract clauses that allow debt anticipation are usually related to long-term debts, these results contribute to literature since they evince the role of long-term debts in the accounting choices of companies.

5 FINAL REMARKS

Previous studies have verified a nonlinear relation between debt and earnings quality in the North-American market. This work tested this relation in the Brazilian scenario and presented evidence pointing out that managerial decisions also have a nonlinear association to debt levels in emerging countries, as the case of Brazil. Specifically, it was generally inferred that: i) companies with low debts report higher quality earnings, allowing themselves to increase their indebtedting capacity and to reduce debt costs; and ii) companies with higher debts report earnings with higher discretionary component. These results suggest that the risks of not complying to covenant clauses may be surpassing the benefits of reporting higher quality earnings for very indebted companies.

Additionally, it was investigated which kind of debt (short- or long-term) affects earnings quality. If the company chooses to incur costs related to management increase in self-indebting situations, due to the restrictions imposed by covenants, then it is more probable that these costs are being created by long-term debts, since they can be anticipated by breach of contract clauses. The results obtained corroborate to these expectations by indicating that the nonlinear relation between debt and earnings quality is related to long-term debts, and not to short-term ones.

These evidences contribute to literature and extend the discussion of works such as the one by Ghosh and Moon (2010), as they demonstrate the role of long-term debts in the accounting decisions of companies. Because this is a result of an emerging country with a more restrict access to capital market and with lower financing deadlines, we highlight another justification for the use of debt levels in research involving the quality of accounting information.

The results obtained also bring contributions to governance literature that analyzes the role of the monitoring exerted by debt contracts (Grossman & Hart, 1982; Diamond, 1991; Francis et al., 2005; Bharath et al., 2008; Funchal and Monte-Mor, 2016). In this case, our results extend this literature by presenting evidence that the debt policy interferes not only on the companies' operational policy, but also on the managerial decisions of reporting earnings.

In practice, estimations pointed out in this article can work as the basis for a bigger detail of debt contracts and more protection to the creditor. The concave relation points out the debt levels in which accruals are higher and, thus, the estimations of cash flow are less precise.

Thus, financing agents (banks and creditors) may use these cut-offs to require protection clauses or interest rates that will compensate them for the risks resulting from the increase (or reduction) of accrual levels. Likewise, companies can measure its ideal average accrual levels so that they will not incur high taxes and requirements and end up increasing their weighted average capital cost.

This work raises some points with the potential for further discussion in future researches: i) the models of accrual used, although being the main metrics used in literature, are based on the variation of working capital and cash flow, they do not capture non-current operational accruals, besides measures of acquisitions and disinvestments and/or fixed asset capitalization.

In Brazil, as many covenants are based on asset fixation metrics or have additional clauses placing them as the guarantee in long-term loans, it is possible that other management types may contribute for the nonlinear dynamics between long-term debt and earnings quality; ii) although contract restrictions are one of the main arguments for the nonlinear relation, more detailed studies are needed so that the clauses in debt contract can be deeply investigated, in order to identify which kinds of covenants/contracts increase the probability of changing the companies' management dynamics; iii) more recent studies have shown evidence point out that the IFRS has increased the number of contract clauses in Brazil. In this case, it is possible that this increase has taken place exactly to limit the engagement of managers in relation to managerial decisions; iv) after the development of new techniques for large scale collection of information in financial demonstrations, such as in Perlin (2017), it will be possible to extract different maturities of the profile of company debts and to explore nonlinearity in function of debt maturity deadlines, one of the points highlighted in this work. These results could contribute for the significance of long-term debts in the accounting decisions of companies.

