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The impact from adapting of the IFRS 9 (CPC 48) on expected credit losses (ECL) in Brazilian energy companies

El impacto de la adopción de IFRS 9 (CPC 48) en provisiones por pérdidas crediticias esperadas (PCE) en las empresas brasileñas del sector de energía eléctrica

O impacto da adoção do IFRS 9 (CPC 48) nas perdas esperadas em crédito de liquidação duvidosa (PECLD) nas empresas brasileiras do setor de energia elétrica

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Abstract

Purpose: To identify the IFRS 9 (CPC 48) adoption impact on Expected Credit Losses, based on historical losses under CPC 38.

Methodology: a documentary, exploratory research was carried out in all the companies of the electric energy sector listed on the Brazilian Stock Exchange, denominated, Bolsa, Balcão (B3) of the Novo Mercado (NM), Level 1 (N1) and Level 2 (N2) of corporate governance. Analyzing all the expected losses disclosed in the financial statements, mainly the explanatory notes of 2017 and the first quarter of 2018. For the companies that disclosed these adjustments the Wilcoxon average comparison tests and the Boxplot diagram were performed.

Results: The survey results showed that not all the companies analyzed disclosed the adjustments and the accounting criteria of the SCPPs in the Explanatory Notes, according to CPC 48, and those that disclosed haven't had a significant impact on the adoption of the new CPC.

Contributions of the Study: This paper contributed to the reflection, understanding and analysis of the adoption, impact and empirical evaluation of the effects of the expected loss models on companies in the electricity sector, corroborating the effects of the Standard CPC 48 (IRFS 9) on the financial statements of companies classified as New Market, starting in January 2018, and may be useful in the process of regulating the segment, in decision-making and possible understanding of its potential effects, particularly in the adequacy of multinational standards. It was verified whether changes in expected losses measurement metrics could result in impacts on net income for the year, as well as changes in the net value of current assets, both of which are relevant to decision making. Such verification is relevant to the managers of the companies and investors, for security in relation to the maintenance of the form of performance verification.

Keywords: Expected Credit Losses, ECL, CPC 48, Electric Power Companies, IFRS 9.

Resumen

Objective: Identificar el impacto de la adopción de las IFRS 9 (CPC 48) en las provisiones por pérdidas crediticias esperadas (PCE) antes basadas en pérdidas históricas según el CPC 38.

Metodología: se realizó una investigación con carácter documental, exploratorio, en todas las empresas del sector de energía eléctrica listadas en la Bolsa de Valores de Brasil, denominada, Brasil, Bolsa, Balcão (B3) de los segmentos Nuevo Mercado (NM), Nivel 1 (N1) Nivel 2 (N2) de gobierno corporativo.

Results: Los resultados de la encuesta mostraron que no todas las empresas analizadas divulgaron en Notas Explicativas los ajustes y los criterios de contabilización de las PCE, conforme al CPC 48, siendo que las que divulgaron no demostraron impacto significativo en la adopción del nuevo CPC.

Contribuciones del estudio: Este artículo contribuyó a la reflexión, comprensión y análisis sobre la adopción, impacto y evaluación empírica de los efectos de los modelos de pérdidas crediticias esperadas en empresas del sector eléctrico, corroborando los efectos de la Norma CPC 48 (IFRS 9) en los estados financieros de las empresas clasificadas como Nuevo A partir de enero de 2018, pudiendo ser útiles al proceso de regulación del segmento del sector eléctrico, en la toma de decisiones y posible comprensión de sus potenciales efectos, particularmente en la adecuación de las normas multinacionales. Se verificó si los cambios en las métricas de medición de PCE pueden resultar en impactos en el resultado del ejercicio constatado, así como cambios en el valor neto del activo circulante, ambos componentes relevantes para la toma de decisión. Esta verificación es relevante para los gestores de las empresas e inversores, para la seguridad en relación con el mantenimiento de la forma de verificación de desempeño.

Palabras clave: Pérdidas Crediticias Esperadas, PCE, CPC 48, Empresas de Energía Eléctrica, NIIF 9.

Resumo

Objetivo: Identificar o impacto da adoção do IFRS 9 (CPC 48) nas Perdas Esperadas em Crédito de Liquidação Duvidosa (PECLD) antes baseadas em perdas históricas conforme o CPC 38.

Metodologia: Pesquisa documental, exploratória, com todas as empresas do setor de energia elétrica listadas na Bolsa de Valores do Brasil, denominada, Brasil, Bolsa, Balcão (B3) dos segmentos Novo Mercado (NM), Nível 1(N1) e Nível 2 (N2) de governança corporativa. Analisando as PECLDs divulgadas nas demonstrações financeiras, principalmente notas explicativas (NE) de 2017 e primeiro trimestre de 2018. Para as empresas que divulgaram estes ajustes foram realizados os testes de comparação de média de Wilcoxon e o diagrama de Boxplot.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

Resultados: Os resultados mostraram que nem todas as empresas analisadas divulgaram em suas NEs os ajustes e os critérios de contabilização das PECLDs, conforme o CPC 48, e as que divulgaram não demonstraram impacto significativo na adoção do novo CPC.

