Reading between the line items:
Does readability affect the relevance of risk disclosures?

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ABSTRACT

Information on firms' risk management practices (risk disclosures) are vital for investors to make informed decisions, but the manner in which this information is presented can affect its decision-usefulness. This study contributes to the existing discourse by providing empirical evidence on the value relevance of narrative risk disclosures, specifically how narrative complexity, as measured by readability, affects the value relevance of risk disclosures. This study employs panel regression analyses on a sample of 200 companies listed on the Johannesburg Stock Exchange for the time period 2005 to 2022. The findings suggest that readability is an important control variable for decision-usefulness in value relevance studies.

Keywords: derivatives, hedging, readability, risk disclosure, value relevance

Purpose – This study investigates whether readability affects the value relevance of company risk disclosures. Value relevance studies are concerned with the relationship between financial information reported by companies and their market values. This study argues that the usefulness of this information is affected by narrative complexity.

Design/methodology/approach – The Flesch Reading Ease and Gunning Fog scores are used to measure the readability of risk disclosures of companies listed on the Johannesburg Stock Exchange (JSE) from 2005 to 2022. The sample period includes the period when companies disclosed information according to IAS 39 (2005 – 2017) and IFRS 9 (2018 – 2022). Multiple linear regression analyses using panel data is used to determine whether derivatives disclosures are value relevant and what effect readability has on the value relevance of risk disclosures.

Findings – The results of the analyses suggest that narrative complexity such as readability is an important component of value relevance research.

Research limitations/implications – In this study, readability scores are used as a proxy for the decision-usefulness of risk disclosures. The utility or decision-usefulness that a user of financial reports obtains may vary depending on a number of different elements, including the quality of the disclosure, the user's background, and their perceptions.

Practical implications – The study's findings have important implications for the many stakeholders that use the information in financial reports. Firms should be aware of how

information is presented in the financial statements so that their risk management practices are conveyed in an understandable manner to users. I contribute to value relevance literature by showing that narrative complexity is an important component of measuring the effects of accounting information on firm value.

Originality/value – This study uses a novel approach by using readability scores to proxy for the decision-usefulness of risk disclosures. I make use of a unique dataset from an emerging market that has the potential for wider generalizability to other countries that use IFRS to assess the value relevance of risk disclosures.

Keywords – Derivatives, Disclosure, Risk disclosures, Hedging, Readability, Value relevance

Paper type – Research paper

1 Introduction

"…*value-relevance research demands an in-depth knowledge of accounting institutions, accounting standards, and the specific features of the reported numbers*" - Beaver, 2002

Value relevance research empirically investigates the usefulness of accounting information to equity investors (Barth, Beaver, & Landsman, 2001; Beaver, 2002; Beisland, 2009). Accounting information can be said to be value relevant if a statistical association exists between an amount disclosed in the financial reports and the market value of a firm. However, the amount of value (decision-usefulness) that derived from the information contained in the annual reports could be dependent on a number of factors, such as the difficulty of users to understand the information. The primary objective of this study is to explore the nexus between the complexity of risk disclosures and the impact it has on the value relevance of risk disclosure information.

In recent years, value relevance research has focused increasingly on company risk management practices and financial instruments. Particularly, the use of derivatives by firms have come under scrutiny, due in large part by the disproportionate important role derivatives played in various corporate scandals (Dunne & Helliar, 2002) and financial crises (Barth & Landsman, 2010; Jickling, 2009). Though it has become vital for risk disclosures to provide adequate information on firms' derivatives use, the accounting standards that prescribe the disclosure requirements have been criticized for being overly complex and difficult to understand for both setter and users[1] of annual reports (Chang, Donohoe, & Sougiannis, 2016; Huang & Gao, 2014; Jermakowicz & Gornik-Tomaszewski, 2006; Malaquias & Zambra, 2019; Onali & Ginesti, 2014; F. E. Toerien & du Toit, 2023).

Complexity can affect the usefulness of information gained from the annual reports. Chang et al. (2016) cite the financial reporting of the economic complexity of derivatives, rather than the economic complexity of derivatives themselves, that negatively affect earnings forecasts of analysts. Similarly, Kawaller (2004) states the incorrect and inconsistent application of accounting rules make it extremely difficult for users to assess the derivatives activities of firms from the financial reports.

[1] Users in context of this study refers to any individual interested in reading the annual financial report of corporate entities and include analysts, current and potential investors, shareholders, credit providers and other stakeholders.

To measure and verbalize complexity is not easy. The Fog Index (Gunning, 1952) and Flesch Reading Ease score have become a popular means to measure the linguistic complexity of financial reports (Fisher, Van Staden, & Richards, 2020). Linguistically or narratively complex financial reports, reports that are longer and less readable, are more difficult to consume (Lehavy, Li, & Merkley, 2011; Loughran & McDonald, 2016; You & Zhang, 2009). Less readable financial reports are associated with worse analyst performance (Bozanic & Thevenot, 2015; Lehavy et al., 2011), and firms with less readable reports show lower trading volumes and lower investment efficiency (Biddle, Hilary, & Verdi, 2009; Miller, 2010).

This study makes use of readability scores to proxy for the narrative complexity of risk disclosures and use it as a control variable in panel regression analyses to determine if it affects the value relevance of risk disclosures. I make use of a large data sample of 200 non-financial JSE listed firms for the period 2005 to 2022. The findings of the study suggest that complexity is an important factor in value relevance research.

The findings in this study contribute to the broad literature on risk disclosure and value relevance research. I contribute by showing readability scores can be used as a proxy for the complexity of derivatives disclosures and therefor its decision-usefulness. Furthermore, the results of the study suggest that a proxy for the complexity of risk disclosures, such as the readability used in this study, can enhance the value relevance models that seek to determine the value-adding benefits of corporate hedging.

The paper is structured as follows: the following section gives a brief overview of the relevant value relevance and financial report complexity literature, followed by a description of the methodology used in the study in section three. Section four presents the analyses of the results and section five discusses the results and offers concluding remarks.