REFERENCES

- Almeida, J. E. F., & Dalmácio, F. Z. (2015). The effects of corporate governance and product market competition on analysts' forecasts: Evidence from the Brazilian capital market. *The International Journal of Accounting*, 50(3), 316-339. DOI: <https://doi.org/10.1016/j.intacc.2015.07.007>
- Altman, E.I., Baidya, T. K., & Dias, L.M.R. (1979). Previsão de problemas financeiros em empresas. *Revista de Administração de Empresas*, 19(1), 17-28. DOI: <http://dx.doi.org/10.1590/S0034-75901979000100002>
- Beiruth, A. X., Fávero, L. P. L., Murcia, F., Almeida, J. E. F., & Brugni, T. (2017) Structural Changes in Covenants Through the Adoption of IFRS in Brazil. *Accounting Forum*, 41 (3), 147-160. DOI: <https://doi.org/10.1016/j.accfor.2017.06.004>
- Bharath, S. T., Sunder, J., & Sunder, S. V. (2008). Accounting quality and debt contracting. *The Accounting Review*, 83(1), 1-28.
- Billett, M. T., King, T. D., & Mauer, D. C. (2007). Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants. *Journal of Finance*, 62, 697-730. DOI: <https://doi.org/10.2308/accr.2008.83.1.1>
- Chiang, S. Kleinman, G. & Lee, P. (2017). Do non-staggered board elections matter to earnings quality and the value relevance of earnings and book value?. *Review of Accounting and Finance*, 16(1), 46-66. DOI: <https://doi.org/10.1108/RAF-01-2015-0006>
- Citron, D.B. (1992). Financial Ratio Covenants in UK Bank Loan Contracts and Accounting Policy Choice. *Accounting and Business Research*, 22(88). DOI: <https://doi.org/10.1080/00014788.1992.9729448>
- Cormier, D., Demaria, S., & Magnan, M. (2017). Beyond earnings: do EBITDA reporting and governance matter for market participants? *Managerial Finance*, 43(2), 193-211. DOI: <https://doi.org/10.1108/MF-07-2016-0205>
- Cupertino, C. M. (2013). *Gerenciamento de resultados por decisões operacionais no mercado de capitais brasileiro*. Tese (Doutorado em Administração) – Programa de PósGraduação em Administração, Universidade Federal de Santa Catarina, Florianópolis. Available in: <https://repositorio.ufsc.br/handle/123456789/122592>
- Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77(1), 35-59. DOI: <https://doi.org/10.2308/accr.2002.77.s-1.35>
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *Accounting review*, 70(2), 193-225. Retrieved from <http://www.jstor.org/stable/248303>
- Dechow, P., et al. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of accounting and economics*, 50(2), 344-401. DOI: <https://doi.org/10.1016/j.jacceco.2010.09.001>
- DeFond, M. L., & Jiambalvo, J. (1994). Debt covenant violation and manipulation of accruals. *Journal of accounting and economics*, 17(1), 145-176. DOI: [https://doi.org/10.1016/0165-4101\(94\)90008-6](https://doi.org/10.1016/0165-4101(94)90008-6)

