



## EFFECTS OF THE CAPITAL STRUCTURE ON THE MANAGEMENT OF ACCOUNTING RESULTS IN THE BRAZILIAN CAPITAL MARKET

**Alexandre Cunha Gomes**

[alexandregomes@id.uff.br](mailto:alexandregomes@id.uff.br)  
Fluminense Federal University -  
UFF, Niterói, Rio de Janeiro, Brazil.

**Hugo Costa de Macedo**

[hugomacedo@id.uff.br](mailto:hugomacedo@id.uff.br)  
Fluminense Federal University -  
UFF, Niterói, Rio de Janeiro, Brazil.

**José Augusto Veiga da Costa Marques**

[jose.laura@uol.com.br](mailto:jose.laura@uol.com.br)  
Federal University of Rio de  
Janeiro - UFRJ, Rio de Janeiro, Rio  
de Janeiro, Brazil.

### ABSTRACT

The objective of this research was to analyze the relationship between the capital structure and the management of accounting results in the Brazilian capital market. In order to address this research objective, 223 non-financial companies listed on the BM&FBovespa were analyzed. The analysis addressed the management of results from the discretionary *Accruals* estimated by means of three different operational models (Modified Jones, KS and PAE). The capital structure was approached from two factors generated through factorial analysis, with the extraction by the main component analysis method applied to capital structure indices used in previous research. The objective of using the factorial analysis was to allow the greatest number of perspectives on the proportions between the sources of capital to be contemplated in the analysis without there being problems of high correlation between the explanatory variables of the model. The results showed that there is, in a conclusive way, a statistically significant relationship between the capital structure and the discretionary *Accruals* estimated through any of the three operational models. These results allow understanding that the capital structure does not act as an incentive to the management of accounting results in the Brazilian capital market.

**Keywords:** Capital structure; Accounting Results Management; Discretionary *Accruals*.



## 1. INTRODUCTION

From an opportunistic perspective and the maximizing behavior of individuals in the organizational environment, Jensen et Meckling (1976) understand that managers make accounting choices for the purpose of maximizing their own expected profits relative to the particular relationship of remuneration, debt contracts and costs politicians (Watts et Zimmerman, 1978). In this line of reasoning, Healy et Wahlen (1999) define management of results as the exercise of the judgment of managers on the accounting practices and the structuring of operations to change financial reports, either for the purpose of deceiving some interested parties about the economic performance of the company or for influencing the contractual results that depend on the reported accounting numbers.

Martinez (2001) considers the management of accounting results a practice quite harmful to the quality of accounting information disclosed. Their effects may lead to deficiencies in the allocation of resources between companies and distributions of unjustifiable wealth. A greater understanding of the incentives that lead managers to practice results management can help mitigate the effects of such practices and provide improved information quality by reducing information asymmetry, user uncertainty, and leading to more efficient economic decisions (Nardi et Nakao, 2009).

The relationship between capital structure and results management is a reflection of the incentives to managers to exercise their discretion in the context of the accounting choices on the recognition of *Accruals*. Two types of incentives contribute to the discretionary recognition of *Accruals* with impacts on the capital structure, and are often complementary: i) to manipulate net income to influence the perception of risk and the expectations of future results by investors, with reflections on liabilities accounts and, therefore, in the capital structure; and ii) for the direct purpose of shaping the capital structure itself in search of better conditions for raising funds, making the company's indexes more attractive to investors and creditors, as well as to seek compliance with restrictive clauses of contracts protecting the company's creditors.

In this sense, Coelho et Lopes (2007, p. 122) deal with the hypothesis of the degree of indebtedness, according to which companies with a higher proportion of third-party capital against total resources would be more likely to choose accounting methods that result in an increase in reported profit, "[...] thus, those who have contracts with restrictive clauses based on accounting numbers are more likely to incur techniques that prevent the violation of such clauses".

An et al. (2016) argue that understanding the role of results management in determining leverage is important as

managers, in an attempt to protect their private control benefits, use results management to manipulate the perception of external users of accounting information. Banks have a special interest in this relationship that implies the quality of the accounting profits and the capital structure of the company, two decisive pieces of information for decisions on the issuance of bank loans and the interest rates to be applied. Moreover, shareholder wealth is influenced by the link not only between profits and stock returns, but also between results management and corporate value.

With regard to the Brazilian scenario, some characteristics of our economic environment impose some limitations to the application of certain research approaches. Coelho et Lopes (2007: 131) understand that the small volume of debt contracts with restrictive clauses of accounting numbers does not yet allow a scale of events involving possible manipulation of results. In this way, the level of indebtedness can act as a proxy for the existence of contractual covenants.

The financing structure of a company's capital refers to a mix of capital sources divided between equity and third-party assets distributed over its short- and long-term maturities with impacts on risk, return prospects and corporate value (Gitman, 2002). According to Silva et al. (2014, p.7), "this capital structure indicator expresses a relationship between the short-term (PC) and long-term (PNC) sources of capital and equity (PL)". In this way, it is understood that the mix of capital sources that form the capital structure of companies cannot be correctly represented by a single measure, but by a set of indices, so that they also reflect the different perspectives of the processors of the demonstrations on their capital structure and how each of these perspectives acts as an incentive to the management of accounting results. In this sense, **the present study aims to analyze the relationship between the capital structure and the management of accounting results in the Brazilian capital market.**

Considering that these indices represent several relations between the same sources of capital and are calculated using the same small set of variables, it is inevitable to expect a high correlation between them. In order to reconcile the proposal to cover the greatest number of perspectives on the formation of the capital structure, we opted to aggregate the capital structure indicators into uncorrelated components that best represent these indicators using the Factor Analysis.

In addition to this introduction, the text is organized as follows: Section 2, Theoretical Framework, which discusses the theoretical basis to ground the effects of the capital structure on the management of accounting results and presents the main results of previous research; Section 3, Methodological Procedures, in which the methodology for



collecting and processing data is described; Section 4, Results, in which the results found in the research are reported; Section 5, Final Considerations, in which the main research results are discussed, their limitations are presented and suggestions for future research are presented.

