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Review

Hedge accounting: results and opportunities for future studies

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Supplementary

Appendix 1

Table 2. Summary of investigations in Regulatory Environment.

Authors (year)	Objective	Results/conclusions
Abdel-khalik and Chen (2015)	Examine the potential forces behind exponential growth in the use of derivatives in U.S. banks. Three possible influences were investigated: (i) the Gramm-Leach-Bliley Act of 1999; (ii) the Modernisation of raw materials futures Act of 2000 and (iii) FAS 133 (now ASC 815).	There was a temporary association between the approval of the two laws of Congress and abnormal growth in the negotiation/derivatives of free sale. There was a reduction in earnings volatility/equity risk through the use of cash flow hedge accounting. Finally, a reaction of high levels of profit volatility/equity risk of companies, through the increase in their use of non-negotiable derivatives.
Cameran and Perotti (2014)	Analyse how the implementation of IFRSs affects the determination of auditors' fees in the Italian banking sector.	The adoption of these rules increased the value charged in real values. The increase is positively related to the presence of financial derivatives for coverage due to increased risk.

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Authors (year)	Objective	Results/conclusions
Chang et al. (2018)	Analyse the accounting policies of American banks during the financial crisis, in order to verify whether they have motivation to manage profits or regulatory capital.	Banks are more likely to manage results using fair value. In addition, banks with securities held for sale and higher capital had greater accounting number management than non-adopters. Finally, Companies with loans for sale also have a greater trend of performance management.
Duh et al. (2012)	Examine the impact of IAS 39 adoption, Financial Instruments: Recognition and Measurement on a Sample of Non-US Commercial Banks listed in the US evaluating effects on earnings volatility and its risk relevance.	The adoption of IAS 39 increased the volatility of corporate earnings measured from 2005. Hedge accounting and the measurement of financial instruments, through fair Value Measurement under IAS 39, are designed to reduce the volatility of mixed measurements and improve the sensitivity of firm risk measurements to earnings volatility. There was a relationship between credit ratings (risk proxy) and earnings volatility after adoption.
Glaum and Klcker (2011)	Analyse the application of hedge accounting and its influence on hedge behaviour in German and Swiss non-financial companies.	Of the companies analysed, 72% use hedge accounting, the probability of usage is associated with the frequency in the use of derivatives, size, experience with IFRS, perceived importance of reducing earnings volatility and low growth opportunities. Finally, companies are more likely to be affected if using derivatives only occasionally, they are smaller, highly leveraged, have a dispersed share, have fewer opportunities for growth, and they are protected in shape.
Hope et al. (2008)	Investigate the effects of the introduction of Financial Accounting Standards Statement No. 131 (SFAS 131) in the valuation of the foreign earnings market.	There is robust evidence that the introduction of the standard is positively associated with the pricing of foreign earnings. Using both the Mishkin test (1983) and a zero-investment portfolio test, they documented that poor pricing of foreign earnings by investors decreases (and indeed disappears) after SFAS 131. Finally, the study shows that improved disclosure reduces incorrect pricing.

Source: Prepared by the authors.

Appendix 2

Table 3. Summary of research at Academic Research.

