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COMPARABILITY OF THE MEASUREMENT OF INVESTMENTS PROPERTIES OF PUBLIC THE OPEN COMPANIES LISTED ON B3: AN ANALYSIS UNDER THE OPTICS OF T AND H

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ABSTRACT

The international standards symbolized the beginning of the harmonization of accounting standards, which includes, among other qualitative characteristics, the comparability of accounting information. The CPC 28 (2009) allows for accounting choices between the cost and fair value method in the measurement of Investment Property (PPI). The general objective of this article is to verify the level of comparability of the measurement after the initial recognition of the PPI of the public companies listed on B3. The sample consisted of the 91 companies that presented PPI balance in 2015. The data were collected in the Financial Statements and in the Explanatory Notes. To verify the level of comparability, the H index introduced by Van der Tas (1988) and the T index proposed by Taplin (2004) were used. The results showed that 40% of the companies opted for the cost method, 36% through the fair value method and 24% didn't disclose the method used. Additionally, it was observed that 58% of the companies using the cost method disclosed the fair value. As for the comparability analysis, an average level for the sample was verified according to the first approach of the T and H indexes, but with values very close to a low level.

Keywords: Comparability. Accounting Choices. Investment Property.

1 INTRODUCTION

The growth of capital markets in different countries has promoted a greater concern about the disclosure of relevant information to attract new investors and increase the level of confidence of companies in the market (Vaz, Gonçalves, Niyama, & Gonçalves, 2010). Thus, international standards, called *International Financial Reporting Standards* (IFRS), elaborated by the *International Accounting Standards Board* (IASB), have as objective the harmonization of accounting standards. In Brazil, the process of convergence began with the adoption of the Law No. 11.638/2007, but only from 2010 on, the instructions were required (Thomaz, Kronbauer, &

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Schneider, 2015).

According to Cairns, Massoudi, Taplin and Tarca (2011), one of the main objectives of adopting IFRS is to improve the comparability of financial reports. This qualitative characteristic improves the usefulness of accounting information, as it allows the comparison of financial reports between different entities or between the same entity in different periods (CPC 00 R1, 2011). In order to enable comparability, some norms allow the company to opt for the method of accounting for certain items, that is, they provide *accounting choices*.

The technical pronounce CPC 28 (2009) (*International Accounting Standard* [IAS] 40) deals with properties for investment (PPI) and allows the accounting choice between the cost method and the fair value in the measurement after the initial recognition of these Properties, which are maintained for obtaining income and/or capital valuation.

> Property for investment is the property (land or building – or part of building – or both) maintained (by the owner or by the tenant in financial leasing) to earn rent or for valuation of the capital or for both, and not for:
> (a) Use in the production or supply of goods or services or for administrative purposes; or
> (b) sale in ordinary business course.
> Property occupied by the owner is the property held (by the owner or by the tenant under financial leasing) for use in the production or supply of goods or services or for administrative purposes. (CPC 28, 2009, p. 3)

As the existence of accounting choices in the measurement of PPI can influence the comparability of information among financial reports, this study presents the following research problem: What is the level of comparability of the measurement after Initial recognition of the investment properties of open companies listed in Brazil, Bolsa, OTC (B3)?

In this context, the general objective is to verify the level of comparability of the measurement after the initial recognition of the investment properties of the companies listed in B3. On the other hand, specific objectives can be defined as: (i) identify the method used to measure the properties for investment; (ii) to ascertain compliance with the purpose of disclosure of the fair value provided for in CPC 28 (2009) and (iii) to analyze the comparability level of the companies listed in B3.

The research is justified because, despite the harmonization of accounting standards defined by international norms, the flexibility in measuring PPI can influence the quality and comparability of information. Thus, the lack of equivalent standards can impair the relevance of information and decision making of internal and external users.

Thus, the study intends to contribute to the research line that evaluates the influence of accounting choices in the comparability of financial reports of Brazilian companies, contributing to the literature through the use of indexes of comparability. Few studies are concerned with the measurement of the level of comparability by means of indices, which reveals the existence of a gap in the theme.

Considering that CPC 28 (2009) allows alternative methods in the subsequent measurement of the initial recognition of PPI, and that the CPC 00 R1 (2011) Highlights comparability as a qualitative characteristic that must be present in the accounting information, the Results of this research also seek to motivate the reflection on the part of regulators about the usefulness and impacts of accounting choices in financial reports.

2 THEORETICAL FRAMEWORK

2.1 Comparability and accounting choices

The accounting information has as one of the main objectives the assistance to users in decision making, such as investment decisions or even for credit operations (Pereira, 2013). Thus, to be relevant, such information should present equivalent standards with regard to measurement and evaluation, so that they are comparable, regardless of the entity, the country

or even the period analyzed (Araújo, Souza, & Lemes, 2015; Rabbit, Campagnoni, & Rover, 2016).

According to the Conceptual Framework for the Elaboration and Dissemination of Accounting-Financial report-CPC 00 (R1), elaborated by the Accounting Pronouncements Committee (CPC) in 2011, comparability is presented as one of the qualitative characteristics Responsible for improving the usefulness of information provided to internal and external users and by advising the choice between equivalent alternatives in relation to the relevance and reliability of the information. In addition, verifiability, timing and comprehensibility are highlighted.

This improvement feature makes accounting information more useful from the time it can be compared between different entities or between the same entity in distinct periods. It is important to emphasize that this qualitative characteristic presupposes the existence of at least two items in order to identify and comprehend their similarities and differences (CPC 00 R1, 2011). The Conceptual Framework still highlights that: "although a singular economic phenomenon can be represented with the reliability of multiple forms, the discretion in choosing alternative accounting methods for the same economic phenomenon decreases comparability" (CPC 00 R1, 2011, item QC 25, p. 18) .

