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Editor's Word

Dear reader, I would like to be happier today but I write this letter with great regret because of the loss of Professor Gilberto Martins, who made significant changes in accounting research and created two important congresses in the accounting field in Brazil, the USP International Conference in Accounting and the Congress of Scientific Initiation in Accounting. We are delivering the first issue of 2023, and I want to congratulate the papers published in this issue. It is an arduous path for everyone but immensely gratifying. An analysis of the last year's issues reveals a more inclusive REPeC, with papers from different states from our country and abroad, more female authors, and papers that possibly would not have a chance in other journals, though not ignoring the quality of research. This first issue of 2023 will be no different, as we begin with an editorial written by Professors Mara Jane Contrera Malacrida and Mariana Mitiyo Yamamoto. This guest editorial brings the story and experiences of the first female Head of the Department of Accounting and Actuarial Science at FEA/USP. It brings the view on the other side of the window seen by her advisor and friend and the mirror view when we see ourselves on the journey. I hope this editorial brings hope and shows the possibilities to so many other women in our accounting, business, academic, and everyday environments.

Larissa Costa, Paulo Lustosa, and Jorge Niyama wrote the second paper. It aims to perform a comparative analysis of the different ways of reducing the carrying amount of goodwill in light of the IASB Discussion Paper/2020/1. Based on the stakeholders' claims to the IASB, the impairment test, the current goodwill reduction method, presents several limitations, such as high cost, late recognition, and the shielding effect, which implies a reduction in the quality of accounting information. Therefore, this study sheds light on an alternative consonant with a new approach to goodwill developed by Professor Lustosa, the reduction by proportional write-off, to more relevantly and reliably represent the companies' economic and financial situation.

The third paper is written by Julio Machado and aims to analyze the influence of the level of intangibility on accounting conservatism. In this paper, the author considers evidence that the valuation of shares might influence discretionary accounting practices and that recorded intangible assets may improve the quality of information. Among the results, intangibility based on market value negatively correlated with conservatism. On the other hand, intangibility based on book value showed a positive relationship. Additionally, companies with greater intangibility based on market value did not show the conservatism attribute.

Elizio dos Reis, Hugo Ferreira, Kelly Nunes, and Jacqueline Veneroso wrote the fourth paper. It aimed to verify in what ways the accruals calculated according to the Balance Sheet and the Cash Flows Statement approaches are similar. The results showed a difference between the two approaches, indicating that they are not statistically similar. When applying the cash flow prediction model, the approach to accruals calculated by the Cash Flow Statement proved to be more adequate than the Balance Sheet approach.

The fifth paper was written by Rudolph Teixeira, Adriano Rodrigues, and Marcelo Alvaro. The paper's objective was to verify whether the defined-benefit (DB) and variable-contribution (VC) plans of Complementary Private Pension Funds in Brazil tend to present solvency equal to or above the established standard ratio when they are close to reaching it. The results showed considerable discontinuity in the histogram distributions between the class that includes the equilibrium coverage index and the class just below it. A statistically positive solvency volume was also found for the private companies' plans, which are governed by a governance structure concentrated around sponsors, and for plans located in the Federal District and in the states of Rio de Janeiro and São Paulo, which, on average, have higher administrative expenses than plans situated in other states.

The sixth paper, written by Thiago Sena, Sheizi de Freitas, and Jorge de Santana Jr., aimed to verify the relationship between the readability level of explanatory notes and earnings management practices among companies listed on [B]^3 between 2010 and 2018. The results show no statistically significant relationship between the readability of explanatory notes and earnings management levels compared to companies that most frequently manage earnings. The results are robust, considering additional tests show coefficients in the same direction and significance.

Finally, I would like to emphasize that REPeC is a publication linked not only to the education field but to several areas, as shown in its objectives: Financial, Managerial, Public, Audit, and Taxes, among others.

Also, I thank all the researchers who submitted their papers to REPeC and the referees, who are always very collaborative. Congratulations to those who had their papers approved because the demand is quite high, and the path toward the final publication is very arduous.

Thanks again to the readers. I hope you will enjoy this new edition. Have a great 2023 with many quality studies, new submissions, and, consequently, new publications.

Academic greetings,

Gerlando Lima, Ph.D.
Editor in Chief

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The much-needed pioneer spirit: the story of a woman who paves the way and strengthens other steps

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Introduction: The other side of the window

The year is 2022, the 21st century. The struggle for racial and gender equality exists in all society's agendas. Thus, in this context, I witness the exciting event of the election of the first woman to assume the head of the Department of Accounting and Actuarial Science at FEA-USP in São Paulo. Sometimes, I asked myself when this would finally happen, considering that in other departments, as is the case of administration and economics departments, women had already taken this position in the last century, at least 25 years ago.

I must congratulate Professor Mara Jane Contrera Malacrida for another achievement in her life journey! A feisty warrior and pioneer in this feat and many others that she will tell here herself.

I met Mara when she was my undergraduate student in 1998. At the time, the good student she was, she soon stood out and began to show interest in gaining other experiences beyond the classroom. For this reason, I invited her to develop a scientific initiation project and work as a teaching assistant in accounting training courses. Since then, her experience in the academic milieu – a very rich experience that I believe should be offered to all willing students – awakened her desire to teach.

Later, she attended the Master's and Doctoral programs and became a highly qualified consultant and professor at the Department of Accounting and Actuarial Science at FEA-USP.

She was invited to serve as financial director at USP, the largest university in Latin America, which is much more than the position of CFO in any multinational company. Additionally, she was the first woman at USP to hold this position.

The battle is challenging, and the path has many obstacles. I witnessed tears, indignation, and frustration along the way, some of which we experienced together. Many nights were dedicated to working, to the detriment of obligations still classified as feminine, such as taking care of the home and children and making the groceries, among the many tasks society still expects us to do. And living with that feeling of guilt that is always on the back of our minds, especially when our pursuits are obstructed, and it happens many times. And when we find such impediments unfair, we even reconsider whether we are on the right path. We always need to prove that we are capable to ourselves and others and more capable than men because, after all, most of the time, our competence is judged predominantly by the male gender. This context has indeed changed, but we still need to go much further in this regard.

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Today, we are professional colleagues and friends. The fact that I have gained a true professional friend makes me very happy. We can share doubts about our personal lives, children, clothing, trips, and also other matters, such as accounting standards, class content and exercises, and so many professional challenges arising in our daily routine.

I am very proud to witness and accompany the progression of that undergraduate student of mine from 20 years ago and see her transformation into a very accomplished professional, one with whom no one can find any fault. I also cannot miss the opportunity to mention that my choice for the teaching career is worth it due to the "Maras" I met along the way and who are certainly shining with their choices, just as, in a few years, Professor Mara will also feel highly gratified by her choice, if she does not already experience such a feeling.

Next, Professor Mara tells a bit of her story, which, like so many others, can motivate you not to give up on your ideals, however distant they may currently appear.

"People do not fail; they give up." (Henry Ford)

Brief life account: the mirror's other side

I was born and raised in a small town in the interior of São Paulo, Brazil, called Fernando Prestes. Daughter of a farmer (and amateur musician by talent) and a primary school teacher mother, I lived in the countryside until I was 14 years old on a farm that belonged to my grandfather, and it still belongs to my family. I have always liked to study, though I had to wait until I turned seven before I could go to school. The reason is that studies in the rural school close to where we lived were only initiated in the old first grade for those who had completed seven years of age or for those who would complete seven until mid-year. Since my birthday is in February, I entered school when I was seven years old. I would go to school with my mother and older brother. I attended this rural school until the third grade, together with my younger brother and a cousin. All the remaining years I attended at the town's headquarters. And we depended on the school transportation provided by the city hall, which would transport the students who lived in the rural area. The road would be all muddy on rainy days, but going to school was an incredible experience!

I am the only woman among four children, and from a tender age, I would help my mother with the house chores, tasks considered "womanly." My brothers, cousins, and I would help my parents in the fields during school vacations. Despite the hard and tiring work, my parents always protected and cared for us. We did not feel exploited, and none of us carry any trauma from that time. Working in the fields to help my parents contributed to my character in the most positive way. There was a dam where we lived with very clean water (a beautiful spring of water), which was our entertainment. Every day after work, we would swim. There, we learned to swing using the trunk (stem) of a banana tree.

This hard and tiring work spurred me to study even more. Although it was positive for my development as a human being, working in the fields was not something I envisioned for my future. I have always been a good student, always pushed myself further, and always wanted to get the best grades! Despite being a good student, I was never very quiet in the classroom. I got good grades, but I was part of the "noisy group", which, from time to time, caused my mother, who was a teacher at the same school, to stress. As the town was small and there was only one school, the students in a class would go all the way from the first grade to high school. Rich and poor went to the same school, which taught me how to deal with diversity.

When I turned 14, my parents built a house in the urban area, where they still live today, and we moved to the city. From then on, the school was closer to my home, an eight-block walk. Hence, I was allowed to attend school since the high school in Fernando Prestes was only taught in the evening, and no transportation was available for students in the rural area.

Concomitantly with high school, I studied the former teaching profession (due to my mother's will). The teaching course, now extinct, was an alternative to high school, which allowed recent graduates to teach children attending between the first and fourth grades. At that time, teaching children was also considered a feminine activity, so we were all women in the class. Although I started the teaching course to fulfill my mother's wish, I became very interested in teaching techniques, which are still valuable for me today, as I opted for a career as a university professor. From 15 to 17 years old, I studied in the afternoon (teaching course) and in the evening (high school), and I also helped my mother with the housework since I was the other woman at home. I have always been very dedicated and honored to receive several academic achievement awards during my lifetime, and I had a dream of going to university.

When I finished high school, I took Fuvest [the competitive exam to enter university] for the first time and entered the Chemistry program at the USP at Ribeirão Preto; however, I dropped out. As a science, Chemistry is beautiful, but I could not see myself doing it my whole life. Today, after so many years, I learned that giving up quickly what one does not want is very valuable in the future. Time is scarce, and it only makes sense to apply it to what truly matters and interests us. I took Fuvest again the following year and found that I was pregnant with my first child, which made me postpone my studies, but not give up. I married at 20, and we are still married after 27 years. I went back to school after the birth of my son and with a family to look after. Hence, things got a little more complicated, but I had a lot of support from my family, and, most importantly, I never got hung up on the difficulties but on my goals.

Later, I took Fuvest again; this time, I was confident, I wanted Accounting Sciences. I recall my husband's face when I told him I was going to study Accounting after having started the Chemistry program and taking the entrance exam the year before for Literature. Perhaps it seemed to everyone that I would give up yet another program, but I was convinced in my heart. As I mentioned, we lived in the countryside, and my father was a farmer with little formal education, despite his immense wisdom in life. As a girl, I remember helping him with the accounts, inventory (of course, we did not use that name), and production yield. Without even knowing it, I already had a "proto-accountant" within me. It was an immense joy when I was accepted into the Accounting Sciences program at FEA/USP, and such bliss remains alive.

In my first semester, I took an Introductory Accounting course with João Domiraci Paccez, the best professor anyone could have. Anyone who knows him understands precisely what I am talking about; impossible not to be enchanted with Accounting after having classes with him. Today we are more than colleagues in the Accounting and Actuarial Sciences Department. Professor Joãozinho, as he is affectionately called, is an exceptional friend and a great inspiration!

Professor Joãozinho created a legion of Accounting fans – a subject that some may consider uninspiring but which, when taught by him, becomes heaven, believe me. What a difference in the lives of young students to have mentors like Professor Joãozinho! Today I have the honor of being one of those responsible for the Introductory Accounting program (together with Professor Joãozinho) because I know that, in these initial courses, it is possible to awaken a passion for Accounting, as happened to me in 1997. I completely identified myself with the program, and I am proud to say that I AM AN ACCOUNTANT AND A PROFESSOR!

During the undergraduate program, I started scientific initiation with Professor Marina Mitiyo Yamamoto, a great friend, and supporter of my career. It was when I decided I would pursue a Master's degree. I attended the five-year undergraduate program in the evening and graduated with the highest weighted average of all graduates in 2001! I am very proud of such a feat! I was already the mother of two boys, and believe me, many people were surprised. They thought, "How was it possible to be a mother and the best student?"

In addition to deciding to pursue a Master's degree, I also decided to have a second child. I started my Master's program in 2002 when I was the mother of a 1-year-old baby. I recall as if it were today when I told Professor Marina (later my Master's and doctoral advisor) that I was going to have my second child and that he would grow up while I was studying. She spontaneously asked if I was "crazy." Today, the memories of that time bring me a good laugh during the countless conversations with my friend Marina. Even so, after the storm passed, I can say that she was right. Nonetheless, I obtained my Master's degree in 2004. It was exhausting, but I did it.

Given the stressful experience of the Master's program, I decided not to pursue a doctoral degree. However, it was the turn of a great friend of mine to convince me to keep going. Thus, Gerlando, now a professor at the University of Illinois in the United States, and I decided to study together for the selection process and apply for the doctorate. In addition, my love for Accounting also spoke louder. It worked, and off we went! Doctoral Program's Class 2006. Modesty aside, I can say that we were part of one of the best classes the department ever had. Many of us became professors at USP or other leading institutions in Brazil and worldwide.

I became a professor at FEA in 2010 after participating in two contests and being successful in the second one, held in September 2009. During this journey, I made friends who were important to me to overcome life's mishaps and get here.

Two years later, I became the Accounting and Actuarial Sciences program's vice coordinator and increasingly engaged\ in academic and administrative activities. In 2016, I assumed the Presidency of the Undergraduate Committee at FEA and, as such, became part of the USP Undergraduate Council, which allowed me to expand my knowledge and my friendships at the university. During that time, I had the opportunity to participate in important decisions that would impact many people's lives, such as, for example, the adoption of quotas by the University of São Paulo in 2018!

To my surprise, in 2018, I was invited by the then Vice-President, Professor Antonio Carlos Hernandes, to take over the board of directors of the Department of Finance at USP. Given such a responsibility, I stayed for a few months as his advisor. Then I took over as Financial Director in May 2019, a position I still occupy as I was invited to remain as the head of the Finance Department by the new Presidency that began in January 2022. During the period I held the advisor position, we worked to improve the mechanisms related to student permanence (even more critical due to inclusion processes).

As the head of the Finance Department, I had the opportunity to begin "giving back" to USP some of the knowledge I gained there since I joined as a student in 1997. It had been 22 years! The Finance Department is responsible for consolidating USP's entire budget, controlling financial resources, and accounting and preparing the university's financial statements; that is, I perform activities related to my professional training. I have made many friends in this new challenge. I say "challenge" because USP is equivalent to a large company with around 20,000 employees, 100,000 students, and a budget of approximately R$8 billion (in 2022).

I was the first female professor in the history of the University of São Paulo to take over the Department of Finance. As with large private companies, USP is governed by an absolute majority of men. Gradually, I appropriated this environment, carried out the activities with great dedication and determination, and was recognized for my work. There is still a long way to go and, at this point, my focus is on implementing a new accounting system (based on the new accounting standards applied to the public sector), generating savings with the purchase of electricity (through *Mercado Livre*) and improving processes to increase our efficiency and agility. As the financial director, I needed to show that I had the knowledge and competence to assume the position despite not being a full professor. Even though the role is related to my training, many people thought I was too young to exercise it.

In 2020, many challenges were imposed on teaching and the university's finances in the context of the pandemic. Nonetheless, little by little, all challenges were overcome. In 2022, I decided, together with Professor Bruno Meirelles Salotti, to run for the head of the Department of Accounting and Actuarial Science. New challenges and, once again, the first female professor to assume the head of the Department of Accounting and Actuarial Science at FEA/USP after 76 years of history!

My journey thus far was not easy, but it has been very enriching! The university, like society, still feeds stereotypes of what it means to be a woman, what it means to be a mother, and, finally, what is not usual. Breaking these stereotypes is part of my life. During my academic career, I often proved that I was as or more competent than certain men (professors or otherwise). It was like that when I was a student, when I became a mother (as if it were impossible for someone to be a mother and a student simultaneously!), and when I joined USP as a professor. With my work and dedication, and recognition by students for the excellence of my teaching, I gained credibility to take on key disciplines at the undergraduate level and, finally, at the graduate level.

I am very grateful to the University of São Paulo, where I joined in 1997, and took my undergraduate, Master, and doctoral degrees. My husband and my eldest son also graduated from FEA/USP and my youngest son, who would say, is an undergraduate student in the Accounting course at FEA. Being a woman, I am convinced that life has imposed more obstacles on me, but I never surrendered. I hope this inspires other women. It takes resilience and determination to change the world. Inertia is what is normal, and I have always positioned myself as a force against it. I feel accomplished and recognized in my work as the head of the Accounting Department and as director of the Finance Department at USP. Even so, the classroom is irreplaceable, and it is there when I am in contact with my students, where I feel fully professionally fulfilled. Teaching Accounting to incoming students makes me very happy!

I am content with the choices I have made throughout my life, and I feel personally and professionally accomplished! It was not easy, but I say it was worth it!

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The reduction in the carrying amount of goodwill: an analysis in light of the IASB's Discussion Paper/2020/1

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Abstract

Objective: This paper aims to perform a comparative analysis of different ways to reduce the carrying amount of goodwill in light of the IASB's Discussion Paper/2020/1.

Method: This research is a theoretical essay that highlights the view of the literature and accounting standards on the subject.

Results and contributions: Based on the stakeholders' claims towards the IASB, the impairment test, the current goodwill reduction method, has several limitations, such as high cost, late recognition, and shielding effect. The reflection presented here proposes that the permanence of this test as the only form of subsequent goodwill accounting implies a reduction in the quality of accounting information. Therefore, other reduction forms are recommended to represent the figures in the financial statements more faithfully. Thus, given the current opportunity provided by the IASB to discuss the subject, this paper's relevance lies in timely addressing the discussion alluding to Discussion Paper/2020/1 of what are the potential and most appropriate ways to reduce the carrying amount of goodwill in order to represent the equity of companies in a more relevant and reliable manner.

Keywords: Goodwill. Subsequent Accounting. Impairment. IASB.

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1. Introduction

Accounting information is one of the most relevant inputs for organizational decision-making. Foster (2003) relates it to a lower cost of capital, while other authors highlight its importance in the organizational field and the economy as a whole. For example, Bushman et al. (2001) associate it with the effective allocation and use of resources in an economy when it is used to regulate concentrated sectors, fiscal and tax policies, and identify investment opportunities, among others.

The International Accounting Standards Board (IASB) is the international organization responsible for developing high-quality global accounting standards. Thus, it issues the International Financial Reporting Standards (IFRS), which are currently adopted in 166 jurisdictions (IASB, 2020). Its international relevance is apparent and given its mission to develop standards that confer transparency, accountability, and efficiency to financial markets, a higher quality of accounting information is expected.

The accounting treatment of assets is an object of study and constant development. Although many assets in the measurement process are subjective, the case of goodwill is a "controversial matter in accounting because of its vague nature and difficulty in arriving at a value that is verifiable" (Glautier and Underdown, 2001, as cited in Martins, 2010, p. 167). This difficulty extends to its forms of value reduction (or subsequent accounting) and originates in in-depth discussions concerning its nature.

One of the topics currently discussed concerning goodwill is how the reduction of its book value is configured. Although an indefinite useful life is attributed to it, this does not mean that it is infinite, but rather that there is no predictable limit to the period during which the asset should generate economic benefits for a company.

Currently, IASB determines that the value of goodwill is reduced through an impairment test. Under the previous standard, amortization was required over a maximum period of 20 years. Throughout history, the accounting rules related to it have changed several times (Guillaume et al., 2014). According to a historical survey (Hughes, 1982; Garcia, 2007), the pre-regulatory period was a turning point in the subject, with many researchers in favor of its instant write-off. However, as standards were issued in the early 20th century, the current treatment (recognition as an asset, with reduction based on impairment test), though controversial (Hayn & Hughes, 2006; Li & Sloan, 2017), remains predominant in the literature (Chalmers et al., 2011; Hirschey & Richardson, 2002). Thus, the ways of reducing the value of goodwill is a matter still disputed in Accounting Theory.

Due to a lack of consensus, in addition to the dimension and importance this component – goodwill – has assumed in the global economy, IASB performed a post-implementation review (PIR) of IFRS 3 – Business Combinations, so that stakeholders could express their opinions on the current reduction in accounting goodwill, among other matters. As a result, Discussion Paper/2020/1 was published, and suggestions provided through comment letters may support the IASB's decision on a possible change in the current standard. If the decision is to implement changes (or even in the case of new standards), IASB will publish an Exposure Draft in advance to get feedback from professionals and people working in the field.

Because IASB opened the opportunity to discuss and challenge the current subsequent accounting of goodwill, this study's objective is to answer the following question: what are the alternatives to reducing the value of goodwill?

In this context, this study's general objective is to compare the possibilities for subsequent accounting for goodwill. The specific objectives include (1) presenting the changes proposed in the IASB's Discussion Paper (DP/2020/1) on IFRS 3 – Business Combination; (2) analyzing the current subsequent accounting for goodwill (impairment test); and (3) analyzing alternatives for the subsequent accounting for goodwill. Therefore, this is a theoretical essay presenting the main controversial points in the literature of Accounting Theory about the possibilities of reducing the value of accounting goodwill.

This study shows that the preliminary positioning of the IASB contained in the Discussion Paper 1/2020 (i.e., remaining with the impairment test) does not eradicate the inconsistencies listed in the standard's post-implementation review contested by stakeholders regarding the subsequent accounting of goodwill. Thus, it presents a new theoretical approach to goodwill, whose value reduction (i.e., proportional write-off) may represent a potential future replacement for the impairment test, as it is consistent with the nature of goodwill introduced in this approach, configured as a state of potential wealth, rather than an asset (Lustosa, 2017).

Considering the discussion fostered by the IASB and the imminent change in IFRS 3 (Business Combinations), this study's relevance lies in its timeliness and innovation since it is expected to promote a greater understanding of the reduction in the goodwill's book value and, therefore, assist in a controversial subject, the consequences of which may vary, e.g., from the reasons for sending suggestions (comment letters), in case IASB launches the Exposure Draft, to changes in the course of research and the standardization of this controversial subject, to contribute to the quality of accounting information and enrichment of Accounting Theory.

The remainder of this paper is organized as follows: chapter 2 presents the theoretical framework, such as the history of goodwill and its potential subsequent accounting strategies; chapter 3 addresses the IASB's preliminary positioning presented in Discussion Paper/1/2020; chapter 4 presents a reflection upon the subsequent accounting for goodwill; and finally, chapter 5 concerns the final considerations.

2. Theoretical Framework

2.1 Goodwill history

Business combinations (detailed as mergers and acquisitions in IFRS) play a relevant role in the global economy. In its DP/2020/1, IASB presents data that support the impact and relevance of goodwill accounting. In 2019, business combinations totaling more than $4 trillion were announced. Furthermore, goodwill reached $8 trillion for all listed companies worldwide, representing about 18% of their net worth and 3% of their total assets.

The accounting treatment of equity items is an object of study and constant development. The difficulty and subjectivity in measuring goodwill extend to how its value is reduced and originates from in-depth discussions addressing its nature.

The discussion about the nature of goodwill is old. Falk and Gordon (1977) highlighted that, although much has been written on the subject, there are still uncertainties and disagreements. Johnson and Petrone already questioned the subject in 1998, noting that some believed in its recognition as an asset while others disagreed. Hopkins and Ma (1988) referred to goodwill as an example of an accounting puzzle. They highlighted that its nature continues to be misunderstood, which generates inconsistency in the measurement and disclosure of this accounting component. Davis (1992) suggests that goodwill is probably the most intangible of intangibles.

Jahmani et al. (2010) alert for the possibility of earnings management when using estimates and managerial judgments of fair value, cash flow, and discount rates, estimates used in the impairment test. Other authors reinforced the idea that the impairment test can open the door to the manipulation of results (Massoud and Raiborn, 2003; Sevin and Schroeder, 2005; Jordan and Clark, 2004; Han and Tang, 2020; Masters-Stout et al., 2008; and Hamberg et al., 2011).

2.2 Goodwill subsequent accounting

The reduction in the carrying amount of goodwill is directly linked to its predecessor recognition and measurement processes. When goodwill is recognized as an asset, it may have its value reduced through a linear and periodic write-off (amortization), or an occasional write-off for the recoverable value, the need for which is identified through an impairment test. It can also maintain its initial value recorded in the asset without subsequent changes (in this case, there is no reduction in the accounted value).

If goodwill is not recognized as an asset, its subsequent treatment can occur either by instant write-off (full write-off of its value) or by periodical write-off (sporadic write-down of its value). The conversion rate (i.e., reduction) is something to be studied in greater depth in the literature, but its starting point is the theory developed by Lustosa (2017) and Oliveira and Lustosa (2022). This section will present discussions on potential subsequent accounting alternatives of this equity instrument, as shown in Table 1.

Table 1

Alternatives to reduce the book value of intangible assets

Recognition as an asset				Non-recognition as an asset		
With amortization		No amortization		Instant write-off		Regular write-off
Defined useful life	Without defined useful life	Initial measurement unchanged	Subject to an impairment test	Reserves (equity)	Results (expense)	As goodwill is converted into real wealth

Source: adapted from Carvalho et al. (2010).

2.2.1 Impairment test (IFRS 03)

The impairment test consists of assessing the inequality between the accounted and actual cash-generating power to verify potential loss due to the devaluation of the asset.

The recoverable amount is defined as the higher value between the fair value and the value in use. Thus, based on estimates of future cash flows, the impairment test compares the accounting amount with the recoverable amount of cash-generating units (CGU). The entity shall recognize the difference as an impairment loss when the recoverable amount is lower than the carrying amount. Its purpose is to ensure that a company's assets are accounted for at values no higher than recoverable ones (IASB, 2013).

Currently, according to the international standard that provides for the impairment test is IAS 36 – Impairment of Assets (IASB, 2013), together with IFRS 3 (Business Combinations), companies with goodwill are required to test their cash-generating units for impairment at least annually, even if there is no indication of loss.

As goodwill does not independently generate cash flows, but rather through the synergy of its components that are not individually identified and these with other assets, it is tested for impairment losses within the cash-generating units to which their generated economic benefits flow. Thus, the impairment test assesses whether the combined recoverable value of the assets of these cash-generating units, including goodwill, is greater than the recorded carrying amount.

If the recoverable amount of a cash-generating unit (which goodwill comprises) exceeds its carrying amount, no adjustment is made, and no loss is recognized. However, if the recoverable amount is lower than the carrying amount, the CGU is adjusted, reducing the recoverable amount, and the company recognizes the impairment loss. Hence, it is clear that goodwill is not directly tested, which may have consequences.

Because the impairment test verifies the recoverability of the combined book value of assets within cash-generating units - instead of testing the recoverability of directly acquired goodwill -, the so-called shielding may occur, the effect of which incurs the risk of overstating the carrying amount of goodwill.

