



Review

Hedge accounting: results and opportunities for future studies

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Abstract: This study identifies the main results and research opportunities based on 52 hedge accounting-related studies, published in Scopus indexing journals from 2007–2019. The study was classified in five investigation groups based on their main topic, with Risk Management and Hedge Accounting being the topic most studied (18) and Regulatory Environment the least studied (six). The results show that during the period analysed, the journal with the largest number of publications on hedge accounting is in the United States of American and the most common origin of the journals is the United Kingdom (21). We have identified different research opportunities for each of the five groups and some general opportunities. The main opportunities relate to comparative researches, considering samples from different countries, the development of methodologies for teaching hedge accounting and models for effectiveness measurement, the study of enterprise risk and disclosure analysis, and research on the impact of Covid-19 on hedge accounting through risk management. The study differs by identifying five classification groups for papers on hedge accounting, since prior studies didn't carry out such classification. The groups are: i) Regulatory Environment, ii) Academic Research, iii) Evolution of Hedge Accounting and Disclosure, iv) Hedge Effectiveness and v) Risk Management and Hedge Accounting. Furthermore, this study is, to our knowledge, the first bibliometric review done about hedge accounting. The paper is relevant to researchers because it points out opportunities for future studies, enabling the production of new research for a topic considered to be complex.

Keywords: disclosures; risk management; financial derivatives instruments

JEL Codes: M4, N2

Abbreviations: Financial Accounting Standard Board (FASB); Higher Education Institution (HEI); International Accounting Standard Board (IASB); International Accounting Standards (IAS); International Accounting Standard Committee (IASC); International Financial Reporting Standards (IFRS); Journal of Accounting, Auditing and Finance (JAAF); Statements of Financial Accounting Standards (SFAS); United Kingdom (UK); United States of America (USA).

1. Introduction

Faced with constant fluctuations in market indicators and a globalized economy, companies face constant challenges related to the reduction of risks inherent to companies (Sticca & Nakao, 2019). Under this scenario, financial instruments play an important role in managing business risks, acting against variations such as commodity prices, foreign exchange, earnings volatility or others, whose impact directly influences income, cash flows and inventory valuations, depending on the industry (Aabo et al., 2015; Abdel-khalik & Chen, 2015; Campbell et al., 2019; Duangploy & Helmi, 2000; Guay, 1999; Hassan et al., 2006; Malaquias & Zambra, 2019; Melumad et al., 1999; Santos et al., 2017). Thus, accounting standards evolve with respect to different measurement and disclosure requirements, the effect of which is reflected in various stakeholder parameters (Richie et al., 2006; Sticca & Nakao, 2019).

Derivative financial instruments such as forward contracts, futures, swaps, and options are highly used by corporate managers in their financial risk strategies (Hughen, 2010; Kharbanda & Singh, 2018; Middelberg et al., 2012; Naylor & Greenwood, 2008; Santos et al., 2017). However, there are also other options such as the use of foreign currency denominated debt (“foreign debt”) to decrease foreign exchange risk (Aabo et al., 2015; Dybvig & Marshall, 2013). The improper use of these instruments exposes the company to a complex scenario of possible financial losses and may have an effect on the assessments carried out by stakeholders (Aabo et al., 2015; Duangploy & Helmi, 2000; Glaum & Klcker, 2011; Malaquias & Zambra, 2019; Zorzi & Friedl, 2014) or in managerial behavior (Gumb et al., 2018).

Hedge accounting is an accounting policy directly related to the use of derivative financial instruments (Santos et al., 2017), included in both the accounting standards issued by the IASB and FASB. In this sense, accounting standards have evolved over the years with significant changes in measurement and presentation requirements. The perceptions of the complexities associated are a highly used concept in the aforementioned, even and have been subject to study or motivations (Abdullah & Ismail, 2016; Frestad & Beisland, 2015; Malaquias & Zambra, 2019; Zambra et al., 2019).

Several authors agree on the definition of hedge accounting, understood as an exception to normal accounting, as it is designed to synchronize the recognition of profits and losses of a covered item and the derivative of coverage in the company’s statement of results in order to avoid an unjustified appearance of earnings volatility over the periods (Glaum & Klcker, 2011; Oktavia et al., 2019; Sticca & Nakao, 2019).

The presence of hedge accounting in companies increases their market value (Allayannis & Weston, 2001). This view is supported by Galdi and Guerra (2009), who mention that the use of derivatives associated with currencies and interest rates is related to the high value of companies in several countries. In addition, the use of hedge accounting allows companies to manage risks and uncertainties, contributing to the reduction of economic and financial risks, of volatility in results. The company can also defer gains or losses on assets sold as a hedging instrument, whose price change is evidenced in other comprehensive income. The profit is also able to more transparently represent the economic performance of the organization (Rocha et al., 2019).

The study problem is: what are the results and opportunities for future studies on hedge accounting? To answer this question, the objective is to analyze the literature after the 2007 financial crisis on hedge accounting to identify key findings and research opportunities based on 52 studies published in Scopus indexing journals. We did not identify any bibliometric studies on hedge accounting, as well as research on the subject that classifies articles into groups with similar themes. Thus, this research aims to fill this gap. This paper is relevant for researchers because it provides evidence of study possibilities for them to contribute to the literature on hedge accounting. Therefore, we will contribute to (i) enhancing future research related to the area, (ii) detecting existing opportunities in related research areas, (iii) contributing to the reduction of perceived complexity in this concept through the collection of published information, (iv) encouraging specific hedge accounting training allowing access to a direct compilation, (v) providing guidance to researchers on the probability of acceptance of their work by providing a view of the journal with the largest number of publications related to the area, (vi) classifying articles by research groups, (vii) identifying the participation of researchers by gender, to provide a vision of these differences in relation to the concept.