In this sense, international norms recognize that alternative accounting methods, known in the literature as *"accounting choices"*, influence the comparability of information. According to Fields, Lys and Vincent (2001), an accounting choice can be defined as any decision that aims to influence the *output* of an accounting system, in relation to financial statements, tax returns and regulatory documents.

Botinha and Lemes (2016) sought possible explanations that justified the choice in the face of different accounting methods. Based on the positive theory of accounting, we identified the presence of three hypotheses that influence accounting choices: Incentive plan, degree of indebtedness and size or political costs. The first hypothesis proposes that the administrators will opt for the alternative that increase the profit, adding values for their remuneration and bonuses. The hypothesis of the degree of indebtedness suggests that companies with a higher level of indebtedness will seek choices that increase profits to, for example, capture investments. The latter, in turn, indicates that the largest companies will prioritize accounting methods that reduce profit to lower costs and political attention.

Besides this empirical perspective-positivist, Pinto, Martins e Silva (2015) and Botinha and Lemes (2016) approached the influence of the *status quo* for explanations of accounting choices, which represents the maintenance of a decision to represent an information Accounting, preventing the change to avoid costs and risks and remain in the "comfort zone". It is noteworthy that the existence of alternative methods, although in some cases assisting the company, influences the decision making of internal and external users, hinders the application of the qualitative characteristic of comparability by allowing different Forms of measurement for similar facts and reduces the usefulness of accounting information (Andrade, Silva, & Malaquias, 2013).

Fearnley and Gray (2014), in order to investigate the adoption and implementation of IFRS in the European Union, by examining the ways of measuring PPI from 66 companies, in the period 2005 to 2010, found that national institutional factors and values Continue to be more important to explain accounting choices in the measurement of PPI in relation to legal factors and the development of the stock market. In this way, it is possible to verify the factors that justify why many companies maintain the approach of the cost method in measuring the properties for investment.

Accounting choices can be observed in accounting for customer loyalty programs (Araújo *et al*., 2015); In measuring, evaluating and evidencing inventories (Coelho *et al*., 2016); In the accounting treatment of intangible assets (Souza, Silva, & Costa, 2013) and in the measurement of biological assets (Botinha, Santos, & Lemes, 2013). The focus of this study is the accounting choice existing in the measurement after the initial recognition of PPI.

Research on comparability is mainly divided into two aspects: The Strand that evaluates the impact of IFRS adoption on internal accounting variables and the capital market, analyzing the improvement of comparability, and identifying the level of Comparability from the existence

of accounting choices in companies (Souza & Lemes, 2016). According to Cole, Branson and Breesch (2008, 2009), comparability can be measured by techniques based on indexes or statistical models, and the authors explore characteristics of indices H, C, I, V and T.

Van der Tas (1988) was responsible for introducing the first indices of measurement of the comparability of the financial statements: Indexes H, C and I. The Herfindahl Index (h) was initially developed by Herfindahl, as a measure of concentration Industrial, and adjusted by Hirschman, but introduced only in 1988 by Van der Tas. This is a concentration index that ponders the relative frequencies of each accounting method. The relative frequency is obtained by dividing the number of companies opting for a given accounting practice and the total number of companies. The H-index reveals greater comparability when companies concentrate on a single method, and their values range from 0 to 1.

The comparability index (C), also introduced by Van der Tas (1988), is based on the number of pairs of compatible companies and the number of possible pairings. This index measures the probability that two randomly selected companies have comparable accounts, varying between 0 and 1, and can match the H index if the number of firms is sufficiently large and there are no multiple reports (Cole *et al.*, 2008, 2009).

Index I represents a concentration index, as well as H, and emerged as a measure of international comparability of materials. It is important to highlight that this index is one of the most criticized among those introduced by Van der Tas (1988). It indicates the degree to which companies belonging to a country apply it or only a limited number of alternative methods, compared to companies from other countries. This index does not take account of multiple accounting reports, since the company can be associated only with an alternate method. In addition, it ignores non-disclosure, does not present partial comparability and its values fluctuate between 0 and 1 (Cole *et al.*, 2008, 2009).

In addition to the indices of Van der Tas, Krisement introduced in 1997 the Entropy Index, an alternative method of concentration index. Entropy is an inverse measure of the degree of comparability. Thus, when entropy is at its maximum level, the level of comparability is considered to be minimal. Subsequently, the V index was developed to determine whether there are small differences between regions when accounting practices are compared (Cole *et al.*, 2008).

The last index stands out as one of the most important and complete in researches about the level of comparability: The T-index, introduced by Taplin (2004), and which includes all the possibilities of the previous ones, representing the probability of two companies Randomly selected account for comparable accounts. In 2006, Taplin developed the Harmoniser Software, an Excel spreadsheet, with the objective of calculating the index (Cole *et al.*, 2008). Table 1 shows the main characteristics of the comparability indexes H, C, I, V and T.