Contribuições do Estudo: Este artigo contribuiu para a reflexão, compreensão e análise sobre a adoção, impacto e avaliação empírica dos efeitos dos modelos de perdas esperadas em empresas do setor elétrico, corroborando os efeitos da Norma CPC 48 (IFRS 9) nas demonstrações financeiras das empresas classificadas como Novo Mercado, podendo ser úteis ao processo de regulação do segmento, na tomada de decisões e possível compreensão de seus potenciais efeitos, particularmente na adequação das normas multinacionais. Foi verificado se as alterações nas métricas de mensuração de PECLD podem resultar em impactos no resultado do exercício apurado, assim como alterações no valor líquido do ativo circulante, ambos componentes relevantes para tomada de decisão. Tal verificação é relevante para os gestores das empresa e investidores, para segurança em relação a manutenção da forma de verificação de desempenho.

Palavras-chave: Perdas Esperadas em Crédito de Liquidação Duvidosa, PECLD, CPC 48, Empresas de Energia Elétrica, IFRS 9.

1 Introduction

In 2007, Law 11.638 was issued in Brazil, amending law 6.404 dated 1976, called the Shareholding Company Law, with the purpose to adapt the Brazilian accounting to the international accounting standards and thus, provide higher transparency and quality of the accounting information. According to Herst and Duarte (2013), with the crisis in 2008, the need to create regulation to prevent crises, instead of only remediating them, was evident.

Until December 31, 2017, according to the Accounting Pronouncement Committee (2009), there may be impairment loss of asset or group of financial assets only if there are objective evidences of loss and impact on the estimated future cash flows.

According to Sayed, Souza, Costa and Tancini (2013), this model was very much criticized for recognizing loss abruptly and late. By the discussions at that time, there was a trend for a change to a model based on the expected loss, as that traditionally used in Brazil before.

After the crisis, relevant changes were made in the International Accounting Standards IFRS, in which the International Accounting Standards Board (IASB) issued IFRS 9, whose model was changed to expected loss, i.e., a model based on expectation and probability of loss. This Standard opposed the model used before, namely, International Accounting Standards (IAS) 39, a model of incurred historical loss. Such change contributed to convergence to the international standards and to make the financial statements more transparent, transmitting better quality of the information to the users to take decision.

Considering the time of convergence of the Brazilian standards to the international accounting standards with the purpose to strengthen the uniformity of the financial statements, on 12/22/2016, the Accounting Pronouncement Committee (CPC) disclosed Technical Pronouncement CPC 48 correlated to IFRS 9 in relation to recognition and measurement of

ECL, based on the calculation of expected loss and not historical loss anymore, as it was in the previous model of the IAS 39 standard, adopted in Brazil before.

According to KPMG (2016), the adoption of CPC 48, although approved and disclosed in 2016, entered in force in 2018, with the term of the Brazilian General Technical Accounting Standard – 48 (NBC TG 48). Since this year, it is not necessary anymore the event to occur for the expected loss to be recognized.

Upon the regulation of CPC 48 or IFRS 9, the Brazilian companies from the electric sector and from other sectors, should have calculated ECL of the first quarter 2018 based on their expected loss. For comparison purposes, according to Basic Conceptual Pronouncement (R1) - Conceptual Structure for Preparation and Disclosure of Accounting-Financial Report (2011), they should have recalculated and adjusted their ECL at the end of 2017, based on their expected loss, in addition to including in their explanatory notes both the change of criterion and the impact on the financial statements for 2018.

Based on this change and the possible effect of such adjustment on the companies' results, the following problem is presented: **after the change from historical loss to expected loss methodology, had the companies from the Electric Energy sector listed in the Brazilian stock exchange called Brazil, Bolsa, Balcão (B3), had a significant impact on the constitution of their ECL?** Thus, the purpose of this research is to identify whether there was an impact on ECL of the Electric Energy companies after adoption of CPC 48.

2 Review of the Literature

For review of the literature and technical support to this research, the theoretical reference was composed of the following topics: Electric Sector and its accounting; ECL in the terms of CPC 48 - IFRS 09 and Researches made on ECL in the terms of CPC 48 and IFRS 09.

2.1 Electric sector and its accounting

The Brazilian electric sector is controlled by the National Electric Energy Agency (ANEEL) related to the Ministry of Mines and Energy, created to regulated the Brazilian electric sector by means of Law no 9.427/1996 and Decree no 2.335/1997. The ANEEL main activities are regulation, inspection, implementation of policies, setting fares, solution of divergences and concession granting.

ANEEL has the authority to define standardized accounting norms for the electric sector and in February 2018, in published on its site that on “February 20, 2018 it was informed by the accounting innovations resulting from adoption of IFRS 9 and upon the preliminary perception of the characteristics of these accounting standards, it deemed prudent not to the receive them for regulatory purposes, until a deeper analysis of the way to comprehend the actual impacts within the regulatory scope is made”. Therefore, it is understood that this study analyzed whether the sector has applied the accounting standards set by CFC or are awaiting according to the ANEEL publication.

2.2 ECL in the terms of CPC 48 - IFRS 09

According Iudícibus, Martins, Santos and Gelbcke (2018), risks or uncertainty regarding the realization of trade bills or receivables shall be covered upon constitution of adequate adjustment for estimated credit loss. The purpose of using ECL is to adjust receivables to their

probable realization value, in addition to providing adequate adjustment to the competence regime in income from sale, in order to reflect more realistically the expected future cash flows as well.

CPC 48 also deals with recognition of expected credit loss by means of expected risk of default, and not based on historical analysis of the loss anymore as accounted before, as well as other topics on Financial Instruments correlated to IFRS 9, according to the International Accounting Standards.