## 2. LITERATURE REVIEW

### 2.1 Accounting Results Management

According to Paulo (2007: 9), from Firm's Contractual Theory, organizations can be understood as a set of contracts among the various economic agents, so that each of them offers its attributes to the firm's productive process in return for a counterpart. The nature of this contractual relationship is further affected by the maximized behavior of the individuals involved, so that "[...] there is a good reason to believe that the agent will not always act in the interests of the principal individual" (Jensen et Meckling, 1976, p. 309).

The divergence of interests between agent and principal individual causes a demand for accounting information with informational content useful for the monitoring of these contractual relations. To meet this demand "Accounting has, over time, incorporated a series of economic concepts to present as accurately as possible the reality of the company within its reports" (Paulo, 2007, p. 11). The introduction of these economic concepts is accompanied by a greater degree of subjectivity, expanding the range of accounting choices and the discretion of managers in the preparation of financial statements.

Based on the view of organizations as a legal fiction that serves as a connecting point for a set of contractual relationships between individuals, Jensen and Meckling (1976, p. 310) have developed hypotheses regarding the reasons why variations in the forms used by companies to account for their economic activities, as well as the importance of these effects in the preparation and application of accounting standards, should be predictable.

In this context, the management of results is fundamentally characterized by the deliberate alteration of accounting results in order to meet particular motivation, which does not express the economic essence of the underlying transactions (Martinez, 2001). The management of results can occur "through the accounting choices or changes in the company's normal (actual) operating activities" (Paulo, 2007, p. 12). Although the motivations are individual and the action of managers is to manipulate information, it is important to emphasize that results management is distinguished from accounting fraud, considering that the agents

who prepare the statements exercise their choices within the possibilities left by the regulator.

Martinez (2001, p.15) lists a number of situations where processors can exercise their discretion through accounting choices:

"[...] when the manager assess future economic events, such as estimating expected useful lives, and defining the residual value of long-term assets, obligations to be paid and probable losses with bad debtors, occasionally, it is possible for the manager to choose the most compatible depreciation method, or cost criterion more in tune with the reality of the production process" (Martinez, 2001, p.15).

The management of results from accounting choices relies heavily on the recognition of *Accruals* (accumulations), which should be understood as the "components of the accounting results that adjust the cash flow over time" (Paulo, 2007, p. 13). The *Accruals* are derived from the accrual regime and are essential for the profit to reflect the increase of wealth incorporated into the equity, independently of the financial movement.

*Accruals* are an essential part of the accounting information system; however, eventually, managers make decisions to increase or decrease accumulations for reasons unrelated to the reality of the business. In this way, it can be understood that a part of *Accruals* refers to the normal accumulations of the company that are related to its operational activity and aims to capture the economic essence of the transactions and these are called non-discretionary *Accruals*; another part of the *Accruals* represents the accumulations recognized by the exercise of the discretion of managers in order to modify the performance evaluation and influence the contractual relations of the company for its own benefit.

Paulo (2007) explains that the research line dedicated to results management based on *Accruals* seeks to identify and measure discretionary *Accruals* through operational models. According to the author, some of the most used models are:

- a) Healy Model;
- b) DeAngelo Model;
- c) Jones (1991) Model;
- d) Modified Jones (Dechow et al, 1995) Model; and
- e) KS (Kang et Sivaramakrishnan, 1995) Model.



The effectiveness of these models depends on the discretionary *Accruals* being related to certain incentives, which would lead managers to manipulate the accounting results. Healy et Wahlen (1999) discuss some of these incentives that were well synthesized by Coelho et Lopes (2007, p. 124), as follows:

- a) "Linked to the capital market, aimed at changing the perception of risk on the company (smoothing profits, for example) and inducing investors to lower expectations of future profits (reduction of benchmarks).
- b) For contractual motivations between the company and various groups:
  - a. To guide and calculate wage compensation for company executives, where such incentives are based on accounting measures.
  - b. To obtain credit limits and better financing conditions, as well as to guide clauses restricting or protecting creditors.
- c) Linked to regulations and political costs, such as reduction of monopoly profits or to escape taxation and antitrust rules." (Coelho et Lopes, 2007, p. 124).

Discretionary *Accruals* are usually reversed in the future moment, but can temporarily "polish" financial ratios and cover up some weaknesses of companies, which in the long run may lead to collapse. In manipulating the accounting information, managers violate their timeliness and credible representation, not only for the purpose of smoothing profits, but also to "polish" the capital structure and make it more attractive to investors and creditors (Tahir et al., 2011, p. 97).

## 2.2 Capital Structure and Accounting Results Management

Studies on the firm's capital structure become more relevant in the accounting and finance literature from the Capital Asset Pricing Model of Modigliani et Miller (1958). This model establishes four propositions regarding capital structure: the ratio between debt and total resources does not affect the market value of the firm, the level of leverage does not affect the weighted average cost of capital, the dividend policy is independent of the capital structure and shareholders are indifferent to the capital structure of the company. The validity of these propositions would be limited to the assumptions of absence of taxes, insolvency costs, agency costs, asymmetric information and in the hypothesis of an efficient market (in which all information is known to

all stakeholders and immediately incorporated into the price of assets). Despite these propositions, the market perception is that greater proportions of debt to invested capital expose the company to financial vulnerabilities, which may contribute to the degeneration of credit rating and investor confidence. In addition, such conditions create difficulty in raising more funds through long-term financing or the sale of preferred and common shares.

Some international surveys have already been dedicated to the study of the management of results motivated by the need to adapt the accounting numbers to restrictive clauses of debt contracts. Such clauses restrict the performance of managers in order to safeguard the investment of creditors, guaranteed by the requirement of minimum rates of return and liquidity and maximum for the indebtedness of the firm. Among these surveys, Sweeney (1994) examined time series of accounting choices before and after companies report breaches of accounting restrictions on debt contracts. Their results indicated a large number of increases in profit due to changes in accounting choices. The managers chose to change accounting procedures in order to postpone the violation of the restrictive clauses when there was no significant negative cash flow effects associated with the change in accounting procedures.

