ISSN 1981-8610

repec

English version

Revista de Educação e Pesquisa em Contabilidade

Journal of Education and Research in Accounting

REPeC, Brasília, v. 12, n. 3, Jul./Sep. 2018
Available online at www.repec.org.br
DOI: http://dx.doi.org/10.17524/repec.v12i3

ABRACICON
ACADEMIA BRASILEIRA
DE CIÊNCIAS CONTÁBEIS

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Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

ISSN 1981-8610 Quarterly journal, digital and free published by Brazilian Academy of Science in Accounting (Abracicon)

ABRACICON
ACADEMIA BRASILEIRA DE CIÊNCIAS CONTÁBEIS

Publication date: September 28th, 2018

EDITORIAL TEAM

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REPeC uses the Journal Electronic Editing System (SEER) for management of the periodical.

The Electronic Editing System (SEER) was translated and adapted from the Open Journal Systems (OJS) by the Brazilian Institute of Information in Science and Technology (IBICT). This free software, developed by the British Columbia University from Canada, aims at assisting scientific journals editing in each stage of the process, from submission and consultants evaluation to online publication and its indexation.

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REPeC: Journal of Education and Research in Accounting [eletrônic issue] / Brazilian Academy of Science in Accounting – v.1, n.1 (dec. 2006 /mar. 2007)-. -- Brasília: CFC, 2007-.
Quarterly
ISSN: 1981-8610
Access Mode: http://www.repec.org.br

1. Accounting Sciences 2. Accounting I. Federal Council of Accounting II. Title.

CDU-657

Catalographic Label prepared by Librarian Lúcia Helena Alves de Figueiredo CRB 1/1.401

REPeC, Brasília, v. 12, n. 3, Editorial, p. 272-274, Jul./Sep. 2018
Available online at *www.repec.org.br*

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

Editorial

Dear reader,

The Journal of Accounting Education and Research (REPeC) is a scientific journal issued by the Brazilian Academy of Accountancy (Abracicon), electronically published every three months.

In its third issue of 2018 (v. 12, n. 3), REPeC publishes 7 (seven) original articles, resulting from relevant research in Accounting and related areas, addressing topics such as investments, student retention in accounting courses, preparation processes of standards for Leasing by the accounting standardization committee, modeling for credit risk analysis, retention of cash by companies, materiality and accountability in the integrated report and, finally, discourse analysis in company management reports.

Below is a brief report of the 7 (seven) articles published:

Does the Management Fee Signal the Performance of Investment Funds in Brazil? This is the title of the first article, written by Sabrina Espinele da Silva, Carolina Magda Roma, and Robert Aldo Iquiapaza. The study looks at the relationship between the management fee and the risk-adjusted performance before the rates of active stock investment funds classified as Ibovespa and investigates whether the difference in rates reflects differences in the value that the funds create for the investor. The authors found a negative relationship between administration rate and performance. This indicates that the funds in the sample that charge high rates are the ones that generally generate the worst performance for the investor. Thus, the differences in rates also reflect differences in the value that the funds create for the investor. In addition, the net equity of the fund has a positive relationship with its performance, while the age has a negative relation and the Anbima seal did not present statistical significance.

Influential Factors in Student Retention: a Study Involving Undergraduate Students in Accountancy is the second article, authored by Luis Felipe Hortenzi Vilela Braga, Neusa Maria dos Santos Bastos Fernandes Santos, José Carlos Toledo, Andrei Aparecido Albuquerque, and Jhon Franky Bernedo Gonzales. The objective of the research was to analyze factors that influence student retention, aiming to produce indicators for the management of courses in Accounting Sciences. The factors considered are derived from the model by Cabrera, Nora, and Castañeda (1992) and cover cognitive, behavioral and external factors to the institution. In a sample of 155 undergraduates attending an undergraduate course in Accounting Sciences, the factors "encouragement of close people" and "academic and intellectual development" were more important in the explanation of student retention.

The third article was entitled **IFRS 16 - Leases: Challenges, Perspectives and Implications in the Light of Substance over Form**, written by Nyalle Barboza Matos and Jorge Katsumi Niyama. The objective of this paper was to discuss the main challenges and impacts of IFRS 16 and its implications for the accounting treatment of leases, analyzing the compliance with the new models imposed in the light of the primacy of substance over form. The discussion of the topics reveals that the main challenges the standard entails are perceived by the lessees. The single accounting model comes with a number of subjectivities that start with the On / Off balance sheet test, which brings concepts to identify whether the contract is or contains leasing. Subsequently, the subjectivity in identifying and separating the leasing components from the non-leasing components of a contract may be a complex exercise that will require more information to be made available by the lessor and/or the use of an independent base price for that lease. At the macro level, the impact of the standard is mainly due to changes in financial measures (e.g. EBITDA, ROE, ROA); new estimates, greater judgment, and balance sheet volatility.

In the fourth paper, entitled **A Credit Risk Analysis Approach Using the Fleuriet Model**, by José Willer do Prado, Francisval de Melo Carvalho, Gideon de Carvalho de Benedicto, Valderí de Castro Alcântara, and Antonio Carlos dos Santos, the authors sought to construct a model capable of evaluate the credit risk in Brazilian publicly traded companies, using indicators from the Fleuriet model of financial analysis. For indicators such as financial structure, working capital and the need for working capital, the companies seek to perform a constant growth model, expanding or gaining markets, as there is always a need for additional working capital over time. The results found for the liquidity thermometer demonstrate the importance of financial accounts called treasury accounts to calculate the company's short-term liquidity and solvency capacity. Finally, financial indebtedness as a structural index contributed significantly to the model.

Vanessa Rabelo Dutra, Igor Bernardi Sonza, Paulo Sergio Ceretta and *Oscar Claudino Galli* are the authors of the article **Determinants of Cash Retention in Brazilian Companies: an Analysis after the 2008 Crisis**. In this study, the authors analyzed the determinants of cash retention in Brazilian companies through the literature assumptions related to the transaction, speculation, precaution, taxes and governance problems. The authors found three schemes, defined by the size variable, dividing the sample into larger, intermediate and smaller companies. Transactions and taxes are the main reasons to reduce the retention of cash for smaller companies. The reasons related to the precaution for bigger ones and to the problems of governance for the smaller companies presented a positive relationship with the cash change, corroborating the theory, but do not explain this change in the Brazilian companies. Speculation was not significant in any scheme.

The sixth article, by Wesley Paulo Santos, Raimundo Nonato Rodrigues and Luiz Carlos Miranda, is entitled **A Study of Stakeholders' Positioning on Information Materiality and Accountability in the Integrated Report**. This study sought to identify, in an individualized way, the positioning adopted by each participant in the process of elaborating the Integrated Report (IR) at the Consultation Draft stage and whether this positioning is similar to that adopted by others who identified themselves in a similar way. Their results show that stakeholders, with the exception of financial capital providers, tended to disagree on the concept of materiality suggested by the International Integrated Reporting Council (IIRC). It was found that most companies were not resilient in assuming responsibility for information disclosed in IR.

The seventh and last article of this issue, **Analysis of the Occurrence of Machiavellian and Narcissistic Discourse in the Management Reports of Firms Involved in Financial Scandals**, by Márcia Figueredo D'Souza, Iracema Neves Aragão and Márcia Maria Mendes De Luca, arose from the motivation to examine the occurrence of words that reveal linguistic traits of Machiavellianism and Narcissism in the discourse of leaders of companies involved in corruption scandals in Brazil in the light of the Upper Echelons theory. The authors' findings suggest that the use of the words "our/ours", "plus", "strong", "greater", "great", "best", "confidence", "values", and "growth" refer to narcissistic characteristics. The semantic analysis of the speech acts reveals machiavellian traits.

Finally, the entire editorial team of REPeC hopes you will enjoy your reading!

Prof. Orleans Silva Martins, Ph.D.
Editor-in-Chief

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

REPeC, Brasília, v. 12, n. 3, art. 1, p. 275-290, Jul./Sep. 2018
Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1717

Does the Management Fee Signal the Performance of Equity Investment Funds in Brazil?[1]

Abstract

Objective: Analyze the relation between the management fee and the risk-adjusted performance before fees of active investment funds classified as Ibovespa and investigate if the difference in fees reflects differences in the value the funds create for the investor.

Method: Therefore, a panel regression was applied, using a pooled model in which the funds' risk-adjusted performance served as the dependent variable and the management fee as the explanatory variable. Then, other control variables were included in the regression. To measure the fund performance, the models of Carhart (1997) and Fama and French (1993, 2015) were used.

Results: The results appointed a negative relation between management fee and performance. This indicates that the funds in the sample that cover high fees generally perform worse for the investor. Hence, the different fees also reflect differences in the value the funds create for the investor. In addition, the net equity of a fund is positively related with its performance, while age is negatively related and the Anbima seal did not reveal statistical significance.

Contributions: This research adds to the results in the literature as follows: a negative relation is shown between management fee and performance, even when controlling for variables such as size, age and quality in terms of corporate governance. In addition, this relation exists independently of the model used to measure the fund performance; in addition, more current evidence is presented and for an emerging market. Also, evidence is provided that the best corporate governance practices are not related with the achievement of good performance.

Key Words: Investment funds; management fee; performance.

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1 Preliminary version of this paper presented at the XVII Brazilian Encounter of Finance (2017).

Published in Portuguese and English. Original Version in Portuguese.

Received in 10/27/2017. Ask to Revise on 6/16/2018. Resubmitted on 7/1/2018. Accepted on 7/8/2018 by Dr. Orleans Silva Martins (Editor).
Published on 8/22/2018. Organization responsible for the journal: Abracicon

1. Introduction

One of the major challenges for capital market investors is the assessment of different investment alternatives. Specifically for equity investment funds, evaluating their performance is one of the key steps in the decision-making process between whether to invest or not. This task is not so simple though, as several studies have shown that there are different characteristics of the funds that influence its performance, such as size, age and management fee (Pollet & Wilson, 2008; Gil-Bazo & Ruiz-Verdú, 2009; Castro & Minardi, 2009; Milani & Ceretta, 2013).

Given the importance of understanding the factors influencing fund performance, studies such as Chen, Hong, Huang and Kubik (2004) and Pollet and Wilson (2008) analyzed the relationship between fund size and the achievement of good performance. Chen et al. (2004) argue that, as funds grow, diseconomies of scale emerge that corrode performance. On the other hand, in Brazil, Castro and Minardi (2009) found a positive relationship between size and performance.

The age of the fund is also analyzed as a variable that relates to performance. In a way, the fund's age measures its survival in the market and the loyalty of its investors (Golec, 1996). Thus, a positive relationship between age and performance is expected and was found in the studies by Milani and Ceretta (2013) and Alda, Andreu and Sarto (2017).

With regard to fees, it is known that the management and maintenance of a fund generate costs, and these are distributed to the stockholders through the fees, which may be: management fees, performance fees and entrance and exit fees. Gil-Bazo and Ruiz-Verdú (2009) argue that, as the main service a fund provides is portfolio management, the fees they charge should reflect their risk-adjusted performance. Also according to them, "in a well-functioning mutual fund market, fund fees should be positively correlated with risk-adjusted expected returns before fees" (p. 6).

Despite the apparent positive relationship between fees and performance, studies developed in the American market evidence a negative relationship between the management fee and the performance of equity investment funds (Gil-Bazo & Ruiz-Verdú, 2009; Vidal, Vidal-García, Lean & Uddin, 2015). This divergence from the initial idea made the authors consider this relationship as anomalous.

Based on the evidence from previous work, Mansor, Bhatti and Ariff (2015), analyzing Malaysian funds, point out that the imposition of fees has an unfavorable impact on fund performance, regardless of the type of fee charged, with higher fees being related to the low performance of fund returns. The results of these authors also demonstrated a negative relationship between fees and fund returns, both for Islamic funds (funds that limit investments based on faith-based ethical issues) and for conventional funds (other funds that do not use ethical restrictions in portfolio formation).

Given the apparently intriguing results found for the relationship between fees and performance in the US funds market, the main objective in this study is to analyze if this same relation can be verified in the Brazilian fund market, considering the equity investment funds classified as Ibovespa, and to investigate whether the difference in fees reflect differences in the value that the funds create for the investor. Therefore, a panel regression was applied using a pooled model and, later, using the Fama-MacBeth model, with performance adjusted to the funds' risk as a dependent variable and the management fee as the explanatory variable. The results showed that the negative relationship observed in the US market between management fee and performance can also be observed in the Brazilian market.

This research is justified because the investment fund industry represents an important market for Brazil. This industry has shown significant growth over the last few years. According to data from the Brazilian Association of Financial and Capital Market Entities (Anbima, 2016), the consolidated net worth of the investment funds in January 2017 exceeded 3 trillion *reais*, which corresponds to more than 50% of the country's Gross Domestic Product (GDP); in contrast, in December 2004, this equity corresponded to approximately 600 billion, thus showing the great increase in the amount of resources Brazilian investment funds have managed over the years.

In addition, active funds seek to achieve the highest possible return in their category, as opposed to the passive funds, which follow a certain indicator. Also, active management requires greater management effort with further research and elaboration of more sophisticated strategies, increasing the cost of management, consequently raising the value of the management fee. The main question is whether the rising cost of management is offset by performance increases.

The number of Brazilian studies on this subject is scarce, especially with regard to the evaluation of the relationship between the fees the funds charge to the investor and their performance. Therefore, a broader debate is necessary in the literature, expanding the findings of other works. In this regard, the studies of Dalmácio, Nossa and Zanquetto Filho (2007) and Dalmácio, Nossa, Louzada and Santanna (2010) can be cited, who analyzed if the management fee and the performance fee are related with the performance of the equity funds. This study differs by presenting a more current database and using the four-factor model by Carhart (1997) and the three and five-factor models by Fama and French (1993, 2015) to calculate fund performance. In addition, control variables are tested to investigate the robustness of the relationship between management fees and performance. Thus, this research aims to contribute to the Brazilian literature in order to fill the gaps in this field of study.

The choice of Carhart's four-factor model (1997) and Fama and French's (1993, 2015) three and five-factor models to measure fund performance is justified, the former being one of the most used models by authors who discuss the performance evaluation of funds (Chen et al., 2004; Gil-Bazo & Ruiz-Verdú, 2009; Castro & Minardi, 2009; Vidal et al., 2015). The five-factor model of Fama and French (2015), being a more current model, was used as a complementary and test model, which constitutes a contribution of this article. Finally, the model of Fama and French (1993) was also used as a complementary analysis, following the procedure of other authors, such as Chen et al. (2004) and Gil-Bazo and Ruiz-Verdú (2009).

This research extends the results of the literature as follows: it shows that there is a negative relation between management fee and performance, even when controlling for variables such as size, age and quality in terms of corporate governance. In addition, this relationship exists independently of the model used to measure fund performance. In addition, it presents more current evidence and for an emerging market. In addition, it provides evidence that there is no relationship between best corporate governance practices and the achievement of good performance.

In practical terms, this research shows that investors should pay attention to the value of the management fee when selecting an active investment fund to invest in, as this may erode the performance delivered to the shareholder. Similarly, managers need to pay attention to managers' practices in order to minimize the management cost as much as feasible, in order to reduce the management fees and deliver better performance.

2. Literature Review

2.1 Management fee and the performance of the funds industry in Brazil

The collective application of resources through investment funds provides investors with a number of benefits, such as access to markets that are unlikely to be accessed individually; greater diversification of risks; professional management; and safer investments. Milani and Ceretta (2013) point out that the main advantage of a fund is to provide specialized management for inexperienced investors.

Brazilian funds, in addition to significant growth, also show greater diversification in the management of the resources managed. In 1980, the funds invested only in equity; in 2000, then, fixed income investment funds prevailed. Data from Anbima (2017) show that 48% of total industry equity is in fixed income funds, while 4.3% is in equity funds; in 2000, 87% of the total equity of the industry was in fixed income funds.

Brazilian industry ended the year 2015 with 3 trillion in net worth, capturing 7 billion in the domestic market, which turned it into the seventh largest resource management industry in the world in 2014, according to information from the Brazilian Financial and Capital Markets Association (Anbima) and the Getúlio Vargas Foundation (FGV) (2016).

In terms of regulation, the Brazilian Securities and Exchange Commission (CVM) is primarily responsible for the Brazilian funds industry and published the new CVM Instruction 555 in 2014, which replaces CVM Instruction 409/2004, simplifying rules and the structure of the investment funds themselves and defining concepts and characteristics of the funds and types of investors. In addition to the CVM, Anbima also self-regulates the Brazilian fund industry, compiling and providing information and data about it.

There is a wealth of literature on performance, whether risk-adjusted or not, generated by the active management of investment funds, especially in the United States, where the industry is more developed and more representative (Sharpe, 1966; Jensen, 1968; Grinblatt and Titman, 1989, among others), but this literature has hardly discussed one of the main costs of managing investment funds for stockholders. Grinblatt and Titman (1989) argue that fees (management and performance) and transaction costs ultimately dilute the abnormal returns the fund managers generate. According to this study, one can observe abnormal performance (above average) only by examining gross returns, from which transaction costs, fees or other expenses have not been subtracted yet. Their study compared the abnormal return of active and passive investment strategies, with and without transaction costs, fees and expenses, for the period 1975-1984.

Dellva and Olson (1998) investigated the relationship between the various fees the funds charged and the performance adjusted to their risk. The sample consisted of mutual equity funds from 1987 to 1992. They concluded that funds with sales commission charges (charged at the time of purchase, front-end load) obtained lower risk-adjusted performance than funds without this charge. In addition, that 12b-1 (annual marketing) fees, deferred sales costs and redemption fees increase fund expenditures and only a limited number of funds achieve risk-adjusted performance to justify them. The authors also point out that the absence of fees cannot be interpreted as a sign of superior performance, as most funds that do not charge a fee also gain on average risk-adjusted negative returns.

Gil-Bazo and Ruiz-Verdú (2009) investigated whether the differences in the rates charged by the funds reflected differences in the values these funds create for the investor. They used a sample of investment funds in active management stock from December 1961 to December 2005, excluding from the sample passive and institutional funds. The authors used regressions of the surplus return before the fees on the risk factors of the Carhart model (1997); they also used the three-factor model of Fama and French (1993) and the Fama-MacBeth procedure. Their results showed that there is a negative relationship between the fees charged by the funds and their performance. The authors attempted to explain the reason for this negative relationship by studying fund characteristics such as fund governance, operating cost, fund strategy and others.

Mansor et al. (2015) examined the comparative performance of two types of funds - Islamic funds (faith-based ethical funds) and conventional funds (other funds that do not use ethical filtering in portfolio formation) - to find out if investor returns are affected by different rates and if the returns are significantly different. At the same time they investigated whether there is evidence of the market timing ability of fund managers. They used a sample of 106 equity funds in Malaysia between 1990 and 2009. They concluded that the fees, no matter whether they are compulsory, expense fees or both, significantly affect the equity fund performance, reducing the performance and the investors' return. In addition, they also rejected the managers' market timing skills, which they appointed as one of the justifications for charging high rates.

Vidal et al. (2015), seeking to understand the relationship between fund fees and the predictability of returns, examined the relationship between individual fund returns and fees, controlling for various macroeconomic variables. They analyzed monthly returns of 37,166 registered US funds (restricted to active management funds), using four macroeconomic variables to consider variations in business conditions, such as: default spread, dividend yield, one-month treasury bill fee and term spread (difference between income from treasury bills of ten years and three months). The authors used Carhart's four-factor model (1997) to calculate the performance of funds before fees. Their results showed that there is a negative relationship between the fund performance before fees and the fees they charge to investors. In addition, they found that the funds show evidence of predictability of negative returns for expense fees, i.e. lower net performance would be expected in the future from funds with higher fees.

Haque and Ahmed (2015) studied the relationships between the conditional and unconditional abnormal returns generated by the Australian fund managers and the expenses they incurred. The authors used monthly returns, net of expenses from June 1992 to December 2013. Abnormal returns were assessed using the model of Fama and French (1993) and an augmented version of this model to include the period of recession and booming of the market. They found that Australian retail funds charging high rates generate relatively low post-fee risk-adjusted returns, both unconditionally (regardless of market condition) and under poor economic conditions. They concluded that Australian funds charge more in fees than they generate in returns for investors when the risk is accounted for, both under strong and weak economic conditions.

Among the studies carried out in the Brazilian market, Dalmácio et al. (2007) aimed to find out if the management fee attributed to investment fund management institutions is related to the performance (risk x return) of these funds. For this purpose, they analyzed the active Ibovespa and IBrX equity funds in the period from May 2001 to December 2003. Based on the data, the authors calculated the volatility and the Sharpe Index used as an indicator of performance; then, they associated the management fee to the respective Sharpe indices of each fund and calculated the linear correlation coefficient and Pearson's moment-to-product correlation coefficient between these variables. They found that there is no relationship between the management fee and the performance of the active Ibovespa equity funds and that there is weak correlation between the management fee and the performance of the active IBrX equity funds.

Dalmácio et al. (2010) investigated whether there is a relationship between the performance fee charged by the fund manager and the performance (risk x return) of these funds. For this reason, they analyzed the Brazilian active Ibovespa equity funds from May 2001 to December 2003. The authors compared the averages between the 32-month profitability of the funds that charge a performance fee against the 32-month profitability of the funds that do not charge this fee. They also analyzed the volatility and Sharpe's index of these funds by means of comparison using a t-test. The conclusion of this study was that there is no relationship between the performance fee charged by asset management institutions and the performance (risk x return) of these funds. The study showed that there is no evidence to state that the profitability of funds that charge performance fees is greater than the profitability of those that do not charge those fees.

Chart 1 summarizes the studies presented, demonstrating the main objectives and results found in the literature regarding the relationship between the management fee and the performance of investment funds.

Author	Year	Objective	Main Results
Grinblatt and Titman	1989	Compare the abnormal return of active and passive investment strategies, with and without transaction costs, fees and expenses in the period 1975-1984.	Abnormal (above-average) performance can be observed by simply examining the gross returns, from which transaction costs, fees or other expenses have not been subtracted yet.
Dellva and Olson	1998	Investigated the relation between the different fees the funds charge and the risk-adjusted performance.	Funds with sales commission charges (charged front-end load) achieve lower risk-adjusted performance than funds without this charge. In addition, 12b-1 fees (annual marketing fee), deferred sales costs and rescue fees increase the fund expenses and only a limited number of funds achieve a risk-adjusted performance able to justify them.
Dalmácio et al.	2007	Investigated if the management fee charged by the investment fund management institutions is related with the performance (risk x return) of these funds.	Verified that there is no relation between the management fee and the performance of the Ibovespa ativo stock funds and that a weak correlation exists between the management fees and the performance of the IBrX ativo stock funds.
Gil-Bazo and Ruiz-Verdú	2009	Investigated if the differences in the fees the funds charged reflected differences in the values these funds create for the investor.	Showed that a negative relationship exists between the charges the funds cover and their performance.
Dalmácio et al.	2010	Investigated the existence of a relation between the performance fee, charged or not, by the fund manager and the performance (risk x return) of these funds.	Concluded that there is no relation between the performance fees charged or not by the management institutions of the active stock funds and the performance (risk x return) of those funds.
Mansor et al.	2015	Examined the comparative performance of two types of funds (Islamic funds and conventional funds), aiming to discover if the different fees affect the investors' returns and if the returns are significantly different, also looking for proof of the fund managers' market timing capacity.	Concluded that the fees, whether compulsory, expense fees or both, significantly affect the performance of stock funds, reducing the performance and the investors' return. In addition, they also rejected the managers' market timing skill, which they appointed as one of the justifications for charging high fees.
Vidal et al.	2015	Aimed to understand the relationship between the fund fees and the predictability of the returns and examined the relation between the individual returns of the funds and the fees, controlling for several macroeconomic variables.	Its results showed that a negative relationship exists between the fund performance before the fees and the fees they charge the investor. In addition, they concluded that the funds show evidence of predictability of negative returns for expense fees.
Haque and Ahmed	2015	Studied the relations between the conditional and unconditional abnormal returns produced by the managers of Australian equity investment funds and the expenses they charge.	Discovered that the Australian retail funds that charge high fees produce relatively low post-fee risk-adjusted returns, both unconditionally (independent from the market condition) and in weak economic conditions.

Chart 1. Synthesis of main results found in the literature concerning the management fee and performance of investment funds

Source: created by the authors

2.2 Performance assessment models

Since Modern Portfolio Theory, proposed by Markowitz (1952), much has been discussed about the process of portfolio construction and evaluation. The performance evaluation of a portfolio is one of the parts of an investor's decision-making process between investing or not.

Investment fund performance measuring is done with the aid of mathematical models. Jensen (1968), in evaluating the performance of funds, proposed an evaluation measure that corresponded to the intercept of the regression obtained through the use of the capital asset pricing model (CAPM). This measure was known as Jensen's alpha and represents the abnormal return achieved by the fund.

The CAPM model, however, despite being a widely used model, undergoes several points of criticism (Ross, 1976; Roll, 1977; Fama and French, 1996). Ross (1976) argues that the model has inconsistencies in considering a single measure of risk in asset valuation. Thus, in the literature, other models have emerged to expand on the CAPM model and its explanatory power.

Fama and French (1993) proposed adding two additional factors to the CAPM model; a size factor and a book-to-market factor. According to these authors, investors would demand a premium not only for the market risk proposed by the CAPM model, but also for the risk related to the size of the company and the risk related to the book value indicator in relation to the market value.

Afterwards, Carhart (1997), when evaluating the predictability of investment fund performance, adds the momentum factor to the model proposed by Fama and French (1993). The momentum factor can be defined as the strategy to buy assets that have performed well in the previous months (short term) and to sell assets with low income in the same period. It will determine the manager's ability to keep up past positive and negative returns in the future.

More recently, Fama-French (2015) updated the three-factor model and created a five-factor model, incorporating two new risk factors into the first: profitability and investment.

The Brazilian and international studies have indicated preference for using Fama and French (1993) and Carhart's (1997) models to measure the performance of investment funds (Carhart, 1997; Chen et al., 2004; Gil-Bazo & Ruiz-Verdú, 2009; Casto & Minardi, 2009; Nerasti & Lucinda, 2016; Paz, Iquiapaza & Bressan, 2007).

3. Method

3.1 Description of sample data

The data for the analysis were collected in the database provided by Anbima, Sianbima 4.3.7. Information on funds classified as Ibovespa Activo was collected according to Anbima's new ranking of funds. For each fund, the value of the quota, the shareholders' equity and the start date of the fund were collected, as well as the code, name, management fee, performance fee and its return, on a monthly basis, considering the period from January 2009 to September 2015, chosen based on the availability of the data.

Following the procedures performed by Gil-Bazo and Ruiz-Verdú (2009) a restriction was established that, to remain in the sample, the fund should have at least 48 months of return data. Thus, all funds that had less than 48 months of return data were excluded from the sample. In addition, still following the authors' method, as a guarantee that the results were not influenced by differences between types of management or type of investor the funds are offered to, the sample consisted only of active and retail funds. Thus, the results can be compared with the literature.

3.2 Calculation of return before fees

To calculate the return before fees, the procedures by Castro and Minardi (2009) and Paz *et al.* (2017) were adopted. First, the monthly net return of each fee was calculated in accordance with Equation 1:

$$Net.Ret._{i,t} = \frac{Quota_{i,t} - Quota_{i,t-1}}{Quota_{i,t-1}} \quad (1)$$

Where:

- $Quota_{i,t}$ = quota value of fund i (R$) at the end of month t;
- $Quota_{i,t-1}$ = quota value of fund i (R$) at the end of month t-1;

After calculating the return net of fees, the gross monthly return (return before fees) was calculated according to Equation 2:

$$Gross.Ret._{i,t} = Net.\,\mathrm{Re}\,t._{i,t} + ((1 + manfee)^{(1/12)} - 1) \quad (2)$$

The factor 1/12 is due to the fact that the information disclosed about the fees is detailed in annual terms. Therefore, the management fees were also transformed into monthly fees according to the model in Equation 3.

$$monfee_{i,t} = ((1 + manfee)^{(1/12)} - 1) \quad (3)$$

3.3 Fund performance estimation

To estimate the fund performance before the fees, Carhart's four-factor model was used (1997), similar to the procedures by Gil-Bazo and Ruiz-Verdú (2009). This model is described in Equation 4.

$$r_{i,t} - r_{f,t} = \alpha_{i,t} + b_{i,t}(r_{m,t} - r_{f,t}) + s_{i,t}SMB_t + h_{i,t}HML_t + p_{i,t}PR1YR_t + \varepsilon_{it} \quad (4)$$

Where:

- $r_{i,t}$ - $r_{f,t}$ = return before fees of fund i in month t superior to the risk-free asset return in month *t*;
- SMB_t = S*mall Minus Big* – premium for the size factor in month *t*;
- HML_t = *High Minus Low* – premium for the book value / market value factor (BV/MV) in month *t*.
- $PR1YR_t$ = *Prior 1-year momentum* – premium for the momentum factor in month *t*.
- ε_{it} = Error term of the model.

The factors used in the Carhart model (1997) were obtained through the construction of portfolios with all the Brazilian shares registered on BM & FBOVESPA. The procedures performed to construct the factors are described in section 3.3.1.

The estimation was performed in two stages. In the first stage, regressions were executed with all funds that had at least 48 months of return data. The excess return was reversed before the fees against the risk factors in the previous five years, in a moving window. Then, in the second stage of estimation, the risk-adjusted performance of fund i was estimated as the difference between the surplus return before interest rates and the realized risk premium, defined as the beta vector multiplied by the vector of realized factors in month t.

In addition, besides Carhart's (1997) model, Jensen's alpha was also calculated using the models of Fama and French (1993), which considers only three factors (market risk premium, size and book value/market value) and by the model of Fama and French (2015), which adds the profitability (RMW – Robust-Minus-Weak) and investment (CMA – Conservative-Minus-Aggressive) factors to the model of Fama and French (1993).

3.3.1 Construction of risk factors in Fama-French (1993, 2015) and Carhart (1997)

In order to estimate the factors used in the multifactor model, portfolios were constructed. All portfolios were established at the end of June of year t-1 (last trading day). The portfolios included all stocks listed on BM & FBOVESPA with available data, excluding financial institutions and companies that had negative book value.

The first factor, the market risk premium, was constructed as the difference between the monthly returns of the Ibovespa index and the risk-free monthly returns of the fee (CDI).

Similar to the procedure of Fama and French (1993), stocks were ranked according to size relative to the median of their market value in small and large. Soon after, the percentiles of the book value / market value ratio (BV/MV) were used to divide them into three groups: high ratio (> 70), neutral (between 70 and 30) and low ratio (<30), resulting in six portfolios relating size and BV/MV ratio. According to Fama and French (2015), the SMB factor (BV/MV) is defined as the difference between the average monthly return of the three small stock market portfolios and the average monthly return of the three stock portfolios with large market capitalization (large stocks). This factor was also used for the Carhart model (1997) in this study.

Fama and French (2015) also present the variables SMB (profit.) and SMB (invest.), which are ways to verify the effect of size on profitability and investment. Thus, the SMB (profit.) is the average of the returns of three small and large portfolios, classified based on the percentiles of the operating profitability ratio (robust, neutral and weak), and the SMB (invest.) is the average of returns from three small and large portfolios, classified based on the percentiles of the investment ratio (conservative, neutral and aggressive). The percentiles remain the same (> 70, between 70 and 30, <30). Thus, the SMB factor for the model of Fama and French (2015) consists of the average of the returns of the three factors mentioned above - SMB (BV/MV), SMB (invest.), SMB (profit.).

The book value/market value (HML) factor was computed as the difference between the average monthly return of the two stock portfolios with high book value/market value (BV/MV) and the average monthly return of the two stock portfolios with low BV/MV index.

For the construction of the momentum factor in the Carhart (1997) model, with the same portfolios constituted for the three-factor model, the stocks were ranked based on the accumulated returns of the last 11 months and divided into two groups (winners and losers), based on the median of the accumulated returns. The momentum factor (MOM) is defined as the difference between the average monthly return on the two winning equity portfolios and the average return on the two losing equity portfolios.

The profitability factor (RMW) was calculated as the difference between the average monthly return on the two highly profitable equity portfolios and the average monthly return on the two poorly profitable equity portfolios.

The investment factor (CMA) was calculated as the difference between the monthly average return on the two low-investment portfolio (conservative) and the average monthly return on the two (aggressive) high-investment portfolios.

3.4 Econometric estimation

To answer the proposed research question, after calculating the risk-adjusted fund performance, a regression was calculated in which fund performance served as the dependent variable and the management fee as the explanatory variable. Gil-Bazo e Ruiz-Verdú (2009) applied a similar procedure.

A panel regression was performed using a pooled model, followed by the Fama-MacBeth model, as described in Equation 5.

$$\alpha_{it} = \delta_{ot} + \delta_1 manfee_{it} + \xi_{it} \quad (5)$$

Where:

- α_{it} = risk-adjusted performance before fees of fund i in month t;
- $manfee_{it}$ = management fee of fund i in month t;

The fund performance was measure using Jensen's alpha, obtained from Fama and French (1993), Carhart (1997) and Fama and French's (2015) models, all applied in the model of Equation 5.

Like the effect of the management fees, in other studies, empirical evidence was surveyed for additional variables affecting performance. In Chart 2, the variables chosen for use in this study have been summarized, aiming to test the robustness of the results, as well as the authors who used them and the results found for this relationship. It is highlighted that the expected relationship is based on the evidence found in background studies.

Variable	Specification	Source	Expected Relationship
Size	Natural logarithm of Net Equity of the Fund.	Chen et al.(2004); Milani and Ceretta (2013); Carneiro (2014); Paz, Iquiapaza and Bressan (2017);	+/-
Age	Number of years the fund has been functioning (calculated at the end of each period).	Milani and Ceretta (2013)	+/-
Management fee	Fee charged by some funds to cover management and other costs.	Gil-Bazo and Ruiz-Verdú (2009); Mansor et al. (2015); Vidal et al. (2015); Carneiro (2014); Paz et al. (2017)	-
Seal	Dummy variable: (1) Fund holds Anbima seal of regulation and best practices; (0) Fund does not hold Anbima seal.	Paz et al. (2017)	+

Obs.: Expected Relationship according to previous empirical evidence.

Chart 2. Empirical evidence of other variables influencing performance

Source: created by the authors

Thus, after estimating the effect of the management fees on performance, a new regression model was applied, now including the variables size (natural logarithm of fund equity), age (measured in years of activity of the fund), Anbima seal (proxy to measure the funds' compliance with best corporate governance practices) and management fee (management cost of fund). This model has been specified in Equation 6.

$$\alpha_{it} = \delta_{ot} + \delta_1 manfee_{it} + \delta_2 Siz_{it} + \delta_3 Age_{it} + \delta_4 Seal_{it} + \xi_{it} \quad (6)$$

The interquartile interval was analyzed to identify outliers, in accordance with other authors (Favero, Belfiore, Silva & Chan, 2009; Carneiro, 2014). Observations considered as outliers were excluded from the sample. This detection method of outliers was chosen because of its robustness, in view of the absence of influence from external value, as opposed to method that consider the standard deviation in the detection of atypical values for example.

4. Results and Analysis

4.1 Descriptive statistics of funds in the sample

After the restrictions established according to the method, the final sample of active Ibovespa funds consisted of 152 funds, with a mean age of 12 years and mean management fee of 0.16 % per month. On average, these funds manage a net worth of 61.41 million *reais*. The descriptive statistics of the funds in the sample are displayed in Table 1.

Table 1
Descriptive statistics of sample funds, monthly data from 01/2014 to 09/2015

Indicators		Active Ibov. Stock	
Number of Funds		**152**	
Management Fee		Age	
Maximum (in % p.m.)	0.53%	Maximum	36.19
Mean (in % p.m.)	0.16%	Mean	12.31
Minimum (in % p.m.)	0.00%	Minimum	0.76
Standard Deviation (in % p.m.)	0.11%	Standard Deviation	8.37
Net Equity in million BRL		Monthly Return (in %)	
Maximum	1373	Maximum (in % p.m.)	36.16%
Mean	61.41	Mean (in % p.m.)	-2.91%
Minimum	0.97	Minimum (in % p.m.)	-36.75%
Median	17.26	Median (in % p.m.)	-2.67%
		Standard Deviation (in % p.m.)	13.51%

Obs.: (in % p.m.) – percentage per month
Source: Created by the authors based on the sample data

As regards the risk-adjusted performance before fees, on average, the funds' performance is negative, and the results calculated by the three proposed models presented similar results (Table 2).

Table 2
Descriptive statistics of Active Ibovespa fund performance (Jensen's alpha)

Model					
Carhart (1997)		Fama and French (1993)		Fama and French (2015)	
Minimum	-0.46300	Minimum	-0.45550	Minimum	-0.47080
Mean	-0.02420	Mean	-0.02274	Mean	-0.02076
Median	-0.01820	Median	-0.01854	Median	-0.01766
Maximum	0.35830	Maximum	0.36390	Maximum	0.41840
Standard Deviation	0.13375	Standard Deviation	0.13187	Standard Deviation	0.13414

Source: Created by the authors based on the research data

As observed, the funds' performance is spread. To give an example, according to the model by Fama and French (2015), the Jensen's alpha coefficient of the funds ranged between – 0.47 and 0.42 p.m., with standard deviation of 13.41%. This variation may reflect the particular characteristics of each. This aspect will be analyzed further ahead when the results of the regressions are observed, controlled by the fund characteristics.

4.2. Analysis of performance determinants

The results of the model proposed in Equation 5 can be observed in Table 3. Using different correction procedures for self-correlation and heteroscedasticity, the results point towards a strongly negative relationship between management fee and performance – the latter being measured using Jensen's alpha.

Table 3

Regression analysis (performance explained by management fee)

Risk-adjusted performance	Correction Method (Standard errors)	Coefficient	Adjusted R^2	F-test
Carhart	White	-15.457***	0.01702	31.26***
Carhart	Clustered[1]	-15.46**	0.01702	
Carhart	Fama-MacBeth	-14.572***	0.02064	
Fama and French (1993)	Clustered[1]	-15.675**	0.01805	33.13***
Fama and French (1993)	Fama-MacBeth	-15.069***	0.02302	
Fama and French (2015)	Clustered[1]	-14.314**	0.0145	26.71***
Fama and French (2015)	Fama-MacBeth	-13.406***	0.01898	

Obs.: [1] Clustered per month and per fund, *, **,*** indicate statistical significant at 5%, 1% and 0.1%, respectively.

Source: research results

As with the results by Gil-Bazo and Ruiz-Verdú (2009) for the American market, there is also a negative relationship between the management fee and the risk-adjusted performance before fees in the Brazilian market. This is an indication that funds with high fees do not necessarily provide high returns to the investor and, thus, the differences in fees also reflect differences in the value the funds create for the investor.

