UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

The Effects of qualitative Attributes of Sustainability Reports on Investors Trading Behavior

Master Thesis in Accounting and Financial Management

Author: Ensieh Mahi

Supervisor: Mari Paananen

Spring 2021

Abstract

The importance of adopting sustainable measures in running businesses under different sectors is becoming more important. Many companies care more about sustainability these days, while they were considering only their financial goals previously. Companies become aware of their social and environmental impacts and responsibilities. The importance of sustainability also affects the investors' concern and attention about the firm's performance. Consequently, respecting sustainability goals has become a motivation for firms to present a good image and legitimate themselves by preparing sustainability reports.

In my thesis, I examine the impact of sustainability report's quality on market liquidity for European listed-firms in the energy sector. I use two qualitative attributes including the readability and specificity of sustainability reports. I measure the readability through the size of report's file which is a proxy for complexity of reports. Specificity represents the quality of the report, explaining how much the report is assigned to the firm specifically. I use abnormal trading volume as a proxy for market liquidity. I find that less readable reports (bigger reports) has negative impacts on the investors behavior in trading and they are reluctant to trade. On the other hand, more specific reports lead to a higher trading volume in the capital market.

I contribute to literature in sustainability reports and textual analysis by using two qualitative attributes in measuring the quality of sustainability reports. My findings are in the interest of investors, firms and regulator to consider the role of sustainability reports on investors' decision.

Key words: sustainability report, textual analysis, readability, specificity, abnormal trading volume

Acknowledgements

First and foremost, I would like to thank my supervisor, Professor Mari Paananen, whose expertise, constructive discussions and understanding were invaluable. I have learned a lot under her supervision.

Getting through my thesis required more than academic support, I would also like to thank all my friends for their supports during the time I spent at University of Gothenburg whom I am very lucky to have, Vahid, Elham, Samane, Mohammad, Sahar and Negar. I want to express my appreciation to my seminar opponents for their constructive comments.

My deepest thanks are extended to my family, specially my parents which none of this was not possible without them. I like to express my warmest gratitude to my sisters, Elahe and Elham.

Ensieh Mahi

University of Gothenburg- May 2021

Contents

List of Tables and Figures

1 Introduction

Sustainable development should "address the needs of the present without compromising the ability of future generations to meet their needs" (Brundtland, 1987, p.16). In this regard, the economic development should address the requirements of societies towards having safer and more sustainable futures. Such a development includes major areas, such as society, economy and environment – known as the triple bottom line or triangle (Dyllick and Hockerts, 2002). Multiple companies around the world have been adopting the values of sustainable development at different scales, which many reflect that in their annual sustainability reports. Different frameworks and standards have been provided to guide the companies to prepare sustainability reports in order to present their impact on society, environment and economy. The Global Reporting Initiative (GRI) is a non-profit organization that was founded in 1997 and focused on governance and social and environmental issues at first and then moved toward sustainability. Initially, GRI presented guidelines in order to prepare sustainability reports but it changed its procedure since 2016 and recently GRI's concentration moved toward setting standards for sustainability reporting (GRI, 2021).

Over the past decades, communities have paid more attention to the environmental and social aspects of an organization's performance in addition to their financial outcomes (Wilmshurst and Frost, 2000). In addition, investors' awareness and concern about sustainability issues have increased and this is one of the main motivations for firms to move toward sustainability reports to legitimate themselves to different stakeholders. Legitimacy means to consider stakeholder's expectation to satisfy them about the performance of an organization which is not out of norms (Unerman et al., 2014). Moreover, sustainability reports have some advantages for companies such as increase in reputation and economic return in a long-run period (Du et al., 2010; Falck and Heblich, 2007).

In addition to the stakeholder's concerns, the attitude of social responsibility is also embedded in the firm's vision. The traditional business model focused on financial outcome while now the Triple Bottom Line including economic, social and ecological aspects are at the focus of attention (Gond et al., 2012). Most people accept that sustainable development is required which does not have any other alternative. Many companies currently present CSR reports or standalone sustainability reports (Landrum and Ohsowski, 2018; Nidumolu et al., 2009) while previously they were presenting their environmental and social concern inside their annual report. Presenting stand-alone sustainability reports is very common nowadays and this change comes from the importance of sustainability.

Initially, Corporate Social Responsibility (CSR) reports was a voluntary disclosure of information to investors while nowadays shareholders and investors use sustainability reports as critical tools to assess the organization in different areas such as future performance and earnings quality (Clarkson et al., 2020; Orlitzky et al., 2003; Yongtae Kim et al., 2012). EU Directive 95/2014 changes the voluntary nature of non-financial reporting including sustainability reports into mandatory reporting. European firms need to prepare non-financial reports according to EU Directive 95/2014 which is applicable for special category of firms to disclose information regarding how they perform in societal and environmental challenges. EU Directive 95/2014 raises the importance of sustainability issues in European community which increases awareness of community too (Caputo et al., 2020). EU rule applies for firms with employees more than 500 that cover all listed firms and banks from year 2017. However, the European Commission has not set any standards for reporting and the first set of standards will be used from October 2022 (European Commission, 2017). All in all, it can be concluded that the importance of sustainability report has increased and it becomes an essential element similar as the financial statements in evaluating the firm performance.

The sustainability report as an unregulated report allows managers to modify the reports according to their interest. Sustainability reporting can contain two objectives for firms. The first one is to share more information with shareholders for their decision making and the second one is to influence the shareholder's view by controlling information and using specific impression in the reports. This is the reason that many researchers look at sustainability report as an impression management tool (Merkl-Davies and Brennan, 2008; Sandberg and Holmlund, 2015). It can be assumed that managers use sustainability reports as a tool to change the investors' perception about the company. Therefore, investigating different qualitative attributes for sustainability reports become important. On the other hand, different groups of stakeholders including investors, regulators and standard setters have been concerned about efficiency of corporate disclosure since the reports get longer but less readable and less specific while using more boilerplate clauses (Dyer et al., 2017). Sustainability reports as a part of corporate disclosure are not excluded from Dyer et al.(2017)'s result and studying its qualitative is required to examine how investors evaluate the sustainability reports by defining readability and specificity and measuring market liquidity.

In this study, I am examining qualitative attributes of sustainability reports which have become concerns of different groups of users. I conduct textual analysis of sustainability reports through measuring two qualitative aspects: *readability* and *specificity*. I expect less readable (longer) sustainability

reports have negative impact on trading volume since such reports are more complex which makes the investors reluctant and uncertain to trade, consequently it takes longer to decide and trade. Moreover, *specificity* is used to see its association with trading volume. *Specificity* is calculated as the total number of specific words related to organization divided by the total number of words in sustainability report (Hope et al., 2016). I expect that having a more specific report has positive impacts on trading volume because readers get sufficient information about the firm by reviewing the report. I select trading volume to study since there are more studies on share prices, bid-ask spread.

This report is divided into seven sections. Section 2 introduces the research question and contributions. Section 3 covers the literature review related to the subject followed by Section 4 which is about developing the hypothesis. Section 5 presents the methodology of this study. Section 6 discusses the empirical result and analysis. Finally Section 7 presents the conclusions of this study.

