



UNIVERSIDADE CATÓLICA PORTUGUESA

Can Financial Narratives Explain Residual Returns?

Evidence from UK FTSE350 non-financial firms

Juliana Gonçalves Machado

Católica Porto Business School

April 2023



UNIVERSIDADE CATÓLICA PORTUGUESA

Can Financial Narratives Explain Residual Returns?

Evidence from UK FTSE350 non-financial firms

Final Assignment in the modality of Dissertation presented to *Universidade Católica Portuguesa* to obtain the degree of Master in Finance

by

Juliana Gonçalves Machado

under the supervision of

(PhD) Paulo Alexandre Pimenta Alves

Católica Porto Business School

April 2023

Acknowledgments

I would like to express my sincere appreciation to several individuals who have made this work possible. Firstly, I would like to thank my parents for their unconditional support and affection throughout my life, which has helped me in achieving my academic goals.

Secondly, I am grateful to Católica Porto Business School, and especially to my supervisor, Professor Paulo Alves, for his invaluable guidance, support, and availability during the course of this research. I am also thankful to Professor Francisco Santos for his valuable assistance.

Lastly, I would like to extend my gratitude to my boyfriend and friends for their constant encouragement, which has kept me motivated throughout this journey. Their unwavering support, along with that of my family, has made this work possible. Thank you all for believing in me.

Resumo

Este estudo analisa o impacto das narrativas financeiras, nomeadamente, o tom, o *forward-looking* e a complexidade dos relatórios anuais nos retornos residuais. Usando modelos de regressão linear, realizamos uma análise dos retornos residuais gerados pelo *Fama-French 3-factor model* relativamente às narrativas financeiras de várias secções do relatório, incluindo *Management Discussion and Analysis* (MD&A), mensagem do CEO, mensagem do *Chairman* e secção Operacional e Financeira.

Apesar da falta de impacto do tom de cada secção nos retornos residuais, verificou-se que o *forward-looking* da mensagem do CEO e a complexidade da secção Operacional e Financeira foram significativas. Isto demonstra que ao ter estes fatores em consideração, os investidores serão capazes de aprimorar as avaliações que fazem das empresas o que levará a decisões mais informadas.

Palavras-chave: narrativas financeiras; tom; *forward-looking*; complexidade; divulgações; relatórios anuais; retornos residuais; avaliação de empresas; assimetria de informação

Número de palavras: 8520

Abstract

This study analyses the impact of narrative measures, specifically tone, the number of forward-looking words, and the complexity of annual reports on residual returns. Multivariate models were performed using the annual residual returns generated by the Fama-French 3-factor model and the narrative features of various report sections, including the Management Discussion and Analysis (MD&A), CEO Review, Chairman's Statement, and Operational & Financial Review.

Despite the lack of impact of tone of every section on the residual returns, the forward-looking words of the CEO Review and the complexity of the Operational & Financial Review were found to be significant. This highlights the potential for investors to enhance their valuations of companies and make better-informed decisions by taking these factors into consideration.

Keywords: financial narratives; tone; forward-looking; complexity; disclosures; annual reports; residual returns; firm valuation; information asymmetry

Number of words: 8520

Table of Contents

Acknowledgments.....	v
Resumo.....	vii
Abstract.....	ix
List of tables.....	xii
1.Introduction.....	14
2. Literature Review.....	17
3. Research Question and Hypotheses.....	29
4. Data and Methodology.....	33
4.1. Sample selection and data collection.....	33
4.2. Methodology.....	36
5. Results.....	40
5.1. Tone.....	45
5.2. Forward-looking.....	46
5.3. Complexity.....	47
6. Conclusions.....	49
References.....	51
Appendix.....	57

List of Tables

Table 1 – Companies distribution over industry.....	34
Table 2 - Descriptive statistics - Narrative measures.....	35
Table 3 - OLS coefficients estimates - individual regressions	41
Table 4 - OLS coefficients estimates - narrative measure.....	42
Table 5 - OLS coefficients estimates - report section.....	43
Table 6 - OLS coefficients estimates - 3 narrative measures/4 report sections...	44
Table 7 - Variables Definition.....	57

1. Introduction

Various studies have attempted to capture the part of returns which cannot be explained by valuation models. For instance, Francis et al. (2005) investigated the extent to which investors price securities in a way that reflects their perception of the accrual's quality. In essence, their objective was to ascertain whether the quality of accruals could exert a discernible influence on a company's expected returns.

The present study shares a similar goal, though the focus is directed towards three specific attributes of financial narratives, namely: the tone, the use of forward-looking words and the complexity of disclosures, and their potential impact on the residual returns.

One could argue that a thorough analysis of financial narratives enables investors to establish a connection between the financial statements and the underlying economic performance of companies (Feldman et al., 2010). Research has shown that firm sentiment has predictive value for earnings and stock returns, reflecting both present and future performance (Price et al., 2012; Loughran & McDonald, 2016).

In this regard, examining the words used in companies' disclosures can be effective in reducing the informational asymmetry between managers and investors (Verrecchia, 2001; Kothari et al., 2009). As a result, a significant amount of research has been conducted, demonstrating that the tone of companies' disclosures can have an impact on capital markets (Davis & Tama-Sweet, 2012; Wang et al., 2021). Similar evidence has been observed regarding the influence of forward-looking words (Muslu et al., 2011; Hassanein et al., 2019) and the complexity of disclosures (Li, 2008; You & Zhang, 2009).