Table 1
Characteristics of Comparability Index

Characteristics of Indexes	H	C	I	V	T
Consider the number of surveyed companies	Yes	No	No	Yes	Yes
Consider the size of the countries examined	No	No	No	No	Yes
Consider the non-disclosure (*non-disclosure*)	Yes	Yes	Yes	No	Yes
Considers multiple accounting choices	No	Yes	No	No	Yes
Consider the partial comparability	No	No	No	No	Yes
Sensitivity to zero frequency	No	No	Yes	No	No
National Comparability (N), International (I) or both (A)	N	N	I	I	A
Ability to determine a probability interval	No	No	No	No	Yes
Allows the sector analysis with weights	No	No	No	No	Yes

Source: Adapted from Cole, V., Branson, J., & Breesch, D. (2008). An analysis of methods to measure the comparability of the consolidated financial statements of the European listed companies from the viewpoint of user. *Accountancy & Bedrijfskunde*, *28*(3), 1-31; Cole, V., Branson, J., & Breesch, D. (2009). How to measure the comparability of financial statements?. *International Journal of Managerial and Financial Accounting*, *1*(4), 379-397; and Souza, F. E. A., & Lemes, S. (2016). Comparability of accounting choices in the subsequent measurement of fixed assets, intangible assets and investment properties in South American companies. *Revista Contabilidade & Finanças*, *27*(71), 169-184. (2018).

Thus, it is perceived that the level of comparability of accounting information can be evaluated by means of different indexes, but those proposed by Van Der Tas (1988) and Taplin (2004) are highlighted. Araújo *et al.* (2015), Souza, Silva and Rech (2015) and Botinha *et al.*

(2013) applied the H index (*Herfindhal*), while Coelho *et al.* (2016) and Souza, Botinha, Silva and Lemes (2015) used the index T.

2.2 Investment properties

The property for investment (PPI), item regulated by the technical Announcement CPC 28 (2009), referring to the *International Accounting Standard* (IAS 40, *Investment Property*), can be understood as the property retained to obtain rents and/or value capital. It differs from the property occupied by the owner because it is not used for use in the production, supply of goods and services or administrative purposes, and also for generating cash flows independent of other assets belonging to the entity (CPC 28, 2009).

CPC 28 (2009, p. 3 and 4) cites some examples of PPI, such as "land maintained for long-term capital appreciation and not for short-term sale in the ordinary course of business" and "building that is vacant, but maintained to be leased under one or more leased operating systems."

As for the measurement, the PPI initially must be recognized by the cost – the purchase price and expenditures, such as professional remuneration of legal services, transfer taxes and others. After the initial recognition for the cost, these properties can be measured at fair value or by cost, through the choice of accounting policy adopted by the entity (CPC 28, 2009). The fair value is defined as "the price that would be received for the sale of an asset or that would be paid for the transfer of a liability in a non-forced transaction between market participants of the measurement date" (CPC 28, 2009, p. 2).

The entity is obliged to disclose whether the cost method or the fair value method is applied in the subsequent measurement of the initial recognition of these properties, in addition to other information, according to item 75 of CPC 28 (2009). It is important to highlight that, even if the entity chooses the cost method, it is mandatory to measure the fair value of PPI for disclosure purposes. If the choice is by the fair value method, the purpose of measurement is occurring. Thus, it appears that there is an "incentive" for measurement through fair value policy, since the entities are obliged to measure it independently of the chosen method.

Since the measurement of PPI after initial recognition can be performed in two different ways, it is identified the presence of accounting choices that can directly influence the comparability of the financial statements of companies of equal or different countries. The IASB stated that it allowed the use of the options between the cost method and the fair value method by countries with less developed markets and that could have a greater difficulty in adopting fair value (Costa, Silva, & Laurencel, 2013). Thus, it is assumed that the fair value method is preferable by the IASB and that the most developed markets tend to use this policy for posterior measurement of PPI. However, several studies apply in this area, analyzing which method is more applied and defending those who consider representing a more relevant accounting information.

2.3 Previous studies

The accounting choice between the cost method and the fair value method in the measurement of PPI and its reflection in the qualitative characteristic of comparability was studied in national and international articles, which contributed significantly to the area. While some seek to verify which method is most applied between different countries or between the same country, others seek to identify the explanatory factors for the accounting choice or even check the level of disclosure of properties against the rules of CPC 28 (2009).

Costa *et al.* (2013) sought to investigate what are the economic incentives for choosing the accounting method in the measurement of PPI, demonstrating the occurrence of each accounting method and the quality of the information disclosed, according to the requirements of CPC 28 (2009). In the sample of 36 Brazilian non-financial public companies, the authors identified that 39% adopted the fair value method. Moreover, the economic incentive found in the study was the size of the company, represented by the net revenue. Regarding disclosure, the study identified that 68% of the companies opting for the cost method disclosed the fair value in explanatory notes.

In this way, the authors concluded that companies belonging to the same sector presented different accounting choices in the measurement of PPI, and that the level of disclosure compliance, according to CPC 28 (2009), is below the expected. Such findings affect the comparability of financial statements, since users are at risk of making decisions based on information raised by different methods, and incomplete disclosure deprives them of access to important information. The study also confirmed the hypothesis of incentive plans, because companies with lower net revenues tend to measure their properties by the fair value method, increasing the result.

Analyzing the accounting choices for PPI, during the years 2009 and 2010, of 39 companies belonging to the stock exchange, commodities and futures of São Paulo (BM & FBovespa) and possible significant variables related to the method, Andrade *et al.* (2013) verified that 44% adopted the fair value method and, consequently, 56% adopted the cost method. Besides that, it was concluded that none of the study variables was related to the accounting choice for PPI measurement.

Kolozsvari, Marques and Macedo (2014) studied the real estate segment of commercial enterprises seeking to define the impact of choice between the options of measurement policies in the IPs in the results of companies. Through a form of calculation to compare results before taxes, the study illustrated that companies that use fair value for measurement have better results and profitability.