This Technical Pronouncement deems it difficult to associate the risk of non-receiving to a single event, and brings a concept of combined risks, which might lead to non-receiving, leading to higher risk management.

According to Dantas, Micheletto, Cardoso and Sá Freire (2017), the big difference between IAS 39 and IFRS 9 is that one of the models is focused on the past, because it considers loss only when there is evidence of any loss, i.e., incurred loss, and the other one is a model aiming at the future for being an expected loss model.

When acquiring a financial asset, there is always a level of loss expectation for which estimated loss constitution is necessary. In the IFRS 9 model of expected loss, constitution of loss estimation is required considering such expectation in the initial period of 12 months. When the risk of default is significantly reduced, the provision shall be constituted considering the total period of the operation.

2.3 Researches made on ECL in the terms of CPC 48 - IFRS 9

Table 1 is presented below, containing a summary of the main publications about this topic between 2016 and 2018, the period after the disclosure of CPC 48.

Table 1.
Researches on the topic

Authors/year	Research	Findings
José Alves Dantas, Matheus Assis Micheletto, Fernando Augusto Cardoso, Antônio Augusto Pinho França de Sá Freire/2017	Credit Loss in the Brazilian Banks: expected and incurred loss models and impacts of IFRS 9	The loss levels in the statements in BRGAAP are comparatively higher than those recorded in the IFRS statements; they adjust more precisely to the effective loss in the credit operation if compared to the records in the BRGAAP statements; and the impact from the adoption of IFRS 9 shall make the IFRS statements record higher loss levels than the BRGAAP statements, in case the national model is not modified.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

Kátila Oliveira Silva, Antonio Robles Junior /2018	(ECL) calculated according to the Bacen and IFRS Standards: Comparison	After the research made, the relevance of ECL was confirmed, mainly in the results of the financial institutions, because this provision works as a credit portfolio reduction source and impacts result of the financial institutions directly.
Cipullo Nadiaa, Vinciguerra Rosab/2014	The impact of IFRS 9 and IFRS 7 on liquidity in banks: Theoretical aspects	This study tried to provide how, and to what extent, the content of IFRS 9 met the goals of the bank liquidity risk in terms of their evaluation and monitoring, and suggested that IASB should think about the possibility to issue a specific standard for bank institutions, deepening into the sector aspects more.
Enrico Onali, Gianluca Ginesti/2014	Pre-adoption market reaction to IFRS 9: a cross-country event-study	It suggests that the investors perceive the new regulation as a wealth factor for the shareholders and support the vision that higher comparability among the European companies' accounting standards is a benefit for the international investors and exceeds the costs of the firms' specific information.
Jan Marton, Emmeli Runesson/2017	The predictive ability of loan loss provisions in banks – effects of accounting standards, enforcement and incentives	The performance of the local GAAP is relatively better than IFRS in big and profitable banks. This impacts IASB and FASB, once they prescribe adoption of the expected loss model based on judgment in IFRS 9 and in the corresponding US GAAP standard (topic ASC 326), as well as for supervision authorities, which apply these standards.
Madeline Trimble/2018	A reinvestigation into accounting quality following global IFRS adoption: Evidence via earnings distributions	No systematic relation between the discretionary accruals levels and the actual profit management around the income benchmark was found for any method before or after the adoption of IFRS in 46 countries, mainly in countries with high enforcement and high levels of demand in relation to the quality of the accounting information.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

<p>Zóltan Novotny – Farka/2016</p>	<p>Title: The Interaction of IFRS 9 Expected Loss Approach with Supervisory Rules and Implications for Financial Stability</p>	<p>This article examines the interaction of the expected credit loss model (ECL) of the International Financial Reporting Standard (IFRS) 9 with the supervision rules, and discusses possible implications for the financial stability of the European Union. Anticipated recognition of credit loss will reduce the accrued loss and over-estimation of the regulatory capital, the evidence requirements will contribute to the market discipline; thus, contributing to financial stability. The bank supervisors may play an important role in the implementation of IFRS 9, but there is a lot of supervision intervention, there is a risk to introduce bias in the accounting of the loan loss, which might impair the integrity of the financial results. In general, the potential benefits of the standard will crucially depend on their adequate and consistent application in all jurisdictions.</p>
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Source: *Elaborated by the authors (2018).*

According to the summary of publications on this topic, it can be observed that there are a few researches directly related to the ECL topic in relation to CPC 48 and IFRS 9.

The studies listed in table 1 approach the same topic as the present article, but not necessarily under the same focus. Some of these focuses can be mentioned: Comparison between the loss levels in BRGAAP and IFRS (Dantas, Micheletto, Cardoso, & Sá Freire, 2017); investigation of the adherence of expected loss estimations based on IFRS in relation to the effective loss from credit operations (Dantas, Micheletto, Cardoso, & Sá Freire, 2017); comparison of what benefits IFRS 9 will provide to the international investors (Onali & Ginesti, 2014); identification of the relevance of the credit loss, mainly in financial institutions Silva & Robles Junior, 2018); Proof of compliance with the bank liquidity risk goals provided by the content of IFRS 9 (Nadiaa & Rosab, 2014); Verification of the local GAAP of the studied environment, presenting relatively better performance than IFRS in big and profitable banks (Marton & Runesson, 2017); demonstration that the result management relationship in adoption of international accounting standards in 46 countries was denied (Trimble, 2018); determination that anticipated recognition of loss provided by IFRS 9 will reduce the accrued loss and the evidence required by the standard will assist the market discipline, thus, contributing to financial stability (Novotny-Farkas, 2016).