DeFond and Jiambalvo (1994) examined the discretionary *Accruals* and *Accruals* related to working capital of a sample of 94 companies that disclosed breaches in clauses restricting debt contracts. Their results showed that in the years prior to the violations, the discretionary *Accruals* were significantly positive; however, in the year of the violation the data are difficult to interpret because the management of results occurs to avoid contractual violations. Considering that the survey sample comprises firms that have effectively breached covenants contracts, if results management is unable to prevent the breach, there is no incentive for it to be carried out.

Dichev et Skinner (2002) used Dealscan, a database of private agreements of corporate loans to conduct tests on the hypothesis of results management for compliance with restrictive clauses of debt contracts in a large sample. The results confirmed the practice of results management to avoid breaches of contractual *covenants*. The authors also showed that technical breaches are relatively frequent in about 30% of all loans, they are not necessarily associated with financial difficulties, consistent with the idea that the consequences of the breach vary considerably depending on the economic circumstances of the debtors. In addition the consequences of violations (early settlement, for example) are often waived for healthy companies.

Kim et al. (2010) examined the relationship between the decisions of management of the operations of the compa-



nies (management of actual results) and the level of clearance in relation to the restrictions of debt contracts (the difference between the limit established for a given accounting index and the observed real index in the statements of the company). Using data from private debt contracts, the authors found that the overall level of real results management is greater when the slack in relation to the constraints of debt contracts is tighter.

Tahir et al. (2011) argue that the greater the ratio of debt to total capital employed (leverage ratio), the greater the evidence of financial weakness and more exposure to risk, with credit rating and stakeholder confidence. Low leverage ratio is desirable especially for weak companies that have great financial risk. The authors sought to investigate the various factors related to the management of results with impact on the capital structure of Pakistani companies listed on the Karachi stock exchange in 2006. The results indicate that the increase in the value of discretionary *Accruals* leads the company to more capital structures leveraged.

An et al. (2016) also studied the relationship between results management and financial leverage and how this relationship is influenced by institutional environments. The authors analyzed a panel of 25,777 companies in 37 countries covering the years 1989 to 2009. Their results indicate that companies with high profit management activities are associated with high financial leverage, but that this positive relationship is mitigated by strong institutional environments.

In the Brazilian market, certain characteristics impose certain limitations on the application of the research approach to the restrictive clauses of debt contracts. Coelho et Lopes (2007: 131) warn that the high public sector indebtedness and high inflation rates imply a high level of macroeconomic risk. In this scenario, financial institutions favor short-term operations, so that the authors identified that the short-term debt of the companies in their sample corresponded, on average, to 45% of total indebtedness. Long-term debt contracts are preferably secured by the commitment of assets in the form of mortgages and fiduciary alienation. In addition, the authors explain that:

“In these contracts, in turn, the existence of restrictive clauses is limited to legal and operational conditions and are recent in our financial culture, as can be seen in the standardization of deeds of public debentures issued by the securities commission, not identifying any restrictions related to accounting numbers.” (Coelho et Lopes, 2007, p. 131)

Thus, Coelho et Lopes (2007) understand that the small volume of debt contracts with restrictive clauses of accounting numbers does not yet allow a scale of events involving possi-

ble manipulation of results. In this way, the level of indebtedness can act as a proxy for the existence of contractual covenants. In the meantime, the authors investigate the existence of results management and its relationship with the degree of leverage in Brazilian publicly traded companies. The results indicated the existence of results management, but did not confirm its association with the levels of corporate indebtedness.

Sant’Ana et al. (2015) studied the influence of the capital structure on performance management practices in a sample of 7,629 firms in the G-20 countries (a group formed by finance ministers and heads of central banks of the world’s 19 largest economies plus the European Union) for the period 2009-2013. Their tests show that capital structure variables did not present conclusive results in all countries regarding their influence on the management of results.

### 3. METHODOLOGICAL PROCEDURES

#### 3.1 Population and Sample

The research population is composed of corporations with securities traded on BM&FBOVESPA. This population includes companies that provide the necessary information for the application of the econometric models used to verify the established research hypotheses.

In accordance with the research objective, from the population a sample of non-probabilistic and convenience work was established. Aiming for greater consistency and robustness in the results of the analysis, it was necessary to treat the sample with the exclusion of observations of companies that make up the financial sector, because they have specific characteristics capable of skewing the results, and of companies that did not have information for some of the variables used in the models.

Once the necessary cuts have been made, the study has 223 observations analyzing the same number of companies in the year 2015.

To obtain the data, we chose to use the Capital IQ McGraw Hill Financial database, chosen for having information about the financial statements of all the companies listed on the Stock Exchange that makes up the study population, providing enough information to feed the econometric models used in the research.

#### 3.2 Research Strategy

In order to investigate the influence of the Capital Structure on the management of accounting results, multiple li-



near regression models were used, estimated by the Ordinary Least Squares (OLS) method. These models alternately relate different methods of detecting the management of the accounting results with variables representative of the capital structure of the company according to Equation 1, below:

$$GR_{it} = \beta_0 + \sum \beta_1 EC_{it} + \mu_{it}$$

Where:

$GR_{it}$  corresponds to the Discretionary *Accruals* identified from one of the result management detection models applied to the firm  $i$  in the period  $t$ .

$EC_{it}$  corresponds to the Factors representative of the Capital Structure of the firm  $i$  in the period  $t$ .

$\mu_{it}$  is the error term in year  $t$ .

As regards the assumptions of regression models estimated by the Ordinary Least Squares method, Fávero et al. (2009) states that it must be observed if the regression error has a normal distribution, if its variance is constant and if it does not present an auto correlation or correlation between any explanatory variable. In order to verify whether these assumptions were met, all the regressions used in this study are tested for residues normality (Jarque-Bera), homoscedasticity of residues (Breusch-Pagan-Godfrey) and multicollinearity of variables (FIV statistics).