The aim of the research is to evaluate whether the narrative measures selected for analysis can account for the aforementioned residual returns. To this purpose, the current dissertation uses the Fama-French 3-factor model to compute the annual residual returns of non-financial firms included in the UK FTSE350 index, over the period spanning from 2008 to 2017. We use three sources of data: i) Thomson Reuters Datastream is used to retrieve market, accounting and other firm characteristics; ii) the database provided by the University of Exeter¹ that presents the Fama-French and Momentum Portfolios and Factors in the UK; and iii) financial narratives data is obtained from El-Haj et al. (2020).

A matching process between the annual residual returns and narrative measures of each section of the annual reports was carried out, resulting in a final sample of 286 non-financial companies for the ten-year period between 2008 and 2017. It is important to acknowledge that, as anticipated, the number of observations significantly declined throughout this process. The missing observations can be explained by two main reasons: i) cases in which the annual report could not be obtained; and ii) text extraction issues that result in unusable output.

The elementary regression model employed in this study utilizes the residual returns as the dependent variable. The independent variables, namely tone, forward-looking words, and complexity, are our narrative measures, and their effect on the residual returns is examined across four sections of the annual reports: MD&A, CEO Review, Chairman's Statement, and Operational & Financial review².

¹ Available at: <http://business-school.exeter.ac.uk/about/departments/accounting-finance/famafrench/>

² Alves et al. (2016) showed that different annual report sections carry different performance predictive ability.

The results of the study indicate that contrary to initial expectations, the tone of the annual reports did not have any discernible impact on the annual residual returns in any of the sections analysed. This suggests that investors cannot improve their assessments of a company's value by analysing the tone of the reports. On the other hand, the use of forward-looking words was found to have a significant impact on the residual returns, but only in the CEO Review section. Lastly, the complexity of the reports, measured by the number of words in each section, was found to have a significant impact on the residual returns, particularly in the Operational & Financial Review section.

Therefore, it can be concluded that by considering the forward-looking words in the CEO Review and the complexity of the Operational & Financial section, investors can obtain a better comprehension of the companies' performance, and consequently, make more informed decisions. This would enable them to arrive at more precise estimates of the expected returns, leading to better investment choices.

The present dissertation aims to contribute to the existing literature by examining the UK market, which has received relatively less attention from scholars, and by utilizing the most up-to-date data available. Moreover, the study aims to aid investors in making better-informed decisions by improving their assessments of companies' expected returns.

The remainder of the dissertation is organized as follows: Chapter 2 offers a comprehensive review of the literature, providing a theoretical framework on financial narratives and their potential impact on capital markets by reducing information asymmetries. Chapter 3 presents the research question and associated hypotheses. Chapter 4 outlines the methodology employed, including data collection and sample selection. Chapter 5 provides an analysis of the results. Finally, Chapter 6 offers concluding remarks.

2. Literature Review

In the realm of finance, the possession of information constitutes a valuable asset for all market participants. Consequently, individuals lacking pertinent information find themselves at a disadvantage relative to those enriched with superior insights (Easley et al., 2002). Easley & O'Hara (2004) further established that investors expect greater returns on stocks when holding superior information, as they can make more informed decisions regarding their portfolios. Diamond & Verrecchia (1991) illustrated that disclosures and the attendant reduction of information asymmetry can enhance a firm's securities liquidity while reducing its cost of capital. Ultimately, these factors can exert an influence upon share prices and, consequently, the overall value of the company in question (Healy et al., 1999).

The concepts of information asymmetry and information quality are inextricably linked. The information problem, also known as the "lemons" problem, describes a condition whereby sellers possess superior knowledge relative to buyers, potentially leading to the destabilization of capital markets (Akerlof, 1970). To mitigate this challenge, one possible approach involves regulatory intervention, requiring firms to disclose information relating to both quantity and quality. Such measures can serve to diminish information asymmetries between a company and its prospective investors.

Considerable research has previously been conducted which demonstrates that a rich disclosure environment and reduced information asymmetry have numerous desirable consequences (Kothari et al., 2009). Verrecchia's (2001) exhaustive examination of the potential relationship between efficiency and

disclosure established that the most notable connection was the one between disclosure and a reduction in information asymmetry. Indeed, a multitude of previous investigations has revealed that greater disclosure is linked to lower costs of capital, enabling companies to influence their cost of capital and expected returns by altering the quality and quantity of information available (Botosan, 1997; Sengupta, 1998; Easley & O'Hara, 2004). Consequently, it is conceivable that disclosures hold the power to exert a profound influence on a company's capital market environment.

The demand for financial reporting and disclosures of superior quality can be attributed to information asymmetry and agency conflicts, which arise essentially between managers and investors (Healy & Palepu, 2001). Agency theory further suggests that disclosures can diminish information asymmetries between management and investors (Jensen, 1986). Jensen & Ruback (1983), in their study of agency conflicts, determined that the market for corporate control represents an arena in which each stakeholder strives for the right to manage corporate resources. In this context, information is viewed as a commodity, with an associated cost (Eisenhardt, 1989).

Corporate financial disclosure serves as the foundation of a company's internal workings and is critical to the establishment of an effective and efficient capital market. It comprises a series of communications designed to mitigate information asymmetry and agency conflicts between a company's managers and external stakeholders. Companies may disseminate disclosures through various means, with regulated reports being the most common.

In a standard annual report, it is possible to distinguish two distinct branches: a narrative component, usually appearing in the initial sections of the document, which presents the chairman's statement, management's commentary on

performance, and other such matters; and a second branch containing the mandatory financial statements and related footnotes (El-Haj et al., 2020).

It is imperative for each and every stakeholder to recognize that companies are multifaceted entities that extend beyond mere numbers. Thus, it is crucial to analyse the narrative aspect of disclosures as it can be a vital source of information. In fact, some significant studies have indicated a decline in the value relevance of financial statement information in determining a firm's value for investors (Brown et al., 1999; Francis & Schipper, 1999).