Among the presented studies, Dantas, Micheletto, Cardoso and Sá Freire (2017) concluded that adoption of IFRS 9 should lead to reporting higher loss levels in the financial statements than the BRGAAP statements, in case the national model has not been modified. In relation to this conclusion presented by the authors, the present study presents significant contribution when demonstrating that such interference ended up not demonstrated, as presented in the result and analysis section.

Most researches related to the topic are associated with financial institutions, which were the sector that has been impacted by IFRS 9 the most because of the impairment accounting. The credit risk is a part of the routine of the financial institutions because it is one

of their main activities and is based on CMN Resolution No. 2.682, dated January 26, 1999, which guides on the expected loss precepts; and the model set in IAS39, which reproduces the assumptions of the incurred loss model. According to Araújo (2014), non-expected loss shall be covered by the own capital kept by the bank and not by the provision.

Based on Bouvatier and Lepetit (2008), there are two types of loss estimation models: *backward-looking*, for estimated loss in incurred loss, and *forward-looking*, when conceptually based on expected loss.

When the incurred loss concept is used, the measurement will be based on identified loss, which impacts current results. For this purpose, it is necessary to identify a “loss event”, which relates to possibility of future loss, and whose value can be estimated reasonably, and based on that, recognize a provision for loss according to Araújo (2014). Thus, the *backward-looking* model is based on situations from the past, which might impact future results or on the date of the analyzed financial statement.

If the expected loss model is used, the future loss estimation base is used. According to Caneca (2015), it consists in application of variable statistics, in order to estimate a reasonable value of loss, which will occur in the future and impact the cash flow of the entity, therefore, the provisions made based on the *backward-looking* model are considered estimations according to Bouvatier and Lepetit (2008).

3 Methodological Procedures

In this research, the methods used for analysis of the proposed goals conjugate qualitative and quantitative data. The qualitative analysis was based on a bibliographic research which, according to Martins and Théophilo (2016), is a research strategy for conduction of any scientific research, and according to Marconi and Lakatos (2015), they are secondary sources related to already published bibliographies, whether in books, loose publications, magazines, written press or articles, whose purpose is to place the researcher in contact with everything that has been written on the subject.

The main source of the research was CPC 48 and IFRS 9, which entered into force in January 2018, as well as theoretical productions by authors, who dedicate to this topic, and based on them, descriptive researches were made with the purpose to describe the characteristics of given population. They can be elaborated also with the purpose to identify possible relations between variables (GIL, 2010).

The researches were characterized by data survey, which is data published or informed by another researcher or another organization according to Loesch (2015). Document analysis technique was used, based on materials, which have not been analytically handled yet, i.e., they can be built based on the research goals according to Beuren (2006).

The sample contemplating analysis of EN of all traded companies from the electric power sector listed on the B3 site (www.b3.com.br), belonging to segments NM, N1 and N2, published in 2017 and the first quarter of 2018, verifying the values of the adjustments in ECL made by these companies.

The data of the traded companies was used because the financial market is “one of the biggest users of accounting information by means of analysts, brokers, institutional and individual investors, investment banks and other agents.” (Lopes & Martins, 2007, p. 9).

The total population of companies listed in B3 from the electric energy sector contemplated 61 companies. However, part of the sample are 22 companies, which participated in segments NM, N1 and N2, according to table 2:

Table 2.
Sample Composition

Segment N1		Segment N2		Segment New Market	
Name	Code	Name	Code	Name	Code
CEEE-D	CEED	AES TIÊTE	TIET	CPFL – Energia	CPFE
CEEE-GT	EEEL	ALUPAR	ALUP	CPFL – Renov	CPRE
CEMIG	CMIG	CELESC	CLSC	EDP - ENERGIAS BR	ENBR
CESP	CESP	ENERGISA	ENGI	ELETROPAULO	ELPL
COPEL	CPLE	RENOVA	RNEW	ENEVA	ENEV
ELETROBRÁS	ELET			ENGIE	EGIE
		TAESA	TAE	EQUATORIAL	EQTL
TRAN PAULIST	TRPL			LIGHT	LIGT
				OMEGA GER	OMGE

Source: *Elaborated by the authors (2018).*

A tying matrix was elaborated, presented in table 3, which, as affirmed by Mazzon (1981), is recommended for all academic works and shall be presented in their body to facilitate comprehension of the research problem, its goals, theoretical referential adopted of the research cases and the techniques used in the data handling.

Table 3.
Methodological synthesis and tying matrix

Research Problem	Upon this change from historical loss to expected loss methodology, had the companies from the Electric Energy sector listed in the Brazilian stock exchange called Brazil, Bolsa, Balcão (B3), had any impact on the constitution of their ECL?
Objective	Identify whether there was an impact on ECL of the Electric Energy companies after adoption of CPC 48
Outlining	Companies from the Electric Energy Sector listed in B3 in segments NM, N1 and N2. a) Total of 22 Electric Energy companies listed in these segments. b) Only 15 of which were analyzed, because 1 did not have its DFPs available on October 09, 2018 because of DFPs representation and other 6 did not constitute ECL for not having loss history.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

Standardized Financial Statements (DFPs) for 2017 and 2018 (first quarter).

a) Total of 30 Explanatory notes, because this is the place, where the information necessary for this research was found, namely, 15 related to 2017 and 15 to the first quarter 2018.

b) ECL - Values of adjustments related to CPC 48, the impacts from these adjustments and identification of the methods for constitution of ECL by expected loss.