2 Literature review an hypotheses development

2.1 Corporate hedging and value relevance research

Corporate hedging and risk management have become vital to companies facing ever increasing number of risks that threaten share value creation and firm value. However, research on the value benefit of risk management, and specifically the use of derivatives, remains contradictory. Seminal researchers show that firm value can be enhanced with corporate hedging by reducing volatility and expected tax liability in the presence of a convex tax schedule (Smith & Stulz, 1985), reducing the costs associated with underinvestment caused by agency costs associated with debt and expensive external financing (Bessembinder, 1991; Froot, 1993), decreasing financial distress costs and increasing leverage (Leland, 1998), and reducing information asymmetries between managers and shareholders (DeMarzo & Duffie, 1991).

More recent researchers, however, argue hedging can be detrimental to firm value if risk management programs serve only managerial interests (Knopf, Nam, & Thornton Jr, 2002), if derivatives are used for speculative purposes that increases risk exposure (Adam, Fernando, & Salas, 2017), are ineffective in reducing risks (Hagelin & Pramborg, 2004), or if the costs associated with a hedging program outweigh the benefits (MacKay, P., and S. B. Moeller. 2007).

Previous studies have often been limited to specific sectors: US high-tech firms (Gleason, Kim, & Mathur, 2005), firms in the airline industry (Carter, Rogers, & Simkins, 2006) and pharmaceutical and biotech firms (Choi, Mao, & Upadhyay, 2013) show a value premium for hedging, while firms in the oil and gas sector (Jin & Jorion, 2006) do not. Similarly, previous studies have also tended to be country specific, with studies from both developed and emerging market economies often showing dissimilar results. Value premiums for hedging was found in the United Kingdom (Judge, 2002), Colombia (Gómez-González, León Rincón, & Leiton Rodríguez, 2012), Spain (Vivel Búa, Otero González, Fernández López, & Durán Santomil, 2015), Sweden (Jankensgård, 2015), South Korea (Bae, Kim, & Kwon, 2018) and South Africa (E. Toerien & Lambrechts, 2016; F. E. Toerien, Hall, & Brümmer, 2023), while no such premium is found in Australia (Nguyen & Faff, 2003), France (Khediri & Folus, 2010), New Zealand (Li, Visaltanachoti, & Luo, 2014), Turkey (Ayturk, Gurbuz, & Yanik, 2016), and Brazil (dos Santos, Lima, Gatsios, & de Almeida, 2017).

The significant growth of the use of derivatives (Abdel-Khalik & Chen, 2015; Ehlers & Packer, 2013) have further spurred research on corporate hedging and its impact of firm value. Abdel-Khalik and Chen (2015) argue the introduction of SFAS 133, the Generally

Accepted Accounting Principles (GAAP) accounting standard for derivatives and hedge accounting that became effective in 2000 in the US, contributed to this increase in derivatives use and have spurred demand for increased risk disclosure (Abdel-Khalik & Chen, 2015; Tahat, Dunne, Fifield, & Power, 2019).

Value relevance studies by definition make use of information from annual reports to determine the variables used in statistical analyses to find associated relationships between accounting figures and firm value (Barth et al., 2001). Geyer-Klingeberg, Hang, and Rathgeber (2021) cite 71 primary studies in a meta-analyses predominately use notional values or fair values of derivatives obtained from annual reports (49%), actual hedge ratios obtained from internal company information (42%), or other various continuous measures, such as the number of different contracts used for hedging (9%).[2] However, the majority of papers appearing in top ranking journals largely shun theory and are mostly based around positivist methodologies, emphasizing regression analysis and other econometric processes (Tahat et al., 2019). Despite this, IFRS 7 is unambiguous in terms of stating its aim of ensuring that users are provided with a holistic understanding of the role that financial instruments play in corporate activities (Tahat et al., 2019).

Hence, in terms of value relevance research, some sort of control variable could be missing from previous studies, that can help explain variation in value relevance: a measure for the complexity/decision usefulness/utility of accounting information. Though researchers such as Hassan (2004) have investigated the quality of disclosure, Jankensgård, Hoffmann, and Rahmat (2014) was the first to include it as a control variable for a value relevance study. They make use of a quality of disclosure index. Typically, a disclosure index comprises of a set of criteria or indicators that are deemed essential for effective communication of financial information to various stakeholders. The researcher then assesses the quality of the information based on a range of criteria such as completeness, consistency, transparency, relevance and accuracy.

In this context, readability tests can aid in determining how simple it is for these stakeholders to understand and process complicated financial data, enabling better investment choices. Studies on the readability of risk disclosures are somewhat limited. Du Toit (2017) found the

[22] It is important to iterate that value relevance research focuses on finding association between reported accounting figures and firm value (Barth et al., 2001; Beaver, 2002): if no association exists between accounting figures and firm value, then accounting information cannot be termed value relevant, and can it be argued that financial reports failed to fulfil one of their primary objectives

complexity of the language used in companies' integrated reports impairs readability and hence affects the value stakeholders can derive from the information disclosed. Linsley and Lawrence (2007) finds the level of readability of risk disclosures for UK companies to be difficult, or very difficult, using the Flesch reading ease score.

Though not an objective of accounting standards (IFRS), financial reports remain the primary method in which communicates their financial performance and position to the wider public. Specifically, it is important to disclose information on their risk management practices, as this enables stakeholders to manage their own risk profiles (Linsley & Shrives, 2005). Linsley and Shrives (2005) already urged firms and banks in 2005 to increase risk disclosures so that shareholders and other stakeholders to better understand the risks companies face and what managers are doing to address those risks. The calls for better disclosure increased after the 2008/2009 financial crisis, due to the role derivatives played in exacerbating the effects of the crisis (Huang & Gao, 2014) (Bamber & McMeeking, 2016). This is also echoed by the "Plain English" rule, issued in 1998 by the Securities and Exchange Commission (SEC) in the United States, which mandated that corporations use simple language, short sentences, the active voice, and tables. (U.S. Securities and Exchange Commission, 1998).