In cases where no residue homoscedasticity was observed, the regressions are obtained with robust standard errors and heteroskedasticity corrected by the White method.

### 3.2.1 Dependent Variable - Results Management

The studies on detection of Accounting Results Management are largely focused on the analysis of *Accruals* (accumulations) (Beneish, 2001). The methodology employed in these surveys consists of the breakdown of Total *Accruals* into non-discretionary *Accruals*, those resulting from the normal operations of the company, and discretionary *Accruals*, which are the result of the manipulation exercised by the discretion of managers in the exercise of accounting choices.

Paulo (2007) explains that *Accruals* are not directly observable; however, operational models were developed to aid empirical research, considering discretionary *Accruals* as proxies for result management. Still, according to Paulo (2007), the detection of results management from *Accruals* starts with the measurement of Total *Accruals*. From these,

the operating models estimate non-discretionary *Accruals*, which, in turn, are used to estimate discretionary *Accruals*. Finally, it must be verified whether there is an explanatory relationship between the estimated discretionary *Accruals* and incentives that may affect the accounting choices.

In this sense, the Total *Accruals* were estimated by the items included in the Statement of Cash Flows, resulting in a measure more directly comparable to the amounts calculated from the Balance Sheet, but without being impacted by non-operating transactions, such as reclassifications, changes in accounting criteria, etc. (PAULO, 2007, p. 94). Total *Accruals* were estimated according to Equation 2:

$$AT_t^{cf} = \frac{\Delta CR_t^{cf} + \Delta E_t^{cf} - \Delta CP_t^{cf} - \Delta TX_t^{cf} - DEP_t^{cf} + \Delta OAPC_t^{cf}}{A_{t-1}}$$

Where:

$AT_t^{cf}$  = *Accruals* measured by means of the Statement of Cash Flow (indirect method) in the period  $t$ ;

$\Delta CR_t^{cf}$  = variation of trade accounts receivable at the end of the period  $t-1$  to the end of the period  $t$ ;

$\Delta E_t^{cf}$  = variation in the inventory accounts at the end of the period  $t-1$  to the end of the period  $t$ ;

$\Delta CP_t^{cf}$  = variation of accounts payable to suppliers at the end of the period  $t-1$  to the end of the period  $t$ ;

$\Delta TX_t^{cf}$  = variation of taxes and tax contributions at the end of the period  $t-1$  to the end of the period  $t$ ;

$DEP_t^{cf}$  = depreciation expense in the period  $t$ ;

$\Delta OAPC_t^{cf}$  = net variation of other accounts of the company's current assets and liabilities at the end of the period  $t-1$  to the end of the period  $t$ ;

$A_{t-1}$  = total assets at the end of the period  $t-1$ .

To ensure greater robustness to the results of the research, three models were used, which are used alternately for estimation of non-discretionary *Accruals*:

#### Modified Jones

Non-discretionary *Accruals* are estimated by the Modified Jones model through Equation 3:

$$AND_{it} = \alpha \frac{1}{A_{t-1}} + \beta_1 (\Delta R_{it} - \Delta CR_{it}) + \beta_2 (PPE_{it})$$



Where:

$AND_{it}$  = non-discretionary *Accruals* of the company  $i$  in the period  $t$ ;

$\Delta R_{it}$  = variation in the revenue of company  $i$  of the end of period  $t-1$  to the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$\Delta CR_{it}$  = variation of the accounts receivable of the company  $i$  of the end of period  $t-1$  to the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$PPE_{it}$  = balances of the fixed assets accounts of the company  $i$  of the end of period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$A_{t-1}$  = total assets at the end of the period  $t-1$ .

$\alpha, \beta_1, \beta_2$  = Estimated Jones regression coefficients (the original, which does not have the term  $\Delta CR_{it}$  and presents the regression error term).

#### KS Model

Non-discretionary *Accruals* are estimated by the KS model through Equation 4:

$$AT_{it} = \phi_0 + \phi_1(\delta_1 R_{it}) + \phi_2(\delta_2 D_{it}) + \phi_3(\delta_3 PPE_{it}) + \epsilon_{it}$$

Where:

$AT_{it}$  = total *Accruals* of the company  $i$  at the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$R_{it}$  = net revenue of the company  $i$  at the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$D_{it}$  = costs and operating expenses of the company  $i$  at the end of the period  $t$ , excluding depreciation and amortization expenses, weighted by total assets at the end of the period  $t-1$ .

$PPE_{it}$  = balance of fixed assets accounts and deferred assets (gross) of the company  $i$  at the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$$\delta_1 = CR_{i,t-1} / R_{i,t-1}.$$

$$\delta_2 = (E_{i,t-1} + DespAnt_{i,t-1} + CP_{i,t-1}) / D_{i,t-1}.$$

$$\delta_3 = Depr_{i,t-1} / PPE_{i,t-1}.$$

$CR_{i,t-1}$  = balance of accounts receivable (customers) of the company  $i$  in the period  $t-1$ .

$R_{i,t-1}$  = net revenue of the company  $i$  in the period  $t-1$ .

$E_{i,t-1}$  = balance of the company stocks account  $i$  in the period  $t-1$ .

$DespAnt_{i,t-1}$  = balance of the anticipated expenses account of the company  $i$  in the period  $t-1$ .

$CP_{i,t-1}$  = balance of accounts payable in the short term of the company  $i$  in the period  $t-1$ .

$Depr_{i,t-1}$  = amount of depreciation and amortization expenses of the company  $i$  in the period  $t-1$ .

$PPE_{i,t-1}$  = balance of fixed assets accounts and deferred assets (gross) of the company  $i$  in the period  $t-1$ .

$\phi_0, \phi_1, \phi_2, \phi_3$  = estimated regression coefficients.

$\epsilon_{it}$  = regression error term (residuals).