In Brazil, Rochman and Ribeiro (2003) also observed a negative effect of the management fee on the Sharpe ratio of Brazilian open funds (a measure of performance that relates risk and return). According to these authors, this negative relation can signal the occurrence of information asymmetry. Thus, smaller investors who have less information (knowledge) about the industry as a whole end up investing in funds with low profitability and high management fees; on the other hand, more knowledgeable investors looking for funds with lower fees and higher returns.

Similarly, Gil-Bazo and Ruiz-Verdú (2008) consider that the revenues of a fund come from the fees and value of the funds' equity. Thus, in a scenario where the quality of the fund is not observable (high quality funds being those capable of generating greater value for the investor), high-quality funds can be differentiated by the lower fees and are likely to dominate the market of sophisticated investors. Thus, poor-quality funds will focus on attracting investments from unsophisticated investors. Therefore, interaction is needed between asymmetric information and the presence of unsophisticated investors in the market.

In the Brazilian market, Paz et al. (2017) conclude, through the results of their studies, that institutional investors are able to obtain better investment conditions (lower management fees and better performance). This would be consistent with the positive relationship between increased investor monitoring capacity and fund performance (greater monitoring implies better performance).

A conclusion that resembles that of Rochman and Ribeiro (2003), Gil-Bazo and Ruiz-Verdú (2008) and Paz et al. (2017) comes from Vidal et al. (2015), in which they argue that this negative relationship may be a consequence of the funds that strategically establish the value of the fees based on their previous or expected performance. Thus, funds with low performance tend to raise fees because their investors are less sensitive to the performance of the funds. On the other hand, top performing funds maintain low fees to compete for performance-sensitive investors.

The results obtained using the model of Equation 6, in which, in addition to the effect of management fees, the effect of other variables on performance is explored, can be observed in Table 4. The main result is similar to that presented in Table 3 - a negative relationship between performance and management fee.

Table 4

Regression analysis (performance explained by management fee and control variables)

Performance measured using the Carhart model (1997)			
	Coefficient	Adjusted R^2	F-Test
Intercept	-0.1089**		
Management fee	-10.443***		
Age	-0.00184***		
NE	0.00742***		
Seal	0.03029	0.04916	7.017***
Performance measured using the Fama and French model (1993)			
	Coefficient	Adjusted R^2	F-Test
Intercept	-0.01006**		
Management fee	-10.605***		
Age	-0.001984***		
NE	0.006843***	0.04622	6.640***
Seal	0.02854		
Performance measured using the Fama and French model (2015)			
	Coefficient	Adjusted R^2	F-Test
Intercept	-0.0979**		
Management fee	-9.0575**		
Age	-0.0021***		
NE	0.0066***		
Seal	0.02526	0.04744	6.797***

Obs.: *, **,*** indicate statistical significance at 5%, 1% and 0.1%, respectively. In the regressions, dummies were added to control for the months. White's Correction for heteroscedasticity was used.

Source: research results

Based on the results, we can observe a negative relationship between the fund's management fee, as well as its age, and fund performance. This is in line with the results found by Milani and Ceretta (2013), although the authors emphasize that the influence of age depends on the category of funds analyzed. This brings evidence that funds that charge a higher management fee tend to deliver poorer performance.

The fund's net worth has a positive relation with its performance, in line with the findings of Milani and Ceretta (2013), Carneiro (2014), Milan and Eid Junior (2014) and Paz et al. (2017), although it differs from the results found by Chen et al. (2004). This result strengthens the idea that larger funds are capable of generating better risk-adjusted performance for their investors.

Milani and Ceretta (2013) argue that increases in the net worth of the funds may lower costs for the manager insofar as they provide economies of scale. Milan and Eid Junior (2014) also argue that, as the funds grow they gain negotiation power, which may facilitate the dilution of operating costs.

The coefficient of the variable Seal, although positive, was not statistically significant. Thus, there is no evidence to assert that funds with the Anbima seal of best practices perform better. This result corroborates the results of Paz et al. (2017).

It is inferred based on the study results that investors wishing to invest in active Ibovespa funds should pay attention to the management fee charged by this fund, its size (shareholders' equity) and its age, so as to try to infer which will provide the best performance. The difference in fees reflects a difference in the value the funds create for the investor.

5. Final Considerations

The objective of this study was to analyze the observed relationship between management fee and risk-adjusted performance before fees for the Brazilian equity investment funds market (active Ibovespa) from January 2009 to September 2015.

The risk-adjusted performance before fees was calculated for each fund in the sample by regressing the surplus return of the fund against the risk factors of the Carhart (1997), Fama and French (1993,2015) models. Subsequently, we estimated the risk-adjusted performance for each fund as the difference between the surplus return before interest rates and the risk premium realized, defined as the beta vector multiplied by the vector of the factors performed each month.

It was concluded that the management fee has a negative relation with the risk-adjusted performance of the Brazilian active Ibovespa funds before fees. Thus, funds with higher fees provide a worse performance for investors. Consequently, investors could associate lower management fees with better performance. It is observed that the results found for the Brazilian market corroborate the studies of other authors - Gil-Bazo and Ruiz-Verdú (2009), Mansor et al. (2015), Vidal et al. (2015). As Rochman and Ribeiro (2003) highlight, however, this negative relation can signal the occurrence of information asymmetry. Hence, the incorporation of some variable that can capture this asymmetry is suggested for future work.

In addition, it is also concluded that larger funds generate a better performance for the investor and that the fund's age negatively affects its performance. The variable seal, which served as a proxy to measure the compliance of the funds with the best practices of corporate governance did not present statistical significance, but the observation of the influence of the corporate governance level on the performance of the fund should be better explored and remains as a suggestion for future studies.

This research extends the results of the literature as follows: it shows that there is a negative relation between management fee and performance, even when controlling for variables such as size, age and quality in terms of corporate governance. In addition, this relationship exists independently of the model used to measure fund performance. In addition, it presents more current evidence and for an emerging market. Also, it provides evidence that there is no relationship between best corporate governance practices and the achievement of good performance.

In practical terms, this research shows that investors should pay attention to the value of the management fee when selecting an active fund to invest in, as this may erode the performance delivered to the shareholder. Similarly, managers need to pay attention to management practices in order to minimize the cost of management, so as to reduce management fees and deliver better performance.

These study results come with limitations, the type of fund chosen, by the models analyzed and by the temporal cut may have exerted influence. Another limitation is the fact that other costs associated with investment fund management could not be taken into account, such as the transaction costs and other variables that may be related with fund performance. Thus, for the sake of future studies, we suggest analyzing the influence of other variables on the performance and extending the study to other types of funds and/or methods (non-parametric regressions for example).

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REPeC, Brasília, v. 12, n. 3, art. 2, p. 291-309, Jul./Sep. 2018
Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1778

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

Influential factors in student retention: a study involving undergraduate students in Accountancy

Abstract

Objective: The research objective is to analyze influential factors in student retention with a view to producing indicators for the management of Accountancy courses. The factors considered derive from the model by Cabrera, Nora and Castañeda (1992), including cognitive and behavioral factors as well as factors external to the institution.

Method: The data were collected through a survey, involving a sample of 155 students from an undergraduate Accountancy program. The students' perception of the factors considered was measured on a Likert scale. The data were submitted to factorial analysis and structural equation modeling.

Results: The results evidenced that the factors "encouragement by close persons" and "academic and intellectual development" were more important in the explanation of student retention.

Contributions: The results contribute to the creation of mechanisms and indicators that affect the retention, contributing to the management of the Accountancy courses through the students' perception of the course and its context.

Key Words: Student retention; undergraduate Accountancy program; influential factors in student retention; factor analysis; structural equation modeling.

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Published in Portuguese and English. Original Version in Portuguese.

Received in 1/5/2018. Ask to Revise on 4/24/2018. Resubmitted on 5/24/2018. Accepted on 5/30/2018 by Dr. Orleans Silva Martins (Editor).
Published on 8/22/2018. Organization responsible for the journal: Abracicon

1. Introduction

Although the number of students attending higher education courses in Brazil is increasing, student retention, that is, the student's stay at the Higher Education Institution (HEI) until the conclusion of the course, is a problem, as many students drop out, increasing the dropout rates in Brazilian higher education.

According to Tinto (2012), the focus on the student's decision to complete or abandon a course is a problem that needs to be understood from the perspectives of the student, HEI and external factors specific to each context and course. In this sense, the motivation for this research is to understand the factors that lead to student retention from the viewpoint of the student, in a certain context, seeking learning that contributes to the management and quality, particularly in Accountancy (AC) courses.

In Brazil, most publications on the subject address the phenomenon of evasion. Investigations are conducted with students who have dropped out or are likely to drop out. From the methodological point of view, the motivation for this research is to fill the gap of the lack of approach of the problem from the perspective of student retention, that is, the desire to continue taking the course at the institution, investigating the perception of students who are attending AC.

According to the Educational Census of the National Institute of Educational Research Anísio Teixeira (INEP, 2016), AC Bachelor's degree programs in 2015 totaled 355,425 students, ranking fifth among the number of students offered in Brazil. The training of accounting professionals is part of the global context of higher education, in which the role of education drives the expansion of the access, especially in developing countries. According to the Organization for Economic Co-operation and Development (OECD, 2013) data for the G20 reveal that, if the trends are confirmed by 2020, China and India will account for 40% of all young people with higher education, while the United States and the European Union will have around 25%.

Since the Law of Directives and Bases (LDB) in 1996, Brazil has restructured the education system, making it possible to expand the supply of higher education, which advanced by 62.84%, according to INEP (2016), in number of enrollments between 2006 and 2016. On the other hand, data from the INEP Census (2016) reveal the low coverage of Brazilian higher education, with only 18.1% of the population aged 18 to 24 inserted in the education system, results much lower than the average of 40% in Latin America and the Caribbean (LAC), according to Ferreyra, Avitabile and Botero Álvarez (2017).

Araujo and Mello (2015), in a survey of 574 teachers in AC courses in Brazilian HEIs, observed the insufficient opportunity for qualification and degree and lack of preparation for academic and pedagogical management. The authors also reported on the lack of student motivation, the heterogeneity of the classes, the great amount of administrative work for the teachers and the difficulty to evaluate the level of learning.

Starting from the context of higher AC education in Brazil and searching for quality and efficiency parameters in course management, the research reported in this article reveals the concern with student retention, recovering the first explanations of the phenomenon based on Psychology and Sociology. Among the studies with references in Sociology, the work by Tinto (1975) was pioneer in creating a theory to explain the student retention process. Next, the studies expanded their analysis horizon, incorporating social, behavioral and financial dimensions proposed by Bean (1982) and Bean and Metzger (1985). Later, Cabrera, Castañeda, Nora and Hengstler (1992) integrated the studies based on Psychology and Sociology and focused on the convergence of the proposed theories.

In Brazil, most AC courses and the highest dropout rates of this course are found in the private network. There is little information and academic publications on the phenomenon of student retention in this course in Brazil. In this context, the research carried out in an undergraduate course in AC at a private HEI in the State of São Paulo intends to answer the following question: What factors influence student retention in an AC course? Based on this question, the objective of the research is to analyze influential factors in student retention, aiming to produce indicators for course management in Accountancy. The factors considered derive from the model by Cabrera, Nora and Castañeda (1992) and cover factors external to the institution, cognitive and behavioral factors.

The contributions to the management of AC courses include obtaining information to develop management plans based on students' perceptions, regarding the course and its context. While evasion research seeks to minimize losses with a reactive view, retention analyses aim to maximize the benefits through preventive actions.

2. Bibliographic Review

The concept of student retention emerged at American HEIs, where surveys of school dropout are present since the 1930s (Berger, Ramirez & Lyon, 2012). Tinto (2006) defines retention as a network of events that contribute to students' permanence until the completion of the course. This approach considers a process that results in the accomplishment of the educational objectives, resting on a relationship of fidelity between the student and the HEI. Berger, Ramirez and Lyon (2012) report that, as of 1960, most studies sought explanations for retention and dropout from the perspective of psychology with a focus on student behavior. In the 1970s, research incorporated elements of sociology, observing that social integration between the student and HEI contributed towards student retention. A pioneer in this line of research, Tinto (1975) proposed three different forms of dropout, which were also adopted by Astin (1984) and by several Brazilian authors, such as Biazus (2004), Cislaghi (2008), Lobo (2003) and Silva Filho et al. (2007). This approach classifies dropout as i) when the student abandons the course of origin and chooses another course at the same HEI; ii) as dropout of the HEI when the student turns to another educational institution; and (iii) dropout of the system when the student gives up the completion of higher education.

The explanation of dropout as a sociological phenomenon occurred initially through the research by Spady (1970) and Tinto (1975). While Spady (1970) contributed to the conceptual and methodological classification of research in the philosophical, census, exploratory, case study, descriptive and predictive areas, Tinto (1975) evolved in predictive studies and created several terminologies to discuss the problem, including the friction between school and student, school failure, student success, retention and persistence.

Pascarela and Terenzini (1980) concluded that student retention takes into account three independent but synergistic variables that work together: informal contact between student and teacher, experiences in college inside and beyond the classroom, and results expressed in academic, social and intellectual performance. For the author, the variable that expresses the academic results is the one that leads to abandonment, although the informal teacher-student contact and the experiences in college can influence the academic results.

Astin's studies (1975, 1984) are multidisciplinary and consider psychological and social aspects. They point out that the effectiveness of educational policies or practices is associated with the increase in student involvement with the HEI. The author's research focuses on student motivation and behavior.

Bean (1982) studied the determinants of the attrition between the student and the HEI and, through a causal model, proposed a behavioral explanation analogous to the turnover of workers in North American companies. The conception of the empirical model by Bean and Metzger (1985) confirmed the possibility of explaining student dropout using predictive models applied to corporate management. This conceptual model gave rise to the so-called Abandonment Syndrome, taking into account the academic, social and personal results observed in the relations between coworkers and with the HEI. These factors would lead to the decision to drop out or stay, given the attrition or friction between the HEI and the student.

Most of the studies are based on the concept that the first year is the critical period during which the main dropout takes place in higher education, as indicated by Red (1975, 2006, 2012), Pascarela and Terenzini (1980) and Peleias, Petrucci, Garcia and Silva (2008). In the explanatory models of the student retention process, it is acknowledged that the reaction to the dropout can be complex and ineffective. This is compatible with the widespread concept in service marketing that it is more costly to re-establish a relationship than to maintain individual satisfaction. Therefore, the ideal is to act preventively, that is, in strategic actions aimed at student retention.

Cabrera, Nora et al. (1992) created a model that explains retention (the author used the term student permanence) through 10 predictive factors of student retention: 1) financial assistance, 2) financial conditions of the individual, 3) earlier school performance, 4) encouragement by close persons 5) academic and intellectual development, 6) performance in assessments, 7) social integration, 8) commitment to the institution, 9) commitment to the goal of graduating, and 10) an intention to stay at the HEI. This approach encompasses pre-college conditions, financial, social and behavioral dimensions, and integrates the studies based on psychology and sociology proposed by Bean (1982), Bean and Metzger (1985). In the model by Cabrera, Nora et al. (1992) considers that the student's perception can serve as an instrument for the diagnosis, elaboration and monitoring of HEI management plans.

The design of this model begins with the research by Cabrera, Castañeda, et al. (1992), who propose the combination of the Student Integration theory by Tinto (1975, 1987) and the Student Attrition theory by Bean (1982), Metzner and Bean (1987), Bean and Vesper (1990), who concluded that the commitment to the HEI and to the training objectives are indicators related to the permanence in the HEI, therefore predicting student retention. Subsequently, the studies by Pascarella and Chapman (1983), Pascarella, Duby and Iverson (1983), Pascarella and Terenzint (1983) were incorporated into the model by Cabrera, Nora et al. (1992), furthering research on the importance of social interaction between teacher and student in and beyond the classroom and factors related to the support by close persons, pre-college conditions and research on student funding, based on research by Nora (1987), Nora, Attinasi and Matonak (1990), Voorhees (1985) and Nora (1990).

According to Tinto (2006), in addition to the academic production focused on the subject of student retention, in the USA, products and services related to the subject, ranging from software development, book publishing, hiring of consultants and companies by teaching institutions, governments and other stakeholders. Tinto (2012) argues that the contributions of studies on student retention should go beyond the dropout reaction, highlighting the need for managers and academic leaders to incorporate retention actions in decision support as well as in the elaboration of institutionalized strategic planning, replacing the punctual actions.

In discussing the conclusion rate of AC courses, Byrn and Flood (2005) noted that the students who completed the training were motivated by a combination of intrinsic goals, such as confidence in their own abilities and preparation to complete the course; and extrinsic goals, involving their motivation and expectations regarding the course.

In an analysis of AC course management in Brazil based on the dropout rates as indicators, Dias, Theóphilo and Lopes (2010) observed the internal causes of dropout: deficiencies in infrastructure, lack of training of the teaching staff and socio-educational assistance. As external causes, socioeconomic reasons, dissatisfaction with the future profession, locomotion problems and forms of entry into Brazilian higher education were found. In a study of first-year AC students in Brazil, Peleias et al. (2008) observed financial problems, as well as work and study overload compromising the students' performance, especially among students of private HEI.

Through an internal evaluation instrument by Paswan and Young (2002), Gomes, Dagostini and Cunha (2013) used indicators of involvement among students and teachers to investigate variables of socialization, interaction, organization and academic management, aiming to measure the satisfaction of AC students. In a study carried out in Brazil, they verified the relevance of three analysis dimensions: i) student interest in learning, ii) teacher involvement and iii) general student satisfaction. Lizote et al. (2014) applied the same model to two AC courses in Brazil, validating six factors: i) indicators of student satisfaction, ii) teacher involvement, iii) student interest, iv) teacher-student interaction, v) course requirement, and vi) course organization. They concluded that these findings can contribute to the course organization, interaction between teachers and students, adaptation of the course curriculum, preparation of teaching plans for teachers and educational marketing plans.

Based on the model by Paswan and Young (2002), the influence of student satisfaction on the dropout and/or permanence decision is admitted (Cunha, Nascimento & Durso, 2016). In a study involving AC students from the Brazilian Southeast, the authors observed among students prone to drop out of the course that the factors of discontent were related to problems with the infrastructure and curricula. On the other hand, students who were prone to remain were not dissatisfied with their course choice, their adaptation to university life and their contact with their coworkers, although they were hardly satisfied with the course coordination and study routines. Collaborating with the authors and investigating federal universities in Santa Catarina, Cunha, Gomes and Beck (2016) find that the teacher-student interaction and the course organization are related to student satisfaction, one of the main factors for student maintenance and the image of the HEI.

The research reported in this article adopts the model by Cabrera, Nora et al. (1992) as the main theoretical framework, an option made based on the research objective, which was to analyze the factors and their impact on student retention, aiming to produce indicators for the management of AC courses in the Brazilian context. These authors studied factors of persistence in the academic context of North-American community colleges, equivalent contexts, as both adopt the guidelines of enhancing the access to higher education and expanding the student base in quantitative terms.

3. Method

For the sake of control in the field research, the application universe, although limiting the generalization of the results, was the four-year Bachelor's degree course in AC, with 248 students in total, maintained by a private institution in the interior of the State of São Paulo.

Due to the fact that the first year is considered a critical period of higher dropout in higher education, as indicated by Pascarela and Terenzini (1980), Peleias et al. (2008) and Tinto (1975, 2006, 2012), the sample plan focused on the total of 194 students enrolled in the second, third and fourth year, 181 of whom answered the questionnaire (Figure 1). Of the 181 responses, 26 were eliminated due to incompleteness, resulting in a final sample of 155 students, that is, 79.90% of the students enrolled from the second to the fourth year.

Figure 1. Questionnaire Applied

Source: created by the authors

The questionnaire, the tool used in this research, was developed based on the adaptation of the explanation model for student retention proposed by Cabrera, Nora et al. (1992). This is a semi-structured questionnaire, composed of 36 questions answered on a Likert scale, grouped into nine factors or constructs, aiming to investigate the behavior of persistent students.

Figure 1 represents the questionnaire applied and Figure 2 the hypothetical factorial structure. As an example, factor f1. is represented by the letter "f" and number "1", in the order of the questionnaire, composed of its respective indicators or questions, represented in turn by the letter "P" and also in numerical order from number "4" to "5". Factor f1 addresses questions related to the students' financial conditions. For example: "Q1: Did the student pay for the course on his own?", "Q2: Did the student receive help from the family to pay for the course?"

To put the research in practice, in the presentation and discussion of the results, the factors are represented by acronyms composed by their initial letters, for example: financial conditions (FC). Based on the factors or constructs originally applied by Cabrera, Nora et al. (1992), the questions were adapted to the Brazilian reality.

Data analysis used descriptive and multivariate statistics, with Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). The EFA and CFA analyses are intended to identify and reproduce the relationships observed between a set of indicators (questions in the questionnaire) and a set of factors (latent variables). In the data-oriented EFA, the covariance and correlations between the indicators and probable factors of the proposed model were studied in order to define variables with greater explanatory power, as well as the set of latent dimensions (factors or constructs) with their respective factor loadings.

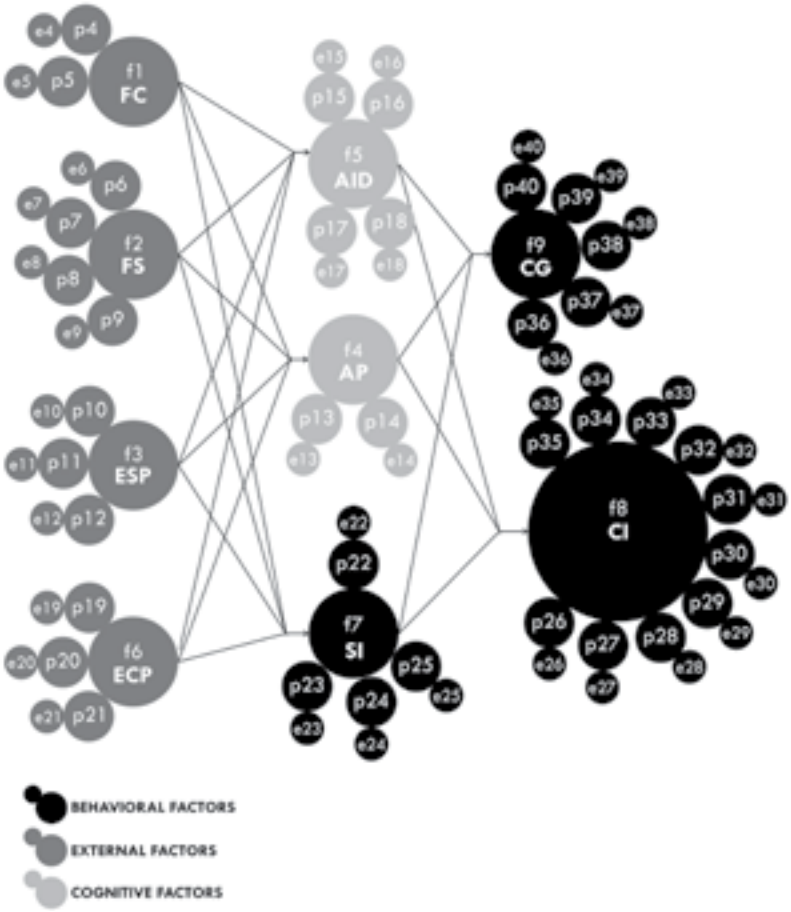

Figure 2. Hypothetic Structural Model

Source: created by the authors.

The application of EFA starts with the application of the Kaiser rule and Scree test, ending with the Parallel Analysis in which, according to Osborne (2014), the data values of the data matrix and the Scree test are analyzed together.

In the CFA, the purpose was to accept or reject a hypothetical factorial structure of a previously established model that fit the data, verifying the degree of correspondence between the obtained data and the proposed model. In the CFA, according to Brown (2015), each indicator is linked to a factor by means of the factorial model.

With the CFA, the measuring model that proposes a structural equation model (SEM) was obtained, whose relations between the factors or constructs are described in a way similar to the multiple linear regression, however, instead of having observed variables, the initial model presents latent variables. Based on the latent variables that may be exogenous or endogenous, the relation between them is obtained by the structural part of the model, given by Equation 1:

$$\eta = \boldsymbol{B}\gamma + \zeta \tag{1}$$

- η: endogenous latent variables (**dependent**)
- γ: exogenous latent variables **(independent)**
- $\boldsymbol{B}$: coefficients representing the relations between the latent variables
- ζ: random error

The *B* coefficients are called regression coefficients in the SEM. Their interpretation is presented in the same way as the coefficients of the linear regression model.

Among the several methods to estimate the parameters of the measuring model, we chose the diagonally weighted least squares method, where S is the covariance matrix of the observed indicators and Σ is the covariance matrix for indicators, as recommended by Rosseel (2012). The R Lavaan software (R Core Team, 2015) was used. Equation 2 indicates the estimation of the model parameters, that is, the loadings of each factor, the variance and covariance of the factors and the unique variance of each estimator.

$$F_{DWLS} = (S - \Sigma)^T \{diag\,(W)\}^{-1} (S - \Sigma) \tag{2}$$

The fit of the model also considers that, in the chi-square test, the indicators do not follow a normal multivariate distribution, as the research works with ordinal variables. Brown (2015), Browne, Cudeck (1993) and Hu, Bentler (1999) propose complementary adjustment indices. Therefore, in order to obtain the fit of the model, in addition to the absolute indices, we consider the parsimony and comparative indices.

4. Results and Analysis

In the data-driven exploratory factor analysis (EFA), following the application of the Kaiser rule, the Scree test and the Parallel Analysis, we identified nine factors to be confirmed by applying the proposed model. In both CFA and SEM, the main means of analysis are estimates of factor loadings and standardized indicators (*Stdall*) that measure the factor loadings of the covariance matrix and correlations for the indicators and factors. The higher the factor loadings, the stronger the relationships between the variables are and the more important they are for the explanation of the model. For the factor loadings to be accepted, they need to be accompanied by the Statistical Significance test, in which the *P (>/z/)* cannot exceed the 0.05 confidence interval in order to reject the null hypothesis.

In Table 1, the following items are presented for analysis:

- *StdIv:* Estimated loadings for standardized factors;
- *Stdall:* Estimated loadings for factors and standardized indicators;
- *StdErr:* Standard error of estimates;
- *Z Value:* Null hypothesis test; and
- *P(>/z/):* Value associated with each hypothesis.

In the analysis, the indicators were discarded, that is, questions P1, P2, P3 because they are the students' personal identification data. Based on the initial model, the p values of the indicators P11, P14, P35, P39 in Table 1 are greater than 0.05 - which indicates that the estimated factor loadings of these variables are not statistically significant, that is, there is evidence not to reject the null hypothesis.

Table 1

Estimated loadings of factor analysis indicators in the initial model

Indicator	Estimate	*Std.Err*	Z-value	P(>|z|)	*Std.lv*	*Std.all*
P4	1.000	–	–	–	0.326	0.435
P5	–1.121	0.420	–2.671	0	*0.365	0.429
P6	1.000	–	–	–	0.395	0.560
P7	0.853	0.168	5.077	0*	0.337	0.472
P8	1.264	0.211	5.994	0*	0.500	0.923
P9	1.129	0.229	4.936	0*	0.446	0.617
P10	1.000	–	–	–	0.321	0.509
P11	**0.344**	**0.272**	**1.263**	**0.206**	**0.110**	**0.142**
P12	0.820	0.209	3.931	0*	0.263	0.475
P13	1.000	–	–	–	0.288	0.484
P14	**1.241**	**0.641**	**1.936**	**0.053**	**0.357**	**0.478**
P15	1.000	–	–	–	0.453	0.559
P16	0.700	0.145	4.821	0*	0.317	0.448
P17	1.036	0.185	5.599	0*	0.469	0.603
P18	0.841	0.176	4.785	0*	0.381	0.492
P19	1.000	–	–	–	0.438	0.570
P20	0.748	0.177	4.239	0*	0.328	0.453
P21	0.559	0.185	3.018	0.003	0.245	0.409
P22	1.000	–	–	–	0.402	0.569
P23	1.109	0.198	5.604	0*	0.446	0.682
P24	1.064	0.194	5.472	0*	0.428	0.703
P25	1.756	0.346	5.080	0*	0.706	0.824
P26	1.000	–	–	–	0.081	0.162
P27	3.704	1.773	2.089	0.037	0.302	0.457
P28	6.913	3.159	2.188	0.029	0.563	0.674
P29	7.004	3.144	2.228	0.026	0.570	0.658
P30	7.687	3.683	2.087	0.037	0.626	0.643
P31	4.452	1.784	2.496	0.013	0.363	0.386
P32	5.664	2.784	2.035	0.042	0.461	0.601
P33	6.527	2.922	2.234	0.025	0.532	0.709
P34	4.997	2.280	2.192	0.028	0.407	0.583
P35	**1.975**	**1.254**	**1.575**	**0.115**	**0.161**	**0.243**
P36	1.000	–	–	–	0.272	0.503
P37	0.769	0.299	2.574	0.010	0.210	0.569
P38	1.440	0.509	2.830	0.005	0.392	0.565
P39	**0.903**	**0.494**	**1.828**	**0.068**	**0.246**	**0.397**

P(>|z|) values inferior to 0.001 are represented by 0*

Source: created by the authors

In a second application, the indicator P26 was rejected. A new analysis was done excluding the indicators P11, P14, P26, P35 and P39, as the estimates of their factor loadings were not considered significant.

Table 2 shows the goodness-of-fit ratios for the final model. The chi-square coefficient is 443.776 with 399 degrees of freedom. The p-value is greater than 0.05, indicating that the initial model rejects the null hypothesis, that is, that the observed covariance matrix is equal to the covariance matrix of the initial model, but the chi-square test is restrictive and the data present asymmetry. Therefore, other criteria have to be considered for the goodness-of-fit analysis. In the same table, it is observed that the CFI 0.866 and TLI 0.849 are inferior to 0.9, indicating that the initial model should be rejected.

In the final model, because it has a covariance structure close to the initial model, there is evidence not to reject the covariance matrix of the observed variables. The absolute indices P-value is 0.06 (greater than 0.05) and the SRMR (0.067), lower than 0.08; interpreted together as the parsimony index RMSEA (0.027), lower than 0.05; and the comparative indices CFI (0.922) and TLI (0.909) greater than 0.9. The fit of the final model is reasonable and can be accepted.

Table 2
Goodness-of-fit ratios for initial and final model

Model	χ2	p value	SRMR	RMSEA	CFI	TLI
Initial Model	631.204 (558)	0.017	0.075	0.029	0.866	0.849
Final Model	443.776 (399)	0.060	0.067	0.027	0.922	0.909

Source: created by the authors

Table 3 presents the estimated loadings, the standard estimation error, test statistic and *P-values* of the estimated loadings when the factors and indicators are standardized. As observed, all loadings of the estimators are significant (the *P-values* are inferior to 0.05).

Table 3

Estimated parameters of final model

Factor	Indicador	Estimate	*Std.Err*	Z-value	P(>|z|)	*Std.lv*	*Std.all*
f1	P4	1.000	–	–	–	0.339	0.452
	P5	–1.034	0.401	–	2.578	0.010	–0.351
f2	P6	1.000	–	–	–	0.398	0.564
	P7	0.825	0.167	4.933	0*	0.329	0.460
	P8	1.254	0.212	5.925	0*	0.499	0.923
	P9	1.137	0.233	4.88	0*	0.453	0.626
f3	P10	1.000	–	–	–	0.335	0.532
	P12	0.891	0.229	3.887	0*	0.299	0.539
f4	P13	1.000	–	–	–	0.595	1.000
f5	P15	1.000	–	–	–	0.459	0.567
	P16	0.688	0.141	4.881	0*	0.316	0.447
	P17	1.028	0.181	5.689	0*	0.472	0.608
	P18	0.803	0.167	4.797	0*	0.369	0.477
f6	P19	1.000	–	–	–	0.454	0.592
	P20	0.734	0.168	4.361	0*	0.334	0.461
	P21	0.517	0.179	2.885	0.004	0.235	0.393
f7	P22	1.000	–	–	–	0.406	0.576
	P23	1.075	0.190	5.653	0*	0.437	0.668
	P24	1.051	0.193	5.459	0*	0.427	0.702
	P25	1.755	0.345	5.088	0*	0.713	0.832
f8	P27	1.000	–	–	–	0.295	0.447
	P28	1.943	0.375	5.18	0*	0.574	0.687
	P29	1.954	0.407	4.803	0*	0.577	0.666
	P30	2.147	0.433	4.957	0*	0.634	0.651
	P31	1.215	0.319	3.808	0*	0.359	0.382
	P32	1.556	0.343	4.536	0*	0.460	0.599
	P33	1.804	0.381	4.736	0*	0.533	0.710
	P34	1.360	0.277	4.913	0*	0.402	0.576
f9	P36	1.000	–	–	–	0.285	0.525
	P37	0.723	0.309	2.340	0.019	0.206	0.559
	P38	1.234	0.482	2.563	0.010	0.351	0.506

P(>|z|) values inferior to 0.001 are represented by 0*

Source: created by the authors

Table 4 presents estimates of covariance and correlations (*Std.all* column) between the factors. The results show the significant relationships between the factors in bold. For example, there is a statistically significant relationship between f1 and factors f2 and f3.

Table 4

Estimated covariances and correlations for the final model

Covariance		Estimate	*Std. Err*	Z-value	P(>|z|)	*Std.lv*	*Std.all*
f1	**f2**	**-0.071**	**0.024**	**-2.902**	**0.004**	**-0.523**	**-0.523**
	f3	**0.065**	**0.031**	**2.083**	**0.037**	**0.568**	**0.568**
	f4	-0.019	0.033	-0.596	0.551	-0.097	-0.097
	f5	0.012	0.030	0.401	0.688	0.078	0.078
	f6	0.041	0.035	1.166	0.244	0.266	0.266
	f7	0.026	0.027	0.964	0.335	0.189	0.189
	f8	0.007	0.018	0.397	0.691	0.069	0.069
	f9	0.031	0.020	1.538	0.124	0.316	0.316
f2	**f3**	**-0.056**	**0.024**	**-2.356**	**0.018**	**-0.420**	**-0.420**
	f4	0.037	0.023	1.627	0.104	0.156	0.156
	f5	0.032	0.020	1.570	0.116	0.172	0.172
	f6	-0.006	0.022	-0.271	0.787	-0.034	-0.034
	f7	0.019	0.016	1.168	0.243	0.116	0.116
	f8	0.009	0.012	0.707	0.480	0.073	0.073
	f9	0.012	0.012	0.998	0.318	0.105	0.105
f3	f4	0.005	0.030	0.163	0.871	0.025	0.025
	f5	0.057	0.032	1.798	0.072	0.372	0.372
	f6	**0.122**	**0.041**	**2.966**	**0.003**	**0.799**	**0.799**
	f7	0.030	0.031	0.973	0.331	0.219	0.219
	f8	0.026	0.018	1.453	0.146	0.260	0.260
	f9	0.003	0.015	0.163	0.870	0.026	0.026
f4	**f5**	**0.068**	**0.031**	**2.183**	**0.029**	**0.250**	**0.250**
	f6	0.039	0.031	1.286	0.198	0.145	0.145
	f7	0.042	0.027	1.542	0.123	0.173	0.173
	f8	0.016	0.016	0.964	0.335	0.090	0.090
	f9	0.020	0.017	1.185	0.236	0.120	0.120
f5	**f6**	**0.118**	**0.038**	**3.077**	**0.002**	**0.567**	**0.567**
	f7	**0.123**	**0.040**	**3.060**	**0.002**	**0.660**	**0.660**
	f8	**0.123**	**0.040**	**3.084**	**0.002**	**0.908**	**0.908**
	f9	**0.052**	**0.021**	**2.507**	**0.012**	**0.399**	**0.399**
f6	**f7**	**0.080**	**0.039**	**2.049**	**0.040**	**0.435**	**0.435**
	f8	**0.059**	**0.023**	**2.616**	**0.009**	**0.438**	**0.438**
	f9	**0.051**	**0.023**	**2.210**	**0.027**	**0.394**	**0.394**
f7	**f8**	**0.087**	**0.030**	**2.925**	**0.003**	**0.726**	**0.726**
	f9	0.030	0.017	1.770	0.077	0.260	0.260
f8	**f9**	**0.030**	**0.014**	**2.109**	**0.035**	**0.352**	**0.352**

Source: created by the authors

The Confirmatory Factor Analysis (CFA), which guarantees the existence of the measuring model, in which each indicator is linked to its corresponding factor, permits the individual validation of the factors, as well as the observation of relations between them, as observed in Table 5. In that table, the estimated (B) coefficients, the standard error, the Z-statistic of the hypothesis test, the *P-value* and the correlations between the factors (*Std.all*) are displayed. Almost all of the relations between factors are beyond the confidence interval, that is, they have a *P-value* superior to 0.05.

Table 5

Estimated regression coefficients for the structural model

Model	Structural	(B) Estimate	*Std.Err*	Z-value	P(>|z|)	*Std.lv*	*Std.all*
f5	f1	1.196	2.149	0.557	0.578	0.874	0.874
	f2	-1.212	2.211	-0.548	0.584	-1.037	-1.037
	f3	-5.745	7.642	-0.752	0.452	-3.981	-3.981
	f6	3.978	4.373	0.910	0.363	3.776	3.776
f4	f1	0.268	0.780	0.344	0.731	0.155	0.155
	f2	-0.213	0.700	-0.304	0.761	-0.144	-0.144
	f3	-1.772	2.387	-0.742	0.458	-0.971	-0.971
	f6	1.295	1.345	0.963	0.336	0.972	0.972
f7	f1	1.039	1.590	0.654	0.513	0.874	0.874
	f2	-0.786	1.420	-0.553	0.580	-0.774	-0.774
	f3	-4.083	4.914	-0.831	0.406	-3.256	-3.256
	f6	2.752	2.819	0.976	0.329	3.005	3.005
f8	f4	-0.069	0.036	-1.909	0.056	-0.139	-0.139
	f5	0.456	0.124	3.666	0*	0.727	0.727
	f7	0.195	0.101	1.926	0.054	0.271	0.271
f9	f4	0.012	0.047	0.258	0.797	0.026	0.026
	f5	0.256	0.148	1.733	0.083	0.429	0.429
	f7	-0.008	0.134	-0.057	0.954	-0.011	-0.011

P(>|z|) values inferior to 0.001 are represented by 0*

Source: created by the authors

A new version of the model was elaborated. After discarding the relationships whose significance levels went beyond the confidence interval, Table 6 shows the estimated regression coefficients, standard error and the statistical coefficient of the Hypothesis test of the Modified Structured Model, called Final Structural Model.