Shielding occurs when the acquirer's margin (headroom) protects goodwill against impairment loss. In more detail, when the impairment test is carried out jointly (acquired business included in the acquirer's business), the margin produced by the acquirer's business can shield the impairment loss that would exist if goodwill (and its integral components, whose synergy generates economic benefits) was tested separately, as shown in Figure 1:

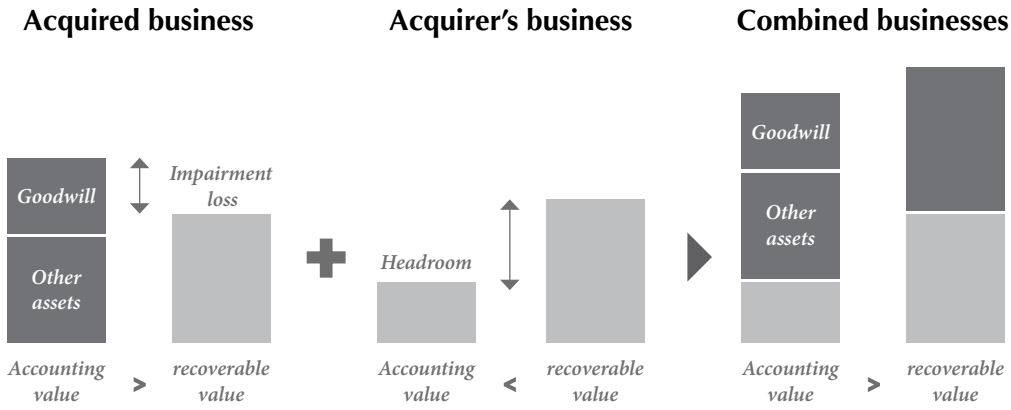

Figure 1. Demonstration of the shielding effect

Source: adapted from IASB (2020).

An acquisition could therefore underperform management's expectations, but the company would not recognize any impairment of acquired goodwill if it had enough headroom to absorb a decrease in value.

Another point noted in the impairment test listed by DP/2020/1 is that impairment losses are sometimes recognized too late, long after the events that caused these losses, both due to the shielding mentioned above and when the future cash flow estimates are very optimistic. The last aspect refers to the fact that the estimates of both the value in use and the fair value minus disposal costs will always be subject to measurement uncertainty. Therefore, managers may be incentivized to make optimistic assumptions and judgments to be financially benefited.

Failure to recognize an impairment loss when an acquisition does not meet its objectives (i.e., if it does not meet the initial expectations of generating future benefits) may induce investors to be more confident in the acquisition than they should. Thus, DP/2020/1 presented the view of some stakeholders that the impairment test is ineffective in holding management accountable for the goodwill recognized on acquisitions. They argue that constant amortization through expenses would represent a more effective accounting and management accountability, as the company would need to generate profits to recoup this expense.

Another critical issue to be highlighted is that impairment losses are recognized infrequently, despite evidence that a significant percentage of acquisitions fail (IASB, 2020). Consequently, there are arguments that the book value of goodwill does not faithfully represent the future benefits expected from the acquisition.

Massoud and Raiborn (2003) believe that the impairment test allows management to make judgments, as companies can choose when to recognize impairment losses in a manner consistent with their operating results. Thus, given its potential for manipulation, the authors believe that reducing the value of goodwill was a "declaration of commitment in which the costs outweigh the benefits."

Some studies associate the impairment test with the quality of accounting information. For example, regarding the Brazilian context, Silva et al. (2017) stated that it is possible that the test is used opportunistically or even not used when it should, decreasing the quality of information presented in financial reports. Furthermore, Chang and Yen (2015) found that given its subjective judgment, the impairment test gives an earnings management opportunity – particularly, big bath accounting and income smoothing on earnings.

On the other hand, those who advocate that impairment testing is the most appropriate way to reduce the carrying amount of goodwill claim that this model provides more helpful information than amortization, considering the arbitrariness in determining the useful life of goodwill (IASB, 2020).

Many stakeholders consider the information provided by the impairment test helpful, even though it mainly provides confirmatory value. That is, even if the impairment loss often delays market assessments of the performance of an acquisition, recognizing such losses confirms the assessments made by investors before the occurrence. Moreover, in some cases, the impairment test may even reveal impairment losses that investors had not previously identified (IASB, 2020).

2.2.2 Alternative subsequent accounting

As noted in Table 1, the impairment test is just one way to reduce the book value of goodwill. The first choice that drives subsequent accounting is whether to recognize goodwill as an asset.

This discussion has not yet been appeased in accounting. Even though the recognition of goodwill as an asset is the predominant understanding in Accounting Theory, even adopted by regulatory bodies (e.g., IASB and FASB), many researchers claim the opposite; there are even some empirical studies on the subject (Lustosa, 2017; Canning, 1929, as cited in Bloom, 2013; Tearney, 1973; Johnson and Petrone, 1998).

Amortization is the most commonly accepted option for reducing the carrying amount of goodwill, other than the impairment test. It was the form adopted by the international standard before IFRS 3 – Business Combinations (IAS 22 – Business Combinations), which required companies to amortize goodwill over its useful life – in theory, no longer than 20 years.

Amortization consists of a linear reduction over an asset's useful life, which may or may not be defined. In the first case, the book value reduction takes place to represent, or at least approximate, the decreased potential for generating economic benefits since the book value of an asset will be zero at the end of its useful life.

However, the same does not occur when an asset's useful life is indefinite. In this case, the useful life of goodwill cannot be estimated; therefore, any rate used for amortization would be somewhat arbitrary. Johnson and Tearney (1993) reinforce the idea that the low period is the focus when it comes to amortization as a way to reduce the value of goodwill. Given that goodwill represents a probable future economic benefit due to a past transaction, the authors believe it has a limited, although "impossible to measure," life.

When amortization was compulsory to reduce the book value of goodwill, Hall (1993) outlined a survey to verify whether company managers are influenced by external aspects when choosing the number of years over which goodwill is amortized. The results indicated that such a choice is affected by the size of the company and the restrictions of debt agreements. In this sense, Henning and Shaw (2003) showed that the choice of the amortization period for the acquired goodwill predicts the company's post-acquisition earnings levels since shorter lives can lead to a dilution of earnings. Therefore, the possibility of external factors influencing the amortization period is perceived to exceed an attempt to estimate the approximate period of the asset's generation of economic benefits.

Jennings et al. (2001) found that earnings before goodwill amortization explained stock prices significantly better than earnings after goodwill amortization and concluded that this component – amortization – is interpreted as a noise source. Therefore, they suggested that excluding amortization from the income statement would not reduce the utility of earnings but might instead eliminate such noise.

Hendriksen (1965, as cited in Gynther, 1969) states that amortization in arbitrary periods can lead to an undervaluation of assets in subsequent periods and does not promote responsible accounting.

Spacek (1968) argues that amortization for acquired goodwill should occur only when there are signs of limited existence, and write-offs due to impairment should only be made when there is evidence of loss in value. The opposite result consists of an understatement of net income during the amortization period and a perpetual understatement of assets in subsequent periods.

The author also stated that the most appropriate treatment would be the total write-off of the goodwill value as soon as it is acquired against equity reserves. However, due to practical difficulties, the periodic revaluation of goodwill could be performed using methods involving capitalizing the entity's profits, the present net values of some assets, knowledge of business conditions, etc., with sophisticated quantitative techniques.

Spacek's (1968) line of reasoning, in which the periodic reassessment of goodwill would have to use a method involving capitalizing the entity's profits, is based on the idea of super profit, which had Leake (1921) as its precursor. The author defended the idea of residual profits; that is, he conceptualized goodwill as the present value of the right to receive future super profits. In this context, the term "super profit" means the amount by which the future income, increase, or advantage to be received must exceed all expenses incidental to its production.

Proponents of reintroducing amortization claim that, with impairment testing, the carrying amounts of goodwill may be overstated. As a result, the company's management is not held accountable for its acquisition decisions. Furthermore, despite goodwill having an indefinite useful life, it is finite. Amortization would reflect the consumption of goodwill more adequately, in addition to reducing the cost inherent to the impairment test. Johnson and Tearney (1993) reinforce that the low period becomes the focus when it comes to amortization as a way to reduce the value of goodwill. The authors believe goodwill represents a probable future economic benefit due to a past transaction and has a limited life, although "impossible to measure."

Lustosa (2017) proposes an alternative theory about goodwill and its subsequent reduction. The author suggests that a company's economic value is formed by an intangible and a physical asset (Lustosa, 2009). Physical assets result from implemented decisions and completed transactions, while intangible assets refer to ideas and strategies whose decisions have not yet been implemented. Creating economic value involves transforming ideas – intangible heritage – into physical (actual) heritage, even though they remain intertwined (Oliveira & Lustosa, 2022).

According to current regulations, goodwill is classified as a separate item in a company's assets list due to the requirement to individualize balance sheet items (Oliveira & Lustosa, 2022). However, the authors state that potential (and not guaranteed) wealth represents the present value of future residual profits. That is, goodwill may or may not "become" physical assets (in addition to being renewed as new ideas, plans, and strategies emerge to feed the decision-making process), which mischaracterizes its intrinsic and unique capacity to generate future economic benefits as assets.

While not converted into physical assets, goodwill is a potential state of intangible wealth. According to Lustosa (2017), its synergistic effects with other assets are beneficial and have economic value for a company. However, while this intangible asset is not materialized in a physical asset, as ideas and strategies are materialized in actual transactions, these intangibles are not supposed to be individualized in the balance sheet as assets.

In the same line of reasoning, Oliveira et al. (2021) propose that physical and intangible wealth are entangled, i.e., they cannot be analyzed separately. Future managerial decisions (intangible wealth) are in the present, just as what happens in the present (implemented managerial decisions – physical wealth) affects future wealth. There is a constant feedback transformation of these riches, characterizing dynamism. For this reason, it is not recommended that the value of goodwill remain for too long in the financial statements, given that the realization of physical assets depends on the conversion of intangibles (i.e., the materialization of ideas, strategies, etc.).

Pereira and Lustosa (2020) deepened this suggestion of conversion – intangible heritage becomes physical. When analyzing the recovery of goodwill acquired in a specific business combination (Hypera S.A.), the authors found that it was recovered within two years. However, it continued to be recorded in the acquirer's balance sheet. This fact confirms the notion that goodwill represents a state of wealth converted into a physical asset. Consequently, keeping it on the balance sheet after its recovery may lead to the risk of recognizing internal goodwill, which is currently prohibited by accounting regulations.

Thus, Lustosa (2017) proposed that if goodwill continues to be recorded as an asset, mainly due to the practical difficulties suggested by Spacek (1968), replacing the impairment test (current requirement) with a write-off proportional to the increase in fixed assets in use, whose rate is a proxy for the conversion of intangible assets into physical assets. However, considering that the classification as an asset is seen as inappropriate in this new theoretical approach proposed by Lustosa (2017) and Oliveira and Lustosa (2022), an alternative, even in this view of a proportional write-off, would be to classify it in shareholders' equity. The rate (an attempt to represent its conversion into physical assets) is still something to be improved in future research since this is a recent approach and different from the prevailing view in Accounting Theory.

Finally, some researchers also advocate the instant write-off approach to goodwill. Seetharaman et al. (2004) highlight some justifications defended in this subsequent accounting method, such as the measurable difficulties – since, unlike other assets, these cannot be sold separately –, and the fact that goodwill related to the business is expected to disappear with time. Gray (1988) and Ma and Hopkins (1988) favor instant write-off because they believe that, since internally generated and acquired goodwill represents benefits with similar risk characteristics, it should be accounted for in the same way so that the balance sheet is not distorted.

On the other hand, the instant write-off has limitations, including the substantial impact on the acquirer's result at the time of acquisition and the distortion in the companies' leverage position (Seetharaman et al., 2004).

3. Discussion on changes proposed by Discussion Paper/2020/1

In 2013 and 2014, the IASB performed a post-implementation review (PIR) of IFRS 3 – Business Combinations to verify whether the standard's operation corresponded to expectations or implementation problems were identified. Stakeholders expressed concerns about some accounting aspects of business combinations, such as the current reduction in accounting goodwill. Some stakeholders described the impairment test as complex, time-consuming, and expensive, requiring companies to make complex judgments. Furthermore, they alleged a time lag between the occurrence of a loss and its recognition in a company's financial statements. Thus, they suggested amortization should be introduced.

As a result of the PIR, IASB published Discussion Paper/2020/1 on potential improvements in business acquisition reporting to help investors assess the success – or failure – of such acquisitions. This document examines the topics under discussion and expresses the IASB's preliminary views. The final objective is to verify if there is convincing evidence that changes in IFRS standards are necessary and justify their cost.

Suggestions are made to the Discussion Paper through comment letters. After considering the feedback, the Board will decide how to move forward with the project and whether to amend any of its previously released draft opinions. If it decides to make changes, the Council will publish an exposure draft, initiating a potential official change to the current standard.

3.1 Preliminary IASB positions in DP/2020/1 and Comment Letters

According to the IASB (2020), its preliminary positions aimed to provide investors with more helpful information about acquisitions and consider the expected benefits and costs. It should be noted that only the positions related to this study's theme (reduction in the book value of goodwill) will be addressed here.

The first preliminary view is that the IASB should maintain the impairment-only model and not reintroduce amortization. This view is based on the impairment test providing essential, if not timely, confirmatory information and ratifying the investors' past assessments that such losses occurred, helping to hold management accountable.

The second preliminary view is that it is not feasible to significantly improve the effectiveness of the goodwill impairment test at a reasonable cost. Such a position concerns the allegations about the shielding effect. Hence, additional information about the subsequent performance of acquisitions would be provided by implementing new requirements on companies, which would provide investors with more direct information about the success or failure of acquisitions.

Finally, the third preliminary view is that the need for an annual impairment test should be removed. That is, companies would only be required to perform such a test if an assessment indicated a reduction in the recoverable amount, which would be done at the end of each year. Such a stance considers that this periodicity cannot eliminate the shielding effect, besides the manifestations of the test's high cost. It is worth highlighting the view of some members that removing this requirement could make impairment tests less robust (IASB, 2020).

An analysis of the 193 comment letters indicated that 30% (58 letters) supported the IASB's decision to maintain only the impairment test to reduce the book value of goodwill. Among other justifications is that amortization has several limitations, such as not being able to estimate the useful life of the goodwill and, consequently, using an arbitrary rate. On the other hand, 28% (54 letters) supported the reintroduction of amortization; most due to the subjectivity of the impairment test, which ends up being subject to management's judgment and, therefore, in practice, the auditors cannot sufficiently contest the value in use. There were also 38 letters (20%) that advocated a hybrid method to reduce the value of goodwill. Apart from these, 43 letters (22%) did not take a stand on any of the methods and/or dealt with different subjects addressed by the DP/2020/1.

4. A reflection upon the subsequent accounting of goodwill

All post-goodwill accounting models have limitations. However, even if there are limitations, the model adopted for reducing the carrying amount of goodwill is expected to represent the economic essence of this component more closely.

Even though the impairment test is the model adopted by the international accounting standard-setting body (IASB) and provides important information that can confirm losses due to the reduction in the recoverable value, some problems cannot be ignored. The fact that the test cannot directly capture the reduction in the value of goodwill (shielding) means that this loss may become arbitrary.

However, it is necessary to verify impairments so that the company's assets in general, including goodwill, are accounted for at amounts not exceeding their recoverable amounts. Given the limitations of this goodwill subsequent accounting model, it is necessary to reduce its value more directly and reliably.

Regarding the DP/2020/1, some stakeholders defend that goodwill has an indefinite but finite helpful life. Therefore, the reintroduction of amortization is the only way to show that goodwill is being consumed. An amortization expense does not provide investors with helpful information if it is arbitrarily determined though. Therefore, a more appropriate way would be to reduce the book value of goodwill in a non-random manner but involving a coherent counterpart, with a rate that, despite not being the direct delimitation of useful life, enables visualizing the conversion of goodwill into the expected benefits (profits).

Spacek (1968) states that this reduction should be performed using a method involving capitalizing the entity's profits. In the same sense, Lustosa (2017) argues that the surplus paid concerning the fair value of the acquirer's net assets is not an acquisition of non-individualizable intangible assets, grouped in the form of goodwill, but rather a partial waiver by the acquirer to the future physical wealth s/he hopes to obtain (with future decisions s/he will make). Therefore, goodwill, as an intangible asset, only potentially exists. According to the author, its value should be reduced along with converting intangible wealth into actual wealth, through proportional write-off, up to the limit of the surplus paid.

Subsequent accounting that manages, even if approximately, captures its economic essence – stock of intangible wealth equivalent to the present value of future residual profits expected from decisions yet to be implemented (Leake, 1921; Lustosa, 2017) – prevents that internally generated goodwill is implicitly recognized, replacing what was purchased and consumed, as noted by Pereira and Lustosa (2020). It needs to be prevented since, in addition to international standards prohibiting the recognition of internally generated goodwill, such recognition, although legitimate (i.e., although internally generated goodwill does exist in companies), would lead to problems in the qualitative characteristic of information comparability, given that only companies that undergo a business combination with the presence of goodwill would have this value explained in the financial statements.

5. Final Considerations

Acquiring a business is a common strategy for companies to grow. However, in subsequent years, acquisitions do not always perform as well as management initially expected. Thus, investors benefit from learning more and comparing acquisitions' performance to their expectations so that the management can be held accountable for their decision to combine business (IASB, 2020).

Reducing the carrying amount of goodwill has always been controversial and subject to wildly divergent views. Goodwill values have increased significantly around the world. According to some members of the IASB (2020), this may be evidence that it is not adequately reduced and that management is not being properly held accountable for its acquisition decisions.

With the post-implementation review (PIR) of IFRS 3, debates have returned to the standard-setters agenda, in which stakeholders expressed concerns regarding some aspects of the current reduction in accounting goodwill (i.e., impairment test), such as a time lag between the occurrence of a loss, high costs, high degree of judgment (and the possibility of earnings management), and shielding effect, among others.

To carry out a comparative analysis of the potential ways of subsequently accounting for goodwill, this study presents a theoretical overview, including the recent changes proposed in the IASB's Discussion Paper/2020/1.

Observing the IASB's preliminary stance, it is clear that maintaining the impairment test, as the only way to reduce the book value of goodwill does not solve the problems listed in DP/2020/1. This test is expected to reduce the book value of acquired goodwill when the margin produced by the acquirer's business (due to the shielding effect) does not mask the loss that would exist if it were possible for goodwill to be tested separately. However, it can also result in relatively inflated balances. Additionally, the use of fair value may be subject to managerial opportunism, which also makes it difficult for auditors and regulators to assess impairment.

Furthermore, the impairment test can only capture the difference between the accounted and actual cash-generating power when goodwill (or its CGU) has its book value below the recoverable amount. Even though this loss has valuable information, it says much more about the cash-generating unit than the goodwill itself. Therefore, it should not be the only criterion considered for reducing its value.

According to Lustosa (2017), while not converted into physical assets, goodwill is a potential state of intangible wealth equivalent to the present value of expected future residual profits from decisions yet to be implemented. As this implementation occurs (e.g., the materialization of ideas and implementation of plans and strategies, among others), this intangible heritage is converted into a physical asset. Note that this conversion cannot occur linearly, much less be captured only annually, as it is a dynamic and constant process. Therefore, the way to reduce its carrying amount that most closely demonstrates that the goodwill is being consumed (i.e., transformed) is the proportional write-off.

The challenge lies in linking this reduction (or conversion) of goodwill to the generation of physical assets and future wealth, as Lustosa (2017) advocates. Thus, the primary and challenging issue to be debated is structuring a rate that can approximately translate the conversion of goodwill into expected future earnings, which remains a suggestion for future research.

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Intangible Assets and Conservatism in the Brazilian Stock Market

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Abstract

Objective: This study's objective was to analyze the influence of the level of intangibility on accounting conservatism. Evidence was considered that the valuation of shares might influence discretionary accounting practices and that recorded intangible assets may improve the quality of information.
Method: 92 publicly traded Brazilian companies were analyzed between 2014 and 2019. The empirical models adopted were those of Basu (1997) and Ball and Shivakumar (2005). Two aspects of intangibility were considered: (i) the relationship between the shares' market value and book value; and (ii) accounted intangible assets. Data were processed using panel data regression.
Results: Intangibility based on market value showed a negative relationship with conservatism. On the other hand, intangibility based on book value showed a positive relationship. Additionally, companies with greater intangibility based on market value did not show the conservatism attribute. It was also found that companies with a higher proportion of recorded intangible assets showed more significant conservatism.
Contributions: This paper contributes to the academic milieu, regulatory agents, and investors, as it helps understand the influence of intangible assets on the quality of accounting information.
Keywords: intangible assets; intangibility; conservatism; profit quality.

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1. Introduction

Intangible assets are key elements in the new economy. The reason is that they provide a competitive advantage, which is crucial in a highly competitive economic context. Hence, the competitiveness of firms in this environment becomes more dependent on strategic assets without physical substance, making up a considerable portion of some companies' investments.

For example, Haskel and Westlake (2018) mention the case of technology companies such as Microsoft, which has physical assets equivalent to approximately 1% of its market value. Another example is reported by Ewens, Peters, and Wang (2021), which shows the intangible elements' more significant participation in the prices of mergers and acquisitions in the American market, starting from 50% in the 1990s to more than 80% in 2015.

Haskel and Westlake (2018) argue that the main drivers of value have shifted from physical properties, machinery, and inventories to patents, brands, technological information, and human resources. The importance of these resources without physical substance has transformed the nature of capital, making economies and companies with high investments in intangible assets behave differently. This environment where market value can be predominantly based on intangible assets has radically changed capital markets.

This scenario has impacted the usefulness of financial information in equity markets. Researchers such as Brown, Lo, and Lys (1999) and Lev and Gu (2016) found a decrease in the statistical relationship between the firms' accounting information and market value, mainly from the 1980s onwards, showing that markets have assigned increasing importance to non-financial information. As new economic environments generate new informational demands, there is a need to study how the current era of assigning relevance to intangible assets impacts the quality of disclosed information. This need becomes evident given the market's difficulty pricing intangible assets (Eisfeldt & Papanikolaou, 2014).

As the prices of assets reflect not only past performance but also future prospects, and the market attributes high expectations to intangible-intensive companies (Griffin & Lemmon, 2002), the opportunity arises for these firms' managers to follow the requirements of accounting standards making discretionary choices, i.e., bias based on interests. When a company's equity is valued in such a way that most of its value is based on intangible assets that are difficult to control or monitor, discretionary practices that obscure the informational content of earnings may impair the quality of information. In this context, a wide range of studies, such as Healy (1985) and Burgstahler and Dichev (1997), has shown the existence of bias in accounting choices to match market expectations. For example, in Brazil, Martins, Paulo, and Monte (2016) obtained evidence along these lines, as they found that managers are more likely to manage earnings when they are close to reaching analysts' forecasts.

Regarding information attributes, studies address the relationship between earnings management and intangibility. For example, Machado and Machado (2021) showed higher levels of earnings management among companies with high intangibility based on market value. This finding suggests that the quality of information among intangible-intensive companies may be lower, considering biased accounting estimates aimed at meeting market benchmarks.

Other studies, such as Moura, Theiss, and Cunha (2014), Moura, Ziliotto, and Mazzioni (2016), Lopes, Peixoto, and Carvalho (2021) and Machado and Machado (2021) considered recorded intangible assets. These authors obtained evidence that the participation of these assets in balance sheets is negatively related to earnings management, arguing that higher scrutiny to recognize them contributes to the quality of information.

Considering the conservatism attribute, this study aims to verify the relationship between intangibility levels and the quality of accounting information. Conservative practices (or their lack thereof) are possibly used in a discretionary manner. According to Moreira, Colauto, and Amaral (2010), choosing between a conservative or bold method can reflect on stock prices differently depending on the news.

Considering that the specific characteristics of firms can influence accounting conservatism (Watts, 2003) and that intangible assets have informational relevance for the market (Ewens et al., 2021; Loprevite, Rupo, & Ricca, 2019; Silva, Sousa, & Klann, 2017), these assets are expected to influence conservatism practices.

Given the inherent subjectivity of intangible resources and doubts about firms' ability to deliver consistent performance, caution when preparing financial reports can avoid damaging the quality of information. In this context, the following problem arises: does a company's intangibility level influence conservatism practices? Thus, this study analyzes the relationship between intangibility and accounting conservatism to answer this question.

This study is relevant because it fills a gap in research addressing Brazil's accounting information quality. No papers addressing the direct relationship between intangible assets and conservatism were found. Given the growing participation of companies with high intangibility, there is a need to study the informational environment of these companies.

Additionally, this study is expected to expand the literature, considering that Brazilian researchers seldom address the level of intangibility as a factor influencing the quality of accounting information (Moura et al., 2016). Moreover, the benefits of conservatism for the capital market are still unclear (Lara, Osma, & Penalva, 2014). Thus, this study is intended to fill these gaps and encourage discussions in the academic milieu and among regulatory agents and investors.

2. Theoretical Framework

2.1 Accounting conservatism

According to Kam (1990), assets and liabilities are frequently assessed in the context of uncertainties, and therefore, accounting can choose a conservative behavior. It is better to err in underestimating positive elements and overestimating negative items than passing an expectation that may not be fulfilled. This prudent conduct is about conservatism, which Basu (1997) defines as the requirement for more verification to recognize good news (gains) than bad news (losses). Ball and Shivakumar (2005) state that the biased recognition of bad news causes losses to affect profit more rapidly, as they are recognized more opportunely.

The asymmetric recognition of gains and losses intended to anticipate problems might be helpful in not misleading investors. Exercising caution when making estimates generates financial statements without optimism bias. This cautious behavior on the part of accountants can balance the optimistic tendency of managers to overestimate earnings, which can be more dangerous than their underestimation in terms of disclosure penalties (Kam, 1990; Hendriksen & Van Breda, 1999).

The literature has considered conservatism one of the proxies for accounting information quality (Watts, 2003; Ball & Shivakumar, 2005). Although regulatory bodies do not consider it on the list of quality characteristics because it is inconsistent with neutrality, it is an important attribute of quality, which contributes to information efficiency by mitigating problems such as information asymmetry and agency conflicts.

The literature shows the pros and cons of conservatism. However, the positive aspect most frequently mentioned refers to the reduction of information asymmetry by disclosing conservative rather than opportunistic results (Watts, 2003; LaFond & Watts, 2008; Lara et al., 2014; Silva, Heinzen, Klann & Lemes, 2018); as it reduces managers' incentive to engage in earnings manipulation. Thus, it is an important corporate governance mechanism, especially when facing uncertainty.

The influence on contractual relationships can also be considered a positive aspect. Conservatism works to mitigate moral hazard effects associated with managers, to the detriment of contracting parties, due to imperfect information. It is intended to ensure minimum guarantees for fulfilling obligations and reducing the likelihood that resources are inappropriately distributed to a few agents (Watts, 2003).

LaFond and Watts (2008) note another positive aspect of conservatism, i.e., greater disclosure is expected. In this case, the explanatory notes are supposed to mention gains that had not been accounted for.

Regarding the negative aspects, comparisons are hindered due to a lack of standards and the possibility of generating biased numbers due to the negative bias. Additionally, its excessive use may lead to the disclosure of information, emitting false signals to users (Hendriksen & Breda, 1999).

When considering the pros and cons, Silva et al. (2018) argue that this attribute can improve the quality of accounting information, mitigating opportunistic practices that could generate artificially inflated results, which eventually might be more harmful to users than conservative information.

2.2 Intangibility

According to regulatory restrictions, it is not possible accounting all intangible assets. Hence, there is a need to consider the level of intangibility using two approaches: (i) the relationship between the shares' market value and book value; and (ii) intangible assets relative to total assets.