Authors (year)	Objective	Results/conclusions
Campbell et al. (2019)	Provide a review of studies on financial derivative instruments, from 1996 to 2017, analysing 15 of the major accounting journals.	The results show that there are few studies addressing the issue of derivatives, with the most studied topic referring to changes in accounting and disclosure requirements. One of the possible motivations for low research rates is the inherent complexity and limitations of data.
Frestad (2018)	Develop a model that shows the exposes of profit forecasts, and the joint optimisation of their coverage strategy and the choice between hedge accounting and fair value measurement, with emphasis on the implications of decisions for predictability of earnings according to SFAS 133 / IAS 39, aimed at non-financial companies.	There was a significant reduction in long -term earnings coverage when prices were persistent, and when they were not, there was a reduction in long-term coverage levels. The economic environment is one of the main factors responsible for accounting imbalances in the use of hedges in companies. The study also provides a prospective view of the variable properties of earnings since the end of the 1970s, contributing to the existing body of accounting studies.
Gigler et al. (2007)	Examine a simple model of speculation and coverage and analyse how different stakeholders seek the most reasonable interpretation of reported loss in derivatives, when applying market value accounting to cash flow hedges creates a mixed attribute problem.	The results, when applying informative assumptions that may seem extreme, show that due to the mixed attribute problem, the content of market-adjusted accounting information has a very specific relationship with historical costs. There is evidence that reporting an imminent loss of derivatives by a struggling company can lead stakeholders to better infer a company’s financial situation as compared to historical information alone.
Gumb et al. (2018)	Study the effects of financial accounting standards on the economic decisions of French managers, by analysing a sample of 48 interviews with corporate treasurers.	The results show that earnings influence the decision making of corporate treasurers, that earnings volatility is a major concern and that hedge accounting treatment is complex. The behaviour of the corporate treasurer appears to be the result of collective learning, in which this professional is only an actor.
Lombardi (2010)	Expand the “sources of profit analysis” proposed by Horn in 1971, with the aim of presenting the evolution in product design, accounting patterns and risk management practices.	The use of fair value for the analysis of the capital account in insurers was increased. Thus, an update of the Horn 1971 model was proposed, replacing the historical capital cost analysis with fair value. The results also provide evidence that most insurers have hedge programs for managing equity risks embedded in the types of products they make in the subscription.

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Authors (year)	Objective	Results/conclusions
Malaquias and Zambra (2019)	Investigate the explanatory variables to evaluate the perception of 60 Brazilian and 55 Chilean accountants, related to the complexity of accounting and disclosure of financial instruments in the annual reports.	The results show that, accounting for derivatives, hedge accounting, measuring the fair value of financial instruments and disclosure, are perceived as complex concepts. It is stressed that, even though there are rules that detail these characteristics, they are equally perceived as complex. The main explanatory variables are: gender difference and professional experience.
Middelberg et al. (2012)	Establish a standard methodology for the interpretation of IAS 39, which serves as a benchmark and best practices for agricultural enterprises and commodity processors in South Africa.	The investigation found that there is no consistent interpretation or application of IAS 39 by respondents. The recommended standard methodology includes that agricultural enterprises that have grain inventory for commercial purposes should value that inventory and the transactions should be classified as derivatives contracts as defined in IAS 39.
Naylor and Greenwood (2008)	Compare, through 400 questionnaires in non-financial companies, and 20 interviews with New Zealand's finance directors, treasurers, or business change brokers, exchange-rate hedge practices and business characteristics, with American, Asian, and European studies.	Companies in smaller countries tend to focus more on profit/loss rather than on reducing volatility. Some hedge-user companies do not exhibit any obvious method of hedging. Finally, companies when they disclose the use of hedging, usually do not make use of 100% coverage or gross exposure, as they focus on liquid exposure.
Shin (2007)	Conduct an analysis of the studies of Bleck and Liu (2006) and Kanodia and Venugopalan (2006)	Based on the study by Bleck and Liu (2006), a way to reduce the manipulation of results for the benefit of economic efficiency would be a combination of accounting and market value. For its part, the study by Kanodia and Venugopalan (2006) proposed a position for market to market, as a way of helping to improve an early warning signal of impending problems about the company's activities.
Strnad (2009)	Review literature on fair value and interest rate risk on Demand deposits.	Demand deposits is important to banks, because they have low interest, and as a result, they cause high volatility in the economic and accounting results. The sight deposit hedge can follow two perspectives: Profit or economic value. The economic value, with the aim of protecting the bank's economic value, the profit perspective seeks to stabilise accounting volatility. Both perspectives have the same source of uncertainty, since the mixed attribute accounting model is subject to amortised cost, not being subject to fair value.