2 Research Question and Contribution

To the best of my knowledge, the focus of most of the studies on textual analysis is on the financial reports. There are some studies on sustainability reports as well, however they did not look at both of the textual attributes which I examine in mu study or the studies take the stock price volatility as a dependent variable. I want to consider sustainability reports in analyzing two textual attributes and its impact in investors' reaction through trading behavior. The main objective of this study in to investigate the following research question:

RQ: Does qualitative attributes of sustainability reports affect the market liquidity?

In order to address this question, I measure readability and specificity of sustainability with the help of previous literatures and I add several control variables which are related to my variables.

This thesis provides several contributions to previous literature and can be useful for investors, analysts and regulators. Firstly, it provides analysis of association between textual attributes in sustainability reports with investors' reaction such as trading volume. While prior research (e.g., Lang and Stice-Lawrence, 2015; Loughran and Mcdonald, 2014; Miller, 2010) studied tone management or various textual attributes in financial reports and there are less studies that explored the textual analysis of sustainability report and its impact on the capital market. Moreover, my thesis contributes to current literature on sustainability reports as financial statements cover much more studies because working with numbers and figures can be easier for researchers in accounting and finance (Richardson, 2015).

Secondly, I examine the textual attributes in a new context by studying listed-firms in the energy sector over Europe instead of just limiting to the United States or one country in Europe. As most studies on the textual analysis concentrate on the US market where firms report under SEC regulation and more comprehensive databases exist there, which has the advantage of conducting an easier process for extracting text.

Finally, sustainability report was an unregulated voluntary report before EU Directive 95/2014 although there were some guidelines and standards like GRI and IIRC (International Integrated Reporting Council) and etc. A unified standard for reporting will be ready in 2022 (European Commission, 2017). Therefore, there is less control on how it is presented and this can create an opportunity for managers to modify the reports in their own interest to show more positive news and hiding bad news (Merkl-Davies and Brennan, 2008). Studying in this field helps the investors and analysts to consider sustainability reports in their decision making process and help them to be aware of different qualitative factors in

sustainability reports. Moreover, the result of my study can help the standard setters on how set the standards for organizations to increase the quality of sustainability reporting.

3 Literature review

Most prior research in accounting and finance cover quantitative disclosure of financial information in the capital market while recently, investors do not consider just financial statements as a measure for a firm's performance reports. Other qualitative information has become an important medium to transfer considerable signals to investors besides other components of financial reports. Therefore, adding other qualitative factors become crucial since investors do not rely just on financial statements to make their final investment decision. The qualitative information gathered from earnings press releases, management discussion and analysis, media news and sustainability aspects of the firm (Hales et al., 2011; Xuan Huang et al., 2014).

Disclosing information to shareholders and how this affects the market reaction have been the focus of studies in accounting. Information varies from financial information till nonfinancial information. Market reaction covers studies in the scope of stock price, trading volume and bid-ask spread (Rowland and Smith bamber, 1994). Disclosing information to investors is a useful mean for managers to be transparent and transfer information about firm performance (Healy and Palepu, 2001). Rowland and Smith bamber (1994) found that information asymmetry before disclosing earnings is positively correlated with trading volume which means higher information asymmetry lead to more trading volume reaction to earnings announcement. Impact of information on the capital market is not limited to financial data while recently other nonfinancial information has become important such as environmental disclosure. All these disclosures decrease the information asymmetry and helps the investors in firm's valuation and this result in less trading profit for insiders as outsider get the same information (Frankel and Li, 2004; Villiers and van Staden, 2011).

The number of firms presenting sustainability reports as voluntary non-financial information has increased during the last two decades (Dhaliwal et al., 2012). On one hand, firms care more about decreasing their negative impact on society and environment and the number of firms presenting sustainability reports has increased (Eccles et al., 2012). On the other hand, the society's trust in sustainability report has been increasing and investors rely more on accuracy of sustainability performance of firms (GRI, 2020). According to Crane and Glozer (2016), the aim of CSR report is to have legitimacy and show accountability to stakeholders to build a more positive view while it has been explained that sustainability report has positive consequences for firms like increasing the economic return (Du et al., 2010). In addition, presenting sustainability reports has other positive results for firms like reducing the cost of capital (Dhaliwal et al., 2011a). Suchman (1995) defined the logic of legitimacy as

making the actions of organization desirable and proper within some social norms, values and beliefs. Suchman suggested some reasons for legitimacy such as increasing credibility and persistence for organization. In alignment with legitimacy theory, Islam and Deegan (2008) studied disclosure of social responsibility information in a developing country which they conclude that pressure and expectation of shareholders over the organization lead to disclosing social responsibility information and firm will disclose less if this pressure did not exist. So preparing sustainability reports can be used as a tool to satisfy the society/investors by influencing their perception about the firm. Wilmshurst and Frost (2000) mentioned some motivations for disclosing environmental information including shareholder's demand for information and society concerns.

Sustainability reports are also subject to textual analysis in the capital market. Textual analysis in sustainability reports studied the quality of information means how the information is presented, not what is presented (Xuan Huang et al., 2014). One example of textual analysis studies in sustainability reports is Clarkson et al. (Clarkson et al., 2020) that examined textual analysis on Corporate Social Responsibility (CSR) reports in US firms to predict the actual performance of CSR, they use some linguistic proxy including number of words and sentences to measure the quality of CSR reports and they found that number of words and number of sentences are helpful to predict CSR performance of a firm.

In addition to the content of CSR reports, the readability of reports is important for shareholders: the ease of reading and understanding the text (Wang et al., 2018). Several studies have been done concentrating on readability of annual reports and its impact on different variables such as valuation, stock price volatility and firm performance. One study showed that having a more readable content of IR reports (Integrated Reporting combines both financial statement and environmental, social and governance (ESG) information in one report) leads to a higher valuation of firms (Caglio et al., 2020). Moreover, Miller (2010) studied the complexity of reports, defining complexity based on the length of report and its readability. He found that more complex reports make investors reluctant to trade and lead to less abnormal return. This is true especially for small investors. In addition to the previous studies, the relation between readability and performance of firms has been examined. Different proxies were used to measure readability such as Flesch reading ease index , length of sentences, long words and Fog Index (Hrasky et al., 2009). It is noted that firms with weaker performance presented less readable reports. Also, firms that present an easier report to read have more persistent earnings (Bloomfield, 2008; Li, 2008). Similarly Lawrence(2013) explained that investors prefer to invest in firms with more clear reports. It is demonstrated in a survey of Malaysian stock market that firms with sufficient financial performance in

terms of growth and profitability, use the CSR report as a signaling tool to investors and they present CSR reports in an easy way to understand (Bakar and Ameer, 2011).