In the case of the KS model, the value of the discretionary *Accruals* is given by the regression error term.

#### PAE Model

Non-discretionary *Accruals* are estimated by the PAE model through Equation 5:

$$TA_{it} = \alpha \left( \frac{1}{A_{t-1}} \right) + \beta_1(\Delta R_{it}) + \beta_2(PPE_{it}) + \lambda_1(FCO_{it}) + \lambda_2(FCO_{it-1}) + \lambda_3(TA_{it-1}) + \epsilon_{it}$$

Where:

$TA_{it}$  = total *Accruals* of the company  $i$  of the end of period  $t-1$  to the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$\Delta R_{it}$  = variation in the revenue of company  $i$  of the end of period  $t-1$  to the end of the period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$PPE_{it}$  = balances of the fixed assets accounts of the company  $i$  of the end of period  $t$ , weighted by total assets at the end of the period  $t-1$ .

$FCO_{it}$  = operating cash flow of the company  $i$  of the end of period  $t$ , weighted by total assets at the end of the period  $t-1$ .



$FCO_{it-1}$  = operating cash flow of the company  $i$  of the end of period  $t-1$ , weighted by total assets at the end of the period  $t-2$ .

$TA_{it}$  = total *Accruals* of the company  $i$  of the end of period  $t-1$ , weighted by total assets at the end of the period  $t-2$ .

$\epsilon_{it}$  = regression error term (residuals).

$A_{t-1}$  = total assets at the end of the period  $t-1$ .

$\alpha, \beta_1, \beta_2, \lambda_1, \lambda_2, \lambda_3$  = Estimated coefficients of regression.

### 3.2.2 Independent Variable - Capital Structure

The capital structure of a company relates to a mix of capital sources divided between equity and third-party assets, distributed over their short- and long-term maturities, with impacts on risk, return perspective and corporate value (Gitman, 2002). The capital structure of companies can be measured by various financial indices that capture different perspectives as to their composition.

In the present study, some of these indexes that have been used successfully in previous research will be used (Procianoy et Schnorrenberger, 2004; Sant'Ana et al., 2015; Silva et al., 2014), such as: total indebtedness (PC + PNC / AT), the coverage ratio of current liabilities for own resources (PC/PL), the coverage ratio of noncurrent liabilities for own resources (PNC/PL), the proportion of short-term liabilities in relation to long-term liabilities (PC/PNC), the coverage ratio of total liabilities for own resources ((PC+PNC)/PL), the ratio of short-term to long-term capital sources (PC/(PNC+PL)), the proportion of liabilities due in the short term against the total liabilities (PC/(PC + PNC)) and the ratio between short-term liabilities and total resources (PC/AT).

According to Silva et al. (2014, p.7), "Each capital structure indicator expresses a relationship between the sources of short-term (PC) and long-term third-party capital (PNC) and equity (PL)". In this way, it is understood that the mix of capital sources that form the capital structure of companies cannot be correctly represented by a single measure, but rather by a set of indices, so that they also reflect the different perspectives of processors and how each of these perspectives acts as an incentive to the management of accounting results.

Considering that these indices represent several relationships between the same sources of capital and are calculated using the same small set of variables, it is inevitable to expect a high correlation between them, which makes it impossible to use them fully in econometric models of multiple

regression using the minimum ordinary square method. In order to reconcile the proposal to cover the greatest number of perspectives on the formation of capital structure, it was decided to follow the procedure adopted by Silva et al. (2014) and to aggregate the capital structure indicators into uncorrelated components that best represent these indicators from the Factor Analysis.

Hair Jr et al. (2009, pp. 109-110) argue that it is necessary "... to ensure that the variables are sufficiently correlated with one another to produce representative factors". Additionally, the authors point out that poor correlation matrices can be formed when highly correlated variables have loads substantially larger than other variables in that factor.

For adequacy of factorial analysis, sample adequacy measures (*medidas de adequação da amostra* – MAS) should be observed, "the researcher should examine the MAS values for each variable and exclude those that are in the unacceptable domain" (Hair Jr. et al., 2009, p. 110). In this sense, observing the correlation matrix of the variables used in previous studies and listed above, as well as the results of the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO test), the variables selected for the present study were as follows:

- The coverage ratio of current liabilities by the own resources (PC / PL);
- The proportion of short-term liabilities in relation to long-term liabilities (PC / PNC);
- The ratio of short-term to long-term capital sources (PC/(PNC+PL));
- The ratio of short-term liabilities to total liabilities (PC/(PC + PNC)); and
- The ratio between the short-term liabilities and the total resources (PC/AT).

The variables selected were tested for multivariate normality and the results indicated a violation of the premise of existence of a multivariate normal distribution. However, Hair Jr. et al. (2009, p.109) argue that:

"[...] in factorial analysis the concerns that are imposed are much more focused on the character and composition of the variables included in the analysis than on their statistical qualities [...] a basic assumption of factor analysis is that there is some underlying structure in the set of chosen variables [...] from a statistical point of view, deviations from normality, homoscedasticity and linearity are applied only because they



decrease the observed correlations". (Hair Jr. et al., 2009, p. 109)

Based on the considerations of Hair Jr. et al. (2009) and the understanding that the capital structure is the underlying structure of the set of indicators used in this analysis, it was decided to continue the analysis despite the violation of the premise of multivariate normality.

The assumption of a considerable number of correlations can be verified by means of the correlation matrix expressed in Table 1.

#### 4. DATA ANALYSIS

##### 4.1 Factorial Analysis

The first step in the application of a factorial analysis is the analysis of the correlations between the studied variables.

It is observed that the PC / PNC variable was moderately correlated with the PC / (PNC + PL) and PC / (PC + PNC) variables; the latter also presented a moderate correlation with the PC / AT variable. There were no correlations with the PC / PL variable.