Table 6

Regression coefficients for Final Structural Model

Coeficiente de regressão (B)		Estimativa	*Std.Err*	Z-value	P(>|z|)	*Std.lv*	*Std.all*
f5	f6	1.518	0.544	2.790	0.005	0.885	0.885
f4	f6	0.575	0.243	2.370	0.018	0.262	0.262
f7	f6	1.081	0.340	3.178	0.001	0.714	0.714
f8	f4	-0.066	0.034	-1.94	0.052	-0.132	-0.132
	f5	0.459	0.124	3.708	0*	0.720	0.720
	f7	0.209	0.100	2.098	0.036	0.289	0.289
f9	f5	0.267	0.115	2.326	0.020	0.432	0.432

P(>|z|) values inferior to 0.001 are represented by 0*

Source: created by the authors

The greater the range of the covariance coefficients, for the positive as well as the negative relationships, the higher the factor loadings and the weight of the relationships in the explanation of the model will be. The structural equation modeling proposed in Figure 3 expressed the presence of three analytic dimensions:

- External factors dimension: f1: Financial Conditions (FC); f2: Financial Support (FS); f3: Earlier School Performance (ESP); and f6: Encouragement by Close Persons (ECP).
- Cognitive factors dimension: f5: Academic and Intellectual Development (AID); and f4: Academic Performance (AP).
- Behavioral factors dimension: f7: Social Integration (SI); f9: Commitment to the Goal of Graduating (CG); and f8: Commitment to the Institutional (CI).

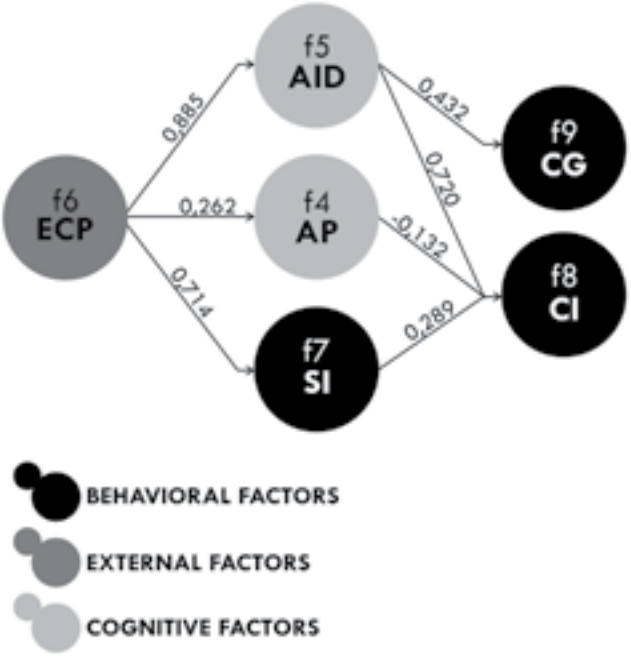

Figure 3. Final Structural Model

Source: created by the authors.

In the original model by Cabrera, Nora et al. (1992), the external variables initially addressed by Bean (1982), Voorhees (1985), Nora (1990), Cabrera, Castañeda et al. (1992) and Tinto (2006, 2012) are based on the factors Financial Support (FS) and Students' Financial Condition (FC), relating to cognitive and behavioral factors. In this research, however, the external factors, such as Financial Support (FS) and Students' Financial Conditions (FC) were excluded from the final model because they did not present statistical significance.

The pre-college conditions addressed by Nora (1987), Nora, Attinasi and Matonak (1990) and Earlier School Performance (DEA) were not withheld in the final model either in function of the statistical significance level.

The only external factor that presented acceptable levels of significance and sufficient statistical loading to present covariance relationships with other factors was Encouragement by Close People (ECP), which evidenced relationships with the cognitive and behavioral variables of the model by Cabrera, Nora et al. (1992). The external factor ECP presented relationships of 0.885 with Academic and Intellectual Development (AID) and 0.714 with the Social Integration (SI) factor.

The findings by Cabrera, Nora et al. (1992) lead to evidence that Encouragement by Close People is not the only external factor present in the students' environment that influences their persistence and retention. In the model adopted in the research reported in this article, it is assumed that the improvement of the instrument and the data collection and analysis procedures offer more expressive results referring to external factors.

Among the cognitive and behavioral factors, the most important was Academic and Intellectual Development, showing a relationship of 0.720 with Commitment to the Institution (CI) and 0.432 with the Commitment to the Goal of Graduating (CG). The Social Integration factor presented a relation of 0.289 with the Commitment to the Institution.

The presence of important relations between the Academic and Intellectual Development and the Commitment to the Institution and Commitment to the Goal of Graduating is in agreement with the results of the research by Cabrera, Nora et al. (1992), in which Academic and Intellectual Development among the main cognitive factors.

The Academic Performance (AP) factor presented a relation of -0.132 with Commitment to the Institution (CI). We observe a low and negative variation in the statistical loading, assuming that the academic performance measure improves students' gaining self-confidence and becoming less dependent and committed to the institution. Research on the factor Academic Performance can be improved by including data obtained from primary sources, referring to the results of the evaluations, conclusion of courses and semesters, collected from the HEI's academic system.

Analyzing the model from a global perspective, it is observed that external factors can exert positive influences on students' academic and social experiences, contributing to their academic performance, behavior and attitudes towards the commitment to the course and its educational objectives. These results are consistent with the proposals by Red (1975), Bean (1982) and Cabrera, Nora et al. (1992), in which the students' experiences, inside and beyond the HEI, contribute to their academic performance, personal and institutional commitments, influencing student persistence and retention.

The results of the research justify the importance of support from colleagues and family members, social interaction, expressed in the Social Integration factor, students' Academic and Intellectual Development and their Academic Performance, influencing factors indicative of persistence and retention.

The adaptation of the model by Cabrera, Nora et al. (1992), through the behavior of AC students towards their educational challenges, reflects the work by Byrn and Flood (2006), who observed the academic success of AC students based on intrinsic and extrinsic motivations.

Approaches centered on the satisfaction of AC students converge with the importance of variables of socialization and interaction between teachers and students, as well as with factors related to the management and academic organization observed in the research by Gomes, Dagostini and Cunha (2013), Lizote et al. (2014), Cunha, Gomes and Beck (2016) and Cunha, Nascimento and Durso (2016).

From the viewpoint of the management of AC courses, the adaptation of the model by Cabrera, Nora et al. (1992) was useful in presenting the possibility of investigating students' perceptions through the student retention factors, analyzed together, acknowledging their complexity. The holistic view of retention factors gives researchers and academic managers more effective assessments of students' perceptions, permitting integrated actions to promote retention.

The research results contribute to the elaboration of management plans that go beyond the mission of teaching, research and extension. The incorporation of services of welcoming, counseling and academic support is suggested, resting on the analysis and maintenance of the quality and institutional image indicators.

5. Final Considerations

The objective of analyzing the student retention factors based on the adaptation of the model by Cabrera, Nora et al. (1992) was achieved, aiming to produce indicators for the management of AC courses, as the application of factor analysis and structural equation modeling confirmed the presence of relations between factors that explain student retention, considering factors external to the institution, cognitive and behavioral factors. The student retention factors analyzed in the research can be applied as indicators to guide the management processes of the AC courses.

In the research results, the Encouragement by Close Persons shows that family support, co-workers and social interaction beyond the academic environment are important external variables for student retention in HEI, revealing, in the case studied, greater importance than Financial Conditions, Financial Support and Background School Performance.

Among the cognitive factors observed in the research, the academic and intellectual development presented a higher factor loading. Therefore, the teaching and learning process, as well as the positive results in student achievement assessments, among the most important variables expressed in this factor. These results are in agreement with factors that are also considered fundamental in the research by Pascarela (1980) and Cabrera, Nora et al. (1992).

The analysis of the AC students' behavior studied in this research contributes to the elaboration of management plans and converges with the work by Byrn and Flood (2006), who observed analysis variables synthesized in intrinsic motivations for academic success, such as trust in their own abilities and the preparation to complete the course - and extrinsic variables -, involving motivation and expectations regarding the course, and also with the studies by Lizote et al. (2016) and Cunha, Nascimento and Durso (2016), who reported on the importance of organizational, management, socialization and interaction factors influencing students' satisfaction.

The analysis of the students' profile through retention factors contributes to the elaboration of internal evaluation and institutional research tools, aiming to understand the interdependence of external, cognitive and behavioral factors, generating information and guiding planning and execution actions, involving the students' perception in the management processes of AC courses.

These actions may involve motivational aspects related to the student's education, the future professional career and also aspects related to the academic performance, involving the planning of integrated academic activities and the management of events targeting the students, such as presentation of cases of successful professionals, lectures with managers knowledgeable in the area and development and motivation workshops. These actions contribute to the course and to the profession. These activities cover the HEI's mission and the search for efficiency and effectiveness through a view and projection of an integrated image of teaching, research and extension, according to Tinto's (2012) observation on the need for managers and academic leaders to incorporate retention actions. This occurs both in decision support and in the elaboration of institutionalized strategic planning, substituting specific actions.

The presence of the encouragement by close people as the only external factor presupposes the improvement of the research questionnaire and the data collection in order to improve the study of the external factors related to the financial and preschool conditions in future research. The inclusion of data obtained in primary sources referring to the results of the evaluations, conclusion of courses and semesters, based on the HEI's academic system, complements the information obtained through the application of the questionnaire and improves the observation of the academic performance factor.

To model can be applied in longitudinal studies, analyzing and comparing the behavior of students who drop out and persist, adding demographic information obtained from the INEP database through the Brazilian national higher education census and the answers obtained by applying the socioeconomic questionnaire adopted in nationwide examinations.

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Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1858

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

IFRS 16 - *Leases*: Challenges, Perspectives and Implications in the Light of Substance Over Form

Abstract

Objective: To start a theoretical debate on the main challenges and impacts of the standard IFRS 16 and its implications for the accounting treatment of leases, further analyzing compliance with the new models imposed in the light of the primacy of substance over form.

Method: In methodological terms, this is a theoretical essay, as the discussion is focused on knowledge that has not been developed yet in the Brazilian literature, presenting the most recent aspects found in the international literature on IFRS 16 and complementing the analysis of the standard in the light of Accounting Theory. Therefore, the main problems appointed in the previous standard are highlighted, analyzing documents and perspectives IASB and other entities have published to demonstrate how companies should prepare for the challenges the standard entails. Almost all of its items require a high level of subjectivity and professional judgment.

Results: The discussion of the topics reveals that the lessees perceive the main challenges the standard entails. The unique accounting treatment model brings a series of subjectivities that start with the On/Off balance sheet test, with concepts to identify if the contract is or contains leasing. Then, the subjectivity of identifying and separating between the leasing and non-leasing components of a contract can be a complex exercise that will require further information the lessor should offer, and/or the use of an independent baseline price for that breakdown. At the macro level, the main consequence of the impact of the standard are the changes in the financial measures (such as EBTDA, ROE, ROA); new estimates; greater judgment; and volatility of the balance sheet.

Contributions: From the academic viewpoint, the theoretical debate on the new accounting standard, which will come into force in 2019, adds an important reflection for Accounting as a Science. For the Market, the issues raised as the main challenges in the standard soon to be adopted in Brazil offer new perspectives for the companies that are facing the transition period to adopt the new standard.

Keywords: Leases. IFRS 16. Substance Over Form.

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Published in Portuguese and English. Original Version in Portuguese.

Received in 5/18/2018. Ask to Revise on 6/30/2018. Resubmitted on 7/19/2018. Accepted on 7/30/2018 by Dr. Vinícius Gomes Martins (Assistant Editor) and by Dr. Orleans Silva Martins (Editor). Published on 9/6/2018. Organization responsible for the journal: Abracicon

1. Introduction

One of the objectives of the International Accounting Standards Board (IASB) is to issue standards that will ensure useful information for current and potential investors to make more effective decisions, based on more transparent and comparable financial statements (IFRS, 2015). To better meet this purpose, agencies such as the IASB and the Financial Accounting Standards Board (Fasb) have been publishing standards to improve the quality of accounting information, making them more relevant and reliable, seeking to establish uniform measuring standards for asset and liability valuation with a view to enhancing their use around the world (Khan, Anderson, Warsame & Wright, 2015).

The accounting regulators, professionals and users of the financial statements mention this need for greater quality and reliability of accounting information as one of the major reasons for the implementation of the international standards (Khan, Anderson, Warsame & Wright, 2015). Complementing this breakthrough in global accounting in January 2016, the IASB issued IFRS 16, known as Leases, which establishes new rules for the recognition, measurement and disclosure of lease information.

Leasing can be defined simply as a contractual transaction between the owner of a property (lessor), who grants the use of that property to a third party (lessee), for a certain period of time defined in the contract, with option for the lessee to acquire the good, return it or to extend the contract (Niyama & Silva, 2013).

The need to change the accounting treatment of leasing is verified when a 2014 IASB survey showed that approximately 3.3 trillion dollars in liabilities were off-balance sheet (Sacarin, 2017). The regulatory agencies FASB and IASB currently permit this lack of accounting information (through Statement No. 13 and IAS 17, respectively), which has been criticized for impairing financial market transparency and may confuse the financial statement users, as it does not allow a complete visualization of the assets that are controlled and used in the activities of the lessee, nor of the liabilities arising from leasing agreements. The proposal of IFRS 16 is a single accounting model in which, regardless of the classification of the lease as finance or operating, the lessees disclose the assets and liabilities in their balance sheets in accordance with the precepts of the new conceptual framework (IFRS, 2016).

In a document called Effects Analysis, in January 2016, the IASB conducted a study with more than 1,500 companies located worldwide, aiming to evaluate the costs and benefits and approximately estimate the quantitative impact the changes will cause in the financial statements (IFRS, 2016). The findings showed that the application of IFRS 16 does not have the same effects in all sectors, with a greater impact on the aviation sector, which will recognize about 22% more liabilities in its balance sheets according to the IASB forecast.

Given the imminent application of the standard in a global context, it is known that the scope and range of these changes represent a major challenge for accountants and academics, who have the role of helping information users to better understand the impact of the standard in the statements. In this perspective, audit firms and financial analysts articulate and issue manuals and documents to guide companies and accountants about possible substantial changes in financial reporting, and the academy analyzes the impacts and benefits to Accounting as a science and therefore to accounting theory.

Despite the importance of the theme, we were unable to identify in the Brazilian literature studies that broadly discuss the changes proposed in the standard. In view of this gap in the Brazilian literature, the research problem arises that this theoretical essay seeks to clarify: What are the main challenges and impacts to be addressed after the changes proposed by IFRS 16 and how can these changes be interpreted in the light of the primacy of substance over form? In order to respond to this research problem, we used the main documents officially issued and discussed by the IASB and the academic discussions in order to clarify the challenges the standard entails.

This theoretical approach may facilitate a better understanding of the topic, encouraging discussions about the regulatory aspects that will affect Brazil through the adoption by the Accounting Pronouncement Committee, through Technical Pronouncement CPC 06 Revision 2 - Leasing Operations (approved by CVM Resolution 787 of December 21, 2017). Despite the recent edition of the CPC, discussing the theme is relevant in Brazil because leasing operations are currently controlled and supervised by the Brazilian Central Bank, which issues resolutions different from those the IASB has adopted for lessors. This theme has aroused interest in recent years, with an increasing number of studies that aim to clarify a range of questions on the accounting treatment of leases, ranging from the general and conceptual view to more specific sectorial approaches, revealing aspects that vary between measuring the impact on corporate and sectorial performance, including theoretical debates that discuss the substance of the standard. By emphasizing the theoretical approach to the changes the standard proposes, this study is methodologically considered a theoretical essay, as it discussed knowledge that has not been developed yet in the Brazilian literature, presenting the state-of-the-art aspects found in the international literature about IFRS26 and complementing the analysis of the standard in the light of Accounting Theory.

2. IAS 17 and Main Problems

In 1980, the International Accounting Standards Committee (IASC) issued its Exposure Draft 19 about leases. That document was similar to Fasb's Statement No. 13 in force at that time, which set out four requirements for leasing to be considered financial and to be recognized by the lessee. In the first criterion established, the leasing operation should transfer the ownership to the lessee at the end of the contract term; it should also contain a call option at a price significantly lower than the market value at the option date, representing a reasonable certainty that the call option would be exercised. Another criterion was that the lease term should cover most of the economic useful life of the leased asset, usually 75% or more. Finally, the present value of the minimum lease payments should be greater than or equal to the market value of the leased asset at the time the leasing is contracted, usually 90% or more.

To proceed with the IASC analyses, in 1982, IAS (International Accounting Standards) 17 was issued virtually unchanged in relation to Exposure Draft 19, except for the removal of the information between parentheses related to the percentages of 75% for the lease term that would cover most of the economic useful life of the leased asset and 90% for the base to test whether the present value of the minimum lease payments would be greater than or equal to the market value of the leased asset at the time of contracting.

The models in IAS 17 require lessees and lessors to classify their leases as finance leases or operating leases, with different accounting models. This distinction did not satisfy the needs of investors, as the dependence on the qualification of leases would result in different treatments in the financial statements, in some cases being presented in the balance sheet and, in others, only reflected as a rent expense in the income statement (Lloyd, 2016). As a result of this divergence, investors adjusted the financial statements of the lessees to recognize assets and liabilities that were "off-balance sheet", and recalculated relevant indicators in the economic-financial analysis of the entities.

The main proposals to amend the standard were set out in ED/2010/9, whose proposal was to consider the substantial transfer of the risks and benefits of the asset, in order to recognize the leasing, especially under the usage right, but without segregation in finance or operating terms, and ED/2013/6, in which the leasing operations will no longer be classified as Operating or Finance, but in Type A and Type B. The criterion for classification will be the economic life of the leased asset, as well as the application of the understanding of the usage right.

IAS 17 may not promote transparency and be susceptible to fraud in three main situations: first, the disclosure and measuring requirements that underpin the substance of finance leases may be misinterpreted by the financial statement preparers; second, the application of changes in the interest rate can be deferred to existing leases if there is a significant impact in the financial performance in the annual report, smoothing income to favor management; and, thirdly, the inaccuracy of analysts' predictions may mislead the financial statement users on the long-term solvency of entities (Edeigba & Amenkhienan, 2017).

Leases classified as operating leases were not disclosed in a company's balance sheet but rather in the balance sheet in a similar manner to a service contract, in which the company reports a lease expense in the income statement (typically the same amount in each lease period) (Loyd, 2016). The adoption of IAS 17 could then cause distortions in the financial ratios and cause false impressions on the financial health of the company as perceived by investors and creditors. In a simple example, a company that presented a greater risk or difficulties in borrowing could resort to operating leases and mask its risk of bankruptcy and growth rates.

Examining this situation from the viewpoint of the capital structure, Cornaggia, Franzen and Simin (2013) argue that firms strive to minimize taxes and financing costs. So when OBS (off-balance sheet) funding is allowed, management tends to distort financial information. Therefore, there may be a propensity for companies with poor financial reporting and worse financial ratios to tend to use operating lease as a source of financing.

In addition to the possibility of potential investors being misled, manipulation of regulatory requirements imposed by IAS 17 affects clients, suppliers, employees and other stakeholders who base long-term contracting decisions on perceived financial health (Cornaggia, Franzen & Simin, 2013). To the extent that counterparties do not properly assess financial risk, the company benefits from its asymmetric information in the contracting.

Another argument is that IAS 17 allows companies, in addition to preferring operating leases, to tend to inform the financial as operating, even if, in substance, they are classified as financial or characterize a common service contract, which does not fit into the definition of leasing according to the standard (Sacarin, 2017; Edeigba & Amenkhienan, 2017). Therefore, the new standard proposes emphasizing the use of the asset in its substance rather than the legal form of classification.

It is known that operating leasing gives the company a better capacity and indebtedness rate and this could also make companies choose the operating lease, thus avoiding the Fasb rules and their Brightline rules (demarcation of percentages of useful life, risk transfer and others), which determine when the lease is characterized as financial leasing and should be on balance sheet. The need for an international standard, such as the new IFRS lease rule, avoids the dissemination of different accounting methods, resulting in better comparability of financial statements and thus reducing reporting disparities (Cornaggia, Franzen & Simin, 2013).

Concern about improving financial disclosures and statements continued to grow, and other agencies such as the Securities and Exchange Commission (SEC) expressed concern about the lack of information transparency on lease obligations, highlighting concerns investors and others had previously expressed. The document Basis for conclusions (IFRS, 2016b) brings these considerations about the lack of transparency and lack of attention to the financial statement users' needs. After reviewing comments from countries around the world, the IASB found that many users adjusted financial statements of a lessee to capitalize on operating leases because, in their view, the financing and assets provided by leases should be reflected in the statement of financial position (IFRS, 2016b).

The comment letters also show that some users of the statements tried to estimate the present value of future lease payments to have a more realistic view of the company's situation. Because of the limited information available in the explanatory notes, however, many used approximation techniques to estimate total leverage and capital employed in operations, while other users were unable to make adjustments. Thus, these different approaches created asymmetric information in the market (IFRS, 2016b).

The IASB increasingly noted the inefficiency of the current model through its research and consultations, which was eventually misused by companies. Statistics revealed significant amounts of unrecorded leases and investors showed their dissatisfaction. The arguments against IAS 17 were highlighted in this topic in order to describe the scenario of changes in which IFRS 16 was created, to then discuss the challenges and changes it proposed.

3. IFRS 16 and Proposed Changes

IFRS 16 largely retains the lease definition in IAS 17, but changes guidance on how to apply it. This refinement in the accounting form was necessary to remove the practice of OBS items for operating leases and to better distinguish a lease from a service contract (Sacarin, 2017).

Another measure that will also facilitate the application and reduce the cost to businesses is that the new standard and its definition will only apply to new lease agreements (as of January 2019). Therefore, it is not necessary for companies to re-evaluate their existing contracts to make the transition. The lessee's new accounting approach implies the recognition of two main items as a result of the contract, which involves: a right-of-use asset and a lease liability.

Compared to other standards, IFRS 16 is similar to ASC 842 (FASB Accounting Coding Standards) issued on February 25, 2016. The difference between the standards is that IFRS 16 recognizes only one model for all contracts while ASC 842 recognizes two models, still depending on whether the lease is financial or operating. In the case of operating leases, liabilities and assets will be measured on a linear base while, for the finance leases, classification and procedures are the same as in IFRS 16.

3.1 International transition scenario

The IASB and other agencies, such as the audit companies, economic groups like the European Union and financial analysts are concerned with how the companies will process this transition and how it will affect the financial market. As discussed, the main impact of IFRS 16 will be the recognition of assets and liabilities formerly kept OBS related to operating leasing operations.

A study by the European Financial Reporting Advisory Group (EFRAG, 2017) simulated these effects on companies registered in its territory. Considering the limitations inherent in the nature of this simulation, this study showed that total liabilities arising from operating leases correspond to approximately 516 billion euros, representing 15% of the lessees' average total debt (excluding financial institutions). If we consider only the three sectors where the use of operating leases (airlines, retail and travel and leisure) is more common, this figure rises to 40% of total debt. The value of the ROU asset for the lessees in the simulation corresponds to 551 billion euros, representing 15% of the total net book value (EFRAG, 2017).

The IASB also collected information on the likely effects of new standards through consultations on exposure drafts and their analyses and consultation with stakeholders through outreach activities (IFRS, 2016a). Overall, this document recognizes the difficulty to apply the standard, but emphasizes that the benefits of adopting it will be far greater than the costs. The IASB also recommends that all companies that follow the IFRS standard begin to analyze the impacts the adoption of the standard will cause. Early adoption is permitted for companies that simultaneously adopt IFRS 15 - Revenue from contracts with customers.

To anticipate adherence to the standard, companies may choose to apply the new definition of lease contract to all their contracts, or apply a "practical expedient", maintaining their previous assessment of which contracts are or contain leases (IASB, 2016). The practical expedient option reduces the cost of the standard, but also reduces the comparability among companies.

Lloyd (2016) states that, in response to the expressed concerns about cost and complexity (and particularly the costs of applying the standard requirements to large volumes of "small-value" items), IFRS 16 does not require a lessee to recognize assets and liabilities for (a) leases of 12 months or less (short-term leases), and (b) leases of low-value items (such as computers and office furniture or other items worth less than U$5,000). If this exemption is applied, then the rent expense is recognized in the income statement.

According to the Bases for conclusions (IFRS, 2016b), the short-term and low-value exemption decision is related to the economic consequences of a short-term lease for a lessor. It is considered that there is an economic disincentive for lessors to grant leases with shorter maturities, because the reduction of the lease term would increase the risk associated with the residual share of a lessor in the underlying asset.

The IASB chose not to require a mandatory retrospective approach because it knew that it would be virtually impossible for some companies. The IASB team conducted a consultation on the term and found that most companies would need two to three years to implement the new standard, and that most companies preferred to adopt IFRS 16 after IFRS 15, although some wanted to adopt both at the same time. The users and preparers of the statements complain of so many impending changes (financial instruments and revenues will take effect as from 2018, and IFRS 15 as from 2019).

With one year left for the mandatory adoption of the standard, discussing the effects under macroeconomic aspects and considering the characteristics of each economic sector and the operational particularities of each company are crucial to maintain the financial health of the markets. Investors, analysts and academics should focus their efforts on preparing for the maximum possible impacts the standard may cause. Besides this aspect, one must also consider if the increase in the subjectivity of the parameters, the insertion of concepts such as relative certainty and symbolic price, would provide greater scope for income smoothing and its impact for the financial information.

3.2 Brazilian context and related studies

In Brazil, the Accounting Pronouncements Committee (CPC), the Brazilian Securities and Exchange Commission (CVM) and the Federal Accounting Council (CFC) offered for joint public hearing the Technical Pronouncement CPC 06 (R2) - Leasing Operations (corresponding to IFRS-16 - Leasing), starting on June 1, 2017 and ending on August 31, 2017, with insignificant contributions and changes (only one suggestion reported) in relation to IFRS 16. In addition to replacing existing lease standards, including CPC 06 (IAS 17) Leasing Operations, IFRS 16 also changes ICPC 03 (International Financial Reporting Interpretations Committee - IFRIC 4 Standing Interpretations Committee SIC 15 and SIC 27), which deal with complementary aspects of leasing operations (KPMG, 2017). - Despite the disclosure of the pronouncement, few studies have investigated the future impact of asset and liability disclosure in compliance with IFRS 16 in Brazil. In the Brazilian context, where new fiscal and regulatory standards are essential to measure the impacts of this new CPC, since 2014, Law 12.973 has been published, which established the fiscal treatment of the accounting changes due to the convergence of the Brazilian with the international standards (RBF, 2017). Nevertheless, as CPC 06 R2 only came into force after that law, the altered accounting criteria depend on the Brazilian Internal Revenue Service (RBF) and its Normative Rulings to regulate the adjustments to be made in the calculation base of federal taxes in order to guarantee the tax neutrality.

On this regulation, RBF Normative Ruling 1700, dated March 14, 2017, provides for the calculation of Income Tax and Social Contribution for companies opting for the Actual, Assumed and Arbitrated Profit regimes, imposing general exemption rules and immunities, obliging the taxpayers. In addition, it regulates the practical application of the tax adjustments of the international accounting standards and the CPC, with its annexes on appropriate procedures to nullify the effects of these acts on the determination of federal taxes (RBF, 2017).

Following the same purpose of IN 1700, other regulations were issued: IN RFB 1753, of October 30, 2017, and IN 1771, of December 26, 2017. The latter deals with Technical Pronouncement 47 (Revenue from Contracts with Customers), disclosed on December 22, 2016 by CPC 47, which identified new methods and accounting criteria with significant changes in the measuring and accounting recognition of revenues. In this latest update, it is important to remind that, although IN 1771 came after the approval and disclosure of the content of CPC 06 R2, there was no mention of its changes, also lacking RBF regulation.

Academic studies that address the impact of CPC 06 and its new criteria are still scarce in Brazil. Moura's research (2017) sought to identify the degree of disclosure of leasing by the companies listed on Ibovespa, based on the changes in the accounting standard, verifying the disclosure requirements by IAS 17 and IFRS 16, analyzing the financial statements of 17 companies listed on Ibovespa. The research was aimed at verifying if any company already shows traces of disclosure of the lease in the quarterly results according to the standard proposed to enter into force in January 2019 (CPC 06-R2). The results show that the percentage disclosure according to the new standard is still low (an average 40% of the selected companies) (Moura, 2017).

Arroziom Gonzales & Silva (2016) studied the changes in the financial indicators of companies in the wholesale and retail sectors, due to the new accounting treatment of the operating leases of the companies listed on the Brazilian stock exchange B3, noting that leasing has effects on liquidity, debt and operational leverage. It should be reminded that some studies in Brazil already verified the impacts on the asset and liability structure and financial indicators, even before IFRS 16 was published (Barbosa, Barros, Niyama & Souza, 2011; Gallon, Crippa, Gois & Luca, 2012).

Since the promise of changes through Exposure Draft 2010/09 (ED), some authors, such as Batista & Formigoni, (2013) and Martins, Silva Filho, Girão and Niyama (2013) use the simulation method of the proposals in the ED in order to verify if the expected changes can cause significant differences in the indicators tested. Evidence shows that, in 2011, R$ 3.8 billion, related to operating leasing contracts, did not go on the balance sheet of the respective Brazilian companies, and that, on average, the companies in the sample have operating leasing contracts payable equivalent to 18.46% of equity and 16.14% of third-party capital (Martins et al., 2013).

Similar simulations were analyzed in Australia by Xu, Davidson and Cheong (2017) in order to calculate the impacts of the local standard correlated with IFRS 16 (corresponds to AASB 16 in Australia), noting that the standard has a stronger economic impact for companies in the industrial sector and that the change in the book value of equity that occurs as a result of capitalizing the operating leases is relevant to determine the market value of the shares. Nevertheless, the changes in the company income do not materially affect the market value of these leases (returns). From the viewpoint of improving the information transparency for investment decisions, the study provided the first Australian evidence on the impact of adopting the new standard. The authors believe that the right-of-use method applied in IFRS 16 is consistent with the present conceptual framework and ensures that leasing operations are faithfully incorporated in the financial statements, increasing the transparency of accounting practices and reducing the data manipulation capacity (Xu, Davidson & Cheong, 2017).

More broadly, Akbulut (2017) focused on international studies that evaluated accounting treatment changes due to the adoption of IFRS 16. Twelve studies were selected as a sample for the literature review, published in high impact factor journals such as Journal of Accountancy, Accounting and Business Research, Accounting Horizons, and Journal of Accounting Research, between 2000 and 2015. The range of these academic studies, which used different samples, reveal that the suppositions on the variations in the interest rate, remaining useful life, total useful life, variation of the leased assets, lease term and accounting and financial ratios vary according to the sectors and countries analyzed, and that there is no consensus on what will change when the new standard is adopted. The results of those academic studies show that there is no agreement.

The statistics of the Brazilian Association of Leasing Companies (Abel) show that, until April 2018, leasing contracts in Brazil, distributed according to the leased object, are concentrated in 39.70% of machinery and equipment, 26.85% of vehicles and the like and 13.97% of aircraft (ABEL, 2018). Abel also reveals that the 184,249 current contracts registered in the association amount to a present value of R$ 11,198,113,807 (Abel, 2018). Based on these data, research is needed to analyze the quality of the information and the amount of accounting disclosure after the standard, comparing the impacts imposed by CPC 06 RS in the financial statements and in the economic and financial indicators, such as EBITDA, Net Income, Return on Shareholders' Equity, Operating Profit and Liquidity Ratio.

4. Main Challenges and Impacts

IFRS 16 was issued with a two-year term for implementation. The IASB (2016) states that it grants this deadline so that implementation costs can be spread over time, and perhaps avoided altogether. The implementation costs for creditors and lessors tend to be much lower than those for lessees.

4.1 Challenges for lessees

For lessees, the implementation of the Information Technology and Accounting system accounts for about 90% of total compliance costs for adherence to the new standard (Efrag, 2017). A study by Efrag (2017) expects that the major costs will relate to the analysis of existing contracts, including the purchase of additional Information Technology systems and possible changes in accounting processes. These costs vary among companies and economic sectors. If the lease portfolio contains different assets and/or varying terms and conditions, the companies would spend more time and resources (Efrag, 2017).

The positive point is that the goal of these initial costs with change is to achieve process automation, that is, tend to promote a lower continuous incremental cost over time. In addition to these costs, under IFRS 16, operating leases, which were previously considered as expenses, would be reported as depreciation and interest expense. As a result, the company's operating costs would drop and EBITDA (Earnings Before Interest, Taxes, Depreciation And Amortization) would increase (IFRS 2016a).

The so-called "On / off balance sheet test" is the test that differentiates whether or not a contract is part of the balance sheet. It represents the material abandonment of the idea of a different accounting treatment for operating and finance leasing (IFRS, 2016). Based on the provisions of IFRS 16, if a contract is identified as a lease, it follows a single lease model, similar to that used in IAS 17 for finance leasing.

In the interpretation of KPMG (2017) on the standard, there is a step-by-step in which three prerequisites have to be fulfilled simultaneously for a contract to be characterized as being or containing a lease. This would be the initial test to apply the rules of IFRS 16. The requirements would be that the contract needs to contain: an identified asset; transfer of economic benefits to the lessee and lessee to manage the use of this asset.

Firstly, to be considered an "identified asset", the leased property needs to be explicitly specified in a contract or implicitly specified when it is made available for use by the lessee. This can occur in two ways: when it can be physically separated or when it substantially represents the total capacity of the asset (KPMG, 2017; IFRS, 2016).

Second, the transfer of economic benefits - this consideration is taken as a crucial point of the new standard. In this regard, leasing contracts will be separated from mere service provision, in which the good is not substantially transferred to the lessee, and in which the lessee does not enjoy the economic benefits as it wishes. For example, if the lessor has the substantive power to replace an asset identified during the lease term, the entity has no control over the asset, which does not constitute a leasing contract. A replacement right is considered substantive when the lessor has the practical ability to replace the asset or when it can economically benefit from its ability to take advantage of that right of substitution (KPMG, 2017).

Finally, the prerequisite of the lessee having the right to manage the use of an identified asset when it occurs, when the lessee has the right to manage and for what purpose, the asset will be used throughout the contract period and when relevant decisions for use are predetermined in the contract (without the lessor having the right to change those decisions). When these three requirements are attended to, the contract is identified as leasing, moving on to aspects of the initial and subsequent measuring of the financial assets and liabilities deriving from the contract. PWC (2016) highlights that this requisite of IFRS 16 to separate leasing and non-leasing components and assigning the consideration to separate components will require management judgment in identifying those components and applying estimates to determine the observable prices. The lessees may not yet have all the information necessary to separate between leasing and non-leasing elements.

The effects of recognition of assets and liabilities in the statement of financial position are accompanied by the recognition of depreciation and interest expenses in the financial performance statement and is reflected in the Cash Flow and comprehensive income Statement (IFRS, 2016a). The lessee's accounting model defines the initial and subsequent measuring form of assets and liabilities over the periods and has particularities the preparers of the statements should be aware of, starting with the lease term.

To define the lease term, the preparers of the statements have a certain degree of subjectivity. The rule states that an entity shall determine the term of the lease as the non-cancellable term of the lease, together with: the periods covered by an option to extend the lease if the lessee is **reasonably** certain to exercise that option; and the periods covered by an option to terminate the lease if the lessee is **reasonably** certain not to exercise that option (IFRS, 2016).

On this reasonable certainty, it is clarified in the document Bases for Conclusions (IFRS, 2016b) that relevant facts and circumstances should be considered that lead the lessee to realize that the term may extend, or not, by evaluating the cost-benefit of not extending the lease term. Examples of relevant facts to consider include: the cost of termination penalties; costs of returning the goods (removal and transportation); existence of improvements; specificity of the asset (possibility of not having the same good available in the market); and market rate in comparison. These factors should be considered and compared to the other options available to the entity.

All leasing liabilities should be measured with reference to an estimated lease term, which includes optional lease periods when an entity is reasonably certain to exercise an option to extend (or not terminate) a lease. A "right of use" model replaces the "risks and rewards" model; the lessees are required to recognize an asset and liability at the beginning of a leasing contract (PWC, 2016).

After determining the contract term for the accounting treatment of the lease, the initial measurement of the right to use asset at cost is done considering (based on) the leasing liability with adjustments to any prepaid rents, lease incentives received and initial direct costs incurred (IFRS, 2016).

It is correct to say, then, that the first step is to measure the leasing liability, at the start date (the date on which the asset is made available for use). A lessee will measure the leasing liability at the present value of the lease payments that are not made on that date (IFRS, 2016). Lease payments will be discounted using the interest rate implied in the lease if that rate can be determined immediately. If that rate cannot be determined immediately, the lessee will use the incremental rate on the lessee's loan (IFRS, 2016).

At the start date, lease payments included in the leasing liability measurement comprise the following payments for the right to use the underlying asset during the lease term that are not made at the start date: (a) fixed payments (including payments fixed in substance, which are variable by name but have a mandatory minimum payment), less any lease incentives receivable; (b) variable lease payments that depend on an index or a rate, initially measured using the index or start date rate); (c) amounts that are expected to be paid by the lessee in accordance with residual value guarantees; (d) the exercise price of a call option if the lessee is reasonably certain of exercising that option; and (e) payments of fines for termination of the lease, if the lease term reflects the lessee exercising an option to terminate the lease (IFRS, 2016).

Variable lease payments will need to be included in the measuring of leasing assets and liabilities when they depend on an index or a rate or are fixed payments in substance. A lessee has to reassess variable lease payments that depend on an index or a fee when the lessee forwards the leasing liability for other reasons (for example, due to a reassessment of the lease term) and when there is a change in the cash flow resulting from a change in the benchmark or rate (i.e., when an adjustment for lease payments takes effect). Lessees should reassess the lease term only after a significant event or a significant change in the circumstances under the lessee's control (PWC, 2016).

After the initial recognition, the standard addresses the subsequent measuring, in which the liability is recognized at amortized cost using the effective interest method. IFRS (2016b), after analyzing suggestions from the comment letters, highlights that the reason why fair value is not used in subsequent measures is the high complexity and valuation cost, in addition to reducing comparability (in this case). There is also the case of liability repricing (changes in payments), which can occur in three ways: with changes in payments as a result of a change in the variable interest rate, with changes in the lease term or change in the valuation of the exercise of the call option (KPMG, 2017). Another aspect that aroused substantial discussion among the financial statement preparers was the variable payments, in which some suggested that it would be extremely hard, in many cases, to estimate the variable lease payments if the values depended on future sales or the use of the underlying asset and that these estimates would be subject to a high level of measuring uncertainty. Many expressed the view that, due to the extent of judgment involved, the cost of including variable lease payments and payments to be made during the optional periods in the measuring of leasing assets and liabilities would surpass the benefit for the financial statement users (IFRS, 2016b).