This research is important, because CPC 48 revokes CPC 38 since January 01, 2018, changing the ECL constitution calculation method from historical loss to expected loss.

Upon this change, the companies shall parameterize the ECL accounts from 2017 to make them compatible in 2018, and had to make adjustment, which resulted in an amount to be analyzed to see the impact from the adoption of this new standard.

Justification

It is also important to identify what is contemplated in the expected loss method used by these companies since January 01, 2018.

The companies included in this research are traded companies and therefore, there are committed to provide disclosure of their accounting practices to internal and external users, to analyze indicators, distribute dividends, among others, making analysis of the adoption of the accounting standards and their impacts on the results of these companies extremely important.

The research methodology of this work was based on bibliographic research, which, according to Martins e Theóphilo (2016), is a research strategy for conduction of any scientific research. The main source was Technical Pronouncement CPC 48 Financial Instruments, correlation to the International Accounting Standards - OFRS 9, which entered into force in January 2018 and theoretical productions by authors, who dedicated to this topic.

Methodology

Descriptive researches were made characterized by data survey, using the document analysis technique in DFCs from 2017 and 2018 (first quarter) of the Electric Energy companies listed in B3 in segments NM, N1 and N2, using information coming from B3 with the purpose to compare the methods and the values of the ECL constitutions, as well as the values pursuant to the effects from the adjustment of the CPC 48 application.

For quantitative analysis, the Kolmogorov-Smirnov and Shapiro - Wilk normality tests were carried out using the R system, the non-parametric Wilcoxon's test and a Box-plot diagram were also carried out.

Theoretical Referential

2.1. Electric sector and its accounting

2.2. Expected Credit Loss (ECL)

2.3. ECL in the terms of CPC 48 - IFRS 09

Source: *Elaborated by the authors (2018).*

The main purpose of the elaboration of tablet 3 above was to demonstrate the work development simply and objectively.

For quantitative analysis, the Kolmogorov-Smirnov and Shapiro-Wilk normality tests were carried out using the R system, the non-parametric Wilcoxon's test and a Box-plot diagram were also carried out.

With the purpose to check whether there is a difference between the ECL balance before and after CPC 48 (IFRS 9), i.e., whether the ECL calculation adjustments determined based on historical loss values and the values determined based on expected loss values of ECL on 01/01/2018 are relevant, analysis of the means of the depending variables was made. In order to determine the statistical test to be used, normality of the variables was tested by the Kolmogorov-Smirnov (K-S) and Shapiro Wilk tests.

Based on Marôco (2010), the K-S test is used more for normality text. This test is used in order to decide whether the distribution of the studied variable in given sample comes from a special population. The Shapiro – Wilk test is an alternative test for the Kolmogorov- Smirnov test and also tests whether the analysis variable is normally distributed or not.

The Wilcoxon's test is a hypothesis test, using statistical concepts to reject or not a null hypothesis, which consists in equality between the means of the compared samples. This assumption is normally used when the thesis statistics follows abnormal distribution, i.e., a non-parametric test.

According to Martins e Theóphilo (2016), the Wilcoxon's test is about extension of the signal test, which is used for mirrored values, where the researcher wants to determine whether two conditions are different to evaluate the impact of the ECL constitutions based on loss.

This test evaluates the significance of the difference between the two mirrored measurements, when the depending variable can be measured in an ordinal scale. The depending variable of the Wilcoxon's test is the application of the ECL adjustment in relation to the change of the historical loss calculation corrected to expected loss calculation, according to CPC 48 (IFRS 9) in the start balance for 2018, determined and demonstrated in the financial statements of the electric energy companies of the sample of the present study.

The test was carried out to check statistically whether the variable of the ECL balance before CPC 48 (IFRS 9) and after the implementation of the standard had significant adjustment.

The null hypothesis of the tests can be described as:

H0: Value of the ECL balance at the end of the period 2017 = μ value of the ECL balance at the beginning of 2018 after CPC 48.

The test was carried out as the R program, which a language and an environment for integrated development for statistical calculations and graphs (R Core Team, 2018). This program is very well known and used in the academic environment and for this reason, it was selected for analysis of the present study. In the analysis of the result provided by the program, the criterion used for rejection is $H_0: p\text{-value} < \alpha$. The significance level – α assumed was equal to: 1%, 5% and 10%. To eliminate the effect of the variable size and the difference between the means, it was presented in percentage.

4 Results and Analyses

4.1 Qualitative Analysis

Analyzing the explanatory notes of the companies, it was identified that 11 out of the 15 companies contemplated in the sample disclosed the methodology they are using since January 2018 regarding constitution of ECL in the terms of CPC 48.