The first refers to internally generated intangible assets, which, although not accounted for, are valued by the market. These include corporate culture, advertising effects, and administrative quality (Ewens et al., 2021). This subjective evaluation can generate asymmetric information, as verified by Wu and Lai (2020). These authors showed a positive relationship between intangibility based on market value and informational asymmetry. It occurs due to errors in measuring intangible assets, as there is no universal standard for their valuation, and also due to the difficulty in monitoring.

The remaining are essentially acquired intangible assets. Because they are identifiable, they are accounted for in the assets. However, certain intangible assets, such as research and development, expenses with advertising, and employee training, are taken to the result of the period because they do not meet recognition criteria. These intangibles generate future benefits, although they are not activated.

The difference in the treatment of intangible assets impacts accounting in the subsequent periods. Banker, Huang, Natarajan, and Zhao (2019) note that the profits of companies with high expenses related to intangible assets that go to the result tend to be underestimated because these expenses reduce current profits but generate value in the future. In other words, what is recognized in the results, instead of assets, will generate a benefit in the future and will not have a related expense to be recognized. This value created in the future is not reflected in current balance sheets due to this accounting treatment. The authors add that if investors focus on the accounting rule and do not understand this effect, it may lead to the mispricing of shares. In this line of reasoning, Lev and Gu (2016) argue that what is conservative in the present may become bold in the future, as this practice generates effects in the coming periods. This is in line with Watts (2003), who highlights that one of the consequences of the asymmetrical recognition of losses and gains resulting from conservative practices is the persistent undervaluation of assets, which may lead to the overvaluation of future profits due to the underestimation of future expenses. That is, underestimating assets or overvaluing liabilities in the present may overestimate financial performance in the future.

Given the two intangibility approaches, one has to consider that the capital market assigns importance to information about these assets, considering that several studies have found the value relevance of these items in the United States (Ewens et al., 2021), Europe (Loprevite et al., 2019), and Brazil (Silva et al., 2017). Thus, intangible assets provide valuable information that impacts the firms' market value.

2.3 Research hypotheses

For Feltham and Ohlson (1995), the value of intangible assets results from the expectation that profits above the normal will be generated. Griffin and Lemmon (2002) state that the market attributes greater expectations to intangible-intensive companies. Hence, this feeling becomes an essential vector of the price of these companies' shares. The authors above reported evidence of overvalued companies with weak fundamentals in the present but with the potential for future growth.

Market expectations can motivate biased accounting decisions depending on the message one wants to convey. In this context, Wu and Lai (2020) argue that intangible-intensive companies are subject to discretionary accounting choices that encourage opportunism to make judgments according to specific interests.

Stock prices are also likely to influence accounting choices. According to Ball and Brown (1968), most of the information in earnings is already priced before disclosure. The reason is that stock prices reflect expected earnings as analysts release estimates. According to this reasoning, Brugni, Fávero, Flores, and Beiruth (2015) studied the relationship between stock prices and earnings and identified situations in which earnings impact prices, and vice-versa, prices impact earnings. The first situation occurs with the disclosure of good or bad information. The second denotes that price may precede earnings based on the released estimates of analysts. This finding makes room for biased accounting choices for a company to match analysts' forecasts. Additionally, there is evidence that the release of prior earnings impact stock prices, as analysts' forecasts influence the market more strongly than past performance analyses (Lev & Gu, 2016).

Anticipating prices while waiting for profits may motivate accounting practices that compromise information content. In this environment, Jensen's statement (2005) is valid as it suggests that the overvaluation of companies is a fertile ground to impair the quality of information. Machado and Machado (2021) corroborate this statement as they found more frequent earnings management in firms with high intangibility at market value.

Added to this context is the fact that conservatism, or its lack, may also be a means of manipulating accounting numbers, as managers have different incentives to report financial information on losses and gains (Healy, 1985; Ball & Shivakumar, 2005). This attribute may also be used with greater discretion among companies that need to meet expectations. Thus, an absence of conservatism is expected in intangible-intensive firms.

Additionally, the first hypothesis is based on research conducted in the Brazilian market that showed a negative relationship between conservatism and market value (Roychowdhury & Waths, 2007; Silva et al., 2018).

In this context, the first hypothesis is proposed:

H1: Intangibility based on the relationship between the shares' market value and book value is negatively related to conservatism.

The second hypothesis is based on the finding that intangible assets have informational relevance for the market (Ewens et al., 2021; Al-Ani, & Tawfic, 2021; Silva et al., 2017) and, for this reason, might also influence judgments when preparing financial statements.

Furthermore, the regulatory aspect is a determining factor. In this sense, Watts (2003) notes that regulation incentivizes companies to prepare conservative accounting statements. At the same time, Roychowdhury and Watts (2007) argue that assets tend to be undervalued if bad news is accounted for faster than good news. This undervaluation is more evident in intangible assets, as these are subject to more significant regulatory restrictions than physical assets. For example, Beuren, Theiss, and Sant'Ana (2013) found conservatism in the treatment of expenses with research and development. Most companies were resistant to capitalization due to uncertain future results. As conservatism is a rational means of dealing with uncertainties, as Kam (1990) noted, one opts for conservative behavior to amortize current expenses.

The relationship between accounted intangible assets and information quality was investigated by Moura et al. (2014), Moura et al. (2016), Lopes et al. (2021), and Machado and Machado (2021). These authors found that the greater the share of intangible assets in total assets, the less frequent earnings management is. Complementarily, Al-Ani, and Tawfic (2021) found a positive relationship between these assets and earnings quality in emerging countries. Such results suggest that, as these assets are limited by conservatism due to regulatory issues, the extensive verifications for recognition may restrict discretionary practices, contributing to the quality of financial information. Thus, the second hypothesis is proposed:

H2: Intangibility based on intangible assets accounted in the balance sheet is positively related to conservatism.

3. Method

3.1 Sample and data collection

Companies from the Índice Brasil Amplo, by B3 – Brasil Bolsa Balcão, were selected, comprising the shares of the 149 companies with the highest trading volume in July 2021, configuring a non-probabilistic sampling. The period concerned is 2014 to 2019. In addition, financial and insurance companies (14), those missing data or which did not have listed capital in the period (36), and companies with negative equity (7) were excluded. Hence, the final sample comprised 92 companies.

The information was extracted from the Economática® database, the companies' websites through which they communicate with investors, and the B3 listed companies directory.

3.2 Intangibility variables

Two proxies were used to capture the intangibility level. The first, called *INT1*, refers to the division between the market value of Shareholders' Equity and its book value, similar to the market-to-book ratio. As the indicator reflects a firm's potential to grow and the expectation of it generating funds (Griffin & Lemmon, 2002), it corresponds to the objective of this study, which is to capture market expectations reflected in stock prices. Its use as an intangibility index was pioneered by Lev (2001), Chen and Zhao (2006), and Kayo and Fama (2004), who claim that this indicator is based on the close relationship of intangible assets with the market value share exceeding the book value. This measure is widely used in studies intending to capture intangibility at market value, such as Machado and Famá (2011), Lev and Gu (2016), Sousa and Cunha (2020), and Machado and Machado (2021). The higher the result, the greater the participation of intangible assets in a company's value, denoting the characteristics of intangible-intensive or otherwise tangible-intensive companies. Due to fluctuations in share prices, the average annual index was used.

The *INT2* variable was used to reflect the intangible assets recorded in the balance sheet. It comes from the ratio between intangible assets and total assets. This variable was also used by Moura et al. (2014), Moura et al. (2016), Lopes et al. (2021), and Machado and Machado (2021), to verify the level of intangibility at book value.

3.3 Empirical models for conservatism

For more in-depth and rigorous verifications, two models of conservatism were used, those proposed by Basu (1997) and Ball and Shivakumar (2005). Both are conditional conservatism, also seen as profit conservatism. The first considers the stock price, seeking to identify whether there is a difference in the timing of the accounting result insofar as the return is positive or negative. The second considers accounting variables, allowing us to measure conservatism by reversing the results. Both were adapted by including intangibility variables.

3.3.1 Adaptation of Basu's model (1997)

This model is based on the regression of companies' profits, showing whether they respond more strongly to negative returns (bad news) than positive returns (good news), assuming that bad news captured by the market is derived from conservatism. The original model is given by:

$$Luc_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 RE_{it} + \beta_3 D_{it} \times RE_{it} + \varepsilon_{it} \quad \text{(Eq. 1)}$$

Where: *Luc* – earnings per share, *D* – dummy variable for returns, where 1 concerns negative returns and 0 positive returns, *RE* – stock returns, *DxRE* – the difference between the impact of positive and negative returns. All variables refer to company *i* in year *t*. To control for heteroscedasticity and the scale effect, the variables were deflated by the share price in *t-1*.

The β_3 coefficient corresponds to conservatism. When it is positive and significant, it shows timely recognition of negative returns. In other words, β_3 is positive when bad news (negative return) is reflected in earnings to a greater extent than good news (positive return). When it is negative and significant, it indicates no conservatism.

The original model was adapted by including intangibility variables to test the hypotheses. This procedure is commonly adopted in studies addressing conservatism according to the variables of interest one wishes to study, as shown in Demonier, Almeida, and Bortolon (2015). Intangibles at market value (*INT1*) were included in equation 2, and intangibles at book value (*INT2*) in equation 3:

$$Luc_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 RE_{it} + \beta_3 D_{it} \times RE_{it} + \beta_4 INT1_{it} + \beta_5 INT1_{it} \times D_{it} + \beta_6 INT1_{it} \times RE_{it} + \beta_7 INT1_{it} \times D_{it} \times RE_{it} + \varepsilon_{it} \quad \text{(Eq. 2)}$$

$$Luc_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 RE_{it} + \beta_3 D_{it} \times RE_{it} + \beta_4 INT2_{it} + \beta_5 INT2_{it} \times D_{it} + \beta_6 INT2_{it} \times RE_{it} + \beta_7 INT2_{it} \times D_{it} \times RE_{it} + \varepsilon_{it} \quad \text{(Eq. 3)}$$

The regressions' results will be analyzed by controlling the variables included in the model and their interactions with the original variables. To test hypothesis 1, it is expected that β_7 of equation 2 is positive and significant, confirming that there is no conservatism in intangible-intensive companies.

For hypothesis 2, β_7 in equation 3 is expected to be negative and significant, confirming conservatism practices in companies with a greater intangible assets to total assets ratio. Additionally, one can analyze the original coefficients after controlling for additional variables in both regressions.

3.3.2 Adaptation of Ball and Shivakumar's model (2005)

Ball and Shivakumar's (2005) model measures the recognition asymmetry between gains and losses. Conservatism is assessed according to the occurrence of reversing accounting results, allowing the identification of the profit's transitory components. The lower frequency of timely loss recognition is associated with a lower quality of financial statements. The original model consists of the following equation:

$$\Delta NI_{it} = \beta_0 + \beta_1 D\Delta NI_{it-1} + \beta_2 \Delta NI_{it-1} + \beta_3 D\Delta NI_{it-1} \times \Delta NI_{it-1} + \varepsilon_t \quad \text{(Eq. 4)}$$

Where: ΔNI_{it} – the variation in accounting net income of company i from year *t-1* to year t; $D\Delta NI_{it-1}$ – dummy variable for negative variation in the net income of company *i* from year *t-2* to year *t-1*, assuming *1* if $\Delta NI_{it-1}<0$, and 0 otherwise; ΔNI_{it-1} – the variation in net income of company i from year *t-2* to year *t-1*.

Conservatism is reflected in β_2 and β_3. Parameter β_2 indicates whether there is a reversal of positive results. Positive variations tend to become a persistent component of profit, tending to non-reversal, given the higher requirements for recognizing good news. Thus, a β_2 positive denotes conservatism. On the other hand, timely recognition of gains implies a negative β_2, denoting no conservatism.

Coefficient β_3 indicates the existence of reversal of negative results. If it is negative and significant, it indicates timely recognition of losses, denoting conservatism. As there is no need for strong verification to recognize expenses, this means that negative results can be reversed in later periods. Thus, negative variations can be transitory components of profit.

Verifying the opportune recognition of losses as transitory dimensions of the result is also possible by adding $\beta_2 + \beta_3$. There is conservatism when the sum is negative.

Next, the model was adapted by including intangibility variables – respectively, market value (*INT1*) and book value (*INT2*) – in equations 5 and 6:

$$\Delta NI_{it} = \beta_0 + \beta_1 D\Delta NI_{it-1} + \beta_2 \Delta NI_{it-1} + \beta_3 D\Delta NI_{it-1} \times \Delta NI_{it-1} + \beta_4 INT1_{it} + \beta_5 INT1_{it} \times D\Delta NI_{it-1} + \beta_6 INT1_{it} \times \Delta NI_{it-1} + \beta_7 INT1_{it} \times D\Delta NI_{it-1} \times \Delta NI_{it-1} + \varepsilon_{it} \quad \text{(Eq. 5)}$$

$$\Delta NI_{it} = \beta_0 + \beta_1 D\Delta NI_{it-1} + \beta_2 \Delta NI_{it-1} + \beta_3 D\Delta NI_{it-1} \times \Delta NI_{it-1} + \beta_4 INT2_{it} + \beta_5 INT2_{it} \times D\Delta NI_{it-1} + \beta_6 INT2_{it} \times \Delta NI_{it-1} + \beta_7 INT2_{it} \times D\Delta NI_{it-1} \times \Delta NI_{it-1} + \varepsilon_{it} \quad \text{(Eq. 6)}$$

In equations 5 and 6, coefficient β_7 reflects the relationship between conservatism and the variable of interest, denoting conservatism when it is negative. To test hypothesis 1, it is expected that β_2 and β_3 of equation 5 are negative and positive, respectively, or the sum of both be positive. Furthermore, β_7 is expected to be positive. Therefore, both cases will indicate no conservatism.

Regarding hypothesis 2, β_2 and β_3 of equation 6 are expected to be positive and negative, or the sum is supposed to be negative. Furthermore, β_7 is expected to be negative. In these cases, there will be evidence of conservative accounting practices.

Note that only statistically significant regression estimates were used to confirm or reject the hypotheses.

4. Results

4.1 Descriptive Statistics

As the intangibility indices show high fluctuations, we cut out outliers corresponding to 5% of the total observations distributed at the lower and upper ends. Such a practice is helpful for the results to be independent of extreme values. Considering the total number of companies in the sample (n = 92) and the six-year time series, 524 observations were obtained. Table 1 presents the results of descriptive statistics for the intangibility indices:

Table 1

Descriptive Statistics for the Intangibility Indexes

Panel A	**Intangibility at Market Value – *INT1***						
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**6 years**
Mean	1.90	1.70	1.81	2.11	2.23	2.20	1.98
Standard deviation	1.79	1.67	1.74	2.06	1.88	1.64	1.81
Coefficient of variation	0.94	0.98	0.96	0.98	0.84	0.74	0.91
Minimum	0.22	0.21	0.24	0.20	0.23	0.30	0.20
Maximum	8.03	8.18	7.46	8.72	8.64	8.19	8.72
Panel B	**Intangibility at Book Value – *INT2***						
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**6 years**
Mean	0.18	0.18	0.18	0.16	0.16	0.15	0.17
Standard deviation	0.21	0.20	0.20	0.18	0.18	0.16	0.19
Coefficient of variation	1.17	1.08	1.13	1.12	1.09	1.05	1.11
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.86	0.85	0.85	0.85	0.68	0.70	0.86

Source: developed by the authors.

The intangibility at market value (*INT1*) mean was 1.98 in the study period. It means the companies' equity market value was approximately twice the book value. Hence, the market is willing to disburse a premium above the book value due to a perception of potential elements that generate value and which are not accounted for.

The high standard deviation indicates that the results oscillate considerably in a distribution that reaches extreme points far from the mean. The high coefficient of variation corroborates this finding, denoting high volatility considering its result was higher than 1 in all the years. Volatility may result from stock price changes, reflecting market expectations adjustments. Additionally, we need to emphasize the low homogeneity between the companies included in the sample.

Note that intangibility decreased during times of financial crisis, in 2015 and 2016, with subsequent recovery. The fact that this indicator is linked to the shares' market value means that its dynamics follow the volatility of the capital market. As the economic situation influences investors' decisions and provides essential bases for valuation, a decrease in the intangibility level may be seen in periods of crisis, corroborating Lev's (2001) and Wu and Lai's (2020) studies.

Another important finding is that the mean of 1.98 for the Brazilian market is far from the mean of 6 that Lev (2001) found for the American market. A potential explanation lies in Brown, Martinsson, and Petersen's (2013) statement that developed financial markets favor intangible assets. Thus, it is expected that, in these markets, intangible assets are priced higher, as the indicator found was higher than in Brazil.

Regarding intangibility at book value represented by the *INT2* variable, an average of 17% of the companies' total assets was composed of intangible assets. There is also high oscillation, as shown by the standard deviation and coefficient of variation. The analysis of minimum and maximum values shows the high distance between the extremities; on the one hand, some companies do not have these resources accounted for. On the other hand, there are companies with this investment equivalent to 86% of total assets. This dispersion can be explained by sector particularities and the firms' idiosyncrasies, reflecting the particularity of these resources. This finding aligns with several studies that identified a substantial discrepancy in investments in intangible assets, which shows a heterogeneous demand for these resources (Rech, Schnorrenberger & Lunkes, 2012; Moura et al., 2014; Santos, 2015).

Additionally, adherence to accounting standards determines the volume of intangible assets recorded on balance sheets. It means, for instance, that two firms have a high investment in these resources; however, for regulatory reasons, one can account for it in assets, while the other must take it to the result.

Analysis of the indicator every year shows that the index stagnated at 0.18 from 2014 to 2016, declining until reaching 0.15 in 2019, showing no increase in the mean of intangible assets accounted for in the period. Furthermore, the analysis can be complemented with studies addressing previous periods, making up a more extensive historical series. Other authors show that capitalized intangible assets have risen since the advent of international accounting standards in Brazil. Rech et al. (2012) showed that these resources started from 1% in 2006 and reached 12% in 2010, while Santos (2015) found 19% in 2012. The authors verified the years after adopting IFRS, which coincided with economic growth. As this study found stagnation and subsequent decrease, the pace of growth of this type of investment may have ceased along with economic stagnation. Thus, while intangibility at market value is related to the financial market dynamics, intangibility at book value may be related to the dynamics of the economic situation.

4.2 Panel data regressions

Regressions were estimated for the original (equations 1 and 4) and adapted models (equations 2, 3, 5, and 6), which makes it possible to analyze whether accounting conservatism exists in firms before considering the variables of interest. In addition, the adapted models' regressions enabled analyzing the effect of including intangibility variables.

To test hypothesis 1, regressions were estimated according to equations 2 and 5, while equations 3 and 6 were used for hypothesis 2. The Stata® software was used for the Econometric processing. The Chow, Breusch-Pagan, and Hausman LM tests were applied to analyze the best regression model, and the results determined the use of estimators with fixed effects. Hence, we decided to control for the fixed effects by company, admitting each company's intercept dummy variable to reflect the singularity.

The results are presented in Table 2:

Table 2
Results of the regression of the original and adapted models

	Basu's model (1997)			Ball and Shivakumar's model (2005)		
	Original model Equation 1	**Adaptation *INT1* Equation 2 (H1)**	**Adaptation *INT2* Equation 3 (H2)**	**Original Equation 4**	**Adaptation *INT1* Equation 5 (H1)**	**Adaptation *INT2* Equation 6 (H2)**
Variables	**Coef. Sig.**	**Coef. Sig.**	**Coef. Sig.**	**Coef. Sig.**	**Coef. Sig.**	**Coef. Sig.**
Cons	0.2782 (0.001)	0.3437 (0.067)	-0.1175 (0.651)	2.6945 (0.001)	1.8155 (0.251)	2.7023 (0.244)
β_1	0.0470 (0.746)	-0.0248 (0.915)	0.1667 (0.402)	-5.4583*** (0.000)	-8.3917*** (0.000)	-6.4762*** (0.000)
β_2	-0.0261 (0.149)	2.6341*** (0.001)	-0.1417 (0.611)	-0.2146*** (0.000)	-0.1724 (0.181)	-0.1722** (0.018)
β_3	7.2074*** (0.000)	-0.1983 (0.972)	7.9952*** (0.000)	0.0478 (0.723)	0.0526 (0.819)	-0.0256 (0.867)
β_4	–	0.0292 (0.721)	2.3827 (0.113)	–	0.4479 (0.522)	-0.0932 (0.994)
β_5	–	-0.0169 (0.877)	-0.8715 (0.322)	–	1	6.1141 (0.376)
β_6	–	-2.6743*** (0.001)	1.4337 (0.679)	–	-0.0395 (0.401)	-0.2807 (0.376)
β_7	–	7.8542* (0.066)	-8.2336 (0.569)	–	-0.0149 (0.943)	1.3833 (0.460)
Adjusted R^2	0.2148	0.3299	0.3148	0.0864	0.1054	0.0909
Observations	524	524	524	524	524	524
EF firm	Yes	Yes	Yes	Yes	Yes	Yes
Prob > F	0	0	0	0	0	0
Wald	0	0	0	0	0.0001	0.0004

* significant at 10%. ** significant at 5%. *** significant at 1%.

Source: developed by the authors.

A comparison of the results obtained by the original and adapted models shows an increase in the adjusted R^2, suggesting that the intangibility variables are relevant to conservatism, increasing the models' explanatory power. The significance obtained by the *F* test indicates that the increase in R^2 is not the result of specification with the inclusion of an irrelevant variable. Furthermore, the Wald test showed the variables' significance.

The original models indicate the existence of conservatism in the companies addressed here. Basu's model (1997) returned a positive and significant result in β_3, showing timely recognition of negative returns. This result is in line with Moreira et al. (2010) and Demonier et al. (2015), who also report this finding for Brazilian companies based on this model. The model by Ball and Shivakumar (2005) also shows conservatism in the companies, given the negative result of the sum ($\beta_3 + \beta_3$). It shows timely recognition of losses as transitory dimensions of the result. This finding corroborates Demonier et al. (2015), who obtained similar results with this model in Brazil.

When verifying hypothesis 1 using the model adapted from Basu (1997), note that the inclusion of the *INT1* variable generated a change of signs in the coefficients obtained in the original model, denoting that the conservatism previously observed does not remain. Thus, when considering intangibility at market value, the model fails to return coefficients that point to conservative practices. Furthermore, the result of positive and significance denotes no conservatism but the anticipation of gains. The results suggest that intangibility at market value influences conservatism practices negatively, which makes good news (positive return) timelier than bad news (negative return). Thus, hypothesis 1 was confirmed. These findings align with studies that found a negative relationship between conservatism and market value (Roychowdhury & Watts, 2007; Silva et al., 2018).

The test of hypothesis 1 using the model by Ball and Shivakumar (2005), adapted with the inclusion of the variable *INT1* shows a decrease in the significance of . Thus, this attribute loses significance relative to the intangibility variable. The coefficient did not return the expected positive sign or significance, which is insufficient to make inferences about this attribute. The decrease in the statistical significance of conservatism when relating it to intangibility at market value indicates that there may be a negative relationship between the two. However, it is insufficient to confirm hypothesis 1.

To test hypothesis 2, the results of Basu's model (1997), adapted with the inclusion of the *INT2* variable, indicate the permanence of the conservatism found in the original model. In addition to an increase in β_3, it remained positive and significant, showing that the negative return reflects on profit to a greater extent than positive returns. As expected, the β_7 coefficient was negative, though without statistical significance. Thus, it is possible to confirm hypothesis 2, as evidence was found that intangibility at book value leads to conservative accounting practices. Furthermore, these results corroborate studies showing that intangible assets accounted for positively contribute to the quality of accounting information (Moura et al., 2014; Moura et al., 2016; Lopes et al., 2021; Machado & Machado, 2021; Al-Ani & Tawfic, 2021). In this line of reasoning, considering that conservative practices can reduce information asymmetry (LaFond & Watts, 2008), the beneficial informational effect that these assets can provide is evident.

As for the test of hypothesis 2 using the adapted model by Ball and Shivakumar (2005), it shows that the conservatism found by the original model remained after the *INT2* variable was included, as the sum $(\beta_2 + \beta_3)$ remains negative. Additionally, the β_3 coefficient changed sign and became negative, although without significance. The negative sum and the significance obtained in β_2 denote conservatism; hence, *H2* is accepted. On the other hand, contrary to the expected, the negative β_7 coefficient without significance is insufficient to confirm hypothesis 2 according to the adapted model. The absence of significance when including *INT2* does not allow us to state that this variable influences conservatism.

4.3 Robustness tests

To deepen the study, we opted for performing additional analysis, dividing the sample into two clusters according to the intangibility levels in each variable, considering intangible-intensive and tangible-intensive companies. Next, the original models were regressed in each group to compare the differences.

For intangibility at market value (*INT1*), the companies were separated according to the index result, i.e., above or below 2, according to Machado and Machado (2021). This decision considers that intangible-intensive companies have most of their market value reflected by resources not accounted for in the financial statements, which only occurs when the indicator is above 2.

The results for intangibility at market value are shown in Table 3:

Table 3
Results for intangibility at market value

	Basu (1997)		BS (2005)	
	INT1 < 2	*INT1 > 2*	*INT1 < 2*	*INT1 > 2*
Cons	0.2797 (0.001)	0.0345 (0.005)	1.3406 (0.002)	8.6407 (0.001)
β_1	0.0901 (0.507)	0.0293 (0.220)	-1.8506** (0.004)	-1.1206** (0.003)
β_2	-0.0256* (0.069)	0.3887*** (0.000)	-0.0107 (0.826)	-0.0635 (0.566)
β_3	7.1990*** (0.000)	0.9449 (0.417)	0.0507 (0.914)	0.0716 (0.638)
Adjusted R²	0.5259	0.1725	0.0294	0.0548
Observations	369	182	369	182
Firm effects	Fixed	Fixed	Fixed	Random
Hausman	0	0.003	0.0003	0.8953
Prob > F	0	0	0.0353	0.0714
Wald	0	0	0.0321	0.0300

* significant at 10%. ** significant at 5%. *** significant at 1%.

Source: developed by the authors

When applying the original model by Basu (1997) in the group of tangible-intensive companies (*INT1<2*), the conservatism initially found by the model that included all companies without separation remains (*Table 2*). The positive and significant β_3 coefficient shows that conservatism is more pronounced in this group of companies. On the other hand, note that β_3 lost significance in intangible-intensive companies (*INT1>2*), indicating no conservatism in this group. These results confirm hypothesis 1, as tangible-intensive firms present the conservatism attribute more pronouncedly than intangible-intensive firms.

Ball and Shivakumar's (2005) model did not show a relevant change in β_2 and β_3, as they remained without significance after the companies were separated. However, it does not allow us to state that there is a significant difference in conservatism between the groups. Therefore, it is not possible to confirm hypothesis 1, but there is no significant evidence to reject it; hence, the result is inconclusive.