Following this same reasoning of subsequent measuring of liabilities, the lessee generally evaluates the asset at cost less depreciation and impairment of assets; whenever there is a remeasuring in liabilities, the value of the right of use asset is modified (IFRS, 2016). There are two situations where the asset measurement basis can be changed: if a right of use asset falls within the definition of investment property (IAS 40), it is valued at fair value or, if the entity applies the revaluation to a class of property, plant and equipment and the right of use is included in this class, it must also be remeasured.

Recognition of an asset on the lessee's balance sheet entails the need for depreciation of the asset. The depreciation rule follows the model of IAS 16 and consequently reflects the pattern in which the economic benefits are consumed. The particularity of leases is to know the depreciation period, which can vary according to two factors: whether the property is transferred to the lessee or if the lessee is reasonably certain that he will exercise the call option. Then the depreciation period will be the useful life of the underlying asset. If there is no transfer of ownership, however, the depreciation period may be the useful life of the asset or the lease period, whichever is shorter (IFRS, 2016b).

4.2 Challenges for lessors

As already mentioned, the lessor's accounting remains similar to IAS 17, where a lessor classifies a lease as finance or operating. The applied concept also follows the same logic in that leases that transfer all the risks and benefits are financial leases, and all others that do not fit into this transfer of risk are operating.

The main difference between the two models is that, under the operating lease arrangements, the lessor continues to recognize the underlying asset and does not recognize a financial asset for his right to receive lease payments. Unlike the lessee's accounting model, where there is subjectivity as from the moment the contracts that are leases or not are recognized, the term of the agreement is evaluated and the rate is defined, the lessors do not change their initial evaluations of the lease term and the call options. Lessors and lessees use the same guidance to determine the term regarding the reasonable certainty of call options. The problem is that, unlike lessees, lessors do not change the term.

Financial Statement	Finance Leasing	Operation Leasing
Financial Position	• Derecognize the underlying asset • Recognize a lease receivable	• Continues to present the underlying asset • Adds direct costs of lease to the value of the underlying asset
Financial Performance	• Recognizes the financial revenue based on the effective rate; • Revenue based on lowest between the fair value of the asset and the present value of the lease. • Sales cost based on book value of asset minus present value of the non-guaranteed residual value.	• Recognize the revenue from the lease during the lease term on a linear base. • Recognize the expenses related to the asset - Depreciation

Figure 1. Double accounting model of the leaser and its reflexes in the financial statements.

Source: elaborated by the authors based on IFRS (2016).

As for disclosure requirements, the standard also entails a substantial increase in the amount of information disclosed by lessors. In this case, the disclosure model remains segregated according to the leasing modality. For operating leases, lessors will disclose: Lease revenue for variable payments that do not depend on an index or a rate; detailed analysis of the maturities and disclosures related to the revaluation of the assets. For financial leases, the requirements are higher: Profit or loss on sale; Financial Income in the Net Investment; Financial income from lease of variable payments; Significant changes in the book value of the investment and analysis of the maturities of the payments receivable.

5. Discussion on the Changes and Challenges of IFRS 16 in the Light of Substance over Form

In the new conceptual framework whose release is expected in 2018, the primacy of substance over form has been removed from the condition of a separate component of the reliable representation, being considered a redundancy (IFRS, 2015). Although it is not a separately stated component, representation by the legal form that differs from the economic substance cannot result in a reliable representation. Thus, substance over form remains irreplaceable in the IASB standards because the reliable representation implies that there is information about the substance of an economic phenomenon rather than information about its legal aspects and format (IFRS, 2015).

This recognition of the prevalence of the accounting substance over the legal form is of great importance to Accounting as a science, because it means that the IASB explicitly recognizes that accounting standards should be subordinated to the principles of the true and fair view, the primacy of substance over form and the true and fair representation of the economic reality (Iudícibus & Martins, 2015). This means that the economic reality needs to be reflected in the financial statements in such a compulsory way that, even in the case of conflict with the standards issued, the fair representation should be preponderant, so that the objective of bringing useful information to users is achieved (Iudícibus & Martins, 2015).

Although throughout its editions and corrections, IAS 17 was considered in the literature as one of the accounting standards that most required professional judgment, it was also considered the first standard to apply the principles of substance on form, representing a great advance for Accounting (Edeigba & Amenkhienan, 2017). This breakthrough was overshadowed when some entities misapplied the standard though, which could be interpreted as potential elements of corporate fraud.

To overcome these shortcomings, the changes proposed by IFRS 16 make all leasing operations, whether operating or financial, be recognized in the assets of the lessees. For the lessors, IFRS 16 retains the previous accounting form, recognizing the asset only in the operating leasing operations. This line of reasoning provokes reflections on the concept of substance over legal form and IASB argues that it is more appropriate to the concepts established in the conceptual framework of the IASB proposed in 2015 and which is expected to come into force as from 2018.

The IASB defines an asset in its conceptual structure as a "resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity" (IFRS, 2015). Based on this definition, it is concluded that a lessee's right to use an underlying asset meets the definition of an asset for two essential reasons: first, the lessee controls the right to use the underlying asset throughout the lease term and if the lessee is able to determine how to use the underlying asset (IFRS, 2016b). By contractual agreements, in any of the leasing arrangements, once the asset is made available for use by the lessee, the lessor is unable to recover or otherwise use the underlying asset for its own purposes during the lease term, despite being the legal owner of the underlying asset. As for the economic benefits, it is known that the right of use also transfers them to the lessee (IFRS, 2016b).

The "right of use" and the leasing liability represent the main recognized equity items and entail subjectivity and challenge for accounting professionals, who will have to understand the range and substance of the standard that is based more on principles than on rules, and makes it clear at bottom that what should be taken into account is the concept of asset, and not the right of ownership. In addition, one of the main points mentioned in favor of the standard is that the existence of two different accounting models for leases, where assets and liabilities associated with leases were not recognized for operating leases, but were recognized for finance leases, meant that transactions that were economically similar could be accounted for in a very different way (IFRS, 2016b).

Although it fits into the asset definition of the current conceptual framework, questions are due about the impact of the new standard on accounting characteristics such as reliability, comparability, uniformity and verifiability. Would increasing the judgment and establishing an imbalance in the balance sheet symmetry (caused by the same good being accounted for concomitantly in balance sheets of two companies, with possibly different values and terms) not hinder the reliable representation and relevance of the financial statements?

According to the comment letters analyzed in the Basis for conclusions, users are concerned about the inconsistency of a dual model for lessors and a single model for lessees. This can be perceived when a lessee recognizes a right of use asset and a liability and the lessor continues to recognize the underlying asset and does not recognize any financial asset for the right to receive payments (KPMG, 2017).

On this lack of symmetry generated in the lessee's and the lessor's balance sheets, one can affirm based on the analysis of the section entitled "Divergent Opinions" in the Basis for Conclusions that this was the point most cited by users in the comment letters. The opinion of most commentators states that "a lessor should recognize a lease receivable and a residual asset for all leases for which a lessee recognizes a leasing liability and a right of use asset." It is also believed that "it is conceptually inconsistent to require a single accounting model for lessees while maintaining a double accounting model for lessors" (IFRS, 2016b). It should also be argued, however, that to the extent that operating leases that relate to short-term and low-value leases also satisfy the concept of an asset, they should be recognized for the same reason, claiming the same benefits.

In reviewing the IASB's proposal for IFRS 16, Biondi, Bloomfield, Glover, James and Ohlson (2011) point out that the standard fails by not determining that the lessor should reclassify the leased asset as a financial asset (or receivable), as the property is no longer under the control of the lessor. In this regard, the authors rest on the idea of symmetry, considering that transferring control of an asset to a lessee would necessarily imply a disposition of control and economic benefits on the part of the lessor. This symmetry is necessary, mainly when the lessor and lessee are part of consolidated balance sheets. The lack of symmetry between the balance sheets can cause problems even when the lessee does not recognize the lease expense, but depreciates the right related to using the asset and this is done by the lessor, who also continues to depreciate the good even if it does not remain under the entity's control (Biondi et al. 2011). Therefore, there will be problems for both consolidation and taxation purposes.

This dual accounting of the same asset in two different balance sheets then generates a controversy for the recognition of assets, which should be done using the same conceptual logic, respecting the reliable representation for the recognition of balance sheet items. This reliable representation of accounting elements also requires the concept of True And Fair View, which states that a true and fair view of the economic and financial situation of the business and results, including any legal and regulatory provisions, must prevail in the financial statements (Dantas, Rodrigues, Niyama & Mendes, 2017). Therefore, many questions remain about the possibility that IFRS 16 does not result in the fairer form of the leasing companies' economic situation, for example, that they continue to recognize the leased asset, even if it no longer satisfies the concept of an asset, and without recognizing the right of reception as a financial asset.

In analyzing the comment letters, the IASB notes that some stakeholders are concerned that IFRS 16 may introduce some elements of subjectivity due to differences in the approach the lessees adopt in determining the lease term, and that some lessees may change the leasing modality to short-term to take advantage of the exemption from the standard. On this, the study by Efrag (2017) states that there would be a higher cost associated with these types of leases, and that these cases may represent only about 13% of the lessees who might be motivated to change a substantial part of their leasing portfolios to short-term leases.

Single costs of compliance with the standard should be treated as an unrecoverable cost. For the IASB (2016), the costs involved in creating new accounting systems and processes, staff training, will need to be sufficient to develop a continuous basis of procedures to enable the company to: identify effectively and reliably which contracts are or contain leasing, then make the separation between the lease and non-lease (service contracts) components, determine the term of each contract based on what is expected for a "non-cancellable" term; and, finally, determine the appropriate discount rate.

Perhaps the most important aspect of the standard is to note that IFRS 16 between the many lines requires judgment in the accounting treatment and measuring by the lessees in the terms listed in the paragraph above. On the one hand, the ability to apply some judgment allows companies to apply the new rules in a way that best reflects their own circumstances (for example, determining a time frame that better reflects the economic benefits than the term contractually agreed upon); on the other hand, rules that require greater professional judgment may increase the costs of complexity and, consequently, require greater preparation of accountants and staff (Efrag, 2017).

This negative point in relation to greater openness to professional judgment revolves around the IASB's proposal to have principle-based rather than rule-based standards. For some authors (Paulo, Carvalho & Girão, 2014; Martins et al., 2013; Niyama, Mota, Oliveira & Paulo, 2016), accounting has migrated towards the adoption of standards based on principles, and this represents a trend that has been reinforced by the IASB.

There are various advantages of standards such as IFRS 16 being based on principles, with some common characteristics that are clearly perceived in IFRS 16: They do not determine how to do it, but how to decide what needs to be done (e.g. the standard does not explicitly determine when a contract is or is not a lease, but clarifies broad features to recognize it as such); uses the True and Fair View (TFV) concept (to determine which operating or financial lease modalities meet the same purpose and concept of assets in the leasing company); it seeks the best expression of the economic and financial reality, necessitating at certain moments to use estimates in the measuring and/or disclosure process (for example, the determination of the rate to estimate the leasing liability); the substance of the transaction or economic event is preferable to the legal form; the accounting professional uses his or her value judgment more often; and, a greater degree of freedom to present information (Paulo, Carvalho & Girão, 2014).

6. Final Considerations

The main reason for the implementation of IFRS 16 is to increase the transparency and the reliable representation of the accounting information. To identify the main challenges and impacts of the standard that will soon be in force, this research made a theoretical survey, using the documents published by the IASB and other empirical research to indicate the main changes proposed in the lessee and the lessor, also analyzing the possible costs and benefits cited in the current Brazilian and international literature.

Clarifying the reasons why many considered IAS 17 to be open to manipulation, lacking uniformity and not depicting the substance of transactions, the IASB's argument and effort is clear to draw up a standard with proposals for more transparent accounting information as a result of years of study.

The main challenges the standard poses are perceived by the lessees. The single accounting model entails a number of subjectivities that start with the On/Off balance sheet test, which brings concepts to identify whether the contract is or contains leasing. Subsequently, subjectivity in identifying and separating leasing components from non-leasing components of a contract may be a complex exercise, which will require more information to be made available by the lessor, and/or the use of an independent baseline price for that lease. As well as the determination of the lease term (due to the non-cancellable period) and the discount rate to recognize the liability at present value.

At the macro level, the impact of the standard is mainly due to changes in financial measures (e.g. EBTDA, ROE, ROA); new estimates and greater judgment; balance sheet volatility (more changeable assets and liabilities); and changes in contractual conditions and business practices (those that rely on financial indicators as a contractual warranty clause or to provide financial incentives or employee compensation).

The increase in the subjectivity of the standard also represents a great challenge, as it requires greater professional judgment for the measuring and recognition of the leases. The argument is that, for principle-based standards, there is a discussion that tends to prioritize principle-based standards as they increase the transparency and quality of information. It is in this sense that the IASB has been working on the issue of its new standards (Niyama et al., 2016). Although early adoption of the standard in Brazil is not yet possible, companies should prepare and invest in adoption strategies, studying and considering all the impacts that the recognition of operating leases will cause in their financial statements.

IFRS 16 represents a major step in international accounting as, considering that leases (with the exception of short-term and low-value leases) substantially carry assets and liabilities in accordance with the IASB's conceptual framework, recognizing them in the financial statements offers a number of benefits. Nevertheless, further reflection is due on possible problems the lack of symmetry in the lessor and lessee's models can cause to accounting, considering that, in substance, the same transaction is being recognized in different ways for the parts of the operation, which causes lack of comparability and consistency.

Therefore, it is necessary to recognize the progress of the standar in worrying about eliminating the weaknesses of IAS 17, a standard that is subject to manipulations and presents transparency failures when it omits a large amount of unreported debts. It is also necessary to discuss a possible regression of the standard with respect to the primacy of substance over form though, which is being proposed in the accounting treatment of leasing in the leasing companies, but not in the lessors.

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Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

REPeC, Brasília, v. 12, n. 3, art. 4, p. 327-348, Jul./Sep. 2018
Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1816

A Credit Risk Analysis Approach Using the Fleuriet Model

Abstract

Objective: To construct a model that can assess the credit risk in Brazilian publicly-traded companies, using indicators from Fleuriet's model of financial analysis.

Method: Methodologically, the research was defined as quantitative, with a descriptive design. The financial statements were collected from Economática and the website BM&FBOVESPA. The sample consisted of 121 companies, being 70 solvent and 51 insolvent, from different sectors.

Results: For the financial structure, working capital and working capital requirement indicators, the companies seek to achieve a constant growth model, expanding or gaining markets, in view of the continuing need for additional working capital over time. The results found for the liquidity thermometer demonstrate the importance of the financial accounts called treasury account to calculate the company's short-term corporate liquidity and solvency. Finally, financial indebtedness as a structural index contributed significantly to the model.

Contributions: This study can contribute to the Brazilian literature by evidencing that some of the indicators in Fleuriet's model are significant to assess the credit risk in Brazilian publicly traded companies.

Key words: Dynamic model, Credit risk, Bankruptcies, Financial indicators.

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Published in Portuguese and English. Original Version in Portuguese.

Received in 3/18/2018. Ask to Revise on 6/11/2018. Resubmitted on 7/3/2018. Accepted on 7/24/2018 by Dr. Vinícius Gomes Martins (Assistant Editor) and by Dr. Orleans Silva Martins (Editor). Published on 9/6/2018. Organization responsible for the journal: Abracicon

1. Introduction

Decisions concerning the granting or not of credit play a fundamental role for the creditor institutions. The greater the volume of credit operations, the greater the risks involved, risk being an ever-present cost in credit business, making it imperative for managers to quantify it. More specifically, the idea of risk is associated to the probability that a certain result will occur in relation to the expected return, whose estimation, in turn, depends on the past (Assaf Neto, 2010). In financial activities involving credit, the aim is to find security against the risk present in operations or, at least, to transform uncertainty into measurable risk (Silva, 1983).

It is evident that the first studies in this field sought to detect if the indicators of the solvent companies were favorable and if the indicators of the insolvent companies were unfavorable. Two of the earliest (univariate) studies in the field were Fisher's Multiple Use Measurements in Taxonomic Problems (1936) and Durand's Risk Elements in Consumer Installment Lending (1941). The univariate analyses carried out in the late 1950s were replaced though as soon as academic research turned to credit scoring modeling techniques in the late 1960s (Sabato, 2009).

Seminal papers in this field were Beaver's Financial Ratios Predictors of Failure (1966) and Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy by Altman (1968). In Brazil, the first study was the article "How to predict corporate bankruptcies," published by professor Stephen Charles Kanitz. Kanitz (1974) proposed a thermometer of the business solvency situation that would become a reference for future research. Other research that would become relevant to the field was: the work "A Mathematical Model for Credit Decisions in the Commercial Bank" by Elizabetsky (1976) and "Contribution to the techniques of financial analysis: a credit grant model" by Matias (1978), among others.

Martins (2003) explains that the literature does not determine which indicators are the most significant in the assessment of insolvency. According to the author, although many indicators are used repeatedly in several studies, the choice of indicators is largely related to access to the data and the perception of the researcher.

The first study that sought to broaden the range of options in the choice of new economic/financial indicators, besides those referring to the Traditional Model of Financial Analysis, frequently used for the analysis of credit risk in Brazil, was the work of Sanvicente and Minardi (1998), by selecting indicators from the Fleuriet Financial Analysis model (also called the dynamic model) to test the dynamics of overtrading, as proposed by Fleuriet, Kehday and Blanc (1978).

Although Sanvicente and Minardi (1998) did not find better results when replacing the liquidity index with indicators of overtrading dynamics, they opened up possibilities for new work to explore other indicators. The objective of this study is to build a model capable of evaluating credit risk in Brazilian publicly traded companies using the Fleuriet model of financial analysis.

2. Theoretical Framework

2.1 Credit risk

Garcia, Guijarro and Moya (2013) and Prado, Alcântara, Carvalho, Vieira, Machado and Tonelli (2016) point out that credit risk assessment has been the subject of a series of in-depth studies in recent years; it is the main focus of the financial and banking areas mainly due to the recent international financial crisis, which had a severe effect on many financial organizations. In addition, Akkoç (2012), Finlay (2011) and Oreski and Oreski (2014) emphasize that credit risk is one of the most important issues for the banking sector and has gained increasing attention in recent years.

Garcia, Gimenez and Guijarro (2013) elucidate that credit risk management is a key issue for any company at any time. The authors note that there are currently several methods that aim to predict the probability of default by debtors, many of them using logit analysis or discriminant analysis for classification.

Harris (2013) and Yu, Wang and Lai (2008) note that increased competition in the financial service industry has led many companies to find innovative ways to deal with risk in order to achieve and/or maintain a competitive advantage. As a result of the current economic and business environment, financial institutions face greater risk of losses associated with non-compliant credit approval in decisions. Kou and Wu (2014) argue, however, that the main purpose of credit risk analysis is to classify customer samples as "good" or "bad" payers (solvent or insolvent).

2.2 The Fleuriet model

In predicting insolvency, the financial literature does not definitively establish which are the best indicators to be used. Various researchers have repeatedly used several indicators, but the choice process usually depends on the data availability and the researcher's intuition.

According to Assaf Neto (2010), the traditional model of analysis of financial statements is one of the most important studies of financial management. A better understanding of this method can be achieved by means of economic and financial indicators, classified into four groups: liquidity and activity, indebtedness and structure, profitability and stock analysis.

In this respect, Fleuriet, Kehday and Blanc (2003) argue that the traditional presentation structure, which groups several asset and liability accounts horizontally and, according to the terms of these accounts, in a decreasing order of availability, is erroneous. The authors emphasize that the assets and liabilities accounts should be considered in relation to the dynamic reality of the companies and classified according to their cycle, i.e. the time it takes to accomplish a turn.

2.2.1 The Balance Sheet in the Fleuriet model

Padoveze and Benedicto (2010) point out that Law 6.404/1976 (Brazil, 1976), the Brazilian Corporate Law, which presents the basic structure of the financial statements in Brazil, has undergone countless updates, deriving from Law 11.638/07 of December 28, 2007 and Law 11.941 of May 27, 2009 (Brazil, 2007, 2009). On this basic presentation structure of the financial statements, the model proposed by Fleuriet et al. (1978) suggests a reclassification to a completely dynamic and functional standard, in order to satisfactorily address the financial management of the organization. According to Fleuriet et al. (2003, p.7):

> For a better understanding of the financial analysis model to be defined, the assets and liabilities accounts should be considered in relation to the dynamic realities of the companies, in which the accounts are classified according to their cycle, i.e. the time it takes to make a turn.

Fleuriet et al. (2003) present the classification of the accounts within the Balance Sheet, according to its model, as can be observed in Figure 1.

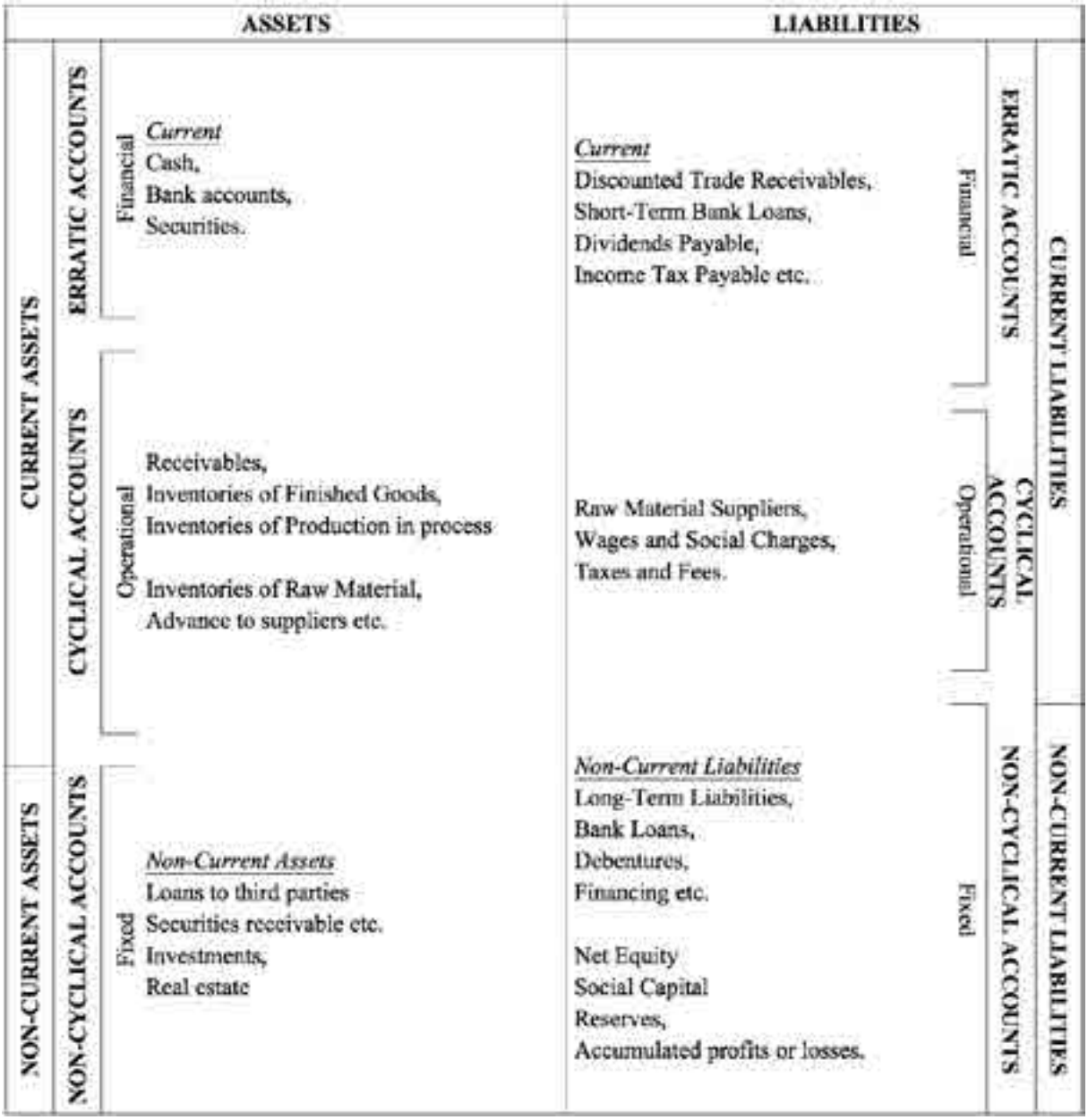

Figure 1. The cycles in the Balance Sheet

Source: adapted from Fleuriet *et al*. (2003, p. 8).

According to Fleuriet et al. (2003), Santos and Francisco (2016) and Vieira (2008), some accounts show a slower movement, when analyzed separately, in relation to other Balance Sheet accounts, and can be called "non-cyclical" or "permanent" (Fixed). Other accounts are directly influenced by the turnover (production and sales) and characteristics of the operating cycle (conditions of receipt and payment, storage period), and can be classified as "cyclical" or "operational" because they are related to the operational cycle of the business (Assaf Neto & Silva, 2012).

And finally, as Fleuriet et al. (1978) argue, there are accounts that do not necessarily have a direct link with the operational cycle of the company, varying according to the conjuncture and the risk of more or less liquidity that the company wishes to assume, presenting a 'discontinuous and erratic' movement. They are called erratic or financial. According to Fleuriet et al. (2003: 7): "Erratic, from the Latin erraticu. Wandering, bumbling, erratic, random, walking out of the way. That is, it implies the non-connection of these accounts with the Operational Cycle of the company ".

2.2.2 Main indicators in the model

Rasoto, Ishikawa, Rasoto, Stankowitz, Pietrovski and Carvalho (2017) and Viera, Brito, Santana, Sanches and Galdamez (2017) emphasize that, from this new segmentation of the Balance Sheet, the indicators of the Fleuriet model arise: Working Capital Requirement (WCR), Working Capital (WC) and Cash Balance (CB). These new indicators are used in the economic-financial analysis of companies no longer in a static way, but understanding the organization as a 'living organism' (Assaf Neto & Silva, 2012; Braga, 1991; Fleuriet et al., 1978; Jones and Jacinto, 2013; Melo and Coutinho, 2007; Padoveze & Benedicto, 2010; Silva, 2012).

Considering the three indicators, the overtrading effect can be analyzed, the Liquidity Thermometer, which results from the relationship between the Cash Balance and the Working Capital Requirement (CB/WCR), and also evaluate the types of financial structure. The next topic brings further detail on the indicators and their analyses.

2.2.2.1 Working Capital Requirement (WCR)

Fleuriet *et al.* (2003) describe the Working Capital Requirement (WCR) as follows: within the financial cycle of companies, cash outflows (production expenses) occur before cash inflows (sales revenues). The company's operations, therefore, create a need for permanent fund application (called working capital requirements), which is evidenced in the balance sheet by a positive difference between the value of the operational/cyclical accounts of the asset (Operational Assets - OA) and operational/cyclical liabilities (Operational Liabilities - OL).

$$WCR = OA - OL \quad (1)$$

Melo and Coutinho (2007) clarify that the Fleuriet model can be used as a joint solvency and profitability indicator. The authors affirm that, for WCR, low values are expected as a positive sign for the company, that is, the higher this indicator, the greater will be the possibility of using short-term financial resources to finance it, without guarantees of renewal, increasing the risk of insolvency.

2.2.2.2 Working Capital (WC)

According to Vieira (2008), working capital represents a source of long-term resources that can be used to finance the company's working capital requirement. If negative, however, the working capital represents a lack of long-term resources, forcing the company to finance its activities with short-term resources. The calculation is:

$$WC = NCL - NCA \quad (2)$$

Fleuriet *et al.* (2003, p. 11) clarify that: "the Working Capital Requirement, when positive, reflects a permanent application of funds that normally needs to be funded with the permanent resources the company uses. When the WCR is funded with short-term resources [...] the risk of insolvency increases".

2.2.2.3 Cash Balance (CB)

Silva (2012) clarifies that the Cash Balance (CB) can be higher or lower than zero but, when lower, it means that the company has short-term debts in financial institutions, or other short-term debts not related to the operational cycle, and higher than its short-term resources. Araújo, Costa and Camargos (2013) affirm that the cash balance is measured through the confrontation between the financial asset (FA) and financial liability (FL) accounts, and can also be obtained by the difference between WC and WCR.

$$\begin{gathered} T = FA - FL \\ \text{or} \\ T = WC - WCR \end{gathered} \tag{3}$$

Melo and Coutinho (2007) explain that, in view of the analysis of business solvency, the cash balance can be interpreted by analysts as a favorable indicator for a company when it presents higher or positive values, because the lower (or negative) it is , the more short-term financial resources the company will need to finance its activities, increasing the risk of insolvency, and the renewal of these resources is not guaranteed (Silva, Lopes, Pederneiras, Tavares, & Silva, 2016).

2.2.2.4 Overtrading

Sanvicente and Minardi (1998) observe that the Overtrading Effect is a relevant factor for predicting bankruptcies in Brazil. In this same line, Carvalho (2004) affirms that, when a company presents, for several consecutive years, a growth in Working Capital Requirements (WCR) higher than its Working Capital (WC), we can say that it coexists with the so-called Overtrading Effect, which will be identified by a growing negative Cash Balance (CB).

Brazil and Brazil (2008), within this same theoretical domain, affirm that the pathology of the Cash Balance management is the Overtrading Effect, which arises from an excessive reliance on short-term loans, which makes company liquidity critical. The authors point out that any credit cut that occurs as a result of a slowdown in the economy and, consequently, a drop in sales, can lead the company to a state of insolvency quickly, as the delay with suppliers is inevitable in these conditions.

2.2.2.5 Liquidity Thermometer (LT)

Another indicator that can be analyzed in the Fleuriet model is the Financial Situation Thermometer (TSF) or Liquidity Thermometer (TL). According to Fleuriet *et al.* (2003), the liquidity thermometer demonstrates the magnitude of the negative cash balance in relation to the WCR and its trend over time and, depending on the signs of the two indicators involved, it shows the share of the short-term capital from third parties that finance the WCR.

$$LT = \frac{CB}{WCR} \tag{4}$$

Vieira (2008) emphasizes that the WCR is an operational demand for resources that, in view of its strong link with the operations, is permanent or long-term. Due to this characteristic, its funding source should be similar, preponderantly deriving from long-term sources.

2.3.2.6 Types of financial structure

Marques and Braga (1995) argue that the affinity between the cash balance (CB), the working capital requirement (WCR) and the working capital (WC) permits the identification of six specific funding structures. It should be observed that, in the initial study by Fleuriet *et al.* (1978), only four types of financial structures were considered: I, II, III and IV (Fleuriet *et al.*, 2003). In this study, as can be observed in Table 1, the authors ignored conditions in which CB, WCR and WC were equal to zero.

Table 1
Types of financial structure and situation

Type	WC	WCR	T	Situation
I	+	–	+	Excellent
II	+	+	+	Solid
III	+	+	–	Unsatisfactory
IV	–	+	–	Bad
V	–	–	–	Very Bad
VI	–	–	+	High Risk

Source: Adapted from Marques and Braga (1995) and Fleuriet *et al.* (2003, p. 8)

Brazil and Brazil (2008, p.31) explain that "these three variables WCR, WC and CB permit the definition of the companies' conjunctural and structural profile, linked, respectively, to the adopted financial policy (level of risk) and to the business". Fleuriet et al. (2003) note that Type I companies, although they appear less frequently, deserve to be evaluated because they have an excellent financial position with respect to their high level of liquidity. Type II shows a solid financial situation, having a positive CB that allows it to face temporary increases in WCR, as mentioned by Fleuriet et al. (2003).

In Type III, the WCR is higher than the WC and, therefore, the CB is negative. The company finances part of its WCR with short-term credits. This condition is not severe when the WCR is temporarily high. In Type IV, "it configures a typical financial structure of a company that fights to survive" (Fleuriet et al., 2003, p.16). Marques and Braga (1995) show that, in the Type V structure, the financial condition is very bad. In addition to the negative WC, which suggests that short-term sources are used to finance long-term assets, the value of the WCR, also negative, is higher than the WC. Finally, Marques and Braga (1995) comment that, in the situation of high risk originating from the use of the Type VI structure, WC and WCR remain negative. The WCR is lower than the WC though. This scenario allows for a positive CB, which indicates that the company is not performing its operations properly.

2.2.3 Studies on credit analysis using the Fleuriet model

Fleuriet et al. (2003, p. 75) state that the "three categories of liquidity indicators [immediate liquidity, dry liquidity and current liquidity] present a major drawback: they do not provide any indication of the liquidity situation of the company because, in the long-term liabilities, there is no distinction between renewable financing and exceptional financing". Padoveze and Benedict (2010, p.262) clarify that:

> Considering the differentiated nature of the cash accounts, there is a reclassification of working capital: cyclical accounts are classified as cash and, consequently, total cyclical assets less total cyclical liabilities indicates *net working capital requirement* (NWCR). The other accounts, financial and not linked to operations, are called treasury accounts, and only with them should the company's short-term liquidity and solvency capacity be calculated.

In the light of the method developed by Fleuriet in 1978, some studies on liquidity, solvency and/or credit using the Fleuriet model can be found in the literature as presented in Table 2.

Table 2

Synthesis of studies that used the Fleuriet model.

Authors / Year	Dimension Sample	Period	Model and Accuracy	Conclusion/Observations
Sanvicente and Minardi (1998)	Total sample 81 companies 44 solvent 37 insolvent	1986 until 1997	DA* Best forecast: 81.8%	First study to test the dynamics of overtrading in credit risk analysis in Brazil. In total, 14 independent indicators were tested.
Minussi, Damacena and Ness Junior (2002)	323 companies 168 solvent 155 insolvent	1998 until 2000	LR* 95%	49 financial indicators were selected for the solvency analysis, 45 of which belong to the traditional financial analysis model and 4 to the Fleuriet model. Of the five significant indicators for the final model, two refer to the Fleuriet model.
Eifert (2003)	51 companies 30 solvent 21 insolvent	1996 and 1997	DA and LR Best models: DA 92.7% LR 100%	174 indicators were tested, 64 of which referred to the most recent statement (period t), 55 to the one but last statement (period t-1) and 55 to the three years-previous statement (period t-2). With the groups of indicators (t), (t and t-1) and (t, t-1 and t-2), the stepwise method was used for DA as well as for LR to produce 6 models. According to the author, the superiority of LR over DA is clearly perceived in all aspects.
Carvalho (2004)	100 companies 50 solvent 50 insolvent	2000 until 2002	DA Best model 96%	Five models of insolvency prediction were developed. The author affirms that, in the elaboration of his study, the importance of the dynamics of overtrading can be highlighted as highly valuable in the construction of an insolvency prediction model for commercial companies.

(*) DA = Discriminant Analysis; LR = Logistic Regression.

Source: elaborated by the authors based on the studies cited.

3. Research Method

Regarding the ends, this study can be classified as descriptive (Marconi & Lakatos, 2011); as for the means, it can be characterized as *ex post facto* (Vergara, 2008); and as to the form of approach, this research is qualified as quantitative.

With regard to the sampling, first, the solvency concept used in the study had to be defined. In order to define insolvency, the Bankruptcy Law - Law 7.661, dated June 21, 1945 (Brazil, 1945) was used, which was revoked by Law 11.101 of February 2005 (Brazil, 2005), valid for all current bankruptcy and bankruptcy cases.

It should be taken into account that, in order to collect the indicators of insolvent companies, the date of one year before the company announced bankruptcy was used (year previous to the event, time t-1). In order to complete the sample, however, at least one solvent company is selected for each insolvent company, that is, for each company determined as insolvent, at least one solvent company belonging to the same industry will be selected and, where possible, with assets proportionate to that of the insolvent institution. This method is based on previous studies developed by Altman (1968), Brito, Assaf Neto and Corrar (2009) and Sanvicente and Minardi (1998) to match the sample. The database was prepared based on Economática. And, for the preparation of this study, the sample was composed of 121 companies, being 70 companies considered solvent and 51 insolvent.

3.1 Definition of indicators

For the selection of the indicators of the Fleuriet model of financial analysis, the initial work of Fleuriet et al. (1978) was used, as well as the main works presented, which demonstrate the importance of identifying future insolvency problems in companies. The definition of the indicators is based on Pereira, Domínguez and Ocejo (2007), in which the authors affirm that empirical evidence has indicated that the choice of indicators that presented satisfactory results in previous research offers high potential for new research. Table 3 shows the indicators from the Fleuriet model that were used.

Table 3

Notation of Indicator Calculation Formulae

Fleuriet Model			
Cod.	**Indicators**	**Formula**	**Authors**
X1	WC over Assets	WC / AT	Presented in this study
X2	WC over Net Income	WC / NI	
X3	WCR over Assets	WCR / AT	Brito, Assaf Neto and Corrar (2009), Carvalho (2004), Minussi, Damacena and Ness Junior (2002) and Sanvicente and Minardi (1998)
X4	WCR over Net Income	WCR / NI	
X5	Cash Balance over Assets	CB / AT	Brito, Assaf Neto and Corrar (2009), Carvalho (2004), Eifert (2003), Horta (2010), Minussi, Damacena and Ness Junior (2002) and Sanvicente and Minardi (1998)
X6	Cash Balance over Net Income	CB / NI	
X7	Financial Liabilities over Current Assets	FL / CA	Eifert (2003)
X8	Type of Financial Structure	TFS	Melo and Coutinho (2007)
X9	Liquidity Thermometer - LT	CB / (|WCR|)	Horta (2010) and Vieira (2008)
X10	Cash Balance	CB=FA–FL	Melo and Coutinho (2007)
X11	Working Capital Requirement	WCR = OA – OL	Melo and Coutinho (2007)
X12	Working Capital	WC = NCL – NCA	Melo and Coutinho (2007)
X13	Financial indebtedness	(FL + NCFL) / TA	Brito, Assaf Neto and Corrar (2009)

Legend: CA = Current assets; FA = Financial assets; OA = Operational assets; NCA = Non-current assets; TA = Total assets; WC = Working capital; FL = Financial liabilities; NCL = Non-current liabilities; NCFL = Non-current financial liabilities; OL = Operational liabilities; WCR = Working capital requirement; NI = Net Income; CB = Cash balance; TFS = Type of financial structure; LT = Liquidity thermometer.

Source: elaborated by the authors based on the studies cited.

3.2 Discriminant Analysis - DA

For this study, the Discriminant Analysis model was used, as it permits verifying the impact of each indicator on insolvency through its coefficients. For the development of the model, the software SPSS (Statistical Package for Social Sciences) was used.