The sample adequacy measures were then analyzed. In this sense, the KMO test, which evaluates the suitability of the sample for the degree of partial correlation between the variables, was observed. The value of the KMO statistic was 0.631. According to Fávero et al. (2009), this result makes it reasonable to apply the factor analysis. Additionally, the significance level of the Bartlett sphericity test (p-value = 0.000) rejects the hypothesis that the correlation matrix is an identity matrix, also corroborating the application of the factorial analysis. Finally, the Anti-Image Matrix, presented

in Table 2, shows the sample adequacy measure (*medida de adequação da amostra* – MAS) for each of the analysis variables. It can be observed that all MAS were greater than 0.50, showing that each of the variables fit the structure defined by the others.

Then, the method of analysis of the main components for the extraction of the factors was chosen. Hair Jr. et al. (2009, p 112) explain that this method is the most appropriate when the objective is to summarize most of the information in a "minimum number of factors necessary to explain the maximum portion of the total variance represented in the original set of variables".

The choice of the number of factors to be extracted will be given based on the criterion pointed out by Fávero et al. (2009), according to which factors with eigenvalues greater than 1 must be retained. Thus, two factors that can explain 64.99% of the total variance are retained, as can be observed in Table 3.

Graphically, the smoothing criterion of the factors analyzed curve (scree test) corroborates with the retention of the optimal number of factors for the analysis. According to Hair et al. (2009), after smoothing the curve (below eigenvalue 1), a given amount of proportion with single variance would be included; thus, there is no acceptability for such factors.

After extracting the components and considering the objective of the application of the data reduction technique, it is possible to consider the goal of applying the factorial analysis. However, Hair Jr. et al. (2009, p. 116) argue that factor rotation should simplify the factor structure in order to provide more adequate information for the interpretation of the variables under examination. In this sense, the varimax rotation method was used to "provide a clearer separation of factors" (p. 119). The matrices of the components before and after the application of the varimax rotation method are presented in Table 4.

**Table 1.** Spearman Correlation Matrix (\*\*correlation is significant at the 0.01 level)

	PC / PL	PC / PNC	PC / (PNC + PL)	PC / (PC + PNC)	PC / AT
PC / PL	1	0,0680	0,0780	0,0710	0,0560
PC / PNC	0,0680	1	0,519**	0,610**	0,349**
PC / (PNC + PL)	0,0780	0,519**	1	0,318**	0,0710
PC / (PC + PNC)	0,0710	0,610**	0,318**	1	0,518**
PC / AT	0,0560	0,349**	0,0710	0,518**	1

Source: The authors themselves



**Table 2.** Anti-Image Matrix

		PC / PL	PC / PNC	PC / (PNC + PL)	PC / (PC + PNC)	PC / AT
Anti-image covariance	PC / PL	,991	-,002	-,046	-,016	-,025
	PC / PNC	-,002	,505	-,264	-,231	-,066
	PC / (PNC + PL)	-,046	-,264	,712	-,039	,109
	PC / (PC + PNC)	-,016	-,231	-,039	,520	-,252
	PC / AT	-,025	-,066	,109	-,252	,713
Anti-image correlation	PC / PL	,815a	-,003	-,054	-,022	-,030
	PC / PNC	-,003	,652a	-,440	-,450	-,110
	PC / (PNC + PL)	-,054	-,440	,629a	-,064	,153
	PC / (PC + PNC)	-,022	-,450	-,064	,663a	-,414
	PC / AT	-,030	-,110	,153	-,414	,657a

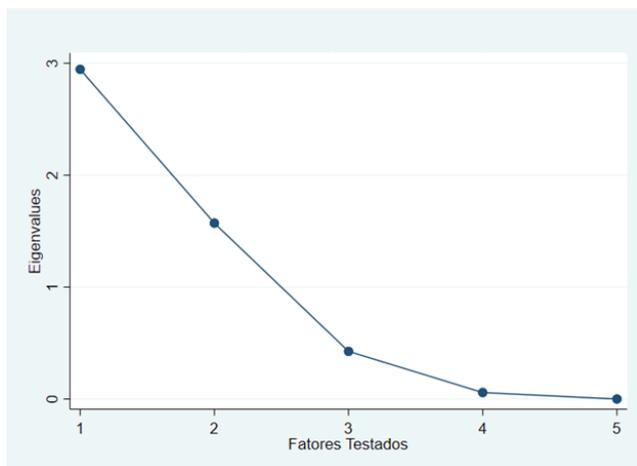
a. Sampling adequacy measures (*Medidas de adequação de amostragem – MSA*)

Source: The authors themselves

**Table 3.** Total Variance Explained

Comp.	Initial eigenvalues			Square load extraction sums			Square load rotating sums		
	Total	% de var.	% cumul.	Total	% de var.	% cumul.	Total	% de var.	% cumul.
1	2,248	44,960	44,960	2,248	44,960	44,960	2,054	41,074	41,074
2	1,002	20,033	64,993	1,002	20,033	64,993	1,196	23,918	64,993
3	,971	19,427	84,420						
4	,447	8,939	93,359						
5	,332	6,641	100,000						

Source: The authors themselves



**Figure 1.** Scree eigenvalues test after the principal component analysis

Source: The authors themselves

Legend: (x) tested factors

**Table 4.** Matrices of the components before and after the factor rotation

	Unrotated component		Component with factor rotation	
	1	2	1	2
PC / PL	,162	,692	-,125	,699
PC / PNC	,854	,088	,750	,418
PC / (PNC + PL)	,616	,480	,377	,684
PC / (PC + PNC)	,845	-,202	,856	,148
PC / AT	,631	-,494	,775	-,205

Extraction Method: Principal Component Analysis.

a. 2 extracted components.

Source: The authors themselves

From the analysis of factorial loads presented in Table 4, a clear association of the variables PC / PL and PC / (PNC + PL) can be done with Factor 2, while the other variables are more associated to Factor 1.

Finally, Table 5 presents the factorial scores that are multiplied by each of the respective values of the standardized variables for factor calculation. For each observation of the research sample, these factors will replace the capital structure variables in the empirical model of research analysis presented in section 3.2.