There are other attributes to consider in textual analysis which have been studied a lot in recent years including specificity or boilerplate (Li et al., 2019). According to study of Dyer et al. (2017) different textual characteristics have changed over the period of 1996-2013. They demonstrated that specificity and readability has decreased in the US firms while boilerplate had increased. Specificity is other side of the coin which means more boilerplate in reports results in less specificity in information conveyed to readers. Boilerplate describes some standardized words that many firms use and this can decrease the informativeness of financial reports (McMullin, 2014). The boilerplate trend shows that firms tend to repeat the same word in their report from year to year and they follow generic disclosure which was also concern of IASB chairman (Hans Hoogervorst, 2013). The increasing trend in boilerplate ended in decreasing trend in specificity. Specificity in the annual reports act as a qualitative measure that describes how much annual reports contain specific data about the firm which include the location and organization's names (defined completely in next part). It is noted that higher specificity in disclosing risk information results in greater content of accounting information which has a positive impact on market response (Hope et al., 2016). Regarding the relation between specificity and firm characteristics, García-Meca and Martínez (2005) found that firms with larger size and more profit and less debt present more specific reports. Moreover, according to the previous studies when firms provide more dollar specific information about Initial Public Offering (IPO) they can decrease the uncertainty of investors which results in a lower underpricing (Leone et al., 2007). In addition, it has been shown that more specificity in financial disclosure leads to less bid-ask spread in the market (Paananen et al., 2021).

Since one objective of the financial reports is signaling and reducing the information asymmetry between shareholders and manager, different textual analysis is important to see how reports are presented to assess its quality. Hans Hoogervorst, Chairman of the International Accounting Standard Board (IASB) noted that increasing the volume of annual reports is not useful as long as the reports do not increase the information about firms. He mentioned concerns of standard setter have been increased about the quality of financial statements and more specifically using more Boilerplate (Hans Hoogervorst, 2013). Lang and Stice-Lawrence (2015) concluded that firms present financial reports with greater quality when there is a strict need for disclosure. They define quality as less boilerplate and more disclosure, concluding that firms with less boilerplate in their annual report have better economic outcomes like liquidity and analyst following.

4 Hypothesis Development

Based on the previous studies on textual analysis, it is clear that examining different qualitative attributes of annual reports and its impact on the firms' performance and market reactions has been increasing recently. Various textual characteristics have been mentioned such as readability, specificity, boilerplate and impression management. The number of firms that prepare the non-financial report is increasing and organizations have concerns about their impact on the environment, economy and society (Sierra-Garcia et al., 2018). According to one report from Ernst and Young (2020), 68% of investors consider the sustainability in their investment decision.

Based on the literature review, a greater number of studies in readability have investigated the financial statement and valuation and performance of firms (Bloomfield, 2008; Caglio et al., 2020; Lawrence, 2013; Li, 2008) and there are very few studies that examine the relation between readability in non-financial reports, such as sustainability report, and investors trading behavior. I expect that a less readable report lead to a lower trading volume. Regarding the specificity, I expect that presenting annual reports with more specific details about the organization satisfies investors better and this decreases the uncertainty in capital market and investors. The more specific reports is a signal of high quality reporting that investors can gain more information about the organization by reading the annual reports which results in a positive trading volume. Therefore the following hypothesis presented:

H: Higher quality (more specific and readable) in sustainability reports increase trading volumes.

5 Methodology

5.1 Model Specification

In order to test my hypotheses, I define the model based on hypotheses. I apply fixed effect model for my regression since I have panel data for specific amount of firms during specific times which I include year fixed effect as potential determinants of specificity and readability. I apply the model in three regression with different time span. The first regression is covering the whole sample while the second one just contains observations in 2012 till 2016 and the third one is assigned to 2017-2020. I do this to analyze the result before and after the EU Directive 95/2014. In model (1) I examine the quality of sustainability reports through two attributes of readability and specificity and their association with investor's trading behavior. I expect that higher quality in sustainability reports assure investors about the performance of firm and lead to more trading volume.

$$AVOL = \beta_0 + \beta_1 \, Log(file\ size)_{it} + \beta_2 \, SPEC_{it} + Controls_{it} + \varepsilon_{it} \qquad (1)$$

Where subscript *i* and *t* presents firm and year respectively.

$$AVOL = Trading\ volume\ for\ firm\ i\ in\ year\ t$$

$$Log(file\ size)_{i,t} = Readability\ factor\ for\ firm\ i\ in\ year\ t$$

$$SPEC_{i,t} = Specificity\ factor\ for\ firm\ i\ in\ year\ t$$

5.2 Variables

In order to measure trading volume as a dependent variable, I follow Miller's method (Miller, 2010) by defining abnormal trading volume as:

Abnormal trading volume equals mean daily trading volume during the report date (-1, 3) minus the mean daily trading volume before the report date (-49, -5), divided by the standard deviation of daily trading volume before the report date (-49, -5).

I gathered the filing dates of annual reports for each year manually which I use firms' website or news releases. I expect that quality of sustainability reports influence the trading behavior of investors. Higher quality in disclosure results in more trading volume. Therefore, two qualitative attributes of sustainability reports studied in this thesis which influenced the investor reaction based on previous literature.

Readability refers to test how easy for the investors is to understand the financial reports. The most recent studies in readability used the FOG Index as a measure (Lawrence, 2013; Li, 2008; Miller, 2010), which is defined as the following by Gunning (1952): FOG index = 0.4 (average number of words per sentence + percent of complex words). A lower FOG Index indicates a higher readability. Loughran and Mcdonald (2014) criticized the traditional measure of readability in the field of accounting and finance, as the FOG Index includes two part of length of sentence and complexity of word. It is difficult to measure the length in financial context since it has also tables and parsing the text become challenging. In addition, some words are not complex in the financial context as the other fields such as company and operation so this makes noise in the final result. They concluded that the file 's size is a more suitable proxy for readability as it has less measurement error and noise. In order to measure readability, I use natural logarithm of plain text file 's size in megabytes of sustainability report the same as what suggested by Loughran and Mcdonald (2014).

Specificity means how precise are information about the subject or how much information content of the report is connected to the main subject of the report so that it can convey useful information to the readers. In order to find a proxy for specificity, I use the Hope et al. (2016) structure in which they defined specificity (*SPEC*) as the number of specific groups of words divided by total number of words. They identified seven specific groups of words including: (1) location, (2) name of persons, (3) time, (4) date, (5) values mentioned in percent, (6) organization, and (7) money values in dollar. I use Stanford Named Entity Recognition (NER) tool to extract different names from text. One limitation of the NER tool for money category is that it covers just USD currency while my sample is based on firm in Europe. Therefore, I use another database for money from Paananen et al. (2021) article which measures specificity for the European firms and consider currencies other than USD. In order to check validity of specificity measure, I analyze excel files generated by python scripts. The excel file contains identified specific words with the number of them. I examine excel file to measure how much it has error and I do this for some firm-year 's result randomly which its error was not considerable. The specific words were identified correctly.