In this context, information on risk disclosure and specifically the disclosure of derivatives in company financial statements become evidently valuable to value relevance research since value relevance focuses on finding association between reported accounting figures and firm value: if no association exists between accounting figures and firm value, then accounting information cannot be termed value relevant, and can it be argued that financial reports failed to fulfil one of their primary objectives.

This paper argues that it is not just a question of whether the information is contained in the financial reports or not, but also whether that information can be understood by investors to make an informed decision. Some disclosures, such as for financial instruments, derivatives and risk disclosures, are notorious for their complexity. The more easily understood the information in the financial reports are, the more value should be gained and hence the more significant the relationship between reported accounting figures and firm value should be.

2.2 Risk disclosures complexity and why readability is important

International Accounting Standard (IAS) 32, introduced in 1995 by the International Accounting Standards Board (IASB), aimed to enhance user comprehension of the impact of financial instruments on firms' financial position, performance, and cash flows (IASC, 1995). IAS 39, introduced in 1998, however gained notoriety for its complexity (Helliar and Dunne, 2004; Helliar, Dunne, and Moir, 2004). IFRS 7, introduced in 2006, emphasized financial instrument disclosure, asserting that firms should provide statements enabling users to assess the significance of financial instruments on firms' financial positions and performances (IASB, 2006). In 2009, IFRS 9: Financial Instruments, effective from 2018, focuses on classification and measurement, (IASB, 2014) (Tahat et al., 2019)

These changes and developments in accounting standards have resulted in more information about firms' use of derivatives and hedging practices being disseminated. Furthermore, if the primary objective of financial reporting should be to provide information that is useful to various stakeholders, changes to accounting standards should enhance decision usefulness (Ishikawa, 2005). If decision usefulness is improved, then it should also improve the relevance, reliability and comparability of annual reports relevance, reliability, and comparability (Schipper, 2003; Schipper & Vincent, 2003).

One important conclusion drawn from the extensive body of existing research is that these standards have improved the disclosure of financial information connected to financial instruments inside financial statements, and investors may find this information beneficial as it helps them make better economic decisions. Since keeping investors informed about a firm's ongoing circumstances upholds its validity, this greater transparency may be utilized to justify a company's accounting policies.

2.3 Readability as a measure of narrative complexity and decision usefulness

Decision-usefulness of accounting information lacks a formal definition (Tahat et al., 2019). Various researchers however have attempted to quantify the amount of utility users derive from the information in the annual reports, including quality of disclosure indexes that measure the relevance metrics of accounting information and book earnings informativeness (Jankensgård et al., 2014; Potin, Bortolon, & Sarlo Neto, 2016; Thai & Birt, 2019), interviews, questionnaires and surveys (Gumb, Dupuy, Baker, & Blum, 2018; Huang & Gao, 2014; Malaquias & Zambra, 2019). This study contributes to this discourse by making

use of readability tests to proxy for the decision-usefulness of risk disclosures in assessing its value relevance.

Readability of financial and non-financial information affects users' understanding of organizational behaviour (Gosselin, Le Maux, & Smaili, 2021; Smaili, Gosselin, & Le Maux, 2022). In accounting terms, readability defines the ability of users to incorporate relevant information firm annual reports into share prices (Loughran & McDonald, 2016). Readability is a useful tool for accounting researchers to assess the quality of the information provided by preparers and evaluate the usefulness of information for users. Readability can also help assess whether and how users such as investors are influenced in their decision-making process (Gosselin et al., 2021; Smaili et al., 2022).

New requirements and amendments, of both quantitative and qualitative nature, to risk disclosure requirements about the risks arising from financial instruments such as derivatives (including credit risk, market risk and liquidity risk) however, may enhance risk disclosure transparency and can in turn affect the decision-usefulness of the information for users (Tahat, Dunne, Fifield, & Power, 2016). These changes are incentivized by the primary objective of financial reporting that the provision of information about an economic entity is useful to existing and potential stakeholders in making investment and credit decisions (Ishikawa, 2005), with both the FASB and the IASB emphasizing the importance of providing useful risk related accounting information about economic entities for investor and creditor decision-making (Arnold, 2009).

Both the Flesch Reading Ease and the Gunning Fog Index (Gunning, 1952) are widely used in financial literature to assess the narrative complexity of financial information presented in the annual reports (Fisher et al., 2020; Hoitash & Hoitash, 2018). A higher Flesch Reading Ease score indicates content is relatively easy to understand, while a higher Gunning Fog Index signifies more intricate content, potentially necessitating specialized knowledge or educational background for comprehension.

The introduction of IFRS has notably increased the length and complexity of disclosures for both preparers and users of accounting information (Bradbury, Hsiao, & Scott, 2020; Cheung & Lau, 2016). Risk disclosures in particular have become notorious for their complexity and difficulty to understand (Chang et al., 2016; Huang & Gao, 2014; Jermakowicz & Gornik-Tomaszewski, 2006), wich even the introduction of new disclosure

requirements have failed to address (F. E. Toerien & du Toit, 2023). Though limited in the context of accounting literature, researchers such as Linsley and Lawrence (2007), Jia and Li (2022) and F. E. Toerien and du Toit (2023) have found the readability of specifically risk disclosures to be generally low and risk disclosures complex to understand.

This study determines the value relevance of using derivatives by firms listed on the JSE and assesses whether the readability of a risk disclosures influences the value relevance. This study expects that firms with more readable financial statements will exhibit higher firm value. The stated hypotheses for this investigation are the following:

H_1: The disclosure of derivatives in the financial reports of JSE-listed firms is value relevant.

H_2: The readability of risk disclosures affects the value relevance of derivatives in the financial reports of JSE-listed firms.