Amir & Lev (1996) conducted a study on the relevance of non-financial information in the wireless communications industry and found that the value-relevance of this type of information overwhelms that of traditional financial indicators. They argued that in such fast-growing industries, where expenses related to Research and Development (R&D) are significant, book values may not fully reflect a company's success and growth. Similarly, Hirschey et al. (2001) reported a strong complementary relationship between traditional financial information and nonfinancial data in the high-tech sector.

The comprehension of narrative information in disclosures is critical and equally relevant as financial information, and both complement each other. Consequently, a well-informed market participant should pay attention to both parts of the disclosures. Nonetheless, it is essential to be conscious of narrative information's nature and interpret it rationally.

Companies can strategically release this type of communication, potentially reducing its usefulness to investors, as it is largely subject to managerial discretion. In the presence of uncertainty, managers may opt to disclose or withhold information regarding the firm's value. By manipulating disclosures,

they may be covering useful information for valuing the company, which can have economic consequences (Verrecchia, 2001; Kothari et al., 2009).

The present study focuses on financial narratives and the relevance of incorporating textual analysis in the company valuation process. Investors are increasingly aware of the necessity of considering more than merely quantitative data in their assessments. The words employed by managers to outline their operations and the firm's performance are meaningful and evidence demonstrates that it is correlated with future stock returns and earnings (Loughran & McDonald, 2016). Consequently, an investor who analyses the language used in a company's annual report could acquire additional information and subsequently adjust his decisions.

In most jurisdictions, publicly traded companies are obligated to provide an annual report, although regulations and standards vary across different areas of control. In the United States, for example, the Securities and Exchange Commission (SEC) mandates that publicly traded firms issue annually a comprehensive report known as the 10-K, which adheres to a strict template to ensure that stakeholders have sufficient and valuable information (El-Haj et al., 2018). However, outside the United States, the situation is not homogeneous. While companies are required to comply with international regulations from the International Accounting Standards Board (IASB) or directives from the European Union, each jurisdiction has its unique requirements.

The lack of standardization among annual reports has resulted in a significant challenge, as it increases the influence of managerial discretion in the reporting process (El-Haj et al., 2020). The absence of uniformity in report templates allows for management to selectively present information to their advantage. Such actions can exacerbate the information asymmetry between managers and investors, thus diminishing the reliability of the information provided. It is,

therefore, imperative to acknowledge the potential concerns and develop strategies to mitigate their impact on the analysis and valuation of companies.

As the primary focus of this dissertation pertains to the qualitative aspect of companies' reports, it is crucial to comprehend the key factors that are considered during the examination of the narrative section.

Textual analysis, a specific technique within the broader realm of qualitative analysis, entails a methodical investigation of predefined categories or targeted phrases within a document. For effective analysis of qualitative data, it is essential to convert the textual content into quantitative measures. Through the extraction of these quantitative measures from discrete segments of text, significant insights and information can be accessed (Loughran & McDonald, 2016).

A diverse range of these quantitative metrics can be derived from the narrative component of reports which can aid investors in gaining supplementary insights that augment their existing knowledge regarding a specific company. The primary objective of data reduction is to synthesize the substantial volume of textual information into a succinct set of numerical variables that can be efficiently analysed (Li, 2010a). That is viable due to the tremendous advancements that have been made in the areas of computational linguistics, text mining, and machine learning over the past twenty years (Manning & Schütze, 1999; Jurafsky & Martin, 2000). These advancements furnish accounting and financial experts with effective methods to comprehend corporate statements more efficiently (Core, 2001).

Li (2010b) has pointed out three narrative measures of potential interest to researchers, which include: the complexity of the disclosure, largely related to the length of the document and the subsequent number of words; the

transparency, frequently evaluated through the assessment of textual readability; and the tone. With the aim of investigating whether certain narrative characteristics could enhance one's perception of companies, beyond the quantitative data, this study concentrates on three specific features: the tone, the use of forward-looking words and in order to understand the possible impact of the complexity of the report, the number of words was also added.

When assessing the tone of a report, researchers commonly employ word categorization which is a dictionary-based method, relying on content analysis. This entails tallying the frequency of words that are associated with a particular sentiment. For instance, a higher incidence of negative words indicates a more pessimistic tone. This practice relies on the use of word lists or bags of words, which comprise collections of words that pertain to a given attribute. The most significant advantage of this method is its replicability across multiple studies, which brings legitimacy. However, it has a notable limitation in that it does not capture semantics, which includes the order and sequence of words in the text (El-Haj et al., 2019).

This method typically involves selecting an appropriate lexicon, with the Harvard General Inquire (GI) word lists being widely employed in many fields (Loughran & McDonald, 2016). In the specific field of financial text analysis, the Henry (2008) word list was one of the earliest developed specifically for this purpose. Nevertheless, this list of only 85 negative words has been found to be insufficiently comprehensive compared to other more expansive word lists.

Later, a study by Loughran & McDonald (2011) stated that dictionaries originating from other fields contain inaccuracies and misclassify common financial words within financial texts. In response to this issue, the authors developed six distinct word lists that more accurately reflect the financial context and the language typically employed in that domain. In light of technological

advancements, contemporary research benefits from the use of computer programs designed to count words associated with a designated list. The use of such programs enables researchers to analyse larger samples with greater efficiency and accuracy.