The research also helps researchers by classifying the studies into five topics. This will provide them information about previous articles focused on the specific topic they have chosen for analysis. The first is the Regulatory Environment, which deals with research into the factors that affect changes in accounting standards and the effects caused by their implementation. The second is Academic Research, whose research has used hedge accounting teaching tools or investigated the theoretical effect of use hedge accounting. The third is the Evolution of Hedge Accounting and Disclosure, in which the authors address how the evolution and disclosures of hedge accounting have effects on different concepts and/or markets. Comparisons between current and previous accounting methodologies are also included as well as the effects of voluntary and mandatory disclosures on different markets and/or stakeholders. The fourth is Hedge Effectiveness and consists of the verification of and model proposals for measuring hedge accounting effectiveness. Finally, the fifth topic is Risk Management and Hedge Accounting, which investigates how risks are managed around the use of hedge accounting.

We have performed a bibliometric analysis of 52 articles. The period analyzed is driven by the different discussions that have emerged after the subprime crisis, that is, since 2007. After that crisis, financial instruments and related accounting standards have been incorporated in different discussions such as: (i) the role of credit risk transfer granted by banking institutions, through derivatives, and their role in the financial crisis (Minton et al., 2009); (ii) discussions about credit risk, which prompted joint work between IASB and FASB, in developing a new model for determining depreciation of financial assets (Camfferman, 2015; Novotny-Farkas, 2016); (iii) involvement of derivatives in financial scandals, which have led the boards of accounting standards to issue rules aimed at promoting greater transparency and reducing information asymmetries (Strouhal et al., 2010; Titova et al., 2020).

2. Theoretical reference

When looking at the 52 previous studies on hedge accounting, it can be noted that only 4 have focused on the analysis of other studies. Campbell et al. (2019) proposed a literature review on hedge accounting. Strnad (2009) reviewed the fair value and interest rate risk of sight deposits. Shin (2007) and Vasvari (2012) held a discussion of articles. The first author discussed two studies, one written for Bleck and Liu (2007) and other for Gigler, et al., (2007), while the second discussed the research of Beatty et al. (2012).

In this scenario, no study has analyzed hedge accounting in a bibliometric way, offering possibilities for future analyses. There is also a gap in the grouping of studies into related themes. Accordingly, as we read the articles, we proposed grouping them into five groups: regulatory environment; academic research, evolution and disclosure of hedge accounting, hedge effectiveness, and risk management and hedge accounting. This grouping is important for researchers, as it clearly presents which previous studies have researched each of the topics on hedge accounting.

2.1. Regulatory environment

It is of vital importance for our research to establish the normative environment in which studies regulating hedge accounting are developed. On the one hand, research is being carried out on the impacts of the standards issued by IASB and on the other hand FASB. Although there are changes in the issuing body, both regulate the same accounting policy.

By deepening the standards issued by the IASB (formerly IASC), we can group studies related to the standards that regulate the measurement of financial derivative instruments and hedge accounting, regulated in evolution from IAS 39 to IFRS 9. Under this context, some studies are grouped: (i) research on factors driven by changes in standards (Abdel-khalik & Chen, 2015) and (ii) measurement of different effects caused by the implementation (Cameran & Perotti, 2014; Chang et al., 2018; Duh et al., 2012; Glaum & Klcker, 2011; Hope et al., 2008).

With the IASB regulatory environment, there have been discussions around derivative and hedge accounting disclosures involving IAS 32 and IFRS 7. Within this context, the studies are diverse and consider the construction of a disclosure index based on the current regulations and their implications in different fields, such as: Stock markets (Strouhal et al., 2010); specific industries (Malaquias & Zambra, 2018), among others, highlighting the need for improvements in application requirements (Strouhal et al., 2010). However, the increase in mandatory disclosure requirements for derivatives and hedge accounting, improves the management of corporate risk as well as the quality and homogeneity of information on their use (Panaretou et al., 2013).

In the same context above, the standards issued by FASB have evolved into standards that regulate aspects of recognition, measurement and disclosures. The difference is in the number of changes observed and the number of higher regulations. Some studies have been oriented in the application of SFAS 52 and SFAS 80, where mentioned, a limited scope in the regulation of derivatives. SFAS 105, 107 and 119, on the other hand, regulated the disclosures on the foot of the page, highlighting constant improvement in requirements (Campbell et al., 2019). The above standards, issued by FASB, were replaced by SFAS 133 and 161, with critical improvements made to the decline in disclosed information (Abdel-khalik & Chen, 2015; Campbell et al., 2019; Hope et al., 2008) and improvements in financial ratios in banking institutions by adoption anticipated (Wang, 2018).

However, even though there are differences between the regulatory bodies, studies document the similarities between the two standards IAS 39 and SFAS 133) (Frestad, 2018; Frestad & Beisland, 2015; Glaum & Klcker, 2011). The joint effort of the regulatory bodies to issue a standard worked together, materialized in IFRS 9, is also highlighted (Deloitte, 2018; Huguen, 2010).

2.2. Academic research

The research classified in this group is oriented towards accounting education, use of methodologies for the teaching of hedge accounting, bibliographic reviews of other studies or bibliometrics, proposals for theoretical models and analysis of the characteristics of financial professionals is incorporated.

Examples of studies are those that propose methodologies for classrooms, such as serious games or self-learning tutorials directly related to hedge accounting (Hwang, 2002; Malaquias & Zambra, 2018; Schöndube-Pirchegger, 2006). Publications with theoretical review methodology and discussions that focused on presenting a critical review of previous research on financial derivative instruments or hedge accounting (Campbell et al., 2019; Shin, 2007; Strnad, 2009; Vasvari, 2012). Studies analyse characteristics of financial professionals about the perception of complexity or financial knowledge in concepts related to the rules that regulate hedge accounting (Dionne et al., 2019; Gumb et al., 2018; Malaquias & Zambra, 2019). And perception of higher remuneration to auditors, due to the increased effort in the implementation of the rule regulating financial instruments (Cameran & Perotti, 2014).