I add several control variables which have an impact on investors' decision on a short-window basis including five days (-3,1). This study covers control variables about firm's characteristics which have an impact on quality of sustainability reports and trading volume. The following control variables are suggested by previous literature. Cho et al. (2010) show that some firm specific factors including size, profitability, age of firm and capital intensity are associated with sustainability disclosure of firms. I control size of firms since the disclosure volume is associated with firm size. Larger firms tended to disclose more

information because of public pressure (Cho and Patten, 2007; Dhaliwal et al., 2011). I calculate size (*SIZE*) by natural logarithm of total asset of firm. I use ROA (Return on Asset) as proxy for profitability since ROA can impact the investor 's shareholdings which calculated by net income divided by total asset (Cho et al. (Cho et al., 2012; Lawrence, 2013). I measure capital intensity (*CAPINT*) as total asset divided by revenue. In addition, Loughran and Mcdonald (2014) found book value to market value ratio as significant variables in explaining the analyst dispersion so I expect that it can affect the investors reaction. I add the natural logarithm of book value to market value (*B/M*) as another control variable to measure the future growth opportunities. I control growth since firms with higher growth opportunities may prepare more complex reports and this affect the trading behavior of investors (Li, 2008). Moreover, I also control Leverage (*Lev*) since debt playing a monitoring tool for disclosing more information and this can influence the size of reports. I calculate *Lev* as the ratio of total debt over total asset (Dhaliwal et al., 2011; Miller, 2010).

This study also includes three dummy variables. One is derived from Paananen et al. (2021) looking at whether the firm audited by four big auditors (Deloitte, Ernst & Young, KPMG, and PricewaterhouseCoopers) or not. In this regard, I define AUDIT variable and it takes a value of 1 if the company has one of the four big auditors and 0 if not. I expect that loss/profit among other aspects of sustainability has an impact on trading volume, so I add Loss variable as a dummy variable and get the value of 1 if the firm has loss and 0 if the firm has profit for the given year. I also add DIVIDEND as another dummy variable which gets the value of 1 if the firm paid dividend for the given year and 0 if it did not distribute dividend. I expect firms with earnings and dividend have higher trading volume since it is a positive signal to investors.

5.3 Sample Selection

I examine the impact of two textual attributes of sustainability reports on market liquidity including trading volume. The chosen attributes include readability and specificity. I study European listed-firms in Energy sector as I assume companies active in the energy industry have had more challenges and risks for the environment and they can be considered as high risk firms. Therefore, the energy companies may use the sustainability reports as a tool to hide their negative impact on the society and environment (Cho et al., 2012). In addition, according to Malaquias et al. (2019) companies performing in the energy industry during the studied period of 2012-2017 have shown a considerable increase in using the words with content of sustainability in their annual reports, which is a motivation to choose them as case studies.

The sample covers all publicly listed firms in Europe in the energy sector for a 9-year period between 2012 and 2020. The database of Global Reporting Initiative (GRI) was used to get the initial list of the European firms in the energy sector. I download the PDF files of sustainability reports from GRI website and firm 's website in the case of shortage in GRI database. I collected the remaining data about firm characteristics form S&P Capital IQ and I use Yahoo Finance to gather data about trading volume and stock price of firms in the case of shortage in S&P Capital IQ 's database.

The initial sample includes 197 European firms in the energy sector that prepare their sustainability reports according to the GRI guideline. I could not find the sustainability reports for some years, especially for 2020 and this makes my sample unbalanced. In the next step, I excluded those firms that are not listed or have some shortages for other information as presented in Table 1. My final sample consists of 552 observations for 67 firms between 2012 and 2020. I describe the procedure of downloading and parsing PDF in Appendix B.

Table 1. Sample Selection

Panel A: Sample selection

	Year-firm observations	Unique firms
Initial sample sourced from the GRI database	1773	197
After removing firms which are not listed	1192	133
After removing firms which their sustainability reports were in another language	1014	116
After removing firms with missing information for control variables	960	110
After removing firms without standalone sustainability report	669	80
After removing firms which there is no presence in S&P Capital IQ	552	67

Panel B: Year breakdown

Year	Observations
2012	64
2013	65
2014	65
2015	65
2016	63
2017	64
2018	61
2019	62
2020	43
Total:	552

6 Empirical results and Analysis

6.1 Descriptive Statistics

Table 2 presents descriptive statistics regarding dependent, independent and control variables for the all 552 firm-year observations between years 2012 till 2020. AVOL as a dependent variable has mean of 0.286 and the median is -0.036. A negative median suggests that half of the figures in abnormal trading volume is negative which is a signal of decreasing trading volume during the filing date while the amount of average indicates the larger absolute values for the positive ones as one can see from min and max amounts too. Skewness of AVOL is positive which shows distribution of trading volume is pointed to right that means most of the firms in sample have relatively low AVOL and a few companies have a big amount of AVOL. Based on the kurtosis, I conclude that the distribution is not normal and it has a sharper peak and wider tails.

SPEC varies from 3.6% to 20.7% and it has median and mean of 7.9% and 8.3% with little amount of standard deviation which means the average of SPEC fluctuated around 8%. However, Log(size) as the second independent variable has more difference in its minimum and maximum values which are 3.955 and 7.212 respectively and it has mean and median quite similar which shows half of reports are smaller than average amount and the remaining are larger which approves the symmetry of reports ‘s size in the sample.

FirmSize statistics show that the sample are distributed normally as it has the lowest amount of skewness among all variables and this indicates that sample has medium and big firms in the quite similar proportion. FirmSize has standard deviation of 1.531 which standard deviation indicates how data are spread out from mean and not too big amount of standard deviation shows that data are concentrated around the mean value.

The distribution of Log(size) variable is point to left since it has negative skewness while it has positive kurtosis which indicates it has heavier tails and sharper peak. Among control variables, AGE has the highest standard deviation which shows the sample covers both old and new firms as it has minimum and maximum amount of 4 and 189 years respectively, while ROA has the lowest standard deviation which is 0.072 means all firms have ROA around the mean amounts (0.018) so the profitability measure among all firms does not have huge variation as the minimum and maximum amount of ROA are - 0.567 and 0.430, respectively. High amount of kurtosis in CAPINT variables which shows the distribution is not normal and there is large range between the lowest and highest amount and this can interpreted by extreme status

of firms and that was the reason which I did not perform winsorization by percentile 1% and 99% (Leone et al., 2007).

Table 2. Descriptive Statistics

variable	N	Mean	Median	SD	Skewness	Kurtosis	Min	Max
AVOL	552	0.286	-0.036	1.129	1.927	7.547	-1.457	5.724
SPEC	552	0.083	0.079	0.025	1.137	5.075	0.036	0.207
Log(size)	552	5.750	5.748	0.618	-0.260	3.144	3.955	7.212
ROA	552	0.018	0.026	0.072	-1.767	16.356	-0.567	0.430
FirmSize	552	9.659	9.500	1.531	-0.010	2.965	5.189	12.873
CAPINT	552	2.620	1.754	4.544	16.850	349.892	0.000	97.763
AGE	552	57.174	41.000	46.883	1.058	3.286	4.000	189.000
BM	552	-0.036	-0.039	0.796	0.610	5.141	-2.494	3.766
LEV	552	0.278	0.262	0.142	0.425	2.843	0.000	0.737
AUDIT	552	0.815	1.000	0.388	-1.624	3.638	0.000	1.000
Loss	552	0.207	0	0.405	1.450	3.102	0.000	1.000
DIVIDEND	552	0.759	1.000	0.428	-1.212	2.468	0.000	1.000

Table 3 presents the pairwise correlation matrix with its significance level which is conducted by running command pwcorr in Stata and it shows the correlation between two variables. All the correlation between control variables are not too high so the issue of multicollinearity does not happen except for ROA and Loss which is -0.7 and the high amount comes from interconnection of two variables which ROA is net income divided by total asset while Loss is a dummy variable for Loss of firm. Abnormal trading volume(AVOL) has positive correlation with ROA, FirmSize, BM, AUDIT and so I can say variables related to earnings or profit have positive correlation while LEV and AGE and Loss have negative correlation.