The article by Silva, Fonseca and Nogueira (2014) presented as objective the study of the level of conformity of companies during the exercise of 2012, according to the disclosures required by the technical Announcement CPC 28 (2009). Thus, the authors found that the level of disclosure of the companies opting for the cost method was more satisfactory than that of the companies that opted for the fair value method. The companies belonging to the branch of real estate exploitation were those with the highest percentage of disclosure, since they presented more significant values for PPI. In addition, the study identified difficulties in evidencing PPI in financial statements and explanatory notes, affecting the comparability of information and decision making of investors.

Souza *et al.* (2015) studied the degree of comparability and the determinant factors for the accounting choice of measurement, after the initial recognition for PPI, of Brazilian and Portuguese open companies between 2010 and 2012. Through the T Index (*T index*) for the measurement of national and international comparability and the parameters established by Souza *et al.* (2013), it was found that the Brazilian comparability is considered average and has been decreasing. Although they also presented an average comparability, Portuguese companies had stable values between 2010 and 2012.

From an analysis of the annual reports published in 2008 by 96 Chinese companies, Taplin, Yuan and Brown (2014) found that half uses the fair value to measure the properties for investment. Through the T-index, the authors found that companies with international influence that is, with international transactions and/or listed in global stock exchanges, are more likely to use the measurement at fair value.

The international comparability between Portugal and Brazil, in the study of Souza *et al.* (2015), was characterized as mean, with values close to a low and decreasing comparability over the years. Regarding the explanatory variables for the choice of the accounting method, the study identified *big four*, country, indebtedness, relevance of the balance of the properties and net income. The article presented as one of the main contributions to the use of the T index.

In order to identify the possible characteristics for accounting choices in open companies of BM & FBovespa and NYSE in PPI in the year 2013, Botinha and Lemes (2016) concluded that there was a greater use of the cost method by companies in both stock and that the significant variables for accounting policy decision were *big four*, company size, relevance of the PPI balance and the Telecommunications sector.

The authors found results that provide evidence of the existence of a *status quo*, which relates to the "comfort zone", and did not recognize that companies belonging to more developed markets would have greater acceptance to fair value, since the percentages To adopt this method between NYSE – the most developed capital market – and BM & FBovespa were close.. As for the purpose of disclosure of fair value, Botinha and Lemes (2016) found that

68% of the companies opting for the cost method respect the obligation present in CPC 28 (2009) regarding the accounting *disclosure* of PPI, but the scenario of the two stock exchanges Presented distinct. While on the NYSE 86% of the companies disclosed the fair value, at BM & FBovespa only 55% of the companies did. In addition, the study contributed to the theme through information about the positive theory of the accounting of Watts and Zimmerman (1986) and the theory of the agency.

Kwinto and Voss (2016), through the study of the forms of recognition, measurement and dissemination and the way of presenting information about PPI in the standardized financial statements, found that approximately 90% of the companies belonging to the largest groups of the *Warsaw Stock Exchange*, use the cost method in the measurement of PPI, and that the low rate of application of the fair value method may be related to the difficulty in measuring and the fact of being in use in a short period of time.

National research on PPI is mainly concerned with the investigation of variables that may explain the accounting choice between the cost method or fair value in the measurement after initial recognition. It is possible to observe that few of them applied comparability indexes, which reveals a gap in the theme. Thus, it is justified to investigate the comparability of PPI measurement, which influences the relevance of accounting information and decision making of internal and external users.

3 METHODOLOGICAL PROCEDURES

This article has as characteristic a descriptive methodological classification because it studies the behavior of companies regarding the choice between the methods of measurement of PPI. Descriptive research seeks to report aspects of a population or phenomenon and even establish connections between the analyzed variables (Gil, 2008).

As for the procedures, the survey represents a *survey*. According to Martins and Theóphilo (2009, p. 60), "the surveys are proper for the cases in which the researcher wants to answer questions about the distribution of a variable or the relationships between characteristics of people or groups". The methodological approach is identified as quali-quantitative, as it presents quantified data and analyzed by means of statistical techniques and others that represent non-susceptible descriptions (Martins & Theóphilo, 2009).

The study population includes the 457 open companies listed in B3, belonging to ten distinct sectors. It is important to highlight that 13 companies that did not present standardized financial statements (DFP) dated 31/12/2015 were excluded. For the definition of the sample, information was collected regarding the existence of PPI in the DFP and explanatory notes (NE), and the companies that presented balances for these properties were selected in the 2015 social year.

Table 2 shows the total number of companies per sector listed in B3 and the quantity of companies that have and do not have a balance for PPI in the year 2015. Thus, it is concluded that of a total of 457 organizations, the study sample consists of 91 companies from the ten distinct sectors listed. In addition, it is verified that the sample represents 20% of the population and that the sector with the highest percentage of companies with a balance in PPI is non-cyclical consumption.

Table 2
Population and Sample

Sector	NOTE	No. Companies without PPI	%	No. Companies with PPI	%
Industrial Goods	76	65	(86%)	11	(14%)
Cyclical Consumption	85	65	(76%)	20	(24%)
Consumption Not Cyclical	20	13	(65%)	7	(35%)
Financial and Other	135	109	(81%)	26	(19%)
Basic Materials	34	29	(85%)	5	(15%)
Oil, Gas and Biofuels	11	9	(82%)	2	(18%)
Health	13	10	(77%)	3	(23%)
Information technology	8	7	(88%)	1	(13%)
Telecommunications	7	6	(86%)	1	(14%)

Public Utility	68	53	(78%)	15	(22%)
Total	**457**	**366**	**(80%)**	**91**	**(20%)**

Source: Prepared by the authors (2018).