2.3. Evolution of hedge accounting and disclosure

The evolution in accounting standards contains discussions that address different effects caused by changes in accounting standards that regulate hedge accounting and that reinforce this grouping. These include: Studies of the effect of advanced applications (Wang, 2018) for subsequent effects measurements (Hughen, 2010), comparisons between the repealed standard and the new standard (Choi et al., 2015), effects caused at disclosure levels (Kim et al., 2018; Potin et al., 2016), and direct effects on different financial reporting components (Beneda, 2013; Campbell, 2015).

Different studies are based on the disclosures of financial derivative instruments and hedge accounting, some of which document the different factors that may explain the degree of compliance with the standards that regulate these instruments (Strouhal & Ištvánfyová, 2010). There are also analyses of the impacts on policy changes that regulate disclosures, highlighting discussions about the low level of disclosure of some financial derivative instruments and discussions of improvements in risk management requirements (Makar & Huffman, 2008; Strouhal & Ištvánfyová, 2010) or value of the shares that reflect the price of the company in capital markets (Kanodia, 2010).

The relevance of the studies analyzing the degree of compliance and effects of the disclosures are diverse, however, the different studies provide the following arguments: i) lack of experience in reports (Strouhal & Ištvánfyová, 2010); ii) reduction of the asymmetry of information framed in the Agency's Theory through the detail of disclosures (Kim et al., 2018; Potin et al., 2016).

2.4. Hedge effectiveness

The effectiveness of hedges is an integral part and necessary requirement for the qualification and application of hedge accounting. In this sense, risk managers focus on estimating optimal coverage rates and measuring early effectiveness, demonstrating that they are “highly” effective in compensating the risk being covered (Juhl et al., 2012).

As mentioned, we have grouped research that has focused on developing different aspects related to coverage effectiveness. We can identify studies that: (i) have been oriented on the tools used to measure the effectiveness of coverage (Di Clemente, 2015; Juhl et al., 2012; Kawaller & Koch, 2013; Kharbanda & Singh, 2018; 2020); (ii) focused on identifying different alternatives in the compensation reason mediation of the items covered for the development of the effectiveness evaluation (Kawaller & Koch, 2013) and (iii) external factors such as earnings volatility and their influence on effectiveness and coverage requirements (Tessema & Deumes, 2018).

Researchers contribute to dialog on the appropriate methodology for the size of the coverage positions and the validation of the expectations that a derivative will provide coverage of the risks (Juhl et al., 2012). Under this statement, some authors, on the one hand, promote a greater alignment of best practices used in risk management, that is, statistical models that consider different financial factors in their calculations or exposing variations to the models heavily used (Di Clemente, 2015; Kawaller & Koch, 2013; Kharbanda & Singh, 2018), how the multivariate GARCH model, that is, the dynamic model (Kharbanda & Singh, 2020). While other authors conclude that the analysis of effects does not necessarily require additional statistical analysis, if the documentation of a co-integrated coverage relationship is significant and applied to the analysis of sufficiently long coverage horizons (Juhl et al., 2012).

2.5. Risk management and hedge accounting

Financial instruments play an important role in business risk management. Consequently, hedge accounting policy is used to synchronize the acknowledgments between the covered element and the effects of derivatives, avoiding an unjustified appearance of earnings volatility throughout the periods (Glaum & Klecker, 2011). According to the foregoing, various studies focus on studying different risk management strategies, either by basing their research on the item covered (Goodman, et al., 2018; Sticca & Nakao, 2019; Zorzi & Friedl, 2014) or financial derivative instruments used for coverage (Minton et al., 2009; Santos et al., 2017).

Some studies are based on comparing the coverage style used in different countries, depending on the size of their financial markets (Naylor & Greenwood, 2008). Evidence from studies from emerging markets (Santos et al., 2017; Sticca & Nakao, 2019). The effects of hedge accounting disclosures on investor confidence about the effectiveness of risk coverage (Wang & Makar, 2019). Other studies have been oriented towards coverage instruments other than derivatives (Aabo et al., 2015; Cheong, 2018), and analysis of the banking perspective about the use of hedge derivatives by identifying which ones are most used by banks and classifying them by sectors (Minton et al., 2009; Titova et al., 2020).

3. Methodology

The database chosen for the analysis was Scopus (Elsevier), because it is the largest database of citations and peer-reviewed abstracts. The database contains: scientific journals, books and congress yearbooks. This is important because it is updated daily, allowing for quick and effective generation of academic information at the international level (Valenzuela-Fernandez et al., 2019).

For the development of this bibliometric research, in the field of research, the keyword used was: HEDGE ACCOUNTING, considering the search in the title, summary or keywords. Data collection

was carried out in August and September 2020. The initial sample was 325 articles of which 26 investigations were subsequently withdrawn because it was not possible to obtain the papers in a comprehensive manner. Subsequently, the articles were downloaded and read, with 225 investigations being withdrawn that did not specifically address the subject, and 22 investigations that were prior to 2007 were finally withdrawn because the period established was after the 2007 crisis (increase in the use of derivatives and consequently hedge accounting), thus resulting in a final sample of 52 papers.

After the reading of the studies, the data was compiled into an electronic spreadsheet, with the purpose of identifying, recording, and transforming the articles into visual information, thus facilitating the compression of the analysis carried out. With this information, we built five research groups according to the similarities with the articles' main objectives. In the case of studies that had more than one topic, the one with greater relevance in its results was chosen.