Among all variables in the Table 3, SPEC and LEV are significantly correlated to AVOL on the 95% level. SPEC has negative correlation with FirmSize which means bigger firm prepare less specific sustainability reports. Leverage(LEV) as a variable to measure the ability of a firm to meet its debt, is correlated negatively with FirmSize. Loss and DIVIDEND has quite high negative correlation (-0.518).

Table 3. Pairwise Correlation Matrix

Variables	AVOL	SPEC	Log(size)	ROA	FirmSize	CAPINT	AGE	BM	LEV	AUDIT	Loss	DIVIDEND
AVOL	1											
SPEC	0.086**	1										
Log(size)	-0.004	-0.002	1									
ROA	0.001	0.029	0.064	1								
FirmSize	0.054	-0.126***	0.186***	0.172***	1							
CAPINT	-0.010	-0.078*	0.030	0.004	-0.044	1						
AGE	-0.034	-0.112***	-0.074*	-0.100**	-0.072*	-0.042	1					
BM	0.060	0.404***	0.014	-0.227***	-0.016	-0.002	-0.018	1				
LEV	-0.084**	-0.322***	0.165***	-0.092**	0.039	0.132***	0.002	-0.214***	1			
AUDIT	0.033	-0.047	0.076*	-0.091**	0.018	0.058	0.092**	-0.117***	-0.024	1		
Loss	-0.001	0.015	-0.158***	-0.679***	-0.148***	-0.043	0.050	0.139***	-0.027	0.081*	1	
DIVIDEND	-0.063	-0.230***	0.171***	0.424***	0.354***	-0.053	-0.028	-0.322***	0.176***	-0.006	-0.518***	1

*** p<0.01, ** p<0.05, * p<0.1

6.2 Trend of readability measure

I measure another variable for size of report to validate the FileSize which is used in my thesis. I measure number of words. According to (Miller, 2010), number of words is a proxy for complexity of reports and I want to examine how is the trend of reports' complexity during the studied period. According to Figure 1, number of words in sustainability reports have had an increasing trend from 2012 till 2020. Firms tend to disclose more information to investors regarding their environmental, social and economic impact. Especially this increase is more considerable after 2017 which sustainability reports become mandatory for most of firms in Europe.

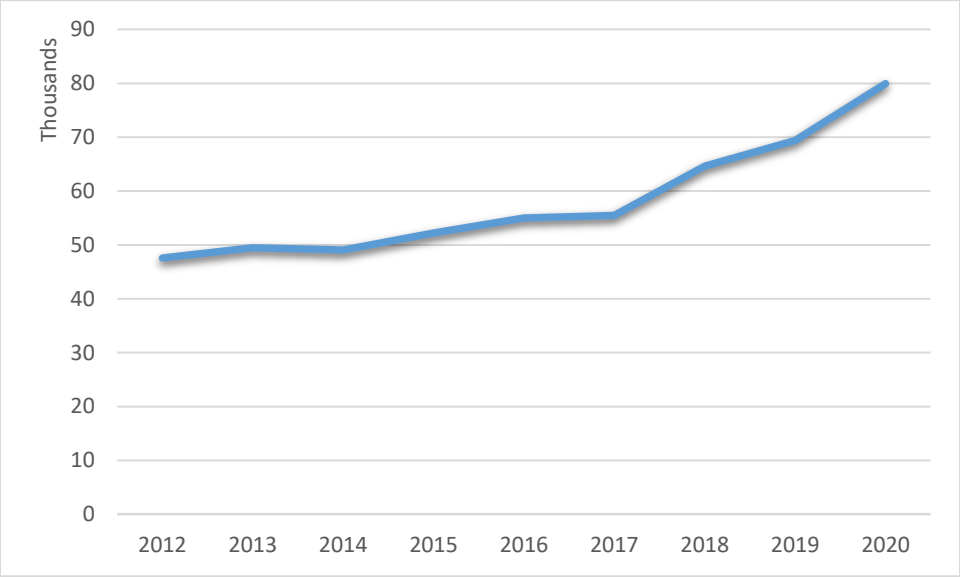

Figure 1. Number of words between 2012 and 2020

6.3 Trend of specificity measure

According to Figure 2, average of specificity score did not changed too much during the period of 2012-2016 while it began to decrease form year 2017 which is a start of implementation of EU Directive 95/2014 which made the non-financial reporting mandatory. Sustainability report as a kind of non-financial reporting is not excluded from this rule.

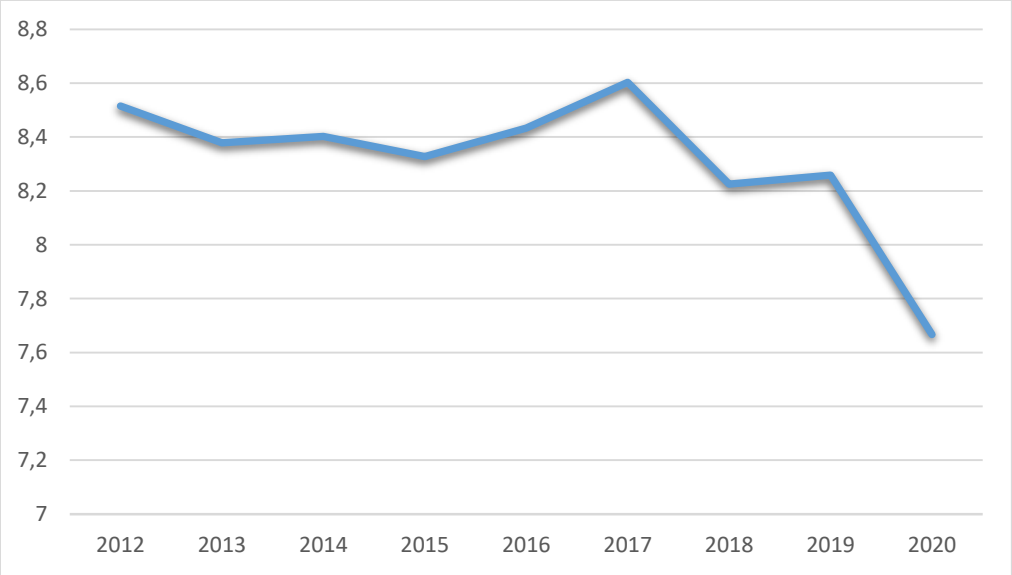

Figure 2. Specificity between 2012 and 2020

6.4 Regression Results

Table 4 presents the regression results where abnormal trading volume have been regressed on specificity and readability measure and other control variables. Standard errors has been clustered on year and firm. I use fixed effect model because the dependent variable can fluctuate over the period while a random effect model is used when we select the sample randomly (Brooks, 2008). Fixed effect for year is included in the model.