Table 4 shows the discloses in the explanatory notes in relation to the method used.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

Table 4.
ECL Calculation Methods

Companies	ECL Calculation Method the last quarter 2017 in Explanatory Notes	ECL Calculation Method Informed in the first quarter 2018 in Explanatory Notes
LIGHT	For consumers with significant values, an analysis is made of the receivable balance considering the recovery history of the Company, the negotiations in progress and the actual guarantees; and for other consumers, debits overdue for more than 90 days for residential consumers, more than 180 days for business consumers, or more than 360 days for other consumers, 100% of the balance is provisioned. The Company calculates the present value of the balances with payment terms over 180 days.	They used a prospective model based on the actual experience with credit loss in the last years, and considered sufficient by the Administration to face the possible losses in the credit receiving.
CEMIG	For consumers with significant values, an analysis is made of the receivable value considering the debt history, the negotiations in progress and the actual guarantees; and for other consumers, debits overdue for more than 90 days for residential consumers, more than 180 days for business consumers, or more than 360 days for other consumers, 100% of the balance is provisioned. For big consumers, individual analysis of the debtors and the initiatives in progress to collect the credits is made.	They adopted simplified approach and calculated the expected loss considering the average history of non-collection over the total billed every month,, segregated by consumer class, considering the invoice due age, including invoices, which are not due yet.
RENOVA	The Company understands that based on the studies carried out by the time being, there is no expectation for impairment loss to be recognized.	They evaluated and understand that there are no significant impacts in their balance and/or financial income in the application of the classification and measurement requirements in IFRS 9 (CPC 48),
ELETROBRÁS	Values receivable from consumers from the residential class overdue for more than 90 days, from the business class overdue more than 180 days and from the industrial, rural classes, public authority, public lighting and public services overdue more than 360 days, are provisioned. They also consider individual analysis of the receivable bonds and the balance of each consumer based on the Administration's experience in relation to the	They adopted simplified approach and calculated the expected loss based on the expected risk of default occurred along the life of the financial instrument. They set a calculation matrix based on the loss rates separate for every segment of customers.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

effective loss and the existence of actual guarantees.

ENEVA	They didn't disclose.	They adopted a risk matrix based on the last five years of the receivables, checking the loss history, considering all receivables from 2013 until March 2018. They calculated the expected credit loss rates separately for default customers. They applied the percentage result from their evaluation described above to the groups of due date range over 90 days.
ENGIE	Based on the actual credit loss experience in the last years. Values of receivables from customers do not contain significant financial components, a reason why in its analysis, the Company applied simplified approach, in which the evaluation of the expected loss is given by the entire life of the asset. Furthermore, for calculation of the expected loss, a matrix was used from the segregation of the customers based on common characteristics. It is necessary to highlight that the Company does not have loss history.	They adopted simplified analysis based on the actual experience with credit loss in the last years. A matrix was used from the segregation of the customers based on common characteristics. The Company does not have relevant loss history in the realization of these assets.
CEEE-D	By of the antiquity of due dates of the invoices, the existence of actual guarantees of non-receiving, consumer default history, installments of debits in force, debtors in concordat situations or analysis of values, which are under judicial discussion.	They made monthly analysis by building a loss matrix using a historical base of the last fifteen months. The company did not find any evidences that justify any recognition of additional loss.
CPFL – Energia	Based on history and probability of default and specifically for the distributors, here are the following criteria: Class - Residential 90 days; Business 180 days; Other classes 360 days; Miscellaneous invoices 150 days Installments of debits 90 days; In case of delay of an installment, the entire balance is provisioned.	They constituted based on the expected loss, based on history and future probability of default.
EDP – ENERGIAS BR	ECL Criteria - Current Values: i) Residential: overdue more than 90 days; ii) Business: overdue more than 180 days; and iii) Other classes: overdue more than 360 days.	They evaluated based on application of percentage on the receivables calculated from a historical study of default

		segregated by consumer class parameters. Thus, a risk matrix was constituted by period of default adjusted by the economic expectation of the current period, obtained by means of provision of parameters of the market default index of the Central Bank.
ELETROPAULO	The constitution is done by the total open amount of the deal, when the oldest over installment reaches the deadlines disclosed in explanatory note No. 5 (according to the consumer class). The values are reverted upon occurrence of one of the following events: (i) receiving of the value of each negotiated installment, considering that reversal is done proportionally according to the received amount and (ii) the amortized amount is equal to or greater than 30% of the total negotiated debt and complies with the plan, with the total reversal of the amount still open.	They evaluated based on the default history and the expected receiving of the contracts in force. Simplified approach with a matrix by due date age calculated according to the average history of non-collection on the total billed every month (based on 24 month billing), segregated by consumer class and designed using the average history of the last 12 months (by due date age).
EQUATORIAL	Customers with relevant debits - Individual analysis of the receivable balance from customers by consumption class, considered difficult to receive. For the 10 thousand biggest customers, with or without debts in installments, with invoices provisioned for impairment, all their other invoices are considered, overdue and to become due, for inclusion in the provision for impairment. For the other cases, we apply the rules below: Residential consumers - overdue more than 90 days; Business consumers - overdue more than 180 days; and Industrial, rural consumers, public authorities, public lighting, public services and others - overdue more than 360 days. The criteria presented above are also adopted for receivables in installments.	They evaluated based on the actual credit loss experience in the last years. They made a calculation matrix of the loss rates separate for every segment of customers. When applicable, the changes in the credit risk following published external credit evaluations were considered. After the analysis, it was concluded that the currently used criteria are sufficient.

Source: *Elaborated by the authors (2018).*

According to the summary of the publications demonstrated in chart 4, not all Brazilian companies from the electric sector disclosed the adjustments and the criteria for accounting of ECL according to CPC 48 in explanatory notes.

4.2 Quantitative Analysis

For quantitative analysis, the Kolmogorov-Smirnov and Shapiro-Wilk normality tests were carried out using the R system to verify the sample normality. After that, the non-parametric Wilcoxon test was carried out and a Boxplot diagram was made in 15 out of the 22

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

companies in the sample. The company CEE-GT did not have its explanatory notes disclosed by the date of collection of the information due to re-presentation of the notes, and Renova, Taesa, Omega Ger, Alupar, CPFL Renov and Tran Paulista had not constituted ECL for not having default history.