- Desender, K. A., Aguilera, R. V., Crespi, R., & Garcia-Cestona, M. (2013). When does ownership matter? Board characteristics and behavior. *Strategic Management Journal*, 34(7), 823–842. DOI: <https://doi.org/10.1002/smj.2046>
- Diamond, D. (1991). Monitoring and reputation: the choice between bank loans and directly placed debt. *Journal of Political Economy*, 99(4), 689-721. DOI: <https://doi.org/10.1086/261775>
- Dichev, I. D. et al. (2012). Earnings quality: Evidence from the field. *Journal of Accounting and Economics*, 56(2), 1-33. DOI: <https://doi.org/10.1016/j.jacceco.2013.05.004>
- Doukakis, L. C. (2014). The effect of mandatory IFRS adoption on real and accrual-based earnings management activities. *Journal of Accounting and Public Policy*, 33(6), 551-572. DOI: <https://doi.org/10.1016/j.jaccpubpol.2014.08.006>
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The journal of law and Economics*, 26(2), 301-325. DOI: <https://doi.org/10.1086/467037>
- Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of accounting and economics*, 39(2), 295-327. DOI: <https://doi.org/10.1016/j.jacceco.2004.06.003>
- Funchal, B., & Monte-Mor, D. S. (2016). Corporate Governance and Credit Access in Brazil: The Sarbanes-Oxley Act as a Natural Experiment. *Corporate Governance: An International Review*, 24(5), 528-547. DOI: <https://doi.org/10.1111/corg.12151>
- Fung, S. Y., & Goodwin, J. (2013). Short-term debt maturity, monitoring and accruals-based earnings management. *Journal of Contemporary Accounting & Economics*, 9(1), 67-82. DOI: <https://doi.org/10.1016/j.jcae.2013.01.002>
- Ghosh, A. A., & Moon, D. (2010). Corporate debt financing and earnings quality. *Journal of Business Finance & Accounting*, 37(5-6), 538-559. DOI: <https://doi.org/10.1111/j.1468-5957.2010.02194.x>
- Graham, J. R., Li, S., & Qiu, J. (2008). Corporate misreporting and bank loan contracting. *Journal of Financial Economics*, 89(1), 44-61. DOI: <https://doi.org/10.1016/j.jfineco.2007.08.005>
- Grossman, S. J., & Hart, O. D. (1982). *Corporate financial structure and managerial incentives*. In *The economics of information and uncertainty* (pp. 107-140). University of Chicago Press.
- Gu, Z., Lee, C. W. J., & Rosett, J. G. (2005). What determines the variability of accounting accruals? *Review of Quantitative Finance and Accounting*, 24(3), 313-334. DOI: <https://doi.org/10.1007/s11156-005-6869-1>
- Harris, M., & Raviv, A. (1990). Capital structure and the informational role of debt. *The Journal of Finance*, 45(2), 321-349. DOI: <https://doi.org/10.1111/j.1540-6261.1990.tb03693.x>
- Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of accounting and economics*, 31(1), 405-440. DOI: [https://doi.org/10.1016/S0165-4101\(01\)00018-0](https://doi.org/10.1016/S0165-4101(01)00018-0)
- Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting horizons*, 13(4), 365-383. DOI: <https://doi.org/10.2308/acch.1999.13.4.365>
- International Monetary Fund (IMF). (2015). *World economic outlook: a survey by the staff of the International Monetary Fund*. Washington, DC: International Monetary Fund.
- Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, 76(2), 323-329. Retrieved from <http://www.jstor.org/stable/1818789>
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360. DOI: [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Jha, A. (2013). Earnings management around debt-covenant violations—An empirical investigation using a large sample of quarterly data. *Journal of Accounting, Auditing & Finance*, 28(4), 369-396. DOI: <https://doi.org/10.1177/0148558X13505597>
- Joia, R. M. (2012). *Adoção de IFRS e gerenciamento de resultado nas empresas brasileiras de capital aberto*. Dissertação (Mestrado em Ciências) – Faculdade de Economia, Administração e Contabilidade de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto. Available in: <http://www.teses.usp.br/teses/disponiveis/96/96133/tde-06122012-155637/pt-br.php>