For the intangibility variable at book value (*INT2*), no previous studies were found separating companies according to accounted intangible assets. Thus, we decided to partition the observations according to the mean 0.17 calculated in the descriptive statistics (Table 1). The regressions' results are shown in Table 4:

Table 4
Results for intangibility at book value

	Basu (1997)		BS (2005)	
	INT2 < 0.17	***INT2 > 0.17***	***INT2 < 0.17***	***INT2 > 0.17***
Cons	0.2593 (0.005)	0.1080 (0.000)	7.1707 (0.001)	1.7006 (0.032)
β_1	0.1254 (0.418)	-0.0155 (0.421)	-1.0606 (0.000)	-1.9606 (0.082)
β_2	-0.0259* (0.081)	0.2738*** (0.005)	-0.0048 (0.932)	-2.1769*** (0.004)
β_3	7.2491** (0.042)	1.1677*** (0.000)	0.0331 (0.891)	2.1799*** (0.004)
Adjusted R²	0.5315	0.1732	0.0485	0.0596
Observations	320	204	320	204
Firm effects	Fixed	Fixed	Random	Random
Hausman	0	0	0.2429	0.9512
Prob > F	0	0	0.0047	0.0202
Wald	0	0	0.0034	0.0122

* significant at 10%. ** significant at 5%. *** significant at 1%.

Source: developed by the authors.

Note that when comparing the two groups of companies in the Basu model (1997), the significance of the parameter β_3 is higher for companies with intangible assets recorded above the market mean (*INT2*>0.17), statistically confirming the more conservative behavior of this group. Furthermore, a positive and significant β_2 suggests an increase in the opportunity for accounting earnings by improving the quality of information. Hence, according to these results, hypothesis 2 is confirmed.

Analysis of the Ball and Shivakumar's (2005) model for the *INT2* variable reveals results contrary to what was expected. β_2 and β_3 are respectively, significantly negative and positive, showing no conservatism in the group with greater participation of intangible assets (*INT2*>0.17). Thus, hypothesis 2 is rejected. Of all the tests performed, this was the only one with statistical significance that enabled rejecting the hypothesis.

This rejection of hypothesis 2, according to Ball and Shivakumar's (2005) model, opens space for future discussions and verifications, considering the possibility that intangibility at book value may also encourage financial reports with discretionary choices, given the subjectivity in the judgment of intangible assets. However, this result is opposed to that obtained by the previous model and also goes against studies showing that there is informational improvement with recorded intangible assets.

The summary of evidence obtained and repercussions on the hypotheses is presented below:

Table 5
Summary of the results of the hypotheses tests

H	Model	Coefficient	Status	Repercussion on H1
H1	Basu's model adapted (Table 2)	β_3 β_7	Significance is lost when the *INT1* variable is included Positive and significant as expected	Accept Accept
	Basu's original model (Table 3)	β_3	Positive and significant for the *INT1*<2 group It loses significance in the INT1>2 group	Aceitar
	BS's model adapted (Table 2)	$(\beta_2 + \beta_3)$ β_7	Negative and loses significance when *INT1* is included Sign is unexpected and with no significance	Inconclusive Inconclusive
	BS' original model (Table 3)	$(\beta_3 + \beta_3)$	No significance	Inconclusive
H	**Model**	**Coefficient**	**Status**	**Repercussion on H2**
H2	Basu's model adapted (Table 2)	β_3 β_7	Remains significant when *INT2* is included Negative with no significance	Accept Inconclusive
	Basu's original model (Table 4)	β_3	Positive and significant in *INT2*>0.17 And significance is higher than in *INT2*<0.17	Accept
	BS's model adapted (Table 2)	$(\beta_2 + \beta_3)$ β_7	Negative when *INT2* is included Negative with no significance	Accept Inconclusive
	BS' original model (Table 4)	$(\beta_2 + \beta_3)$	Positive and negative in *INT2*>0.17	Reject

Source: developed by the authors.

While the two models showed different results, note that Basu's model (1997) showed higher statistical significance, given the results of the *F* test (Tables 3 and 4). This model showed the highest increase in the adjusted R^2 when the intangibility variables were included in the adaptations. It provided greater statistical relevance, which supports the decision to confirm the two hypotheses.

5. Final Considerations

The current scenario of the relevance of intangible assets leads to discussions about how they impact the quality of information a company reports. Considering conservatism as one of the quality information attributes, this study aimed to analyze the influence of the level of intangibility on accounting conservatism practices.

The results obtained by Basu's model (1997) show that conservatism was not found in intangible-intensive firms when intangibility at market value was considered. Including this variable in the econometric model showed that the conservatism previously found in the original model no longer exists. Furthermore, the robustness tests indicated conservatism in the group of companies with less intangibility, which was not found in the intangible-intensive companies. Thus, hypothesis 1 was confirmed, as evidence was found that the intangibility of firms at market value negatively influences accounting conservatism. For intangible-intensive companies, the absence of a cautious approach to measuring future events suggests worse quality of information. In these firms, negative returns are not timely recognized, as losses are recognized less quickly than gains.

Regarding intangibility at book value, including this variable in the adapted Basu's model (1997) provided results that indicate conservatism. It was also found that conservatism was more significant in the group of companies with recorded intangible assets that exceeded the sample's mean. Thus, in this model, hypothesis 2 was confirmed. When considering this variable in the regression, the results indicate an increase in the opportunity for accounting profit, suggesting that intangible assets recorded on the balance sheet contribute to improving the quality of information. As these assets are subject to rigorous recognition criteria, their high participation in balance sheets may motivate managers to be cautious when preparing financial reports. Such cautious behavior may propagate a conservative mindset when judging other equity items.

Basu's model (1997) obtained higher statistical significance and an increase in explanatory power after the intangibility variables were included. As a result, the study hypotheses were confirmed.

Note that the fact that the two hypotheses were confirmed supports Lev and Gu's (2016) argument that resistance to recognizing intangible assets can generate substantial costs for the entire economy. On the one hand, not recognizing intangible assets increases the difference between the shares' market and book values. The intangibility at market value generated by this situation negatively influences the quality of information, causing an environment more prone to information asymmetry. Complementarily, recorded intangible assets can improve the quality of reported earnings. Both results shed light on understanding how intangible assets can impact the informational environment. Moreover, the finding that they are related to conservatism is an important factor, given the demands for transparency, accountability, and the need to prevent information asymmetry. Therefore, these important results can encourage a reflection among regulatory bodies, investors, and other stakeholders.

The model proposed by Ball and Shivakumar (2005), adapted for the two hypotheses, did not obtain statistical significance; hence, the results are inconclusive. Only the robustness tests obtained significance and enabled rejecting hypothesis 2, as conservatism was not found in companies with high intangibility at book value. This finding is opposed to studies showing that recorded intangible assets improve the quality of information. This observation shows that these assets may also be subject to discretionary decisions. As these elements are subjective, they may favor accounting choices with a bias of interest.

This study's limitations include the limited sample, which does not allow for the generalization of results, and the fact that two different empirical models were used to measure conservatism. Therefore, different results may be obtained.

Future studies are suggested to use other econometric models to study conservatism and verify other information attributes such as relevance, persistence, and timeliness. One can deepen the analysis of the inconclusive results by considering, for example, sectorial particularities.

With the development of businesses and the growing flow of capital worldwide, high-quality accounting information must be an objective of accounting professionals' and market participants' requirements, showing the importance for the academic community to dedicate efforts to conduct research in this context.

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Accruals according to the Cash Flow Statement and Balance Sheet Approaches: A Comparative Analysis

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Abstract

Objective: To verify whether accruals calculated according to the balance sheet and cash flow statement approaches are similar.

Method: This study included 348 non-financial companies listed on B3 from 2011 to 2020, totaling 2,786 observations. First, a non-parametric test of difference in means was performed to verify whether there were significant differences between the accruals calculations according to the approach used. Next, both approaches were tested in a prediction model of cash flows to identify the most adequate measurement.

Results: The results showed a difference between the two approaches, indicating that they are not statistically similar. The cash flow prediction model showed that the accruals approach calculated by the cash flow statement proved to be most appropriate than the balance sheet approach.

Contributions: This study contributes to the academic milieu by indicating that accruals calculated by the balance sheet and the cash flow statement approach are not similar, suggesting researchers adopt both calculation approaches in academic research.

Keywords: accruals; profits; balance sheet; cash flow statement.

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1. Introduction

Financial statements are the primary source of information regarding a company's financial and equity condition. There are a variety of stakeholders, including equity and debt investors, regulators, employees, and competitors, who review these statements to obtain information about a company's transactions, economic conditions, growth prospects, and risks (Casey et al., 2017).

The Conceptual Framework, CPC 00 (R2), reports that the objective of financial statements is to provide financial information regarding the reporting entity that existing and potential investors, lenders, and other creditors use when making decisions regarding the allocation of resources to this entity.

According to CPC 00 (R2), the usefulness of accounting information is related to its relevance and ability to represent what it is intended to. Being relevant means the information has a predictive and/or confirmatory value and can make a difference in users' decisions. Hence, accounting information that has predictive value is considered good quality information.

Disclosed accounting information includes accounting income, as it is used for various purposes, such as contractual obligations, asset valuation, executive compensation, and bonus plans, and provides relevant information that proves to be useful for various stakeholders (Cupertino et al., 2016). Accounting profit plays a central role in accounting and is widely used to assess stocks, management, and debt contracts (Dechow et al., 1998).

Thus, Earnings Quality is fundamental in accounting and financial economics (Dichev et al., 2013). This concept does not have a precise definition though. It is generally defined as the extent to which the earnings disclosed in financial statements represent the economic context of a company and the extent to which they reflect the basic accounting concepts (Yoon, 2007). Furthermore, such quality is related to different aspects for the different users of financial statements (Dechow & Schrand, 2004).

Dichev et al. (2013) note that besides differences in its definition, there are also different strategies to measure them, such as earnings persistence, predictability, and smoothing, among others. Dechow et al. (2010) organized earnings quality proxies into three categories: a) earnings properties, b) investor response to earnings, and c) external indicators of earnings distortion. Regarding earnings properties, among other proxies, this category includes accruals.

Accruals concern accumulations arising from income accounts that are included in the calculation of accounting profit but which do not imply a necessary change in cash flow (Martinez, 2001), due to inter-temporal differences between economic recognition in income, because of the accrual principle and its impact on cash flow (Malacrida, 2009).

According to Hribar & Collins (2002), the measurement of accruals plays a central role in the accounting literature, especially when studying the properties of earnings. Hribar & Collins (2002) observed, however, that despite the availability of cash flow statements (CFS), most American studies at that time continued to calculate accruals using the Balance Sheet (BS) approach. The authors above note a difference between the calculation of accruals by the two approaches, especially when there are mergers and acquisitions, discontinued operations, or foreign currency conversions that affect the Balance Sheet accounts but which have no impact on the cash flow statement (Hribar & Collins, 2002).

Analogously, this fact can be verified in some studies in the Brazilian context, among which Novaes et al. (2018), Oliveira and Cavalcante (2018), and Rodrigues et al. (2019), despite the mandatory disclosure of CFS in Brazil beginning in 2010. Thus, the results may have been influenced if the events listed by Hribar & Collins (2002) occurred in these studies' samples and periods.

Given this context, the following research problem arises: ***in what ways are the accruals calculated according to the balance sheet and the cash flows statement approaches similar?***

Therefore, this study's objective is to verify in what ways accruals calculated by the balance sheet and the cash flow statement approaches are similar. This variable is often used in studies addressing earnings management, earnings persistence, and the ability to predict cash flows, among others, without presenting a uniform way of calculating it, which may cause these studies' results to be misinterpreted. Therefore, this study intends to analyze the accruals calculated by the two approaches among companies listed on the B3 between 2011 and 2020, when the CFS became mandatory.

This study is expected to contribute to the academic milieu by revealing the relationship between the accruals calculated according to the BS and CFS approaches, clarifying how the results of previous studies compare, and how the accruals' differences and similarities impact those using accounting information, suggesting a potential direction for future studies using this variable, especially in the field of accounting and finances.

2. Theoretical Framework

2.1 Earnings Quality

Profit is one of the leading accounting items relevant for decision-making since it represents an organization's current performance and is the primary metric used by investors and analysts (Barker & Imam, 2008; Francis et al., 2020). According to Chang (1962, p. 639), "profit can be defined as the maximum amount a firm may distribute as dividends and still expect to be as well off at the end of the period as it was at the beginning."

For efficient decision-making, financial statements must disclose accurate and trustworthy data without manipulating numbers that may modify the organization's actual conditions, mainly evidenced by profits (Barth et al., 2019). High-quality information provides an accurate and reliable picture of a company's performance and is informative and necessary for decision-making (Dechow et al., 2010; An, 2017). According to Martins (2012), the quality of financial information is fundamentally based on the usefulness and relevance of its content for users.

The relevance of accounting information is linked to the quality of earnings. High-quality earnings present useful numbers for managers and investors for decision-making purposes (An, 2017) and provide more information about a company's financial performance, relevant for specific decisions (Dechow et al., 2010).

According to Dechow et al. (2010), earnings quality can be defined as the ability of accounting reports to provide more detailed information on a company's performance that is relevant for decision-making. However, some authors argue that this concept is not well established or that there is divergence among researchers (Givoly et al., 2010). Accordingly, Dechow et al. (2010) report that such quality is conditioned to the information's relevance for decision-makers. In addition to conceptual divergences regarding the quality of information, there are different ways of measuring it. For example, earnings persistence, smoothing, and the magnitude of accruals are proxies of such quality (Dechow et al., 2010; Dichev et al., 2013).

Several quality measures have been used in the literature to measure earnings quality. For example, Dechow et al. (2010) reviewed more than 300 studies addressing earnings characteristics or attributes. They identified the proxies for earnings quality in these studies, organizing proxies into three broad categories: 1) earnings ownership – this category includes earnings persistence, earnings smoothing, and accruals; 2) investors' responsiveness to results, which considers the earnings response coefficient (ERC), or the R^2 of the stock return model; and, finally, 3) indicators of distortions in results, such as deficiencies in internal controls and re-disclosure required by regulatory bodies.

In the earnings properties proxy, earnings persistence reflects earnings sustainability, as it shows that earnings persistence from one period to the next is estimated by regressing earnings for the current period on earnings for the previous period (Kohlbeck & Warfield, 2010). Earnings smoothing aims to reduce fluctuations and stabilize earnings over time and can be defined as an intentional effort to reduce fluctuations in reported earnings (Martinez, 2006). Finally, accruals are measures to capture the quality of earnings to measure economic profit regardless of a company's cash flow (Martinez, 2006). The following topic provides an explanation of accruals.

2.2 *Accruals*

Accruals are all income accounts included in the calculation of profits and which, although they do not cause changes in cash, improve the ability of profits to reflect a company's performance (Dechow, 1995). Profits are accounting information based on the accrual basis, which determines that an entity's accounting transactions are recorded in the period in which they are realizable. Thus, revenue is recognized in the period when it was realized, confronting the expenses necessary for its effectiveness (Martinez, 2001). Thus, under this regime, revenues, expenses, and costs must be recorded, as they occur, not at the time of financial realization. In addition, following the principle of comparing expenses, revenues must be recognized according to their related expenses to determine the net result of the economic event in question (Machado et al., 2014).

According to Machado et al. (2014, p. 6), "the accrual basis is linked to the economic event rather than to the financial event of cash inflows or outflows, which the cash basis would represent." Thus, the name accruals are given to all accumulations from income accounts included in the accounting profit calculation, but which does not imply necessary changes in cash flow (Martinez, 2001). That is, they arise when there is a discrepancy between the moment cash flows occurred, and the transaction was recognized in accounting (Roneen & Yaari, 2008).

Studies addressing accruals are present in some fields of accounting research, especially when one wants to verify the quality of accounting information with a view to the capital market. The accounting information system's usefulness is providing valuable information to change investors' beliefs, thus reducing existing information asymmetry between managers and stakeholders. This role is played by accruals, as it is where the informational content of accounting resides (Lopes & Martins, 2007). It turns out that, as observed by Hribar & Collins (2002) in the American context at the time, many studies used two approaches to calculate accruals: the Balance Sheet approach and the Cash Flow Statement approach, even though the CFS had been published for a while.

2.2.1 Accrual Estimation Approach

Accrual estimates can be performed using the balance sheet or the cash flow statement approaches (Hribar & Collins, 2002). The balance sheet estimation is based on a supposed connection between the accrual components (revenues and expenses) in the income statement and the net working capital accounts in the balance sheet (Paulo, 2007). The balance sheet method approach is the most frequently used in the Brazilian context since the mandatory preparation of the cash flow statement was only implemented after Law No. 11,638, of December 28th, 2007 (Macedo et al., 2011).

Following some authors such as Dechow et al. (1995) and Paulo (2007), one can estimate the total accruals using the Balance Sheet according to Equation 1:

$$TA = \Delta(AC - DISP) - \Delta(PC - FCP) - DD \quad (1)$$

Where:
TA = total accruals estimated by the balance sheet approach;
ΔAC = variation in current assets in period t;
ΔDISP = variation in cash and cash equivalents in period t;
ΔPC = variation in current liabilities in period t;
ΔFCP = variation in short-term financing and loans in period t;
DEP = depreciation and amortization of period t.

Several authors have used the balance sheet method to estimate accruals, e.g., Hirshleifer et al. (2009), Kang et al. (2010), Dechow et al. (2012), Martinez (2008) and Medeiros et al. (2019). The objectives and results of these studies are summarized in Table 1:

Table 1
Some of the studies using accruals according to balance sheet

Authors	Studies' objectives	Results
Martinez (2008)	Discuss statistical models of aggregated accruals and verify whether accounting earnings management occurs in Brazil and what would be some of its motivations.	The statistical model test results indicated that Brazilian public companies manage their results in response to market stimuli.
Hirshleifer et al. (2009)	Examine whether accumulation and cash flow effects at the firm level extend to aggregate market returns.	The authors concluded that aggregate accruals positively predict future market returns.
Kang et al. (2010)	Analyze and evaluate the predictive ability of discretionary and non-discretionary accruals to predict future cash flows.	This study concluded that aggregated discretionary accruals positively predict future market returns, while aggregated non-discretionary accruals lack predictive ability.
Dechow et al. (2012)	Propose a new approach to identify and test competency-based earnings management.	The results indicated that the new approach to detecting management earnings leads to substantial improvements in the estimation. Any interference in the increases at a point in time will lead to a reversal in one of the following periods.
Medeiros et al. (2019)	Verify whether the companies listed on B3 from 2010 to 2015 managed their results simultaneously by real activities and discretionary accruals to avoid profit surprises.	The authors found no evidence that earnings management was simultaneously performed using real activities and discretionary accruals to avoid earnings surprises.

Source: developed by the authors.

Although the method above is the most frequently used, Martinez (2013) states that the balance sheet approach will likely remain the preferred one for a longer time, considering the need to have larger samples to ensure the robustness of the results observed. However, according to Paulo (2007, p. 93), "the accruals under the balance sheet approach used in several studies may contaminate empirical evidence due to the accruals estimates' measurement error."

Another method to calculate accruals is the cash flow statement approach, which became possible in Brazil after adopting IFRS and became mandatory. Under this approach, accruals can be determined from the difference between net income for the year and the amount of cash generated or consumed in operating activities, as shown in Equation 2:

$$TADFC = LL - FCO \quad (2)$$

Where:
TADFC = Total accruals estimated by the cash flow statement in period t;
LL = Net Income for period t;
FCO = Operating Cash Flow in period t.

Calculating accruals with this equation is justified by the fact that the subtraction of operating cash flow from net income specifically represents the portion of the result that does not change a company's financial resources, removing from net income the effects of the accrual basis relative to the cash basis.

According to Hribar and Collins (2002), the approach using the Balance Sheet to estimate accruals contaminates discretionary accruals and may lead to wrong conclusions about the occurrence of earnings management. Thus, some authors used the estimation of accruals according to CFS. Table 2 summarizes some of the studies using this approach:

Table 2
Some of the studies using accruals according to cash flow statement.

Authors	Studies' objectives	Results
Machado et al. (2014)	Verify which accounting information is most relevant in predicting future cash flow.	The results revealed an increase in the explanatory power of net income and operating cash flow combined with accruals, calculated using the cash flow approach, during the post-convergence period, compared to the pre- and partial convergence periods. Additionally, the results showed that earnings disaggregated into cash flow and accruals significantly increase the predictive capacity of future cash flows.
Boina and Macedo (2018)	To analyze and evaluate the predictive ability of discretionary (DA) and non-discretionary accruals (NDA) to predict future cash flows before and after Brazil's implementation of the International Financial Reporting Standards (IFRS).	The authors concluded that current aggregated accruals have informational gains relative to those produced before IFRS. The DA and NDA produced before IFRS are negative and statistically significant for predicting cash flows. In contrast, the DA and NDA produced after IFRS are positive and statistically significant for predicting future cash flows.
Al Azeez et al. (2019)	Analyze whether board characteristics impact earnings management among the largest oil and gas companies	The study's results revealed that board independence and CEO duality have a considerable impact on reducing earnings management.
Martins et al. (2019)	Analyze how the pricing of accruals is configured in the Brazilian market; that is if it represents a market mispricing or a priceable risk factor.	The authors found evidence that confirmed the existence of the accruals anomaly in the Brazilian capital market, directing the explanation of the presence of this anomaly in terms of the mispricing hypothesis.
Rodrigues et al. (2019)	To investigate the behavior of the management level of quarterly earnings of Brazilian public companies.	The results suggest that managers' discretionary behavior affects the accounting numbers reported quarterly by companies, which may influence the perception of investors, shareholders, and remaining stakeholders.

Source: developed by the authors.

According to Boina & Macedo (2018), measuring accruals using the CFS approach is especially useful in economic environments in which business mergers are intense, as has been the case of the Brazilian market in recent years.

2.2 Previous Studies

According to Hribar and Collins (2002), accruals are central in a large body of accounting literature. Therefore, the authors sought to examine and compare the measurement of accruals estimated by the balance sheet and the cash flow statement and show the implications of empirical studies based on the balance sheet approach. They analyzed US companies listed on the NYSE and AMEX from 1988 to 1997, concluding that measurement errors in accrual estimates might contaminate studies using the balance sheet approach.

Nallareddy et al. (2020) used accruals to forecast future cash flows for American companies from 1989 to 2015. The results of the estimates according to the balance sheet and the cash flow statement were compared, and the conclusion was that the use of the BS approach might provide a better measure for cash flow forecasting purposes. According to the authors, the measurement of accruals using the BS approach considers unrelated events, such as mergers and acquisitions, which also impact a company's future cash flows.

Heater et al. (2021) used the accruals estimated through the balance sheet and the cash flow statement to analyze the impact of mergers and acquisitions (M&A) on US companies' market returns from 1988 to 2017. First, the authors analyzed the role of M&A in measuring accruals, focusing on the difference between BS-based and CFS-based accruals. The evidence suggests that the accruals measured according to the balance sheet method contain more helpful information about a company's specific economic activities relevant to predicting the return.

These two more recent studies confront the results of Hribar and Collins (2002), showing that the accruals calculated using the balance sheet approach present higher information quality. The reason is precisely that they consider some economic events, such as mergers and acquisitions, which would not be captured using the CFS approach only.

3 Method

3.1. Typology, sample, and data collection

This descriptive, documental, and quantitative study followed the categorization indicated by Raupp & Beuren, 2006 to verify to what extent the accruals, calculated according to the balance sheet and cash flow statement approaches, are similar.

All publicly traded companies listed on B3 from 2011 to 2020 were selected to compose this study's sample, except those belonging to the financial sector and funds, considering that besides the infeasibility of using the metric adopted to estimate accruals, these companies have characteristics that hinder comparisons with the other sectors in the sample (Rodrigues et al., 2014). Furthermore, this timeframe was chosen because the CFS disclosure became mandatory beginning in 2010, enabling comparisons between these approaches to calculate accruals. Thus, one can work with the annual data available in the Economática® database up to 2020, when this study was performed.

Furthermore, the data set missed information that hindered the calculation of the accruals. However, we decided to work with an unbalanced panel to avoid data loss. Hence, a total of 2,786 observations were collected, considering the 348 companies from 2011 to 2020, treating the outliers in the variables with the winsorization technique, which consists of trimming extreme values (above or below the minimum and maximum percentiles defined) and replacing them with the smallest and largest values remaining in the distribution (Fortunato et al., 2012). In this study, 1% and 99% were considered.

3.2. Variables and procedures

At first, accruals were estimated following the two approaches discussed in section 2: balance sheet (Equation 1) and cash flows statement (Equation 2). These calculation methodologies adhere to the current literature, such as Boina and Macedo (2018) and Rodrigues et al. (2019).

To compare the results obtained by the two accrual estimation approaches, exploratory data analysis was initially performed, which, according to Triola (2005), consists of using statistical tools to investigate the data set and understand its characteristics. Thus, mean, median, standard deviation and minimum and maximum values were calculated for accrual estimates. This procedure enabled obtaining indications of the differentiation potential of the variables analyzed.

Next, the difference in means test was performed, containing the two accrual estimation approaches. Hence, initially, we verified the sample's normality by applying the Doornik and Hansen (2008) test, considering that if data did not meet this assumption, non-parametric tests would be required (Fávero & Belfiore, 2017).

Finally, as a mechanism to provide further robustness to the results, both accrual estimation approaches were applied in an operating cash flow prediction model to verify whether it is possible to identify in practice differences in the adjustment capacity of the model by changing the accruals proxy. The models used are similar to the one applied by Nallareddy et al. (2020), as shown in Equations 3 and 4, in which the variables will be divided by the Total Assets of the previous period.

$$FCO_{it} = \alpha + \beta_1 TA\_DFC_{it-1} + \beta_2 FCO_{it-1} + \varepsilon_{it} \quad (3)$$

$$FCO_{it} = \alpha + \beta_1 TA\_BP_{it-1} + \beta_2 FCO_{it-1} + \varepsilon_{it} \quad (4)$$

Where:

FCO_{it} = Operating Cash Flow of company i in period t;
FCO_{it-1} = Operating Cash Flow of company i in period t-1;
TA_DFC_{it-1} = Total Accruals estimated by the CFS approach of company i in period t-1; and
TA_BP_{it-1} = Total Accruals estimated by the BS approach of company i in period t-1.

The multiple regression technique with panel data was used to test the models presented in Equations 3 and 4. According to Gujarati and Porter (2011), this method is more informative, presents a more efficient estimation with less collinearity between the variables, being suitable for samples that combine cut-off data with a time series. We decided to estimate models with standard errors corrected by the HC1 Robust Standard Error technique for heteroscedasticity, with fixed effects per company, considering that the heterogeneity of companies is correlated with the independent variables. The parameters of the models controlling the fixed effects between companies were estimated, considering the heterogeneity between them. We estimated Equations 3 and 4 with the unbalanced panel to avoid losing potentially relevant information.

Three statistical measures were used: the adjusted R^2, the Akaike Information Criteria (AIC), and the Bayesian Information Criteria (BIC), also known as the Schwarz Criteria, to verify the models' goodness of fit. According to Gujarati (2006), the higher the adjusted R^2 and the lower the AIC and BIC, the better a model's goodness of fit.

4. Analysis And Discussion Of Results

The variables used in this study concern the period from 2011 to 2020, totaling 10 years, with just over 2,700 observations, constituting an unbalanced panel. Table 1 presents the variables' descriptive statistics.

Table 1
Descriptive Statistics of the Study's Variables

Variables	Obs.	Q1	Median	Q3	Mean	Standard deviation	D-H
FCO	2789	0,00828	0,06031	0,11732	-0,01226	0.56241	0.000
TABP	2786	-0,08764	-0,03435	0,01914	-0,03565	0,17812	0.000
TADFC	2786	-0,09709	-0,04127	0,00910	-0,05597	0,16704	0.000

Source: developed by the authors.