3 Research design

3.1 Sampling and data collection

The study uses a purposive sampling technique. Firms listed on the JSE from 2005 to 2022 are included in the data sample. The sample period includes the years in which JSE-listed companies had to disclose risk management under IAS 32 (2005 to 2017) and IFRS 9 (2018 to 2022). Two separate samples were utilized, the first sample includes only non-financial firms. Financial firms are excluded to maximize comparability between firms making use of derivatives for hedging purposes. The second sample includes all firms listed on the JSE during the sample period. Financial firms are market makers in derivatives instruments, necessitating more risk disclosures, hence readability can have a bigger impact on firms that disclose more information (Bradbury, Hsiao, & Scott, 2020; Cheung & Lau, 2016). Ntim, Lindop, and Thomas (2013) found ownership and board characteristics drive corporate risk disclosures in South Africa, and that risk disclosures are predominantly ‘non-financial’, ‘historical’, ‘good news’ and ‘qualitative’ in nature.

South Africa is considered an emerging economy, but tends to perform in line with developed economies in terms of governance and disclosure quality (Du Toit and Esterhuyse, 2021). This holds true for the use of derivatives and the development of the derivatives market (Correia et al., 2012; Upper and Valli, 2016), with some 57% of listed non-financial companies making use of derivatives from 2005 to 2017 (Toerien, Hall & Brümmer, 2023). This compares well to 60% of firms that use derivatives in developed economies (Ayadi et al., 2022). Data was collected from Refinitiv and IRESS, reputable repositories of financial and firm data. Refinitiv is a financial data and technology company that provides financial data and IRESS is a data repository and software and technology provider.

3.2 Model specifications

To estimate firm value, I follow previous researchers who predominately use Tobin's Q (Allayannis & Weston, 2001; Bartram, Brown, & Conrad, 2011; Jankensgård et al., 2014; Jin & Jorion, 2006; Khediri & Folus, 2010). Tobin's Q is calculated as Total Book Value of Assets minus Book Value of Equity plus Market Value of Assets divided by Total Book Value of Assets. Tobin's Q is a popular measure of firm value since Tobin's Q is a forward-looking measure, it reflects the notion and evaluation of the external stakeholders, and firms across different industries can be better compared (Ibrahim & Aboud, 2023). To address the skewness of Tobin's Q, the natural log is used, similar to previous studies. The other variables were winsorized at the 5% and 95% intervals to minimize the potential violations of the OLS assumptions (Ntim et al., 2013).

This study uses the panel regression model (1) to assess the impact of derivatives use on firm value through the estimate of $\beta 1$. Regression findings could be skewed by endogeneity. Using panel data can help lessen endogeneity problems (Gujarati & Porter, 2009). To further decrease any possible negative effects of endogeneity caused by omitted variables (Bartov, 1993), several variables that are thought to affect firm value are included in the model (Ibrahim & Aboud, 2023). To addresss heteroskedasticity and contemporaneous correlation across periods, Panel Estimated Generalized Least Squares with Period Seemingly Unrelated Regression, (Panel EGLS (Period SUR)) is used.

$$\text{LN(Tobin's Q}i,t) = \beta_0 + \beta_1\text{DER}i,t + \beta_2\text{Ln(TA}i,t) + \beta_3\text{ROA}i,t + \beta_4\text{(D/E)}i,t + \beta_5\text{(CR)}i,t + \beta_6\text{DIV}i,t + \beta_7\text{(FOR/SALES)}i,t + \beta_8\text{(CAPEX/SALES)}i,t + \beta_9\text{DUM}i,t + \beta_{10}\text{(READ)}i,t + \varepsilon it$$

Where:

LnTobin′s Qi,t is the natural logarithm of Tobin's Q of firm i during year t,

DERi,t The total amount of derivatives disclosed by companies as either assets or liabilities were added together and captured from Refinitiv. A binary dichotomous variable was created if a company disclosed(1)/did not disclose(0) a derivative during the period. A second measure of derivatives were included that is measured as a continuous variable (DERTOTAL) that is measured as the total value of derivatives disclosed in the annual reports.

READi,t The software tool "Readability Studio 2019" was used to analyse the disclosures of derivatives in the financial statements and notes using a range of readability indicators. Readability measurements and software were used because they make it easy, quick, and objective to examine several entries on multiple pages. Because readability tests are used for a variety of purposes, the developers of Oleander Software's Readability Studio 2019 explain which tests are best suited for the task at hand. For assessing the readability of content intended for adult readers, such as technical reports, the Gunning-Fog metric is advised.

The following formulas are used to calculate the Gunning Fog and Flesch Reading Ease scores:

- The Gunning Fog index establishes the minimum number of years of formal education required for an individual to understand the content after only one reading.
- The formula for Gunning Fog is 0.4 ((words/sentences) + 100 (complex words/words)). Complex words are those containing three or more syllables.
- The Flesch Reading Ease is calculated as (206.835 – 0.846 (number of syllables per 100 words) – 1.015 (average sentence length in words)).
- A higher score for Flesch Reading Ease indicates easier readability

LnTAi,t is the natural logarithm of the total assets of firm i at year-end t, since firm size has been shown to affect firm value either positively due to economies of scale, or negatively due to the complexity of larger operations (Ayturk et al., 2016; Jankensgård et al., 2014; Khediri and Folus, 2010).

ROAi,t is the ratio of net income divided by total assets of firm i during year t, since more profitable firms tend to be valued higher by the market (Ayturk et al., 2016; Jankensgård et al., 2014; Luo, 2016).

D/Ei,t is the ratio of long-term debt divided by market value of equity of firm i at yearend t. Firm value can be affected by the level of debt financing to equity financing used in a firm's capital structure because of its influence on a firm's risk of financial distress (Jankensgård et al., 2014) (Bartram et al., 2011; Shu and Chen, 2003).

CR$i,t$. Firms with a relatively high amount of free cash flow are more likely to invest in projects with a negative net present value, so firms that are cash constrained are more likely to have higher values. The current ratio (CR) is used to proxy for liquidity (Fama and French, 1998; Pramborg, 2004).