The data collection technique was content analysis, performed in the DFP and in the NE of the companies with respect to PPI. Thus, information was investigated regarding the value of PPI, the method chosen for measurement after initial recognition and the fulfillment of the disclosure requirement of the fair value of the companies that opted for the cost method, as stated in the CPC 28 (2009).

To verify the comparability level of the companies, the H index was applied, proposed by Van der Tas (1988), and the T Index (*T-Index*), proposed by Taplin (2004).. The H-index is calculated through the weighting of relative frequencies of the alternative accounting methods. The frequency of an accounting method comprises the number of companies that opt for this method. The relative frequency is obtained by the number of companies opting for a given accounting method divided by the total number of companies. Thus, the index reveals a higher level of comparability when companies concentrate on only one or a limited number of accounting practices (Van der Tas, 1988).

The form for calculating the H-index is presented in the Van Der Tas Survey (1988). The variable *n* represents the number of alternative accounting methods, and the variable *Pi* is the relative frequency of the accounting method *i*.

$$H = \sum_{i=1}^{n} p_i^2$$

Figure 1. Index General Formula H

Source: Van der Tas, L. G. (1988). Measuring harmonization of financial reporting practice. *Accounting and business research*, *18*(70), 157-169.

The T-index determines whether the accounting accounts of different companies are comparable, according to the chosen accounting methods (Coelho *et al.*, 2016). The general formula for calculating the T-index is presented in the study by Taplin (2004, p. 61):

$$T = \sum_{i=1}^{N} \sum_{j=1}^{N} \sum_{k=1}^{M} \sum_{l=1}^{M} \alpha_{kl} \beta_{ij} P_{ki} P_{lj}$$

Figure 2. Index General Formula T

Source: Taplin, R. H. (2004). A unified approach to the measurement of international accounting harmony. *Accounting and Business Research*, *34*(1), 57-73.

The formula variables are, according to Taplin (2004, p. 61):
αkl – the coefficient of comparability between the accounting methods k and l;
βij – the weighting for comparison between companies from countries i and j;
Pki – the proportion of companies in the country i k using the accounting method;
Plj – the proportion of companies in the country i k using the accounting method;
N – the number of countries (1 to N);;
M – the number of accounting methods (1 M).

The minimum value for the H-index and the T-index is 0, and indicates the level of non-comparability. The maximum value is 1, and indicates the total level of comparability. To interpret the values of the two indices, shown in table 3, the adapted scale was used, present in the research of Souza *et al.* (2015) and Souza *et al.* (2013).

Table 3
Interpretation of the index H and T

Index T	Level of comparability
Between 0.700 and 1.000	High
Between 0.500 and 0.699	Average

Between 0.000 and 0.499	Low

Source: Souza, F. E. A., Botinha, R. A., Silva, P. R., & Lemes, S. (2015). Comparability of accounting choices in the subsequent evaluation of investment properties: an analysis of Brazilian and Portuguese listed companies. *Revista Contabilidade & Finanças*, *26*(68), 154-166. (2018)

The H-index was calculated by means of *Microsoft Excel* and T-index using the *T-index Calculator* program, made available by Professor Ross H. Taplin by e-mail address. The following options were used for calculating the T-index: 1 (b) reflection of company/Country: countries are reflected equally; 2 (a) International focus: comparisons are made between all companies regardless of their country; 3 (a) several accounting policies: multiple accounting policies are not allowed, as they are comparable only to themselves; and in step 4, the options (a), (b) and (c) were chosen, which generated three different T-index approaches and which will be analyzed in the study (Taplin, 2004).

4 RESULTS ANALYSIS

4.1 Methods of measurement of investment properties

The sample companies that presented balances for PPI in the social exercise of 2015 were initially analyzed for the measurement method. Table 4 shows the number of companies per sector that opted for the cost method, the fair value method, or that did not disclose the method.

Table 4
Method of Measurement of PPI in 2015

Sector	Cost	%	Fair value	%	Non-disclosed	%	Total
Industrial Goods	4	(36%)	6	(55%)	1	(9%)	**11**
Cyclical Consumption	5	(25%)	9	(45%)	6	(30%)	**20**
Consumption Not Cyclical	3	(43%)	4	(57%)	0	(0%)	**7**
Financial and Other	14	(54%)	10	(38%)	2	(8%)	**26**
Basic Materials	2	(40%)	2	(40%)	1	(20%)	**5**
Oil, Gas and Biofuels	0	(0%)	2	(100 %)	0	(0%)	**2**
Health	1	(33%)	0	(0%)	2	(67%)	**3**
Information technology	1	(100%)	0	(0%)	0	(0%)	**1**
Telecommunications	1	(100%)	0	(0%)	0	(0%)	**1**
Public Utility	5	(33%)	0	(0%)	10	(67%)	**15**
Total	**36**	**(40%)**	**33**	**(36%)**	**22**	**(24%)**	**91**

Source: Prepared by the authors (2018).

It is possible to verify, in Table 4, that 100% of the sectors of Information Technology and Telecommunications applied the cost method. However, as each sector encompasses only one company, this information is not relevant to the study. The financial sector and others counted with 14 companies opting for the cost method among 26 analyzed, i.e. 54% of the companies chose the method. The number can be explained by the fact that the sector includes the segments related to the real estate, the focus of other studies, such as that of Kolozsvari *et al.* (2014). This sector is the one with the largest number of companies in the sample studied (26) and also the largest number of companies that applied the cost method (14). Kwinto and Voss (2016) found that approximately 40% of the Warsaw Stock Exchange Financial services companies applied the fair value method in measuring PPI.