In addition to the prevalent dictionary-based approach, some scholars utilize a machine learning method also known as Natural Language Processing (NLP) which has been imported from computer sciences and Artificial Intelligence (El-Haj et al., 2019). This approach employs statistical techniques to deduce the content of texts and categorize them based on statistical inference. However, the application of these methods is complex and challenging to replicate across studies, making the validation process of their accuracy more arduous compared to other methodologies (Xing et al., 2018; Lewis & Young, 2019; El-Haj et al., 2019). Besides, it entails significant time and cost demands, resulting in its relatively limited usage among researchers. (Li, 2010b).

Scholars increasingly recognize the importance of scrutinizing the language employed in financial documents as a means of acquiring insights into the prospects of a firm. Managers' expressions of optimism or pessimism can provide investors with valuable information beyond the apparent meaning of the words. In his seminal publication, Tetlock (2007) established a significant relationship between the tone of the Wall Street Journal's "Abreast of the Market" daily column and stock market levels. Tetlock's research uncovered that heightened levels of journalistic pessimism in the daily column are associated with both lower subsequent stock returns and higher subsequent stock market volatility. These findings have been influential in the field of finance, highlighting the potential influence of media tone on market outcomes.

Given the potential impact of media tone on the stock market, it is reasonable to postulate that the tone conveyed by management or the chairman in reports

could have a similar effect on the market (Lewis & Young, 2019). In fact, later Kothari et al. (2009) demonstrated that disclosure tone, based on an analysis of disclosures from United States publicly traded companies, is significantly associated with both stock return volatility and analyst forecast error dispersion. Specifically, the authors found that disclosures with a more positive tone were associated with lower volatility and forecast dispersion, while negative new information contained in the disclosures was linked with significantly higher volatility and analyst dispersion.

Numerous studies have investigated the influence of sentiment conveyed by the non-financial information included in the Management Analysis & Discussion (MD&A) section of SEC filings on the stock market. If managers hold a more pessimistic (optimistic) outlook regarding future prospects, they are likely to utilize more negative (positive) language in their disclosures. Feldman et al. (2010) examined the effect of the tone expressed in the MD&A section on short window returns following the release of SEC filings. Through an analysis of positive and negative word frequency and their difference, they found that alterations in the tone conveyed by the MD&A section significantly correlate with short window returns around SEC filing dates, even after controlling for relevant variables such as accruals or earnings surprises.

Likewise, Davis & Tama-Sweet (2012) established a significant association between the tone in the MD&A section of the 10-K filing and the future return on assets (ROA) of a firm. Specifically, the more negative or pessimistic the MD&A tone, the lower the subsequent ROA for the company. More recently, Wang et al. (2021) investigated the influence of positive tone in MD&A disclosures on the dynamic adjustment of capital structure. Their findings suggest that such positive disclosures are positively associated with the adjustment speed of capital structure.

Furthermore, McKay Price et al. (2012) investigated the tone of quarterly earnings conference calls and found that linguistic tone during these calls is a significant predictor of abnormal returns and trading volume, indicating the potential influence of tone on market outcomes. (Bannier et al., 2017) who studied the CEO's speech from German firms at the Annual General Meeting concluded that cumulative abnormal returns decreased with the decrease of the difference between positive and negative tone.

The importance of tone in qualitative disclosures as a means of influencing investors' assessments of a firm's value has been well-established through prior research (Huang et al., 2014). Thus, based on the body of research, it can be asserted that the tone is one of the most salient narrative characteristics for investors, given its proven correlation with financial variables and ability to affect the market and stakeholders' perceptions of companies.

Similar to tone, research has proved that other narrative features can impact investors' perceptions of firms when scrutinized. As indicated by Hussainey et al. (2003) forward-looking disclosure in the United Kingdom (UK) provides pertinent and valuable information to investors in predicting future earnings. However, it should be noted that there are considerable differences in the forward-looking disclosure approaches of UK firms, which can impede analysis, as pointed out by Wang & Hussainey (2013).

Forward-looking information encompasses firms' voluntary disclosures concerning anticipated payoffs from present and future investment plans and from structural business transformations that enable users to predict a company's future financial performance (Athanasakou & Hussainey, 2014). Since forward-looking information is typically conveyed through qualitative narrative statements due to its qualitative and non-time-specific nature, its measurement commonly involves the use of the conventional content analysis approach to

quantify the number of sentences or words containing forward-looking information in the narrative sections (Clatworthy & Jones, 2003; O'Sullivan et al., 2008).

Consistent with the findings on the impact of tone on market perception, the presence of forward-looking words in disclosures has also been shown to affect capital markets and investors' perception of companies. Barron et al. (1999) conducted a study demonstrating the positive association between forward-looking disclosures and the accuracy of analyst earnings forecasts, highlighting the effect of such disclosures on capital markets.

Subsequent studies have continued to confirm the impact of forward-looking information on investors' perceptions of firms. Miller & Piotroski (2000), Hussainey et al. (2003), Muslu et al. (2011) showed that the incorporation of forward-looking information in disclosures increases the correlation of stock returns with the next period's earnings. More recently, Hassanein et al. (2019) conducted a study on the influence of forward-looking information on the values of UK FTSE all-shares non-financial firms and confirmed a significant effect. Overall, these studies provide compelling evidence that the presence of forward-looking information in disclosures has a positive impact on capital markets and investors' assessment of firms.

In addition to investigating the influence of the tone and forward-looking words of annual reports on investors' evaluation of companies, this study also aims to examine the impact that the complexity of the reports can have on this assessment. Specifically, the relationship between the number of words of the reports and performance will be analysed, as previous research has shown a link between the two factors.

