**Fair value measurement and its impact on audit fees: evidence in the Brazilian market**

**Medición al valor razonabley su impacto en los honorarios de auditoría: evidencia en el mercado brasileño**

**Mensuração a valor justo e seus impactos nos honorários de auditoria: evidências no mercado brasileiro**

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## Abstract

**Objective**: The purpose is to verify the impact of using the measurement at fair value on the audit fees, differentiating even the period before and after the adoption of IFRS 13 (CPC 46).

**Methodology:** The research is quantitative, for testing the hypothesis raised, the multiple regression technique was used, with data available from companies listed in B3 for the period between 2010 and 2016.

**Results**: The evidence indicates that the complexity and subjectivity of fair value is recognized by the audit firms, that is, audit firms recognize that fair value measurement implies more effort and that the associated audit risk rises, leading firms to charge of a risk premium for the provision of the service. However, it was not possible to confirm that auditors' fees increased after the adoption of IFRS13 (CPC 46).

**Contributions of study**: Theoretical/methodological - The study contributes to understanding the impacts of adopting international accounting standards, in this specific case on audit fees. Social/management - Given the evidence that there is a higher audit cost associated with the greater complexity of information in a fair value environment, companies can develop mechanisms to minimize the uncertainty of the information to be audited.

**Keywords:** Fair value; Audit fees; Monitoring costs.

## Resumen

**Objetivo:** El objetivo es verificar el impacto del uso de la medición a valor razonable sobre los honorarios de auditoría, diferenciando incluso el período anterior y posterior a la adopción de la IFRS 13 CPC 46.

**Metodología:** La investigación es cuantitativa, para probar las hipótesis planteadas se utilizó la técnica de regresión múltiple, con datos disponibles de empresas listadas en B3 para el período comprendido entre 2010 y 2016.

**Resultados:** la evidencia indica que las firmas de auditoría reconocen la complejidad y la subjetividad del valor razonable, es decir, las firmas de auditoría reconocen que la medición al valor razonable implica más esfuerzos y que los riesgos de auditoría asociados aumentan, lo que lleva a las firmas a el cobro de una prima de riesgo por la prestación del servicio. Sin embargo, no fue posible confirmar que los honorarios de los auditores aumentaron después de la adopción de la IFRS 13 (CPC 46).

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**Contribuciones del estudio**: Teórico / metodológico - el estudio contribuye a comprender los impactos de la adopción de normas internacionales de contabilidad, en este caso específico sobre los honorarios de auditoría. Social /para la administración - Dada la evidencia de que hay un costo de auditoría más alto asociado con una mayor complejidad de la información en un entorno de valor razonable, las empresas pueden desarrollar mecanismos para minimizar la incertidumbre de la información que se auditará.

**Palabras clave**: Valor razonable; Honorarios de auditoría; Seguimiento de costos.


**Resumo**

**Objetivo**: O objetivo é verificar o impacto do uso da mensuração a valor justo sobre os honorários de auditoria, diferenciando-se inclusive o período pré e pós adoção do CPC 46.

**Metodologia:** A pesquisa apresentada é quantitativa, sendo que para o teste das hipóteses levantadas foi utilizada a técnica de regressão múltipla, com dados disponíveis das empresas listadas na B3 referentes ao período entre 2010 e 2016.

**Resultados**: As evidências indicam que a complexidade e subjetividade do valor justo é reconhecida pelas empresas de auditoria, ou seja, as firmas de auditoria consideram que a mensuração a valor justo implica mais esforços e que os riscos de auditoria associados se elevam, levando as firmas à cobrança de um prêmio de risco pela prestação do serviço. Entretanto, não foi possível confirmar que os honorários dos auditores aumentaram após a adoção da IFRS13 (CPC 46).

**Contribuições do estudo:** Teóricas/metodológicas - o estudo contribui para a compreensão sobre os impactos da adoção de normas internacionais de contabilidade, neste caso específico, sobre honorários de auditoria. Sociais/para gestão **-** dada a evidência de que há maior custo de auditoria associado à maior complexidade das informações em ambiente de valor justo, as empresas podem desenvolver mecanismos de minimização de incerteza associada às informações a serem auditadas.

**Palavras-chave:** Valor Justo; Honorários de Auditoria; Custos de Monitoramento.

## 1 Introduction

Although very present today, partly due to the entry into force of the International Financial Reporting Standards (IFRS) 13 and its correspondent here in Brazil, the Technical Pronouncement of the Accounting Pronouncements Committee (CPC) 46, as of January 1, 2013, the discussion on the measurement basis for assets and liabilities, whether fair value or historical cost, has always been present in the academic and professional scope of accounting, as presented in Georgiou and Jack (2011) and Herrmann, Saudagaran and Thomas (2005 ). The use of historical cost, according to Georgiou and Jack (2011), enjoyed full legitimacy in the period between the 1940s and 1970s, and before and after other forms of measurement were present, including market measures.