DIVi,t is a binary variable that takes the value 1 if firm i pays dividends during year t and zero otherwise. Firms that lack easy access to financial markets are compelled to engage exclusively in highly profitable projects that have a positive net present value. Firms that pay dividends are less constrained in the financial markets since doing so boosts the value of the company (Asquith and Mullins, 1983; Fazzari et al., 1988)

FOR/SALESi,t is the proportion of revenues from foreign sales of firm i during year t, Firms operating in more than one country may be more likely to be valued higher (Allayannis et al., 2012). The ratio of foreign sales divided by total sales is used.

CAPEX/SALESi,t is the ratio of capital expenditures divided by total revenues of firm i. Firm value is affected by a company's future investment opportunities (Géczy et al., 1997; Rogers, 2002)

IndustryDUMi,t Dummy variables are used to control for industry effects for firms that operate in different business sectors. IRESS separates the different companies listed on the JSE into nine sectors: basic materials, consumer discretionary/staples, energy, financials, health care, industrials, real estate, technology and telecommunications.

4 Data analysis/nature and form of results/empirical results

4.1 UNIVARIATE ANALYSIS

Table 1 exhibits the descriptive statistics for all the variables used in the models for the total sample. Descriptive statistics are conducted after winsorizing variables at 5% to address skewness and kurtosis in the original data. Winsorizing removes extreme variables that can distort the results of the analysis. The derivatives value is denoted in South African rand. The average of 23.54 Flesch Reading Ease readability score denotes content that is extremely difficult to read and is best understood by readers with a university degree.

Table 1 Descriptive statistics

	N	Mean	Median	Std. Deviation	Min	Max
LnTobinsQ	3 335	-0.07	-0.10	0.85	-4.14	5.18
DER	1 717	187 644.66	40 000.00	31 1701.04	476.00	988 550.00
FleschReadingEase	1 618	23.54	23.00	6.72	1.00	58.00
GunningFog	1 630	15.63	15.70	1.75	10.00	30.30
LnTA	3 577	15.29	15.41	2.33	4.87	26.75
ROA	3 465	7.65	7.36	8.35	-10.43	24.76
D/E	3 283	67.70	41.37	77.07	0.81	295.31
CR	3 116	1.84	1.44	1.21	0.57	5.19
DIV	2 454	5.01	3.70	8.81	0.13	229.24
FOR/SALES	1 489	37.92	22.68	196.73	-84.68	7459.28
CAPEX/SALES	3 161	10.72	3.77	18.12	0.29	77.45

Untabulated Pearson correlations indicate

4.2 REGRESSION RESULTS

4.2.1 Non-financial firms

Table 2 below presents the regression results to test for Hypothesis 1. Only non-financial firms are included in the regression. The decision to hedge is statistically significant (0.05; $p<0.05$) indicating that firms are rewarded with higher firm value if they make use of derivatives. Firm size, profitability, capital structure, dividend policy, geographic diversification and growth prospects, are all significant drivers of firm value.

Table 2 Value relevance of risk disclosures

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 14:25
Sample: 2005 2022
Periods included: 18
Cross-sections included: 158
Total panel (unbalanced) observations: 2101
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.823264	0.332892	5.477038	0.0000
DERBIN	0.054702	0.022988	2.379587	0.0174
LNTA	-0.085903	0.018594	-4.619853	0.0000
ROA	0.019459	0.002018	9.641644	0.0000
D/E	0.000795	0.000194	4.094725	0.0000
CR	-0.006789	0.017153	-0.395807	0.6923
CAPEX/SALES	-0.623759	0.152925	-4.078858	0.0000
DIV	0.096016	0.025626	3.746789	0.0002
FOR/SALES	0.110306	0.034032	3.241251	0.0012
DUMCD	-0.088538	0.106085	-0.834595	0.4040
DUMHC	0.020355	0.121485	0.167547	0.8670
DUMIND	-0.461864	0.122754	-3.762517	0.0002
DUME	0.113968	0.341487	0.333741	0.7386
DUMTECH	-0.285941	0.170958	-1.672580	0.0946
DUMTEL	-0.100652	0.154778	-0.650302	0.5156
DUMRE	-0.215127	0.200362	-1.073692	0.2831

Weighted Statistics

Root MSE	0.870241	R-squared	0.165852
Mean dependent var	-0.010766	Adjusted R-squared	0.159850
S.D. dependent var	0.958075	S.E. of regression	0.873574
Sum squared resid	1591.128	F-statistic	27.63700
Durbin-Watson stat	1.456394	Prob(F-statistic)	0.000000

Unweighted Statistics

R-squared	0.196557	Mean dependent var	0.074050
Sum squared resid	1101.022	Durbin-Watson stat	0.264155

Tables 3 and 4 include the control variable for the narrative complexity of risk disclosures, the Flesch Reading Ease score, and an interaction term between the derivative binary amount and the Flesch Reading Ease score.

Table 3 Value relevance of risk disclosures and readability

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 14:26
Sample: 2005 2022
Periods included: 18
Cross-sections included: 158
Total panel (unbalanced) observations: 2101
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.816505	0.332893	5.456723	0.0000
DERBIN	0.064926	0.026240	2.474340	0.0134
LNTA	-0.085421	0.018583	-4.596749	0.0000
ROA	0.019471	0.002022	9.630385	0.0000
D/E	0.000796	0.000194	4.110048	0.0000
CR	-0.007398	0.017232	-0.429334	0.6677
DIV	0.095653	0.025634	3.731499	0.0002
FOR/SALES	0.111612	0.034114	3.271722	0.0011
CAPEX/SALES	-0.622095	0.153208	-4.060463	0.0001
DUMCD	-0.087025	0.105907	-0.821710	0.4113
DUMHC	0.026474	0.121724	0.217488	0.8278
DUMIND	-0.460557	0.122555	-3.757972	0.0002
DUME	0.110326	0.340763	0.323761	0.7462
DUMTECH	-0.285848	0.170515	-1.676381	0.0938
DUMTEL	-0.101134	0.155145	-0.651868	0.5146
DUMRE	-0.215629	0.201120	-1.072138	0.2838
FLESCHREADINGEASE	-0.000768	0.000931	-0.824406	0.4098