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Authors (year)	Objective	Results/conclusions
Vasvari (2012)	Discuss the article by Beatty, Petacchi and Zhang (2012)	The author concludes that, despite the relevance of the study of the authors discussed, empirical evaluation of hedge benefits is more complex. The monitoring of conservative accounting requires more evaluations related to the alternative mechanisms available to creators. Finally, they point out that it can be analysed how accounting policies are important to the debt contracting process.
Zorzi and Friedl (2014)	Develop a deductive model of multi -period analytical decision to explain the influence of income smoothing on a company's hedge strategy.	There are two reasons that determine the ideal proportion of hedge in an organisation. The first is for reducing the volatility of the company's value, therefore, it can cause volatility in periodic earnings in case there are no accounting principles that allow for integrated hedge accounting and class of Transactions. The second factor concerns income smoothing, which opposes the risk reduction effect, in which managers are evaluated by investors, and therefore seeks to limit volatilities in periodic profits as a way to protect themselves from risk exposures. The ideal level of hedges depends on the characteristics of the commodity futures chosen and on market conditions.

Source: Prepared by the authors.

Appendix 3

Table 4. Summary of research in Evolution of Hedge Accounting and Disclosure.

Authors (year)	Objectives	Results/Conclusions
Beneda (2013)	Assess the existence of an association between earnings volatility and hedge use, through financial derivative instruments in the non-financial sector.	SFAS 133 increased volatility of reported earnings. There is a strong association between derecognition of reported earnings and coverage. Finally, in an 8-year study period, after SFAS No. 133, there may be a learning curve in companies for the use of effectiveness in earnings reported through the use of cash flow coverage and associated accounting.
Choi et al. (2015)	Investigate the effects of SFAS 133 in relation to hedge accounting in the year 2000, which influenced the relative merit of the income smoothing methods of non-financial American companies listed in S&P 500.	One of the main results found is the existence of a substitution relationship between derivative coverage and discretionary accumulation, which is significantly attenuated after the implementation of FAS 133. There was a significant increase in earnings associated with post-FAS 133 derivatives coverage. Finally, a change in an accounting rule with respect to derivatives can influence reported earnings, as well as the income smoothing method.

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Authors (year)	Objectives	Results/Conclusions
Hughen (2010)	Examine business behaviour following a change in accounting treatment of derivative hedges, due to incorrect application of hedge accounting.	The historical capabilities of companies to achieve profit targets are positively associated with the likelihood that they will focus on accounting earnings, rather than economic gains. In addition, they provide evidence of a change in management behaviour, following a change in the accounting method.
Kanagaretnam et al. (2009)	Empirically investigate the implementation of new accounting standards in Canada, investigating whether requiring Canadian companies to report comprehensive revenues and their components provides the securities market with relevant information on incremental value over the traditional historical cost-earnings approach.	There is evidence that the available components of coverage for sale and cash flow are significantly associated with market price and profitability. Aggregate integral income is more strongly associated with both stock prices and returns compared to net income. Finally, net income is a better predictor of future net income relative to integral income.
Kim et al. (2018)	Investigate how the effects of the availability of negotiated Credits default Swap (CDs) affect the voluntary disclosure options of the above companies.	The supervision of lenders leads shareholders to intensify their follow-up and require greater voluntary disclosure. The higher demand increases the likelihood and frequency of earnings forecasts of managers when negotiated CDs refer to their companies. Finally, an increase in demand for public shareholders causes a stronger impact of CDs on voluntary disclosure for companies with higher institutional ownership and stronger corporate governance.
Makar, Wang and Alam (2013)	Examine the price of cash flow coverage adjustments, reported in another integral result (OCICF), according the mixed attribute model in SFAS 133. Analysing the hedging activities and derivatives accounting in non-financial multinational companies in the United States whose foreign sales rates were at least 10% in the period from 2001 to 2006	A concern is expressed from the FASB about the information provided for the understanding of the net economic effects of the use of derivative instruments on investors when the SFAS 133 mixed attribute model is used.
Potin et al. (2016)	Investigate the effect of hedge accounting on the quality of financial information, on the asymmetry of information, and on disclosure of derivative financial instruments in the Brazilian stock market.	The evidence found about the influence of hedge accounting indicates a positive and significant relationship about the relevance of accounting information and disclosure of derivatives; a negative and significant relationship to report on book earnings.