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The use of fair value as a basis for measurement, although it has advocates (Sapra, 2010; Munteanu & Zuca, 2015; Marra, 2016), also introduces subjectivity in the accounting environment, as it now requires greater judgment on the part of the financial statement preparers. This raises questions related to independent auditing. Cannon and Bedard (2017), point out that the concern with the audit of fair value measures has intensified in the last decades, given that such measures have high estimation uncertainty, a lot of subjectivity, complex assumptions, and multiple valuation techniques, which are associated with higher inherent risk analyzes.

Therefore, in an environment of greater subjectivity and consequently a higher risk of uncertainty, associated costs such as audit fees arise. Evidence of this increase in costs is obtained from Alexeyeva and Mejia-Likosova (2016), who find that assets of high uncertainty value are positively associated with the fees of auditors, suggesting that more complex estimates require greater effort from the service provider.

Considering that the discussion about fair value is associated with the subjectivity that the concept carries, being, therefore, complex and uncertain, causing a potential increase in risks, it is opportune to discuss the audit fees considering the impact of the fair value. Such an investigation has not yet been carried out in the Brazilian market and, therefore, this research proposes to do it in response to the following problem: **What are the impacts of using fair value measurement on audit fees?** Thus, the objective is to verify the impact of the use of measurement at fair value on audit fees, differentiating even the pre and post adoption period from CPC 46.

The justification for dedicating the research on measurement at fair value and its potential impact on audit fees is linked to discussions by other authors, such as Cannon and Bedard (2017) and Sapkauskiene and Orlovskij (2017), who indicate that there are problems with the reliability of the information at fair value, especially due to the discretion involved and this can increase the complexity of the audit, impacting the costs of the service offered.

This research is in line with the interest of the International Accounting Standards Board (IASB) in revising IFRS 13 and obtaining empirical evidence about the impacts of adopting this standard in all environments. In addition, the report issued by the Public Company Accounting Oversight Board (PCAOB), in November 2017, reinforces the need for research on the fair value and audit relationship (PCAOB, 2017).

It is expected that this research will be useful to the normatizers, making it possible to identify costs associated with the use of fair value. It is worth mentioning that only one of the potential associated costs is addressed in this research. With this, it is inserted in a perspective of expansion of the literature about the measurement at fair value and audit fees, especially in the Brazilian market, without the restriction to the specific sector, which still has a lack of evidence. It is also expected that audit firms, auditors and audit clients will be able to use the results of this survey to better understand the fee pricing process.

## 2 Theoretical framework

### 2.1 The use of fair value as a basis for measurement

The measurement base used by accounting is relevant because one lives in an imperfect world, where markets are not entirely liquid and company managers have private information that is not easily disclosed to those outside the company (Sapra, 2010) . Singh and Doliya (2015) state that the measurement activity is divided into two phases, the first being the identification

of an assessment basis against which the measurement should be made and the second the actual calculation of the value of the asset or liability. on the selected evaluation basis.

To increase consistency and comparability in fair value measurements and corresponding disclosures, IFRS 13 (CPC 46) established a fair value hierarchy, which classifies the information used in three levels. Table 1 below shows the hierarchical classification of fair value as contained in CPC 46, as well as a summary description of the characteristics of each of the three levels.

**Table 1**

*Summary of the characteristics of the fair value hierarchical classification*

| Hierarchical level | Level description |
|---|---|
| Hierarchical level 1 | It is the level with the highest priority, it refers to prices quoted (unadjusted) in markets for identical assets or liabilities on the measurement date. |
| Hierarchical level 2 | It is the intermediate level of priority, refers to information that is observable for the asset or liability, either directly or indirectly, except for quoted prices included in Level 1, such as prices quoted for similar assets or liabilities in active markets or quoted prices for identical or similar assets or liabilities in markets other than assets. |
| Hierarchical level 3 | It is the low priority level, it refers to information obtained from unobservable data for the asset or liability, based on the entity's own assumptions about the market. |

**Source**: *Comitê de Pronunciamentos Contábeis [CPC] 46, 2012.*

The fair value estimates reported in the financial statements differ in subjectivity according to the assumptions made at the time of measurement, which may vary from entity to entity (Clor-Proell, Proell & Warfield, 2014). Therefore, according to the authors, mandatory supplementary disclosures are necessary and are intended to allow users of the statements to assess the nature of the information that was used to develop the fair value measures.

However, even if the assumptions used in the measurement are disclosed, the problem of fair value subjectivity may still persist. The evaluation by external experts does not guarantee the elimination of the subjectivity of the individual's judgment. An experiment, with evaluation experts, carried out by Carpentier, Labelle, Laurent and Suret (2008), demonstrated this. The results indicated that even under the same assumptions, qualified specialists use different valuation methods, with significant variations found in the measurement at fair value for the same investment.

Criticisms of the use of fair value are not limited to its subjectivity. Bignon, Biondi and Ragot (2009) affirm that the fair value reinforces financial criteria in detriment of the other evaluation criteria of the management teams. Corroborating this line of argument is Abdel-Khalik (2010), who states that the exclusive use of measurement at fair value may not help investors in assessing managers, since the variation in value may be due to changes in the market and not the result of the skills and abilities of managers.