I run three regression for testing my hypotheses. In the first one I include the whole sample while in the second one I focused on years 2012-2016 which the second regression covers the results before EU Directive 95/2014 and the third one is for years 2017-2020 and my motivation for three regressions is to examine the effects of EU Directive 95/2014 on the results. Based on the regression (1) in Table 4, R-squared is 17% which means 17% variation of dependent variables in the model are explained with independent and control variables. There is a negative relation between the size of sustainability report's

file in the regression which is -0.1218. The negative relation indicates one unit increase in independent variables will result in decrease in AVOL equal to coefficient. Coefficient of -0.1218 for Log(size) means one-unit increase sustainability report 's size leads to -0.1218 decrease in abnormal trading volume which is in alignment with previous research (Loughran and Mcdonald, 2014; Miller, 2010). Previous studies on readability focused on the whole annual report and they found a significant negative relation on the confidence level of 5% or 1% while I selected sustainability reports to examine its readability measure. The results shows there is no significant association between dependent variable and abnormal trading volume so I reject my hypotheses which is Higher quality (more specific and readable) in sustainability reports increase trading volumes. To compare my result with previous studies, I can say that the regression result shows investors consider sustainability report in their decision making less than annual reports.

Among control variables in model (1), Just AGE has significant relation with abnormal trading volume in 95% confidence level. ROA has the highest positive relation with AVOL that is 0.3587 which shows profitability of firms have considerable impact on investors reaction and it is not surprising. Size and age of firms have positive impacts on investors decision and they trade more in these firms while firm with higher leverage make investors trade less. Among dummy variables, Audit has positive coefficient while Loss has negative one which Loss has stronger association so investors care more about the loss and profit than the auditor of firms.

In model (2) of regression results which covers the period of 2012-2016, specificity and readability are significant at $p<0.1$ and $p<0.01$ respectively. In addition, coefficients of these two independent variables are the highest among three regression which shows investors consider the sustainability reports more in their trading behaviour than a period after 2017. In model (2), variable BM is negatively significant at 95 % confidence level. In addition , Model 2 has the highest R-squared among all models.

Table 4. Regression Result

Time span:	2012-2020	2012-2016	2017-2020
	(1)	(2)	(3)
VARIABLES	AVOL	AVOL	AVOL
SPEC	3.8993	7.9908*	6.1011
	(1.112)	(1.662)	(0.875)
Log(size)	-0.1218	-0.4823***	-0.0458
	(-0.926)	(-2.663)	(-0.162)
ROA	-0.3587	0.8881	-0.3844
	(-0.307)	(0.505)	(-0.194)
FirmSize	0.1316	0.1693	1.0234
	(0.548)	(0.432)	(1.511)
CAPINT	-0.0002	0.0884	-0.0063
	(-0.019)	(0.779)	(-0.397)
AGE	0.0460**	-0.0589	-0.0828
	(2.240)	(-1.328)	(-0.841)
BM	-0.0514	-0.3867**	0.0532
	(-0.411)	(-2.264)	(0.205)
LEV	-0.4078	2.2518	1.1815
	(-0.458)	(1.485)	(0.554)
AUDIT	0.0224	0.2968	0.3011
	(0.089)	(0.732)	(0.593)
Loss	-0.1773	-0.1380	-0.1994
	(-0.965)	(-0.584)	(-0.550)
DIVIDEND	-0.0091	-0.1857	-0.5032
	(-0.041)	(-0.692)	(-0.935)
Constant	-3.2706	6.0117	-3.6524
	(-1.318)	(1.303)	(-0.527)
Observations	552	322	230
R-squared	0.17	0.24	0.21
Number of firm_id	67	66	65

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

7 Conclusion

The main focus in this master thesis was to study how the quality of sustainability report has an impact on the capital market. I assess the quality of sustainability report through two different aspects including readability and specificity.

I used the file's size as a measure for readability. I measure specificity through number of specific words in sustainability report divided by total number of words. Based on previous studies on readability and specificity and trading volume, I expected to find significant association between quality of sustainability report and abnormal trading volume while There is not any. Therefore, I reject my hypotheses. This can be explained by nature of sustainability report; more investors consider it as a must for firms while they weigh the financial information more on their decisions. While the results was little different when I divided the sample into two period and both independent variable become statically significant in the period of 2012-2016.

The results can be implied by standard setter for sustainability reports. There is not unified standards for preparing sustainability reports and the results show that investors do not pay much attention to sustainability report in their decision making. Moreover, specificity in sustainability report has been decreased since 2017 when the sustainability report became mandatory for listed European firms while the size of reports has been increased. This can be explained that sustainability report convey less informative information to investors. In addition, my study can be of importance to shareholders and investors to evaluate the quality of sustainability reports.

A report by Ernst and Young (Ernst & Young, 2020) showed that a considerable portion of investors consider sustainability report in their decision making, while the conclusion is a bit different in my thesis. One can say that investors value the existence of sustainability reports not their quality and they make their investment decision by considering the presence of sustainability reports.

7.1 Suggestions for future research and Limitations

I studied European listed-firms in energy sector and found no significant association between the quality of sustainability reports with trading volume. As a suggestion for future research one can examine the model with more control variables in different industries or in another regions to see how the result changes and compare them. My results show that specificity decreased from 2017 and the effect of specificity and readability measures in 2017-2020 is less than 2012-2016 and there is potential for future research to see why this occurred after EU Directive 95/2014 especially by extending the sample till 2022

when the standards will execute for sustainability reporting. Evaluating how mandatory standards for preparing sustainability report on quality of reports can be another research suggestion.

Another option for future research, adding other aspects into the research such as ownership structure, media exposure and studying the whole annual reports including financial statements and sustainability reports and compare the results.

As I selected Europe to study, one limitation of my study is the lack of a comprehensive database including the PDF files of annual reports and the filing dates which made me download all these manually and it takes too much time. Therefore, I could not download more data to increase my sample. Moreover, some sustainability reports were in another language and I could find its English version and this made my sample smaller as I need English version for studying specificity.

References

Asthana, S., Balsam, S., Sankaraguruswamy, S., 2004. Differential Response of Small versus Large Investors to 10-K Filings on EDGAR. Accounting Review 79, 571–589. https://doi.org/10.2308/accr.2004.79.3.571

Azizul Islam, M., Deegan, C., 2008. Motivations for an organisation within a developing country to report social responsibility information: Evidence from Bangladesh. Accounting, Auditing & Accountability Journal 21, 850–874. https://doi.org/10.1108/09513570810893272

Bakar, A.S.A., Ameer, R., 2011. Readability of Corporate Social Responsibility communication in Malaysia. Corporate Social Responsibility and Environmental Management 18, 50–60. https://doi.org/10.1002/csr.240

Bloomfield, R., 2008. Discussion of "Annual report readability, current earnings, and earnings persistence." Journal of Accounting and Economics, Economic Consequences of Alternative Accounting Standards and Regulation 45, 248–252. https://doi.org/10.1016/j.jacceco.2008.04.002

Brooks, C., 2008. Introductory Econometrics for Finance. Cambridge University Press, Cambridge, UNITED KINGDOM.