With regards to the collection of data for bibliometric analysis, the following information was tabulated: Authors, journals, universities and more prolific countries, authors' gender, publication periods, journal countries, H-index and citations by articles.

4. Characteristics of publications

The Table 1 shows the number of papers per journal, H-index, country of the journal and year of publication.

Table 1. Number of papers per journal.

Journals	Qty	H-index	Country	Year
Review of Accounting Studies	5	67	USA	2012, 2013, 2013, 2015 and 2016
Journal of Accounting, Auditing and Finance	4	47	USA	2015, 2016, 2017 and 2018
Journal of Accounting Research	3	132	UK	2007, 2007 and 2018
Contemporary Accounting Research	2	90	USA	2013 and 2015
Journal of Business Finance and Accounting	2	72	UK	2007 and 2010
Journal of Accounting and Public Policy	2	70	USA	2009 and 2015
Accounting and Business Research	2	52	UK	2011 and 2019
Review of Pacific Basin Financial Markets and Policies	2	15	Singapore	2014 and 2018
Accounting Research Journal	1	13	UK	2017
Accounting, Auditing & Accountability Journal	1	92	UK	2017
Agrekon	1	23	UK	2012
Applied Economics	1	78	UK	2017
Applied Financial Economics	1	52	UK	2013
Economic Notes	1	19	UK	2015
Ekonomický časopis	1	16	Slovakia	2009
Emerging Markets Review	1	45	Netherlands	2019

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Journals	Qty	H-index	Country	Year
Empirical Economics	1	53	Germany	2020
European Financial Management	1	60	UK	2015
Gadjah Mada International Journal of Business	1	7	Indonesian	2019
Information: An international Interdisciplinary Journal	1	20	Japan	2016
International Journal of Accounting & Information Management	1	19	UK	2017
International Journal of Auditing	1	16	UK	2014
International Journal of emerging Markets	1	26	UK	2017
Journal of Accounting Literature	1	12	UK	2019
Journal of Asia Business Studies	1	13	UK	2020
Journal of Asia-Pacific Business	1	15	UK	2008
Journal of Contemporary Accounting & Economics	1	18	UK	2012
Journal of Derivatives	1	41	USA	2013
Journal of Financial Services Research	1	50	Netherlands	2009
Journal of Futures Markets	1	50	USA	2012
Journal of International Financial Management and Accounting	1	35	UK	2018
Business Finance	1	35	UK	2017
North American actuarial Journal	1	41	UK	2010
Review of quantitative Finance and Accounting	1	39	USA	2018
Journal of Accounting & Finance	1	4	Brazil	2016
Risk Management and Insurance Review	1	15	UK	2018
The Accounting Review	1	156	USA	2015
WSAS Transactions on Business and Economics	1	15	Greece	2010

Note: Qty—number of publications per journal; USA—United States of America, UK—United Kingdom.

Source: Prepared by the authors.

The first journal with the largest number of publications was the USA-based Review of Accounting Studies, whose publications are quarterly. In it, theoretical, empirical and experimental studies are accepted, which contribute to progress in the accounting areas (see, <https://bit.ly/3K1EaGw>). The H-index of this journal, 67, ranks eighth in relation to the sample journal, and its hedge accounting publications ranged from 2012 to 2016.

The second journal was the Journal of Accounting, Auditing and Finance, which was published in the USA, also with quarterly publications. The journal publishes high-quality studies in accounting and related areas, as well as accepting studies that address different accounting topics, related to the development of other areas (see, <https://bit.ly/38aN8nj>), with H-index of 47. In addition, their hedge accounting publications are recent (last five years), giving researchers the possibility of creating a journal to disseminate their studies on this subject.

The journal with the highest H-index (156) was The Accounting Review. It is originally from the USA, and its publications cover the areas of accounting. Their publications cover any methodology in the field of accounting (see, <https://bit.ly/37p7o0R>). The journal with the second highest H-index (132)

was the *Journal of Accounting Research*. It is originally from the UK, and its publications cover the areas of accounting and related fields. Their publications typically use analytical, empirical, experimental, and case studies for economic approaches in accounting and related areas (see, <https://bit.ly/3L3KbUv>).

It is perceived based on the Table 1, that the amount of research per year presented variations; between 2015 and 2017 there were a total of seven studies each year caused by the subprime crisis, because researchers needed data from longer periods to compare the impact of the crisis and in order to see if it impacted the choice of hedge accounting. Another possible factor was the inclusion of the hedge accounting chapter in 2013 in IFRS 9. The years 2008 and 2011 were the periods with lower publications, with only two each year.

The most common origin of journals is the UK (21), followed by the USA (six). It is noted that 49 researchers are linked to HEI in the USA, evidencing, that it is the country with the greatest contribution in this topic, understanding that the biggest stock exchanges are those that use derivatives most. Finally, it should be stressed that, the results show that eight journals were responsible for 42.3% of publications, that is, few journals publish high volumes of articles on hedge accounting, as stated in Bradford's law.

In relation to the number of citations per article, it is perceived that the study entitled "How much do Banks use Credit derivatives to Hedge Loans?" was the most cited (129 times). The publication occurred in 2009 by Minton, Stulz and Williamson in the *Journal of Financial Services Research*. The second investigation in the number of citations (72) was "Usefulness of comprehensive income reporting in Canada". This was published in 2009 by Kanagaretnam, Mathieu and Shehata in the *Journal of Accounting and Public Policy*. The third most cited study was, "Do financial market developments influence accounting practices? Credit default swaps and borrowers' reporting conservatism" with 46 citations, was written by Martin and Roychowdhury and published by *Journal of Accounting and Economics* in 2015.