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Authors (year)	Objectives	Results/Conclusions
Strouhal et al. (2010)	Carry out an analysis of the Czech derivatives market, using a deductive approach, based on the macroeconomic picture of emerging markets, and to compare with other markets in different sectors of Europe (Central and Eastern) and the same country under analysis.	The main results document potential sources of information asymmetry, which could put the information advantage in the hands of some parties involved in derivatives trading. In addition to interpreting that the low level of information reported on derivative transactions may be a sign of an alarming situation regarding the characteristics of accounting information.
Wang (2018)	Examine the portfolios of US banks that adopted SFAS 133 in advance, and if they experience changes in their external financing activities, relative to banks that did not adopt the standard in advance.	Early adopters' predictions have more, and they experience greater changes in their leverage compared to those that have not previously adopted it. In addition, they experience greater changes in the weight of liabilities, other than insured deposits in the combination of bank financing.

Source: Prepared by the authors.

Appendix 4

Table 5. Summary of Hedge Effectiveness research.

Authors (year)	Objective	Results/Conclusions
Di Clemente (2015)	Propose a model to evaluate the economic effectiveness of hedge accounting, using a prospective vision using different hypothetical portfolios of shares composed of Italian shares.	There is difficulty in implementing advanced models to simulate the distribution of estimated financial results, containing statistical data with real supporting information and adopting reliable and consistent risk metrics. The proposed model derives from the traditional model of measurement, in some estimates produced by the coverage strategy, in addition, questions the traditional hypotheses of an abnormal distribution of risk factors, which generate their return scenarios by means of the Monte Carlo simulation, arguing that portfolio coverage has implemented a cross-market risk hedging strategy that contains a mixed forward-looking view (forward-looking stock index (short-position) with a portfolio of shares (long-standing position).
Frestad and Beisland (2015)	Develop a model for measuring the effectiveness of cash flow hedge accounting, focusing on the "highly effective" approach of FASB and IASB for different risk exposures.	The developed model fails to effectively isolate pure hedges from derivative portfolios that are partially or fully influenced by speculation. Consequently, the mechanism in force in the study on "highly effective" selection and, its effectiveness in capturing market effects is a matter of study by regulators in search of reforms that better reflect this effect.

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Authors (year)	Objective	Results/Conclusions
Juhl et al. (2012)	Deepen hedge accounting effectiveness measurement models, applying different alternatives and regression specifications, with the aim of dimensioning coverage positions and measuring coverage effectiveness.	An optimal coverage rate is produced over a longer coverage horizon with co-integrated prices (covered line item and cover instruments). On the other hand, in horizons of short price change intervals, the estimated coverage coefficient and the R^2 regression, however, decrease as the coverage horizon lengthens, both measures will converge toward one.
Kawaller and Koch (2013)	Provide recommendations with an alternative measurement proposal to traditional dollar compensation, and in application to R^2 of a regression analysis, as a measure of the effectiveness of advance coverage for hedge accounting professionals.	The alternative measure proposed to make the division by the initial value of the item covered, rather than the division by the change in the value of the item covered, points out that, in times of derecognition, the potential for difficulty increases related to the possibility of division by zero. The second proposal documents the proportion of the total risk that is actually mitigated, given the coverage ratio chosen by the coverlet and relates it to the calculation mostly used, applying the regression slope coefficient.
Kharbanda and Singh (2018)	Assess the effectiveness of coverage of US foreign exchange futures contracts, considering the efficiency of the foreign exchange market in India.	Based on the changes implemented by the Reserve Bank of India (RBI) and the different assessments carried out, it is noted that, the quantitative models allowed in Indian markets to evaluate the effectiveness of hedges, have co-integration that checks the long-term balance of the market, confirming that the futures and spot markets are linked. In addition, the error correction model (VECM) vector is applied to study short -term error correction mechanisms to bring the market to balance. Regarding time series with price data from futures and cash markets, it is observed that the waste is self-correlated and heteroscedastic. Finally, the relative comparison of other models points to better results, with greater use of the CCC-MGARCH model.
Kharbanda and Singh (2020)	Measure the effectiveness of coverage with futures currency contracts in Indian markets under India's standards.	Based on the comparison of three models of hedge accounting effectiveness measurement, they express preference over the dynamic model (DCC-MGARCH). The authors also provide arguments about the static of models such as: The minimum ordinary squares of coverage (MCO) method and the vector error correction model (VECM).
Tessema and Deumes (2018)	Investigate effects caused by the Financial Accounting Standard 133 (SFAS 133), the level of effectiveness of coverage, and volatility with respect to the levelling of results or income smoothing of American companies, through cumulative discretionary accrual.	Following the implementation of SFAS 133, there was a significant increase in income smoothing through discretionary accruals activity, an increase in the level of ineffectiveness of hedges, and a positive relationship between increases in market volatility income softening, through discretionary accumulations.