Table 5. Matrix coefficient matrix of components scores

	Component	
	1	2
PC / PL	-,207	,663
PC / PNC	,314	,231
PC / (PNC + PL)	,063	,548
PC / (PC + PNC)	,425	-,037
PC / AT	,453	-,343

Extraction Method: Principal Component Analysis

Source: The authors themselves

## 4.2 Regression Analysis

In analyzing Table 6, which contains the descriptive statistics of the capital structure variables included in the factorial analysis, it is possible to infer explanations regarding the low results of the adequacy measures of the sample of the variables that were discarded from the factorial analysis. The average results of the indicators show that the short-term liabilities stand out in the composition of the capital structure of Brazilian companies. This is clear from the average results of PC / PL (1.39) and PC / PNC (1.56). Considering this profile, the strongest correlations fell on variables that more directly explain the proportion of short-term liabilities, and are poorly correlated with the others.

In addition, the results show that, among the 223 companies in the sample, short-term debt represents on average 49.62% of long-term funds (PNC + PL) and 45.33% of total indebtedness. These results cannot be considered surprising in an economy primarily financed by bank credit.

Table 7 shows the results of the empirical research model for the three discretionary *Accruals* methods, considering the specifications presented in section 3.2, as well as the considerations about the assumptions of the regression analysis by the ordinary minimum squares method.

Analyzing the results obtained, it can be observed that the three models are significant as a whole, that is, the null hypothesis (H0) that the determination coefficient (R2) would be statistically equal to zero should be rejected. This

fact can be observed by the probability of error evidenced in the F-statistic tests, which allows concluding that the behavior of alteration of the explanatory variables represented by Factors 1 and 2, extracted from the factorial analysis, has influence on the discretionary *Accruals* variation estimated by the three models, at the level of 5%.

The results also show that the PAE model was presented as the most explanatory, so that the Factors can explain approximately 9.99% (adjusted R<sup>2</sup>) of the variations occurring in discretionary *Accruals*. However, the individual analysis of the explanatory variables demonstrates that the coefficients of neither Factor are significant in all the models. These results make the analysis inconclusive because, although the regression is significant as a whole, there is no statistical significance of the coefficients of the explanatory variables of the model.

## 5. FINAL CONSIDERATIONS

The objective of this research was to analyze the relationship between the capital structure and the management of accounting results in the Brazilian capital market. The basic premise of the research is that managers have incentives to manage accounting results by means of accounting choices related to the recognition of *Accruals* with the objective of: i) manipulating accounting profits for the purpose of influencing investors' perceptions of future risks and prospects of return, with repercussions on liabilities and therefore on the capital structure; and ii) with the direct purpose of shaping the capital structure itself in search for better conditions for raising funds, making the company's indexes more attractive to investors and creditors, as well as to seek compliance with restrictive clauses restricting contracts to protect company creditors.

To address this research objective, 223 non-financial companies with publicly traded capital were analyzed at BMFBovespa. The analysis addressed the management of results from the discretionary *Accruals* estimated by means of three different operational models (Modified Jones, KS and PAE). The capital structure was approached from two factors formed through factorial analysis with extraction by

Table 6. Descriptive statistics of capital structure indices used in research

	Mean	Standard deviation	Variance	Minimum	Maximum
PC / PL	1,3943	12,3445	152,3870	-80,3182	158,7250
PC / PNC	1,5633	3,1644	10,0131	0,1027	37,2059
PC / (PNC + PL)	0,4962	1,2908	1,6662	-8,3520	10,8493
PC / (PC + PNC)	0,4533	0,2090	0,0437	0,0932	0,9738
PC / AT	0,3139	0,2932	0,0860	0,0298	2,4917

Source: The authors themselves



**Table 7.** Results of the multiple regression model estimated by the standard minimum squares method with robust standard errors for 223 companies

$GRI_{i,t} = \beta_0 + \sum \beta_1 ECI_{i,t} + u_{i,t}$			
Robust standard errors for White's heteroskedasticity correction			
Variable	Modified Jones	KS	PAE
Factor 1	-0.017603	-0.007953	-1.49E+13
	(0.2117)	(0.5870)	(0.2802)
Factor 2	0.013492	0.016953	1.65E+13
	(0.4630)	(0.3719)	(0.3209)
Intercept	-0.045435	-0.001662	-4.55E+12
	(0.0000)	(0.7864)	(0.2931)
R <sup>2</sup>	0.055248	0.040559	0.107681
Adjusted R <sup>2</sup>	0.046659	0.031837	0.099569
F-Statistics	6.432.682	4.650.087	1.327.434
Prob (F-Statistics)	0.001927	0.010520	0.000004
Akaike Info. Criteria	-1.917.880	-1.931.795	6.644.446
Schwarz Criterion	-1.872.044	-1.885.959	6.649.030

Source: The authors themselves

the main components analysis method applied to capital structure indices used in previous studies. The objective of using the factorial analysis was to allow the greatest number of perspectives on the proportions among the sources of capital to be included in the analysis, adding refinement to the methodology used in previous studies focusing on leverage. The factor analysis allowed the study to contemplate a greater variety of perspectives on the capital structure without there being problems of high correlation between the explanatory variables of the model, which are usually calculated using the same variables.

The results did not show a statistically significant relationship between the capital structure and the discretionary *Accruals* estimated through the three operational models. These findings allow understanding that the capital structure does not act as an incentive to the management of accounting results in the Brazilian capital market. Thus, managers' concerns regarding the capital structure and its various dimensions are not related to accounting choices and their discretionary reflections on the formation of results, on the formation of the *Accruals*, and on the quality of the accounting numbers.

It is recommended that future research refines the applied model with the inclusion of control variables to isolate the effects of the other incentives to the management of results, as well as the expansion of the research sample, either through the inclusion of previous periods, in order to form a panel that captures temporal effects in management practice, either with the inclusion of companies from other countries or with different models of financing in the economy (which may result in different capital structures and

establish new possibilities of relation with the accounting choices).