Another criticism directed at the use of fair value is that it introduces the volatility of markets into financial accounting. According to Bignon et al. (2009), excess volatility in the financial markets adds a superfluous risk and tends to reduce the investment capacity of companies. Such volatility was confirmed by Couch, Thibodeau and Wu (2017) and attributed to the fact that companies are valuing assets at fair value without reporting liabilities on the same basis. These authors affirm that the measurement at fair value could be favoring the discretion of managers, instead of reducing it as the normatizers would like.

For Mingzhe and Huifeng (2010), there are two defects inherent in accounting at fair value. First, in certain circumstances, fair value does not exist and, according to fair value

accounting, it may be a bubble maker. These two defects would bring risks to investors in the capital markets and would cause a financial crisis. However, the idea of financial crisis (bubbles) caused by the use of fair value has already been refuted, based on empirical studies, by Amel-Zadeh and Meeks (2017), Liao (2014) and Barreto, Murcia and Lima (2012).

It is important to consider criticisms of fair value, however, its use, in addition to being standardized, has been defended by theorists and empiricists from various markets. Reis and Stocken (2007), for example, obtain evidence that the informativeness of the accounting report is superior when using the fair value in comparison with the use of historical cost, since the first completely reveals the company's inventory level.

Fiechter and Farkas (2017), on the other hand, demonstrate that it is the institutional differences between countries that affect the ability of investors to process and understand fair value information in their valuations, thus refuting the idea that valuation discounts in certain fair value assets arose from measurement errors or bias. For Sapra (2010) the benefit of using fair value would be the ability to better inform external users about the risks underlying the business, thus improving the assessment of investment decisions.

Demerjian, Donovan and Larson (2015), obtain results indicating that the accounting of fair value is not uniformly harmful for the contracting of debt, with adjustments even being included when they are more likely to improve the performance measure. Another reason for using fair value measurement would be that accounting on this basis is more related to the needs of a globalized and information-based economy, thus increasing its importance and use in the future (Marra, 2016; Munteanu & Zuca, 2015).

In a neutral position, there are authors who advocate for both measurement bases, that is, both fair value and historical cost, considering for which purpose the information will be used. Botosan and Huffman (2015) state that for listed assets investors need to determine the expected value to be realized in exchange and, therefore, the fair value represents the best information. As for the assets in use, the historical cost generally provides investors with useful information for the decision for forecasting purposes, while the fair value does not.

In the same strand of utility to both measures, Liao (2014) investigates the relative and incremental relevance of financial assets and liabilities measured at fair value and historical cost. The results indicate that the relevance of the measures of fair value is not superior to those of historical cost and that both exercise incremental power, one in relation to the other. The only situation in which fair value measures are relatively more relevant than those of historical cost is concentrated in the period of financial crisis.

Table 2 summarizes the unfavorable and favorable arguments for the use of fair value as a basis of measurement. It is noticed that the opinions on the use of fair value are divergent, with favorable, unfavorable, and even neutral arguments, as well as the empirical evidence on the use of it is mixed. Therefore, the subject must remain in the accounting research environment, in the most diverse aspects, including in relation to the costs and benefits associated with its use.

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**Table 2**

*Summary of unfavorable and favorable arguments for the use of fair value as a basis for measurement*

| Position | Authors | Argument |
|---|---|---|
| Unfavorable | Carpentier et al. (2008) | Subjectivity: inconsistency of values obtained under the same premises. |
| | Bignon et al. (2009) | It makes the assessment of management teams difficult. Increases the volatility of financial markets. |
| | Abdel-Khalik (2010) | Makes it more difficult for administrators to evaluate. |
| | Couch et al. (2017) | Increased volatility due to valuation of assets at fair value without reporting liabilities at fair value. |
| | Mingzhe e Huifeng (2010) | In certain circumstances, there is no fair value. Fair value accounting can be a bubble maker. |
| Favorable | Reis e Stocken (2007) | The informativeness of the accounting report is superior when using fair value in comparison with the use of historical cost. |
| | Fiechter e Farkas (2017) | Investors are able to understand the information at fair value. |
| | Sapra (2010) | Fair value information better informs external users of the risks underlying the business. |
| | Demerjian et al. (2015) | They demonstrate that the use of fair value is not detrimental to contracting the debt. |
| | Marra (2016) e Munteanu e Zuca (2015) | Both argue that accounting at fair value is more appropriate in a globalized and information-based economy. |
| Neutral | Botosan e Huffman (2015) | For the authors, both fair value and historical cost are useful, depending on the item evaluated. |
| | Liao (2014) | It identifies that both fair value and historical cost have an incremental relevance in relation to others. |

**Source:** Research data.

## 2.2 Discussion on audit fees in an uncertain environment

According to Erickson, Goldman and Stekelberg (2016), in an extensive research on the determinants of audit prices, it was concluded that auditors compensate for the increased audit effort (complexity) and the risk of audit by negotiating higher fees. The authors cite the studies by Simunic (1980), Bell, Landsman and Shackelford (2001) and Bedard and Johnstone (2004) as empirical evidence that corroborates with this statement.

The audit risk, according to Huang, Lin and Raghunandan (2016), is a function of the risk of material misstatement and the risk of detection, and the risk of material misstatement is defined as being the product of the inherent risk and the risk control and thus the standard audit risk could be specified in a formula such as: "audit risk = inherent risk × control risk × detection risk".