According to Loughran & McDonald (2014) file size is a reliable proxy for the complexity of disclosures. As such, the number of words within a document can be used to gauge the level of complexity, an attribute that the authors contend is intricately linked to readability. Specifically, the more complex a report, the less readable it is likely to be.

Research findings suggest that investors tend to have cognitive biases that can be influenced by the presentation of information. When information is presented in a more complex textual format, it can create additional barriers to investors' willingness and ability to process the information, ultimately resulting in obstacles to trading activity (Merkl-Davies & Brennan, 2007). This underscores the importance of taking into account the complexity and readability of financial disclosures.

In his influential research, Li (2008), revealed that longer financial reports are linked with lower earnings in subsequent periods, indicating that managers may attempt to cover poor future earnings by intentionally increasing the complexity of these documents. Subsequently, Lawrence (2013), arrived at a similar conclusion, demonstrating that the readability and complexity of companies' reports has a discernible effect on market pricing.

In line with this argument, You & Zhang (2009) conducted a study on the complexity of 10-K filings, which revealed that companies with word counts exceeding the median annual value exhibit a delayed stock market response in the subsequent 12 months. Additionally, Miller (2010) concluded that longer and hence more complex reports are associated with lower trading volume.

Lee (2012) documented that when quarterly reports are longer and more complex, they hinder the market's capacity to rapidly assimilate information

related to earnings. Similarly, Boubaker et al. (2019) recently demonstrated that firms that have longer and more difficult-to-read narratives experience a decrease in stock liquidity, as it becomes harder for investors to process and analyse information from annual reports, thus reducing their willingness to trade. These results are significant as they indicate how the complexity of reports can impact capital markets and investors' perceptions of companies and their future actions.

Numerous studies (Huang et al., 2014; Hussainey et al., 2003; Li, 2008) have demonstrated that how a company communicates through its reports can significantly impact how investors perceive its value. Elements such as the tone of the communications, the number of forward-looking words and the level of complexity all play a role in shaping investor sentiment. Therefore, the analysis of narrative characteristics is crucial in determining the market perception of companies and their valuation.

3. Research Question and Hypotheses

Empirical research has provided evidence that the annual report provided by companies and its various sections when properly analysed, have the ability to predict a company's future performance. Alves et al. (2016) found that each section of the annual report has a different predictive capacity regarding firm performance. Hence, it is crucial to undertake a comprehensive analysis of various annual report sections simultaneously, owing to their distinct purposes and associated information. Additionally, the linguistic style of annual reports is subject to variation as it is typically produced by multiple authors (Argamon et al., 2009). Furthermore, it is important to acknowledge that the quality of disclosures may be affected by the type of governance in place, as research indicates that robust governance structures are typically associated with higher quality disclosures (García Osma & Guillamón-Saorín, 2011).

Having all the posterior information in mind, the objective of this study is to examine the extent to which the tone, utilization of forward-looking words, and complexity of a company's annual report can justify the residual returns observed in the Fama-French 3-factor model. To accomplish this objective, we compare the impact of the three selected narrative characteristics on the annual residual returns. The study seeks to determine the degree to which the tone, use of forward-looking words and textual complexity serve as meaningful narrative attributes in an annual report, capable of accounting for the residual returns that remain unexplained by the model.

Each narrative measure is analysed in relation to the MD&A section as well as the CEO's and Chairman's narrative sections. The narrative component of the

Operational and Financial sections in the reports was also included, in order to facilitate the analysis these different narrative parts will be treated as a singular section.

The four aforementioned sections were chosen for this study due to their relevance. The MD&A section is of considerable significance, similar to the Operational and Financial section, as it includes multiple sub-sections. Specifically, it pertains to the initial part of an annual report that is typically distinguished by a greater emphasis on a narrative viewpoint and a lesser emphasis on numerical information.

The CEO Review section was selected as it is closely tied to the thoughts of top management regarding the company's performance. Analysing this section may provide insights into previously inexplicable returns. The Chairman's statement, which may be referred to as the President's or Chairman's letter, was included to explore potential differences in comparison to the CEO Review. This section is particularly interesting as the chairman typically does not have an active role in daily operations, and previous research has shown that the chairman's statement can be a predictor of financial distress in firms (Smith & Taffler, 2000).

Lastly, the narrative component of the Operational and Financial sections within the annual reports, was incorporated into the analysis to ascertain whether the language utilized to explicate these more numeric sections may contain significant insights into a company's expected returns.

With the aim of investigating the impact of tone on the residual returns generated by the selected model and its potential as a tool for evaluating company performance, the following hypotheses were formulated:

Hypothesis 1: The tone employed in companies' annual reports can help explain annual residual returns.

H_{1a}: The tone of the MD&A can help explain annual residual returns.

H_{1b}: The tone of the CEO Review can help explain annual residual returns.

H_{1c}: The tone of the Chairman's Statement can help explain annual residual returns.

H_{1d}: The tone of the Operational and Financial section can help explain annual residual returns.

Forward-looking words are defined as words associated with "forecasts and predictions" (Hussainey et al., 2003). As previously demonstrated, numerous studies have established a link between the use of forward-looking language and its impact on capital markets. In light of this, the following hypotheses were formulated:

Hypothesis 2: The forward-looking words presented in companies' annual reports can help explain annual residual returns.

H_{2a}: The forward-looking words presented in the MD&A can help explain annual residual returns.

H_{2b}: The forward-looking words presented in the CEO Review can help explain annual residual returns.

H_{2c}: The forward-looking words presented in the Chairman's Statement can help explain annual residual returns.

H_{2d}: The forward-looking words presented in the Operational and Financial section can help explain annual residual returns.