Regarding the most prolific authors and HEI, the Figure 1–2 present a summary of those with more publications.

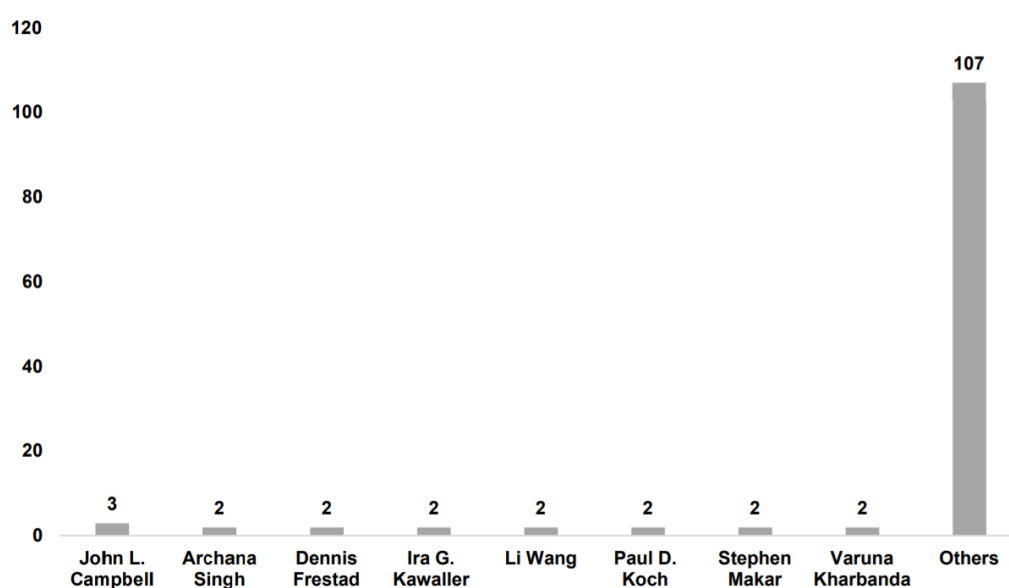


Figure 1. More prolific authors. Legend: FEA-RP—Faculty of Economics, Administration and Accounting of Ribeirão Preto. Source: Prepared by the authors.

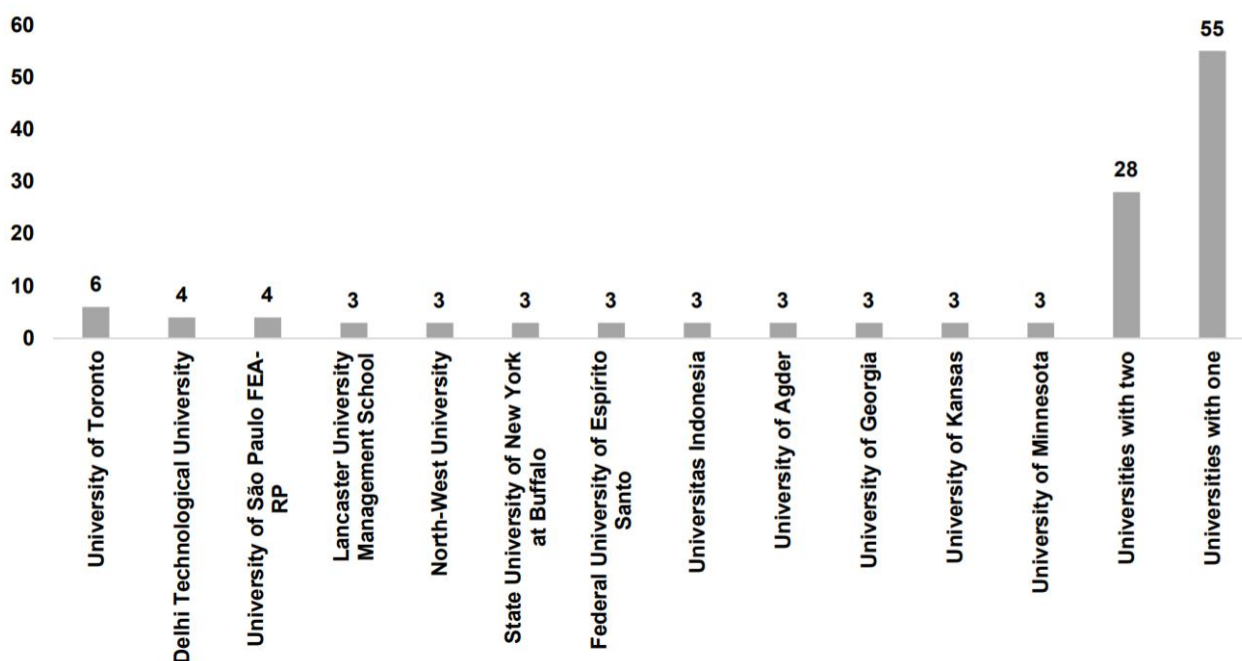


Figure 2. More educational institutions. Legend: FEA-RP—Faculty of Economics, Administration and Accounting of Ribeirão Preto. Source: Prepared by the authors.

According to the 124 authors (Figure 1) who in their publications address the topic of hedge accounting, John L. Campbell is the most prolific author (3 publications), followed by seven scholars with two published articles. It is therefore perceived that this area still has space for research, as the number of studies per authors is considered low. Several authors considered “less prestigious”, were responsible for various publications. In addition, few authors with many publications were highlighted, because those with two to three studies produced only 13.71% of the total publications on the subject.

With regard to the HEI (Figure 2) with more publications, the most outstanding was the University of Toronto, located in Canada, which has six studies, followed by Delhi Technological University in India and the Universidade de São Paulo of Ribeirão Preto in Brazil, with four publications each, respectively.