The inherent risk is the susceptibility of a statement to being distorted, due to error or fraud, which can be material, individual or in combination with other distortions, before considering any related control. Control risk is the risk of a distortion, through error or fraud, that can occur in a statement and that can be material, individually or in combination with other distortions and cannot be prevented or detected in a timely manner by the company's internal control. Detection risk is the risk that auditors will not detect a distortion that exists and that could be material (Huang et al., 2016).

According to Cao, Li and Zhang (2015), the assessment of business risk should be the first step in defining the audit effort, which will consequently impact the fees charged. For the authors, the size of the firm, complexity of activities, debt risk, risk of internal control, listing

status and corporate governance, are considered factors that affect business risk, which may increase or reduce it.

According to Jensen and Meckling (1976), the agent's opportunistic behavior can be controlled through monitoring, and the same can be exercised by spending resources to alter the agent's opportunity to benefit from non-monetary benefits. One of the monitoring methods is the external audit and its fee can be considered a monitoring cost. Cho and Wu (2014) obtain empirical evidence confirming the theory that external monitoring mechanisms help mitigate agency conflicts and that companies with more serious agency problems generally require more external monitoring mechanisms, such as high-quality auditors.

In emerging markets, the concentration of ownership creates the agency conflict between controllers and minority shareholders, which according to Fan and Wong (2005), require unconventional corporate control mechanisms, like independent auditors. Thus, it can be assumed that audit fees are included in the monitoring costs. In line with the complexity and risk impacting the pricing of fees, Lin and Yen (2016) find evidence that auditors with experience in IFRS charge significantly higher audit premiums in the initial years of adoption of standards.

Considering the fair value approach to fees, Ettredge, Xu and Yi (2014) argue that audit fees should be positively associated with the extension of the fair value of assets, as they are more difficult to audit and, therefore, more costly. Thus, charging higher fees in the presence of fair value has two justifications: i) protection in relation to the increase in the audit effort; and that ii) the audit of data at fair value requires more dedicated time, or even the hiring of professionals specialized in valuation.

In subsection 2.1, the evidence on the benefits and costs associated with the use of fair value is mixed. In this subsection, the pricing of audit fees was discussed. Within the scope of this research, the study of the association between the two is relevant considering, the Brazilian market, that the impacts of the adoption of international accounting standards have not yet been fully identified and that this identification has been encouraged by agencies, such as PCAOB and IASB. In the next subsection, the hypotheses to be tested in this research are outlined.

## 2.3 Development of hypotheses based on previous studies.

Accounting measurement at fair value introduces subjective criteria in the estimates, according to Carpentier et al. (2008). This increase in criteria leads auditors to increase their risk assessment and, consequently, their audit efforts are bigger. Ettredge et al. (2014) record that the proportions of assets at fair value held by banks are positively associated with fees, having a greater association when level 3 information is used.

Yao, Percy, and Hu (2015) obtain empirical evidence that measuring at fair value increases audit fees. The authors investigate the association between the fair value assessment of investment properties, the intangible assets and audit fees, and prove the positive association. However, the authors point out that a strong corporate governance structure can have a moderating effect on fees.

The measurement at fair value caused a significant increase in the audit hours according to the study by Alexeyeva and Mejia-Likosova (2016). According to the authors, this result is consistent with the suggestion that more complex estimates require a greater audit effort. The initial hypothesis indicated that a greater degree of subjectivity and uncertainty of assets at fair value Level 2 and Level 3 are associated with higher audit rates.
Considering the empirical evidence from previous studies and justifications that fair value adds subjectivity to the measurement process, making it more difficult to audit and increases the

level of risk and complexity, in addition to requiring more resources in the activities of the auditors, H1 is formulated as follows:

**H1: Considering all other constant variables, the higher the values of assets and liabilities measured at fair value, the higher the audit fees.**

Previous studies indicate that the entry into force of a new accounting standard may have an impact on audit fees. Erickson et al. (2016) analyzed the impacts of adopting the Financial Interpretation Number 48 (FIN 48) and concluded that the auditors charged higher fees in the post-FIN 48 period compared to the pre-FIN 48 period. Graham, Hanlon, Shevlin and Shroff (2014) , found that the increased visibility of uncertain fiscal positions after the implementation of FIN 48 increases the risk and liability for audit failures related to the financial statements, implying an increase in the value of audit services.

The adoption of IFRS is an observable fact that can impact the audit fees. Loukil (2016) argues that the entry into force of IFRS increases the audit effort, given that the financial statements increase in number of pages, need more diligence and more contacts to ensure coordination between auditors and the audited company. In this sense, Loukil (2016) obtained evidence that the transition to IFRS was associated with a significant increase in the values of audit fees, for French companies, especially in the years 2004 and 2005, references for adoption.

Harmonic results to those of Loukil (2016) were obtained by Lin and Yen (2016), who noted that in China, IFRS specialist auditors charged a premium for their audit service in the initial years of IFRS adoption. Goncharov et al. (2014), when analyzing the impact of adopting IFRS on European companies, also found results that indicate that the adoption of IFRS contributed to the increase in audit fees.