- Joia, R. M., & Nakao, S. H. (2014). Adoção de IFRS e gerenciamento de resultado nas empresas brasileiras de capital aberto. *Revista de Educação e Pesquisa em Contabilidade*, 8(1), 22-38. DOI: <http://dx.doi.org/10.17524/repec.v8i1.1014>
- Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of accounting research*, 193-228. DOI: <https://doi.org/10.2307/2491047>
- Klann, R. C. (2011) *Gerenciamento de resultados: análise comparativa de empresas brasileiras e inglesas antes e após a adoção das IFRS*. Tese (Doutorado em Ciências Contábeis e Administração) – Programa de Pós-Graduação em Ciências Contábeis da Universidade Regional de Blumenau, Blumenau. Available in: http://www.bc.furb.br/docs/TE/2011/349758_1_1.PDF
- Larson, C. R., Sloan, R. G., & Zha Giedt, J. (2017). *Defining, Measuring and Modeling Accruals: A Guide for Researchers*. Working paper, SSRN n. 2952601. DOI: <https://dx.doi.org/10.2139/ssrn.2952601>
- Leland, H. E. (1994). Corporate debt value, bond covenants, and optimal capital structure. *The journal of finance*, 49(4), 1213-1252. DOI: <https://doi.org/10.1111/j.1540-6261.1994.tb02452.x>
- Lopes, A. B., & Walker, M. (2008). *Firm-level incentives and the informativeness of accounting reports: An experiment in Brazil*. Working paper. SSRN n. 1095781. DOI: <https://dx.doi.org/10.2139/ssrn.1095781>
- Martinez, A. L. (2013). Gerenciamento de resultados no Brasil: um survey da literatura. *Brazilian Business Review*, 10(4), 1-31. DOI: <http://dx.doi.org/10.15728/bbr.2013.10.4.1>
- McNichols, M. F. (2002). Discussion of the quality of accruals and earnings: multiples. *Journal of Accounting Research*, 40(1), 135-72. DOI: <https://doi.org/10.2308/accr.2002.77.s-1.61>
- Perlin, M. (2017). *GetDFPData: Reading Annual Financial Reports from Bovespa's DFP, FRE and FCA System. R package version 0.5*. Available in: <https://CRAN.R-project.org/package=GetDFPData>
- Sengupta, P. (1998). Corporate disclosure quality and the cost of debt. *Accounting review*, 459-474. Retrieved from <http://www.jstor.org/stable/248186>
- Silva, A. H. C. (2008). *Escolha de práticas contábeis no Brasil: uma análise sob a ótica da hipótese dos covenants contratuais*. 159f. Tese (Doutorado em Ciências Contábeis) – Programa de Pós Graduação em Ciências Contábeis, Universidade de São Paulo, São Paulo. Available in: http://www.teses.usp.br/teses/disponiveis/12/12136/tde-16012009-120147/publico/Tese_Adolfo_Silva_2008.pdf
- Smith, C.W. Jr. (1993). A Perspective on Accounting-Based Debt Covenant Violations. *The Accounting Review*, 68(2), 289-303. Retrieved from <http://www.jstor.org/stable/248402>
- Soderstrom, N. S., & Sun, K. J. (2007). IFRS adoption and accounting quality: a review. *European Accounting Review*, 16(4), 675-702. DOI: <https://doi.org/10.1080/09638180701706732>
- Sweeney, A. P. (1994). Debt Covenant Violations and Managers' Accounting Responses. *Journal of Accounting and Economics*, 17, 281-308. DOI: [https://doi.org/10.1016/0165-4101\(94\)90030-2](https://doi.org/10.1016/0165-4101(94)90030-2)
- Sun, L., & Rath, S. (2008). Fundamental determinants, opportunistic behavior and signaling mechanism: an integration of earnings management perspectives. *International Review of Business Research Papers*, 4(4), 406-420. Disponível em: <http://www.bizresearchpapers.com/32-Lansun.pdf>
- Van Tendeloo, B., & Vanstraelen, A. (2005). Earnings management under German GAAP versus IFRS. *European Accounting Review*, 14(1), 155-180. DOI: <https://doi.org/10.1080/0963818042000338988>
- Watts, R. L., & Zimmerman, J. L. (1986). *Positive accounting theory*.
- Zamri, N., Rahman, R. A., & Isa, N. S. M. (2013). The impact of leverage on real earnings management. *Procedia Economics and Finance*, 7, 86-95. DOI: [https://doi.org/10.1016/S2212-5671\(13\)00222-0](https://doi.org/10.1016/S2212-5671(13)00222-0)

How to cite this article

Costa, C.M., Matte, A.M. & Monte-Mor, D.S. (2018). Indebtedness and accounting choices: the nonlinear relation between debt and earnings quality. *Revista de Contabilidade e Organizações*, 12:e137077. DOI: <http://dx.doi.org/10.11606/issn.1982-6486.rco.2018.137077>