Weighted Statistics

Root MSE	0.869729	R-squared	0.166346
Mean dependent var	-0.011231	Adjusted R-squared	0.159946
S.D. dependent var	0.957801	S.E. of regression	0.873269
Sum squared resid	1589.255	F-statistic	25.98996
Durbin-Watson stat	1.454705	Prob(F-statistic)	0.000000

Unweighted Statistics

R-squared	0.196592	Mean dependent var	0.074050
Sum squared resid	1100.974	Durbin-Watson stat	0.264053

Table 4 Value relevance of risk disclosures and interaction with readability

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 14:27
Sample: 2005 2022
Periods included: 18
Cross-sections included: 158
Total panel (unbalanced) observations: 1918
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.628434	0.328296	4.960266	0.0000
DERBIN	0.075623	0.035763	2.114567	0.0346
LNTA	-0.075051	0.017142	-4.378197	0.0000
ROA	0.022503	0.002057	10.94036	0.0000
D/E	0.000877	0.000197	4.444636	0.0000
CR	-0.020753	0.017867	-1.161529	0.2456
DIV	0.124221	0.027206	4.565946	0.0000
FOR/SALES	0.121588	0.033777	3.599696	0.0003
CAPEX/SALES	-0.656692	0.173062	-3.794542	0.0002
DUMCD	-0.055399	0.085925	-0.644744	0.5192
DUMHC	0.055257	0.102724	0.537924	0.5907
DUMIND	-0.435092	0.095046	-4.577700	0.0000
DUME	0.287716	0.242157	1.188137	0.2349
DUMTECH	-0.294276	0.126509	-2.326130	0.0201
DUMTEL	-0.171590	0.151242	-1.134543	0.2567
DUMRE	-0.225730	0.123377	-1.829597	0.0675
FLESCHREADINGEASE	-0.001457	0.001478	-0.985697	0.3244
INTDERBINFLESCH	0.014214	0.017055	0.833416	0.4047

Weighted Statistics

Root MSE	0.862283	R-squared	0.189176
Mean dependent var	-0.023296	Adjusted R-squared	0.181921
S.D. dependent var	0.959268	S.E. of regression	0.866358
Sum squared resid	1426.095	F-statistic	26.07623
Durbin-Watson stat	1.342828	Prob(F-statistic)	0.000000

Unweighted Statistics

R-squared	0.218948	Mean dependent var	0.073721
Sum squared resid	1010.924	Durbin-Watson stat	0.266459

Neither the proxy for narrative complexity, nor the interaction term is statistically significant. Untabulated results using DERTOTAL showed that DERTOTAL was not statistically significant, nor was Flesch Reading Ease or the interaction term. The binary derivatives variable however did become slightly more significant when controlling for readability.

4.2.2 Total sample

Tables 5, 6 and 7 make use of DERBIN to proxy for risk disclosures in a sample that now includes financial firms as well. As can be seen from the tables, neither the risk disclosure proxy nor the readability proxy was statistically significant, but the interaction term is statistically significant. This implies that narrative complexity influenced the value relevance of derivatives disclosure if financial firms are included in the sample. Financial firms are larger users of financial instruments such as derivatives, are market makers and often speculate with derivatives. The larger use of derivatives hence necessitates more disclosures. Firm size, profitability, capital structure, dividend policy, geographic

diversification, growth prospects and operational sector are again significant drivers of firm value.

Table 5 Value relevance of risk disclosures- Total sample

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 13:44
Sample: 2005 2022
Periods included: 18
Cross-sections included: 199
Total panel (unbalanced) observations: 2580
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.048429	0.296087	6.918335	0.0000
DERBIN	0.027710	0.022106	1.253539	0.2101
LNTA	-0.123977	0.015929	-7.783097	0.0000
ROA	0.018883	0.001871	10.09370	0.0000
D/E	0.000988	0.000182	5.429313	0.0000
CR	0.006060	0.015395	0.393641	0.6939
DIV	0.093998	0.026421	3.557726	0.0004
FOR/SALES	0.090298	0.032664	2.764440	0.0057
CAPEX/SALES	-0.217897	0.090015	-2.420681	0.0156
DUMHC	-0.038494	0.131228	-0.293339	0.7693
DUMIND	-0.580092	0.123346	-4.702953	0.0000
DUME	0.016364	0.339044	0.048266	0.9615
DUMTECH	-0.407947	0.176273	-2.314291	0.0207
DUMTEL	-0.149956	0.175247	-0.855679	0.3923
DUMRE	-0.416370	0.176835	-2.354563	0.0186
DUMFIN	-0.874842	0.118340	-7.392643	0.0000
DUMCD	-0.136286	0.113536	-1.200376	0.2301

Weighted Statistics

Root MSE	0.872421	R-squared	0.212622
Mean dependent var	-0.100151	Adjusted R-squared	0.207707
S.D. dependent var	0.978803	S.E. of regression	0.875310
Sum squared resid	1963.686	F-statistic	43.25682
Durbin-Watson stat	1.486288	Prob(F-statistic)	0.000000

Table 6 Value relevance of risk disclosures and readability- Total sample

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 13:46
Sample: 2005 2022
Periods included: 18
Cross-sections included: 199
Total panel (unbalanced) observations: 2580
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.054585	0.296745	6.923729	0.0000
DERBIN	0.018876	0.024492	0.770704	0.4410
LNTA	-0.124438	0.015968	-7.792871	0.0000

ROA	0.018823	0.001868	10.07755	0.0000
D/E	0.000992	0.000183	5.427107	0.0000
CR	0.006713	0.015417	0.435390	0.6633
DIV	0.094475	0.026429	3.574606	0.0004
FOR/SALES	0.088919	0.032615	2.726358	0.0064
CAPEX/SALES	-0.221023	0.090138	-2.452045	0.0143
DUMHC	-0.045320	0.131065	-0.345784	0.7295
DUMIND	-0.581169	0.123595	-4.702204	0.0000
DUME	0.024304	0.341513	0.071167	0.9433
DUMTECH	-0.405895	0.176399	-2.301006	0.0215
DUMTEL	-0.148596	0.174912	-0.849548	0.3957
DUMRE	-0.413708	0.176336	-2.346136	0.0190
DUMFIN	-0.884981	0.119091	-7.431117	0.0000
DUMCD	-0.136198	0.113648	-1.198416	0.2309
FLESCHREADINGEASE	0.000849	0.000927	0.915425	0.3601