The information presented in Table 1 enables us to infer that both the accruals calculated by the BS and by the CFS approaches present negative means; at least 50% of the sample present negative values. In addition, considering Doornik and Hansen's (2008) normality test, the variables were not normal, which makes the mean difference test necessary to verify whether this study's objective is non-parametric. For comparative purposes, the t-test was also performed, that is, the parametric test for differences in means.

Table 2
Mean Differences Test

Variables	P-value	Test statistics	Test
TABP *versus* TADCF	0,0150**	2.433	Wilcoxon test
TABP *versus* TADCF	0,0002***	3.714	t-test

Note: ***Significant at 1%, **Significant at 5%

Source: developed by the authors.

Table 2 presents the Wilcoxon Test for mean differences in samples that do not show normality. This test's null hypothesis is the non-difference between the two groups. Given the p-value presented in Table 2 and considering a significance level of 5%, the null hypothesis can be rejected. That is, a statistically significant difference exists between the accruals calculated using the BS approach and those calculated using the CFS approach. Considering the t-test for differences in means, the result is similar to the Wilcoxon Test.

This result is important for studies adopting accruals as a proxy for earnings quality, especially for those on earnings management. Such studies usually use this variable to determine whether a company manages its results. Given this result, studies that do not consider calculating accruals using both approaches may mistakenly infer that a company manages its accounting results when in reality, it does not. After identifying the mean differences between the two metrics, we verified which of the two variables fits better to the operating cash flow estimation model, adapted from Nallareddy et al. (2020) and presented in Table 3.

Table 3
Regression Coefficients – Robust Errors

Variables	Equation (3)	Equation (4)
FCO_{it-1}	0.74731*** (0.000)	0.75132*** (0.000)
$TABP_{it-1}$	-0.04915 (0.128)	
$TADFC_{it-1}$		0.46362*** (0.000)
Intercept	0.07761 (0.153)	0.09039* (0.070)
F Test	0.0000	0.0000
VIF Test	1.0000	1.0000
Breusch-Pagan Test	0.0000	0.0000
Adjusted R^2	0.8753	0.8787
AIC	-503.23	-767.57
BIC	1.471.17	1209.13
Dependent Variable	FCO_{it}	FCO_{it}
Observations	2777	2747
FE Company	Yes	Yes

Note: ***Significant at 1%, *Significant at 10%

Source: developed by the authors.

Table 3 presents the estimates of Equations 3 and 4, which aim to verify which of the two models presents the best goodness of fit. In this context, Equation 3 calculates accruals using the balance sheet approach as an independent variable, and Equation 4 calculates accruals using the cash flow statement approach.

The model with robust standard errors was used to estimate the two equations with fixed effects per company. The F test shows that, in general, the coefficients of the models are valid. At least one of the estimated coefficients is statistically different from zero.

An analysis of the coefficients shows that the current period's operating cash flow positively impacts future cash flows. The coefficients were positive and statistically significant in both models, similar to the results found by Boina and Macedo (2018). It supports the view of the conceptual framework of accounting, which states that information about an entity's cash flows during the period also helps users to assess the entity's ability to generate future net cash inflows (CPC 00, R2).

As for the variable of interest, the accruals were calculated using the BS and CFS approaches. However, only the accruals calculated with the CFS approach were significant, at a 1% significance level. This difference may be related to the accruals' source. Since accruals are the difference between the accrual basis (earnings) and the cash basis, obtaining accruals by the difference between earnings and cash flow may have a better relationship with future cash flows. On the other hand, calculating accruals through the balance sheet approach uses less dynamic information, making an estimate possible to find a difference between profit and cash.

Another potential explanation is the existence of business combinations in the Brazilian economic environment. Hribar and Collins (2002) point out that mergers and acquisitions may be one of the main factors for this difference. For Boina and Macedo (2018), measuring accruals using the CFS approach is especially useful in business environments with intense combination processes, as has been the case in the Brazilian market in recent years.

It shows that accruals have different impacts on statistical models depending on how they are calculated, suggesting that both alternatives should be considered when the objective is to use accruals in scientific research. Hence, different conclusions about a given event can be reached depending on the calculation method. Hribar and Collins (2002), for example, report that using the balance sheet to estimate accruals contaminates discretionary accruals and may lead to wrong conclusions about the occurrence of earnings management.

To verify the quality of the models' goodness of fit, the R^2, AIC, and BIC criteria show that the model, having the accruals calculated by the cash flow statement approach as the independent variable, better fits data than when using the variable calculated by the balance sheet. It is in line with the results found by Hribar and Collins (2002) but is contrary to the results presented by Nallareddy et al. (2020) and Heater et al. (2021).

5. Final Considerations

This study's objective was to verify in what ways the accruals calculated by the balance sheet and the cash flow approaches were similar. Thus, we analyzed the accruals calculated by the two approaches among companies listed on the B3 between 2011 and 2020, when the CFS became mandatory.

The results of the means tests indicated a statistically significant difference between the accruals calculated by the BS approach and those calculated by the CFS approach; hence, no similarity was found. This result is significant for studies using total accruals to estimate accruals that can be considered earnings management. Thus, if there is evidence that the way one calculates accruals leads to different results and the researchers do not consider the two calculation approaches, results may disagree with the theory, for example.

Additionally, this study was intended to verify which accruals metric had the best predictive power of future cash flows. Using a model with panel data, corrected for heteroscedasticity problems, we found that only the accruals calculated using the CFS approach were significant, at a 1% significance level, corroborating the findings by Hribar & Collins, 2002.

Thus, considering accounting information from Brazilian companies listed on B3 between 2011 and 2020, the conclusion is that the accruals calculated using the balance sheet and the cash flow statement approaches are not similar, suggesting that researchers need to adopt both forms of calculation when using accruals in academic research, as suggested by Novaes et al. (2018), considering that these variables behave differently, possibly leading to mistaken conclusions.

However, one must use caution when interpreting these results since the accruals calculated using the balance sheet approach may contain important information about a company's specific economic activities, as noted by Heater et al., 2021. Likewise, it is worth mentioning that this study's findings do not invalidate previous studies using the balance sheet approach. Therefore, researchers need to be clear about their studies' objectives, evaluate which of both approaches to use, and compare the results.

Additionally, this study's limitations regarding data availability need to be acknowledged. We decided to use all the companies' available information, so the panel was unbalanced. As the information is incomplete for some companies throughout the period, this may have impacted the results, considering that the estimates may receive influence from a given sector where there are more companies with complete information. Also, as it is a non-probabilistic sample collected according to its accessibility, the results cannot be generalized. Nonetheless, the results presented here are considered relevant despite these limitations.

Therefore, we suggest future studies consider the complete information of all companies addressed to analyze the predictive capacity of accruals in another context, in addition to comparing the two approaches between the sectors of the Brazilian economy.

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Defined-benefit and variable-contribution plans: evidence of earnings management in Brazil

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Abstract

Objective: To verify whether the defined-benefit (DB) and variable-contribution (VC) plans of Complementary Pension Entities (*EFPC*) in Brazil tend to present a solvency volume equal to or above the established standard ratio when they are close to reaching it.

Method: Empirical histograms of coverage ratios (solvency), the τ test of Degeorge, Patel, and Zeckhauser (1999), and Mann-Whitney statistics were developed.

Results: Considerable discontinuity was found in the histogram distributions between the class, including the equilibrium coverage index and the class immediately below. A statistically positive solvency volume was also found for the private company plans, which are ruled by a governance structure concentrated around the sponsors, and for plans located in the Federal District and in the states of Rio de Janeiro and São Paulo, which have, on average, higher administrative expenses than those located in other states.

Contributions: Robust evidence shows that *EFPC* managers are possibly manipulating the coverage rates of the DB and VC plans to conceal insolvency problems from sponsors, participants, beneficiaries, and regulatory and inspection agencies, characterizing earnings management.

Keywords: earnings management; coverage ratio (solvency); DB plans; VC plans.

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1. Introduction

Entidades Fechadas de Previdência Complementar (EFPC) [Complementary Private Pension Funds] are non-profit organizations composed of a foundation or civil society, which administer pension plans accessible only to employees/servants of a sponsor or to people who are associated with a founder (Complementary Law no. 108, from May 29th, 2001).

As these entities care for the social security savings of millions of people, the sponsors, participants, beneficiaries, and regulatory and supervisory bodies (principals) must analyze these entities' financial statements and monitor their situation and benefit plans to be aware of decisions that are ultimately attributed to the funds' managers – agents (Chan, Silva & Martins, 2010). In this sense, because managers know the business, they can use their knowledge in the best possible way to help disseminate quality accounting information that portrays these entities' economic context, increasing accounting credibility (Reis, Lamounier & Bressan, 2015; Flores, Braunbeck & Carvalho, 2018). On the other hand, managers often take opportunities to make discretionary choices when preparing and disclosing accounting information to modify financial statements and change the stakeholders' perception regarding the activities and results of these entities, which characterizes the earnings management practice (Martinez, 2013).

As earnings management refers to the purposeful manipulation of accounts to serve particular interests, managers may manipulate some of these accounts to confirm market expectations regarding a company's performance; meet specific regulatory standards; seek government protection; or maximize their career possibilities, power, and remuneration within these companies (Sousa & Bressan, 2018).

It is essential to clarify the distinction between earnings management and fraudulent accounting. While there is manipulation within accepted accounting standards and practices in the first situation, the second violates accounting standards and principles and is illegal (Dechow & Skinner, 2000).

One of the techniques adopted in accounting for detecting earnings management practices is analyzing a variable's frequency distribution around its median (mean) via a histogram. A behavior similar to a symmetrical normal curve is expected during the validity under the null hypothesis of non-occurrence of earnings management. In turn, a substantial discontinuity between the first interval immediately below the median (mean) and the first interval immediately above it suggests the practice of earnings management.

In the case of accounting variables influenced by actuarial assumptions, such as in the case of complementary private pension plans, the technique of analyzing empirical histograms is valid to help identify potential earnings management, as there are observable parameters subject to verification for the main actuarial assumptions (actual interest rate and general mortality table), which restrict discretionary actions. Additionally, the other actuarial assumptions that have a lesser impact on accounting variables are not subject to objective rules and may be freely chosen by managers, which in this context, rules out, in principle, potential fraudulent behavior (Instrução da Superintendência Nacional de Previdência Complementar [PREVIC] No. 33, 2020).

A limitation found in studies analyzing discontinuities in empirical histograms as evidence for the practice of earnings management concerns the impossibility of discriminating between discontinuities naturally occurring in a business or market and discontinuities arising from occasional discretionary actions. That is, although the literature acknowledges that discontinuities in empirical histograms provide indications regarding the practice of earnings management, such a notion cannot be considered an absolute truth, especially if we consider issues such as samples' sensitivity and the impossibility of extrapolating data (Burgstahler & Dichev, 1997; Souza & Bressan, 2018).

The studies using empirical histograms to find evidence of earnings management include Burgstahler and Dichev (1997). In that study, the authors verified that companies have incentives to manage their results for two reasons: a) avoid disclosing small losses to the market when they are close to achieving positive results, and b) meet market benchmarks.

In addition to the motivations presented by Burgstahler and Dichev (1997), Degeorge, Patel, and Zeckhauser (1999) found that companies also manage their earnings in an attempt to confirm market analysts' predictions, as most investors ground their decisions on the information these professionals provide.

Burgstahler and Chuck (2017) conducted a literature review on studies analyzing frequency distributions to find the occurrence of discontinuities in corporate earnings as evidence of earnings management and found that evidence is consistent with the earnings management hypothesis.

In Brazil, Reis, Lamounier, and Bressan (2015) sought to confirm whether companies listed on BM&FBOVESPA from 2008 to 2013 used earnings management to avoid disclosing losses when they were close to achieving accounting profit. However, these authors focused on companies managing operational results, and the findings showed that companies avoided disclosing losses through operating expenses.

Sousa and Bressan (2018) investigated whether small and large Brazilian banks used earnings management to avoid disclosing losses from 2008 to 2015, according to Burgstahler and Dichev's (1997) methodology. Their results showed that the small banks managed their results, but the large ones did not.

Regarding complementary pension funds, the study by Westerduin, Wouterson, and Langendijk (2012) sought evidence of earnings management in 342 Dutch pension funds from 2008 to 2010. These authors verified whether part of the *EFPC* would be managing the index coverage (solvency), which is given by the quotient of the coverage equity by the mathematical provisions. The objective of the study above was to infer whether the coverage ratio was manipulated to meet, at least, the minimum regulatory standard of 1.05 (105%), avoiding the need for funds to prepare a short-term recovery plan under Dutch Central Bank oversight. Thus, the methodology adopted was to graphically analyze the distribution of coverage indices around their minimum rate, from which a behavior similar to that of a symmetrical normal curve is expected. In general, Westerduin, Wouterson, and Langendijk (2012) concluded that the Dutch *EFPC* tend to manage their coverage ratio when they are close to being under the regulatory standard. However, this behavior would not be verified in sectoral *EFPC*, which are overseen by many stakeholders and, in smaller *EFPC*, maintained by only one sponsor.

Therefore, based on Westerduin, Wouterson, and Langendijk (2012), this study's objective is to verify whether Brazilian defined-benefit (DB) and variable-contribution (VC) pension plans tend to present a solvency volume equal to or above the established standard ratio (100%), when they are close to reaching it, which would show the occasional practice of earnings management.

It is important, as the DB and VC plans are subject to discretionary choices of actuarial assumptions – such as the real interest rate, general mortality table, and salary growth rate, among others – which determine these plans' mathematical provisions, that is, their estimates of social security obligations with participants and beneficiaries. Thus, as mathematical provisions reflect changes in actuarial assumptions in accounting terms, this account adequately portrays changes in the plans' actuarial liabilities (Silva & Silva, 2021).

Thus, when these provisions increase above the coverage equity (guarantee assets), the plans start to incur deficits that usually need to be addressed by sponsors, participants, and beneficiaries via extraordinary contributions (Mello, Constantino, Macedo & Rodrigues, 2019).

However, to avoid potential problems with sponsors, participants, beneficiaries, and regulatory and supervisory bodies, *EFPC* managers may manipulate the mathematical provisions of the DB and VC plans to disclose a solvency situation when it is close to being achieved, even if temporarily, which characterizes earnings management.

In addition to this introduction, the next section presents this paper theoretical framework and the research hypotheses, followed by the methodological procedures and the results and respective analyses. Finally, the final considerations are addressed.

2. Theoretical Framework

According to Jensen and Meckling (1976), the Agency Theory deals with the relationships between managers (agents) and capital owners (principals) who do not share the same objectives. While the former is usually portrayed in the figures of presidents and directors of large publicly traded companies, the latter generally refers to shareholders but can also be creditors, suppliers, and all those who, in some way, finance the activities of these companies.

This theory is built upon the conflicting relationship between a principal, who hires someone else (agent) to perform, on his behalf, services that involve granting decision-making power. Thus, if the parties to this relationship maximize utility in an economic sense, the agent will not always act according to the principal's interests, which characterizes an agency conflict (Alchian & Demsetz, 1972; Jensen & Meckling, 1976).

This situation occurs because the managers' interests may differ from those of owners, with the first having the potential to favor strategies within the company that increase their career chances, power, and remuneration instead of being concerned with optimizing a firm's value (Alchian & Demsetz, 1972).

According to Teixeira, Santos, and Macedo (2020), this type of behavior may also be found among *EFPC* managers, who would have incentives to manage the results of post-employment benefit plans to conceal insolvency issues from sponsors, participants, beneficiaries, and regulatory and supervising bodies. Therefore, by manipulating the mathematical provisions of pension plans, managers would be able to demonstrate short-term business competence, transferring the costs of future deficits to their successors (Kisser, Kiff & Soto, 2017).

The specificities inherent to the market of complementary pension plans, mainly regarding DB and VC plans, have generated considerable information asymmetry between managers (agents), who are knowledgeable of actuarial assumptions that strongly impact mathematical provisions, and sponsors, participants, and beneficiaries (principals), who, in general, detain little understanding of the subject (Mello, 2020).

This information asymmetry provides managers with opportunities to make certain choices of actuarial assumptions in the DB and VC plans, which may be used to please sponsors, participants, beneficiaries, or regulatory and supervisory bodies in the present, thus reducing the mathematical provisions of the plans against their coverage equity and, therefore, maximizing their career opportunities, power, and remuneration. Figure 1 shows the relationship between coverage equity (guaranteeing assets) and mathematical provisions (actuarial liabilities) in surplus, deficit, and technical balance situations, respectively.

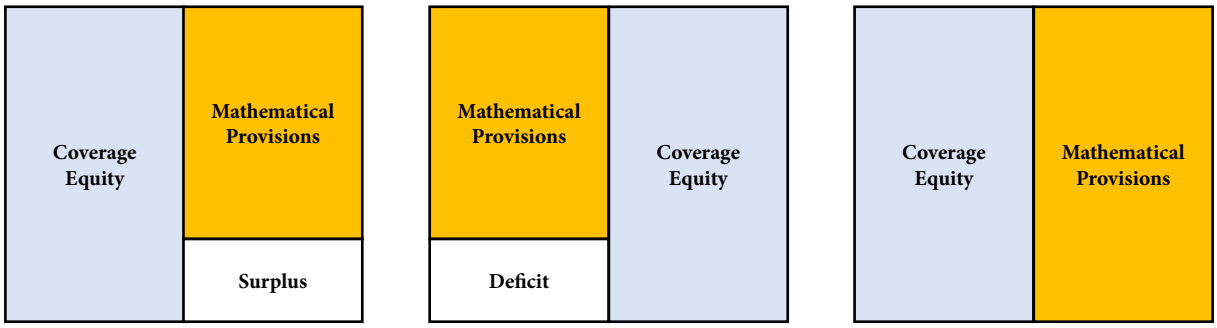

Figure 1. Mathematical Provisions *versus* Equity Coverage

Source: developed by the authors.

It is important to emphasize that the discretion of *EFPC* managers regarding the main actuarial assumptions impacting the mathematical provisions of DB and VC plans, that is, the real interest rate and the general mortality table, is restricted by the *Conselho Nacional de Previdência Complementar* (*CNPC*) [National Complementary Pension Council] (CNPC), former *Conselho de Gestão da Previdência Complementar* (*CGPC*) [Complementary Pension Management Board], and PREVIC, which are the regulatory and supervisory bodies, respectively, of complementary pension funds in Brazil. For example, since 2003, CNPC and PREVIC have determined that general mortality tables, with minimum limits for the expected survival of plan participants to be adopted (Resolution CGPC No. 11, 2002; Instruction PREVIC No. 10, 2018; and Instruction PREVIC No. 33, 2020). As for the real interest rate, its parameters have been regulated and revised since 2007 (Resolutions CGPC No. 18, 2006; CNPC No. 09, 2012; CNPC No. 15, 2014; and CNPC No. 30, 2018). On the other hand, regarding actuarial assumptions that have lesser impacts on mathematical provisions, such as the factor determining the real value of an entity's benefits (capacity factor) over time and the hypothesis on the composition of pensioners' families (family composition), the standard assigns responsibility to the actuaries and the *EFPC* Executive Board for proposing and approving, respectively, without specifying limits (PREVIC Instruction No. 33, 2020).

Glaum (2009) conducted a review of studies addressing the accounting of post-employment social security benefits and concluded that all empirical evidence indicates opportunistic behavior on the part of managers in determining the actuarial assumptions that influence determining mathematical provisions of the DB plans.

Pennacchi and Rastad (2011) showed the existence of agency conflict and opportunistic behavior on the part of managers of US state pension funds, who would act influenced, to a large extent, by their career possibilities in these entities, when determining actuarial goals of supplementary pension plans.

Sousa and Costa (2015) showed that the managers of Brazilian *EFPC*, with DB plans with a coverage ratio lower than 1.05, are encouraged to adopt more optimistic actuarial assumptions when determining the mortality table and the real interest rate of these plans, primarily as a result of information asymmetry that favors directors against the plans' participants and beneficiaries.

The World Bank view complements these studies by considering that *EFPC* managers are unlikely to be held responsible for the wrong choices of actuarial assumptions that do not take into account technically defined parameters and the independence of actuaries, causing a conflict of interest in the plans' management (BM, 2012).

As the actuarial assumptions of the DB and VC plans, which determine the mathematical provisions or social security obligations, are subject to the discretion of the *EFPC* managers, it is possible that these managers are using earnings management to conceal potential insolvency problems in Brazilian complementary pension plan, which requires investigation.

As the actuarial assumptions of the DB and VC plans, which determine the mathematical provisions or social security obligations, are subject to the discretion of the *EFPC* managers, these managers may be using earnings management to conceal potential insolvency problems in Brazilian complementary pension plans, which requires investigation.

Therefore, we intend to explore whether the DB and VC plans of Brazilian pension funds show signs that they manage their mathematical provisions, intending to remain balanced or in surplus, thus avoiding an eventual equation of deficit and/or a more detailed analysis by sponsors, participants, beneficiaries, and regulatory and supervisory bodies, similarly to the study carried out by Westerduin, Wouterson, and Langendijk (2012).

Therefore, the coverage ratio (solvency) will be used. It is given by the quotient of the coverage equity by the plans' mathematical provisions. Thus, if a substantial discontinuity is found in the histograms of the DB and VC plans between the interval that includes the coverage index balance parameter and the interval just below it, one may conclude that the managers of the DB and VC plans manipulate their mathematical provisions to meet a balance parameter, avoiding problems in the present with sponsors, participants, beneficiaries, and regulatory and supervisory bodies. Thus, the first research hypothesis (*H1*) is:

> **H1:** DB and VC plans with coverage ratios just below the minimum solvency standard (100%) adopt discretion so that these ratios reach the minimum or a level just above this minimum.

The method adopted by Westerduin, Wouterson, and Langendijk (2012) can still be helpful to assist in discriminating *EFPC* and plans according to the predominant type of sponsorship and to what is required by law. Complementary Law No. 109, of May 29th, 2001 (LC No. 109/2001), the general supplementary pension law in Brazil, encompasses all types of *EFPC* (with private and state sponsorship) and provides the general guidelines for the operation of these entities and their plans. Complementary Law No. 108, of May 29th, 2001 (LC No. 108/2001) brings specific requirements for *EFPC* and plans sponsored by state-owned entities.

One of the main differences between the two laws lies in the governance structure of the *EFPC* maintained by private and state-owned entities. For *EFPC* sponsored predominantly by private entities and companies, LC No. 109/2001 determines that at least 1/3 of the Deliberative and Fiscal Councils vacancies are destined to the participants and beneficiaries, while representatives' sponsors may occupy the remaining. In the case of *EFPC* maintained by public agencies and companies, LC No. 108/2001 requires parity in the composition of these Councils between participants and beneficiaries (half of the vacancies) and sponsors (half of the vacancies).

In this sense, because DB and VC plans sponsored by private companies are subject to a governance structure more concentrated around the sponsors, they make greater use of actuarial discretion to balance their coverage indices compared to their state-owned counterparts, which are more closely monitored by participants and beneficiaries, given the greater sharing of power provided by LC No. 108/2001. Therefore, the second research hypothesis (*H2*) is the following:

H2: Discretion when determining the coverage rates of DB and VC plans occurs to a greater extent in EFPC predominantly sponsored by private companies and entities, due to the stakeholders' limited involvement and a more concentrated governance structure, compared to plans DB and VC predominantly sponsored by state-owned companies and entities, which are watched over by many stakeholders.

As both the DB and VC plans sponsored by private companies and entities and the DB and VC plans sponsored by state-owned companies probably use actuarial discretion to manipulate coverage ratios, the difference between the influence exerted by these two types of sponsorship would be observed by the persistent disclosure of positive results for the solvency of plans maintained by private companies compared to plans maintained by state-owned entities. Otherwise, DB and VC plans from private sponsors are expected to reveal a greater concentration of positive results for the coverage index around the median (mean) than negative results. In contrast, a more symmetrical behavior is expected for the positive and negative values around the median (average) of state-owned companies' DB and DV plans.

The third research hypothesis (*H3*) departs from the idea that the geographic location of a pension fund influences the solvency disclosed by DB and VC plans. According to Cunha (2018) and Teixeira and Rodrigues (2021), an *EFPC* headquartered in the Federal District (DF) or the states of Rio de Janeiro (RJ) and São Paulo (SP) tends to have higher administrative expenses than an EFPC located in any other Brazilian state, because of the cost of living in these locations. Therefore, to justify the higher administrative expenses, the funds in DF, RJ, and SP would need to demonstrate that they manage the DB and VC plans better than their counterparts in other states.

H3: The discretion in determining the coverage rates of the DB and VC plans occurs to a greater extent in EFPC located in the DF, RJ, and SP than among those located in other Brazilian states.

As DB and VC plans are endowed with risks, these are expected to use actuarial discretion in determining the coverage ratio, regardless of an *EFPC's* geographic location. However, this characteristic would tend to be more frequent in the DB, and VC plans managed by pension funds in DF, RJ, and SP, due to a particular propensity to present a more significant number of solvent plans around the median/average (solvency persistence), than *EFPC* located in other states, which would have present a more symmetrical index in histograms.

3. Methodological Procedures

The data collected for this study concern the annual observations provided in balance sheets of the complementary pension plans from 2010 to 2020, available at PREVIC website: https://www.gov.br/economia/pt-br/orgaos/linked-entities/autarquias/previc/acesso-a-informacao/data-abertos/balancetes-accounting/balancetes-de-plans. Data treatment and analysis were performed using RStudio software.

A procedure similar to that of Westerduin, Wouterson, and Langendijk (2012) was adopted to assess research hypotheses 1 to 3, according to the methodology proposed by Burgstahler and Dichev (1997). However, unlike the above studies, the focus of analysis did not fall on the consolidated solvency of *EFPC* but on the DB and VC plans.

The following accounts were used to build the coverage ratio (solvency) of the plans: coverage equity (account: 2.3.1.0.00.00.00.00), divided by mathematical provisions (account: 2.3.1.1.00.00.00.00), all concerning the 4th quarter of each year under study.

In turn, data obtained from the plans' balance sheets, based on a registration database that defines the legal basis related to each of the plans (LC No. 109/2001 or LC No. 108/2001), were cross-checked to identify the plans covered only by Complementary Law No. 109/2001 (private) and the plans predominantly subject to Complementary Law No. 108/2001 (public). This verification was possible thanks to the key variable "*Número do Cadastro Nacional de Planos de Benefícios* (CNPB)" [Number of the National Registry of Benefit Plans (CNPB)] present in both databases, which is the individualized and a non-transferable record of each plan.

In order to identify the state of the federation where each plan is located, data from the individual balance sheets with an *EFPC* registration database, which contains information about the state and city where the pension funds' headquarters are located, were cross-referenced. Thus, the "*EFPC* Name," simultaneously present in both databases, was used as a key variable.

Initially, 3,628 observations were collected for DB plans. However, 492 observations with missing values concerning coverage equity or mathematical provisions were excluded. Another 39 observations that revealed values equal to zero for one of the two variables mentioned above and 27 observations that contained negative values were excluded. Hence, a sample with 3,070 feasible observations for the solvency calculation remained. Table 1 summarizes how the final sample was obtained.