Virgillito and Famá (2008) point out that, with two groups of companies, solvent (A) and insolvent (B), two measures V1 and V2 (their observations, indicators), the ellipses A and B (drawn with small and large dots , see Figure 2) being their universes; Z being the axis determined by its discriminant function, which in turn consists of indicators. If we draw a straight line through the intersection area of the two ellipses and project this line into a new Z axis, according to Hair et al. (2009), the overlapping area between the two univariate distributions A and B (represented by the shaded area, see Figure 2) will be the smallest among all other possible straight lines to be drawn through the overlapping area of the two ellipses.

The overlapping area in Figure 2, which is projected on the Z-axis, can be interpreted as the discrimination between the two groups, which are the indicators of insolvent and solvent companies. Thus, the smaller the overlapping area, the smaller will be the number of insolvent companies classified as solvent and vice versa. Consequently, the lower the probability will be of granting credit to an insolvent company.

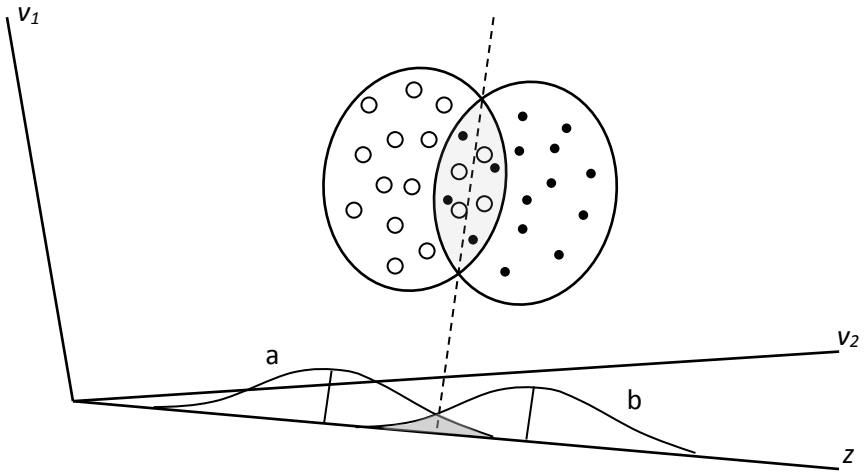

Figure 2. Graphical representation of discriminant analysis of two groups

Source: adapted from Hair *et al.* (2009, p. 230).

It is important to observe that, in the Discriminant Function by Fisher, also known as Classification Function, the constant *a* (intercept) is not used, which simplifies the interpretation of the values produced for $W_{i,}$ because these approach the actual values when intercept *a* is not present in the function. Through this method, the observations for the (independent) variables are inserted in Fisher's function and a classification score for each group is calculated for that observation, so it is classified in the group with the highest classification score (Hair, Black, Babin, Anderson & Tatham; Corrar, Paulo & Dias Filho, 2014).

4. Results and discussion

Firstly, through the descriptive statistical analysis, we aim to better understand the characteristics of the sample used, because two groups represent the sample: solvent companies (2) and insolvent companies (1). In this sense, to verify if the indicators present statistically significant differences, to distinguish between solvent and insolvent groups, the One-Way Anova test was performed to compare the individual means of the groups and to verify the discrimination power of each indicator. The Anova Z test points out that there is a difference between the groups and, when the variances are not equal and the groups have unequal sizes (as in the present case), a more robust statistic like the Brown-Forsythe test is required to measure the means of the groups.

Table 4 presents the descriptive statistics per group, as well as the Z test and the Brown-Forsythe test, which validate the Anova process for all indicators, that is, the indicators have different intergroup means, which makes it statistically possible to create rules to identify solvent and insolvent companies.

Table 4

Descriptive Statistics of Indicators and One-Way ANOVA test

Descriptions		N	Mean	Standard Deviation	Minimum	Maximum	Anova			
							Z test		Brown-Forsythe2	
							Statistics	Sig.	Statistics	Sig.
X1) WC / TA	Insolvent	51	-0.302	0.381	-1.009	0.266	79.110	0.000	65.264	0.000
	Solvent	70	0.166	0.189	-0.213	0.728				
	Total	121	-0.031	0.367	-1.009	0.728				
X2) WC / NI	Insolvent	51	-0.505	1.274	-2.621	2.980	21.109	0.000	16.473	0.000
	Solvent	70	0.251	0.450	-0.929	2.980				
	Total	121	-0.068	0.966	-2.621	2.980				
X3) WCR / TA	Insolvent	51	-0.077	0.257	-0.659	0.365	49.228	0.000	40.930	0.000
	Solvent	70	0.175	0.132	-0.031	0.519				
	Total	121	0.069	0.231	-0.659	0.519				
X4) WCR / NI	Insolvent	51	-0.114	0.439	-0.998	0.874	38.266	0.000	31.374	0.000
	Solvent	70	0.258	0.211	-0.060	0.864				
	Total	121	0.101	0.374	-0.998	0.874				
X5) CB / TA	Insolvent	51	-0.231	0.261	-0.901	0.200	40.414	0.000	34.334	0.000
	Solvent	70	0.007	0.148	-0.322	0.465				
	Total	121	-0.094	0.235	-0.901	0.465				
X6) CB / NI	Insolvent	51	-0.547	0.925	-2.649	0.997	20.785	0.000	16.145	0.000
	Solvent	70	-0.005	0.315	-1.499	0.994				
	Total	121	-0.233	0.697	-2.649	0.997				
X7) FL / CA	Insolvent	51	1.378	1.029	0.057	3.785	50.849	0.000	39.216	0.000
	Solvent	70	0.442	0.329	0.031	1.726				
	Total	121	0.837	0.848	0.031	3.785				
X8) TFS = Structure	Insolvent	51	4.294	1.082	1.000	6.000	89.117	0.000	83.331	0.000
	Solvent	70	2.614	0.873	1.000	5.000				
	Total	121	3.322	1.273	1.000	6.000				
X9) LT = CB / (|WCR|)	Insolvent	51	-5.871	9.580	-26.496	6.996	27.091	0.000	20.210	0.000
	Solvent	70	0.254	1.986	-5.328	6.986				
	Total	121	-2.328	7.052	-26.496	6.996				
X10) CB = FA – FL	Insolvent	51	-246350	549517	-1557441	1422049	9.121	0.003	8.410	0.005
	Solvent	70	20658	423002	-1557441	1422049				
	Total	121	-91883	496220	-1557441	1422049				
X11) WCR = OA – OL	Insolvent	51	23671	196769	-286261	784853	24.427	0.000	27.289	0.000
	Solvent	70	251798	283467	-167550	905259				
	Total	121	155645	274100	-286261	905259				
X12) WC = NCL – NCA	Insolvent	51	-209052	547758	-1466833	1465732	20.692	0.000	19.370	0.000
	Solvent	70	201269	443412	-1466833	1465732				
	Total	121	28324	528644	-1466833	1465732				
X13) (FL + NCFL) / TA	Insolvent	51	0.627	0.464	0.117	1.757	33.325	0.000	25.976	0.000
	Solvent	70	0.281	0.162	0.020	0.720				
	Total	121	0.427	0.366	0.020	1.757				

[2]Robust Tests of Equality of Means. (sig. < 0.05).

Source: research data.

As statistically significant results were obtained for the indicators, we can proceed with the analyses for the sample. To select the best indicators for the model, we chose to use the stepwise method, which helps to eliminate less significant indicators (based on an F statistic) (Charnet, Freire, Charnet & Bonvino, 2008). This process selected only five out of 13 indicators tested. Next, the results found for the Discriminant Analysis model are presented.

For Discriminant Analysis, indicators are considered significant if the significance ratio is equal or inferior to 0.05 (sig. < 0.05). Thus, based on the observation of Table 5, it can be concluded that the five indicators separated for this study can distinguish the groups and can be used in the analysis.

Furthermore, Wilks' Lambda is presented, which statistically represents that, the lower the indicator and its significance level, the better its power to distinguish among the groups (Hair *et al.*, 2009). As observed, the two indicators that best present this function were Type of Financial Structure (X8- TFS = Types of Financial Structure), corresponding to 0.622 and Working Capital (X1- WC / TA) equal to 0.626.

Table 5
Tests of equality of group means

	Wilks' Lambda	Z	df1	df2	Sig.
X1) WC / TA	**0.626**	52.680	1	88	0.000
X4) WCR / NI	0.784	24.223	1	88	0.000
X8) TFS = Structure	**0.622**	53.586	1	88	0.000
X9) LT = CB / (|WCR|)	0.784	24.308	1	88	0.000
X13) (FL + NCFL) / TA	0.797	22.463	1	88	0.000

Source: research data.

Another important fact is the Multicollinearity test for the indicators in the Discriminant model. In this sense, as Field (2013) highlights, the Multicollinearity test can be applied by means of different criteria, including the Tolerance and VIF. Thus, "a tolerance coefficient inferior to 0.1 probably indicates a severe collinearity problem. [...] a VIF score superior to 10 is a reason for concern" (Field, 2013, p. 257). It can be observed in Table 6 that both the Tolerance and VIF coefficients present favorable statistics against the presence of multicollinearity.

Table 6
Multicollinearity Coefficients

Indicators	Collinearity statistics	
	Tolerance	VIF
X1) WC / TA	0.260	3.849
X4) WCR / NI	0.661	1.513
X8) TFS = Structure	0.414	2.418
X9) LT = CB / (|WCR|)	0.767	1.303
X13) (FL + NCFL) / TA	0.496	2.017

a. Dependent Variable: Situation 1 and 2.

Source: research data

The analysis of the Coefficients in the classification function permits knowing a bit more about the importance of each indicator in the Discriminant function (Corrar *et al.*, 2014). Based on the data in Table 7, it can be concluded that the coefficients (of the indicators) with negative values for the discriminant function will contribute (the higher the indicator) for the company to be ranked below the cut-off point and, consequently, to be considered insolvent. On the other hand, the positive coefficients will contribute (the higher the indicator) for the company to be considered in the group of solvent companies.

Table 7

Canonic discriminant function coefficients (non-standardized coefficients).

Indicators	Function
X1) WC / TA	0.899
X4) WCR / NI	0.971
X8) TFS = Structure	- 0.444
X9) LT = CB / (|WCR|)	0.055
X13) (FL + NCFL) / TA	- 0.980
(Constant)	1.887

Source: research data

After obtaining the coefficients of the non-standardized canonic discriminant function, the function can be elaborated for the Discriminant Analysis, that is, the Credit Scoring can be represented by Equation 5.

$$Z = 1.887 + 0.899.\left(\frac{WC}{TA}\right) + 0.971.\left(\frac{WCR}{NI}\right) - 0.444.\,(\text{Type of Structure}) \\ +0.055.\left(\frac{CB}{WCR}\right) - 0.980.\left(\frac{FL + NCFL}{TA}\right) \quad (5)$$

After establishing the Discriminant Analysis function, the cut-off point can be calculated based on the centroids of each group. The centroids are the means obtained with the individual distribution of the groups. The weighted average between the centroids of each of the distributions will be the cut-off point of the discriminant function. The result obtained for the optimal cut-off point is -0.0641 and this value will serve to classify the companies by means of their discriminant score. That is, companies that rank the cut-off point have been classified as belonging to group "1" (insolvent) and companies that have a discriminant score above the cut-off point will be classified as part of group "2" (solvent).

Another method used in the interpretation of the results obtained by the Discriminant Function is the application of a classification scale as used by Silva (2012) or by Kanitz (1978) in his Insolvency Thermometer. This scale can be obtained after calculating the standard deviations and means of each group (Corrar et al., 2014), as shown in Figure 3.

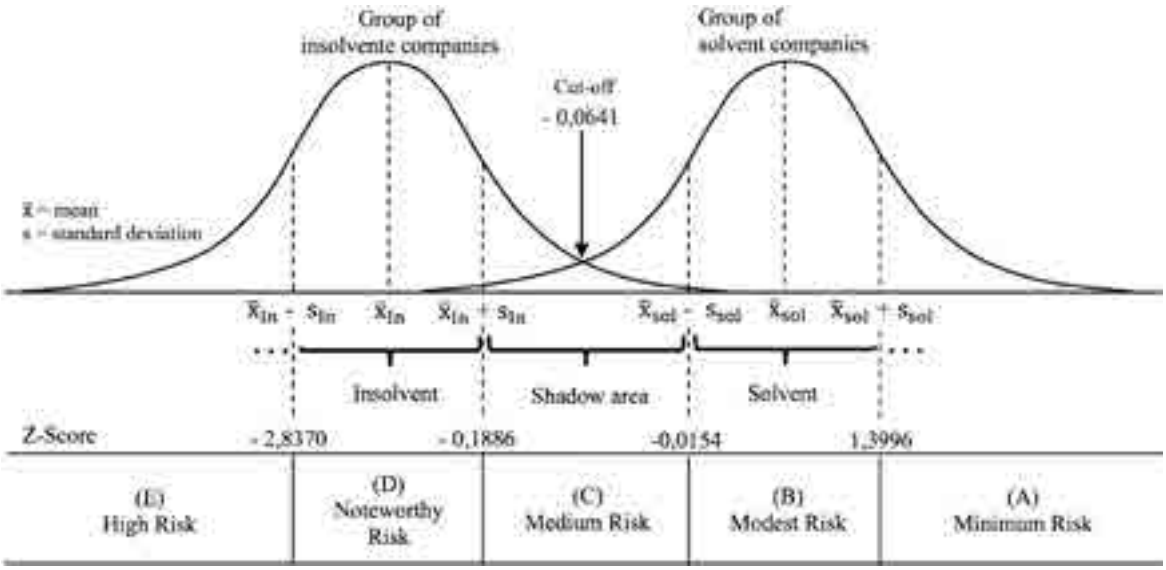

Figure 3. Risk classification scale

Source: elaborated based on the studies by Kanitz (1974, p. 13), Hair et al. (2009, p. 230), Silva (2012, p. 356) and Corrar et al. (2014, 239).

As shown in Figure 3, the company whose Z-Score (discriminant score) calculation ranges between -0.0154 and -0.1886 will be considered in the shadow area and will be classified in an indefinite situation, so that an average risk can be attributed. Companies that rank between -0.1866 to -2.8370 will be classified as insolvent and will be assigned a preoccupying risk due to their status. A company that has a value lower than -2.8370 will be considered insolvent, with a High Risk. Therefore, these companies inspire greater care in the granting of credit. Statistically, one may say that the statistical model has no basis to assert any classification in this shady interval (Kanitz, 1974). Therefore, one solution is to create a scale of risk classification from the ranges found by the two distributions studied, that is, solvent companies and insolvent companies.

The results found through the classification for the discriminant analysis are displayed in Table 8. The correctly grouped original cases represent a 90.9% success rate, while the cases selected for the cross-validation (Lachenbruch's test) confirm the result with the same level of accuracy. Finally, by testing the function for the unselected cases, to generate the function, we obtained 90.9% accuracy. The discriminant function achieved the same level of accuracy for the cases that were used for its creation as well as for the external cases that did not participate in its construction.

Table 8
Results of the classification[a,b,d]

Classg			Situation	Association with expected group		Total
				Solvent	Insolvent	
Selected cases	Original	Count	Solvent	53	3	56
			Insolvent	11	23	34
		%	Solvent	94.6%	5.4%	100%
			Insolvent	32.4%	67.6%	100%
	With cross-validation[c]	Count	Solvent	53	3	56
			Insolvent	11	23	34
		%	Solvent	94.6%	5.4%	100%
			Insolvent	32.4%	67.6%	100%
Non-selected cases	Original	Count	Solvent	14	0	14
			Insolvent	4	13	17
		%	Solvent	100%	0%	100%
			Insolvent	23.5%	76.5%	100%

a. 84.4% of selected original grouped cases classified correctly

b. 87.1% of non-selected original grouped cases classified correctly

c. The cross-validation is only done for the analysis cases. In the cross-validation, each case is classified according to the function deriving from all cases different from this case

d. 84.4% of selected cases grouped with cross-validation classified correctly

Source: research data.

Due to the fact that the Discriminant Analysis is a linear technique, the global precision level of the model for correctly classified companies is satisfactory, as the main objective here is to verify the impact of the Fleuriet model indicators.

4.1 Working Capital over Assets (X1- WC / TA)

The indicator Working Capital over Assets was representative for the Discriminant Analysis model. The sample presented positive coefficients for the solvent companies (0.166) and negative coefficients for the insolvent companies (-0.302), with a total average of -0.031 (Table 9). The Discriminant Analysis presented a positive sign (+) for the coefficient, which indicates that, within the discriminant function, the higher the coefficient of the working capital indicator, the greater the probability of the company being solvent.

Table 9

Summary of results for the indicator Working Capital over Assets (X1- WC / TA)

Comparison	Descriptive Statistics		
	Situation	N	Mean
Literature: The higher the better, Melo and Coutinho (2007).	Insolvent	51	-0.302
	Solvent	70	0.166
DA = (X1) (+) sign of the indicator, the higher the more solvent.	Total	121	-0.031

Source: elaborated by the authors.

As Olinquevitch and Santi Filho (2009: 85) argue, "in analytical terms, the mere availability of WC is not sufficient to indicate good economic and financial health: the available own resources need to be adapted to the needs." From the perspective of solvency analysis, however, experts expect high WC as a positive indicator for the firm. Being a source of long-term resources, the WC, when sufficiently high, i.e. higher than the Working Capital Requirement, brings peace of mind regarding the renewal of short-term financing terms from external sources (Melo & Coutinho, 2007).

4.2 Working Capital Requirement (X4-WCR / NI)

Nascimento, Espejo, Voese and Pfitscher (2012) note that the Working Capital Requirement (WCR) can be positive or negative. For Olinquevitch and Santi Filho (2009, p.13), the positive sign of WCR indicates that Working Capital (WC) applications are higher than the sources of WC, "expressing that the company is investing resources in the business turnover" . When the WCR sign is negative, however, it indicates that WC sources are higher than applications in WC, "expressing that the company is obtaining (financing its activities with) resources from the business turnover" (Olinquevitch & Santi Filho, 2009, p.13).

Analyzing the WCR on Net Income, as can be observed in Table 10, the average of the sample of solvent companies was positive, while the average for insolvent companies was negative. This is confirmed by the Discriminant Analysis model, presenting values that indicate that, the higher the value for WCR, the greater the probability that the company will be solvent.

Table 10

Summary of results for the indicator Working Capital Requirement (X4- WCR/NI)

Comparison	Descriptive Statistics		
	Situation	N	Mean
Literature: Positive or Negative, Padoveze and Benedicto (2010).	Insolvent	51	-0.114
	Solvent	70	0.258
AD = (X3) (+) sign* of the indicator, the higher the more solvent.		121	0.101

Source: elaborated by the authors.

Empirically, these results differ from those presented by Minussi, Damacena and Ness Junior (2002, p. 122), who, when investigating companies in the industrial sector, found coefficients for the indicator WCR over Net Income ("NCG / Net Sales - Variable X2") with averages of 0.80 for the group of solvent companies and an average of 3.50 for insolvent companies. This contradiction has a possible explanation when we analyze the situation more closely through the company's Financial Structure Type, as will be discussed in the following topic.

4.3 Type of Financial Structure (X8- TFS = Balance sheet structure)

As can be observed in Table 11, the divergent result found in relation to the work by Minussi, Damacena and Ness Junior (2002), presented in the previous topic, is due to the fact that only four of the solvent companies in the sample possess the Type 1 Financial Structure 'Excellent', that is, they have positive WC and CB positive and negative WCR, while the majority of the solvent companies presented a Type 2 Financial Structure 'Solid' (32 companies, positive WC, WCR and CB), or Type 3 'Unsatisfactory' (22 companies, positive WC and WCR and negative CB), in which the WCR is positive, which directly influences the positive average WCR for solvent companies (0.258).

On the other hand, what justifies the negative average WCR of insolvent companies (-0.114) is the fact that 27 insolvent companies, more than half of the sample, are classified under Type 5 Financial Structure 'Very bad' (24 firms, negative WC, WCR and CB) and Type 6 'High risk' (3 companies, negative WC and WCR and positive CB. In these two types of structures, companies have negative WCR (Table 11).

Table 11
Clustering of companies per types of structure and financial situation

Type	WC	WCR	T	Situation	Solvent Companies	Insolvent Companies	Total Sample
I	+	–	+	Excellent	4	1	5
II	+	+	+	Solid	**32**	3	35
III	+	+	–	Unsatisfactory	**22**	6	28
IV	–	+	–	Bad	11	14	25
V	–	–	–	Very bad	1	**24**	25
VI	–	–	+	High risk	0	**3**	3
				Total	**70**	**51**	**121**

Source: adapted from Braga (1991, p. 10); Marques and Braga (1995, p. 56); Fleuriet *et al*. (2003, p. 15)

In this sense, the results presented are in accordance with Padoveze and Benedicto (2010, p.264), who emphasize that, "in general, companies seek to perform a model of constant growth, gaining or expanding markets. Within this premise, there is always an additional requirement of working capital over time", because it represents the resource necessary for the performance of the company's operations. Fleuriet and Zeidan (2015) also point out that not planning the growth of working capital requirements can lead to severe cash flow difficulties. Olinquevitch and Santi Filho (2009, p.13) also state that:

> The variable Net Working Capital Requirement (NWCR) is the main determinant of the companies' financial situation. Its value reveals the level of resources needed to keep the business spinning. Unlike the investments in permanent assets, which involve long-term decisions and slow recovery of capital, the accounts that comprise the Net Working Capital Requirement (NWCR) express short-term operations with quick effects. Changes in storage policy, credit policy and purchasing policy have immediate effects on cash flow.

In Table 11, it is important to note that none of the solvent companies was classified under Type VI 'High Risk'. Nevertheless, the company OGX Petróleo, defined as insolvent in the sample, was classified under Type I 'Excellent', although the discriminant analysis model classified the company as insolvent. In the evaluation by type of structure only, the financial situation of OGX Petroleum would have gone by unnoticed.

As shown in Table 11, the Types of Financial Structure were proposed by Fleuriet et al. (1978) and then expanded by Braga (1991) with two more levels. The indicator used in this study represents a proxy equal to 1 for type 1, rising up to 6 for type 6, that is, companies classified as 1 are ranked under 'Excellent', while companies classified as 6 rank under 'High risk'.

Therefore, the indicator Type of Financial Structure presented a coefficient for the indicator in accordance with the literature. The values obtained by the study sample also presented the same behavior (Table 12).

Table 12

Summary of results for the indicator X8 – Type of Financial Structure

Comparison	Descriptive Statistics		
	Situation	N	Mean
Literature: The smaller the better, Marques and Braga (1995).	Insolvent	51	4.294
	Solvent	70	2.614
DA = (-) sign of the indicator, the larger the more insolvent.		121	3.322

Source: elaborated by the authors.

It should be noted that, in the discriminant analysis model, the Wilks' lambda test for the indicator was the most significant, with the lowest coefficient (0.622).

4.4 Liquidity thermometer (X09- LT)

Horta (2010) states that the Liquidity Thermometer confirms a financial reserve to cope with the occasional expansions of the WCR, especially for seasonal growths. In this sense, the temporary needs for investment in cash, when not covered by long-term financing, can be sustained by the limit of the existing balance (Padoveze & Benedicto, 2010).

In the sample, the Liquidity Thermometer presented negative values for insolvent companies and positive values for solvent ones. The positive value for solvent companies was confirmed by the Liquidity Thermometer, in the Discriminant Analysis model, with a positive sign, indicating that, the higher its value, the more likely that the company will have to be solvent (Table 13). This is in accordance with Padoveze and Benedicto (2010, p.262), for whom it is "by means of financial accounts (treasury accounts) that one should "calculate the company's liquidity and solvency capacity in the short term".

Table 13

Summary of results for the indicator Liquidity thermometer (X09- LT)

Comparison	Descriptive Statistics		
	Situation	N	Mean
Literature: The higher the better, Fleuriet et al. (2003).	Insolvent	51	-5.871
	Solvent	70	0.254
DA = (X9) (+) sign of the indicator, the higher the more solvent.		121	-2.328

Source: elaborated by the authors.

Empirically, the results found for the Liquidity Thermometer are in accordance with Horta (2010), when using the Liquidity Thermometer to evaluate several sectors: basic materials sector (solvent = 0.011 and insolvent = -0.003); cyclical consumption goods (solvent = 0.010 and insolvent = -0.032); non-cyclical consumption goods (solvent = 0.002 and insolvent = -0.047); industrial goods (solvent = -0.133 and insolvent = -0.133); construction and transport (solvent = 0.004 and insolvent = -0.219); information technology and telecommunications (solvent = -0.007 and insolvent = -0.385).

4.5 Financial indebtedness (X13- [FL + NCFL] / TA)

The indicator of Financial Indebtedness (X13) is presented in Brito, Assaf Neto and Corrar (2009). Even though it is not exactly one of the indicators that assess the financial situation of the company through a dynamic analysis, it was chosen because it is an indicator of structure that evaluates the degree of indebtedness of the company from a financial perspective.

As Fleuriet *et al.* (1978) argue, there are accounts that do not necessarily have a direct link with the operational cycle of the company, varying according to the conjuncture and the risk of higher or lower liquidity the company wishes to assume, presenting a 'discontinuous and erratic' movement. They are called "erratic" or "financial" and, in this sense, the use of a structure indicator that is based on this view is welcome in the model.

Table 14 presents the measures for the Financial Indebtedness indicator (X13). It is observed that insolvent companies obtained higher averages (0.627), while solvent companies showed lower averages (0.281). On the other hand, the discriminant analysis showed a negative sign, demonstrating that, the higher the value of the indicator, the greater the likelihood of insolvency.

Table 14
Summary of results for the indicator Financial indebtedness (X13- [FL + NCFL] / TA)

Comparison	Descriptive Statistics		
	Situation	N	Mean
Literature: The lower the better, Brito, Assaf Neto and Corrar (2009).	Insolvent	51	0.627
	Solvent	70	0.281
AD = (X9) (-) sign of the indicator, the higher the more insolvent.	Total	121	0.427

Source: elaborated by the authors.

These considerations are in agreement with the literature regarding the risk of insolvency linked to the high degree of indebtedness. The results also corroborate the results found by Brito, Assaf Neto and Corrar (2009, p. 35): "the greater the value of this indicator, the greater the likelihood of the company becoming insolvent".

5. Final Considerations

The objective of this study was to construct a model capable of assessing credit risk in Brazilian publicly-traded companies, using indicators from the Fleuriet model of financial analysis. Methodologically, the research was defined as quantitative and, by nature, it is descriptive. The financial statements were collected through Economática and the BM & FBOVESPA website. The sample consisted of 121 companies, 70 of which were solvent and 51 insolvent in several sectors.

With the sample and the indicators of the study, a descriptive analysis of the data was performed, as well as a one-way Anova, which presented a satisfactory result for the proposed indicators, meaning that the indicators were significant to classify solvent and insolvent companies. Regarding the final indicators used to compose the Credit Risk model, the contribution of the method proposed by Fleuriet applied to grant credit is clearer. The indicators selected for the model were: working capital, working capital requirement, type of financial structure, liquidity thermometer, financial indebtedness.

For the indicators Type of Financial Structure, Working Capital and Working Capital Requirement, one may say that companies seek to perform a constant growth model, expanding or gaining markets, as there is always a need for additional working capital to over time. The results found for the Liquidity Thermometer demonstrate the importance of financial accounts called treasury accounts to calculate the company's liquidity and solvency capacity in the short term. Finally, financial indebtedness as a structure index contributed significantly to the model.

This study may contribute to the Brazilian literature by showing that some of the indicators of the Fleuriet model are significant to assess credit risk in Brazilian publicly-traded companies. Thus, through our study, some of the characteristics of the insolvent companies for the present sample can be elucidated. These contributions are fundamental for credit risk research and contribute to the development of the method of reclassifying the balance sheet through the Fleuriet model. Finally, in the light of the above, it is concluded that the indicators of the Fleuriet model effectively contribute to predict corporate insolvency.

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Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

REPeC, Brasília, v. 12, n. 3, art. 5, p. 349-363, Jul./Sep. 2018
Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1808

Determinants of Cash Retention in Brazilian Companies: An Analysis After the 2008 Crisis

Abstract

Objective: This paper aims to analyze the determinants of cash retention in Brazilian companies through the literature presuppositions related to the transaction, speculation, precaution, taxes and governance problems.

Method: The sample consists of the companies listed on BM&FBOVESPA between 2010 and 2015. The data were collected in the Economática database and the Threshold panel data model was applied, which permits describing the changes or structural breaks in the variables for different individuals, segmenting the sample based on the value of a given observed variable.

Results: Three regimes were found, defined by the variable size, splitting the sample into larger, intermediate and smaller companies. The transactions and taxes were the main reasons to reduce the cash retention for smaller companies. The reasons related to the precaution for bigger companies and to the governance problems for smaller companies presented a positive relation with the cash variation, corroborating with the theory, but do not explain this change in the Brazilian companies. The speculation was not significant in any regimen.

Contributions: The research contributes to enrich the bibliography on cash retention and differs from the approaches proposed in the literature using the method applied.

Keywords: Cash holdings, Threshold, 2008 crisis.

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Published in Portuguese and English. Original Version in Portuguese.

Received in 12/07/2018. Ask to Revise on 06/27/2018. Resubmitted on 07/21/2018. Accepted on 09/11/2018 by Dr. Vinícius Gomes Martins (Assistant Editor) and by Dr. Orleans Silva Martins (Editor). Published on 09/20/2018. Organization responsible for the journal: Abracicon

1. Introduction

Theories that deal with the trade-off between the costs and benefits of maintaining cash may make it possible to identify the reasons that make a company hold a great amount of cash from the perspective of maximizing shareholder wealth. Different points of view focus on this issue though, as directors and shareholders view the costs and benefits of holding net assets differently, thus generating insights about the advantage of having liquid balances.

Since Keynes' (1935) studies, there have been speculations on the advantages of having liquid balances, which allow the company to invest in valuable projects as they arise, thus constituting two main benefits of holding liquid assets. The first is about generating lower transaction costs to raise funds and not having to settle assets to make payments. The second is about the use of liquid assets to finance their activities and investments if other sources of financing are not available or are too expensive for the company.

On the other hand, if the company has unrestricted access to external financing, it will not need to save money to make investments and liquidity will no longer be relevant. To elucidate the issue of cash reserves, several studies were conducted to identify the determinants and implications of this variable in companies, including Opler, Pinkowitz, Stulz and Williamson (1999) and Bates, Kahle and Stulz (2009), who discuss the reasons that made the American companies retain more cash. These studies preceded the financial crisis of 2008 though, leaving a gap on the behavior of this variable. In the post-crisis, the reasons were later clarified by Pinkowitz, Stulz and Williamson (2015), who identified that, after the 2008 crisis, the American organizations had a considerable reduction in their cash level. This phenomenon was identified in Brazilian companies, analyzing historical data on cash retention, and there was a rise in the pre-crisis period, reaching its apex in 2009. Afterwards, there was an abrupt drop and a smoothing retention from 2010 to 2015. It is comprehensible that there was oscillation around the 2008 crisis, which extended to the following two years. There is still doubt though as to why companies continued to retain less cash in the periods from 2010 to 2015.

Although Brazil suffered an economic crisis of considerable magnitude in mid-2014, which affected public expenditures, inflation and solvency of companies, this article aims to verify the influence of issues pointed out in the corporate finance literature to justify this change, starting from the presuppositions related to the transaction, speculation, precaution, tributes and problems of governance.

Corporate cash holding is an important topic in finance that has received increasing interest from different stakeholders (Vo, 2017). In addition, the unique context of Brazilian companies offers important contributions because most previous work on corporate cash holdings mainly refers to developed countries such as United Kingdom (Ozkan & Ozkan, 2004) and the United States (Bates et al., 2009; Opler et al., 1999).

This paper aims to analyze the determinants of cash retention in Brazilian publicly traded companies, based on the approach proposed by Hansen (2000), which permits the description of breakpoints in the variables for different individuals, segmenting the sample based on the value of an observed variable. Thus, this study differs from the other approaches proposed in the literature by the method that will be used to achieve the objective, as the data will be analyzed with threshold panel data.

Afterwards, the other components of the article structure are presented, starting with the revision of the concepts about the cash holding and their determinants followed by the methodology and results. At the end, the conclusions of this study are presented.

2. Cash holding and their determinants

Determining the choice between cash holding and borrowing from external sources has been a challenge for corporate finance in an imperfect capital market. The administration of cash resources based on the formulation of the economic order quantity used for inventory management gave rise to the Baumol Model (Baumol, 1952), which incorporates opportunity costs, transaction costs of investment operations and recovery in financial assets to determine the appropriate cash balance. The Baumol model performs an analysis of the cost associated with maintaining cash that is the cost of opportunity determined by the interest the company fails to earn by not applying these resources in more profitable alternatives, and the transaction cost determined when the transfer occurs between the cash and the financial asset. Although this model has brought several contributions to cash management, it is restricted by the applicability of its concepts in situations in which the company has constant inputs and outputs of resources.

Considering the unpredictability of the inflows and outflows, Miller and Orr (1966) developed a cash management model based on the premise that their balance could reach a maximum value, so resources above this point would be transferred to other assets of equal liquidity and minimum balances, in which the funds would return to the cash flow through the conversion of these assets. In this way, both models proposed by Baumol (1952) and Miller and Orr (1966) focused on the transactional motive and on theoretical models to explain the companies' cash levels.

In terms of transactions, Almeida and Campello (2007) state that assets that serve as collateral are important to obtain more financing, reducing the need for cash retention. Peyer and Shivdasani (2001) identified that the pressure of reducing external capital causes firms to generate high cash levels. Due to these factors, the following hypothesis has been formulated:

H1: Investments in fixed assets and leverage, as they facilitate the acquisition of funds from external capital, generate less need for cash retention for transactions.

There are other reasons highlighted in the literature that influence the cash reserves in companies, such as speculation, precaution, taxes and agency costs. The speculation reason is related to the idea that companies retain liquidity to take advantage of growth opportunities. According to Harford (1999), the cash is an important tool for the companies to operate in imperfect capital markets, because reserves can provide a valuable source of resources for investment opportunities. For this reason, the following hypothesis is formulated:

H2: The companies generate greater cash retention for speculation as they need to maintain liquidity to take advantage of growth opportunities.

The precaution is based on the idea that companies maintain a safe cash level to protect themselves from adverse scenarios in which the access to the capital market has high cost (Bates *et al.,* 2009). This is based on the findings of Opler *et al.*, (1999) as these authors examined the determinants and implications of the cash positions and commercial papers of US publicly traded companies from 1971 to 1994 and found evidence that firms with more difficulties in accessing the capital market tend to hold higher cash levels. In particular, the findings of Opler *et al.* (1999) highlight that organizations with higher risk cash flows, such as large corporations and those with high credit ratios, tend to maintain lower cash ratios related to total non-cash assets.

Han and Qiu (2007) developed a two-period model in which cash investments of financially constrained firms are sensitive to cash flow volatility, generating an intertemporal trade-off between current and future investments. In this context, Almeida, Campello and Weisbach (2004) have been studying the relationship between financial constraints and company liquidity, evidencing that cash sensitivity to cash flow is positive for companies with restrictions to access capital markets, especially in periods of negative macroeconomic shocks. Han and Qiu (2007) indicate that an increase in cash flow volatility causes firms with financial constraints to increase their cash level. Due to these factors, the following hypothesis is raised:

H3: The change in cash flow generates uncertainties, causing companies to operate with greater cash retention as a precaution to protect themselves from adverse scenarios.

A motive that is different from the previous ones and currently considered in the literature was presented in Foley, Hartzell, Titman and Twite (2006), because these authors pointed out questions related to ratios and taxes. They identified that US companies maintain significant amounts of cash in their balance sheets and these financial holdings were justified in the existing literature by transaction costs and precautionary reasons. The authors state an additional explanation though, in that US multinational corporations maintain money in their overseas subsidiaries because of the tax costs associated with repatriating foreign income.

Based on this statement, firms facing higher repatriation tax burdens maintain higher cash levels and retain this money abroad or at branches, thereby avoiding high tax costs in repatriating profits. By analyzing the cash holding of Latin American companies, Rochman and Dylewski (2011)através de técnicas de dados em painel, os fatores determinantes dos níveis de ativos líquidos de empresas abertas do Brasil, Argentina, Chile, México e Peru no período de 1995 a 2009. A literatura apresenta cinco motivos para que as empresas tenham caixa: o Transacional é defendido pelos modelos clássicos de Finanças, como Baumol (1952 argued that tax benefits such as the payment of interest on equity – which is a deductible income tax expense in Brazil– may encourage the company to lower its cash level and distribute it to its shareholders. This argument is presented by Graham (2000, 2003), who states that high taxation companies have more developed tax benefit policies, impacting in the lower retention of cash. In this context, the following hypothesis is formulated:

H4: As companies acquire more outside capital, they increase tax payments, generating tax benefits and encouraging companies to retain less cash.

The fifth reason presented in the literature for cash retention relates to governance problems. This question raises the conflict of interests between agent and principal. Berle and Means (1932) were the first to discuss the potential benefits and costs of the separation of ownership and control in some large corporations. Despite the indisputable relevance of these authors' study, it was the work of Jensen and Meckling (1976) that was considered seminal in the line of in corporate governance research. According to Saito and Silveira (2008), the studies of Jensen and Meckling (1976) represent a true milestone from which many empirical works were developed and new theoretical models were generated.

In this sense, Myers and Majluf (1984) discuss the impact of asymmetric information on companies' cash-use policy. For these authors, it is always better to issue bonds that are safer. Therefore, the cash retention policy is aligned with the pecking order model because the company would have net assets to finance future investment projects with equity.

Another aspect that is presented by Jensen and Meckling (1976) is that, as companies generate a substantial cash flow, conflicts of interest between shareholders and directors over payment policies can be especially serious. The central issue from this point of view is the argument that existing agency conflicts between shareholders and managers can be more severe when companies have large free cash flows. In accordance with these authors, the entrenchment directors prefer to withhold money rather than increase payments to shareholders when the company has bad investment opportunities. However, Bates *et al.* (2009) found no significant relationship between corporate governance – analyzed through GIM index (Gompers, Ishii, & Metrick, 2003) – and cash holding.

Dittmar, Mahrt-Smith and Servaes (2003) found evidence suggesting that firms hold more cash in countries with greater agency problems by investigating cash retention and agency problems. Shleifer and Vishny (1997) verified that firms located in countries with weak legal protection of investors have difficulty in obtaining funds. In developing economies with high concentration in the ownership structure, such as Brazil, it is possible to extend this concept to the existing relationship between majority shareholders and minority shareholders in order to mitigate the conflict of interest between them and prevent the expropriation of minority shareholders by the controllers (La Porta, Lopez-de-silanes, & Shleifer, 1999).