Weighted Statistics

Root MSE	0.872730	R-squared	0.212969
Mean dependent var	-0.099155	Adjusted R-squared	0.207747
S.D. dependent var	0.979500	S.E. of regression	0.875790
Sum squared resid	1965.075	F-statistic	40.78082
Durbin-Watson stat	1.487108	Prob(F-statistic)	0.000000

Unweighted Statistics

R-squared	0.266388	Mean dependent var	-0.050602
Sum squared resid	1466.930	Durbin-Watson stat	0.246145

Table 7 Value relevance of risk disclosures and interaction with readability- Total sample

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 13:47
Sample: 2005 2022
Periods included: 18
Cross-sections included: 197
Total panel (unbalanced) observations: 2369
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.028708	0.298560	6.794966	0.0000
DERBIN	0.023655	0.030488	0.775871	0.4379
LNTA	-0.128730	0.016129	-7.981159	0.0000
ROA	0.021380	0.001913	11.17541	0.0000
D/E	0.001071	0.000187	5.714401	0.0000
CR	-0.003489	0.016136	-0.216223	0.8288
DIV	0.124468	0.027957	4.452162	0.0000
FOR/SALES	0.122494	0.033962	3.606739	0.0003
CAPEX/SALES	-0.200497	0.091701	-2.186432	0.0289
DUMHC	-0.026697	0.109635	-0.243507	0.8076
DUMIND	-0.563667	0.096907	-5.816546	0.0000
DUME	0.068224	0.253563	0.269062	0.7879
DUMTECH	-0.396563	0.134627	-2.945646	0.0033
DUMTEL	-0.238681	0.187085	-1.275789	0.2022
DUMRE	-0.373286	0.116754	-3.197203	0.0014
DUMFIN	-0.829650	0.102134	-8.123170	0.0000
DUMCD	-0.120372	0.093481	-1.287664	0.1980
FLESCHREADINGEASE	0.000305	0.001371	0.222663	0.8238

INTDERBINFLESCH	0.031030	0.017009	1.824404	0.0682

Weighted Statistics			
Root MSE	0.863921	R-squared	0.242804
Mean dependent var	-0.117789	Adjusted R-squared	0.237004
S.D. dependent var	0.988551	S.E. of regression	0.867406
Sum squared resid	1768.124	F-statistic	41.86413
Durbin-Watson stat	1.349305	Prob(F-statistic)	0.000000

Unweighted Statistics			
R-squared	0.274305	Mean dependent var	-0.051343
Sum squared resid	1356.096	Durbin-Watson stat	0.243418

Where it gets really interesting is when DERTOTAL is used as proxy for risk disclosures in the full sample, presented in Tables 8, 9 and 10. DERTOTAL is statistically significant in both Table 8 and Table 9. The interaction term is also strongly significant (Table 10).

The results from the regression analyses suggest two major findings: first, the measure, whether binary or continuous, which is used to proxy for derivatives use, may impact the value relevance of the information. For non-financial firms, firms that disclosed information on their risk management (if there was a derivatives amount in other words) were rewarded with a higher firm value. The extent of their derivatives' use, using DERTOTAL, a continuous variable to measure the size of their disclosure, was not value relevant. Narrative complexity also did not feature as a statistically significant control variable for non-financial firms.

The second main contribution of the study is to show that firms that are expected to have more risk disclosures and more complex disclosures, in other words financial firms that make use of derivatives for both speculating and hedging purposes, are rewarded by the amount of derivatives they disclose (DERTOTAL). The results of the regression analyses show that in a full sample including financial firms, the continuous variable to measure derivatives disclosure became statistically significant, but negatively so. Furthermore, narrative complexity also clearly influenced the value relevance of risk disclosures. Firms with more complex risk disclosures were negatively valued for their derivatives use.

Table 8 Value relevance of risk disclosures- continuous variable

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 13:48
Sample: 2005 2022 IF DERBINNEW=1
Periods included: 18
Cross-sections included: 142
Total panel (unbalanced) observations: 1155

Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.383302	0.306599	4.511756	0.0000
DERTOT	-1.55E-07	5.00E-08	-3.094011	0.0020
LNTA	-0.088575	0.013693	-6.468615	0.0000
ROA	0.031548	0.002238	14.09555	0.0000
D/E	0.001420	0.000239	5.937641	0.0000
CR	-0.020491	0.023116	-0.886464	0.3756
DIV	0.180024	0.035819	5.025894	0.0000
FOR/SALES	0.050829	0.038873	1.307557	0.1913
CAPEX/SALES	-0.113261	0.120867	-0.937070	0.3489
DUMHC	0.105545	0.091310	1.155897	0.2480
DUMIND	-0.540570	0.085849	-6.296732	0.0000
DUME	-0.176719	0.182426	-0.968716	0.3329
DUMTECH	-0.318366	0.158146	-2.013118	0.0443
DUMTEL	-0.291044	0.147490	-1.973305	0.0487
DUMRE	-0.339743	0.196703	-1.727186	0.0844
DUMFIN	-0.946293	0.121791	-7.769800	0.0000
DUMCD	-0.111764	0.093234	-1.198746	0.2309

Weighted Statistics

Root MSE	0.858231	R-squared	0.345908
Mean dependent var	-0.118911	Adjusted R-squared	0.336711
S.D. dependent var	1.059602	S.E. of regression	0.864618
Sum squared resid	850.7278	F-statistic	37.61350
Durbin-Watson stat	1.129831	Prob(F-statistic)	0.000000

Unweighted Statistics

R-squared	0.398905	Mean dependent var	-0.073614
Sum squared resid	533.2496	Durbin-Watson stat	0.228193