Source: Prepared by the authors.

Appendix 5

Table 6. Summary of research in Risk Management and Hedge Accounting.

Authors (year)	Objective	Results/Conclusions
Aabo et al. (2015)	Evaluate the mechanisms used by non-financial, medium -sized Danish companies for the protection of change.	There is a positive relationship between external debt and foreign operating assets and foreign subsidiaries, as opposed to foreign operating income. Finally, most companies use external debt to protect themselves from accounting exposure, rather than operational exposure.
Abdullah and Ismail (2016)	Analyse the effectiveness of the Irrigation Management Committee (IMC) in its influence on hedge accounting practices for non-financial companies listed on the Malaysian Stock Exchange.	There is no influence on the use of hedge accounting practices and the effectiveness of CTRs, even though the size of the company and the leverage has a positive relationship with the effectiveness of CTMR.
Beatty et al. (2012)	Investigate whether loan holders reduce the agency cost of debt and, like the adoption of accounting conservatism, influence interest rate hedges by using derivatives to set loan rates rather than variable rates.	Loan holders who voluntarily use hedges have significantly lower interest rates. The adoption of conservative financial reports contributes to lower interest rates, as accounting conservatism can help borrowers resolve conflicts between shareholders and creditors. Finally, companies with higher marginal tax rates and leverage rates are more likely to use hedge accounting.
Bratten et al. (2016)	See if the fair value adjustments included in other comprehensive results help in forecasting the performance of US bank holdings.	It was found that fair value adjustments assist in the profit forecast for one to two subsequent years. The net unrealized profits and losses do not have the same potential to predict profit; those related to securities available-for sale are positively related to future profits, and on the other hand, those related to derivative contracts classified as cash flow hedge, have a negative association.
Campbell (2015)	Identify whether the presence of unrealised gains and losses due to cash flow hedges has predictive power for changes in the profitability of non-financial American companies.	There was negative association between cash-flow gains and hedge losses with changes in gross profit, after the reclassification of hedges by companies, increasing exposure to price changes. There is also a negative association between gains/losses from non-realised cash-flow hedges in companies in less competitive sectors and also with future returns on shares.
Campbell, Downes and Schwartz (2015)	Examine whether financial analysts understand the future effects of cash-flow hedges on earnings, by analysing the effects of an unrealised gain on cash-flow coverage, and the price of the underlying covered item.	The main results indicate incorrect unrealised gains and losses of cash flow hedges in the forecasts made by analysts, at two and three years. The financial behaviour of investors and analysts is different in correcting errors, who correct their erroneous prices at that time and after expiration, largely of coverages. Finally, the best information process by investors and analysts when managers provide forecasts.

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Cheong (2018)	Analyse the ability of Islamic gold dinar to protect against the changing dollar risks and exchange volatility innovations in Malaysia's non-financial firms.	The Islamic gold dinar can be a form of protection against market volatility, being that it exceeds a diversified number of currencies. When it is, even in a diversified currency portfolio, it increases the ability to protect itself from market volatility.