Through the analysis of the companies that applied the fair value, it appears that 100% of the companies in the oil, gas and biofuels sector – which covers two companies – opted for this method. It is also noted that the companies belonging to the health and public utility sector did not use this method of measurement and their rates of non-disclosure of the method, according to item 75 of CPC 28 (2009), were the highest (67% of the companies in the sector sample). In addition, it is verified that the sectors of Industrial Goods, Cyclical Consumption,

Non-cyclical Consumption and Oil, Gas and Biofuels presented more companies that chose as a method of measurement for PPI the fair value in relation to the cost.

Among a total of 91 companies analyzed, 69 disclosed and 22 did not disclose the method chosen to measure PPI. Thus, 24% of the companies do not comply with the item 75 exposed by CPC 28 (2009), which addresses the obligation of the entity to disclose the adopted method. In addition, 36 companies applied the cost method (40%) and 33 applied the fair value method (36%). If the companies that did not disclose the measurement method were disregarded for analysis, 52% opted for the cost and 48% at fair value. In this way, most companies opted for the cost method, but there is little difference in application between the methods and the high rate of non-disclosure.

It is important to verify whether the companies studied complied with CPC 28 (2009) regarding the mandatory disclosure of fair value, either by purpose of measurement or by purpose of disclosure (opting for the cost method). Thus, table 5 shows the companies that applied the cost method for measurement after the initial recognition of PPI.

Table 5
Fair value disclosure to Companies by the Choosers cost in 2015

Sector	Cost	Fair Value Disclosure	% Fair Value Disclosure
Industrial Goods	4	4	(100%)
Basic Materials	2	2	(100%)
Health	1	1	(100%)
Information technology	1	1	(100%)
Telecommunications	1	1	(100%)
Financial and Other	14	8	(57%)
Public Utility	5	2	(40%)
Consumption Not Cyclical	3	1	(33%)
Cyclical Consumption	5	1	(20%)
Oil, Gas and Biofuels	0	0	–
Total	**36**	**21**	**(58%)**

Source: Prepared by the authors (2018).

It appears that 100% of the companies in the industry of industrial goods, basic materials, health, information technology and telecommunications – who adopted as accounting choice in the measurement of PPI the Cost method – fulfilled the purpose of disclosure of fair value. The Cyclical Consumption sector presented the lowest disclosure index (20%), since, among five companies that applied the cost method, only one disclosed the fair value of PPI. It is perceived, by analyzing the total values, that among the companies that compose the sample, without distinction of sectors, 58% meet the mandatory disclosure of the fair value. In other words, among the 36 companies that applied the cost method, 21 disclosed the fair value in addition.

4.2 Comparability level

The T-index allows to demonstrate the level of comparability to the accounting methods applied by the sample companies. Taplin (2004) evidences the existence of different approaches for calculating the T-index when the sample includes companies that did not disclose the accounting method chosen (*non-disclosure*), based on the premise that the non-disclosure is the last accounting method. The first approach (T1) excludes companies that did not disclose the accounting method for calculating the index. The removal of non-disclosure may be reasonable when the intention is to measure the level of comparability of the companies for which this accounting policy represents a problem (Taplin, 2004). In this way, the T1 index will present the comparability among the companies that presented the method of measuring PPI.

The second approach (T2) includes all the companies in the sample, that is, companies that did not disclose the accounting method adopted are considered comparable to all others, regardless of the method. According to Taplin (2004), this approach is reasonable if it is accepted the idea that non-disclosure is the result of a non-applicability. Thus, the accounts of a company that did not present the accounting method should be compared to any other companies.

In the third approach (T3) The non-disclosure is not comparable to any of the other accounting methods. Coelho *et al.* (2016) clarify this approach by exposing that companies that did not inform the chosen accounting method are considered for calculating the index, but are not compared to other organizations.

Thus, as the sample of the present study counted on companies that did not disclose the accounting method adopted to measure PPI, the three approaches previously presented for each sector were calculated. The values of the T indices obtained are shown in table 6, as well as the interpretation according to the scale addressed in the chapter of the methodological procedures.

Table 6
Index T and Level of Comparability of Sectors

Sector / index	T1	Level	T2	Level	T3	Level
Oil, Gas and Biofuels	1.00	High	1.00	High	1.00	High
Information technology	1.00	High	1.00	High	1.00	High
Telecommunications	1.00	High	1.00	High	1.00	High
Health	1.00	High	1.00	High	0.11	Low
Public Utility	1.00	High	1.00	High	0.11	Low
Cyclical Consumption	0.54	Average	0.78	High	0.26	Low
Financial and Other	0.51	Average	0.59	Average	0.44	Low
Industrial Goods	0.52	Average	0.60	Average	0.43	Low
Consumption Not Cyclical	0.51	Average	0.51	Average	0.51	Average
Basic Materials	0.50	Average	0.68	Average	0.32	Low

Source: Prepared by the authors (2018).

According to table 6, it is possible to verify that the oil, gas and biofuels, information technology and telecommunications sectors presented a T-index of harmony, regardless of the approach, in the value of 1.00. That is, companies have a total level of comparability. The indices were similar in the three approaches, since there were no non-disclosure cases regarding the PPI measurement method. Moreover, it is important to highlight that there are few companies in the general sample belonging to these sectors (2 – oil, gas and biofuels; 1 – Information technology; 1 – telecommunications).

The health and public utility sectors presented similar T indices: T1 and T2 were equal to 1.00 and T3 presented the value of 0.11. In this way, the first two approaches indicate high comparability, but the last approach reveals a low comparability. This fact can be explained by the high representativeness of companies in the sector that did not show the accounting method of measurement, and the fact that the others opted only for one of the two methods (in this case, the cost method).