Analyzing the ownership structure around the world, La Porta *et al.* (1999) identified that more than 60% of the firms have a concentrated ownership structure. These findings show that firms in the world's largest economies are usually controlled by government or by family groups, which have decision-making power over the company's flows in addition to the control. The scenario is not different in Brazil, because the highest concentration of voting share is a fundamental characteristic of governance model of Brazilian publicly traded companies, with an almost total absence of companies with pulverized ownership structure. In this context, the following hypothesis is formulated:

H5: The higher the control structure of the principal shareholder, which represents the governance problems, the more need for liquid assets to finance future investment projects with internal resources the shareholder will have.

3. Method

The sample consists of 144 Brazilian publicly traded companies with stock listed on BM&FBOVESPA from 2010 to 2015, excluding the financial firms. These firms represent a total of 864 observations. The data were collected in Economática and the panel data is balanced, so firms with no existing data were not considered in this study. The variables in this study were identified in relevant Brazilian and international studies that investigated the companies' cash retentions. Therefore, the choice of variables was based on two criteria: theorethic support and use in previous research.

The data analysis is divided into two parts. The first is the analysis of the historical data of the companies' cash in order to verify if the cash retention increased or decreased, as well as the application of the descriptive statistics. The second part consists in the method proposed by Hansen (1999), which deals with the application of panel data with threshold. The data were analyzed using Stata 14 and R.

The literature about cash maintenance employs several alternative definitions to verify the firm's cash ratio, among them (1) cash to assets ratio; (2) cash to liquid assets; and (3) cash values to the sales. Although authors as Bates *et al.* (2009) assert that the relation cash for assets is the traditional measure, Opler *et al.* (1999) use the cash to liquid assets ratio and Foley *et al.* (2006) the log of the cash in relation to liquid assets. In this research, the traditional approach of the relation between cash and assets.

Table 1 shows the independent variables that make up the study as well as how this variable is calculated. The relation and the expected effect are also studied in accordance with the theory and the authors supporting that theory.

Table 1

The independent variables and description

Indep. Variables	Measure	Relation	Authors	Effecto
H1: Transaction	$LEV = \frac{Short-term\ and\ Long-term\ Debt}{Total\ assets}$	The firms will use cash to reduce the leverage if the debt is sufficiently restrictive, and this may result in a negative relation between cash and leverage.	Bates *et al*. (2009); Miller and Orr (1966); Almeida and Campello (2007)	-
H1: Transaction	$IA = \frac{Capital\ Expediture}{Total\ Assets}$	If the capital expenditure generates assets that may be used as collateral, the capital expenditures may increase their capacity of the debt and decrease the cash demand.	Bates *et al*. (2009); Miller and Orr (1966); Almeida and Campello (2007)	-
H2: Speculation	$MB = \frac{Market\ Value}{Book\ Value}$	Firms with better growth opportunities value cash the highest, as it is more expensive to them to be financially restricted.	Kim *et al*. (1998); Opler *et al*. (1999)	+
H3: Precaution	$VOL = \frac{\Delta EBITDA}{Total\ Assets}$	The higher the volatility of cash flow, the higher the risks that may cause an increase in cash retention.	Kim *et al*. (1998); Han and Qiu (2007)	+
H4: Taxes **	$TAX = \frac{T \times DF}{Total\ Assets}$	It is expected that the higher the tax benefit, the smaller the cash retention will be.	Graham (2000, 2003)	-
H5: Governance Problems	Percentage of common shares held by the controlling shareholder in relation to the total shares	The higher the percentage of ordinary stocks held by the controller, the higher the need for liquid assets to finance future investment projects with internal resources.	Dittmar *et al*. (2003); Shleifer and Vishny (1997)	+
Threshold	$SIZE = \ln(Total\ Assets)$	Larger firms usually retain less cash.	Opler *et al*. (1999)	-

Note: * For the calculation of the MV (market value), the concept of Chung and Pruitt (1994) was used, which is the sum of MVE – the firm stock price multiplied by the number of outstanding common share, PS (Current Liabilities minus current assets plus inventories and long-term debt), only divided by Shareholders' Equity (PL); ** TxDF is the tax rate multiplied by the financial expense.

Source: Organized by the authors

The technique of aggregating time series and cross-sectional data, such as the panel data, allows a more complete estimation of econometric models; the estimation of such models becomes more complex though, as the heterogeneity between the units of the cross-section increase. Due to this fact, in this study, we follow the method proposed by Hansen (1999), who developed an estimation method for panel data that permits the division of the sample into different classes based on values of an observed variable.

Threshold panel data emerges as an option that can organize the heterogeneity of individuals in the sample in a more refined way. The approach proposed by Hansen (1999) allows a description of the changes or structural breaks in the variables for different individuals, segmenting the sample based on the value of a certain variable. In this way, an initially heterogeneous sample can be segmented into two, three or four less heterogeneous sub samples where a specific structural relationship between the variables is identified.

The model proposed by Hansen (1999) allows value changes in the coefficient of the regression equation depending on the sub-sample or regime in which it is found. The single-threshold model can be described as (1).

$$y_{it} = \mu_i + x_{it} I(q_{it} \leq \gamma)\beta_1 + x_{it} I(q_{it} > \gamma)\beta_2 + \varepsilon_{it} \quad (1)$$

In (1), I is an indicator function equal to $I = 1$ when $(q_{it} \leq \gamma)$ and 0 in other cases, and $I = 1$ when $(q_{it} > \gamma)$ and 0 in other cases; q_{it} is the *threshold I* variable, γ is the threshold parameter that divides the equation into two regimes with coefficients $\beta = (\beta_1, \beta_2)$; ε_{it} it is the error term assumed to be independent and identically distributed (iid) with zero mean and finite variance, which can be heteroscedastic. An alternative representation of (1) can be described by means of (2).

$$y_{it} = \mu_i + \beta z_{it}(\gamma) + \varepsilon_{it} \tag{2}$$

In (2), $z_{it}(\gamma) = (x_{it} I(q_{it} \leq \gamma), x_{it} I(q_{it} > \gamma))$ and B = (β_1 and β_2), we define a sample space $\Gamma=(\underline{\gamma}, \overline{\gamma})$, where $\underline{\gamma} > min\ \{q_{it}\}$ and $\overline{\gamma} > max\ \{q_{it}\}$. It should be noted that, for each value of $\gamma \in \Gamma$, the vector $z_{it}(\gamma)$ assumes a specific form. The coefficients are estimated by means of Ordinary Least Squares and the selection is by grid search of the estimated coefficients that generate a lower *Sum of Squared Error* (*SSE*), that is, for each value of $\gamma \in \Gamma$, by OLS the coefficients and the *Sum of Squared Error* ($SSE\gamma=\Sigma\Sigma\varepsilon_{it}^2$). The most appropriate estimates are those that minimize the function in space Γ.

The three-regime (double-threshold) model can be described as (3).

$$y_{it} = \mu_i + x_{it} I(q_{it} \leq \gamma_1)\beta_1 + x_{it} I(\gamma_1 < q_{it} \leq \gamma_2)\beta_2 + x_{it} I(\gamma_2 < q_{it})\, \beta_2 + \varepsilon_{it} \tag{3}$$

One way of writing the double-threshold model is (4).

$$y_{it} = \begin{cases} \mu_i + \beta_1 x_{it} + \varepsilon_{it}, & q_{it} \leq \gamma_1, \\ \mu_i + \beta_2 x_{it} + \varepsilon_{it}, & \gamma_1 < q_{it} \leq \gamma_2, \\ \mu_i + \beta_3 x_{it} + \varepsilon_{it}, & \gamma_2 < q_{it}, \end{cases} \tag{4}$$

In (4), the sample is divided into three regimes, only depending on whether the threshold variable is smaller, greater or figures between a range of values defined by the thresholds. By definition, this procedure ensures greater homogeneity within each regime, which contributes to obtaining more realistic coefficients. The Hansen model (1999) supports up to three thresholds. For a better understanding of the estimation process, an alternative representation of equations (3) and (4), given by (5) is considered.

$$y_{it} = \mu_i + \beta z_{it}(\gamma_1, \gamma_2) + \varepsilon_{it} \tag{5}$$

In (4), $z_{it}(\gamma_1,\gamma_2) = (x_{it} I(q_{it} \leq \gamma_1), x_{it} I(\gamma_1 < q_{it} \leq \gamma_2), x_{it} I(\gamma_2 < q_{it}))$ and $\beta = (\beta_1, \beta_2$ and $\beta_3)$. Note that for each pair $(\gamma_1,\gamma_2) \in \Gamma\times\Gamma$, the vector $z_{it} = (\gamma_1,\gamma_2)$ will assume a specific form. The estimation of the coefficients by OLS and the selection is by grid search of the estimates of the coefficients that generate the Sum of Squared Error, that is, for each value of γ_1 *and* $\gamma_2 \in \Gamma\times\Gamma$, the coefficients are obtained by OLS and the *Sum of Squared Error* ($SSE_{\gamma1,\gamma2} = \Sigma\Sigma\ \varepsilon_{it}^2\ (\gamma_1,\gamma_2)$), the most appropriate estimates being those that minimize the function $SSE_{\gamma1,\gamma2}$ in the space $\Gamma\times\Gamma$.

For values of (γ_1,γ_2) the coefficients are (β_1, β_2 and β_3) linear and the OLS estimation by *grid search* is adequate. The coefficients are those that minimize the *Sum of Squared Error* ($SSE_{\gamma1,\gamma2} = \Sigma\Sigma\ \varepsilon_{it}^2\ (\gamma_1,\gamma_2)$).

In the context of the model (1), it is necessary to verify the significance of the threshold effect (γ) that is, if the difference $\beta_1 - \beta_2$ is large enough for (γ) to be significant. The Lagrange test (LR) proposed by Hansen (1999) is described by (6.a, 6.b and 6.c).

$$LR(\gamma) = (SSE(lm) - SSE(\gamma))/\sigma_\gamma^2 \tag{6.a}$$

$$LR(\gamma_1,\gamma_2) = (SSE(\gamma) - SSE(\gamma_1,\gamma_2))/\sigma_{\gamma1,\gamma2}^2 \tag{6.b}$$

$$LR(\gamma_1,\gamma_2,\gamma_3) = (SSE(\gamma_1,\gamma_2) - SSE(\gamma_1,\gamma_2,\gamma_3))/\sigma_{\gamma1,\gamma2,\gamma3}^2 \tag{6.c}$$

The LR test is robust to heteroscedasticity and has its critical values determined by a bootstrap procedure. In (6a), if the value of the LR statistic exceeds the critical value, it is concluded that there are two regimes and the association between the dependent variable and the independent variables is distinct, at least for one of the variables. On the other hand, if the LR statistic does not exceed the critical value, it is concluded that the linear model (*lm*) of fixed effect is the most appropriate. Finally, the analysis for 6.b and 6.c is identical to 6.a, but the comparison performed is 1 vs. 2 threshold and 2 vs. 3

4. Discussion

In order to have a better understanding of determinants of cash retention in publicly traded Brazilian companies, the following section is presented: (i) characterization of the sample, descriptive statistics and correlation; and, (ii) analysis of determinants of the decrease in cash retentions.

4.1 Characterization of the sample, descriptive statistics and correlation

As specified in the method, the sample of this study consists of companies registered as publicly traded corporations, which have data for the analyzed period, excluding those classified as financial. In total, 144 companies were analyzed from 2010 to 2015, totalizing 864 observations. These companies are located in 19 sectors of the Economática database. Among them, Electric Energy, Other and Construction sectors are the three most representative as shown in Figure 1.

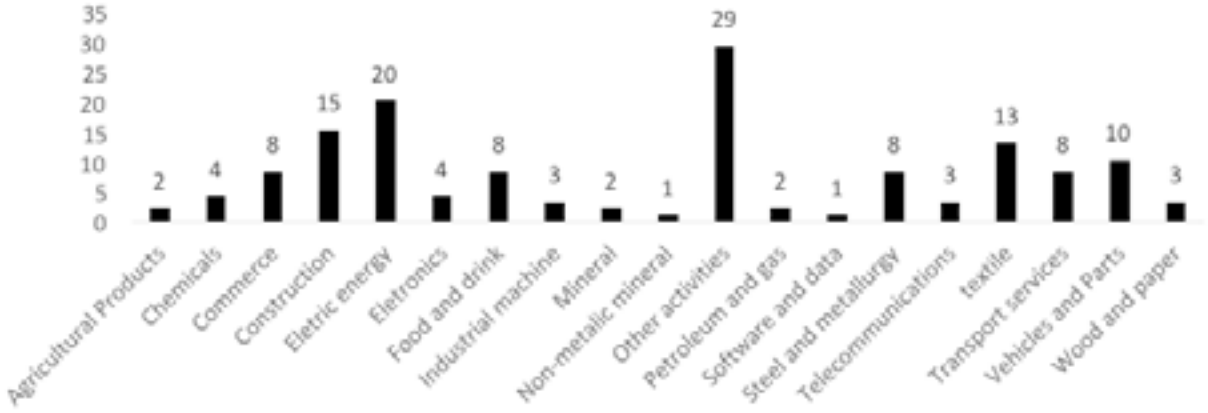
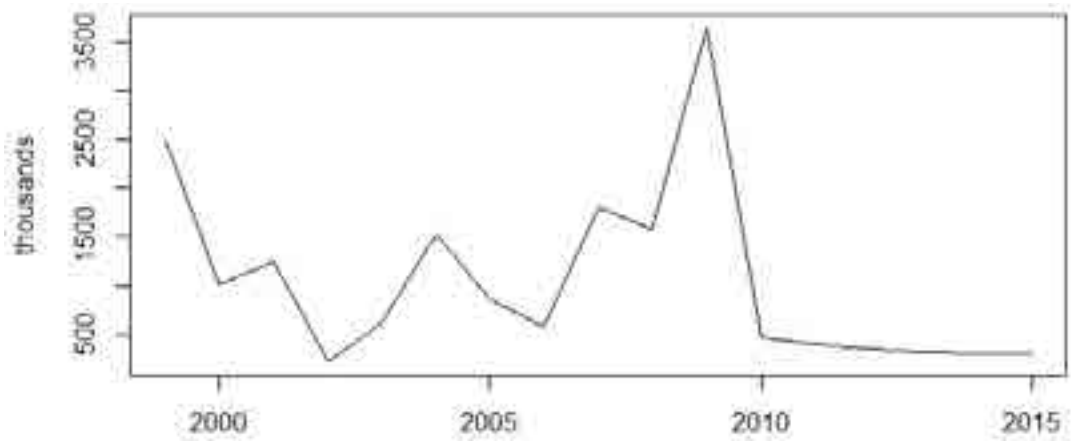


Figure 1. Firms classified according to sectors of the Economática database

Source: Organized by the authors

In order to identify the cash retention behavior of these companies, the historical data of this variable were analyzed. In a study carried out with US companies, Bates *et al.* (2009) identified that these companies retained more cash between 1980 and 2006 and that such behavior was justified by the risk of cash flows and the increase in research and development costs. In a later study, however, Pinkowitz *et al.* (2015) identified that, after the 2008 economic crisis, the American organizations had a considerable reduction in their cash levels.

The study was motivated by the identification of this decrease in the retention of cash of the Brazilian companies, following the logic of the American market indicated by previous studies. As can be seen in Figure 2, there was an abrupt drop in cash retention after the crisis of 2008, which continued to happen between 2010 and 2015, but in a smoother way. The crisis of 2014 may have affected this decline, but the structural breakdown has not been consistently noticed as doubts remained about the determinants of this decline in cash retention and about whether corporate finance fundamentals can explain this phenomenon in the case of the 2008 crisis.



* Inflated by IGP-DI index

Figure 2. Brazilian Companies' Cash retention between 1999 and 2015*

Source: Organized by the authors

To better understand the dynamic of the variables used, the descriptive statistics is presented in Table 2. As can be seen, all variables presented very close averages and medians, except for the total assets, justifying the application of the logarithm in this variable. On average, the variation in cash is small, around 0.7%. The company's fixed assets, represented by Capex, represent around 5.66% of total company assets .

Table 2

Summary statistics of the variables used in the model

Statistic	Cash	Capex	Leverage	MB	Tax	Vol. CF	% Princ. share	Assets*
Average	0.007	0.057	34.47	2.131	0.023	-0.001	44.366	19600000.000
Medium	0.003	0.051	33.98	1.336	0.017	0.009	46.043	4546163.000
p10	-0.044	0.002	10.26	0.245	0.006	-0.050	13.783	652500.300
p25	-0.016	0.020	23.32	0.621	0.010	-0.012	23.934	1450849.000
p75	0.029	0.082	44.68	2.383	0.026	0.028	59.412	12700000.000
p90	0.063	0.126	55.70	4.145	0.045	0.059	78.585	33700000.000
Variance	0.004	0.005	305.65	25.816	0.001	0.066	59.585	5.69x1015
Minimum	-0.277	-0.549	0.000	-17.710	-0.008	-6.990	0.000	16512.000
Maximum	0.654	0.473	97.43	99.246	0.339	1.069	100.000	932000000.000
S.Desv	0.063	0.071	17.483	5.081	0.025	0.256	24.410	75400000.000
Asymmetry	1.889	-0.457	0.348	11.163	5.677	-23.377	0.311	910148.000
Kutosis	24.545	18.371	3.325	183.938	54.331	641.417	2.405	9525661.000

* Inflated data until 2015, according to IGP-DI index.

Source: Organized by the authors.

In terms of leverage, the external capital represents, on average, 34.5% of the total asset. In the Market-to-Book, the market value exceeds the value of shareholders' equity by 2.13, demonstrating that more leveraged companies have greater tax benefits. The volatility of the cash flow is around -0.11%, showing that companies do not have much variation in this item, reducing the uncertainties regarding the cash retention. The studies related to the Brazilian market show that the main shareholder control structure is very high, varying around 44.37%, and the total assets of the company amount to R$ 19.6 billion on average, showing that the companies' size does not meet the market standards.

Finally, a correlation analysis was performed to identify if there is multicollinearity, that is, a very strong relation between the variables of the model. If any variable had a correlation above 0.7 with the others, it would have to be excluded from the study. No variables reached this level, and there was no need to suppress variables from the analysis. The results are presented as follows.

4.2 Analysis of the determinants of the decrease in cash retentions.

In the second phase of analysis, the methodological procedures proposed by Hansen (1999) are adopted. According to this method, the division of the sample into classes or regimes is determined endogenously and arises as an option that can more accurately accommodate the heterogeneity of the individuals in the sample. The Size variable is set to the Threshold of the model. The procedure consists of verifying if there is evidence for the Threshold effect, considering the null hypothesis of non-existence of this effect and computing the p-values by means of the bootstrap technique, that is, the test is applied repeatedly until there is no more statistical evidence of the need for new subdivisions.

To define the number of thresholds for the estimation, the null hypothesis of a linear model against the alternative hypothesis of a Threshold effect model was checked. This test was accomplished sequentially for zero, one, two or three effects according to the procedure developed by Hansen (1999). It is evidenced that the most appropriate model is the double threshold, that means, the one that subdivides the sample into three regimes (1st, 2nd and 3rd), according to the size.

As observed in Table 3, the F test for double effect of the threshold was significant as the value of (F = 41.790) is higher than the Critical Value at 1%, and it presents a reduction of the sum of the squares of the errors in relation to the single threshold test. These results show that the model that considers three regimes for the cash variation is more appropriate. The value of the first threshold is 15.139 and of the second threshold is 15.485.

Table 3
Test to determine the number of thresholds

Threshold Effect	SSR*	Threshold Value	F	p-value	Critical Value (5%)	Critical value (1%)
Single	2.800	15.139	37.660	0.000	26.360	28.499
Double	2.670	15.485	**41.790**	0.000	29.166	32.961

*SSR – Sum of the squares of the residuals

Source: Organized by the authors.

In this way, the sample is divided in firms with size until the first threshold and the first regime contains firms with Size ≤ 15.139. This regime concentrates 50% of the firms studied, that is, the smallest companies in the sample are found up to this threshold. Between the value of the first and second threshold, 9.60% of the companies are concentrated (15.139 <Size ≤ 15.485), denominated intermediate companies in relation to the others. Finally, in the last analysis regime, companies with Size> 15.485 are present in 40.40% of the observations. After the identification of the regimes, Table 4 is presented with the results of the determinants of the cash change

Table 4

Variation of the cash according to the regimes

Var. of Cash	Coefficient	Standard Deviation	P>|t|	[95% Confidence Interval]	
Transaction: Leverage					
1st	0.000	0.000	0.405	0.000	0.001
2nd	0.000	0.001	0.923	-0.001	0.001
3rd	0.000	0.000	0.365	-0.001	0.000
Transaction: Capex					
1st	**-0.294**	0.046	**0.000**	-0.385	-0.203
2nd	**-0.815**	0.132	**0.000**	-1.074	-0.555
3rd	-0.082	0.075	0.274	-0.228	0.065
Speculation: *Market-to-Book*					
1st	0.00	0.00	0.52	0.00	0.00
2nd	0.00	0.00	0.49	-0.01	0.01
3rd	0.00	0.00	0.11	0.00	0.01
Precaution: Volatility of the Cash Flow					
1st	0.003	0.009	0.740	-0.014	0.020
2nd	**0.600**	0.162	**0.000**	0.281	0.919
3rd	**0.164**	0.065	**0.012**	0.036	0.293
Taxes: Taxation					
1st	**-0.443**	0.139	**0.002**	-0.717	-0.169
2nd	0.174	0.557	0.754	-0.919	1.268
3rd	**0.846**	**0.350**	**0.016**	0.158	1.534
Governance Problems: Majority Shareholder Participation					
1st	**0.070**	0.033	**0.036**	0.005	0.135
2nd	**0.083**	0.045	**0.064**	-0.005	0.170
3rd	-0.046	0.037	0.213	-0.120	0.027
Constant	0.006	0.018	0.758	-0.030	0.041
F-test for any u_i=0		F(143,702) = 0.72		Prob > F = 0.9926	

Source: Organized by the authors.

As observed, in the first group of variables related to the transaction motive, the leverage is not significant in any of the regimes, and its coefficients had lower values, close to zero, identifying that this variable has no influence on the cash change. The other variable related to the transaction motive is significant in the two first regimes though, indicating that the 1%increase in Capex generates a 0.29% decrease in the cash variation for the smaller companies and 0.81% for the intermediate companies, both at 1% of significance. Despite presenting a negative relation, the third regime is not significant.

The variable that measures the speculation motive is the growth opportunities and is not significant in all analyses, evidencing that the Market-to-Book does not decisively influence the cash retention of the analyzed companies. In the precautionary motive, analyzed through the volatility of the cash flow, the variable is positive and significantly related to the cash holding in the two last regimes. It can be verified that the 1%increase in the volatility increases the cash flow by 0.60% for intermediate companies, at a 1% significance level, and 0.16% for the largest companies, at a 5% significance level. In this case, the smallest firms are not significantly affected by the cash variation.

Regarding the tax variable, related to the taxation motive, it presented different influences in the regimes, where the 1% increase in the fiscal debt benefit generates a decrease in the cash retention of 0.44% for the smaller companies, at a level of 1% and a 0.84% increase for the largest companies, at a 5% significance level. For intermediate companies, this result is not significant. This difference can be explained by the fact that the tax benefit through the increase in financing only has an effect on the reduction of the cash variation for smaller companies. For larger ones, this benefit is not so great as to affect this variable, which makes the firms focus on other determinants of cash variation.

Finally, it is considered that the control structure proxy to the governance problems is positively related to the cash retention in the two first regimes. It can be observed that a 1% increase in the shareholder control concentration generates an increase in the cash variation of 0.07% for smaller firms, at a 5% significance level, and 0.08% for the intermediary firms, at a 10% significance level. This result is not significant for smaller firms.

Table 5
Effect of the theoretical motive in a cash holding

Theoretical Motive	Expected signal	Regime	Significance
H1: Transaction	–	1st	– ***
		2nd	– ***
		3rd	n/s
H2: Speculation	+	1st	n/s
		2nd	n/s
		3rd	n/s
H3: Precaution	+	1st	n/s
		2nd	+ ***
		3rd	+ **
H4: Taxation	–	1st	– ***
		2nd	n/s
		3rd	+ **
H5: Governance problems	+	1st	+**
		2nd	+*
		3rd	n/s

Note: ***, **, * indicate statistical significance at 1, 5 and 10 percent. n/s is non-significant relation.

Source: Organized by the authors.

In Table 5, a summary table is drawn up with the expected effects and which were found in this study in relation to the decrease of cash of Brazilian companies in the post-crisis period. The following are some conclusions, limitations and suggestions for further research.

5. Concluding Remarks

The article aims at analyzing the determinants of this phenomenon through the premises from the literature related to the transaction, speculation, precaution, taxes and governance problems in Brazilian firms traded on BM&FBovespa. The result shows that transactions and taxation are the main reasons for the decrease in cash retention for smaller firms. The reason related to precaution showed a positive relation to the cash variation for bigger firms and the governance problems for smaller firms though.

Leverage was not statistically significant in any of the regimes analyzed, so it does not permit confirmation or rejection of the theory. Although the method employed allows a detailed analysis through the size of the companies, these results cannot be compared with research such as Fazzari and Petersen (1993), which show that small firms are more prone to credit constraints than larger firms. Under this view that capital expenditures create assets that can be used as collateral to increase the capacity to contract debt and consequently reduce the demand for cash, Capex is negatively related to this variable in the first two regimes, corroborating with Almeida and Campello (2007), and not rejecting the first hypothesis (H1). This effect is not identified for larger companies, probably because these already have a basis that is strong enough not to rely on external capital to determine the company's cash retention policy.

In analyzing the speculation motive, represented by the growth opportunities measured through the Market-to-Book, this variable is not significant in any of the three regimes, rejecting the second hypothesis (H2). Although the studies by Opler *et al.* (1999) show that firms that have greater access to capital markets tend to maintain lower rates of cash in relation to total assets, the results do not support this behavior. Therefore, it cannot be confirmed that the cash flow is used as a tool for companies to take advantage of opportunities with positive present value.

The empirical evidence on the precautionary motive, represented by the volatility of the cash flow, confirms the studies of Han and Qiu (2007) and Kim *et al.* (1998) for the firms in the second and third regimes, bringing evidences for the rejection of the third hypothesis (H3). Therefore, an increase in the volatility of cash flow tends to increase the cash levels of the companies. Nevertheless, this assertion cannot be applied to the companies in the first regime, showing that, on average, they do not take consistent measures aiming at a reserve for contingencies.

In terms of the tax benefits of the debt, which served as a proxy for taxation, a peculiar result is evident. For smaller companies, the fourth hypothesis (H4) was not rejected as this variable is negative and significant, corroborating with Graham (2000, 2003), who states that companies with high taxation have more developed tax benefit policies, opting for more external capital than cash retention. For larger companies, however, this hypothesis cannot be confirmed, although the result is significant. On the other hand, this finding is aligned with the Pecking Order theory proposed by Myers and Majluf (1984), which predicts that companies follow a hierarchy to make their investments, preferring to generate internal cash to make investments, even if the tax benefits are large.

From the perspective of the governance problems, represented by the control structure of the main shareholder, a positive relationship was identified between this variable and the cash retention for the first two regimes, not rejecting the fifth hypothesis (H5) of this study. This result corroborates with Dittmar *et al.* (2003), who found evidence to suggest that firms hold more cash in countries with greater agency problems. It is also aligned with Shleifer and Vishny (1997), who found that companies located in countries with weak legal protection to investors have difficulty in obtaining funds.

The empirical gain in the analysis resulting from the threshold method is evidenced, as it permitted the analysis of the coefficients in different regimes, surpassing the analysis of coefficients that were analyzed as if they were identical, Therefore, the detailed determinants of the decrease of cash in Brazilian companies was revealed, obtaining consistent results. As limitations for the study, the very short period of analysis can be considered, marked by economic crises in Brazil. Also, there is a possibility that the relationship between the variables will be endogenous, damaging the results. For further research, we suggest increasing the period of study and test other variables that may explain the cash variations in Brazil. Another possibility would be to use different threshold measures to separate the sample into regimes.

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repec

REPeC, Brasília, v. 12, n. 3, art. 6, p. 364-384, Jul./Sep. 2018
Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1744

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ABRACICON ACADEMIA BRASILEIRA DE CIÊNCIAS CONTÁBEIS

ISSN 1981-8610

A Study of Stakeholders' Positioning on Information Materiality and Accountability in the Integrated Report

Abstract

Objective: The objective in this study is to identify, in an individualized manner, the position each participant adopts in the elaboration process of the Integrated Report (IR) during the Consultation Draft phase and if this positioning is similar to that adopted by others who identified themselves similarly.

Method: 224 comment letters were read, which were coded according to the positioning and justification each sender presented. Chi-square statistics were used to determine the association between senders and the independence among different groups.

Results: The results found show that the stakeholders, except for the financial capital providers, tended to disagree from the concept of materiality suggested by the International Integrated Reporting Council (IIRC). It was verified that most companies did not resist, taking on responsibility for the information disseminated in the IR.

Contributions: This study identified that the IR was elaborated to respond to the investors, pushing the interests of groups more focused on sustainability into second place, as the other stakeholders were not represented, as the integration the IR aims for was not considered as something broad, which is why, in principle, it would not demand great operational changes from the companies to accept the IR.

Key words: Materiality, Accountability, Governance.

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Published in Portuguese and English. Original Version in Portuguese.

Received in 12/07/2018. Ask to Revise on 06/27/2018. Resubmitted on 07/21/2018. Accepted by Dr. Gerlando Augusto Sampaio Franco de Lima (Assistant Editor) and by Dr. Orleans Silva Martins (Editor). Published on 09/20/2018. Organization responsible for the journal: Abracicon

1. Introduction

From April to July 2013, the International Integrated Reporting Council (IIRC) discussed what was to be the draft of the Integrated Reporting Framework (IR), through the Consultation Draft of the International <IR> Framework, in the stage called Consultation Draft. This was the second consultation open to the international community, receiving 359 responses from all over the world (IIRC, 2013a). These responses came from various stakeholder groups such as academics, accountancy professionals, assurance providers, analysts, individuals, labor representatives, organizations, non-governmental organizations, policy makers, regulators and standard setters, professional bodies - accounting, professional bodies - other, providers of financial capital, report preparers and others. Finally, after this second stage, five months later, in December 2013, the International Integrated Reporting Framework (IIRC, 2013b) was released to the international community.

IR came up with the objective of harmonizing sustainability information with what was evidenced in the financial statements. According to Carvalho and Kassai (2014), IR, if it achieves its intended objective, will be the instrument that will revolutionize Accounting, as it will change the way the company will communicate its value. What distinguishes IR from other sustainability reports is the concept of several capitals the framework works with and the way in which it seeks to reconcile these other capitals with financial capital (Fasan; Mio & Pauluzzo, 2016). Thus, capital such as manufactured capital, intellectual capital, human capital, social and relationship capital and natural capital can relate to financial capital. IR has received a number of supporters around the world, one of the most notable being the Prince of Wales, also being cited as a necessary and desirable means of communication by the United Nations (UN) at Rio + 20.

Although IR has supporters, there are also critics. Researchers such as Flower (2015) and Thomson (2015) criticize the way in which the framework was conceived and consider that the IIRC subjected the IR not to the sustainability demands, but to the interests of the financial capital, thus rejecting the public interest in favor of the interest of financial capital. IR already being a report adopted by several companies and used by various stakeholders around the world, identifying what interests it actually serves is extremely complex.

Greater attention should be given to the process of elaborating the IR, as it was during the elaboration of the IR that the IIRC identified the interests of each individual or group that participated in the process of preparing the document. Watts and Zimmerman (1978) report that the simplest way of identifying what interests an accounting rule serves is during its elaboration process, through the study of lobbying by each stakeholder and the way that party attempts to influence the legislator. Thus, it is during the process of setting a standard that the designer identifies the interests of each group and determines which groups the standard will privilege. The identification of interests occurs through the lobbying process and is easier to visualize when it takes place in the form of public consultations, which was the case with the main accounting regulators and which was also adopted by the IIRC.

These public consultation processes are already known by Accounting, as several studies have already proposed to analyze the disclosure process of accounting standards, such as: Orens, Jorissen, Lybaert and Tas (2011), Giner and Arce (2012) and Demaria, Dufour, Louisylouis and Luu (2012), who analyzed lobbying in the context of the International Accounting Standards Board (IASB). Studies on the lobbying process are important because, according to Sutton (1984), only stakeholders will conclude that the potential benefits generated by their participation exceed the costs of participating, taking into account the probability of influencing the outcome. Thus, stakeholder groups in general will be acting in a way that seeks to maximize their interests in the so-called rational choice model of the lobby (Sutton, 1984).

When designing IR, the IIRC chose to go through several processes also adopted by the Financial Accounting Standards Board (Fasb) and Iasb, such as two stages of public consultation. IR has a peculiar characteristic though as, unlike a regulation that is imposed, the company voluntarily adheres to IR and its non-compliance at a future date does not imply a legal sanction for the company; in addition, the framework aims to ensure that all material information, whether good or bad, is disclosed by those responsible

through the company's governance, who should also be held accountable (IIRC, 2013b; Reuter, Messner, 2015). Following the theory of Voluntary Disclosure, the absence of regulation allows both disclosure and credibility of this material information to undergo analysis and scrutiny by the market, its main agents being providers of financial capital (Healy & Palepu, 2001; Ling & Mowen, 2013).

Thus, this study analyzed lobbying by stakeholders during the IR Consultation Draft stage, in search of a better understanding of this political process, and will address the following question: **What was the position taken by each stakeholder group during the Consultation Draft stage in the elaboration of IR?** The purpose of this study is to identify, in the Consultation Draft process of Integrated Reporting, the positioning each participant adopted and whether the other participants who had common characteristics adopted the same positioning. It is important to study the stakeholders' positioning as studies such as Flower (2015), Thomson (2015) and Gibassier, Rodrigue and Arjaliès (2018) conclude that, in its operation, IR did not meet the stakeholders' wishes and that the integration advocated by the IIRC was but a popular myth that is accepted by all but does not serve sustainability. Thus, the motivation to research about IR lies in the possible benefits this report can bring to society by disseminating new information and presenting the company holistically.

Issues related to sustainability are relevant, as they help to reduce negative externalities companies cause in society, being one of the possible measures they adopt in the search for legitimacy, market differential and increased economic value. This research is justified because, although studies on lobbying in corporate reports have existed in the field of Accounting since Watts's seminal work (1977), only the study by Reuter and Messner (2015) has addressed the topic of lobbying in relation to IR. Reuter and Messner (2015) focused on early-stage lobbying in the Discussion Paper stage though and did not focus on the materiality and accountability of information in IR. This study will focus on lobbying in the Consultation Draft stage as, during this stage, stakeholders had already demonstrated their interests in the previous phase and already had signs, through the publication of the draft IR document, what interests the IIRC contemplated thus far.

2. Literature Review

In this section, the main studies and concepts underlying this study will be addressed. The literature review was divided into two parts: the first section will address the concept of materiality; presenting in IR its criticism and other concepts presented for the theme; and the second section will discuss accountability of information in IR, who should be held accountable for the information in the report, and which groups agreed or disagreed from the accountability suggested by the IIRC.

2.1 Materiality in IR

Integrated Reporting (IR) is a report or set of corporate reports that aims to communicate the organization's ability to create value over time (IIRC, 2013b). It contains both financial and non-financial information, and its main difference, according to Fasan, Mio and Pauluzzo (2016), is not in the reference - the concept of capitals. Capitals for IR are defined as "stocks of value that are increased, decreased or transformed through the activities and outputs of the organisation" (IIRC, 2013b, p.11). The IR recognizes the existence of six types of capital, being: 1- financial capital; 2- manufactured capital; 3- intellectual capital; 4- human capital; 5- social and relationship capital; 6 - natural capital. Not all capitals may be relevant or applicable to all organizations (IIRC, 2013b).

On materiality, the IIRC defines it as "information on matters that substantively influence an organization's ability to generate value in the short, medium and long terms" (IIRC, 2013b, p.18). This concept of materiality, according to the IIRC (2013), contemplates the providers of financial capital, although it does not exclude the other stakeholders. According to Flower (2015) and Thomson (2015), however, the IIRC considers the former to be the main stakeholders in an organization's capacity to create value over time.

IR being voluntary in nature, however, even though it may include financial capital providers, this group may not identify the information it deems material in IR. This may be due to the fact that IR follows the same logic as other information and reports companies voluntarily disclosed as preparers. Healy and Palepu (2001) argue that voluntarily disclosed information will have its materiality validated after market analysis as users of the information, so it is not clear how the market will analyze whether information is material and credible.

Linthicum, Reitenga and Sanchez (2010) found something similar to Healy and Palepu (2001) in their study of the United States financial market at the time of the Enron crisis. The authors concluded that companies that voluntarily disclosed corporate social responsibility (CSR) information and had a high rating of that practice, evaluated by external bodies, nevertheless did not have their negative returns mitigated, as the market did not consider those practices credible due to the fact that these companies were audited by Arthur Andersen, the same firm that audited Enron. That is, the information the market judged as material was the audit firm the company belonged to, and not its good CSR practices validated by other external bodies. On the other hand, Beck, Dumay and Frost (2017) demonstrated that a company, which chose not to identify itself, used IR to legitimize itself to stakeholders after suffering a crisis of public trust, demonstrating that IR can contribute to enhance the company's image and pass credibility to the market.

The first point to be observed is whether the concept of materiality, which will serve as a premise to determine what is relevant for disclosure in RI, is in line with what the financial capital providers expect. This point leads to the formulation of the first hypothesis:

h_1: *Financial capital providers agree with the concept of materiality presented by the IIRC for IR.*

The means used to determine the positioning of financial capital providers and all stakeholders about the implications a concept or document might bring was through lobbying by senders of comment letters at the time the standard was elaborated (Sutton, 1984). Sutton (1984) assumes that a participant will only practice lobbying if the potential benefits generated by his participation exceed the costs incurred in participating, in view of the probability of influencing the outcome in the context of the uncertain environment the process is embedded in. For Watts and Zimmerman (1978), the definition of a standard implies which interests or views the regulator will choose between the different interests and viewpoints of the stakeholders in a political process.

In the field of accounting, Sutton (1984) adapted Downs' (1957) voting model in political science, which aimed to determine how each group would vote in an election and the justification, lobbying, used to support that position. For him, lobbying in the process of promulgating a norm and lobbying in the voting process have common characteristics, since in both cases the participant, if rational, must evaluate the other stakeholders and the lobbying exercised by them.