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Authors (year)	Objective	Results/Conclusions
Dionne et al. (2019)	Assess the influence of independence and managers' financial knowledge on risk management and the value of the company, in the gold mining industry in American and Canadian companies.	Directors' financial knowledge positively influences the value of the company, through the risk management channel. The independence of the directors in the board and audit committee increases risk management. Companies whose directors have financial training are more effective in hedging. Those companies with more edge also attract highly qualified directors on their board and audit committee.
Goodman et al. (2018)	Investigate whether volatility information is properly valued in the US options market.	The options market does not incorporate all the fundamental information on the market. The Transactions costs reduce the overall usefulness of hedge strategies, which use only the fundamental information of volatility, providing a useful complement to strategies based on historical volatility.
Huan and Parbonetti (2019)	Identify the risk ratio of shares and use of financial derivatives in banks in eighteen developed countries in the period 2006 to 2015.	There is an increase in the risk of derivatives use since banks may have used derivatives for speculative purposes, with hedging not being ideal and with the aim of obtaining hedge accounting status or, by accounting factors that cause volatility of profits. Banks "too big to fail" and those using traditional retail bank business models are subject to a lower idiosyncratic risk.
Manchiraju et al. (2016)	Examine the sensitivity of CEO remuneration and earnings/losses of fair value in derivatives for companies in the U.S. oil and gas sector.	Companies with high financial hiring costs pay greater rewards for the proceeds of derivatives to CEOs, therefore, there are payments for companies that earn using derivatives not covered hedges. Remuneration is more sensitive to proceeds with derivatives not covered by hedges, than for losses with derivatives not covered. Companies with an accounting financial specialist increase the efficiency of hiring.
Minton et al. (2009)	Investigate whether the use of credit derivatives by US bank holdings, with assets in excess of $1 trillion from 1999 to 2005, transforms the strongest banks.	Of 395 banks, only 23 use/used credit derivatives, and most of their derivative positions are held for trading activities and not for loan coverage. The low use of credit derivatives is due to adverse selection and moral hazard problems, as banks are unable to use hedge accounting when doing hedge with credit derivatives.
Oktavia et al. (2019)	Note the influence of financial derivatives on performance management and market valuation in non-financial firms in the Philippines, Indonesia, Malaysia and Singapore.	The use of hedges in financial derivative instruments reduces outcome management. The use of the financial instrument presents more persistent results of cash flow components, compared to companies that use it for speculative purposes.

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Authors (year)	Objective	Results/Conclusions
Panaretou et al. (2013)	Assess the impact of derivative accounting on corporate risk assessment, measured by the level of asymmetric information in relation to the utility of the company.	There was improvement in the level of disclosure through mandatory disclosure. The fair value measurement of derivatives improves quality and homogeneity. IFRS hedge accounting can affect earnings volatility and/or lead to an adjustment in the company's hedging behaviour in an attempt to achieve more desirable accounting results. Finally, in the periods surrounding the adoption of IFRS, gains are more predictable under the new hedge accounting regime, acting predictability in a similar manner in the year of first adoption and subsequent years.
Santos et al. (2017)	Find out how financial risk management is related to the creation of shareholder value for Brazilian non-financial companies.	Financial risk management did not add value in the period under analysis, a possible reason being the fact that Brazilian companies used derivatives for the purpose of managing cash flow, and not for or purpose of adding value.
Sticca and Nakao (2019)	Investigate whether the high financial exposure of companies to foreign exchange risk, the high depreciation of the exchange rate derived from the financial crisis verified in Brazil and deferred taxes on foreign exchange earnings affect the hedge accounting policy in Brazilian non-financial companies.	There is evidence that accounting for deferred exchange losses improves accounting results. These provide statistical evidence that the level of financial exposure to environmental risk and exchange rate depreciation contribute to the adoption of cash-flow hedges, suggesting that managers' goal is to avoid divulging losses and not reduce volatility. There is also evidence of aggressive fiscal behaviour by managers when adopting flow hedges.
Titova et al. (2020)	Examine the relationship between the characteristics of banks in nineteen European countries, the value, performance and volatility of stock returns, and their exposure to financial derivative contracts.	The use of hedge derivatives in an efficient manner presents less risk and greater value, since in post-crisis periods, that relationship becomes less pronounced or is invested as much in both negotiation derivatives and hedge derivatives. Most banks that use derivatives have greater volatility in market share returns.
Wang and Makar (2019)	Analyse the effects of exchange risk on cash flow hedge accounting in American manufacturing companies.	On average, the magnitude of the foreign exchange risk award is lower in companies designated as effective cash flow users, suggesting that the use of cash flow hedges increases investor confidence in the insecurities of exchange rate changes through the use of derivatives. Thus, the market grants a lower exchange risk prize in companies with higher levels of foreign exchange derivatives, such as cash flow hedge.

Source: Prepared by the authors.

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