Considering the evidence and justifications previously exposed, and in view of the entry into force in 2013 of CPC 46 - related to IFRS 13, it is opportune to investigate whether this regulatory change had an impact on audit fees in the Brazilian context. The second research hypothesis is defined below:

**$H_2$: Considering all other constant variables, the amounts paid for audit services increased in the post-adoption period of CPC 46.**

## 3. Description of the Research Methodology

To achieve the proposed objective, a quantitative research was carried out, in which the data of the active companies listed in B3 were analyzed. The sample consists of 520 observations, referring to the period from 2010 to 2016. The data analysis period refers to the most recent available at the time of data collection, which was carried out in February 2018. The data collection started by 2010, considering that this was the year of the adoption of international accounting standards in Brazil, when it became mandatory to disclose complementary information on the use of fair value, therefore, the beginning of the period for which the information was available to users. In addition, as CPC 46 came into force in 2013, when considering the period between 2010 to 2016, there is a balance in the database related to the periods before and after the adoption of said CPC 46.

Information regarding audit fees, the value of other services provided by audit firms, the change of the audit firm and whether the service provider was a company in the group of the four largest audit firms (Deloitte, PricewaterhouseCoopers, Ernst & Young , KPMG - called

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BIG4) were collected manually from the reference forms year by year, for each of the observations.

The total fair value (VJTOTAL) was collected directly and manually in the explanatory notes and represents the total value of assets and liabilities reported at fair value, being the sum of the values at the three hierarchical levels, as disclosed by the companies themselves. As not all listed companies disclose in the explanatory notes the information referring to items measured at fair value, the sample is non-probabilistic, composed only of companies with available information. The other variables were obtained from Economática®.

To test the hypotheses, the technique of data analysis of multiple linear regression was used. The research interest falls on the coefficients of β_1 and β_2. B_1 is expected to be positive and statistically significant, indicating that companies that have more assets and liabilities valued at fair value pay higher audit fees, thus confirming the existence of greater complexity and risk associated with measurement at fair value reflected in the amount charged in services. In to β_2, the sign is expected to be positive and statistically significant, indicating that after the adoption of CPC 46 there was an increase in audit fees. The first model follows the specification as follows:

$$LNHON_{i,t} = \beta_0 + \beta_1 * VJTOTAL + \beta_2 * PÓS\_CPC46 + \beta_3 * TRCAUD + \beta_4 * VALSERV + \beta_5 * TAM + \beta_6 * SETREG + \beta_7 * BIG4 + \beta_8 * LLAT + \varepsilon. \text{ - Modelo 1}$$

Onde:
LNHON = LN of the fee paid by company i in period t, related to audit services;
VJTOTAL = Sum of the value of the three hierarchical levels of the fair value of assets and liabilities reported in a standardized explanatory note;
PÓS_CPC46 = Dummy variable that assumes the value 1 for the period from 2013 to 2016 and 0 otherwise;
TRCAUD = Audit firm exchange dummy variable, 1 for the year of exchange and 0 otherwise;
VALSERV = Value of other simultaneous services contracted with the same auditing companies, divided by the amount of audit fees;
TAM= *Proxy for company size, represented by the natural logarithm of total assets.*
SETREG= Dummy variable for heavily regulated sub-sectors, it assumes a value of 1 if the company participates in a regulated sector and 0 otherwise. The sub-sectors considered to be strongly regulated were: electricity, road and air transport, highway exploration, according to the Economática® classification.
BIG4= Dummy variable assumes a value of 1 if the auditing company hired is Big4 and 0 otherwise.
LLAT = Value of net profit on the lagged total asset.

The dependent variable (LNHON) is represented by the natural logarithm of fees paid to auditing companies following the guidelines of Ettredge et al. (2014); Yao et al. (2015); Loukil (2016) and Alexeyeva and Mejia-Likosova (2016). The variable of interest VJTOTAL, referring to hypothesis 1, is represented by the sum of the values of the three hierarchical levels of assets and liabilities evaluated at fair value reported in the explanatory notes of the company, according to the procedure adopted by Ettredge et al. (2014) and Alexeyeva and Mejia-Likosova (2016). As a statistical treatment to mitigate problems resulting from the scale, the variable was standardized.

The variable PÓS_CPC46, related to hypothesis 2, is a dummy variable that corresponds to 1 in the years from 2013 to 2016, the period after the adoption of CPC 46, and 0 in the period from 2010 to 2012. This variable was defined according to procedures adopted by Goncharov et al. (2014) and Loukil (2016).

The other variables in the model, treated as controls, were validated in previous national and international studies aimed at identifying factors that determine the value of audit fees, in which they were statistically significant. Al-Mutairi, Naser and Al-Enazi (2017) documented that the fees are determined by the size of the audited company, the type of professional services provided by the auditor and the audit company's affiliation with the four major international

companies - BIG4. Goncharov et al. (2014) consider the existence of losses and other services contracted together with auditing companies to be a control variable.

Huang et al. (2016) use the dummy to change the audit company, regulated sectors, percentage of other services in relation to the value of the audit fees and the audit by BIG4 as determinants of the fees. Foster and Shastri (2016) use the exchange of an audit company and the value of other contracted services. These control variables used were also used in previous national studies, being statistically significant (Castro, Peleias, & Silva, 2015; Brighenti, Degenhart, & Cunha, 2016; Borges, Nardis, & Silva 2017).