In Sutton's (1984) model, it is necessary to take into account those who practiced lobbying, since this author states that preparers tend to send more letters to the normalizing body than users of financial information. Jorissen, Lybaert, Orens and Tas (2012) - analyzed 3,234 letters sent to Iasb between 2002 and 2006 and found something similar: 44% of the total was sent by report preparers, while the users of the financial information sent only 15% of the total, that is, the preparers sent almost three times the number the letters compared to the users.

In the context of IR, Reuter and Messner (2015) argued that the same actors who usually lobby for financial reporting will not necessarily be found practicing lobbying at the IIRC. According to them, this is due to the fact that the idea of the integrated report is often associated not only with an economic dimension, but also with sustainability issues. The adoption of IR being voluntary, some actors who see benefits in lobbying for the elaboration of a standard that directly affects them will not necessarily find that motivation in IR (Reuter and Messner, 2015).

For those studies, Sutton (1984), Jorissen *et al.* (2012) and Reuter and Messner (2015) considered analysts, individual or group providers of financial capital as users, individual providers being the largest group of senders. The report preparers, then, were corporate and business organizations and banks, lobbying at the IIRC in isolation or as a group.

Another aspect about the preparers is that they are often resistant to voluntarily disclosing as much material information as possible to users (Ling & Mower, 2013). This may occur if preparers understand that the concept of materiality adopted by IR exposes them to a higher level of risk. In this sense, Ling and Mower (2013) argue that companies will only voluntarily disclose, be it economic, social or environmental information, if the expectation of future benefit of this information surpasses its possible costs. Otherwise, companies will be resistant in issuing on a voluntary basis material information that entails an increase in its cost of capital. On the other hand, the study by Zhou, Simnett and Green (2017) showed that companies listed on the Johannesburg stock exchange, South Africa, had their cost of capital reduced due to information presented via IR, this report being one of the practices good governance and transparency for financial analysts.

The rational model of lobbying by Sutton (1984) already foresaw that the preparers, if rational, would seek to influence the regulators in order to minimize the disclosure of material information, required by the standard, which entail the increase of possible costs; and would seek, inversely, to influence the regulator to approve something that maximizes its possible economic benefits. Thus, the preparers, during the conception of IR, could have adopted a position that would prevent them from disclosing more material information, preventing an increase in their cost of capital. In order to verify the position adopted by the preparers, the following hypothesis was adopted:

h$_2$: *The preparers proved resistant to the concept of materiality presented by the IIRC.*

In relation to the second hypothesis, another point that will be considered is the justifications presented by the preparers. Something similar was done by Reuter and Mesner (2015). This measure is intended to assess whether the justifications presented by the preparers who disagree from the IIRC concept on materiality rely on predominantly conceptual or economic issues. For Sutton (1984), the justification the lobbyist presented to the regulator is important because it will be through him that the lobbyist will try to influence the decision of the regulator.

Still on the concept of materiality, Gibassier, Rodrigue and Arjaliès (2018) consider that the IR was unable to integrate the information, because they consider that there is a great separation between what is wanted and what is, in fact, reflected in the IR, making the integration proposed by the report is nothing more than a myth accepted by all, but not proven by science. Researchers such as Flower (2015) and Thomson (2015) argue that the integration proposed by IR will not be possible as long as the IIRC places financial capital providers as the main stakeholders in IR. According to them, this definition does not address what is material to most stakeholders.

In this respect, Gray (2006) argues that it is erroneous to think that value creation for investors produces value creation for all stakeholders, requiring only a conflict of interest between providers of financial capital and other stakeholders to make it clear that value creation for the former does not encompass the creation of value for all stakeholders. For Gray (2006), Searcy and Buslovich (2014) and Flower (2015), the engagement of all stakeholders in the company's operational routine that will evaluate which items will be considered as material. According to Gray and Bebbington (2000), materiality means the determination by stakeholders in its broad sense of what information and data should be included in the reports. Another concept of materiality is defined by the G4 (2013), which exposes that materiality is any truly critical issue to achieve the objectives of the organization and manage its impact on society.

In view of other concepts that define materiality, the third hypothesis addressed in this study aims to verify if most of the stakeholders who sent answers to the IIRC on this issue disagree from the concept of materiality presented by the IIRC:

h$_3$: *Other stakeholders, excluding report preparers and financial capital preparers, disagree from the IIRC concept of materiality.*

2.2 Accountability for the information disclosed in IR

A practice followed by companies that adopted the voluntary disclosure of material information, according to Roychowdhury and Sletten (2012), is the management of bad news. Business managers tend to delay the spread of bad news, awaiting favorable news so that the effect of this good news equals or outweighs the effect of bad news, or until they are able to provide reliable estimates of its possible effects (Roychowdhury; Sletten, 2013).

Similarly, however narrowly, Bewley and Li (2000) argue that companies prone to a higher level of pollution tend to give more general and less material voluntary information. The separation of the firms with the highest propensity to pollute adopted by Bewley and Li (2000) was the same used by Li, Richardson and Thorton (1997), in which companies more prone to pollute are those that act in the chemical, oil, paper and pulp and primary metal industries.

One possible way out to avoid generic information and to hold the preparers accountable would be to regulate IR in the financial markets. Stubbs and Higgins (2018), however, in analyzing stakeholder perspectives on the role of a regulatory reform for IR, have identified that stakeholders want the report to advance further in content and in spontaneous acceptance by more preparers to be able to reach a regulation. Although not regulated, however, the IIRC indicates that the disclosure or omission of any material information in IR is the responsibility of the company's governance, whether that information is good or bad (IIRC, 2013b).

Another point is that, despite material, the information disclosed in IR may have different levels of validation, as the IIRC (2013a) itself highlights for example: the information contained in the financial capital is validated following the regulation of the government or the securities commission, besides going through external auditing; on the other hand, information on sustainability, such as human and social capital, can be disclosed without necessarily going through some kind of previous validation.

Thus, one measure proposed by the IIRC as a way of validating the information contained in the IR was the request for a declaration of responsibility for the information contained therein issued by those responsible for the governance of the organizations (IIRC, 2013c). In this regard, the IIRC argued that, among the grounds for opposition to this corporate responsibility statement was that such a measure could entail possible legal implications for its managers (IIRC, 2013a).

Despite the IIRC's reports of companies opposition to this measure, the IIRC included in IR item 3.41 that those in charge of governance "are responsible for ensuring effective leadership and decision making on the preparation and submission of an integrated report" (IIRC, 2013b, p.21), thus making governance accountable for the preparation and disclosure of information presented in IR.

And as a corrective measure to inhibit any legal implication, the framework also admitted that it would be up to the company management to assess the reliability of information in case of unavailability of reliable information or legal prohibitions. The framework instructs that an integrated report should indicate the nature and explain the reason for omitting this information and, in case of unavailability of the data, the measures to be taken should be identified and the expected timeframes for obtaining the information in a reliable manner (IIRC, 2013b). Thus, the IIRC, despite holding corporate governance accountable, also to some extent admitted that those in charge of governance could continue to evaluate what information IR should contain.

As those responsible for corporate governance tend to manage the news that will be disclosed to the market and the IIRC has stated that there were companies opposed to that measure so as not to hold their governance accountable, the fourth and fifth hypothesis considered in this study are that:

h_4: *Most companies were resilient to hold governance accountable for information in IR. (Broad sense)*

h_5: *Companies prone to a higher level of pollution were resistant to hold governance accountable for the information in the IR. (Strict sense)*

Another measure suggested by the IIRC was that companies should hire an external audit as a way to increase the validity of the information in the IR. The IIRC recognized the importance of auditing the entire IR and, although the framework does not make such an imposition, it says in paragraph 3.42 that the audit during the preparation of IR helps those in charge of company governance to assess whether the information presented is sufficiently reliable (IIRC, 2013b).

Jorissen *et al.* (2012) argue that accounting professionals and firms are active members in the lobbying process of accounting standards, mainly when the development process of the standard is in the final exposure draft stage. In this respect, Puro (1984) argues that the Accounting companies tend to lobby in favor of standards that expand their service demand. In agreement, Reuter and Messner (2015) argue that large Accounting companies' publications in favor of IR indicate that they want this report to be audited (Pricewaterhousecoopers, 2012; KPMG, 2012; Deloitte & Touche, 2011; Ernst & Young, 2011). According to Reuter and Messner (2015), the Accounting companies will benefit from a new market for consulting and audit services of integrated reports. Thus, the Accounting companies can act to agree that the IR holds the corporate governance accountable as, thus, the companies themselves will demand the audit and consulting services for IR, in order to dilute or minimize any possible error for which responsibility can be attributed to the corporate governance responsibles (Reuter; Messner, 2015). Another positive point of this measure is that the Accounting companies would not be held directly responsible for the IR information. Thus, the sixth hypothesis is that:

h_6: *The Accounting companies agreed to hold the corporate governance responsible for the information in IR.*

3. Method

In this section, the population and sample considered by this study will be presented. The criteria used for the data analysis and the statistical test considered are also presented.

3.1 Population and sample

The population of this study included the 359 comment letters sent by the IIRC's respondents during the Consultation Draft stage. The target population was outlined according to respondents who answered questions 11 and 17 of the Consultation Draft, namely:

Q11: *Do you agree with this approach to materiality? If not, what would you change?* (IIRC, 2013c, p.1)
Q17: *Should there be a requirement for those responsible for governance to include a statement acknowledging their responsibility for the integrated report? Why / Why not?* (IIRC, 2013c, p.2)

The analysis of the eleventh question (Q11) aims to answer the questions raised in hypotheses h1, h2, h3, while the analysis of the seventeenth question aims to respond to hypotheses h4, h5, h6.

Regarding the respondents, 287 letters, corresponding to 80% of the total number of letters sent, responded to Q11; while Q17 was answered by 73% of the total population, which is equivalent to 262 letters.

In order to determine the sample, the letters sent to the IIRC whose sender did not identify which group of stakeholders and economic sector he belonged to, were excluded from the target population; this same criterion was used by Georgiou (2010) and Tunico and Rodrigues (2016). All respondents who informed not belonging to any group or sector were kept in the sample because it did not apply or because some other group or sector different from those made available by the IIRC were named. Thus, the sample considered for Q11 consisted of 215 comment letters, against 200 letters for Q17, which corresponds to 75% and 76% of the total number of senders who responded to questions 11 and 17, respectively.

3.2 Criteria for data analysis

When adding up the senders of questions 11 and 17, it was verified that 191 letters answered both questions; 24 senders responded only to Q11 and nine letters dealt only with Q17. When adding up the respondents of the two questions, the total number of letters being analyzed was 224.

Questions 11 and 17 of these 224 letters were analyzed according to their level of agreement. The senders who disagreed totally or partially from the concept presented by the IIRC, for each question, were classified as "divergent"; in the opposite way, the senders who totally accepted what was proposed by the IIRC, for each question, were classified as "convergent".

Next, the justification presented by each group that was considered in the IR draft prepared by the IIRC was analyzed. This type of analysis was adapted based on the work of Reuter and Messner (2015), Giner and Arce (2012) and Stenka and Taylor (2010). The justifications presented were classified as: 1 - economic, when the sender predominantly mentions possible economic costs or benefits for justification; and 2 - conceptual, when the sender predominantly discusses concepts and theories in his justification (Reuter and Messner, 2015).

Finally, in addition to identifying those that differed statistically from the concepts presented by the IIRC and the nature of their justification, it was analyzed among the divergent respondents, whom or what groups, in their opinion, the company should target.

3.3 Statistical test

The Non-Parametric Statistical test was applied to answer each hypothesis raised in this study. Non-Parametric Statistics is indicated because it does not depend on population parameters, and the Chi-Square (χ^2) test of Goodness of Fit is the means used to determine if there is a statistically significant relationship between qualitative variables (Kraska-Miller, 2014), which is given by:

Equation 1: Chi-square

$$\chi^2 = \Sigma \frac{(O - E)^2}{E}$$

Source: Kraska-Miller (2014)

Where:
χ^2 – Chi-square;
O – Frequency of observed values;
E – Frequency of expected values.

The frequency of expected values for the Chi-square test of Goodness of Fit is given by dividing the total number of observations by the total number of categories considered. As two categories will be considered, the expected value will be half of the total observations.

For Kraska-Miller (2014) and Siegel (1957), the χ^2 Goodness-of-Fit test is effective in determining whether the frequency of responses within a group can be considered statistically homogeneous. This test was also applied in the study by Reuter and Messner (2015), which dealt with lobbying in the initial stage of IR.

The χ^2 Goodness-of-Fit test consists of comparing the sum of the frequency of the value observed in the population "O" by the frequency of the expected value "E". A higher frequency of the observed value in relation to the expected value indicates a tendency in the responses of a given group. This trend will have to be validated through the p-value analysis. For this study, a significance level of 5% was adopted, that is, only those trends that have a p-value below 5% will be considered statistically significant. The degree of freedom (gl) for the chi - square test was given by: (t - 1) x (c - 1), "t" representing the number of rows and "c" the number of columns in a matrix CxT: 2x2, which results in gl = 1.

The χ^2 independence test was also performed for item 4.2.2, which aimed to identify the independence between two different populations. The Independence test uses the same formula, concept and interpretation of the χ^2 Goodness-of-Fit test.

4. Results

The results were divided in two groups. The first group, item 4.1, will present and discuss the positioning the stakeholders adopted in relation to the materiality proposal suggested by the IIRC. The second group, item 4.2, will focus on discussing the results found on the accountability of the information contained in the IR.

4.1 Materiality in IR

The result obtained on the positioning adopted by each group of stakeholders in relation to materiality was divided and discussed in topics according to the group considered.

4.1.1 Suppliers of financial capital

Regarding the level of agreement of the financial capital providers on the concept of materiality presented by the IIRC, of the 215 senders considered in this study who responded to Q11, 19 were denominated financial capital providers. In terms of geographical region, 5% were active in Africa, 5% in Central and South America, 5% in the Middle East, 5% in Oceania, 16% in North America, 16% in global operations and 47% in Western Europe.

Table 1
Providers of financial capital (investors)

Agreement	Observed Number	Expected Number	Residue
Agree	13	9.5	3.5
Do not agree	6	9.5	-3.5
Total	19	–	–
Test statistics			
Chi-Square		2.579[a]	
Degrees of freedom		1	
P-value		0.108	
Exact significance		0.167	
Point probability		0.104	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The value frequency expected in the test was 9.5 and the value frequency observed was 13 for convergent and 6 for divergent respondents. The χ^2 test was equal to 2.579 for gl = 1 and p-value = 0.108. Based on the results presented by χ^2, a trend can be identified of capital providers who do not reject the concept presented by the IIRC, as the value frequency observed by those categorized as convergent was higher than the expected frequency. Although the test indicates a trend between the IIRC concept and the financial capital providers' expectations, this trend was not statistically significant as the p-value was higher than 5%. Thus, h_1 that financial capital providers agree with the concept of materiality the IIRC presented for IR cannot be validated.

Most financial capital providers agreed that they were the main stakeholders in IR. Among the arguments they agreed with, some capital providers drew attention to the fact that the Global Reporting Initiative (GRI), through its sustainability report, also guided its concept of materiality to first consider the investors. The providers who were opposed argued a greater participation of the other stakeholders. In this respect, the sender Element Investiment (2013) suggested that the materiality definition process should properly include all key stakeholders interested in the organization, without privileging the capital providers only.

The fact that investors mostly agree with the concept of materiality proposed for IR makes the argument of Flower (2015) and Thomson (2015) gain support, that is, the IR sought to privilege capital providers in its development. This group predominantly agreed with the proposed concept. The fact that it is not statistically significant may lie in the fact that the financial capital providers who witnessed that their interests had already been covered in the IR draft did not have sufficient stimuli to perform lobbying.

4.1.2 Report Preparers

On h2, the report preparers proved resistant to the IIRC concept of materiality. Eighty-two senders were considered who identified with this category. The geographic regions of these report preparers were 4% Eastern Europe, 5% Africa, 5% Oceania, 9% Central and South America, 11% North America, 17% Asia, 20% Global and 30% of Western Europe.

Table 2
Financial statement preparers

Agreement	Observed Number	Expected Number	Residue
Agree	28	41.0	-13.0
Do not agree	54	41.0	13.0
Total	82	–	–
Test statistics			
Chi-Square		8,244[a]	
Degrees of freedom		1	
P-value		0.004	
Exact significance		0.005	
Point probability		0.003	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The expected frequency for the test was 41 and the observed frequency was 54 cases as divergent against 28 convergent. The χ^2 test corresponded to 8.244 for gl=1 and p-value= 0.004. Hence, a statistically significant trend can be attributed to the preparers to reject the IIRC concept for IR, thus validating h_2. As the difference the report preparers presented for the IIRC materiality concept was statistically significant, a second analysis was elaborated to identify, among the divergent preparers, if they presented a predominant justification to oppose what the IIRC had presented.

Table 3
Justification presented by financial statement preparers

Justification	Observed Number	Expected Number	Residue
Economic	9	27.0	-18.0
Conceptual	45	27.0	18.0
Total	54	–	–
Test statistics			
Chi-Square		24,000[a]	
Degrees of freedom		1	
P-value		0.000	
Exact significance		0.000	
Point probability		0.000	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

Among the 54 preparers who disagreed from the concept in the IR draft, 17% presented economic justifications, while 83% justified the disagreement conceptually. The expected frequency was 27 for both cases and the observed frequency was nine economic justifications and 45 conceptual justifications. The χ^2 test corresponded to 24.00 for gl=1 and p-value= 0.000, which reveals a trend among the report preparers who oppose the IIRC concept to adopt a conceptual justification.

And what the content of the divergence is concerned, as observed, among the 54 divergent preparers, 46 senders (or 85%) wanted a concept that better attended to the other stakeholders, besides the financial capital providers, while eight senders who disagreed, equivalent to 15% of the divergent preparers, lobbied in search of a concept closer to what Fasb and Iasb presented.

Table 4
The preparers argued that the concept better contemplates:

Beneficiaries	Observed Number	Expected Number	Residue
Investors	8	27.0	-19.0
Other stakeholders	46	27.0	19.0
Total	54	–	–
Test statistics			
Chi-Square		26,741[a]	
Degrees of freedom		1	
P-value		0.000	
Exact significance		0.000	
Point probability		0.000	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The test considered the observed frequency for the divergence content of 27 for both cases and the χ^2 obtained was 26.741 for gl = 1 and p-value = 0.000. Thus, most of the preparers, by diverging from the concept of materiality presented by the IIRC, used conceptual justifications and had as objective that the concept of materiality contemplated better the other stakeholders, besides the suppliers of financial capital.

The result shows that most of the preparers did not agree with the concept of materiality, so they suggested changes to better contemplate the stakeholders. The sender The Media Group (2013) suggested that section 3.24 of the draft IR document be rewritten, stating that a topic is material when it is considered as such by senior management, financial capital providers and other stakeholders. Among the respondents who disagreed with economic justifications, they informed that the capital providers may disregard certain information that in the future may affect the company's value creation for other stakeholders.

This result is different from what was stated by Ling and Mower (2013) that firms were resistant to disclose more financial information. It is similar to what was argued by Reuter and Messner (2015) though, in that, as IR is not regulated, not necessarily implying legal and economic consequences, only the preparers who adopt a sustainability agenda would have a stimulus to participate in the IR drafting process. Beck, Dumay and Frost (2017) argue that the preparers tend to agree to defend the interests of other stakeholders as a form of legitimacy towards society, IR being the instrument for that visibility. Zhou, Simnett and Green (2017) and Gibassier, Rodrigue and Arjaliès (2018) skeptically evaluate the interest of companies in defending the other stakeholders. For them, organizations can implement IR without there being any integration among the different parts of the company, a myth companies accept and disclose to achieve benefits such as a lower cost of capital.

4.1.3 Stakeholders and materiality

In this session, it was analyzed whether the other stakeholders, excluding the financial capital providers and report preparers, disagree from the concept of materiality presented by the IIRC. The other stakeholders are 114 senders and their percentages were: 1% labor representatives, 2% accounting professionals, 5% market analysts, 6% other users, 6% policy makers, regulators and standard setters, 7% individual financial capital providers, 10% academic, 11% guarantee providers, 11% non-governmental organization, 12% professional bodies - Accounting, 14% class entity - others and 15% others. The geographical regions of these senders were 4% Eastern Europe, 4% other regions, 5% Africa, 6% North America, 8% Oceania, 10% Central and South America, 14% Asia, 15% Global, 34% Western Europe.

Table 5
Do the other stakeholders agree with the materiality concept presented by the IIRC?

	Observed Number	Expected Number	Residue
Agree	51	57.0	-6.0
Do not agree	63	57.0	6.0
Total	114	–	–
Test statistics			
Chi-Square		1,263[a]	
Degrees of freedom		1	
P-value		0.261	
Exact significance		0.303	
Point probability		0.080	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The expected frequency for the test was 57 for both cases; the observed number of divergent stakeholders was 63, while the observed number of convergent stakeholders was 51. The χ^2 test was 1.263 for gl = 1 and p-value = 0.261. The result points to a tendency for other stakeholders not to agree with the IIRC concept of materiality, but this trend was not statistically significant. Thus, despite the trend, h3 that there is no difference between the IIRC concept of materiality and what was presented by the other stakeholders cannot be validated.

Finally, in relation to materiality, an χ^2 test was performed with all 215 senders. This test considered all senders as belonging to a single group. Thus, lobbyists were not separated into stakeholder groups or sector. The goal in treating all stakeholders, including financial capital providers and reporting preparers in a single test, disregarding the interest group they belonged to, was to check whether, in general, there was a statistically significant trend to differ from the IIRC concept of materiality for Q11.

Of the total of 215 senders, 38% were report preparers, while the second group of stakeholders, which most practiced lobbying, included 9% financial capital providers, 7% professional bodies - Others, 7% professional bodies - Accounting, 6% guarantee providers, 6% non-governmental organizations, 5% academic, 4% individual, 3% policy makers, regulators and standard setters, 2% market analysts, 1% accounting professionals, 1% labor representatives, 11% others.

Table 6

Did the stakeholders generally disagree from the materiality concept presented by the IIRC?

	Observed Number	Expected Number	Residue
Agree	92	107.5	-15.5
Do not agree	123	107.5	15.5
Total	215	–	–
Test statistics			
Chi-Square		4,470[a]	
Degrees of freedom		1	
P-value		0.034	
Exact significance		0.041	
Point probability		0.080	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The expected value for both cases was 107.5; the observed value for convergent was 92 senders and for divergent 123. The χ 2 test was equal to 4.470 for gl = 1 and p-value = 0.034. Thus, there was a statistically significant tendency among stakeholders to respond to Q11 only when the sender did not agree with the concept of materiality presented by the IIRC.

When analyzing all the results together, there are signs that the senders were stimulated to practicing lobbying at the IIRC on the concept of materiality because they did not agree with it. The predominant stakeholder group in this lobbying process, was the report preparer, which consists largely of companies; the dominant justification presented was conceptual and focused on a notion of materiality that better contemplated the other stakeholders.

These results are in line with the findings of Sutton (1984), who states that report preparers tend to be the group sending the largest number of letters, preceding the financial capital providers. Reuter and Messner (2015) argue that the incentive of organizations to participate in the elaboration of IR was because they had a sustainability agenda in order to contemplate the other stakeholders and not only think about economic ends. Cho, Laine, Roberts and Rodrigue (2015), however, argue that what motivates companies to voluntarily contemplate their stakeholders is that they can manage possible conflicts among them. Thus, Cho *et al.* (2015) agree with Bewley and Li (2000) because, for them, the goal of preparers is to disclose in a report or in a set of reports as little information as possible that is able to satisfy the needs of most of their stakeholders or at least of the most important stakeholders in a concept of organized hypocrisy they develop.

4.2 Responsibility for IR

The result obtained from the positioning adopted by each group of stakeholders regarding the accountability of the information presented in the IR was divided and discussed in topics according to the group considered.

4.2.1 Lobbying by preparers

In this topic, the response given by the preparers about Q17 will be analyzed, in which the IIRC sought to hold the organizations' governance accountable for the information in the IR. The hypothesis to be validated will be h_4, in which most companies were resistant in holding governance accountable for the information in the IR. Of the 200 respondents who answered this question, considered by this study, 71 described themselves as report preparers, companies.

The economic sector these companies belonged to was 1% health, 1% telecommunications, 3% services, 3% oil and gas, 3% technology, 6% consumer goods, 7% basic materials, 7% utilities, 15% financial sector, 15% industries, 39% others. The geographic region they belonged to was 3% Eastern Europe, 3% other, 4% Africa, 4% Oceania, 10% Central and South America, 10% North America, 15% Asia, 20% Global, 31% Western Europe.

Table 7
Most companies resisted holding their governance accountable

	Observed Number	Expected Number	Residue
Agree	38	35.5	2.5
Do not agree	33	35.5	-2.5
Total	71	–	–
Test statistics			
Chi-Square		0,352[a]	
Degrees of freedom		1	
P-value		0.553	
Exact significance		0.635	
Point probability		0.159	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The expected frequency was 35.5 for both cases, with an observed frequency of 38 for convergent and 33 senders for divergent. The χ^2 test corresponded to 0.352 for gl = 1 and p-value = 0.553. The validation of h4 is not possible, on the contrary, it was not statistically significant. The tendency among the sample firms was to agree to hold their governance accountable for the information in IR.

The companies that agreed adopted a posture similar to Port Metro Vancouver (2013), as they considered that including a governance statement would help ensure an accurate and reliable view of how the organization creates value, including accountability. On the other hand, the companies that disagreed reported something similar to Alianz SE (2013) when it states that an actual integration among the reports would cover the financial report provided to local governments, and the responsibility for this report is already attributed to corporate governance.

Then, h5 was tested to identify whether firms prone to a higher level of pollution were resistant to holding governance accountable for the information in IR. Of the 71 senders considered in h4, 25% or 18 companies belonged to sectors more prone to pollution, being two companies from the oil and gas sector, five from basic materials and 11 industrial.

Table 8

Position of polluting companies to hold their governance accountable for the information in the IR

	Observed Number	Expected Number	Residue
Agree	8	9.0	-1.0
Do not agree	10	9.0	1.0
Total	18	–	–
Test statistics			
Chi-Square		0,222[a]	
Degrees of freedom		1	
P-value		0.637	
Exact significance		0.815	
Point probability		0.334	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The expected frequency was nine for both cases, the observed frequency being eight for convergent and 10 for divergent senders. The χ^2 test was 0.222 for gl = 1 and p-value = 0.637. A trend could be verified among companies more prone to pollute in being resistant to holding their governance accountable. This trend was not statistically significant though, which leads to the rejection of h_5.

When analyzing h_4 and h_5 together, even though both were not statistically significant, a divergent trend could be verified between the two hypotheses. While h_4, which has firms from different sectors, including those prone to pollution, tends to hold corporate governance accountable for information contained in IR, for h_5, which include only those companies most likely to pollute, the trend observed was not to hold governance accountable for the information contained in IR. These divergent trends raise clues as to what Bewley and Li (2000) argue, in that firms with higher pollution risk tend to give more general, less material information and are more resilient in holding the organization accountable.

4.2.2 Lobbying by accounting firms

With regard to the positioning adopted by accounting firms, h6 aimed to identify whether they agreed to hold the governance of their potential clients accountable for the information in IR. The number of senders classified as Accounting companies, organizations or professionals was 27 senders. The geographical distribution of this group was 4% Central and South America, 4% Eastern Europe, 4% North America, 7% Africa, 10% Oceania, 11% Asia, 30% Western Europe and 30% Global.

Table 9

Accounting professionals agreed to hold the company governance accountable for the information disseminated in the IR

	Observed Number	Expected Number	
Agree	21	13.5	7.5
Do not agree	6	13.5	-7.5
Total	27	–	–
Test statistics			
Chi-Square		8,333a	
Degrees of freedom		1	
P-value		0.004	
Exact significance		0.006	
Point probability		0.004	

a. 0 cells (0.0%) have expected frequencies lower than 5. The minimum expected frequency is 9.5.

Source: research data (2017)

The expected frequency was 13.5 for both cases. The observed frequency for the convergent was 21 senders, against only six for divergent. The χ^2 test was equal to 8.333 for gl = 1 and p-value = 0.004. Thus, it can be affirmed that there is a statistically significant trend in the Accounting group to agree with the IIRC by holding corporations accountable, which leads to the acceptance of h6.

Accounting professionals, by agreeing to hold governance accountable, adopted justifications similar to ERM CVS (2013) when it argued that the statement of responsibility would raise IR to the same level as the annual reports. BDO Ukraine (2013), in addition to agreeing, informed that the adoption and accountability of corporate governance in more progressive parts of the world would help to accelerate the process of accountability in Ukraine. Thus, accounting firms have not only agreed to hold corporate governance accountable, but they expect IR to become a global trend.

As accounting professionals and companies in general tended to hold corporate governance accountable for the information in IR, further analysis of this sign was due - to analyze whether companies in general and accounting professionals hold the same position is important because Georgiou (2004, 2002) argued that accounting professionals will agree with the opinion defended by the report preparers, who are their clients. Thus, a χ 2 test of Independence was carried out, through which we tried to identify if there is a positive association between what the preparers and the accounting professionals defended, addressing the following statistical hypothesis:

h_a1: *Agreeing on governance accountability for information in IR depends on whether the group consists of preparers or accounting professionals.*

Hypothesis 1 defends that the act of agreeing to hold company governance accountable depends on whether the sender belongs to the preparers or accounting professionals. The non-rejection of ha1 will confirm what was presented by Puro (1984), in that Accounting professionals will lobby in an opposite sense to their clients when there is a possibility of increasing demand for their audit or consulting services.

h_a0: *Agreeing with governance accountability for the information in IR does not depend on whether the stakeholder group consists of preparers or accounting professionals.*

Conversely, h_a0 states that it does not matter if the sender belongs to the group of preparers or accounting professionals. They will both agree to hold corporate governance accountable for the information in IR. If it does not reject ha0, the result will point to the finding by Georgiou (2004, 2002), that is, preparers and accounting professionals tend to defend the same objectives during lobbying.

Table 10

		Positioning		Total
		Agrees	Does not Agree	
Stakeholders	Accounting professionals	21	6	27
	Financial statement prepares	38	33	71
	Total	59	39	98
χ^2 = 4,804a	gl = 1		P-value = 0.028	

Source: research data (2017)

The result of the Independence test was $\chi^2 = 4.804$ for gl = 1, the p-value was 0.028, being significant at 5%. The result leads to the rejection of ha0 and the acceptance of ha1, i.e. agreeing to hold the company's governance accountable for the information in IR depends on which stakeholder group the sender belongs to: preparers or accounting professionals. Reuter and Messner (2015), in reviewing lobbying in the first stage of IR, identified that these two groups agreed on most issues. As, in the Discussion Paper stage, analyzed by Reuter and Messner (2015), no specific question was presented as to who would assign responsibility for the information disclosed in IR, it could not be identified if there was a difference among the preparers or Accounting between the Discussion Paper process and the Consultation Draft.

The fact that many preparers did not agree with the accountability causes Stubbs and Higgins's argument (2018) to gain momentum, and it is desirable that the world's major stock exchanges encourage the use of IR by seeking more preparers to become supporters and, later, to advance in its compulsoriness.

5. Conclusion

This article verified the responses the various stakeholders sent to the IIRC about the concept the entity presented for materiality and who should be held accountable for the information in the IT. The objective of this study was to verify which stakeholder groups agreed with the measures and concepts under discussion for IR and which groups disagreed, in addition to the justifications presented by those who differed. This analysis is important to identify whether the concept of materiality and the validity of IR information met the concept expected by its target audience, providers of financial capital, and whether other stakeholders also agreed with the proposal presented. Therefore, the comment letters sent to the IIRC in the Consultation Draft were analyzed, being the final stage of public consultation for the elaboration of the IR.

As authors such as Gray and Bebbington (2000) argue in favor of the concept of materiality not from the viewpoint of financial capital providers, but from the point of view of all stakeholders, and as Flower (2015) and Thomson (2015) followed this concept to criticize the IIRC's definition of materiality, it became necessary to verify whether the financial capital providers themselves agreed with the concept of materiality presented by the IIRC. In this respect, the results found in this study pointed out that, in fact, the financial capital providers tend to agree with the IIRC's concept of materiality.

This study found that the report preparers, a group of companies from different sectors, did not agree with the concept of materiality presented by the IIRC because they considered that this concept did not satisfactorily consider other stakeholders. Most of the justifications coming from this group were conceptual, trying to influence the IIRC.

In analyzing the position defined by the other stakeholders for the concept of materiality, this study found that, contrary to the financial capital providers' trend, other stakeholders tended to oppose the concept of materiality presented by the IIRC. Similar to the providers of financial capital, however, the other stakeholders did not form a statistically significant majority as regards the trend of the position argued.

Regarding the responsibility for the information contained in the IR, this article concluded that the companies that sent letters to the IIRC were generally open to holding their governance accountable for the information contained in IR, but that the senders belonging to that group did not agree with statistical significance in this regard. When analyzing the companies with the highest propensity to pollute, however, the tendency was the opposite, with companies in the chemical, oil, pulp and paper and primary metals industries being more resistant to holding the organization's governance accountable for the information in IR. These findings were in accordance with Bewley and Li (2000) and Li *et al.* (1997).

Concerning the Accounting firms, they took a statistically significant position by agreeing to hold organizations accountable for the information contained in IR. This result goes against what was argued by Jorissen *et al.* (2012), in that companies and accounting professionals tend to do lobbying in the same sense as their clients; and agrees with Puro (1984) in that organizations and accounting professionals will lobby in order to increase their demand for work.

Thus, this paper concludes that the financial capital providers supported the IIRC's suggestions for IR regarding materiality and accountability for IR information. The capital providers' support is important to the success of IR, as they will be the primary users of the report, although they do not exclude other stakeholders in principle. IR, through its capitals, provided the possibility for minority investors to have new information that financial reports had not previously covered. On the other hand, the companies supported the IR initiative, hoping that it would better address the stakeholders and sustainability issues. Companies, by accepting IR and wanting to better engage stakeholders, can be seen as a means of seeking public legitimacy. The legitimacy gained by IR would enable a lower cost of capital for companies, as well as an increase in value for the company, if the market judges that the information reported was relevant to decision making.

The contribution made is to demonstrate what was discussed by Flower (2015), Thomson (2015), Stubbs and Higgins (2018) and Gibassier, Rodrigue and Arjaliès (2018) that, in its conception, IR was designed to meet, first, the financial capital providers, pushing the interests of groups more focused on sustainability into the background. Stakeholders did not see their interests represented in the capital providers, which is why they disagreed from the concept of materiality. As the other stakeholders have not been represented since the conception of IR, it is coherent to state that the integration sought and exposed in the concept of materiality was not understood as something broad, therefore being something that was not fully integrated. Thus, if the concept of materiality was not integrated or was still moving towards full integration, it would be easy for a company to legitimize and increase its value, as it would not require major operational changes at the onset.

The limitation of this study lies in the fact that it does not consider all the issues present in the Consultation Draft, besides not analyzing the lobbying exercised throughout the elaboration process of IR. As a suggestion for future research, it is advisable to verify the lobbying based on the sender's perception about the concept of capitals and business model the IIRC presented at the time the IR was elaborated.

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REPeC, Brasília, v. 12, n. 3, art. 7, p. 385-404, Jul./Sep. 2018
Available online at *www.repec.org.br*
DOI: http://dx.doi.org/10.17524/repec.v12i3.1899

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

Analysis of the Occurrence of Machiavellian and Narcissistic Discourse in the Management Reports of Firms Involved in Financial Scandals

Abstract

Objective: This paper's motivation is to study the existence of words that display linguistic traits of Machiavellianism and Narcissism in the discourse of company leaders who are involved in corruption scandals in Brazil, in the light of Upper Echelons theory.

Method: We analyzed the discourse of the leaders in the annual report of the companies Odebrecht S.A. and OAS S.A. The leaders studied are involved in fraudulent negotiations detected by *Lava Jato* Operation, an investigation carried out by the Federal Police of Brazil. The methodological procedures are based on the three-dimensional framework of discourse: text, discursive practice and social practice.

Findings: The results suggest that the use of words such as "our", "strong", "development", "great", "larger", "president", "confidence" and "values" imply narcissistic traits. The semantic analysis of the acts of discourse, though, displays machiavellian traits.

Contribution: We hope to instigate studies that focus on social changes deriving from the delivery of the referred discourse, and that they may incite, in the main users of the information in the companies' management reports, the recognition of discourse that mask the organizations' actual situation, with the purpose of generating personal and business profits, disregarding concerns with the damages society may face.

Key Words: Narcissism; Machiavellianism; Leaders' Discourse; *Lava Jato* Operation

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Published in Portuguese and English. Original Version in Portuguese.

Received in 7/5/2018. Ask to Revise on 8/15/2018. Resubmitted on 9/3/2018. Accepted on 9/18/2018 by Dr. Gerlando Augusto Sampaio Franco de Lima (Assistant Editor) and by Dr. Orleans Silva Martins (Editor). Published on 9/28/2018. Organization responsible for the journal: Abracicon

1. Introduction

The discourse of top executives of Brazilian companies is not always consistent with the dishonest practices revealed by *Lava Jato* (Car Wash Operation), which investigates corruption in Brazilian companies that over-invoice the negotiations to get contracts and favor politicians and managers involved in illicit transactions. According to Vladimir (2016), it is a life-changing operation that has shed light on the biggest financial scandal in the country's history, with long-term economical and financial consequences, inspired by the "Mãos Limpas" (Clean hands) Operation that disrupted Italy in 1990.

The operation was started after the arrest of the black-market money dealer Alberto Youssef, on March 17, 2014. The plea bargains allowed the Public Federal Ministry and the Federal Courts of Justice to get to know the involvement of countless politicians and companies in the corruption scandals, including OAS S.A. and Odebrecht S.A. The operation has been bringing down political barriers, through the work of the federal judge Sérgio Moro, who has been authorizing the arrest of white-collar executives, such as Léo Pinheiro and Marcelo Odebrecht (Vladimir, 2016).

Those white-collar crimes have been related to the executives' personality. Collins and Schmidt (1993) and Blickle, Schlegel, Fassbender, and Klein (2006) highlighted that the most frequent authors of so-called white-collar crimes are managers who display dark personalities. The strongest traits of Narcissism, for instance, are clearer in executives who committed white-collar crimes than in non-criminal executives (Blickle *et al.,* 2006). The leaders who have more Machiavellian traits, though, display cynicism, lie, use strategies to deceive and persuade their subordinates, aiming to obtain personal resources (D'Souza, 2016).