## REFERENCES

- An, Z.; Donghui, L.; Jin, Y. (2016), "Earnings Management, Capital Structure, and the Role of Institutional Environments", *Journal of Banking & Finance*, Vol. 68, pp. 131–52, available from <http://dx.doi.org/10.1016/j.jbankfin.2016.02.007>
- Beneish, M. D. (2001), "Earnings Management : A Perspective", *Managerial Finance*, Vol. 27, No. 12, pp. 3–17.
- Coelho, A. C. D.; Lopes, A. B. (2007), "Avaliação Da Prática de Gerenciamento de Resultados Na Apuração de Lucro Por Companhias Abertas Brasileiras Conforme Seu Grau de Alavancagem Financeira", *Revista de Administração Contemporânea*, Vol. 11, No. spe 2, pp. 121–44.
- DeFond, M. L.; Jiambalvo, J. (1994), "Debt Covenant Violation and Manipulation of Accruals", *Journal of Accounting and Economics*, Vol. 17, No. 1–2, pp. 145–76.
- Dechow, P.M., Sloan, R.G. and Sweeney, A.P. (1995), "Detecting earnings management". *Accounting review*, pp.193-225.
- Dichev, I. D.; Skinner, D. J. (2002), "Large-Sample Evidence on the Debt Covenant Hypothesis", *Journal of Accounting Research*, Vol. 40, No. 4, pp. 1091–1123, available from: <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=7351731&site=bsi-live>
- Fávero, L. P.; Belfiore, P.; Silva, F. L.; Chan, B. L. (2009), *Análise de Dados*, Elsevier, Rio de Janeiro, RJ.
- Gitman, L. J. (2002), *Princípios de Administração Financeira*, 7 ed., Habra, São Paulo, SP.



- Hair Jr, J. F.; Black, W. C.; Babin, B. J. et al. (2009), *Análise Multivariada de Dados*, 6 ed., Bookman, Porto Alegre.
- Healy, P. M.; Wahlen, J. M. (1999), "A Review of the Earnings Management Literature and Its Implications for Standard Setting", *Accounting Horizons*, Vol. 13, No. 4, pp. 365–83.
- Jensen, M. C.; Meckling, W. H. (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics*, Vol. 3, No. 4, pp. 305–60.
- Jones, Jennifer J. (1991), "Earnings Management During Import Relief Investigations." *Journal of Accounting Research*, vol. 29, no. 2, pp. 193–228.
- Kang, Sok-Hyon, and K. Sivaramakrishnan. (1995) "Issues in Testing Earnings Management and an Instrumental Variable Approach." *Journal of Accounting Research*, vol. 33, no. 2, pp. 353–367
- Kim, B. H.; Lei, L.; Pevzner, M. (2010), "Debt Covenant Slack and Real Earnings Management", SSRN Working Paper Series, January, available from: <http://search.proquest.com/docview/815316704?accountid=26357>
- Martinez, A. L. (2001), 'Gerenciamento' dos Resultados Contábeis: Estudo Empírico das Companhias Abertas Brasileiras, Tese de Doutorado em Contabilidade, Universidade de São Paulo, São Paulo, disponível em: <http://www.teses.usp.br/teses/disponiveis/12/12136/tde-14052002-110538/pt-br.php>
- Modigliani, F.; Miller, M. H. (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review*, Vol. 48, No. 3, pp. 261–297, disponível em: [https://www.jstor.org/stable/1809766?seq=1#page\\_scan\\_tab\\_contents](https://www.jstor.org/stable/1809766?seq=1#page_scan_tab_contents)
- Nardi, P. C. C.; Nakao, S. H. (2009), "Gerenciamento de Resultados E a Relação Com O Custo Da Dívida Das Empresas Brasileiras Abertas", *Revista Contabilidade & Finanças*, Vol. 20, No. 51, pp. 77–100.
- Paulo, E. (2007), "Manipulação das informações contábeis: uma análise teórica e empírica sobre os modelos operacionais de detecção de gerenciamento de resultados", Tese de Doutorado em Contabilidade, Universidade de São Paulo, São Paulo.
- Procianoy, J. L.; Schnorrenberger, A. (2004), "A influência da estrutura de controle nas decisões de estrutura de capital das companhias brasileiras", *Revista Brasileira de Economia*, Vol. 58, No. 1, pp. 121–146.
- Sant'Ana, C. F.; Padilha, D. F.; Klann, R. C. (2015), "Impacto do gerenciamento de resultados sobre a estrutura de capital dos países do G-20", in *Simpósio de Administração da Produção, Logística e Operações Internacionais*, pp. 1–16.
- Silva, A. R. P.; Farias, K. T. R.; Machado, M. A. V.; Mendes, D. B. (2014), "Estrutura de capital e conservadorismo condicional nas companhias abertas", *Congresso Controladoria e Contabilidade USP*, pp. 1–17.
- Sweeney, A. P. (1994), "Debt Covenant Violations Accounting Responses and Managers", *Journal of Accounting and Economics*, Vol. 17, pp. 281–308.
- Tahir, S. H.; Sabir, H. M.; Shah, S. Z. A. (2011), "Impact of Earnings Management on Capital Structure of Non-Financial Companies Listed On (KSE) Pakistan", *Global Business & Management Research*, Vol. 3, No. 1, pp. 96–105.
- Watts, R. L.; Zimmerman, J. L. (1978), "Towards a Positive Theory of the Determination of Accounting Standards", *The Accounting Review*, Vol. 53, pp. 112–34.

**Received:** March 15, 2018

**Approved:** May 29, 2018

**DOI:** 10.20985/1980-5160.2018.v13n4.1411

**How to cite:** Gomes, A. C.; Macedo, H. C.; Marques, J. A. V. C (2018), "Effects of the capital structure on the management of accounting results in the Brazilian capital market", *Sistemas & Gestão*, Vol. 13, No. 4, pp. 469-481, available from: <http://www.revistasg.uff.br/index.php/sg/article/view/1411> (access abbreviated month. year).