Table 9 Value relevance of risk disclosures and readability- continuous variable

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 13:49
Sample: 2005 2022 IF DERBINNEW=1
Periods included: 18
Cross-sections included: 142
Total panel (unbalanced) observations: 1155
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.388684	0.306682	4.528090	0.0000
DERTOT	-1.54E-07	4.99E-08	-3.083098	0.0021
LNTA	-0.089734	0.013779	-6.512334	0.0000
ROA	0.031507	0.002230	14.12850	0.0000
D/E	0.001426	0.000239	5.974549	0.0000
CR	-0.019130	0.023103	-0.828025	0.4078
DIV	0.178698	0.035964	4.968795	0.0000
FOR/SALES	0.050437	0.038698	1.303326	0.1927
CAPEX/SALES	-0.118936	0.121395	-0.979745	0.3274
DUMHC	0.097080	0.090908	1.067893	0.2858
DUMIND	-0.546619	0.085540	-6.390209	0.0000
DUME	-0.175166	0.182999	-0.957196	0.3387
DUMTECH	-0.316670	0.159226	-1.988804	0.0470
DUMTEL	-0.291186	0.148020	-1.967210	0.0494
DUMRE	-0.336390	0.195083	-1.724341	0.0849
DUMFIN	-0.951943	0.121781	-7.816861	0.0000

DUMCD	-0.120143	0.092843	-1.294044	0.1959
FLESCHREADINGEASE	0.001174	0.001337	0.878143	0.3801

Weighted Statistics			
Root MSE	0.858077	R-squared	0.347018
Mean dependent var	-0.119352	Adjusted R-squared	0.337255
S.D. dependent var	1.060335	S.E. of regression	0.864842
Sum squared resid	850.4215	F-statistic	35.54371
Durbin-Watson stat	1.130289	Prob(F-statistic)	0.000000

Unweighted Statistics			
R-squared	0.399516	Mean dependent var	-0.073614
Sum squared resid	532.7074	Durbin-Watson stat	0.228712

Table 10 Value relevance of risk disclosures and interaction with readability-continuous variable

Dependent Variable: LNTOBINSQ
Method: Panel EGLS (Period SUR)
Date: 03/28/24 Time: 13:50
Sample: 2005 2022 IF DERBINNEW=1
Periods included: 18
Cross-sections included: 129
Total panel (unbalanced) observations: 944
Linear estimation after one-step weighting matrix
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.510704	0.433019	1.179402	0.2385
DERTOT	-1.53E-07	6.09E-08	-2.510375	0.0122
LNTA	-0.055851	0.021368	-2.613745	0.0091
ROA	0.038064	0.002454	15.51219	0.0000
D/E	0.001376	0.000240	5.733346	0.0000
CR	-0.022288	0.028485	-0.782442	0.4342
DIV	0.236657	0.044063	5.370944	0.0000
FOR/SALES	0.106959	0.043584	2.454096	0.0143
CAPEX/SALES	0.029546	0.137122	0.215476	0.8294
DUMHC	0.093283	0.093844	0.994022	0.3205
DUMIND	-0.410869	0.086004	-4.777341	0.0000
DUME	-0.238650	0.142762	-1.671664	0.0949
DUMTECH	-0.322942	0.175546	-1.839647	0.0661
DUMTEL	-0.256478	0.152242	-1.684670	0.0924
DUMRE	-0.398518	0.206795	-1.927111	0.0543
DUMFIN	-0.844959	0.123181	-6.859501	0.0000
DUMCD	-0.067730	0.092320	-0.733643	0.4634
FLESCHREADINGEASE	0.001326	0.002333	0.568515	0.5698
INTDERTOTWINS95FLESCH	0.029163	0.012102	2.409751	0.0162

Weighted Statistics			
Root MSE	0.858999	R-squared	0.427104
Mean dependent var	-0.140875	Adjusted R-squared	0.415956
S.D. dependent var	1.131188	S.E. of regression	0.867776
Sum squared resid	696.5578	F-statistic	38.31133
Durbin-Watson stat	1.123932	Prob(F-statistic)	0.000000

Unweighted Statistics			
R-squared	0.450274	Mean dependent var	-0.080620
Sum squared resid	415.5824	Durbin-Watson stat	0.243465

5 Discussion of results

The findings of the study suggest that non-financial firms are rewarded with higher firm value if they disclose derivatives in the financial statements, confirming the first hypothesis of the study. It is assumed that all non-financial firms make use of derivatives to hedge. The findings are consistent with previous research that has found a similar value premium in emerging markets (Gómez-González et al., 2012; F. E. Toerien et al., 2023), but contradicts findings that found no benefit to hedging (Ayturk et al., 2016; dos Santos et al., 2017).

The findings also support the hypothesis that readability affects the value relevance of risk disclosures. The low readability scores as measures by Felsch Reading Ease support Chang et al. (2016) and Kawaller (2004) assertion that the complexity of derivatives disclosures and its inconsistent application negatively affect users' ability to derive useful information about companies' use of derivatives.

6 Conclusion

In this study I explore the hypotheses that firms are rewarded with a higher firm value if they disclose derivatives in their financial statements and that such risk disclosure is influenced by its readability. I find non-financial firms are rewarded with a higher firm value if they disclose derivatives in their financial statements. Non-financial firms are thus rewarded for risk management using derivatives. In a sample that includes financial firms, I show that readability of risk disclosure becomes more important the more complex risk disclosures become, since financial firms have more risk disclosures. The findings in my study contribute to the broad literature on risk disclosure, value relevance and narrative complexity research. I contribute by showing readability scores can be used as a proxy for the narrative complexity of derivatives disclosures and therefor its decision-usefulness. Furthermore, the results of the study suggest that a proxy for the complexity of risk disclosures, such as the readability used in this study, can enhance the value relevance models that seek to determine the value-adding benefits of corporate hedging. My study uses the Flesch Reading Ease score as a proxy for narrative complexity and decision usefulness of risk disclosure information. Future research may further investigate the nexus between the quality of information provided in the annual reports of companies and its value relevance.

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