Considering the research of Malaquias and Zambra (2019), a study included in the Academic Research group, in which it emphasizes the inclusion of gender analysis, which is based on improving the understanding of accounting practices, besides being a sociocultural contribution, we have applied this observation to gender differences in the authors. A greater participation of male authors is perceived (85), representing 68.5%, compared with female authors (39), representing 31.5%. Consequently, the results can be extrapolated to a greater perception of complexity perceived by the female gender due to mathematical anxiety related to derivatives (Malaquias & Zambra, 2019).

5. Results

The five categories for classification of presentation and disclosure research are: Regulatory Environment, Academic Research, Evolution of Hedge Accounting and Disclosure, Hedge Effectiveness, and Risk Management and Hedge Accounting. In verifying the most researched topics, the sequence is perceived to be: Risk Management and Hedge Accounting, Academic Research,

Evolution of Hedge Accounting and Disclosure, Hedge Effectiveness and Regulatory Environment, with 18, 12, nine, seven and six studies, respectively. In sequence the results and suggestions of future research, separated by topic, are presented, being the Regulatory Environment, the first to be analyzed.

5.1. Regulatory environment

In Table 2 (Appendix 1), the authors, objectives and results of the research on Regulatory Environment are presented.

We note that three articles are based on SFAS standards (Abdel-khalik & Chen, 2015; Chang et al., 2018; Hope et al., 2008), the study of Abdel-khalik and Chen (2015) it also compares two American laws and three studies based on IAS/IFRS (Cameran & Perotti, 2014; Duh et al., 2012; Glaum & Klcker, 2011). An investigation of factors has been observed that have led to changes in standards (Abdel-khalik & Chen, 2015) and the remaining in the measurement of different effects caused by implementation (Cameran & Perotti, 2014; Chang et al., 2018; Duh et al., 2012; Glaum & Klcker, 2011; Hope et al., 2008).

We observed trends in analyzing theoretical referential comparisons between the two standards (SFAS and IAS/IFRS) (Glaum & Klcker, 2011) or SFAS with North American laws (Abdel-khalik & Chen, 2015) however, the investigations grouped in Table 2 are not intended for this application. Pointing out the above, we can mention as an opportunity for research, the comparison between factors that have driven both regulators to the measurement and/or issuance of hedge accounting standards, or different subjects affected by emphasizing comparing standards. Studies can analyze how IFRS 9 will affect the quality of accounting information, mainly in terms of effectiveness through qualitative use.

5.2. Academic research

According to Table 3 (Appendix 2), the results show that the studies use various approaches, such as: interviews/questionnaires with professionals (Gumb et al., 2018; Malaquias & Zambra, 2019; Naylor & Greenwood, 2008), theoretical research discussions (Shin, 2007; Vasvari, 2012), review of studies (Campbell et al., 2019; Strnad, 2009) and proposals for new models (Gigler et al., 2007; Lombardi, 2010; Zorzi & Friedl, 2014).

Given most of the research found on hedge accounting involved empirical data analysis, limitations related to the adoption of theoretical and/or critical studies can be perceived. Theoretical and critical discussion is important in order to identify new propositions that can be tested and perfected in practice in order to contribute to legislators, investors and managers. Within theoretical studies the focus was on reviewing studies and discussions of previous research. Therefore, it is perceived that theoretical discussions will analyze studies from 2006 and 2012, demonstrating the possibility of more recent revisions. In relation to the review of studies, there was an analysis of the subject of the Demand deposits (Strnad, 2009) and a review of 15 journals (Campbell et al., 2019).

Future studies may also perform a systemic review or meta-analysis on hedge accounting. The purpose of using the first technique is “to identify, select, evaluate and synthesize available relevant evidence” (Galvão & Pereira, 2014). For its part, meta-analysis allows synthesis in “a certain number of conclusions in a specific field of research. One of its advantages is to increase the objectivity of literature reviews, minimizing possible biases and increasing the number of studies analyzed” (Figueiredo et al., 2014). The application of these two techniques shows researchers in the accounting area the evidence and common factors found in previous investigations.

Other research may be conducted with students in grades and/or postgraduate degrees to verify their perception of the complexity of accounting, measurement and disclosure of derivative instruments, because, Malaquias and Zambra (2019) analyzed only the perception of accountants in two markets: Brazil and Chile, and Gumb et al. (2018) inquire only about the perception of corporate treasurers in France, and also found that there is complexity. In line with the previous study, complexity is evident in a period prior to IFRS 9, so it is important to conduct an analysis of the complexity following the adoption of that standard, because it mentions the obligation to consider qualitative aspects for the determination of effectiveness in hedge accounting (IASB, 2018). Analysis performed with more recent data allow the identification of the presence of a learning curve related to the understanding of the standard. Future studies may review literature on issues such as complexity, recognition, measurement and disclosure of financial instruments and the use of hedge accounting, as well as those undertaken by Campbell et al. (2019).

With the participation of regulators, investors, financiers and auditors, surveys can be carried out to identify the perception of public sector auditors over the impact and choice of the company for fiscal audits, in case of greater or lesser value of hedge accounting, because, Sticca and Nakao (2019) point out that this methodology suggests that managers adopt it as a form of fiscal aggressiveness. In the case of investors and financiers, they can contribute to their perception of the gains and losses caused by the application of hedge accounting in their investment decisions and capital loans, and also how this affects the expected return. Finally, in the vision of the external auditors, as they consider the use of hedge accounting for the determination of audit fees, because conformed Cameran and Perotti (2014) there is a positive association between or use of derivatives and audit fees.