Table 5.
Sample List

Name	B3	ECL 2017 Balance	CPC 48 Adjustment	Adjusted ECL 01/2018
COPEL	N1	309,830	21,863	331,693
CELESC	N2	582,584	16,784	599,368
ENERGISA	N2	388,025		388,025
LIGHT	NM	737,085	256,577	993,662
CEMIG	N1	567,956	150,114	718,070
ELETROBRÁS	N1	1,688,795	79,824	1,768,619
ENEVA	NM	47,068		47,068
ENGIE	NM	6,469		6,469
AES TIÊTE	N2	2,777		2,777
CESP	N1	54,028		54,028
CEEE-D	N1	463,197		463,197
CPFL – Energia	NM	296,255	73,426	369,681
EDP - ENERGIAS BR	NM	254,758	6,814	261,572
ELETROPAULO	NM	334,383		334,383
EQUATORIAL	NM	443,755		443,755

Source: *Elaborated by the authors (2018).*

The test was carried out to verify statistically whether the values of the ECL balance of the samples before CPC 48 (IFRS 9) and after that presented statistically significant difference.

4.2.1 Normality Test

After obtaining the value of the sample variables according to the procedures described before, their normality was examined to check the type of test adequate to achieve the research goal. For the ECL events in the period 2017 calculated based on the historical loss and the initial

balance of the first quarter 2018 adjusted based on the expected loss according to CPC 48 (IFRS 9), the Kolmogorov-Smirnov e Shapiro-Wilk normality tests were carried out. The results from the normality tests for the balance before the CPC 48 (IFRS 9) standard and after the accounting standard with adjustment had abnormal distribution as presented in Table 6.

Table 6.
Normality Tests

Variable	N	Kolmogorov-Smirnov		Shapiro-Wilk		TEST
		P_Value	Decision	P_Value	Decision	
ECL 2017 Balance	15	0.0000022	Rejects H0	0.002389	Rejects H0	Non-Parametric
Adjusted ECL 01/2018	15	2,2E-07	Rejects H0	0.006355	Rejects H0	

Source: *Elaborated by the authors (2018).*

It can be observed that the variables of the ECL balance at the end of the period 2017, as well as the variable of the ECL balance adjusted after the CPC 48 (IFRS 9) standard at the beginning of the first quarter 2018, presented p-value < 0.05 and therefore, the Null hypothesis of the test is rejected and it is inferred that both samples did not present normal distribution. Thus, the hypothesis test adequate for comparison between the variables is the non-parametric Wilcoxon's test.

The Wilcoxon's test evaluates the significance of the difference of the samples in relation to the adjustment of ECL loss based on historical values to loss based on expected values. The results obtained upon application of the Wilcoxon's test are presented in Table 7.

4.2.2 Wilcoxon's Test

The Wilcoxon's test evaluates the significance of the difference of the samples in relation to the adjustment of ECL loss based on historical values to loss based on expected values. In table 7, there are the results obtained upon application of the Wilcoxon's test.

Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

Table 7.
Wilcoxon's Test

Sample	n	P_Value	Mean		Difference of the means	Decision		
			ECL 2017 Balance	Adjusted ECL 01/2018		$\alpha = 1\%$	$\alpha = 5\%$	$\alpha = 10\%$
1	15	0.8033	6,176,965	6,782,367	605,402	Does not reject H0	Does not reject H0	Does not reject H0

Source: *Elaborated by the authors (2018).*

Starting from the null hypothesis H0 that the means of the ECL balances at the end of the period 2017 and the initial ECL balances adjusted according to CPC 48 (IFRS 9) of the first quarter 2018 are not statistically different, it is observed that H0 cannot be rejected at the lowest significance level of 1%. Thus, it is inferred that statistically, the average balance of ECL before and after the change of the standard does not show significant difference.

4.2.3 Boxplot

In order to obtain better visualization of the result from this descriptive statistical analysis, the boxplot graph tool was used. Boxplot is a graphic tool to represent the variance of observed data of a numeric variable by means of quartiles.

On Figure 1, there is the diagram of the boxplot with the result of the ECL values with the loss values calculated based on historical loss and based on expected loss. This diagram was obtained by means of the R system based on the balances and the analyses of the normality and the Wilcoxon's tests.