Table 1
Sample selected for DB plans

Sample/Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
General sample	345	343	344	336	332	328	327	327	319	313	314	3.628
(-) Missing observations	(41)	(42)	(42)	(46)	(44)	(45)	(47)	(48)	(46)	(45)	(46)	(492)
(-) Observations with values equal to zero	(3)	(3)	(14)	(4)	(4)	(3)	(2)	(4)	(2)	–	–	(39)
(-) Observations with negative values	(1)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(3)	(3)	(3)	(27)
Final sample	**300**	**296**	**286**	**284**	**282**	**277**	**275**	**272**	**268**	**265**	**265**	**3.070**

Source: developed by the authors.

As for the VC plans, 4,714 observations were initially collected. However, in order to perform the solvency calculation, 14 observations were excluded as they revealed the absence of values for the coverage equity or mathematical provisions. Another 33 observations with values equal to zero for one of these two variables were also excluded, resulting in a final sample of 4,667 observations for this type of plan. Table 2 summarizes the final sample.

Table 2
Sample selected for VC plans

Sample/Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
General sample	441	446	449	447	446	433	414	425	410	402	401	4.714
(-) Missing observations	–	–	–	(1)	(2)	(2)	(2)	(2)	(2)	(1)	(2)	(14)
(-) Observations with values equal to zero	(4)	(3)	(8)	(2)	(4)	(1)	–	(1)	(4)	(2)	(4)	(33)
Final sample	**437**	**443**	**441**	**444**	**440**	**430**	**412**	**422**	**404**	**399**	**395**	**4.667**

Source: developed by the authors

With the samples defined, the natural logarithm of the coverage index was calculated for all plans. It makes this index equal to zero at equilibrium, as Degeorge, Patel, and Zeckhauser (1999) recommended. According to these authors, using variables in logarithms for studies of distributions improves the visualization of the central range of histograms in the presence of severe outliers.

Thus, after transforming the variable of interest, the study methodology consisted of three basic steps. First, the histograms for the DB planes were constructed, considering the entire sample; only DB plans sponsored by private companies and entities; only DB plans sponsored by state companies and entities; only DB plans located in DF, RJ, or SP; and only DB plans located in other Brazilian states. A similar procedure was adopted for the VC plans; however, in addition to the previous histograms, these plans also had histograms prepared only for the "CV Origin" plans and only for the "Defined Contribution (DC) with VC essence" plans. This is explained by the fact that there are several plans in the Brazilian pension funds market using DC nomenclature but which actually have a portion of lifetime income, which characterizes the condition of VC, as advocated by Teixeira, Santos, and Macedo (2020).

Therefore, two calculations were performed to verify which were the DC plans with a VC essence. Initially, the coverage index was verified, which provides the current plan situation and must be equal to 1 (one) to present equilibrium, neither surplus nor deficit. Afterward, the ratio between the coverage equity and the sum of the benefits granted and the benefits to be granted was calculated, which reveals the accumulated status of plans and must also be equal to 1 (one) for balance to occur. Thus, for a plan with DC nomenclature to be considered a "pure DC" plan, that is, without risks, it must simultaneously satisfy the two conditions of equality mentioned above. Otherwise, it will be a DC plan with a VC essence.

Regarding the histograms' intervals (classes), authors such as Westerduin, Wouterson, and Langendijk (2012) and Decourt, Seidler, Daneberg, and Pietro Neto (2014) used ranges with a width of two percentage points (2%). However, because the data were very concentrated in the central region of the histograms, which would impair visualization in this study, we decided to adopt classes with a width of 0.1% for all samples of the DB and VC plans.

The τ test proposed by Degeorge, Patel, and Zeckhauser (1999) was performed in the second stage to formally confirm the existence of discontinuity in the distribution when plans are close to the equilibrium coverage index. The τ-test is represented by the following equation (1):

$$\tau = \frac{\Delta p(x_n) - \mu[\Delta p(x_i)]}{\sigma \Delta p(x_i)} \quad (1)$$

where refers to the probability density of the interval that includes the equilibrium rate (*n*), minus the probability density of the neighboring interval immediately below(*n-1);* e and refer to the mean and standard deviation, respectively, of the variation between the probability density of neighboring intervals located between (*n+5*) and (*n-5*), excluding classes *n-(n-1)*.

A visual inspection of the histograms and the τ test by Degeorge, Patel and Zeckhauser (1999) are the two instruments used to answer research hypothesis *H1*. If *H1* is true, the τ test is statistically significant at 1%, providing evidence that the density of the class with the equilibrium coverage index is higher than the density of the class just below that same index.

In the third step, Mann-Whitney statistics were calculated to investigate whether the DB and VC plans tend to more frequently disclose positive results than negative ones (persistence of solvency *vis-à-vis* insolvency), when the type of sponsorship and the geographic location of *EFPC* are considered. It means that a right-sided test was performed for the empirical distribution of plan coverage ratios. Hence, the differences between class groups (*n+5*) and (*n-5*); (*n+7*) and (*n-7*)*;* and (*n+10*) and (*n-10*), excluding the central classes were assessed, that is, with the coverage index (*n*) and its neighbor immediately below (*n-1*).

For research hypotheses *H2* and *H3* to be true, DB and VC plans maintained by private companies and those located in the Federal District or Rio de Janeiro and São Paulo would have a preference for persistently disclosing a solvency situation to sponsors, participants, beneficiaries, and regulatory and supervisory bodies, compared to DB and VC plans sponsored by state entities and companies and those located outside the DF, RJ, and SP, respectively. In other words, this would indicate that the null hypothesis of equal densities between the sets of classes analyzed for the Mann-Whitney would be rejected at 1% of significance.

Finally, although discriminating between the plans called "VC of Origin" and plans called "DC with a VC essence" is not part of the research hypotheses, the use of the DC nomenclature by a VC plan may be a strategy for *EFPC* conceal from not very engaged sponsors and lay participants these plans' actuarial risks. Therefore, DC plans with a VC essence will consistently report more positive than negative solvency results to cover up their risks, as, in principle, a plan with a DC name could not be in deficit.

4. Results And Analyses

4.1 Results concerning the DB plans

Table 3 shows that 66.5% of 3,070 observations concerning DB plans from 2010 to 2020 are linked to private sponsors, and the remaining to public sponsors (33.5%). Similar percentages are found when observations are separated between plans in the Federal District, Rio de Janeiro, or São Paulo (67.8%) and those in other Brazilian states (32.2%). Regarding the DB plans' guaranteeing assets and actuarial obligations, the first presented an average coverage equity of R$462.52 billion, with obligations represented by mathematical provisions of R$ 460.07 billion on average. As for the measures of central tendency of solvency, the mean for the period was 1.01 and the median 1.02, that is, both slightly higher than the equilibrium rate of 1.00 (100%).

Table 3
DB Plans Statistics

Description	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total\ Mean
Total DB Plans	300	296	286	284	282	277	275	272	268	265	265	3,070
Private DB plans	202	203	194	192	189	184	181	178	173	172	169	2,037
State DB plans	98	93	92	92	93	93	94	94	95	93	96	1,033
DB in DF-RJ-SP	203	202	193	191	187	185	185	185	182	183	186	2,082
DB in other FUs	97	94	93	93	95	92	90	87	86	82	79	988
Coverage equity (R$ billion)	375.9	393.8	433.0	438.5	435.9	429.3	459.0	477.1	507.7	550.1	587.3	462.5
Mathematical provisions (R$ billion)	329.0	354.1	390.1	419.2	436.2	487.8	510.5	494.2	511.8	550.4	577.5	460.1
Solvency mean	1.14	1.11	1.11	1.05	1.00	0.88	0.90	0.97	0.99	1.00	1.02	1.01
Solvency median	1.08	1.07	1.05	1.00	1.00	1.00	1.02	1.01	1.01	1.02	1.01	1.02

Note: The coverage equity and mathematical provisions are in nominal values.

Source: developed by the authors.

As established in the methodology, a histogram of the frequency distribution of the natural logarithm of the coverage index was prepared, considering all the observations concerning DB plans from 2010 to 2020. A visual analysis of Figure 2 reveals considerable discontinuity between the two central classes, that is, the upper class, which encompasses the equilibrium coverage index (zero) and its neighbor just below, with the first having 409 observations and the second with 42 observations.

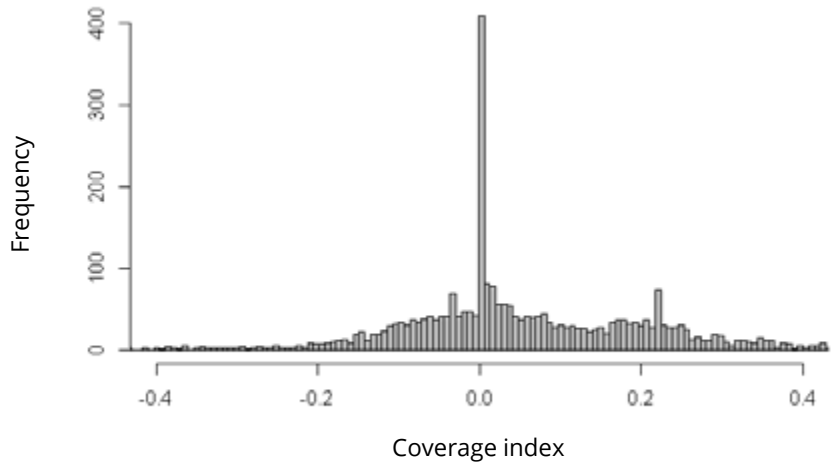

Figure 2. Histogram for the Total Observations of DB Plans

Source: developed by the authors.

This considerable discontinuity between the two central classes, with a wide density of observations for the class encompassing equilibrium coverage index (zero), is a strong indication that *EFPC* executives manage the solvency of DB plans seeking to predominantly report balanced or moderately positive results when insolvent plans are close to the solvency threshold. On the other hand, pension fund managers seem concerned with concealing DB plans' insolvency problems from sponsors, participants, beneficiaries, and regulatory and supervisory bodies whenever possible, thus, maximizing their career possibilities, power, and remuneration within *EFPC*.

Similar results are found when DB plans are separated into a) sponsored by private entities and companies; b) sponsored by state entities and companies; c) located in the Federal District, Rio de Janeiro, or São Paulo; and d) located in other Brazilian states. Figure 3 presents the histograms of the situations mentioned above.

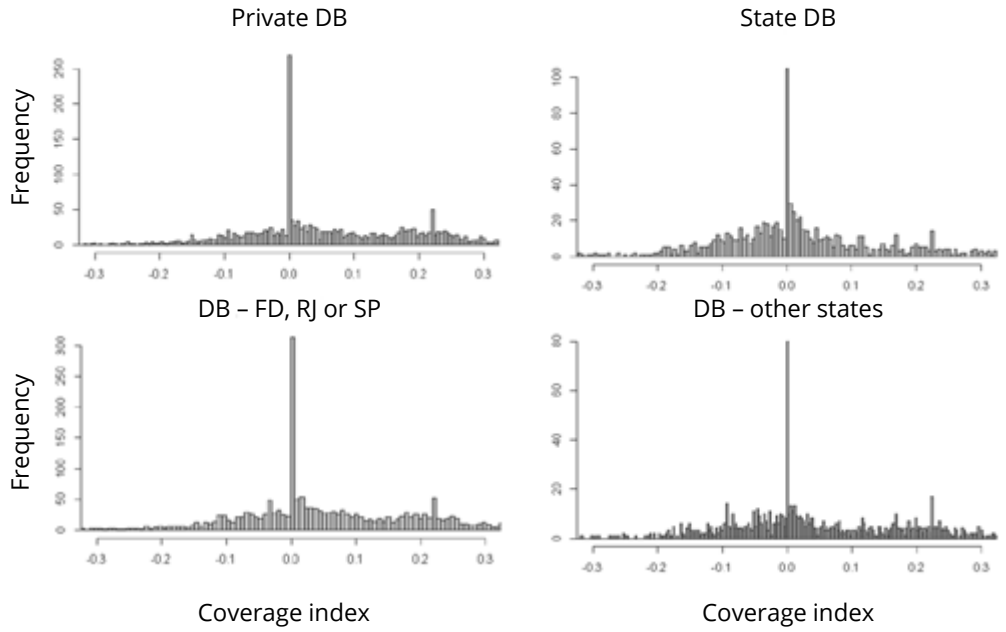

Figure 3. Histograms for the DB Plans' Different Compositions

Source: developed by the authors.

However, to formally confirm the results reported in the histograms, the τ statistic proposed by Degeorge, Patel, and Zeckhauser (1999) was calculated (Table 4). Additionally, the same table provides the values for the Mann- Whitney, which assesses the null hypothesis of equality in densities between classes *(n+5)* and *(n-5)*; *(n+7)* and *(n-7)*; and *(n+10)* and *(n-10)*, excluding the central classes (*n*) and (*n-1*); against the alternative hypothesis that positive values reported are more frequent than negative values (persistence regarding solvency *vis-à-vis* insolvency).

Table 4
Statistics for the DB Plans

Information	Total DB	Private DB	State DB	DB DF, SP and RJ	DB other states
Mean	0.07	0.11	0.01	0.08	0.06
Median	0.02	0.04	0.00	0.03	0.01
τ test	18.58	48.63	12.68	19.18	23.81
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Mann-Whitney (n+5) and (n-5)	22.0	24.0	21.5	22.0	22.5
p-value	0.0297	0.0106	0.0375	0.0297	0.0216
Mann-Whitney (n+7) and (n-7)	34.5	44.0	32.5	41.5	41.5
p-value	0.1116	0.0075	0.1684	0.0173	0.0159
Mann-Whitney (n+10) and (n-10)	64.0	84.0	57.0	81.5	73.0
p-value	0.1517	0.0056	0.3113	0.0094	0.0434
Nº. of Observations	3.070	2.037	1.033	2.082	988

Source: developed by the authors.

The results show that the τ test by Degeorge, Patel, and Zeckhauser (1999) was highly significant for all histograms, enabling rejecting the null hypothesis of equal distributions between the upper central class, which includes the equilibrium coverage index and the neighboring class just below this same index at 1% significance. That is, considerable discontinuity is found in favor of the class that covers the equilibrium coverage index for all histograms, which does not allow rejecting *H1*. This finding suggests that earnings management is recurrent in DB plans, regardless of the type of sponsorship and geographic location of these plans.

As for the Mann-Whitney test, it was impossible to reject the null hypothesis for the set of classes (*n+5*) and (*n-5*) in any histograms at 1% significance. Additionally, for the set of classes (*n+7*) and (*n-7*) and (*n+10*) and (*n-10*), the same hypothesis was rejected in the histograms of the DB plans maintained by private entities and companies; only for the interval set (*n+10*) and (*n-10*), rejection occurred for the DB plans located in the Federal District, in Rio de Janeiro or São Paulo.

Such results indicate that DB plans sponsored by private entities and companies tend to persistently report more positive than negative values for the coverage ratio compared to DB plans maintained by state entities and companies. On the other hand, due to the limited involvement of stakeholders and a more concentrated governance structure, there is an indication that private DB plans are more likely to disclose a greater volume of positive than negative solvency results, as they are under the exclusive aegis of LC No. 109/2001. On the other hand, we cannot deny that the shared governance structure provided by LC No. 108/2001 inhibits, to a certain extent, the disclosure of recurrently positive results in the case of state DB plans, which confirms *H2*.

Regarding DB plans located in the DF, RJ, and SP, a weak tendency was found for these plans to persistently present more positive than negative solvency results compared to DB plans located in the other states, which does not enable rejecting *H3*. It provides evidence that the higher administrative costs of *EFPC* maintaining DB plans in the DF, RJ, and SP, as found by Cunha (2018) and Teixeira and Rodrigues (2021), seems to motivate the use of discretion to improve the solvency of these plans. Such behavior was not found in DB plans located in other Brazilian states

4.2 Results concerning the VC Plans

Table 5 includes 4,667 observations concerning VC plans from 2010 to 2020. Of these, 83.7% refer to plans maintained by private sponsors, and the remaining to plans from public sponsors (16.3%). Percentages very close to the previous composition are found when the observations are separated between plans maintained in the Federal District, Rio de Janeiro or São Paulo (83.0%), and other states (17.0%). The observations were also separated according to nomenclature. Of the observations, 74.4% were called "VC Plans of Origin," while the remaining 25.6% were called "DC Plans with a VC Essence." Despite the name "DC" in the latter, these actually have a VC essence because they allow the conversion of a specific income (or a given period) into lifetime income.

Analysis of the average coverage equity over the period and the mean mathematical provisions showed that the first is slightly higher than the second (R$ 196.4 billion *versus* R$ 195.8 billion). When dealing with solvency centrality measures, the mean and median were equal, and the same value was obtained for the equilibrium index of 1.00.

Table 5
Statistics for the VC Plans

Description	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total/ Média
Total DB Plans	437	443	441	444	440	430	412	422	404	399	395	**4,667**
Private DB plans	370	372	374	376	367	358	343	352	333	330	330	**3,905**
State DB plans	67	71	67	68	73	72	69	70	71	69	65	**762**
DB in DF-RJ-SP	365	367	365	369	363	356	342	353	336	331	328	**3,875**
DB in other FUs	72	76	76	75	77	74	70	69	68	68	67	**792**
VC of Origin	316	322	319	320	321	317	314	313	309	308	313	**3,472**
DC with a VC essence	121	121	122	124	119	113	98	109	95	91	82	**1,195**
Coverage equity (R$ billion)	100.2	114.9	138.3	143.3	162.4	184.7	209.3	236.7	258.7	299.8	312.3	**196.4**
Mathematical provisions (R$ billion)	98.4	113.9	136.6	145.0	163.1	186.5	211.1	233.3	256.1	297.3	313.2	**195.8**
Solvency mean	1.02	1.01	1.01	0.99	1.00	0.99	0.99	1.01	1.01	1.01	1.00	**1.00**
Solvency median	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	**1.00**

Note: Coverage equity and mathematical provisions are in nominal values.

Source: developed by the authors.

The first histogram of frequency distribution prepared for the DV plans includes all 4,667 observations from 2010 to 2020 and refers to the natural logarithm of the coverage index. In it, it is possible to observe a great discontinuity between the class that contains the solvency equilibrium value (total of 2,208 observations) and the class just below it (total of 219 observations), which leads to the conclusion that most of the DV plans makes use of earnings management to reach the established standard ratio or an amount immediately above, when these plans are close to solvency. Figure 4 illustrates the histogram for the total observations of the VC plans.

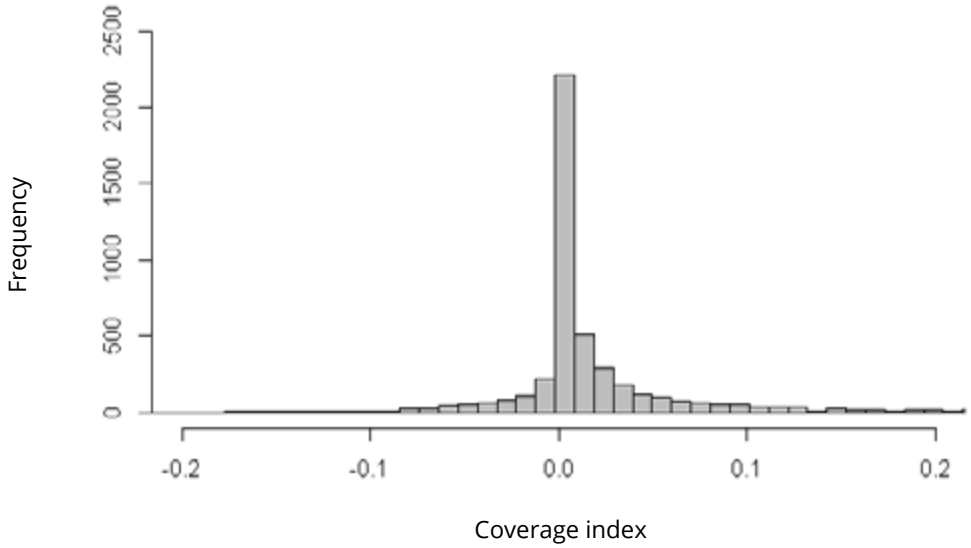

Figura 4. shows the histogram for the total of observations concerning VC plans.

Source: developed by the authors.

Histograms containing observations of the VC plans were also created for the following cases: a) plans sponsored by private companies and entities; b) plans sponsored by state companies and entities; c) plans located in DF, RJ, and SP; and d) plans located in other Brazilian states. For all these cases, there is a considerable discontinuity between the class that includes the coverage ratio and its immediate neighbor below. Hence, the EFPC executives may manage these plans' results in an attempt to disclose a solvency situation to the sponsors, participants, beneficiaries, and control agencies, when the insolvency is small. Figure 5 illustrates the histograms of the four cases described.

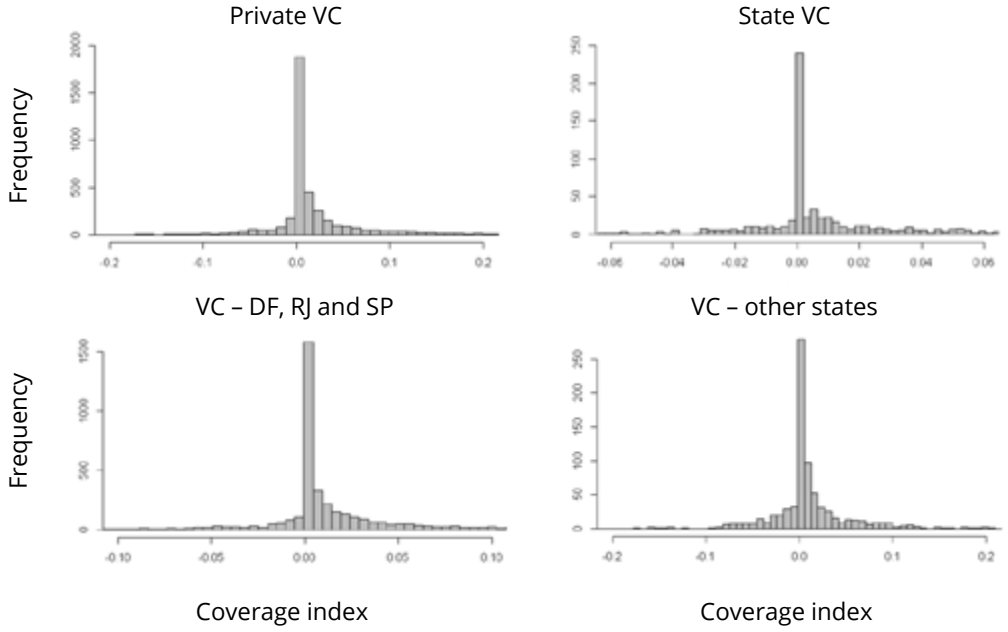

Figure 5. Histograms for Different Compositions of DV Plans

Source: developed by the authors

The last two histograms discriminate the original VC plans (with nomenclature CV), and DC plans with a VC essence (Figure 6). In both, the trend of a considerable discontinuity between the interval that encompasses the coverage ratio (zero) and its neighbor just below it refers to managers' use of earnings management to conceal potential insolvency problems in the present, relocating them to the future.

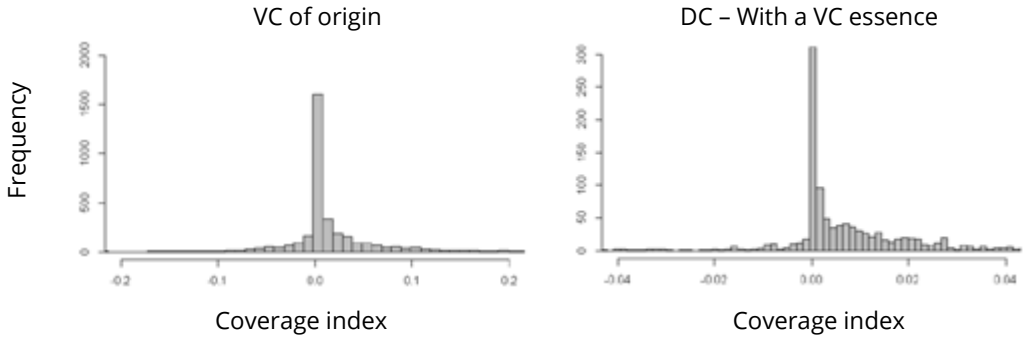

Figure 6. Histograms concerning VC plans of origin *versus* DC with a VC essence

Source: developed by the authors.

The τ statistic proposed by Degeorge, Patel, and Zeckhauser (1999) was calculated to formally confirm the results reported in the VC plans' histograms, as detailed in Table 6. The same table also provides the mean, median, and Mann-Whitney test information. The latter assesses the null hypothesis of equality in densities between classes (*n+5*) and (*n-5*); (*n+7*) and (*n-7*); and (*n+10*) and (*n-10*) against the alternative hypothesis that classes with positive values have greater density than those with negative values (persistence concerning solvency *vis-à-vis* insolvency).

Table 6
Statistical tests of VC Plans

Information	Total VC	Private VC	State VC	VC DF, SP, and RJ	VC in other states	VC of origin	DC with a VC essence
Mean	0.01	0.02	-0.04	0.01	0.03	0.01	0.02
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00
τ test	12.73	11.49	26.62	19.52	8.49	16.71	17.33
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mann-Whitney (n+5) and (n-5)	24.0	25.0	25.0	25.0	21.0	23.0	25.0
p-value	0.0079	0.0040	0.0058	0.0040	0.0468	0.0159	0.0040
Mann-Whitney (n+7) and (n-7)	43.5	46.0	40.5	48.0	36.0	41.5	49.0
p-value	0.0090	0.0020	0.0225	0.0016	0.0795	0.0174	0.0011
Mann-Whitney (n+10) and (n-10)	82.5	87.0	84.5	93.0	69.5	81.5	100.0
p-value	0.0078	0.0029	0.0048	0.0006	0.0745	0.0095	0.0000
Number of Observations	4.667	3.905	762	3.875	792	3.472	1.195

Source: developed by the authors.

The τ test was highly significant for all VC plans, corroborating that the class composed of the equilibrium solvency index (zero) and moderately higher values than this index has a statistically higher density than its neighbor immediately below. This evidence does not allow us to reject the first research hypothesis (*H1*), as occurred with the DB plans.

The Mann-Whitney test rejected the null hypothesis at 1% of significance for all sets of classes assessed when considering: the total of VC plans; VC plans maintained by private companies and entities; the VC plans located in DF, RJ, and SP; and DC plans with a VC essence. In other words, the VC plans maintained by private entities and companies persistently report positive coverage rates, which is equivalent to saying that the governance structure imposed by LC No. 109/2001 has not shielded these plans from recurring earnings management. In turn, persistent reports of positive solvency were not found for VC plans sponsored by state entities and companies in the interval set (*n+7*) and (*n-7*). Thus, we cannot reject research hypothesis *H2* since the greater power-sharing between sponsors and participants provided by LC No. 108/2001 mitigates, at least partially, the disclosure of excessively positive results for the solvency of VC plans.

Regarding VC plans managed by *EFPC* in the DF, RJ, and SP, the insistently positive coverage ratios indicate that the pension funds in these locations seek to offset their high administrative costs by disclosing plans with better performance. The same does not occur in VC plans located in other Brazilian states, which, due to their lower costs, as observed by Cunha (2018) and Teixeira and Rodrigues (2021), present a more symmetrical behavior for solvency. Thus, it is also not possible to reject research hypothesis *H3*.