Lastly, to comprehend the influence that the complexity of the annual report may exert on residual returns, the following hypotheses were formulated, having as a measure of complexity the number of words displayed in each section:

Hypothesis 3: The number of words presented in companies' annual reports can help explain annual residual returns.

H_{3a}: The number of words presented in the MD&A can help explain annual residual returns.

H_{3b}: The number of words presented in the CEO Review can help explain annual residual returns.

H_{3c}: The number of words presented in the Chairman's Statement can help explain annual residual returns.

H_{3d}: The number of words presented in the Operational and Financial section can help explain annual residual returns.

4. Data and Methodology

4.1. Sample selection and data collection

This study specifically focuses on non-financial companies listed on the London Stock Exchange and included in the FTSE350 index. The sample period covers the annual reports of these companies for fiscal years 2008 to 2017. The objective was to include as many recent years as possible while taking into account that the data available for calculating the Fama French 3-factor model for the UK market was only available until 2017.

Consistent with prior research (Athanasakou & Hussainey, 2014; Hassanein et al., 2019) financial firms were excluded due to their unique characteristics. The FTSE350 was chosen as it serves as an appropriate benchmark for the performance of the UK stock market. Companies were excluded if monthly returns could not be calculated due to a lack of data or if the amount of monthly residual returns were insufficient to provide statistical significance in the sample.

The sample originally consisted of 416 companies, which accounted for 3,060 observations of annual residual returns. However, following the process of matching with the correspondent narrative measures, the sample was reduced to 292 companies due to the unavailability of annual reports or challenges in extracting and analysing the textual data. As a result, sample size reduced to 2,453 yearly observations. In order to enhance the reliability and accuracy of the data, a trimming procedure was employed to remove outliers from the dataset. Specifically, observations that fell outside the range of 1% at each tail of the distribution were eliminated.

After all these adjustments the final sample was composed of 286 companies and 2,104 yearly observations, which represents the number of annual reports

under analysis. It is important to note that the number of observations varied across annual report sections and years.

The sample of 286 companies analysed in this study represents a diverse range of industries. The distribution of the sample across various industries is presented in table 1.

Table 1 – Companies distribution over industry

	Freq.	Percent
Consumer Staples	25	9%
Consumer Discretion	82	29%
Industrials	83	29%
Technology	23	8%
Health Care	9	3%
Basic Materials	24	8%
Energy	21	7%
Telecommunications	9	3%
Utilities	10	3%
Total	286	100%

It is possible to understand that throughout the decade under consideration, a preponderance of the annual reports analysed pertained to firms affiliated with the Consumer Discretion and Industrials sectors. Conversely, the Health Care and Telecommunications sectors were comparatively less scrutinized.

With regard to the data required to calculate the Fama-French 3-Factor model, the database made available by the Finance and Accounting Department of the University of Exeter³ was employed to obtain the monthly factors for each year of the sample. To compute the returns of the companies, all the other necessary data were obtained from Thomson Reuters Datastream.

Regarding the data from the narrative characteristics under analysis, the unstructured digital PDF annual reports will serve as the basis for analysis. It has

³ Available at: <http://business-school.exeter.ac.uk/about/departments/accounting-finance/famafrench/>

previously been acknowledged that these reports lack standardization and may exhibit significant variations between firms and even between different years for the same company, which constitutes an added challenge in the examination of these reports.

UK firms still follow the requirements imposed by the IASB Regulation, but they exercise significant discretion regarding the content and structure of their annual reports, as documented by El-Haj et al. (2020). Furthermore, the annual reports of UK firms are distributed in the form of PDF files, which poses a significant challenge for information retrieval and processing. To overcome this obstacle, El-Haj et al. (2020) developed an automated procedure for extracting and categorizing the narrative component of glossy annual reports that are presented in digital PDF format, which will be utilized in the present study.

Given this, the annual data pertaining to tone, forward-looking words and number of words in all four analysed sections were sourced from the study cited earlier (El-Haj et al., 2020). It is pertinent to note that all the data related to the number of words was logarithmically transformed to address any distributional properties. The descriptive statistics of this data are presented in table 2.

Table 2 - Descriptive statistics - Narrative measures

Independent Variables Descriptive Statistics						
Variable name	N	Mean	Std.Dev.	Min.	Median	Max.
Tone_MD&A	2,104	0.3868	0.1213	0.0194	0.3987	0.6634
Tone_CEO	1,582	0.7288	0.1615	0.0769	0.7596	1.0000
Tone_Chair	1,898	0.7075	0.1980	-0.0286	0.7500	1.0000
Tone_OpeFin	2,010	0.5649	0.2035	-0.1818	0.5958	0.9556
Forwardlooking_MD&A	2,104	0.0124	0.0018	0.0076	0.0125	0.0178
Forwardlooking_CEO	1,583	0.0151	0.0058	0.0033	0.0145	0.0342
Forwardlooking_Chair	1,893	0.0170	0.0058	0.0040	0.0166	0.0341
Forwardlooking_OpeFin	2,011	0.0115	0.0039	0.0036	0.0110	0.0270
Wordcount_MD&A	2,104	38,174.24	15,400.62	8,390.00	35,962	96,368.00
Wordcount_CEO	1,586	2,238.36	1,362.31	202.00	1,943.50	8,794.00
Wordcount_Chair	1,908	1,060.58	515.88	163.00	960.00	4,251.00
Wordcount_OpeFin	2,015	6,029.89	3,406.95	275.00	5,364	19,942.00

Taking into consideration that the total number of annual reports examined was 2,104, it is apparent that the majority of variables were not observed for the entire sample. The MD&A section was the only one that was susceptible to analysis for the whole sample across all three narrative characteristics. In comparison, the CEO Review was the section with the largest number of lost observations. With respect to the tone, the median firm exhibited a positive tone (greater than zero), with the CEO Review exhibiting the highest (0.76) and the MD&A exhibiting the lowest (0.40). The Chairman's Statement had the greatest number of forward-looking words (0.02), indicating a higher inclination to discuss future prospects. Finally, in terms of complexity, the MD&A section had the highest median complexity, as evidenced by the elevated number of words in comparison to the other sections (35,962).