Those dark personality traits have inspired researchers to investigate the linguistic traits of Narcissism highlighted in letters from CEOs (Craig & Amernic, 2011; Chatterjee & Hambrick, 2007), investment decision (Dworkis, 2013), leadership capacity, creativity, ability to attract followers and business vision (John & Robins, 1994; Farwell & Wohlwend-Lloyd, 1998; Maccoby, 2004), the predisposition of Machiavellian leaders to manage results (Vladu, 2013; Shafer & Wang, 2011), the charismatic, ideological and pragmatic kind of leadership (Bedell, Hunter, Angie & Vert, 2006; Deluga, 2001), excess confidence in making business decisions (Jain & Bearden, 2011), frauds in financial reports (Murphy, 2012), budget lines maneuvers (Byington & Johnson, 2011; Hartmann & Maas, 2010) and organizational citizenship behavior (Belschak, Hartog & Kalshoven, 2015). It is important to consider that the studies that analyze the personality traits of Narcissism and Machiavellianism in the organizational environment consider concepts that come from social psychology, are non-pathological and are supported by the Upper Echelons Theory (Hambrick & Mason, 1984; Hambrick, 2007), which argues that the executives' choices are influenced by their own personalities, values and experiences.

The executives' personality, values and experiences constitute their conception of the world (ideology), which is expressed through their discourse – and that explains the interest in examining the discourse of the leaders involved in the financial scandals in Brazil. According to the Social Theory of Discourse by Fairclough (1992), which understands discourse as text, discursive practice and social practice, there are three meaningful language functions that allow us to understand its analysis: identity, relational and ideational. The first one refers to the way the social identities are manifested in discourse; the second to how the social relations among the people from a group are represented; and the third expresses the ways in which the texts denote the world.

Following this line of thinking, this paper aims to clarify the following research question: are there evidences of vocabulary or phrases that reveal the linguistic traits of Machiavellianism and Narcissism in the discourse of the leaders of the companies OAS S.A. and Odebrecht S.A., who are involved in the corruption scandals deflagrated by the *Lava Jato* Operation (Car Wash Operation) in Brazil? To do so, we will examine the occurrence of vocabulary that reveals linguistic traits of Machiavellianism and Narcissism in the discourse of the leaders of the companies involved in the corruption scandals in Brazil.

This investigation is relevant in the Brazilian and international context because it highlights results that will allow anyone interested in those results and in the corporate and personal performance of executives to discover and assess linguistic traits of dark personalities. We also believe that this investigation can foster the discussions about the discourse performed, inciting a more argumentative attitude in the reader in what concerns the intentionality, arguments and linguistic strategies used to persuade, mainly in the texts produced by leaders.

This paper has five sections: the first one is this introduction; the second section presents a theoretical platform that debates personality traits and the Upper Echelons Theory; in the third section, the empirical-theoretical methodological approach is presented, with a qualitative design; the fourth section contemplates the results analysis, and finally, in the fifth section, the conclusions of the investigation are expressed.

2. Theoretical framework

In this section, we address the discourse as a mark of subjectivity. Furthermore, we present the conceptual characteristics and literature review on the personality traits of Machiavellianism and Narcissism.

2.1 Discourse as a mark of subjectivity

The composition of the discourse expresses the way the individual conceives the world and it is an identifying mark of this individual. Whether it is spoken or written, the text reflects the relationships established through social groups the individual interacts with, the situation in which they are produced and their identity, and that is why this discourse has sociolinguistic and psycholinguistic marks.

The interference of the social context (Fairclough, 2003) and of psychological elements in the textual production is discussed by van Dijk (2008) and Minayo (2002), who understands that "not only the investigator gives sense to their intellectual work, but also the human beings, the groups and the societies that attribute meaning and intentionality to their actions and constructions". Similarly to the scientific text, the other textual genres maintain a meaningful relation with the social and psychological context because they reflect ideologies that are intrinsic to the individual who produces them. Thus, an individual's perspective of the world is connected to his/her language and it is through language that, consciously or unconsciously, ideas come to life, constructing the composition of discourse.

Among the approaches to language ideology presented by Woolard (1992), there is one that interprets discourse as an ideological tool that maintains relations of power and dominion – what we say is determined by our thoughts. Gouldner (1976) and Thomson (1984) also consider that language exhibits ideology and it is a way to perceive the situations and the opinions about an object or circumstance. For these authors, ideology emerges from the discourse in a conscious way, that is, "part of consciousness which can be said" (Thompson 1934, p. 85). For Althusser (1971), Friedrich (1989) and Eagleton (1991), ideology is unconsciously propagated in the relations between social subjects through the values that emerge from the language and the dominant cultural system. Whether consciously or unconsciously, we believe that, as long as the individuals interact socially, they pervade and are pervaded by ideological concepts that constitute the rhetoric of their discourses, in which the statements reflect solidified and/or altered positions due to these interactions, their personalities and the intentions of the discourse.

In Fairclough (1992), language is not made of independent signs, but of a network of decipherable marks of what it is meant to say; in Van Dijk (2008), language reveals the position of the individuals in the face of life and of what they do. Despite belonging to different historical-social moments, one can infer that the conception of those writers are tangent in what concerns the individuality of discourses or the intentionality of the individual who produces it, reflected in the constituent marks.

In Fairclough (1992), the discourse is conceived three-dimensionally: text, discursive practice and social practice, based on his Social Discourse Theory. In this investigation, this theory is used as the methodological framework – every dimension is explained through linguistic categories that permit inferences about discourse, linking it to the context it is inserted in. The concept of the term discourse is associated to language as social practice, which means a way of acting, representing and signifying. Thus, individuals maintain the discourse out of the text, expressing their attitude, intention and power of persuasion through argumentations, without considering if they are true or not.

2.2 Narcissistic and Machiavellian personality traits

2.2.1 Narcissism

In Freud's point of view (1914, p. 10), Narcissism indicated "[…] the behavior in which the individual treats the body as a sexual object, by touching and caressing it with sexual pleasure, until full satisfaction is obtained through those acts". The author treated Narcissism as a psychological condition, with distinctive characteristics of self-love, selfishness and an ability to unconsciously maintain any kind of information or feeling that could diminish the sense of self.

Clearly, the myth that recalls the legend of Narcissus marked the conception that individuals with narcissistic personality traits are in love with themselves. Arrogance, an abnormal level of high self-esteem, a pronounced need for praise and admiration, superiority, exploitation, vanity, self-sufficiency, authority and exhibitionism are evidences of this personality trait (Raskin & Terry, 1988; Judge, Piccolo & Kosalka, 2009).

In the corporate environment, the narcissistic trait is investigated from the perspective of social psychology, concentrating on the individuals' predisposition to certain attitudes or dark leadership behaviors that might be positive or negative to the organization (D'Souza & Jones, 2017; D'Souza, 2016; D'Souza & Lima, 2015).

Dworkis (2013) signalizes that characteristics such as exploitation, vanity, sense of right and exhibitionism may generate adverse consequences in a group or at an organizational level. The exploitation may lead to dysfunctional behavior, such as lack of control observance or the will to deceive or exploit. Vanity, though, may lead the managers to develop an exaggerated pride or self-confidence and attitudes of arrogance, manipulation, and self-promotion. The sense of right may result in a lack of sharing in the work environment and may decrease the managers' motivation, who do not see themselves as being properly compensated because they have a lasting feeling of privilege. Finally, exhibitionism may make the managers act or behave to call attention to themselves, which may disturb the flow of work and productivity.

In what concerns the analysis of the dark side, Rijsenbilt and Commandeur (2013) stress that CEOs who are truly narcissistic undertake actions that are challenging or daring to obtain praise and frequent admiration, which results in a high probability of harmful consequences for the organization. In the same line of thinking, Stein (2013) analyzes that even the leaders who are considered to be constructive narcissists may present latent problems that will only manifest in a late stage, which may be responsible for serious disturbances, especially during hard times, mainly due to the necessity of being in the limelight and due to their high, even delirious sense of their own capability.

Still on the perspective of the dark side, Craig and Amernic (2011) analyzed the words CEOs used in their annual reports through letters to shareholders. They are linguistic constructions that may reveal marks of a specific dysfunction in leadership, such as destructive Narcissism. The authors analyzed mail exchanges of three important companies on a global scale: Enron (2000), Starbucks (2005) and General Motors (2005).

The authors concentrated on reading 200 words in each letter, due to the rhetoric power on those words in the making of each message. For that analysis, linguistic traits of Narcissism were considered to be words such as, for example: "I", "We", "strong", "big", "fearing growth opportunity", "greatly", "easy growth", "high growth potential", "very well succeeded", "offers high prices to products and services", "powerful gains" and "leaves the competition behind". Strong traits of destructive Narcissism were found in the language used in the letters the CEOs of Enron and Starbucks addressed to shareholders, which were sustained by a grand and manipulative allusion to the companies' actual situation.

Using a similar method to Craig and Amernic (2011), Chatterjee and Hambrick (2007) studied the behavior of 111 CEOs, using criteria such as highlight in photographs of CEOs printed in annual reports and in the media, use of pronouns in the first person singular during interviews and compensation in relation to the executives with the highest payments in the company. Those observations were used to examine the effect of the Narcissism on the CEOs in the company strategies and performance.

The authors were not only concerned with uncovering the dark side, but also with positive aspects of the executives. In this investigation, they noticed a positive association of the narcissistic CEOs with greatness and strategic dynamism; a positive relation with the number and size of acquisitions, facts that cause extreme and floating organizational performances. The results suggest that the narcissistic CEOs favor daring actions that call attention and resulted in great victories or great losses.

In the analysis of the positive side of the characteristics of the narcissistic trait, Dworkis (2013) affirms that authority, self-sufficiency and superiority, for instance, are beneficial to the organizational performance of narcissistic leaders. The authors reaffirm that managers full of authority and self-sufficiency are good performers in most cases. Based on a better performance in the activities developed, the higher level of superiority strengthens the leaders' belief in their abilities and self-sufficiency.

The positive side was also analyzed by John and Robins (1994), Farwell and Wohlwend-Lloyd (1998) and Maccoby (2004), who denoted that narcissistic leaders present attitudes that show: leadership capacity, creativity, competence, innovation, strategic intelligence, business vision and ability to attract followers.

Narcissistic people manipulate financial reports to improve the company's financial situation, and especially their own, with the inherent intention of achieving self-improvement. On this matter, Buchholz, Lopatta and Maas (2014) evidenced that highly narcissistic CEOs are associated with earnings management based on accruals and real operating results, whose forms represent passports to bad managerial behavior. They also stress that CEOs with high levels of narcissistic personality do not only increase the profit by strategically using accounting choices, but also decrease gains, especially in their first two years on the job, in order to obtain later success. Despite limits on CEO turnover and succession, results suggest that they make strategic use of accrual-based earnings to improve their track record in following years.

2.2.2 Machiavellianism

The origins of the personality traits of Machiavellianism are found in the conceptions of the diplomat Florentino Niccolo Machiavelli, who visited the European courts and observed the rising and fall of their leaders. He wrote *The Prince* (Machiavelli, 1513/1966) to reconcile with the new governor. *The Prince* is a book of advice about how to conquer and remain in power. It is based on convenience, not being provided with trustworthy virtues, honor and decency. The book teaches that men are so simple and so willing to obey to immediate necessities that cheaters will never be short of victims to their schemes (Wilson, Near & Miller, 1996).

According to Machiavelli, a politician must be open to all and to any effective maneuver, including interpersonal manipulative strategies like flattery and lying (Jones & Paulhus, 2009). In the perspective of Judge *et al.* (2009), the book encouraged lies, manipulation, and elector persuasion, aiming to provide the leader with social and political power.

These views are supported by Vandenbos (2007) when it is affirmed that Machiavellianism reveals calculating attitudes. The machiavellian sees the others as manipulated beings, characterized by dexterity, manipulation, as well as the usage of any necessary means to reach a goal of political nature.

Machiavellianism was defined as a personality trait by Christie and Geis (1970), based on studies that resulted in the personality inventory The *Mach-IV*, widely used in scientific research, written after observing the writings by Machiavelli and composed of three factors: tactics, human vision and morality. Jones and Paulhus (2009) support the idea that machiavellians are manipulative and strategic, with a predisposition to adopt management tactics aiming at meeting goals and reaching personal objectives to achieve personal gains.

Studies in the organizational environment revealed that leaders prominent in Machiavellianism are involved in earnings management decisions (Vladu, 2013; Shafer & Wang, 2011), are excessively confident about making decisions (Jain & Bearden, 2011), are likely to deceive and fraud financial reports (Murphy, 2012), to mask budget lines (Byington & Johnson, 2011), to create budgets (Hartmann & Maas, 2010) and adopt abusive supervision and authoritarian leadership (Kiazad, Restubog, Zagenczyk, Kiewitz & Tang, 2010).

Bedell *et al.* (2006) investigated 120 leaders in organizations in all sorts of businesses – political, military and religious institutions. The authors used biographies to evaluate twelve general performance measures, as well as twelve general controls and five specific controls of communication. The results showed that the levels of Machiavellianism differ among the different kinds of leadership. It confirms the relation between Machiavellianism and charismatic, ideological and pragmatic leadership. This result is supported by Deluga (2001) by highlighting the similar traits of Machiavellianism and charismatic leadership, including the high levels of behavioral expressive activity, self-confidence, emotional control and willingness to influence others.

Belschak *et al.* (2013) ventured in the investigation of the relation between the machiavellian leadership style and the involvement in positive doings, such as organizational citizenship. It was noticed that positive (cooperative and pro-social) behaviors were found not only when they were beneficial to them. The authors also realized that those individuals are capable of experiencing high levels of intrinsic work motivation, which is related to showing pro-organizational practices. Hartog and Belschak (2012) emphasize, however, that the positive effects in the behavior of the ethical leader are liable to be suppressed when leaders are highly machiavellian.

In focusing on the leading traits of Machiavellianism, Jones and Paulhus (2011a) brought evidence of the strategy and tactics of rational decision making, by considering all the costs and benefits of problem solutions. On the other hand, machiavellians are manipulative strategists, with a pragmatic ethical sense and tendency to use tactics aimed at reaching their own goals and obtaining personal gains (Jones & Paulhus, 2009). Furthermore, these individuals are more susceptible to fraud if they have the opportunity, especially due to the lack of guilt in the face of unethical behavior. When analyzing the relationship between Machiavellianism and unethical behavior, Murphy (2012) investigated rationalization as being one of the three characteristics that compose the triangle of frauds (opportunity, pressure and rationalization), and found that this relationship presupposes the existence of false declarations in financial reports.

Byington and Johnson (2011) demonstrated machiavellian individuals' tendency to manipulate budget rubrics. Shafer and Wang (2011) noticed the relationship between machiavellian traits and earnings management . In this regard, Vladu (2013) brought to light that the machiavellian predisposition plays a central role in the decision on earnings management, as individuals with a high score on the machiavellian scale have less rigid views on the ethics of such a practice in the short term, considering this type of management to be ethically acceptable.

2.2.3 Analysis of the individual and team characteristics based on the Upper Echelon Theory.

By analyzing the narcissistic and machiavellian personality traits, individual characteristics and a superposition of characteristics are clearly observed. Figure 1 presents the illustration of the tangent and individual characteristics of each trait, further highlighted in the social psychology literature.

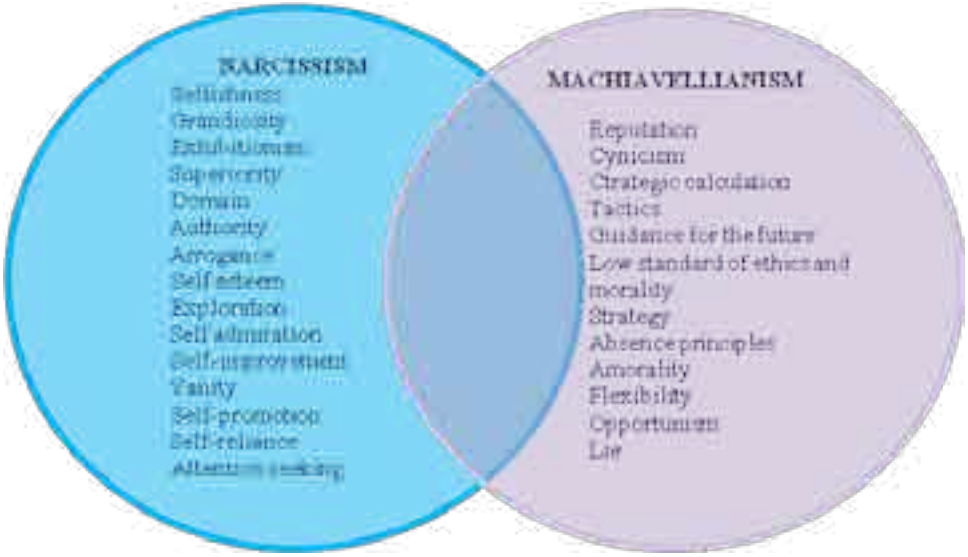

Figure 1. Key features of the Dark Triad personality traits

Manipulation, deceit, dishonesty and the ability to influence and convince are common characteristics in both traits; D'Souza (2016) emphasizes, however, that common characteristics have different objectives and degrees in each trait, especially when the analysis is done at different places and times. To the narcissist, those common characteristics induce to self-promotion, to the sense of superiority and greatness, authority, vanity and exploitation, shown through exaggerated selfishness. The machiavellian, though, aims for strategic and calculated decision making, with low ethical and moral standards, for the future.

The analysis of the personality traits in business leaders is supported by the Upper Echelons theory, enunciated by Hambrick and Mason (1984) and revisited by Hambrick (2007) who understood that the elaboration of a theoretical model that encompassed the characteristic of high executives would be a great contribution to future empirical research, due to the belief that those characteristics are reflected in the organizational results.

The theory enunciates that "the executives' experiences, values and personalities have great influence over their interpretation of the situations they face, and, therefore, affect their choices" (Hambrick, 2007, p. 334). This way, the personality traits exert important influence on the executives' attitudes and behaviors, as well as on the linguistic marks that constitute the range of their discourse. If the executives are marked by dark personality traits, they are more likely to engage in corrupt acts, consequently entailing losses for society.

In their studies, the previously mentioned authors emphasized the management characteristics that are visible, such as the baggage indicators that managers bring to diverse management situations. Characteristics such as age, occupation in the company, functional experience, upbringing, socio-economical background and financial position, considered to be important and complex to them, grant a psychological perspective on human behavior.

The Upper Echelons theory was directed not only to CEOs, but also to the study of managers' teams. That improves the understanding, in a more practical level, of the effectiveness of the theory in predicting why CEOs share tasks and, in a way, the power among other members of the team. In the authors' perspective, the demographical data, besides the relatively simple variables, may accurately predict strategies and performance levels.

Some CEOs work in generous environments, in consolidated strategic positions with capable subordinates, while others do not enjoy such a comfortable professional environment. Often, executives subject to strong labor demands are forced to use mental shortcuts and remember what they have tried or seen in past work. In other words, one's choices reflect one's origins and dispositions. On the other hand, executives who face minimum requirements at work may be more comprehensive in their analysis and decisions. Thus, their choices will be aligned with the objective conditions faced (Hambrick, 2007). The author considers these two moderators or variables as highly predictive and strongly associated with the central idea of the Higher Order Theory.

The initial study, conducted in 1984, gives scope and encourages researchers to empirically apply and broaden the scope of the theory through tests of new moderators and methods that are relevant to the proposal. For academic and organizational purposes, this will grant knowledge on the positive and negative effects of the power of senior executives and management staff on decision-making behavior.

Several studies about personality and personality traits used the Upper Echelons theory to support their beliefs in the organizational environment. Papadakis and Barwise (2002) noted the positive relation between personality and demographical profile as predictive in the strategic and decisive process of the teams of executive managers and CEOs. Abatecola, Mandarelli and Pogessi (2013) confirmed a close relation between CEOs' personality and strategic decision making. Nadkarni and Hermann (2010) highlighted that the individual personality is related to the performance and capability of CEOs to quickly adapt to environmental changes.

In what concerns the personality trait in the organizational environment, the Upper Echelons theory was used as theoretical basis in the studies of dynamism and greatness in corporate strategies in Chatterjee and Hambrick (2007); in the investigation by Dworkis (2013) about capital investment decisions; in the studies by Engelen, Neumann and Schmidt (2016) about entrepreneurial orientation and the performance of big technological companies; and in the investigations by Olsen and Stekelberg (2015) about tax policies adopted in companies.

3. Method

A methodological study was performed based on Fairclough's Theory of Social Discourse (Fairclough, 1992), which is somewhat related to the precepts of the Upper Echelons Theory. This study's approach is empirical-theoretical and the evaluation is qualitative and interpretative.

In this investigation, the discourses were analyzed specifically in the dimension of the text and of the discursive practice, because it is understood that there is no inflexibility in discourse examination, considering that text analysis and discursive practice may occur simultaneously or not, depending on the analyst's intention – there is no delimitation between description and interpretation in discourse analysis.

The investigation corpus consists of the texts of the leaders' discourse in the annual reports of Odebrecht S.A. (2012 to 2014) and OAS S.A. (2012), more specifically in the sections "president's message", "vice-presidents' messages", "chairman of the board's message" and "Director-President's message". The companies were chosen due to their involvement in the financial scandals, besides the accessibility of the information; whereas the choice of the sections with the leaders' discourse was based on the Upper Echelons Theory.

The "vocabulary" was verified in the text dimension (Fairclough, 1992) through the frequency and signified under the narcissistic conception. According to Craig and Amernic (2011), words such as "I", "We", "our", "strong", "bigger/biggest", "great", "better/best", "confidence", "values" and "growth" address narcissistic characteristics (superiority, greatness, selfishness, self-promotion, self-sufficiency and exhibitionism). The text dimension superimposes the discursive practice dimension when the "politeness" and the "ethos" were semantically examined.

According to Fairclough (1992), the "politeness" represents the power of the statements identified in the expressions of promises, requests and threats, among others. In a positive perspective, it can be affirmed that the politeness represents the desire for appreciation and approval of the image, but on the negative side the desire to maintain territories and reserves emerges. Those perspectives meet the narcissistic personality traits.

Maingueneau, who is cited by Fairclough (1992), brings the concept of "ethos" as some kind of social identity taken by the individual, which is linked to the speaker by the linguistic choices, revealing clues about the image in the discursive range. It is highlighted that the semantic analysis of the speech acts permitted both ratifying the existence of traits of Narcissism as well as to interpret the traits of Machiavellianism (cynicism, lie, strategy and low ethical and moral standards) according to the specifications in section 2 of this study.

In order to identify the linguistic terms that refer to narcissistic traits, the leaders' discourse was exported to NVivo 11 software. Next, the frequency analysis was performed, grouping "words derived" from the 24-most-used words with a minimal length of four characters. From the summary of the frequencies obtained, the words that did not make sense in the text were eliminated (they served as simple connectors). The frequency analysis was repeated, grouping "words derived" from the 25-most-used words. Then, the summary of the most frequent words was displayed as a word cloud. In the analysis of the sentences, NVivo 11 helped to categorize the acts of speech that served as "knots" – linking rings. Each "knot" creates a relation between the words or phrases (speech acts) and creates categories in NVivo -, which were labeled as: "OAS Narcissism", "OAS Machiavellianism", "Odebrecht Narcissism" and "Odebrecht Machiavellianism". Thus, each speech acts was systematically exported in the semantic examination of personality traits.

4. Results Analysis

In this study section, our interpretation of the discourse of OAS S.A. and Odebrecht S.A. leaders's is presented, which was part of their annual reports. The word clouds, elaborated through NVivo, provided the discourse analysis in the text dimension, and the analysis of speech acts ground the discourse analysis as a social practice – both based on the narcissistic and machiavellian personality traits.

First, the content of each annual report was analyzed, using the frequencies of words condensated in the clouds of OAS S.A.'s annual reports for 2012 and 2013. In the 2012 annual report, words like "our", "growth", "development", "acting", "expansion", "security", "acknowledgment", "president", "generation" and "satisfaction" were identified as words the leaders used frequently.

Figure 2. Leaders' word cloud - OAS 2012

It is important to consider that, in the analyzed context, the term "our" does not necessarily carry a collective or solidary meaning, considering that the image created by the leader of a company which is solid, safe, well-known in the market and which is growing only refers to the competent projection of the leader. This way of interpreting can be confirmed when the leaders affirm: "the sustainability practices are inserted in our daily life and in the company's DNA" – there is a personification of the organization in the sentence, which is justified in the absence of limits between the person who leads and the company managed.

When the narcissistic leader considers successful transactions, the achievement of excellent results and organizational development as personal successes, he starts to merge his natural person and his legal person. A non-critical/absent-minded attitude towards the argumentations used in the text of the reports may conduct the reader to a false idea of social concern and collective thought of the narcissistic leaders.

In view of those arguments, it can be affirmed that the vocabulary previously mentioned denotes intrinsic characteristics and narcissistic traits, as they reveal self-esteem, superiority, vanity, self-sufficiency, authority, sense of right and exhibitionism (Raskin & Terry, 1998; Judge *et al.,* 2009). The use of terms like "president" caught our attention, because it denotes a reference to the person of the leader, besides "acknowledgement" and "security" because they denote vanity, prepotency and exhibitionism.

As described in section 2, Dworkis (2013) understands that exhibitionism can create adverse situations to the organization and to the groups inside it, triggering absence of control and inclination to exploitation and frauds. The aspects of vanity, self-esteem, superiority, self-sufficiency, however, may configure excessive pride of oneself, arrogance, manipulation and self-promotion. It is noticed that fraud and manipulation are consequences of the depicted narcissistic traits, which suggest a link to the context of the financial scandals brought about in 2014, which OAS S.A. is part of.

In the previous paragraph, the personality traits connected to Narcissism were highlighted because we are interested in detecting potential fraudulent and manipulative leaders. It is worth highlighting that the selfish positions resulting from the absence of sharing in the organizational environment and some people's lack of motivation are some of the problems that can be created by detecting narcissistic, non-pathological traits in individuals in leadership positions. It cannot be affirmed that the fact that leaders have narcissistic traits characterizes them as harmful to the organization, but it can be inferred that such leaders have the necessary talent to perform harmful actions in contemporary organizations.

In the analysis of the leadership discourse present in the 2013 Annual Report of OAS S.A. (Figure 3), the words "our", "growth", "results", "enterprise", "president", "superior", "solutions" and "international" are identified as the most used in the text.

Figure 3. Leaders' word cloud - OAS 2013

When compared to the 2012 Report, some words are frequent in both texts ("our", "president", "growth", "more" and "investment"). As previously discussed, those words imply self-esteem and bring on entail a positive polarity for the discourse text. In some cases of leadership, there is an environment of high competitiveness, which seeks for the organization to get into the limelight because the organization is their projection.

According to Rijsenbilt and Commandeur (2013), the narcissistic individuals get involved in challenging actions to be admired and praised, besides the fact that they feel pleasure in testing their capability. Not losing sight of the positive aspects resulting from the narcissistic leaders (Farwell & Wohlwend-Lloyd, 1998; John & Robins, 1994; Maccoby, 2004), the risk the organization is exposed to is undeniable when it faces an environment of challenges to satisfy the ego of the leadership, mainly when it is immersed in a context of economic and political uncertainties, which is the case of Brazil.

Our inferences around the OAS S.A. leadership discourse became more evident when the word cloud in Figure 4 was analyzed, which represents the group of words more frequently used in the leaders' message in both reports (2012 and 2013). In these reports, the terms "our", "growth", "president", "strong", "results", "security" and "sustainability" stand out almost coincidently with the reports taken year by year.

The Annual Reports of Odebrecht S.A. for the years from 2012 to 2015 were also explored similarly to the reports of OAS S.A. At first, the word frequencies in the discourse were analyzed in the reports year by year.

Figure 4. Leaders' word cloud - OAS 2012 and 2013

Figure 5. Leaders' word cloud - Odebrecht 2012

Figure 6. Leaders' word cloud - Odebrecht 2013

Figure 7. Leaders' word cloud - Odebrecht 2014

Then, a cloud was made to group the most used words during the examined period. The results are practically the same as in the cloud obtained in OAS S.A.'s annual reports from 2012 to 2013 or in comparison with the company's current results.

Figure 8. Leaders' word cloud - Odebrecht 2015

The situation previously depicted is repeated in Figure 9, which was created based on the discourse Odebrecht S.A.'s leaders produced throughout the period analyzed (2012 to 2015).

Figure 9. Leaders' word cloud - Odebrecht from 2012 to 2015

The terms that stand out due to repetitive use are: "our", "development", "growth", "opportunities", "confidence", "investments", "great", "bigger/biggest", "better/best", "compromise", "president", "leaders", "opportunities", "values", "productivity", "perpetuity" and "quality". The discourse by Odebrecht S.A. expresses narcissistic traits not only due to characteristics similar to our descriptions, but also because it evidences a reflection closed in on the person of the leader – focused on self-confidence and pride in his actions.

To close off the analysis of the words, a word cloud was produced using all the annual reports of OAS S.A. and Odebrecht S.A as the corpus. The production of this cloud allowed us to support the presence of the narcissistic traits already shown in all the Figures.

Figure 10. Leaders' word cloud – OAS from 2012 to 2013 and Odebrecht from 2012 to 2015

Prior to that, we sought to ratify the narcissistic traits and highlight the machiavellian traits in the speech acts that emerged from the discourse in the corpus examined. We noticed that the expression "moment of expansion" in the 2012 yearly report of OAS S.A. highlights traits of Machiavellianism, as the date designates future orientation, similarly to Odebrecht S.A. when it says "we always set our eyes on the future. It is the pace we want to be at that determines our present action". This interpretation is ratified by other sentences in the report: "our businesses are enlarging in Latin America and Africa, where there has been expressive expansion" (OAS S.A.); "and the desire to always go further, taking new people and bigger development opportunities" (Odebrecht S.A.).

We can infer that, besides highlighting strategic views (tactics) and future expectations linked to the machiavellian trait, there are also narcissistic characteristics shown through expressions that bring a sense of positive politeness to the sentence: "enlarging in Latin America" and "the desire to always go further" and "bigger opportunities of development". The superposition of narcissistic and machiavellian traits is ratified here, highlighted by the intention to convince and influence others, the manipulation, the dishonesty and the lack of sensitivity, as shown in Figure 1.

In the sentence "in the past two years, OAS lived a period of strong growth, despite the global scenario of crisis. We ended 2012 with a liquid revenue of R$ 6 billion, consolidating our company among the leaders in construction in Brazil", as well as in the sentence "in a year marked by the deepening of a global economic crisis and by the outbreak of social and political tensions in many countries, the organization Odebrecht kept a trajectory of continuous growth, mainly motivated by the development rhythm in Brazil", we understand that there is a machiavellian trait, grounded in cynicism and in the deceit noticed in the semantic power of the sentence.

Our understanding of the sentences presented in the previous paragraph derives from the fact that OAS S.A. and Odebrecht S.A. constructed a discourse marked by distancing from the global economic context, especially because of the solidity in the organizations, a fact that signalizes attitudes of low moral and ethical standards, considering the involvement of these leaders in the financial scandals that caused significant losses to the public funds and to Brazilian society.

The logic we developed is confirmed in the following sentences, especially due to the evidence of a close relationship between these companies and the state, affirming a contribution to the development and the labor conditions in Brazil: "the adherence to the national commitment to perfect the labor conditions in the construction industry, a document that was formalized among unions, government and companies from this sector, formalizes and reinforces our concern to improve the labor conditions in the building sites of the country" and/or in the sentence "the sector of infrastructure experienced a record growth, pulled by the investments in the private sections via concessions and public-private partnerships".

In OAS S.A.'s report, the following assertions "are objectives to prevent tasks related to the integrity and well-being of our partners and guarantee the execution of the buildings respecting the environment"; and "the performance of the institution OAS is noticeable in the promotion of well-being and quality of life for our supporters and neighboring communities" and that "every day more, the concepts of sustainability are being inserted in our organizational culture", we identify traits of Machiavellianism in the tactic-strategic language, especially concerning the leader's and the company's reputation, adding lying to the speech acts in the reports.

In Odebrecht S.A.'s reports, there are accounts of the same nature: "we are sure that the commitment to the well-being and the continuing progress of the societies we insert ourselves in constitutes one of our biggest assets and that the synchrony of our beliefs with the social demands that create new business opportunities is a key factor to a privileged position together with our clients, our service users and the consumers". Both OAS S.A. and Odebrecht S.A. announce concern with the individual and the environment, aiming at building an image that meets the plans they project and that can be disseminated through their organizational culture, despite fake assertions – we do not believe that a company that aims at social progress can be connected to a discourse of lies, fraudulent actions and absence of principles.

We realize the opportunistic perspective in the text when OAS S.A.'s leaders affirm that Brazil "still needs investment in infrastructure", considering that, although they are showing an actual piece of information, the organization uses the discourse range to indicate its availability for negotiations with the government. Another expression of opportunism is the sentence that says: "we instituted a *compliance* committee that will lead and inspect the full compliance with standards and legislation in all the enterprises of OAS" – in our opinion, it is a piece of information that offers guarantees of honesty and organization in convenient time.

5. Conclusion

Financial scandals that reveal the involvement of private company executives and politicians have been targeted by investigations run by the Brazilian judicial entities. The Lava Jato Operation (Car Wash Operation) was launched because of illegal cash transfers and signs of illicit activities in Brazil's state-run oil company Petrobras S.A., partnered with CEOs of construction conglomerates, such as OAS S.A. and Odebrecht S.A. We carried out an empirical-theoretical study and a qualitative and interpretative assessment of management reports released in 2012 and 2013 by OAS S.A. and in 2012 to 2015 by Odebrecht S.A., with the purpose of examining the occurrence of lexical items that reveal linguistic traits of Machiavellianism and Narcissism in the discourse of those companies' leaders.

In the analyzed reports, we found the use of words that indicate characteristics that allude to the leaders' predisposition to narcissistic behavior. The use of "I", "We", "our" points to egoism, "strong", "bigger", "major", "superior" mirror superiority and grandiosity; "better" and "growth" depict self-promotion and exhibitionism; while "confidence" implies self-sufficiency. In that respect, the results of both companies were virtually unanimous.

With regard to Machiavellianism, we adopted the semantics of words method and found phrases that reveal future orientation, strategic vision, low ethical and moral standards, insensitivity, lies, and manipulation. The leaders' intention is to mask the financial situation and project the company through dishonest and corrupt means. The presentation of good financial results and excellent future perspectives depicts worries with the companies' reputation and, consequently, with the projection of good performances by the leaders. In that regard, not only did we notice characteristics inherent in Machiavellianism, but also typical features of Narcissism, corroborating the literature on the overlapping of the characteristics of these two traits.

The texture of the discourse reveals the narcissistic and machiavellian ethos of OAS S.A. and Odebrecht S.A. leaders. This emerges from the positive politeness fundamentally related to narcissistic traits as well as from the semantics of expressions and speech acts that suggest overlapping machiavellian and narcissistic characteristics.

An innocent reading of the text of the leaders' discourse would drive us to the construction of an image of companies that have focused on social matters, on the environment and that are worried with actions that favor the quality of services in the light of the investment in the training and qualification of the companies' employees. The speech acts also point to the solidity of an organization that is continuously expanding, even amidst the political and economic crisis in Brazil and abroad. The discourse also reveals that there is a strong public-private partnership that encourages and motivates the search for effective social results.

Nevertheless, the Car Wash Operation scandals in which OAS S.A. and Odebrecht S.A. take part lead us to infer how strategic, cynical and deceiving the speech acts constituting and emerging from the discourse are. There are no worries with social matters. Cash transfers of enormous amounts of public funds are commonplace in those companies. Thus, the lack of ethical principles, dishonesty and insensitivity – in the face of the poverty and misery that afflict a great part of the Brazilian society – conflict with the ethos of the high ethical and moral standards that company leaders seek to spread through the annually published reports. Furthermore, we cannot neglect that the argumentation in discourse may be based on a construction that aims to mask the real characteristics of a person or organization – the higher the persuasion power of the machiavellian leader, the greater the capacity to deceive and lie.

We noted that the personification of OAS S.A. and Odebrecht S.A. becomes evident when the leaders make use of characteristics, peculiar to individuals, to refer to the companies, such as the "DNA of the company". There is a fusion between the representation of the leader and the organization, which stems from the absence of limits between them. This is very dangerous because all the results reached, as well as any event related to the organization, are confounded with the performance and personality of the person in charge. This is corroborated by the use of terms such as "our".

It is significant to remark that the 2015 report, the year after the deflagration of the crisis and scandals regarding OAS S.A. and Odebrecht S.A., is infused with strategic and tactical speech acts and politeness related to the appeal to and rescue of trust. These aspects show that, even after the disclosure of the involvement in illicit/corrupt activities, the leaders continue to put into practice their machiavellian discourse.

This discussion allows us to affirm that the objective of this study was reached, i.e. to examine the occurrence of lexical items that the linguistic traits of Machiavellianism and Narcissism in the discourse of the company leaders involved in the corruption scandals in Brazil; most of all, because of the homogeneity of the results. Nevertheless, the limitations related to access restrictions to the 2014 and 2015 OAS S.A. reports, as well as the subjectivity of the analysis carried out, entailing the need for news studies using the applied method, most importantly the application of the tool to measure machiavellian and narcissistic personality traits. Although we are aware of the difficulty of applying a questionnaire in such a delicate situation, the triangulation of results is significant.

We hope the research results instigate studies that approach social changes deriving from the delivery of the referred discourse, and that they may incite, in the main users of the information in the companies' management reports, the recognition of speeches that mask the actual situation of the organizations, with the purpose of generating personal and business profits, disregarding preoccupations with the damages society may face.

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REPeC, Brasília, v. 12, n. 3, Guidelines for Authors, p. 405-407, Jul./Sep. 2018
Available online at *www.repec.org.br*

Revista de Educação e Pesquisa em Contabilidade
Journal of Education and Research in Accounting

Periódico Trimestral, digital e gratuito publicado pela Academia Brasileira de Ciências Contábeis

ISSN 1981-8610

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Method: to collect the data, a structured questionnaire was used, elaborated based on the relevant literature. The questionnaire was tested and applied to a sample of Brazilian accountants and businessmen during 2017. In the analysis of these data, content analysis was applied and statistical tests were used to establish relations between the answers obtained.

Results: the main findings of this study indicate that the expansion of accounting education and research in Brazil was essential for the growth of the economy, according to the respondents' perception, despite the impression that accountants and businessmen need to make better use of the accounting information.

Contributions: from the academic viewpoint, the evidences from this research contribute to fill of an important existing gap in the Brazilian literature. What the market is concerned, they contribute by providing evidence that, despite its perceived relevance, its users need to make better use of the accounting information.

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