Finally, comparing the original VC plans with the DC plans with a VC essence; the latter recurrently disclosed a solvency condition. At the same time, such behavior was found in the former only for the set of classes (*n+10*) and (*n-10*).

These findings suggest that managers of DC plans with a VC essence have incentives to persistently manage these plans' solvency, to ratify the adoption of the DC nomenclature, concealing actuarial risks that should not exist in plans named "DC." In the case of the original VC plans, as the actuarial risks are already explicit in the name of these plans, the need to report successively positive results would not be an obligation *a priori*.

5. Final Considerations

A visual inspection of the histograms and the calculation of the statistic τ proposed by Degeorge, Patel, and Zeckhauser (1999) lead us to the conclusion that there is a considerable discontinuity between the class that includes the established standard ratio for solvency and the class immediately below this same index, which favors the hypothesis that *EFPC* make use of actuarial discretion in their DB and VC plans, avoiding reporting unsecured liabilities to sponsors, participants, beneficiaries, and regulatory and supervisory bodies, when possible.

These results show evidence of management in mathematical provisions, mainly in DB plans that are collective, solidary, and mutualist. As the benefit of each participant in these plans is known in advance, its cost is calculated individually, generating a single monthly contribution rate for all participants, which is recalibrated annually according to each plan's needs (Valença, 2013). In other words, in theory, symmetry is expected in the histogram distributions for the coverage index. However, involuntarily making a mistake is, to a certain extent, something intrinsic in the choices regarding the actuarial assumptions of the DB plans, which result from the possibilities provided by the CNPC, PREVIC, and political and market conditions. Therefore, both deliberate choices of actuarial assumptions that project a greater growth of liabilities and the opposite are equally undesirable because a) higher projected liabilities entail higher social security contributions in the present by participants and sponsors, which may significantly reduce the disposable income of the former and increase the operating expenses of the latter, giving rise to the possibility of legal actions against *EFPC*; b) lower projected liabilities result in lower current social security contributions, which may lead to the need for extraordinary contributions in the future to cover deficits; and c) even though achieving balance in the plans is complex, this should be a goal, as recommended by CNPC Resolution No. 30, 2018.

Regarding the VC plans, which individualize the participants' reserves (most of the ported resources) and create a mutual fund for survival and other events of a random nature (a smaller part of the resources), the observations contained in CNPC Resolution No. 30, 2018 are also valid. These observations deal with the continuous search for maintaining balance in plans that are influenced by actuarial assumptions, being equally likely, in theory, the occurrence of deficits or surpluses. In this type of plan, the cost is predefined, and the benefit is unknown; however, the granting of an annuity for life brings uncertainty as to the perfect match of guaranteeing assets and actuarial liabilities, which may result in plans with insufficient or excessive resources (Chan, Silva & Martins, 2010).

In this sense, this study's findings indicate that the governance structure imposed by LC No. 108/2001, with greater power sharing between sponsors, on the one hand, and participants and beneficiaries, on the other (parity in the composition of Deliberative and Fiscal Councils), makes the DB and VC plans maintained by state-owned entities and companies less susceptible to the regular reporting of a solvency situation. However, the same does not occur for the DB and VC plans that exclusively follow LC No. 109/2001. In the case of plans subject to LC No. 108/2001, the greater representativeness of participants and beneficiaries in the collegiate bodies of *EFPC* seems to inhibit the disclosure of recurrently positive results for solvency, contributing to increased transparency, and improving the quality of accounting information.

Regarding the DB and VC plans located in the DF, RJ, and SP, the incentives in disclosing an always positive solvency condition were found, considering that disclosing a better performance of these plans could justify the *EFPC*'s higher administrative costs, as found by Cunha (2018) and Teixeira and Rodrigues (2021). On the other hand, this would not be found in the DB and VC plans located in states with lower administrative costs. Therefore, disclosing an insistently positive solvency condition for the DB and VC plans found in large urban centers is possibly adopted to divert the attention of sponsors, participants, and beneficiaries regarding the high costs of maintaining their plans.

As for DC plans with a VC essence, there is evidence that the "DC" name is used to conceal these plans' actuarial risks from sponsors little engaged with the matter and lay participants. Persistently presenting positive results for the solvency of DC plans with a VC essence would be a way for managers to disguise any volatility of these plans, to maximize their career possibilities, power, and remuneration with an *EFPC*.

In short, in practical terms, the evidence found indicates that DB and VC plans, regardless of how they are presented or separated, always choose to manage their coverage ratio when insolvency occurs to a small extent for an amount equal to or immediately above the established standard ratio, reducing its visibility costs in the face of sponsors, participants, and beneficiaries, and preventing actions on the part of regulatory and supervisory agencies. It suggests that these parties should pay greater attention to the practice of earnings management within *EFPC* since changes in the plans' coverage ratio may be used to reduce "alarmism" and concerns of sponsors, participants, and beneficiaries, regarding the solvency of the DB and VC plans, in addition to hiding these problems from the government agencies and *EFPC* Deliberative and Fiscal Councils.

A limitation of this study concerns the fact that we could not discriminate naturally balanced and slightly positive coverage indices from those that are possibly being manipulated. In this regard, Dechow, Richardson, and Tuna (2003) argue that studies that anticipate a discontinuity as proof of earnings management fail to show how the management occurred.

According to Burgstahler and Chuk (2017), this is a limitation reported in many studies of this nature, as it is not possible to identify whether management is the exclusive result of manipulations in actuarial assumptions, actual changes in the plans' investment portfolios and/or movements linked to political and economic contexts. Thus, these questions can only be answered by a study with more detailed follow-up modeling proposed by Westerduin, Wouterson, and Langendijk (2012).

In this sense, future studies are suggested to deepen explanations regarding the elaboration of mathematical provisions, analyze the actuarial assumptions of DB and VC plans, and unveil their determinants and motivating factors.

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Earnings management and the readability of explanatory notes: accounting information manipulation

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Abstract

Objective: This study aims to verify the relationship between the readability level of explanatory notes and earnings management among companies listed in [B]³ between 2010 e 2018.

Method: An econometric method was used. Readability was the dependent variable, and earnings management was the primary independent variable, in addition to control variables, analyzed through panel data regression with fixed effects controlled by year and sector.

Results: The results show no statistically significant relationship between the readability levels of explanatory notes and earnings management levels, even when compared to companies that most frequently use earnings management. The results are robust, considering that additional results present coefficients in the same direction and significance.

Contributions: This study contributes to the accounting literature as it studies this relationship in a Portuguese-speaking emergent market. Additionally, it supports the understanding of users of accounting information regarding the ease of reading explanatory notes to support decision-making.

Keywords: ease of reading; earning management; obfuscation.

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1. Introduction

The international harmonization of accounting standards has led to significant changes in the parameters for preparing and disclosing accounting information, especially in countries where local standards were more at odds with the standards used in more economically developed centers. Due to the managers' discretionary power, as well as the amount of information required, especially among narrative disclosures, accounting communication has become the focus of attention of several regulatory bodies (Securities and Exchange Commission – SEC, European Financial Reporting Advisory Group – EFRAG, International Accounting Standards Board – IASB, the Brazilian Securities and Exchange Commission – *CVM*, Accounting Pronouncements Committee – *CPC*, and Guidance Committee for the Disclosure of Information to the Market - Codim, etc.). For example, after the Brazilian accounting standards converged to the international standards (International Financial Reporting Standards - IFRS), the disclosure of information provided in explanatory notes that was not previously required increased significantly, also increasing the volume and content of the reports issued (Antunes, Grecco, Formigoni & Neto, 2012).

Peleias (2017) notes that the disclosure of accounting information is a factor that contributes to reducing the level of information asymmetry and increasing users' confidence due to transparency, mainly through non-financial information. Such information benefits users by describing a company's financial and non-financial performance since managers have the opportunity to explain some of the reasons underlying a company's performance (Hassan, Abbas & Garas, 2019).

Based on the fact that accounting regulations, in effect after harmonization, enable managers to act with discretion by making accounting choices and by how information is reported, further research is needed to study the aspects related to the behavior of administrators to opportunistically provide information or manage results (Libby, Bloomfield & Nelson, 2002).

Motivations for earnings management can be explained from different perspectives, with the opportunistic view being the most discussed in the accounting literature since 1970, based on Watts and Zimmerman's studies. From this perspective, managers are motivated to make accounting choices that produce effects in line with their expectations while disclosing information that mainly transmits positive performance and conceals negative news (Bakar & Ameer, 2011).

Earnings management may involve the use of managerial discretion in making accounting choices (accruals), in making operational decisions (real), and in selecting criteria to present statements (disclosure) (Martinez, 2013). According to the Agency Theory (Jensen & Meckling, 1976), one of the leading causes of agency problems is information asymmetry between principals and agents, preventing external users from adequately assessing the managers' competence and efforts.

By applying discretion, managers may use accounting narratives to meet their interests or obtain social legitimacy by choosing the statements' level of readability (Hassan, Abbas & Garas, 2019). This method is called impression management. Impression management has already been identified through information obfuscation, the use of more complex language, emphasis on good news, the use of metaphors, choosing convenient benchmarks, focus on future expectations, concealing information, and adopting a rhetoric and persuasive speech (Clatworthy & Jones, 2003; Merkl-Davies & Brennan, 2007; Ajina, Laouiti & Msolli, 2016; Bushee, Gow & Taylor, 2018).

Previous studies have linked the readability of accounting reports in English with earnings management practices (Ajina, Laouiti & Msolli, 2016; Lo, Ramos & Rogo, 2017). The results of such studies indicate that companies adopting earnings management present narrative statements that are more difficult to read. However, such results cannot be generalized to different contexts due to the different legal and economic conditions between countries and the characteristics of each language (Moreno & Casasola, 2015).

The Portuguese language is known to have a more complex structure than English. For this reason, it potentially makes it easier to obfuscate information, especially when there is an intention to conceal data unfavorable to the composition of a company's performance or the performance of its managers. Additionally, Machado (2018, p. 72) reinforces the need for specific studies in emerging markets, considering that "theories corroborated by research in developed countries may have limited applicability in emerging markets." Brito (2016) states that emerging markets face inefficiency, insufficient regulations, and poor infrastructure. Therefore, companies in such a market will likely provide less relevant and lower-quality information to users than those in developed markets. Based on this context, the following research problem arises: **What is the relationship between earnings management levels and the readability of the explanatory notes of companies listed in [B]³?**

By influencing the decision-making processes of various groups, accounting information generates important implications of an economic nature. Hence, it is necessary to identify the factors that motivate differences in the readability levels of explanatory notes (Silva, 2017; Hasan, 2018). Therefore, this paper seeks to contribute to the accounting literature by relating aspects concerning disclosure and the readability of accounting information with the earnings management practice. Both are impacted by the process of harmonization with international standards, which increased the need for disclosure of information in explanatory notes and concomitantly provided managers with greater discretion to make accounting choices, directly or indirectly affecting the companies' reports.

This study aims to verify the relationship between the level of readability of explanatory notes and earnings management practices among companies listed in [B]³. Hence, multiple linear regressions will be performed to identify potential associations between accruals-based earnings management (Modified Jones - Dechow, Sloan & Sweeney, 1995) or real (Discretionary Expenses - Roychowdhury, 2006) and impression management (adapted Flesch - Martins, Ghiraldelo, Nunes & Oliveira Junior, 1996).

By analyzing the relationship mentioned above, we highlight the importance of explanatory notes' readability and the factors influencing it to help mitigate the risks imposed on users associated with earnings management and information obfuscation. Furthermore, the results reported here are expected to support information for the accounting regulation process regarding aspects related to readability, considering that narrative disclosures have become one of the main attention points of regulatory bodies in recent years.

The need to issue accounting reports with improved readability levels is accentuated due to an increase in different types of users of accounting information, such as, for example, the growth of small investors in the financial market between 2013 and 2019, reported by the Brazilian Association of Financial and Capital Market Entities (Anbima). According to Borges (2020), such investor presents varied levels of education, knowledge, and experience regarding the analysis of financial statements. Therefore, more readable information can help the decision-making process and resource allocation. Another point worth mentioning is the increase in the complexity of international trade relations between companies that, in theory, now share similar parameters for preparing and disclosing accounting information; however, adjusted to their local contexts, as it occurs in Brazil, where there is one accounting statement not provided for in international standards and unknown by other countries.

2. Theoretical Reference

2.1 Accounting information readability

Some studies use the term readability in the same sense of understandability; however, measurements differ, and using the term with such a meaning is not recommended (Smith & Taffler, 1992). The difficulty in understanding a document depends not only on the text's syntactic and linguistic complexity but also on the readers' skills and characteristics. Some people may easily understand different types of text, while others find them difficult; hence, adaptation to the particular characteristics of the target audience is required (Castilhos, 2016).

Note that readability refers to a text's inherent quality of being read quickly and easily. Therefore, readability is a property of the narrative's complexity. Understandability, in turn, is related to the readers' ability to understand a given text and, therefore, depends on each reader's characteristics (Smith & Taffler, 1992). In this sense, readability can be translated in terms of a reading difficulty scale, in which texts as rated as more difficult to read when compared to others, being described as the quality that determines the ease of reading a text. Readability is one of the characteristics of text clarity, which is essential for quick and easy communication, through the use of short sentences and easy-to-understand words (Borges & Rech, 2018). Peleias (2017) presents some readability concepts found during his research (Table 1):

Table 1
Readability concepts

Authors (Year)	Definition
Klare (1963)	Users' ease of understanding or comprehending a written text according to its style.
McLaughlin (1969)	Related to the difficulty some people experience when reading and understanding a text's excerpts and the full text.
Gibson and Shroeder (1990)	Quality of writing that results in easy and fast communication.
Chall (1978, apud Jones and Shoemaker, 1994)	The total sum, including interactions, of all those elements within a written material which influence readers' level of success in reading.
DuBay (2004)	It is what makes a text easier to read than others.
Fernandes and Silva (2009)	It does not provide a readability definition; instead, it presents a definition of understandability.
Cunha and Silva (2009)	The quality of writing, which determines how easy to read a text is.
Fakhfakh (2013)	It is a relevant characteristic of writing techniques and communication theories. It concerns how easy a text is to read and be understood.

Source: Peleias (2017).

Given these concepts, Peleias (2017, p. 23) formulates his definition to apply in his research and the accounting field: "readability is the quality of writing linked to the quality of accounting information, the objective of which is to facilitate reading and understanding financial statements, resulting in easier and faster communication of accounting information to its users."

The expectations of users of financial statements may change, given strategies intended to reduce the readability of financial reports and obfuscate information, both in confirming past events and observing present results or future estimates (Cruz Junior, 2018). With such information in hand, managers have the incentive to obfuscate information when a company's performance does not meet expectations, a case when the market's reaction may be less complete when the information provided is less easily extracted from financial statements (Bloomfield, 2002; Li, 2008).

Because of the global movement aimed at improving the disclosure of qualitative information, in 2014, the CPC issued Technical Guidance 07 – *Evidenciação na Divulgação dos Relatórios Contábil-Financeiros de Propósito Geral* [Disclosure in the Dissemination of General Purpose Accounting and Financial Reports]. The OCPC 07 points out that a large volume of information in the explanatory notes causes an increase in transaction costs, impairing decision-making by financial market agents and raising questions regarding the statement's relevance.

The Obfuscation Hypothesis (Courtis, 1998), which suggests that managers are not neutral in presenting reports, is essential for constructing the Incomplete Disclosure Hypothesis presented by Bloomfield (2002). According to this hypothesis, market users are expected to make decisions based on less complete information if the costs of extracting information from the statements are higher than the expected benefits. This hypothesis confirms that managers have more incentives to make it challenging for users to identify information that could negatively affect their companies' stock prices. (Laksmana, Tietz & Yang, 2012.

Recent studies indicate that the statements' readability can affect the quality of information, impacting factors such as increased agency costs, search for information in external sources, the presence of earnings management, low persistence of earnings, low quality of analysts' forecasts, and decreased value-relevance through weak market reactions to annual reports (Li, 2008; Asay, Elliott & Rennekamp, 2017; Lo et al., 2017). Thus, there is a need to understand the factors affecting how companies determine the accounting reports' readability levels (Rodrigues, 2012).

2.2 Earnings management and managerial opportunism

Earnings management refers to the purposeful intervention in the process of preparing external financial statements (Shipper, 1989); i.e., it occurs when managers use discretion in the reporting of financial statements (Healy & Whalen, 1999). As Watts and Zimmerman (1990) mentioned, accounting standards enable managers to make discretionary decisions, allowing them to use their business knowledge to choose accounting procedures, methods, and estimates to record information and influence financial reports. Earnings management does not constitute accounting fraud, as earnings management operates within the limits of the legislation applied to accounting. Thus, company managers explore the aspects where accounting standards give them a certain degree of discretion in choosing how to report results (Martinez, 2001).

The motivations for earnings management are explained from two main perspectives: the opportunistic and the efficiency perspectives. The opportunistic view has been discussed in the accounting literature since 1970, based on Watts and Zimmerman's research, culminating in the positive approach to accounting research. From this perspective, earnings management is considered an opportunistic process in which managers' primary objective is to maximize utility. Therefore, considering conflicts of interest between owners and managers (Jensen & Meckling, 1976), managers' choices are subject to investigation regarding the explanation of performance aspects (Ajina et al., 2016).

As for the perspective of efficiency, Gabriel (2018) argues that managers can make accounting choices to increase the informative value of results and, consequently, reduce agency costs. To reduce these costs, managers can produce more non-financial information and make these disclosures easier for different users, such as creditors and investors, to understand. The ease of reading annual reports is crucial, as they complete the companies' financial information with more details to ground decision-making.

In his literature review on earnings management in Brazil, Martinez (2013) states that this phenomenon goes beyond the quantitative disclosure of accounting information, involving managerial discretion when making accounting choices (recognition and measurement), operational decisions, and selecting criteria to present statements (disclosure).

An important aspect regarding earnings management through accounting choices concerns that managers can influence changes in earnings by discretionally increasing or decreasing accruals. Meanwhile, earnings management through operational decisions involves business-related activities in a company. Roychowdhury (2006) defines management by operational decisions as deviations from normal operational practices, motivated by the managers' desire to mislead the users of information regarding specific financial reporting goals. Such a practice is mentioned in the international literature as real earnings management (Roychowdhury, 2006; Gunny, 2010).

Cupertino (2013) considers that knowing that detecting manipulation by real activities is more complex than that performed by accruals management, managers structure transactions to achieve the desired level of profits. Thus, earnings management by operational decisions occurs when managers manipulate the company's operating activities to increase or reduce earnings for the current period (Gunny, 2010). Note that, although apparently showing results in the short term, management based on operational decisions may reduce a company's value, as actions taken to increase profits in the current period may harm cash flow in the future (Roychowdhury, 2006).

The literature presents opportunistic management behavior through earnings management from different aspects. For example, Baker, Collins, and Reitenga (2003) show that the structure of executive compensation is related to opportunistic behavior in the measurement of discretionary accruals. In addition, the above authors showed that, in previous periods, the granting of stock options used in compensation management motivated a discretionary reduction in accruals.

Ali and Zhang (2015) show that a CEO's tenure is related to earnings management. Their study shows that, at the beginning of a CEO's mandate, the company reports overestimated results compared to the end of the mandate. The authors consider that this behavior can be explained by an attempt among recently hired CEOs to favor the market's perception of their capacity. Consistent with the literature addressing the horizon problem, the above study also shows that, precisely in the last year of the mandate, there is a tendency to overestimate the company's results.

Finally, Godfrey, Mather, and Ramsay (2003) analyzed earnings and impression management jointly. These authors note that there is an increase in profits through earnings management practices when changing CEOs; at the same time in which impression management occurs to favor the image of managers through graphics in financial reports.

2.3 Earnings management and readability

Some studies highlight impression management as an extension of the literature on earnings management. For Rodrigues (2012), this type of management corresponds to an attempt to control the users' perception of information through dissemination methods, such as graphics and illustrations, in annual reports. This type of management may also come from information obfuscation, by emphasizing specific themes to the detriment of others, or by using more complex language in the textual presentation (Bushee, Gow & Taylor, 2018).

As a result of his study, Li (2008) reports that companies tend to produce more difficult-to-read annual reports when they have lower earnings and profitability. Furthermore, bad news tends to be hidden, and one of the ways of concealing bad news is by decreasing the readability of narrative reports (Zurel, 2014).

Lo et al. (2017) verified the relationship between the readability of annual reports and variation in earnings management in 26,967 companies-year registered with the SEC between 2000 and 2012. The authors used the study by Li (2008) as a basis for determining their study design; hence, they used the same readability index and control variables. Upon observation of the discussion and management analysis section of the annual report (MD&A), Lo et al. (2017) concluded that companies suspected of practicing earnings management to exceed the previous year's earnings present more complex annual reports.

Ajina et al. (2016) found evidence that companies that manage their earnings tend to make annual reports less readable. The above study's sample consisted of 163 companies listed on the French stock exchange between 2010 and 2013, with the readability of yearly reports measured by the FOG index and earnings management measured through discretionary accruals, according to the models by Dechow et al. (1995) and Raman and Shahrur (2008). A correlation was also found between the FOG index (readability) and some financial indicators used as control variables: ownership dispersion, profitability, leverage, and company size.

Managers can manage results through accruals and real activities, in addition to the balance sheet or cash flow management. However, the above study focuses on the first two, as they are directly related to the interests of managers (Lo et al., 2017). Companies can also manipulate the content and presentation of narrative information through impression management (Ajina et al., 2016).

Studies present some explanations relating the readability level to the companies' financial performance and divide them into obfuscation and ontology. In the first group, managers try to hide poor performance using more complex sentences, while ontology claims that poor performance is naturally more difficult to communicate (Li, 2008; Bloomfield, 2008; Lo et al., 2017). In this study, we used the aspect concerning the obfuscation hypothesis, which is based on the intervention of managers to influence the statements, making them more complex.

Thus, based on the opportunistic perspective, we assume that managers practicing earnings management in a quest to maximize their utility tend to obfuscate their actions by disclosing complex narrative reports (Ajina et al., 2016; Lo et al., 2017). Hence, the following hypothesis is presented:

H1: Companies with a higher earnings management index in a given year present annual reports with low readability.

In summary, a negative association between earnings management and readability levels may occur for two complementary reasons: both derived from the opportunistic perspective. The first relates to the notion that readability level potentially represents a mechanism by which managers can influence users' impressions regarding their performance. Therefore, low readability would be associated with the same incentives that explain earnings management: utility maximization. Another explanation from the opportunistic perspective for this association would be that earnings management involves using accounting practices that the users can identify. Hence, reducing the level of readability would be a way of obfuscating the methods by which earnings management was practiced.

Note that studies conducted in Brazil to address readability can be subdivided into four groups: i) those examining only the annual reports' readability level (Zobaran, 2019; Miranda et al., 2018); ii) those seeking to highlight a relationship between readability and other variables – determinants (Borges & Rech, 2018; Peleias, 2017; Borges, 2020; Holtz & Santos, 2020); iii) those seeking to verify changes in the readability level after the OCPC 07 was implemented (Silva, 2017; Gomes et al., 2018; Cruz Junior, 2018); and finally, iv) those comparing and treating readability and understandability as distinct concepts (Telles, 2018). This study falls into the second group, as it observes the relationship between readability and earnings management. Although Rocha and Mont-Mor (2022) present a similar proposition, the report object of analysis used in the previously mentioned study was a press release, the characteristic of which is a less standardized structure than that of explanatory notes.

3. Method

3.1 Study design

This is a descriptive study based on a documental analysis with a quantitative approach, using panel data regression analysis to test the hypotheses regarding the relationship between earnings management and financial statements' readability.

Exploratory studies were performed on bibliographic sources to identify the current state of the art and provide an overview of the subject addressed here. Therefore, Ajina et al. (2016) and Lo et al. (2017) ground this study's development with the econometric model adapted according to the Brazilian literature and data availability in Brazil. Additionally, based on several studies addressing readability, this study adopts control variables presented as characteristics that may influence the readability of financial statements, as discussed in the following subsections.

3.2 Population and sample

This study's population comprises open companies listed on [B]³. This market was chosen due to the absence of empirical evidence regarding the research problem proposed here in the emerging market scenario (Hassan et al., 2019). Initially, 310 companies headquartered in Brazil with an active registration at [B]³ and CVM were identified.

The timeframe chosen comprises 2010 to 2018. The initial period is characterized by different disclosure requirements, with the mandatory adoption of IFRS and the review of accounting pronouncements by the CPC (Borges & Rech, 2018). The initial sample had 400 companies listed on [B]³ in 2018; those that did not present all the necessary data to be included in this study were removed from the sample. A total of 232 companies were identified with missing data in at least one variable in the company-year observations and were excluded from the sample. Additionally, the software used to convert the original files of the explanatory notes from PDF to DOCX could not convert some of the files. For this reason, the explanatory notes of 47 companies failed to be converted, and these companies were also removed from the sample. Thus, 121 companies with 1,089 observations remained in the sample.

3.3 Data collection

The quantitative information required to compose the econometric model is provided in the companies' financial statements and was collected using the Economática software. In addition, narrative information was collected on the website of Professor Tatiana Albanez (https://www.tatianaalbanez.com), which provides various data on Brazilian companies, among which all the explanatory notes were obtained directly from the website of the Brazilian Securities and Exchange Commission (CVM) in PDF format. Elements that cannot be measured for readability were removed, such as headers, footnotes, single-line paragraphs, titles, tables, charts, and graphics (Li, 2008).

This study used the Pylinguistics program (Castilhos, 2016), free, open-source software for natural language analysis in English and Portuguese, to determine readability indices. This software features an accuracy of 97.33% in the processing and syntactic analysis of texts in Portuguese by using Natural Language Processing based on specific neural networks to analyze texts in Portuguese.

Based on an extensive literature review, the characteristics of companies that can influence the statements' readability level were identified and were used as control variables. For example, companies showing results below the expected (profitability), growth (market-to-book), or larger-scale operations (size) tend to present more complex reports, therefore, are more challenging to read (Li, 2008; Rutherford, 2003). Meanwhile, companies that need to meet greater transparency requirements (listed on the new market), or audited by companies that require high-quality levels (big four), or with less information asymmetry because they have been listed on the stock market for longer (publicly traded), are expected to present easier to read annual reports (Li, 2008; Silva, 2017; Borges and Rech, 2018).

Table 2 briefly presents the variables adopted here, their calculation method, and the previous studies supporting their use.

Table 2
Study variables

Variable	Acronym	Calculation method	Previous Studies
Readability	Leg	Adapted Flesch index (Martins et al., 1996)	Telles (2018)
Accrual-based earnings management	GRA	Modified Jones (Dechow et al., 1995)	Lo et al. (2017), Hasan (2018) and Gabriel (2018)
Real Earnings Management	GRR	Expense management (Roychowdhury, 2006)	Lo et al. (2017)
Profitability	ROA	Ratio of net income to total assets	Li (2008); Ajina et al. (2016) and Hesarzadeh, Bazrafshan and Rajabalizadeh (2019).
Corporate Governance	GC	Dummy, assumes 1 for companies in the new market and 0 otherwise.	Silva (2017) e Borges and Rech (2018).
Audit	BigFour	Dummy, assumes 1 for companies audited by a Big Four and 0 otherwise.	Silva (2017); Borges and Rech (2018) and Hesarzadeh et al. (2019).
Time since the company went public	TCA	Difference between the year of observation and the year the company was registered on the Brazilian Stock Exchange.	Li (2008); Silva (2017); Lo et al. (2017); Hasan (2018); Borges and Rech (2018) and Hesarzadeh et al. (2019).
Market-to-Book	MtB	Ratio between market value plus total liabilities and total assets.	Li (2008), Lo et al. (2017), Hasan (2018)
OCPC 07	OCPC	Dummy, assumes 1 for observation after OCPC 07 (2014) and 0 otherwise.	Silva (2017) e Gomes, Ferreira and Martins (2018).
Company's size	Tam	Natural logarithm of total assets.	Li (2008); Lo et al. (2017); Hasan (2018); Borges and Rech (2018); Hasan (2018) and Hesarzadeh et al. (2019).