4.2. Methodology

The objective of this study is to ascertain whether the selected narrative features can elucidate the residual returns obtained from an Asset Pricing Model. The purpose is to determine whether the tone, the utilization of forward-looking words and the complexity of the text can aid investors in more accurately predicting the expected returns of a given company.

The Fama-French 3-factor model (Fama & French, 1992) was selected in this study due to its ability to consider the significant factors that influence stock returns, such as market risk, size, and value. This model has been demonstrated to be effective in explaining these returns and enables investors to obtain a more comprehensive understanding of the risks and opportunities associated with a specific company or portfolio, leading to better-informed investment decisions.

Furthermore, the model has garnered extensive empirical support over the years and can be easily customized to accommodate other supplementary factors.

The purpose of utilizing the Fama-French 3-factor model in this study was to obtain the residual returns that could not be accounted for by the three factors in the model (market risk, size, and value). These residual returns are defined as the difference between the actual returns of a security and the returns predicted by the Fama-French 3-factor model. The model assumes that the expected returns of a security can be expressed as the sum of the expected returns due to the three factors and a random error term, which represents the residual returns (Fama & French, 1992). It is worth noting that the model was selected as a means to obtain the necessary residual returns, and not as the primary focus of the study.

In order to obtain these residual returns, the following regression was performed monthly for the corresponding companies in the sample:

$$R_{it} - R_{ft} = (R_{mt} - R_{ft}) + SMB_{it} + HML_{it} + \varepsilon_{it}$$

The residual returns were derived by running an Ordinary Least Squares (OLS) regression for each company i in month t . As the focus of this study is on annual reports, the monthly residuals were converted into annual residuals. This was achieved by computing the annual mean of the monthly residuals with consideration for the fiscal year-end month of each company. Which lead to initial 3,060 annual residual returns. As said previously due to adjustments in the dataset, the final sample was of 2,104 annual residual returns.

Furthermore, the absolute values of all annual residual returns were computed to accurately assess the magnitude of these returns while mitigating the impact of the residuals' sign on the analysis.

To test the hypotheses, twenty OLS regression models were employed. The primary objective of these models was to examine the influence of the narrative

measures on residual returns. More specifically, the absolute value of the annual residual returns were regressed on the tone, forward-looking, and number of words of the four different sections- while also controlling for year and industry fixed effects.

To test the hypotheses the following model was employed for all the regressions:

$$|Residual\ Return_{it}| = \alpha + Narrative_{it} + fixed\ effects + \varepsilon_{it} \quad (1)$$

It is noteworthy that the dependent variable remained constant across all regression models, specifically the absolute value of the annual residual returns for firm i in year t . The regression models differ only in terms of their independent variables, which vary depending on the narrative measure and section being tested.

Accordingly, an initial stage involved conducting separate regressions for each narrative measure/section. So, all independent variables were tested individually: tone, forward-looking and number of words in each section. This resulted in twelve separate regressions in which: model [1] tested individually the tone of each section for firm i in year t ; model [2] tested individually the forward-looking words of each section for firm i in year t ; model [3] tested individually the number of words of each section for firm i in year t .

Afterwards, we performed new regressions grouping the variables by narrative measures: model [4] tested the tone of the MD&A, the tone of the CEO Review, the tone of the Chairman's Statement and the tone of the Operational and Financial Review for firm i in year t ; model [5] tested the forward-looking words of the MD&A, the forward-looking words of the CEO Review, the forward-looking words of the Chairman's Statement and the forward-looking words of the Operational and Financial Review for firm i in year t ; model [6]

tested the number of words of the MD&A, the number of words of the CEO Review, the number of words of the Chairman's Statement and the number of words of the Operational and Financial Review for firm i in year t .

We will also be performing regressions where each model will aggregate one section of the annual report, working as follows: model [7] tested the tone of the MD&A, the forward-looking words of the MD&A and the number of words of the MD&A for firm i in year t ; model [8] tested the tone of the CEO Review, the forward-looking words of the CEO Review and the number of words of the CEO Review for firm i in year t ; model [9] tested the tone of the Chairman's Statement, the forward-looking words of the Chairman's Statement and the number of words of the Chairman's Statement for firm i in year t ; model [10] tested the tone of the Operational and Financial Review, the forward-looking words of the Operational and Financial Review and the number of words of the Operational and Financial Review for firm i in year t .

Finally, the last regression- model [11]- brings together each narrative measure for each section, having a total of twelve independent variables for firm i in year t .

To facilitate a more thorough comprehension of the various variables, definitions for each one can be found in table 7 in the Appendix.

5. Results

As previously stated, the dependent variable in this study remains consistent across all regressions, specifically the absolute value of annual residual returns. These residuals were calculated using the Fama-French 3-factor model and the resulting dataset comprised 2,104 observations. The median residual value is 0.017 and the mean value is 0.024. Furthermore, the standard deviation is 0.026 and the maximum residual value is 0.30, with the minimum residual value being 0.

To effectively and comprehensively analyse the three primary hypotheses, each of them can be interpreted through the implementation of four distinct regression models. The process involved altering the group of independent variables being analysed to arrive at a comprehensive understanding.