The companies belonging to the cyclical consumption sector presented different levels of comparability, according to the approach: a mean comparability (T1), a high comparability (T2) and a low comparability (T3). The value of the T-index of Harmony obtained by the first approach – in which companies that did not disclose the method are ignored in the calculation – reveals that if two companies in this sector are randomly selected, there is 54% chance that they will adopt the same method in Measurement of PPI. In this way, it conceptualizes as a mean level of comparability. Regarding the value of the T2 index (0.78), a high comparability was revealed among the companies in the sector.

The Financial and Other sector, which covers the largest number of companies in the sample, presented a level of average comparability by the optics of the first two approaches and a low comparability level by the last approach. The interpretation of T1 allows to conclude that there is 51% chance of two separate companies randomly measuring the PPI by the same accounting method, either the cost method or the fair value method.

Companies in the industrial goods sector have a mean comparability, according to the first two approaches of the T-index, and a low comparability, according to the third approach. The non-cyclical consumption sector presented an average comparability and the same values for the three different approaches, because all companies disclosed the accounting method adopted, with the probability of 51% of two companies adopting the same method of measurement . Lastly, the basic materials sector presented an average level of comparability in T1 and T2 and a low comparability in T3.

Although Van der Tas (1988) did not show in his studies the presence of different approaches for calculating the H-index, when in the sample are companies that did not disclose the accounting method for measurement, the present research defined two approaches for The index, with the purpose of comparing the results between this index and the one presented by Taplin. The first approach (H1), as well as T1, excludes companies that did not disclose the accounting method for the index, and the second approach (H2) includes all companies, adopting non-disclosure as one of the existing accounting methods.

Table 7 shows the relative frequencies for the methods of cost and fair value in the measurement of PPI, excluding companies that did not disclose the method to define the values

of the H1 index per sector. In addition, the table presents the interpretation of the index values according to the scale defined in the methodological procedures.

Table 7
Index H1 and Level of Comparability of Sectors

Sector	Relative cost frequency	Relative Frequency fair value	H1	Level
Oil, Gas and Biocomb.	0.00	1.00	1.00	High
Information technology	1.00	0.00	1.00	High
Telecommunications	1.00	0.00	1.00	High
Health	1.00	0.00	1.00	High
Public Utility	1.00	0.00	1.00	High
Cyclical Consumption	0.36	0.64	0.54	Average
Industrial Goods	0.40	0.60	0.52	Average
Consumption Not Cyclical	0.43	0.57	0.51	Average
Financial and Other	0.58	0.42	0.51	Average
Basic Materials	0.50	0.50	0.50	Average

Source: Prepared by the authors (2018).

As the Herfindahl index represents a measure of concentration, a higher level of comparability will occur when companies concentrate on only one or a limited number of accounting methods (Van der Tas, 1988). As well as the companies belonging to the sectors of oil, gas and biofuels, information technology, telecommunications, health and public utility, when concentrating on only one of the accounting practices in the measurement of PPI, they presented a total level Comparability.

The sectors of Cyclical Consumption, Industrial Goods and Non-cyclical Consumption presented a relative frequency for the superior fair value method in relation to the relative frequency for the cost method and a mean comparability level. It stands out in these cases that, the higher the relative frequency for the fair value, the higher the values recorded in the H index. The financial sector and others presented a higher relative frequency for the cost method and a mean level of comparability. As for the companies in the basic materials sector, as the relative frequency was equal between the two methods, the value of the H index was 0.50.

It is important to emphasize that the values of the H1 index are similar to the values of the T1 index for the following reasons: both discarded from the sample the companies that did not disclose the accounting practice adopted in the measurement of PPI (*(non-disclosure*), and the research analyzed Companies in a single country.

The values referring to the second approach of the H-index and the interpretations about the level of comparability, as well as the relative frequencies for the methods of cost, fair value and undisclosed method, are presented in table 8.

Table 8
Index H2 and Level of Comparability of Sectors

Sector	Relative cost frequency	Relative Frequency fair value	Frequency relative method not disclosed	H2	Level
Oil, Gas and Biocomb.	0.00	1.00	0.00	1.00	High
Information technology	1.00	0.00	0.00	1.00	High
Telecommunications	1.00	0.00	0.00	1.00	High
Health	0.33	0.00	0.67	0.56	Average
Public Utility	0.33	0.00	0.67	0.56	Average
Consumption Not Cyclical	0.43	0.57	0.00	0.51	Average
Industrial Goods	0.36	0.55	0.09	0.44	Low
Financial and Other	0.54	0.38	0.08	0.44	Low
Cyclical Consumption	0.25	0.45	0.30	0.36	Low
Basic Materials	0.40	0.40	0.20	0.36	Low

Source: Prepared by the authors (2018).

According to table 8, it is verified that the sectors of Oil, Gas and Biofuels, Information Technology and Telecommunications presented a zero relative frequency for the undisclosed method and a total level of comparability since the companies Were concentrated in only one of the possible methods for measuring PPI. The Health and Public Utility sectors portrayed the

highest frequency concentrations for the undisclosed method and null frequency for the fair value method, in addition to a mean level of comparability (0.56). All companies belonging to the Non-cyclical Consumption sector disclosed by which method they opted to measure PPI, and the value of the H index indicated an average level of comparability for the sector. The H2 values for companies belonging to the financial and other sectors, cyclical consumption and basic materials have portrayed a low level of comparability between the financial statements of each sector.

Table 9 presents the three T-index approaches and the two H-index approaches for the sample covering 91 companies. The comparability scale used is present in the studies by Souza *et al.* (2015) and Souza *et al.* (2013).