Source: developed by the authors (2022).

3.4 Data analysis

As previously mentioned, the dependent variable, Readability, was measured using the adapted Flesch index (Martins et al., 1996). The Flesch index, adapted to Portuguese by Martins et al. (1996), considers that the Portuguese language has, on average, larger words with more syllables than English. Thus, the original index would not reveal a parameter adequate to the context of the language assessed here, requiring the addition of 42 points in the final score for texts in Portuguese (Castilhos, 2016; Telles, 2018).

Note that in this study, readability is understood as the quality that determines the ease of reading a text, not to be confused with the concepts of complexity and understandability, which also depend on readers' intrinsic characteristics and the way one decodes a given text (Borges, 2020). According to Martins et al. (1996), texts with indices between 0 and 25 are considered very difficult to read; between 25 and 50, reasonably difficult; 50 and 75, easy; and between 75 to 100 are considered very easy to read.

The independent variable Earnings Management was measured using two different methods: 1) the Modified Jones model (Dechow et al., 1995) for accruals management, with total accruals measured by the Cash Flow approach, and; 2) the discretionary expenditure method (Roychowdhury, 2006) for real management.

The relationship between Earnings Management and Readability is expected to be negative, as managers who most frequently manipulate via accounting or operational decisions are expected to increase the level of readability difficulty, obfuscating their actions in narrative reports and decreasing readability levels (Ajina et al., 2016; Lo et al., 2017). To test the study hypotheses, the multiple linear regression model grounded the ordinary least squares method, as indicated by Lo et al. (2017) and also adopted by Ajina et al. (2016). Equations (1) and (2) demonstrate the model adopted.

$$Leg_{it} = \beta_0 + \beta_1 GRA_{it} + \beta_2 ROA_{it} + \beta_3 GC_{it} + \beta_4 BigFour_{it} + \beta_5 TCA_{it} + \beta_6 MtB_{it} + \beta_7 OCPC_{it} + \beta_8 Tam_{it} + \varepsilon_{it} \quad (1)$$

$$Leg_{it} = \beta_0 + \beta_1 GRR_{it} + \beta_2 ROA_{it} + \beta_3 GC_{it} + \beta_4 BigFour_{it} + \beta_5 TCA_{it} + \beta_6 MtB_{it} + \beta_7 OCPC_{it} + \beta_8 Tam_{it} + \varepsilon_{it} \quad (2)$$

Where each variable corresponds to company *i* in period *t*, where Leg refers to the Readability level; GRA refers to the Accrual-based Earnings Management level; GRR, Real Results-based Management level; ROA, is the Profitability Index; GC is a dummy for the Corporate Governance level; BigFour is a dummy for the accounting firms; TCA, Time since the company went public; MtB, the market-to-book ratio; OCPC, dummy for observations pre- or post-OCPC 07; Tam, Company Size; and ε is the regression residual.

Similar to previous studies (Li, 2008; Lo et al., 2017), we adopted the estimation of coefficients through panel data regression by fixed effects controlled by sector and year. Cupertino (2013) notes that after the IFRS was implemented in Brazil, the level of accruals manipulation decreased, while management by operational decisions increased, though both may co-occur. Since companies can concomitantly or complementarily use accruals management and management by operational activities, an econometric model similar to the one tested in the study above is proposed below, though it incorporates both types of manipulations; after all, the omission of one of the variables may impact the results:

$$Leg_{it} = \beta_0 + \beta_1 GRA_{it} + \beta_2 GRR_{it} + \beta_3 ROA_{it} + \beta_4 GC_{it} + \beta_5 BigFour_{it} + \beta_6 TCA_{it} + \beta_7 MtB_{it} + \beta_8 OCPC_{it} + \beta_9 Tam_{it} + \varepsilon_{it} \quad (3)$$

Additionally, a dummy variable (GR+) was included in models 1 and 2 to verify whether the companies that most frequently use earnings management behave differently regarding readability compared to the other companies. The value 1 was assigned to companies with earnings management in the upper quartile relative to the median (percentile above 75%).

$$Leg_{it} = \beta_0 + \beta_1 GR_{it} + \beta_2 GR + {}_{it} + \beta_3 GR_{it} * GR + {}_{it} + \beta_4 ROA_{it} + \beta_5 GC_{it} + \beta_6 BigFour_{it} + \beta_7 TCA_{it} + \beta_8 MtB_{it} + \beta_9 OCPC_{it} + \beta_{10} Tam_{it} + \varepsilon_{it} \quad (4)$$

4. resentation of Results

4.1 Descriptive statistics

Table 3 presents information regarding this study's variables to facilitate an understanding of their behavior. Measures of central tendency (mean), dispersion (standard deviation), and range (minimum and maximum values) are presented:

Table 3
Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Leg	16.6534	4.5816	0.8774	39.4554
GRA	0.0599	0.0671	0.0009	0.3620
GRR	0.0210	0.0295	0.0002	0.1926
ROA	0.1263	0.1298	-1.6019	0.4661
TCA	16.4628	8.7420	1	32
MtB	1.3834	0.9466	0.3501	12.2986
Tam	21.9951	1.7508	16.5465	27.5258

Note: Binary variables were omitted.
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on assets; TCA = Time since the company went public; MtB = Market-to-Book; Tam = Company size.

Source: developed by the authors (2022).

The dependent variable "Leg" presented a mean of 16.65 points on the Flesch scale adapted to Portuguese (Martins et al., 1996), revealing that the explanatory notes of the companies listed in [B][3] have, on average, texts considered "very difficult" to read. The lowest score for this variable was 0.88, and the highest was 39.46, reinforcing that texts are classified as "difficult" or "very difficult" to read. These results are similar to those found in Brazilian studies, such as Silva (2017), Borges and Rech (2018) and Borges (2020), and also studies addressing samples from abroad, such as Li (2008), Ajina et al. (2016) and Lo et al. (2017).

As for the primary dependent variables measuring the level of earnings management (GRA and GRR), evidence of outliers was identified, and, therefore, the winsorization procedure was adopted for these variables. The standard deviation presents values close to the mean, which indicates that there may be dispersion in the observations, reflected in the distance between the minimum and maximum values.

The binary variables, not reported in the table, presented the following information: 44% of the company-year observations are listed on the New Market; Big Four companies audited 77% of the explanatory notes; and 56% of explanatory notes were issued after OCPC 07 (2014).

In addition to the descriptive statistics, a correlation matrix was performed to measure the relationship between the variables, as shown in Table 4. This test seeks to identify the degree of association between the studied variables through Pearson's correlation.

Table 4
Correlation Matrix

Variable	Leg	GRA	GRR	ROA	GC	Big Four	TCA	MtB	OCPC	Tam
Leg	1.000									
GRA	-0.063*	1.000								
GRR	0.002	0.152*	1.000							
ROA	0.063*	-0.377*	-0.071*	1.000						
GC	0.119*	-0.040	-0.006	0.068*	1.000					
BigFour	0.214*	-0.184*	-0.032	0.251*	0.249*	1.000				
TCA	-0.074*	0.007	-0.023	-0.116*	-0.618*	-0.226*	1.000			
MtB	0.092*	0.084*	0.056	-0.108*	0.091*	0.034	-0.061*	1.000		
OCPC	0.004	0.015	-0.011	-0.179*	0.025	-0.082*	0.256*	-0.062*	1.000	
Tam	0.215*	-0.228*	-0.146*	0.177*	0.043	0.420*	0.089*	-0.113*	0.042	1.000

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firm; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

A low correlation is found between the accrual and real earnings management levels and the readability index. the latter being a non-significant relationship. This result suggests that changes in the earnings management level due to operational decisions would not significantly change the readability of the explanatory notes of the same observation in the sample. Nonetheless, an increase in the earnings management level due to accounting choices could be related to decreased readability.

All the variables representing characteristics of the company-year observations (profitability, corporate governance, auditing firm, time since went public, market-to-book, and size) showed a low significant correlation with the readability index, indicating that these factors are associated with the ease of reading the explanatory notes; however, they do not present a linear relationship.

4.2 Multivariate statistics

Initially, tests for violation of statistical assumptions were performed, as shown in Table 5, assuming that the residuals have a normal distribution based on the Central Limit Theorem.

Table 5
Violation test of statistical assumptions

Assumptions (Null hypothesis)	Test Performed	Model 1	Model 2	Model 3
Incorrect specification	F	0.000	0.000	0.000
Homoscedasticity	Wald	0.000	0.000	0.000
No serial autocorrelation	Wooldridge	0.000	0.000	0.000
Cross-sectional independence	Pesaran	0.517	0.608	0.511

Source: developed by authors (2022).

The Wald test was used to verify the assumption of homoscedasticity, and the Wooldridge test for serial non-autocorrelation. The null hypothesis was rejected in both tests so that the presence of heteroscedasticity and serial autocorrelation was identified for all models proposed relative to the sample assessed. Therefore, robust statistical tests were required for these characteristics, and the "Sandwich" estimator proposed by Huber-White (Huber, 1967; White, 1980) was chosen for this study. None of the variables presented a multicollinearity relationship (factor greater than 10) in the three models tested in this study through the VIF test.

Table 6
Earnings management and readability

Variables	Predicted sign	Coefficient (Standard-Error)				
		Model 1		Model 2		Model 3
Constant		3,1308 (2,219)	3,730 (2,222)	2,6083 (2,241)	2,4694 (2,275)	2,5680 (2,251)
GRA	–	0,5567 (2,102)	-3,213 (7,459)	–	–	0,2344 (2,132)
GRR		–	–	7,2405 (4,086)	-10,952 (23,979)	7,1914 (4,130)
GR+		–	-1,1818 (0,617)	–	0,5175 (0,528)	–
GR * GR+		–	9,0219 (8,203)	–	12,3789 (24,620)	–
ROA	+	0,7748 (1,057)	0,9060 (1,053)	0,8241 (1,024)	0,9526 (1,026)	0,8598 (1,066)
GC	+	0,4764 (0,372)	0,4701 (0,371)	0,5003 (0,373)	0,5164 (0,371)	0,5016 (0,374)
BigFour	+	1,0512 (0,372)*	1,0939 (0,372)*	1,003 (0,373)*	0,9555 (0,366)*	1,0052 (0,373)*
TCA	+	-0,0484 (0,023)*	-0,0501 (0,023)*	-0,0488 (0,023)*	-0,502 (0,023)*	-0,0488 (0,023)*
MtB	–	0,5878 (0,130)*	0,5562 (0,129)*	0,5944 (0,130)*	0,5954 (0,130)*	0,5935 (0,131)*
OCPC	+	0,8718 (0,601)	0,9181 (0,603)	0,8920 (0,601)	0,9051 (0,598)	0,8942 (0,600)
Tam	–	0,4717 (0,099)*	0,4534 (0,100)*	0,4883 (0,101)*	0,4980 (0,101)*	0,4893 (0,100)*
Adjusted R^2:		0,1209	0,1236	0,1228	0,1250	0,1228
Fixed effects according to		Sector and Year		Sector and Year		Sector and Year

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; GR+ = Earnings management above the upper quantile of the median; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firm; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

The p-significance test found in the analysis of models 1 and 2, which individually test each type of earnings management, indicates that we cannot reject the null hypothesis that the estimated coefficient is equal to zero. That is, the evidence found is not sufficiently strong to indicate a relationship between the earnings management level and the ease of reading the explanatory notes.

Including the dummy variable (GR+) in models 1 and 2 to verify the behavior of the companies that most frequently manage earnings showed no statistical significance for the GR+ variable nor the interaction of this variable with the Earning Management variable (GRA or GRR). Therefore, no evidence was found that companies that most frequently adopt earnings management behave differently from other companies.

The third test proposed in this study sought to verify the relationship between the two types of earnings management and the readability of explanatory notes, considering that managers may concomitantly (complementarily) adopt accounting choices and operational decisions to manage earnings. Similar to the results presented in the previous models, model 3 reports equal relationships, both for the main independent variables and control variables, with no change in sign or statistical significance.

The relationships between the control variables and readability evidenced by this model's coefficients are consistent with Pearson's correlations in the correlation matrix. Regarding the companies' characteristics, statistical significance (5%) was found for the variables representing the auditing company group, time since the company went public, market-to-book, and company size. Concerning the Profitability and Corporate Governance variables, we cannot state that these influence the level of readability.

Regarding the sector, we used the financial sector as a comparison parameter (not including its dummy variable to avoid perfect multicollinearity). The coefficients of all the remaining sectors were positive, indicating that companies in the financial sector tend to present explanatory notes that are more difficult to read. This result may be due to specific regulatory agency requirements for this sector or vocabulary, expressions, or information needs inherent to the financial activity. On the other hand, the basic materials sector presents the highest coefficient, resulting in a greater easiness of reading. Nonetheless, the difference per sector would correspond to approximately 1 point in the Flesch index, on average, meaning that the classification of reading difficulty would not change.

Different tests were performed as a robustness analysis with the following characteristics: 1) box cox transformation in the dependent variable (Leg) to reach the normal distribution of the residuals; 2) using earnings management variables without winsorization; and 3) using the dependent variable according to the Flesch index measured by Microsoft Word. The results of all the tests revealed that the sign and significance of the coefficients of each significant variable in Table 6 had the same direction as previously reported, confirming the robustness of this study's findings.

5. Discussion of Results

This study proposed the hypothesis "Companies with a higher earnings management index in a given year present annual reports with lower readability." Three different econometric models were used to analyze this relationship, involving both earnings management through accounting choices (accrual) and operational choices (real). However, no statistically significant association was found between this study's main variables, i.e., Readability and Earnings Management, when analyzing data from the companies listed in [B][3]. Therefore, no evidence was found to support the research hypothesis proposed here.

Such a fact gives rise to the need to broaden horizons on topics involving the readability of accounting narratives. More specifically, regarding the relationship between earnings management and readability, current literature presents arguments based on the opportunistic perspective (Ajina et al., 2016; Lo et al., 2017) under the premise that individuals act opportunistically for their benefit, depending on the conditions in which they are inserted. Therefore, those elaborating financial statements are seen as individuals with interests that diverge from those of other users, and their actions would seek personal benefits, increasing agency costs (Jensen and Meckling, 1976).

However, not confirming the hypothesis tested in this study raises questions about the motivations of those preparing financial statements and the possibility of discussing it from different perspectives. For example, when it comes to earnings management from the perspective of efficiency, Jiraporn, Miller, Yoon, & Kim (2008) note that managers may use accounting method choices to mitigate distorted information due to the application of "accounting principles" (Generally Accepted Accounting Principals) that do not reflect the economic context of a given company's business. Still, from the efficiency perspective, Scott (2003) explains that the opportunistic actions of managers can be limited through remuneration and internal control contracts, motivating them to select accounting procedures that reduce capital and contractual costs, to minimize the firms' risk.

As this study was based on Ajina et al. (2016) and Lo et al. (2017), it did not analyze earnings management from the efficiency perspective. Therefore, there is an opportunity to discuss and analyze the management of good and bad earnings management and its relationship with the readability of explanatory notes.

Still, on the possibility of choices during the accounting information disclosure process, Hesarzadeh et al. (2019) argue that readability measured by indices (e.g., Flesch or Gunning) can be composed of companies' intrinsic factors and part of the managers' choices. That said, and based on studies addressing readability and accounting information quality, the authors above divide readability into two parts: innate readability and discretionary readability. Discretionary readability can be measured using readability regression residuals that include intrinsic factors as explanatory variables, similar to earning quality and earnings management models.

Following the measurement of readability according to Brazilian studies and Ajina et al. (2016) and Lo et al. (2017), this study did not distinguish between innate and discretionary readability. Therefore, studying the relationship between earnings management and discretionary readability may present different results from those found here and possibly help explain the potential reasons for refuting the research hypothesis.

Note that the behavior of those preparing statements can be influenced by what users expect from such information, as the institutional theory advocates. The institutional approach enables understanding the organizations' motivations to adopt policies and choices that traditional models cannot always explain. The factors determining the adoption of these policies may be related to external factors (Dias Filho & Machado, 2004). Thus, organizations may assume one or another stance due to what is considered to be better or more appropriate, following the efficiency and legitimacy perspectives.

In the same sense, we assume that managers are aware that the level of readability may influence users' decisions. According to the efficient market hypothesis (Fama, 1970), the market impartially reflects the information available to economic agents. More recently and within the context of readability, Asay et al. (2017) found that an increased difficulty in reading statements leads to the search for information from external sources, increasing transaction costs. Therefore, those elaborating explanatory notes would be less motivated to increase the difficulty of reading statements since market agents have other sources of information available.

This subsection presented some possible approaches that give rise to discussions regarding the relationship between earnings management and the readability of the explanatory notes based on the refutation of the hypothesis proposed in this study and the current literature on the subject. However, note that these points currently require further research on the Brazilian context to test what was discussed here; hence, more studies are needed.

In this sense, Rocha and Monte-Mor (2022) recently presented a paper at a conference highlighting the relationship between readability and the readability of Brazilian companies' press releases. Their results indicate a negative and significant relationship; that is, greater earnings management practice is related to reports' low readability. The divergence between the study previously mentioned and what was reported here in the previous section may be explained by the use of different reports. A press release provides managers with greater freedom compared to explanatory notes. Hence, perhaps financial statement developers face greater difficulty implementing textual manipulations in explanatory notes.

6. Final Considerations

This study aimed to verify the relationship between the level of readability of explanatory notes and earnings management practices under the hypothesis that "companies with a higher earnings management index in a given year present annual reports with low readability." Hence, companies listed in [B][3] between 2010 and 2018 were included in the sample, excluding those without all the necessary data in the period under analysis.

An econometric model of multiple linear regression based on the studies by Ajina et al. (2016) and Lo et al. (2017) was used to perform this analysis. It was adapted for the Brazilian context, given its particularities and the specific objectives proposed. Similar to the previous studies, the coefficients were estimated using panel data regression by fixed effects controlled by sector and year.

The results indicate no evidence supporting the research hypothesis, as it was impossible to identify a statistically significant relationship between readability and earnings management in the three econometric models tested to analyze this relationship. Note that publicly traded companies have large organizational structures so that different people or groups of people may perform the processes involving operational and accounting decisions and the preparation of statements. Therefore, from an opportunistic perspective, these processes may lead to results aligned with the interests of each group.

By not finding a result favorable to the research hypothesis in the light of the opportunistic perspective (Ajina et al., 2016; Lo et al., 2017), the motivations of those preparing financial statements are questioned from different perspectives. As an alternative, based on the efficiency perspective, managers can use discretion to make accounting choices intended to mitigate distortions caused by applying standards that do not reflect the economic context of a given company's business (Jiraporn et al., 2008). Additionally, the discussion proposed in this study raises the possibility of finding different results if discretionary readability were considered (Hesarzadeh et al., 2019). Discretionary readability was not analyzed here, nor did the studies grounding the adopted econometric model (Ajina et al., 2016; Lo et al., 2017).

As for the companies' characteristics, the variables that represent the group of auditing firms, time since the company went public, market-to-book and company size are statistically significant (5%). Thus, among the analyzed variables, only these influenced the easiness of reading the explanatory notes in the sample analyzed here.

As a limitation, we emphasize that this study comprises the study of publicly traded companies listed in [B][3]. Therefore, the results cannot be extrapolated to other scenarios like privately held companies, different timeframes, or different economic environments. Furthermore, the readability factors analyzed here are not based on ontological or semantic aspects; therefore, one cannot make inferences about the texts' understandability.

This study's results are expected to support the accounting regulation process by providing information about readability and the behavior of those preparing financial statements. It presents evidence that the managers' potential opportunistic behavior may not lead to a variation in the degree of readability of explanatory notes, making them less prone to textual manipulations and, consequently, less information bias. As for external users who rely on annual reports to assess the companies' current performance and prospects, these results may influence the perception of investors, financial analysts, and creditors and expand the elements of analysis in decision-making by suggesting greater reliability of the informational content of explanatory notes and making them a source of information with greater reliability potential regarding the events it intends to communicate and provide further clarification.

Additionally, this study is expected to contribute to improving the knowledge about readability in the Brazilian accounting context. However, this study does not exhaust the discussion on this topic. Hence, based on the results, research limitations, and gaps in the Brazilian context, future studies are suggested, applying methodologies to explore the characteristics discussed in section 5, such as analysis of good and bad earnings management and its association with the readability of explanatory notes; and the relationship between earnings management and discretionary readability.

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Appendix A

Table 7

How readability progressed over time

Year	Mean Readability	Standard deviation
2010	16.1424	5.1279
2011	16.7616	4.7446
2012	16.8752	4.4765
2013	16.7635	4.4652
2014	16.7833	4.5451
2015	16.6566	4.4033
2016	16.4375	4.3247
2017	16.9075	4.8382
2018	16.5532	4.3478
Total	16.6534	4.5816

Source: developed by the authors (2022).

Appendix B

Table 8

Robustness Tests box cox on the dependent variable (Leg)

Variables	Predicted sign	Coefficient (Standard Error)	
		Model 1	Model 2
Constant		-2,6696 (0,441)*	-2,7734 (0,446)*
GRA	–	0,1279 (0,460)	–
GRR		–	1,5868 (0,890)
ROA	+	0,1742 (0,231)	0,1842 (0,224)
GC	+	0,1044 (0,0810)	0,1096 (0,081)
BigFour	+	0,2306 (0,081)*	0,2201 (0,081)*
TCA	+	-0,0106 (0,005)*	-0,0108 (0,005)*
MtB	–	0,1287 (0,129)*	0,1301 (0,028)*
OCPC	+	0,1936 (0,132)	0,1980 (0,131)
Tam	–	0,1027 (0,022)*	0,1063 (0,022)*
Adjusted R^2		0,1216	0,1236
Fixed effects according to		Sector and Year	Sector and Year

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firms; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

Appendix C

Table 9

Robustness tests without winsorization

Variables	Predicated sign	Coefficient (Standard Error)	
		Model 1	Model 2
Constant		4,6150 (2,036)*	4,5269 (2,018)*
GRA	–	0,0000 (0,000)	–
GRR		–	0,0000 (0,000)
ROA	+	0,8653 (1,129)	0,6827 (1,014)
GC	+	0,4735 (0,371)	0,4703 (0,372)
BigFour	+	1,0502 (0,372)*	1,0600 (0,372)*
TCA	+	-0,0486 (0,024)*	-0,048 (0,024)*
MtB	–	0,5688 (0,140)*	0,5920 (0,130)*
OCPC	+	0,8791 (0,602)	0,8430 (0,604)
Tam	–	0,4655 (0,100)*	0,4681 (0,100)*
Adjusted R^2		0,1210	0,1215
Fixed effects according to		Sector and Year	Sector and Year

Note: *Significant correlation at 5%

Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firms; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

Appendix D

Table 10

Robustness tests with Flesch index measured in Microsoft Word

Variables	Predicated sign	Coefficient (Standard Error)	
		Model 1	Model 2
Constant		26,7942 (1,462)*	26,8870 (1,449)*
GRA	–	-0,0000 (0,000)	–
GRR		–	0,0000 (0,000)
ROA	+	-1,6134 (0,780)*	-1,4482 (0,713)*
GC	+	0,0614 (0,2450)	0,060 (0,245)
BigFour	+	0,7330 (0,273)*	0,7420 (0,274)*
TCA	+	-0,0357 (0,0157)*	-0,0356 (0,016)*
MtB	–	0,3902 (0,101)*	0,3718 (0,096)*
OCPC	+	0,6706 (0,441)	0,6689 (0,441)
Tam	–	0,3633 (0,0719)*	0,3592 (0,072)*
Adjusted R^2		0,1312	0,1315
Fixed effects according to		Sector and Year	Sector and Year

Note: *Significant correlation at 5%
Legend: Leg = Readability; GRA = Accrual-based earnings management; GRR = Real-based earnings management; ROA = Return on Assets; GC = Corporate Governance; BigFour = Auditing firms; TCA = Time since the company went public; MtB = Market-to-Book; OCPC = OCPC 07 (2014); Tam = Company size.

Source: developed by the authors (2022).

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Objective: this study was aimed at investigating the relevance of accounting education and research for the growth of the Brazilian economy during the first decade of the 21st century.

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

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

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

Key words: Education: Research; Accounting.

- The article itself, written in Portuguese or English, with at least 5,000 and at most 9,000 words, including tables, figures, notes and references.
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The table should usually show numeric or textual information organized in an orderly exposition of columns and rows. Any other statement should be characterized as textual figure.

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Font	Times New Roman, size 10
Line spacing	Simple
Spacing before and after paragraphs	3 pt
Table colors	Use only black and white (grayscale)
Title	The table title must be brief, clear and explanatory. It should be placed above the table, in the top left corner, and on the next line, just below the word Table (with a capital initial), followed by the number that designates it. The tables are presented with Arabic numerals in sequence and within the text as a whole. Eg: Table 1, Table 2, Table 3, and so on
Citation of tables	When citing tables in the text, type only the number referring to the table, for example Table 1, Table 2, Table 3 and so on. (the word 'Table' should be presented with the first letter capitalized). Never write 'table below', 'table above' or 'table on page XX' because the page numbers of the article may change while formatting
Table notes	The font used in the notes of the table should be Times New Roman, size 10, single spaced. The notes should be described in the footnote of the table, and they serve to indicate the Source of the information of the table, and other information important to understanding the table

3.2 Figures

The figure should show a flow chart, a chart, a photograph, a drawing or any other illustration or textual representation.

The figure should be displayed with its information visible and adequate for its understanding, and should be formatted as follows:

Font	Times New Roman, size 10
Figure colors	Use only black and white (grayscale)
Format	Figures should be submitted in an editable format
Title	It explains the figure concisely, but discursively. The title should be placed under the figure and numbered with Arabic numerals in sequence, preceded by the word Figure (with initial capital). Eg: Figure 1, Figure 2, Figure 3, etc. After the title, any other information necessary for clarification of the figure or source must be added as a note
Captions	The caption is the explanation of the symbols used in the figure and must be placed within the limits of the figure
Size and proportion	Figures must fit the dimensions of the journal. Therefore, a figure should be drawn or inserted into the article so that it can be reproduced in the width of a column or page of the journal to which it will be submitted
Citations in the main text	When citing a figure in the text type only the number referring to the figure, e.g. Figure 1, Figure 2, Figure 3 and so on. (the word 'Figure' should be presented with the first letter capitalized). Never write 'figure below' figure above ', or even 'figure on page XX' because the page numbers of the article can be changed during formatting

4. Citations and References

For the full version of the standards of citations and references according to APA (American Psychological Association), access http://www.repec.org.br/index.php/repec/article/view/1607/1237.