Other possible research is related to the use of derivatives by commodity producers, with their risk behavior, showing that derivatives can minimize price risk (Morais et al., 2011). Studies with derivative market participants, such as: Hedgers, speculators, arbiters, brokers, clearing house and clients, can be carried out to raise awareness of how the use of financial instruments can generate useful information for users.

With the participation of undergraduate and graduate students, studies could be conducted to identify the skills developed by them after the application of case studies and/or serious games (SG) on hedge accounting. In this sense, it is possible to identify how active methodologies contribute to the development of student skills. Moreover, teachers can apply case studies to identify students' abilities in relation to the Regulatory Environment, hedge accounting and disclosure evolution, hedge accounting effectiveness, and risk management, through hedge accounting. The use of teaching cases can contribute to the development of skills and reduction in the complexity of this topic (Malaquias & Zambra, 2019).

Another research opportunity could be to consider a representative sample of companies applied to emerging countries. This observation is extracted, after analyzing the study Middelberg et al. (2012) which focused only on South Africa, however, contemplates a sample of seven companies. New models for measuring the risk and quality of accounting information, such as those made by Gigler et al. (2007), Lombardi (2010) and Zorzi and Friedl (2014), considering mainly that accounting standards are updated over time, and current models may not clearly measure risk.

5.3. Evolution of hedge accounting and disclosure

In Table 4 (Appendix 3), a greater tendency can be observed to evaluate the evolution in the rules regulating hedge accounting in FASB environment. From a general perspective, authors have oriented

their studies on the assessment of anticipated effects (Wang, 2018) and others, in the post-implementation effects of the standards (Hughen, 2010).

With the evolution of the standards (current IFRS 9), the possibility of entering into hedges is broader, consequently, the financial instrument which may not necessarily a derivative, could follow the structure of what was exposed by Kim et al. (2018), because IAS 1 has been modified in parallel: presentation of financial statements and IFRS 7: Financial instruments, relating to the inclusion of certain new presentation requirements and new and extensive breakdowns, especially with regard to hedge accounting and depreciation (Deloitte, 2018).

By analyzing Hughen (2010) and Wang (2018) studies, the recent implementation of IFRS 9 in the IASB environment can be integrated and reviewed. Although in this research group, we find research focused in Latin America (Potin et al., 2016), it does not consider countries with emerging economies, thus, our observation reinforces and emphasizes the possibility of carrying out studies in these countries.

Finally, we identify as an opportunity for research the evaluation of reclassifications between methods or types of hedge accounting, as well as new requirements concerning the evolution of this in the IFRS environment, and as has affected the quality of the information, through the disclosures.

5.4. Hedge effectiveness

According Table 5 (Appendix 4) seven investigations are grouped in Hedge Effectiveness, in which there is a greater tendency to research the model of effectiveness measurement allowed by different regulators (Di Clemente, 2015; Frestad & Beisland, 2015; Juhl et al., 2012; Kawaller & Koch, 2013; Kharbanda & Singh, 2018; 2020) other research is also directed at the risk-covered party (Kharbanda & Singh, 2020; Tessema & Deumes, 2018).

By deepening the different research, we can identify that the application and variations of effectiveness models are based on quantitative measurement models. However, in analyzing the implementation of IFRS 9, we note that the effectiveness evaluation includes an analysis of qualitative characteristics based on the economic relationship, which is aligned with risk management. Consequently, a wide possibility of evaluation is opened concerning the models applied in different sectors.

Continuing the IFRS 9 analysis, inefficiencies detected by qualitative models will continue their retrospective records. However, they will not contain the obligation to evaluate the same characteristics, this being a challenge to be applied in the determination of flows of the statistical models analyzed to date.

Under the IASB Regulatory Environment, companies can continue to apply the hedge accounting regulated in the previous regulation, until macro hedge regulation is issued, thereby opening up an opportunity for research by deepening the decision to apply new regulations or not and deepening factors that may have influenced these decisions. Other studies may also propose models that work together, qualitative and quantitative characteristics, generating information to subsidize regulators' decisions, by proposing accounting standards, according to Lima et al. (2011), that method is not explicitly detailed in accounting standards.

5.5. Risk management and hedge accounting

According Table 6 (Appendix 5) eighteen investigations are grouped in Risk Management and Hedge Accounting.

Studies that analyze irrigation management and hedge accounting have approaches that involve: i) different types of market risks (Aabo et al., 2015; Beatty et al., 2012; Cheong, 2018; Huan & Parbonetti, 2019; Panaretou et al., 2013; Sticca & Nakao, 2019; Wang & Makar, 2019); ii) characteristics of managers (Dionne et al., 2019; Manchiraju et al., 2016); iii) volatility (Goodman et al., 2018; Titova et al., 2020); iv) risk management committees (Abdullah & Ismail, 2016); v) valuation of the undertakings (Minton et al., 2009; Santos et al., 2017; Titova et al., 2020); vi) results management (Oktavia et al., 2019), vii) constant fair value in other comprehensive results (Bratten et al., 2016; Campbell, 2015) and viii) taxation (Sticca & Nakao, 2019).

Future studies could analyze how other currencies cause effects on market volatility, because of the studies presented in Table 6 only one investigated the Islamic dinar (Cheong, 2018). Other analysis could also be carried out with commodities, since none of the studies investigated the use of hedge accounting for the marketing of these assets, which are basic sources used in various sectors, even in food consumption.

Research that identifies how information on volatility is valued in the options market, also contributes to the users of the accounting information, accordingly, Goodman et al. (2018), the information is not sufficient for recovery where there is a high transaction cost causing the reduction of profits. In addition, research involving conventional and non-conventional derivatives, used in risk coverage, may also be conducted as no research with that perspective was found. Other analysis could be carried out to identify how a risk management team, composed of professionals specialized in the area influencing the use of hedge accounting, and how this would be reflected in the organization's operational outcome. How the social, economic and cultural characteristics of managers and/or companies, affect the use of hedge accounting, to address in the analysis, the effects on results, value aggregation and volatility could also be investigated.