Bearing in mind that fair value has three hierarchical levels of measurement and each of them is assigned a different complexity (Wang, 2012; Clor-Proell et al., 2014), including the possibility of greater discretion when measuring at level 3 (Ettredge et al., 2014; Goncharov et al., 2014; Alexeyeva & Mejia-Likosova, 2016), to identify whether there is an impact on audit fees at all levels, as a robustness test, a second analysis was performed based on the following model:

$$\text{LNHON}_{i,t=} \beta_0 + \beta_1 * \text{NÍVELI} + \beta_2 * \text{NIVELII} + \beta_3 * \text{NIVELIII} + \beta_4 * \text{TAM} + \varepsilon. \quad \text{Modelo 2}$$

Onde:
LNHON = LN of the fee paid by company i in period t, related to audit services;
TAM= Proxy for company size, represented by the natural logarithm of total assets.
NIVELI = Total of the amount specified in an explanatory note as measured at fair value according to level 1 information, standardized.
NIVELII = Total of the amount specified in an explanatory note as measured at fair value according to level 2 information, standardized.
NIVELIII = Total of the amount specified in an explanatory note as measured at fair value according to standardized level 3 information.

The variables LNHON and TAM have the same specification as before. The variables NIVELI, NIVELII and NIVELIII represent the amount of assets and liabilities measured at fair value declared in an explanatory note, in each of the levels, with all variables being standardized. As not all companies report information on the three hierarchical levels, the sample is significantly reduced, from 520 to 75 observations, and, therefore, we opted to use only size as a control variable. Gujarati and Porter (2011) point out that if it is possible to explain a substantial part of the behavior of the dependent variable with fewer variables in the model, by the principle of parsimony, this procedure can be used.

## 4. Analysis and discussion of results

In this section, the results of the research are presented and discussed. Initially, in table 3, the descriptive statistics of the metric variables are reported. The variable VJTOTAL is standardized to mitigate the scale effect, that is, the mean is zero and the standard deviation 1. Note that there are observations above three standard deviations. However, considering Fávero, Belfiore, Silva and Chan (2009), these observations were not considered atypical, given that the data collection procedures were reviewed, and they are not the result of measurement errors, but are a characteristic of the sample.

The variable VALSERV, represents the value of other services contracted from the same auditing company, it deserves attention in relation to descriptive statistics. First, the minimum value of 0 is emphasized, considering that in several observations the company did not declare the value of other services in its reference form, being interpreted that they were not hired. The existence of companies that do not hire other services means that the average is less than the dispersion of data measured by the standard deviation. At the other extreme, there is a maximum

value of 7.693, which means that there are observations for which that the other services provided are more than 7 times above the value of the audit.

**Table 3**
*Descriptive statistics of metric variables*

| Variables | N | Minimum | Maximum | Average | Standart Deviation |
|---|---|---|---|---|---|
| LNHON | 520 | 9,32 | 16,27 | 13,330 | 1,160 |
| VJTOTAL | 520 | -0,72 | 5,78 | 0,000 | 1,000 |
| VALSERV | 520 | 0 | 7,693 | 1,860 | 3,375 |
| TAM | 520 | 17,58 | 25,53 | 22,164 | 1,459 |
| LLAT | 520 | -4,02 | 0,560 | 0,033 | 0,196 |
| NÍVELI | 75 | -0,51 | 6,40 | 0,00 | 1,000 |
| NIVELII | 75 | -0,40 | 7,37 | 0,00 | 1,000 |
| NÍVELIII | 75 | -0,77 | 3,10 | 0,00 | 1,000 |
| TAM | 75 | 21,354 | 24,542 | 23,049 | 1,073 |

**Source**: *Research data.*

Table 4 shows the frequencies of non-metric variables. For the Post CPC46 dummy variable, 1 is assigned if the observation is in the period between 2013 and 2016, it is observed that 59.2% of the observations are in this condition. Regarding the dummy TRCAUD, it is noticed that 22.3% of the observations had to change auditing companies in that the period. The dummy variable SETREG has 39% of the observations referring to companies in the stock exchange's sub-sectors regulated by agencies that have specific reporting requirements. Regarding the dummy Big4, it it´s seen that 95.6% of the observations are from companies audited by Big4, demonstrating the predominance of these service providers.

**Table 4**
*Frequency of non-metric variables*

| DUMMY | PÓS_CPC46 | TRCAUD | STREG | BIG4 |
|---|---|---|---|---|
| 0 | 40,80% | 77,70% | 61% | 4,40% |
| 1 | 59,20% | 22,30% | 39% | 95,60% |

**Source**: *Research data.*

The results of the multiple regression analysis are reproduced in table 5. In panel A the statistics of the variables are reported, in panel B the statistics of the model are presented. In panels A and B, the first and second columns refer to the specification of model 1 and the third and fourth columns refer to the specification of alternative model 2. Both models had standard errors corrected due to the finding of heteroscedasticity and none of them presented problems of multicollinearity evidenced by the maximum Variance Inflation Factor (VIF) contained in panel B.