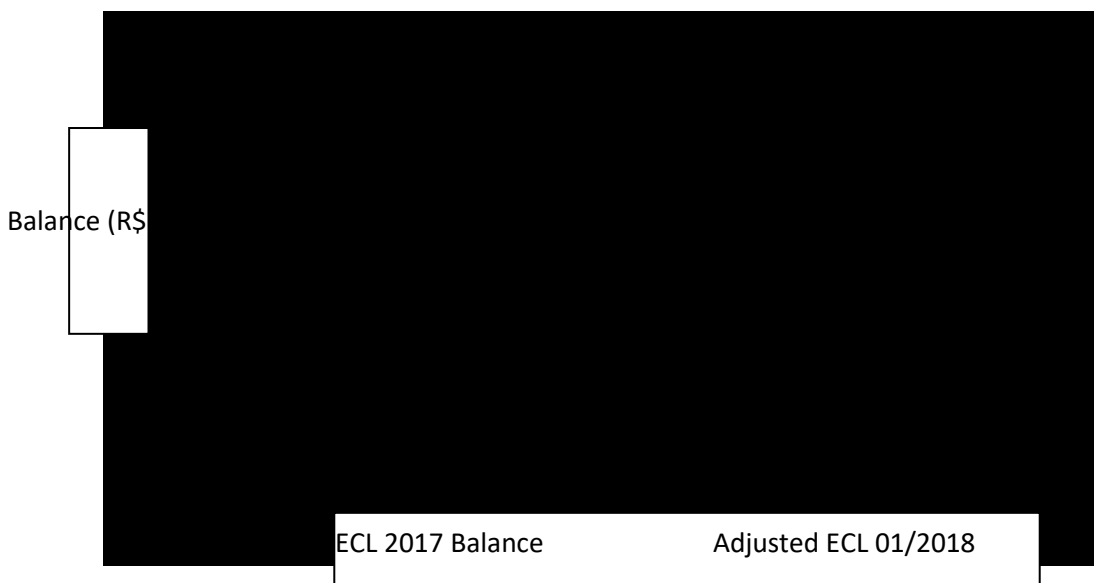


Figure 1 Boxplot of the comparison of the Balance in 2017 and the adjusted Balance for 2018.

Source: *Elaborated by the authors (2018).*

As mentioned, the studies listed in table 1 approach the same topic as the present article, but not necessarily under the same focus. Thus, it was not possible to compare the results to other articles, both national and international.

Based on the Boxplot diagram, it is evidenced that the medians of both samples are very close and therefore, proving the result from the Wilcoxon's test that there was not significant adjustment of the ECL balance of the analyzed companies.

Therefore, both based on the mean comparison test and the Boxplot diagram, no statistically significant differences were found in the constitution of ECL in the analyzed sample pursuant to the change of the way to calculate this estimation upon adoption of Technical Pronouncement CPC 48.

The recognition of estimated credit loss is relevant (Silva & Robles Junior, 2018). In the terms of the accounting standardization, relevant information is information able to make difference in the decisions to be taken by the users, even if the users decide not to take it into consideration, or which they have already been aware of the same information by other means Basic Conceptual Pronouncement (R1), 2011).

In this context, when studying possible changes related to the measurement of the credit loss estimation, the present work contributes to conclude that this variable considered relevant was not significantly changed upon adoption of the new calculation methodology since 2018, thus, providing the users with support accounting information related to possible changes in equity and income accounts of the companies.

In relation to previous studies, it was expected that the impact from the adoption of IFRS 9 would lead to recording higher loss levels than those in the BRGAAP statements, in case the national model was not changed (Dantas, Micheletto, Cardoso, & Sá Freire, 2017). This didn't happen, once the national model was modified following the provisions in IFRS 9, by means of approval of Technical Pronouncement CPC 48 - Financial Instruments on 11/04/2016, text correlated to the referred international standard.

5 Final Considerations

The purpose of the present study was to evaluate whether there was impact pursuant to the change in the standard related to the way to recognize estimated credit loss based on the amendment of the CPC 48 – IFRS 9 standard. If positive, check whether it has been relevant between the loss levels disclosed in the companies from the electric energy sector.

The results from the empiric tests carried out based on the financial statements of 15 companies from the electric energy sector listed in B3 in segments NM, N1 and N2 at the end of the period 2017 and comparatively to the initial balance of the first quarter 2018 revealed that the ECL adjustments to estimated loss evidenced in the financial statements and/or explanatory notes of the analyzed companies were not relevant.

These empiric evidences that confirmed the research null hypothesis, supported the theoretical assumption on the estimation of loss based on the expected loss. The assumption is that the estimated loss based on the expected loss model was adjusted by the companies from the electric energy sector in the analyzed sample and these adjustments were considered not relevant.

Based on the Boxplot diagram, it is evidenced that the medians of both samples are very close. It shall also be highlighted that the result from the Wilcoxon's test proves this information, because it demonstrates that there was not significant adjustment in the ECL balance of the analyzed companies. Therefore, both based on the mean comparison test and the Boxplot diagram, no statistically significant differences were found in the constitution of ECL in the analyzed sample pursuant to the change of the way to calculate this estimation upon adoption of Technical Pronouncement CPC 48.

This study contributed to the progress of literature about the topic in terms of adoption, impact and empiric evaluation of the effects of the expected loss models in companies from the electric sector, specifically, in relation to the adoption of Technical Pronouncement CPC 48, providing a dimension based on empiric validation. The change of the procedure for measuring credit loss estimation might significantly affect the equity of the studies companies, once the constitution of Estimated Credit Loss is compensated in the Income Statement for the Period. This reflex might impact the result determined for the period, in the amount of the current assets and in the amount of the net equity, which might result in change of indicators obtained from financial statements broadly used by users of accounting information, internal or external. As demonstrated in the study, the effects found were not considered significant, thus, it was found out that there is lack of significant impact pursuant to the adoption mentioned in the present study.

Furthermore, for studying an accounting variable considered relevant, in the normative meaning of the term, the results obtained provide support to the users of accounting information when indicating that no significant changes are expected in the financial statements of the companies pursuant to adoption of the new methodology for measurement of estimated credit loss.

It shall be highlighted that this study was limited to the electric energy sector and only companies listed in B3, thus, not enabling to carry out inferences related to all companies belonging to this sector. As a proposal for future works, it is suggested to expand to other sectors.

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Aline Thatyana Aranda da Rocha Branco Alcantara Alves, Maria Paula Ribeiro Bordin, Alexandre Gonzales and Fernando de Almeida Santos

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