Brundtland, F.O. for S.D., 1987. Brundtland Report [WWW Document]. URL https://www.are.admin.ch/are/en/home/nachhaltige-entwicklung/internationale-zusammenarbeit/agenda-2030-fuer-nachhaltige-entwicklung/uno-_-meilensteine-zur-nachhaltigen-entwicklung/1987--brundtland-bericht.html

Caglio, A., Melloni, G., Perego, P., 2020. Informational Content and Assurance of Textual Disclosures: Evidence on Integrated Reporting. European Accounting Review 29, 55–83. https://doi.org/10.1080/09638180.2019.1677486

Caputo, F., Leopizzi, R., Pizzi, S., Milone, V., 2020. The Non-Financial Reporting Harmonization in Europe: Evolutionary Pathways Related to the Transposition of the Directive 95/2014/EU within the Italian Context. Sustainability 12, 92. https://doi.org/10.3390/su12010092

Cho, C.H., Michelon, G., Patten, D.M., 2012. Impression Management in Sustainability Reports: An Empirical Investigation of the Use of Graphs. Accounting & the Public Interest 12, 16–37. https://doi.org/10.2308/apin-10249

Cho, C.H., Patten, D.M., 2007. The role of environmental disclosures as tools of legitimacy: A research note. Accounting, Organizations and Society 32, 639–647. https://doi.org/10.1016/j.aos.2006.09.009

Cho, C.H., Roberts, R.W., Patten, D.M., 2010. The language of US corporate environmental disclosure. Accounting, Organizations and Society 35, 431–443. https://doi.org/10.1016/j.aos.2009.10.002

Clarkson, P.M., Ponn, J., Richardson, G.D., Rudzicz, F., Tsang, A., Wang, J., 2020. A Textual Analysis of US Corporate Social Responsibility Reports. Abacus 56, 3–34. https://doi.org/10.1111/abac.12182

Crane, A., Glozer, S., 2016. Researching Corporate Social Responsibility Communication: Themes, Opportunities and Challenges. Journal of Management Studies 53, 1223–1252. https://doi.org/10.1111/joms.12196

Dhaliwal, D.S., Oliver Zhen Li, Tsang, A., Yong George Yang, 2011a. Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. Accounting Review 86, 59–100. https://doi.org/10.2308/accr.00000005

Dhaliwal, D.S., Oliver Zhen Li, Tsang, A., Yong George Yang, 2011b. Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. Accounting Review 86, 59–100. https://doi.org/10.2308/accr.00000005

Dhaliwal, D.S., Radhakrishnan, S., Tsang, A., Yong George Yang, 2012. Nonfinancial Disclosure and Analyst Forecast Accuracy: International Evidence on Corporate Social Responsibility Disclosure. Accounting Review 87, 723–759. https://doi.org/10.2308/accr-10218

Du, S., Bhattacharya, C. b., Sen, S., 2010. Maximizing Business Returns to Corporate Social Responsibility (CSR): The Role of CSR Communication. International Journal of Management Reviews 12, 8–19. https://doi.org/10.1111/j.1468-2370.2009.00276.x

Dyer, T., Lang, M., Stice-Lawrence, L., 2017. The evolution of 10-K textual disclosure: Evidence from Latent Dirichlet Allocation. Journal of Accounting and Economics 64, 221–245. https://doi.org/10.1016/j.jacceco.2017.07.002

Dyllick, T., Hockerts, K., 2002. Beyond the business case for corporate sustainability. Business Strategy and the Environment 11, 130–141. https://doi.org/10.1002/bse.323

Eccles, R.G., Krzus, M.P., Rogers, J., Serafeim, G., 2012. The Need for Sector-Specific Materiality and Sustainability Reporting Standards. Journal of Applied Corporate Finance 24, 65–71. https://doi.org/10.1111/j.1745-6622.2012.00380.x

Ernst & Young, 2020. How will ESG performance shape your future? [WWW Document]. Ernst & Young. URL https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/assurance/assurance-pdfs/ey-global-institutional-investor-survey-2020.pdf

European Commission, 2017. Corporate sustainability reporting [WWW Document]. European Commission. URL https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

Falck, O., Heblich, S., 2007. Corporate social responsibility: Doing well by doing good. Business Horizons 50, 247–254. https://doi.org/10.1016/j.bushor.2006.12.002

Frankel, R., Li, X., 2004. Characteristics of a firm's information environment and the information asymmetry between insiders and outsiders. Journal of Accounting and Economics 37, 229–259. https://doi.org/10.1016/j.jacceco.2003.09.004

García-Meca, E., Martínez, I., 2005. Assessing the quality of disclosure on intangibles in the Spanish capital market. European Business Review 17, 305–313. https://doi.org/10.1108/09555340510607352

Gond, J.-P., Grubnic, S., Herzig, C., Moon, J., 2012. Configuring management control systems: Theorizing the integration of strategy and sustainability. Management Accounting Research 23, 205–223. https://doi.org/10.1016/j.mar.2012.06.003

GRI, 2021. Mission & history [WWW Document]. URL https://www.globalreporting.org/about-gri/mission-history/

GRI, 2020. Rising trust in sustainability reporting around the world [WWW Document]. URL https://www.globalreporting.org/about-gri/news-center/2020-10-14-rising-trust-in-sustainability-reporting-around-the-world/

Hales, J., Kuang, X. (jason), Venkataraman, S., 2011. Who Believes the Hype? An Experimental Examination of How Language Affects Investor Judgments. Journal of Accounting Research 49, 223–255. https://doi.org/10.1111/j.1475-679X.2010.00394.x

Hans Hoogervorst, 2013. IFRS - IASB Chair's Speech: Breaking the boilerplate [WWW Document]. URL https://www.ifrs.org/news-and-events/2013/06/iasb-chairs-speech-breaking-the-boilerplate/

Healy, P.M., Palepu, K.G., 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. Journal of Accounting and Economics 31, 405–440. https://doi.org/10.1016/S0165-4101(01)00018-0

Hope, O.-K., Hu, D., Lu, H., 2016. The benefits of specific risk-factor disclosures. Rev Account Stud 21, 1005–1045. https://doi.org/10.1007/s11142-016-9371-1

Hrasky, S., Mason, C., Wills, D., 2009. The Textual Complexity of Annual Report Narratives: A Comparison of High- and Low-Performance Companies. New Zealand Journal of Applied Business Research (NZJABR) 7, 31–45.