In addition, because the sample is greater than 30 observations, following the considerations by Fávero et. al. (2009) the assumption of normality of the residues was eased. Model 1, the main specification, and model 2, the alternative specification, are both statistically significant at the 1% level, with explanatory capacity of 48.01% and 47.70% respectively.

The positive and statistically significant coefficient at the level of 10% of $\beta\_1$, inherent to the variable VJTOTAL, although declassed, does not allow to reject hypothesis 1 of the research. The result indicates, in view of the use of control for the other factors, that the use of

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fair value as a basis for measurement adds complexity to the audit process, being perceived by the audit companies reflected in higher fees.

The evidence obtained in the Brazilian market is in line with the findings of Alexeyeva and Mejia-Likosova (2016), who claim that fair value estimates require greater effort; with Ettredge et al (2014), who argue that fair value adds risk to the audit service and requires more dedicated time and with Carpentier et al. (2008) that justifies that fair value inserts subjective criteria in the estimates. The results also corroborate the study by Yao et al. (2015).

Hypothesis 2 of the research has the expectation that the audit fees will increase after the adoption of CPC 46 in the year 2013. For purposes of verifying the hypothesis, the dummy variable PÓS_CPC46 was added to the model and it was expected to be significant and positive. The result indicates that hypothesis 2 cannot be confirmed, as the coefficient was not statistically significant.

Such result can be interpreted in the context that, although CPC 46 came into effect in 2013, the measurement at fair value in Brazil has been present since the adoption of international standards in 2010. Therefore, auditing companies may already have included in their fees the complexity of the fair value at that time, with no need for further adjustments to expectations of complexity when this specific standard came into force.

Regarding the control variables, the dummy TRCAUD, indicative of the change in the service provider company, presents a negative and significant coefficient, indicating that a change of provider may lead to lower audit fees. The result is consistent with the existence of competition between the companies that offer services and also with the possibility that, when performing the audit, the provider may eventually be hired to provide other services not associated with the audit. Similar evidence is found in Foster and Shastri (2016).

The VALSERV variable represents the percentage value of other services, except auditing, in relation to the auditing services provided by the auditor. The results obtained are in line with those of Huang et al. (2016). The negative coefficient indicates that the audit companies charge lower audit fees when they have another connection with the audited entity. This result reinforces the justification of the negative coefficient for cases in which there is a change of service provider.

The size of entity (TAM) is a proxy for its complexity. The positive and significant coefficient indicates that larger companies are more complex and therefore require greater effort from auditors and, consequently, higher fees for the service. The results obtained are in line with Al-Mutairi et al. (2017), Huang et al. (2016), Goncharov et al. (2014) and Foster and Shastri (2016) who found similar results.

**Table 5**
*Results of the multiple regression*

Dependent Variable - LN audit fees

**Panel A: Variable Statistics**

| Model 1 | Hypothesis 1 and 2 Main specification | | Model 2 | Hypothesis 1 Alternative specification | |
|---|---|---|---|---|---|
| Variables | Coef. | EPR | Variables | Coef. | EPR |
| VJTOTAL | **0,081*** | **0,426** | NÍVEL I | 0,161 | 0,116 |
| PÓS_CPC46 | -0,063 | 0,076 | NIVELII | **0,272*** | **0,084** |
| TRCAUD | **-0,204** | **0,103** | NÍVEL III | -0,053 | 0,104 |
| VALSERV | **-0,003*** | **0,000** | TAM | **0,544*** | **0,108** |
| TAM | **0,500*** | **0,028** | CONST | 1,260 | 2,446 |

| | | |
|---|---|---|
| SETREG | **-0,494*** | **0,084** |
| BIG4 | **0,639*** | **0,159** |
| LLAT | 0,173 | 0,217 |
| CONST | **1,910*** | **0,610** |

**Panel B: Model Statistics**

| | | | |
|---|---|---|---|
| R² Ajusted | 48,01% | R² Ajusted | 47,70% |
| Estatística F | 82,52 | Estatística F | 27,06 |
| P-Value F | 0,000 | P-value F | 0,000 |
| Nº Observation | 520 | Nº Observation | 75 |
| VIF maximum | 1,39 | VIF maximum | 1,49 |

**Source:** *Research Data.*
Note: *, **, *** significant at 10%, 5% and 1%. EPR: robust standard error. LNHON = LN of the fee paid by the company for the audit services; VJTOTAL = Sum of the three hierarchical levels of the fair value of assets and liabilities reported in a standardized explanatory note. POST_CPC46 = dummy variable that takes the value 1 for the period 2013 to 2016 and 0 otherwise. TRCAUD = Audit firm exchange dummy variable, 1 for the year of the exchange and 0 otherwise. VALSERV = Value of other simultaneous services hired from the same auditing companies, divided by the amount of audit fees. TAM = Proxy for company size, represented by the natural logarithm of total assets. SETREG = dummy variable for regulated sub-sectors, 1 for companies participating in the regulated sector and 0 otherwise. The sub-sectors considered to be strongly regulated were: electricity, road and air transport, highway exploration, according to the Económatica classification. BIG4 = dummy variable assumes a value of 1 if the contracted auditing company is Big4 and 0 otherwise. LLAT = Value of net profit on the lagged total asset. NIVEL1= Total of the amount specified in an explanatory note as measured at fair value in accordance with level 1 information, standardized. LEVEL2 = Total of the amount specified in an explanatory note as measured at fair value according to level 2 information, standardized. LEVEL3 = Total of the amount specified in an explanatory note as measured at fair value according to standardized level 3 information.