Another aspect that lacks studies is the tax aspect, because Sticca and Nakao (2019) focused their study only on Brazil, which adopted the IFRS standards in 2010. An analysis with more experienced adopters of IFRS could verify how this influences the tax results of companies. Sticca and Nakao (2019) considered only the effect of deferred taxes, but other proxies in tax aggressiveness, such as book-tax differences (BTD) and effective tax rate (ETR) could also be analyzed.

Another suggestion for future research is to address how indicators used to measure the quality of accounting information, such as conservatism, persistence, value relevance and earnings management, are affected by hedge accounting policy. As per the results presented in Table 6, only result management was investigated, showing that the use of hedge accounting reduces the level of discretionary practices (Oktavia et al., 2019).

Based on the exposure of Panaretou et al. (2013), who point out that future studies may focus on assessing the long-term effect of hedge accounting, according to IFRS. Based on the above, we can complement the proposed, pointing to a comparison with the new IASB standard on accounting and measurement of financial instruments (IFRS 9). It can be further deepened into specific factors of companies and how they can influence the magnitude of the effect, as well as the hedge accounting effects according to IFRS, may note that they have not been considered.

5.6. General opportunities

In addition to the opportunities particularly present in each of the topics, there are also those that can be applied to all the topics. In this way, the adoption of country-specific characteristics such as

legal origin, religion, corruption index and sustainability can be considered, as well as macroeconomic indicators. This analysis becomes even more prominent when conducted in a comparative way among different nations, contributing to verify as country-specific characteristics affect the use of hedge accounting, with emphasis on emerging countries, whose subject has not been highly deepened in the studies analyzed.

Considering the changing environment with high uncertainties surrounding us today, different research opportunities could arise when conducting cross-country research looking for business, social and/or economic variables, as explanatory variables associated with each country. The investigation of Malaquias and Zambra (2019), for example, sought an explanation of the perception of complexity about different parameters related to financial instruments, analyzing characteristics such as the gender or the level of education of respondents. Variables such as employability, unemployment, gender of business directors and even state management with respect to Covid -19 can still be considered, which could be used in the search for explanations in the implementation of hedge accounting, risk management and/or derivative use policies.

Considering the health contingency of Covid-19 at present, some analysis can be performed to verify how the use of hedge accounting affects the results of companies that apply it and/or make comparisons with companies that do not adopt this policy. These results can contribute to managers in future periods, even as an incentive or alert signal in the use of accounting policy against different contingencies.

It could also be investigated, how lobbying affects the approval of the rules on hedge accounting, and how this impacts the approval of the rules on hedge accounting and influences the accounting practice. The studies carried out previously can be reapplied with the use of new statistical modelling to see if the results will be the same as they found earlier. When considering more recent data, and with more distant periods, since the year of adoption of hedge accounting regulatory standards there is a period of growth in the learning curve over standards, due to considerations such as complexity.

Finally, from a general perspective, we can mention that there are some issues in which neither concepts nor application have been deepened, such as macro hedge, net investment type hedges in a foreign business, or as in the concepts of new IFRS 9 applications, generating with this, a space for new research, by applying different tools considered in this article.

6. Conclusions

This research analyzed 52 hedge accounting studies, with the aim of identifying the main results and opportunities for future research. The presence of five research areas on this subject was found: Regulatory Environment, Academic Research, Evolution of Hedge Accounting and Disclosure, Hedge Effectiveness and Risk Management and Hedge Accounting, the latter being the most research oriented.

Review of Accounting Studies and Journal of Accounting, Auditing and Finance, both American and with quarterly publications, were identified as the journals with the largest number of publications. However, the most common origin of journals is the United Kingdom (25), followed by the United States (17). The journal with the highest H-index (156) was the USA, The Accounting Review. The results also show that eight journals were responsible for publishing 42.3% of the articles.

The number of investigations per year presented different variations, thus, in 2015 and 2017, there were a total of seven studies in each year. The years 2008 and 2011 were the periods with the least amount of publications, with only 2. The concentration in 2015 and 2017 is exactly the same as the

period in which the IFRS 9 standard came into effect, working together between the two regulators. As far as researchers are concerned, the most representative proportion is in the United States, which suggests that country's greater contribution to the subject. This can be attributed to the fact that derivatives are most widely used in this country.

Finally, with regards to the gender analysis presented in the research results, a lower female participation is documented, which was 39 women in the analysis period and represents 31.5% of the total number of researchers. These results are aligned to related research, extrapolating it to a greater perception of complexity perceived by the female gender, due to mathematical anxiety related to derivatives (Malaquias & Zambra, 2019).

Based on the results, we concluded that hedge accounting as a study topic can be explored in future research. In considering that the use of derivatives has increased in recent years and that there is a forecast to continue its growth. For future research, it will be necessary to address how derivatives are used to reduce/increase the quality of accounting information as disclosed, and how they influence user decision-making, with emphasis on implementing the hedge accounting policy.

In considering changes in IFRS, mainly with regard to the criteria for assessing effectiveness, future analysis may propose models that facilitate the practice of accounting professionals in derivatives, a subject that is considered complex. Other future research might also propose better methodologies to teach hedge accounting to students, also applying concepts concerning new standards such as IFRS 9.

The investigation could be limited to the choice of the five themes because a research had a main theme however there were other themes. There were also limitations in relation to the chosen database because it was selected by the authors, however, it was selected based on its relevance to the academic area.

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Conflict of interest

All authors declare no conflicts of interest in this paper.

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