Table 9
T and H Index Sample

Sample/Index	T1	Level	T2	Level	T3	Level	H1	Level	H2	Level
91 companies	0.50	Average	0.71	High	0.29	Low	0.50	Average	0.35	Low

Source: Prepared by the authors (2018).

The first approach of the T-index, which disregards to the calculation basis, the companies that did not disclose the accounting method for measuring PPI, indicates a mean level of comparability, but with value very close to that of a low comparability. CAs the study used companies from a single country, and the first approach of the H-index also excludes *non-disclosure* in the reckoning, the values of T1 and H1 were equal. The interpretation of these indexes can be made so that, if two companies are randomly chosen, there is 50% chance of them adopting the same accounting method.

The second approach of the T-index, which includes all the sample companies regardless of non-disclosure, reveals a high level of comparability, and the third approach (0.29) reveals a low level of comparability. The second approach of the H-index, which also includes all the companies in the sample, revealed a low comparability by means of the value of 0.35.

5 CONCLUSIONS

International financial Reporting Standards (IFRS), issued by the *International Accounting Standards Board* (IASB), represented the starting point for the process of harmonizing accounting standards, in order to meet the growth of capital markets and, consequently, the demand for information that is increasingly relevant for users ' decision-making.

One of the qualitative characteristics that provide greater relevance and usefulness to accounting information is comparability, allowing the comparison of information between different entities or between the same entity in distinct periods of time. Thus, the existence of accounting choices, also known as accounting choices, can negatively influence the quality of information.

The investment properties – regulated by the technical pronouncements 28 (CPC, 2009) – are those maintained for rent and/or capital valuation and are characterized as one of the cases of accounting choices allowed by international norms. Through the questioning of the influence that alternative methods of accounting may have on the comparability characteristic, the study aimed to verify the level of comparability of the measurement after the initial recognition of PPI of Companies listed in B3. The sample consisted of 91 companies listed in ten distinct sectors of B3, which represent those with PPI balances in the social year of 2015 among a population of 457 companies.

Seeking to achieve the specific objective (i) to identify the method used in the measurement of PPI, it was found that most companies apply the Cost method (40%), but with little difference to the fair value method (33%), and that large part does not disclose the Accounting method Used (24%), disobeying one of the mandatory disclosure, according to CPC 28 (2009).

The results found in relation to the predominance of the cost method in the posterior measurement of the initial recognition of the properties will meet the studies of Costa *et al.*

(2013), Andrade *et al.* (2013) and Botinha and Lemes (2016). In addition, it was observed that 100% of the Telecommunications sector – despite including only one company – adopted the cost method, validating the article by Botinha and Lemes (2016), which verified the reduction of the probability of a company applying the fair value if it belongs to Telecommunications sector.

Through the investigation of the specific objective (ii), it was found that among the 36 companies belonging to the sample that applied the cost method in the measurement of PPI, 58% disclosed the fair value to meet the purpose of disclosure foreseen in CPC 28 (2009). The companies in the industrial goods, basic materials, health, information technology and telecommunications sectors attended 100% for the purpose of disclosure of fair value, while the companies in the cyclical consumption sector were those that presented the lowest rate of Disclosure (20%). In this way, the data are close to those found by Botinha and Lemes (2016): 55% of the companies respected the purpose of disclosure of fair value. Costa *et al.* (2013) concluded that 68% of the companies opting for the cost method disclosed the fair value, an index higher than that observed in this study.

To achieve the specific objective (iii), that is, to analyze the comparability level of the companies listed in B3, were used the three approaches of the T-index of Harmony, proposed by Taplin (2004), and two approaches of the H-index, introduced by Van Der Tas (1988). The sample in general presented a mean level of comparability in the first approach of the two indexes that disregards the companies that did not disclose the method, but with value very close to a low level. The interpretation of T1 and H1 (0.50) can be done in such a way that, if two companies are randomly selected, there is a 50% chance of them adopting the same accounting method. In relation to the second approach of the T-index, which includes all companies, a high comparability was recorded, and the third was a low comparability. As for the second H-index approach, a low comparability was revealed. The study corroborates the research by Souza *et al.* (2015), which verified a mean degree of comparability in Brazilian companies regarding the measurement of PPI. It is noteworthy that, for the present research, as it is not sought to verify the level of comparability between countries, the H index provides the necessary subsidies.

It is concluded that, despite the adoption of international IFRS standards in Brazil through Law No. 11.638/2007 and the process of harmonization of accounting standards, some companies belonging to B3 still do not respect the technical pronouncements 28 (2009) in its entirety , not divulging the method of measuring PPI or even not meeting the purpose of disclosure of fair value. In addition, some sectors presented a high level of comparability observed by the T-index, but the two sectors with the highest number of companies had a very close level at a low level.

In this aspect, agreeing with the study by Costa *et al.* (2013), a problem of comparability of accounting information is identified, since the level of disclosure compliance, according to CPC 28 (2009), has not yet reached its totality, and companies in the same sectors have different accounting choices In the measurement of PPI. In addition, as highlighted in the study by Silva *et al.* (2014), difficulties in evidencing these properties were found in demonstrations and explanatory notes, impairments the decision making of users of accounting information.

The article presented as limitations the year of analysis of the standardized financial statements of the B3 companies, the application of two comparability indexes and the verification of only two mandatory items of disclosure, according to CPC 28 (2009). It is recommended, therefore, for further studies, the extension of the study period, the application of other comparability indexes or statistical models and the verification of other mandatory items for compliance according to CPC 28 (2009).

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