The indicative variable of regulated sectors (SETREG) presented a negative coefficient, indicating that regulation may reduce audit efforts and, thus, reduce fees charged for services. The results for the Brazilian market do not align with the empirical evidence of Huang et al. (2016) and Goncharov et al. (2014), who argue that regulation would add litigation risk to the audit process. However, the textual analysis of the reference forms of the regulated companies, especially of the electric energy companies, reveals that the documents required by the regulators are audited separately composing other services and not the audit fees specifically.

The provision of audit services by a BIG4 company, represented by the dummy variable with the same name, indicates that specialized companies incorporate this know-how in their service fees, charging higher fees than smaller competitors. The results obtained are in line with Huang et al. (2016), Goncharov et al. (2014) and Foster and Shastri (2016). The LLAT variable, indicative of the company's performance, did not present a statistically significant coefficient, and it is not possible to infer about it.

Observing the arguments of Wang (2012) and Clor-Proell et al. (2014) that each hierarchical level of fair value, using different information, has different degrees of complexity, a complementary analysis was carried out only with companies that reported having fair value measured at all three hierarchical levels. The sample for this analysis suffered a significant reduction, since not all companies reported their assets and liabilities measured at fair value by hierarchical level. The results of this complementary analysis are reported in the third and fourth columns of table 5, in panels A and B.

The results of the representative variables of fair value indicate, through statistical significance, that only the measurement of level II positively affects the amount of fees, as pointed out by Alexeyeva and Mejia-Likosova (2016) and Goncharov et al. (2014) and adheres

to the speech of Clor-Proell et al. (2014) that there are differences due to the assumptions and information adopted to measure the fair value. Statistical significance only for NIVELII adds a relevant finding to the literature as it indicates that there is a perception of greater complexity added to audit services when observable information is used, but which is not that which is available in active markets.

## 5. Final considerations

This research aimed to verify the impact of using fair value measurement on audit fees, differentiating the periods before and after adoption of CPC 46. Through multiple linear regression, from a non-probabilistic sample, with data for the period between 2010 and 2016, of companies listed in B3, two research hypotheses were tested. The first aiming to verify that the greater the value of the assets and liabilities valued at fair value, the higher the audit fees would be, and the second that predicted that after the adoption of CPC 46 there would be an increase in the audit fees.

The empirical evidence obtained through the regression indicates that in the Brazilian environment the greater the presence of assets and liabilities measured at fair value, the higher the audit fee charged by the service provider will be. The results indicate that the complexity and subjectivity of fair value is recognized by audit firms. This result confirms what Alexeyeva and Mejia-Likosova (2016) recommend that service providers recognize that under fair value there is a greater effort due to its complexity and because there are more risks associated with subjectivity and, therefore, companies charge a risk fee for providing the service. From these results, it can be considered that hypothesis 1 of the research was confirmed.

The alternative analysis made it possible to identify that the use of level 2 information (LEVEL II) is positively associated with the value of audit fees, as has been foreseen in the international literature, due to the discretion present in the definition of guidelines and premises for level 2 information. corroborating with Clor-Proell et al. (2014) that there are differences between the levels. Although the literature points out that level III information is more prone to subjectivity and discretion, increasing the complexity and effort on the part of the auditors, for the analyzed sample, the values evidenced at this hierarchical level did not present statistical significance that could prove such an argument.

Regarding the second study hypothesis, it was not possible to confirm it, given the statistical non-significance of the coefficient of the variable PÓS_CPC46. Thus, it is assumed that there are no differences between the fees in the periods before and after adoption of CPC 46, possibly because the greatest impact occurred in 2010 when there was the initial affiliation to international accounting standards.

Both models, the main and alternative, provide evidence that in the Brazilian market the use of fair value can be included as a factor that contributes to the increase in monitoring costs, in view of its positive relation with audit fees. Based on these results, it is suggested that companies develop mechanisms that reduce the uncertainty associated with assets and liabilities measured at fair value in order to reduce monitoring costs. To the standardizers, this study allows to identify the impact of the adoption of the fair value on the monitoring costs borne by the companies.

It is noteworthy, however, that this research is intended to study the cost associated with audit services, considering the environment for measuring assets and liabilities at fair value, without, however, investigating the benefits of this same service in that same environment. Looking into the benefits associated with fair value may become a future study. Another suggestion for future research, emerges from the analysis of descriptive statistics, and concerns

the independence of the audit firm when it provides other services concomitant with those of auditing the financial statements, so that a potential conflict of interest arising from the provision of other services by the auditor.

As a limitation of the research the absence or non-uniformity of the information available on the assets and liabilities measured at fair value is recorded; the failure to declare the amount paid exclusively as audit fees in the reference forms that led to a sample reduction, considering that observations needed to be excluded due to the lack of data.

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