Landrum, N.E., Ohsowski, B., 2018. Identifying Worldviews on Corporate Sustainability: A Content Analysis of Corporate Sustainability Reports. Business Strategy and the Environment 27, 128–151. https://doi.org/10.1002/bse.1989

Lang, M., Stice-Lawrence, L., 2015. Textual analysis and international financial reporting: Large sample evidence. Journal of Accounting and Economics 60, 110–135. https://doi.org/10.1016/j.jacceco.2015.09.002

Lawrence, A., 2013. Individual investors and financial disclosure. Journal of Accounting and Economics 56, 130–147. https://doi.org/10.1016/j.jacceco.2013.05.001

Leone, A.J., Rock, S., Willenborg, M., 2007. Disclosure of Intended Use of Proceeds and Underpricing in Initial Public Offerings. Journal of Accounting Research 45, 111–153.

Li, F., 2008. Annual report readability, current earnings, and earnings persistence. Journal of Accounting and Economics, Economic Consequences of Alternative Accounting Standards and Regulation 45, 221–247. https://doi.org/10.1016/j.jacceco.2008.02.003

Li, G., Li, J., Liu, M., Zhu, X., 2019. Evolutionary Mechanism of Risk Factor Disclosure in American Financial Corporation Annual Report, in: ICDS. https://doi.org/10.1007/978-981-15-2810-1_50

Loughran, T., Mcdonald, B., 2014. Measuring Readability in Financial Disclosures. The Journal of Finance 69, 1643–1671. https://doi.org/10.1111/jofi.12162

Malaquias, R.F., Borges Junior, D.M., Malaquias, F.F. de O., Albertin, A.L., 2019. Climate protection or corporate promotion? Energy companies, development, and sustainability reports in Latin America. Energy Research & Social Science 54, 150–156. https://doi.org/10.1016/j.erss.2019.04.001

McMullin, J.L., 2014. Can I Borrow Your Footnotes? Learning and Network Benefits of Footnote Similarity (Ph.D.). University of Southern California, United States -- California.

Merkl-Davies, D.M., Brennan, N.M., 2008. Discretionary Disclosure Strategies in Corporate Narratives: Incremental Information or Impression Management? (SSRN Scholarly Paper No. ID 1089447). Social Science Research Network, Rochester, NY.

Miller, B.P., 2010. The Effects of Reporting Complexity on Small and Large Investor Trading. Accounting Review 85, 2107–2143. https://doi.org/10.2308/accr.00000001

Nidumolu, R., Prahalad, C.K., Rangaswami, M.R., 2009. WHY SUSTAINABILITY IS NOW THE KEY DRIVER OF INNOVATION. (cover story). Harvard Business Review 87, 56–64.

Orlitzky, M., Schmidt, F.L., Rynes, S.L., 2003. Corporate Social and Financial Performance: A Meta-Analysis. Organization Studies 24, 403–441. https://doi.org/10.1177/0170840603024003910

Paananen, M., Runesson, E., Samani, N., 2021. Time to clean up environmental liabilities reporting: disclosures, media exposure and market implications. Accounting Forum 0, 1–32. https://doi.org/10.1080/01559982.2021.1872909

Richardson, A.J., 2015. Quantitative research and the critical accounting project. Critical Perspectives on Accounting 32, 67–77. https://doi.org/10.1016/j.cpa.2015.04.007

Rowland, K. Atiase, Smith bamber, L., 1994. Trading volume reactions to annual accounting earnings announcements: The incremental role of predisclosure information asymmetry. Journal of Accounting and Economics 17, 309–329. https://doi.org/10.1016/0165-4101(94)90031-0

Sandberg, M., Holmlund, M., 2015. Impression management tactics in sustainability reporting. Social Responsibility Journal 11, 677–689. https://doi.org/10.1108/SRJ-12-2013-0152

Sierra-Garcia, L., Garcia-Benau, M.A., Bollas-Araya, H.M., 2018. Empirical Analysis of Non-Financial Reporting by Spanish Companies. Administrative Sciences (2076-3387) 8, 29. https://doi.org/10.3390/admsci8030029

Suchman, M.C., 1995. Managing Legitimacy: Strategic and Institutional Approaches. Academy of Management Review 20, 571–610. https://doi.org/10.5465/AMR.1995.9508080331

Unerman, J., Bebbington, J., O'Dwyer, B., 2014. Sustainability accounting and accountability, 2. ed. ed. Routledge, London.

Villiers, C. de, van Staden, C.J., 2011. Where firms choose to disclose voluntary environmental information. Journal of Accounting and Public Policy 30, 504–525. https://doi.org/10.1016/j.jaccpubpol.2011.03.005

Wang, Z., Hsieh, T.-S., Sarkis, J., 2018. CSR Performance and the Readability of CSR Reports: Too Good to be True? Corporate Social Responsibility and Environmental Management 25, 66–79. https://doi.org/10.1002/csr.1440

Wilmshurst, T.D., Frost, G.R., 2000. Corporate environmental reporting: A test of legitimacy theory. Accounting, Auditing & Accountability Journal 13, 10–26. https://doi.org/10.1108/09513570010316126

Xuan Huang, Siew Hong Teoh, Yinglei Zhang, 2014. Tone Management. Accounting Review 89, 1083–1113. https://doi.org/10.2308/accr-50684

Yongtae Kim, Myung Seok Park, Wier, B., 2012. Is Earnings Quality Associated with Corporate Social Responsibility? Accounting Review 87, 761–796. https://doi.org/10.2308/accr-10209

Appendix A. Variables definition

Dependent Variable	
AVOL	Measured by mean daily trading volume during the report date (-1, 3) minus the mean daily trading volume before the report date (-49, -5), divided by the standard deviation of daily trading volume before the report date (-49, -5).
Independent Variables	
Log(size)	The natural logarithm of plain text file's size.
Specificity	Number of specific words in each report.
Control Variables	
ROA	Return on Asset: net income over total asset.
FirmSize	The natural logarithm of total asset.
CAPINT	Capital Intensity that measured as total asset divided by revenue.
AGE	The age of firm for each year from its foundation
BM	The natural logarithm of book-to-market.
LEV	Total debt divided by total asset.
AUDIT	Dummy variable set to one if the firm is audited by 4 big audit firm, else zero.
Loss	Dummy variable set to one if the firm has loss for given year, else zero.
DIVIDEND	Dummy variable set to one if the firm pay dividend for given year, else zero.

Appendix B. Gathering data and parsing PDF

The first step for this study was to download the PDF file of sustainability reports and this data gathering was the most difficult challenge. I studied firms in Europe where the text files of 10-k annual reports are not available the same as EDGAR database (Loughran and Mcdonald, 2014). I need to extract text from PDF files in order to measure the plain text file (UTF-8 format) for the readability variable. PDF files obtained from GRI database and firm 's website together in the case of missing information in GRI website. Extracting text from PDF was more time consuming than what I expected since some PDF files were encrypted and some firms presented the whole annual report so it's required to separate the sustainability report

Several Python scripts were used to measure the readability variables such as pyPDF2, pdfReader to extract the text from PDF. Then, other coding was conducted to obtain the size of text file and number of words.