Consequently, a series of regressions are presented across four distinct tables, wherein the independent variables are grouped based on a shared logic to effectively address the three hypotheses. Each table is capable of providing insights into all the hypotheses.

To ensure a more systematic and organized approach to the analysis, it will be conducted based on each hypothesis. Accordingly, a comprehensive examination of each hypothesis will be presented, consistently referring to the appropriate models/tables. The results of the regressions are presented as follows: models [7], [8], [9], [10] in table 5 and model [11] in table 6 offer conclusive findings into all hypotheses as they incorporate different narrative characteristics and various sections. Specifically, with regards to each hypothesis: tone (H1) – model [1] in table 3 and model [4] in table 4; forward-looking (H2) – model [2] in table 3 and model [5] in table 4; the number of words (H3) – model [3] in table 3 and model [6] in table 4.

Table 3 - OLS coefficients estimates - individual regressions

	Tone				Forward-looking				Number of words			
	[1]				[2]				[3]			
	[1a]	[1b]	[1c]	[1d]	[2a]	[2b]	[2c]	[2d]	[3a]	[3b]	[3c]	[3d]
Dependent variable: Residuals_Absolute												
Independent variables:												
Intercept	0.0079 (0.4348)	0.0050 (0.6774)	0.0268 * (0.0875)	0.0081 (0.4237)	0.0098 (0.3502)	0.0035 (0.7704)	0.0282 * (0.0716)	0.0076 (0.4483)	0.0024 (0.9127)	0.0097 (0.5065)	0.0111 (0.4271)	0.0295 ** (0.0255)
Tone_MD&A	0.0035 (0.4928)											
Tone_CEO		0.0021 (0.6197)										
Tone_Chair			0.0034 (0.2892)									
Tone_OpeFin				0.0012 (0.6842)								
Forwardlooking_MD&A					-0.0614 (0.8570)							
Forwardlooking_CEO						0.2323 * (0.0513)						
Forwardlooking_Chair							0.0575 (0.5926)					
Forwardlooking_OpeFin								0.1300 (0.4066)				
Wordcount_MD&A									0.0006 (0.7271)			
Wordcount_CEO										-0.0004 (0.6991)		
Wordcount_Chair											0.0018 (0.2066)	
Wordcount_OpeFin												-0.0023 ** (0.0163)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	2,104	1,582	1,898	2,010	2,104	1,583	1,893	2,011	2,104	1,586	1,908	2,015
Adjusted R ²	0	0	0	0	0	0	0	0.0002	0	0	0	0.0032

P-values reported in parentheses are computed using the robust standard errors to obtain unbiased OLS coefficients. * < 0.1; ** < 0.05; *** < 0.01.

Table 4 - OLS coefficients estimates - narrative measure

	Tone	Forward- looking	Number of words
	[4]	[5]	[6]
Dependent variable:			
Residuals_Absolute			
Independent variables:			
Intercept	0.0222 (0.4058)	0.0272 (0.3205)	0.0261 (0.4761)
Tone_MD&A	-0.0033 (0.6951)		
Tone_CEO	-0.0030 (0.6317)		
Tone_Chair	0.0046 (0.2897)		
Tone_OpeFin	0.0042 (0.4517)		
Forwardlooking_MD&A		-0.2663 (0.5826)	
Forwardlooking_CEO		0.3023 * (0.0637)	
Forwardlooking_Chair		-0.0370 (0.7734)	
Forwardlooking_OpeFin		-0.0688 (0.7873)	
Wordcount_MD&A			0.0019 (0.4276)
Wordcount_CEO			0.0010 (0.4390)
Wordcount_Chair			0.0010 (0.5877)
Wordcount_OpeFin			-0.0041 *** (0.0026)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Number of observations	1,463	1,460	1,470
Adjusted R ²	0	0	0.0017

P-values reported in parentheses are computed using the robust standard errors to obtain unbiased OLS coefficients. * < 0.1; ** < 0.05; *** < 0.01.

Table 5 - OLS coefficients estimates - report section

	MD&A	CEO Review	Chairman Statement	Operational & Financial Review
	[7]	[8]	[9]	[10]
Dependent variable:				
Residuals_Absolute				
Independent variables:				
Intercept	0.0021 (0.9233)	0.0021 (0.8917)	0.0109 (0.5691)	0.0237 * (0.0843)
Tone_MD&A	0.0034 (0.5076)			
Tone_CEO		0.0025 (0.5633)		
Tone_Chair			0.0045 (0.1657)	
Tone_OpeFin				0.0002 (0.9450)
Forwardlooking_MD&A	-0.0571 (0.8670)			
Forwardlooking_CEO		0.2374 ** (0.0471)		
Forwardlooking_Chair			0.0784 (0.4682)	
Forwardlooking_OpeFin				0.0972 (0.5394)
Wordcount_MD&A	0.0006 (0.7437)			
Wordcount_CEO		-3,1e-05 (0.9780)		
Wordcount_Chair			0.0019 (0.1887)	
Wordcount_OpeFin				-0.0017 * (0.0771)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	2,104	1,579	1,891	2,006
Adjusted R ²	0	0	0	0.0004

P-values reported in parentheses are computed using the robust standard errors to obtain unbiased OLS coefficients. * < 0.1; ** < 0.05; *** < 0.01.

Table 6 - OLS coefficients estimates - 3 narrative measures/4 report sections

	[11]
Dependent variable:	
Residuals_Absolute	
Independent variables:	
Intercept	0.0245 (0.5217)
Tone_MD&A	0.0006 (0.9447)
Tone_CEO	-0.0010 (0.8783)
Tone_Chair	0.0064 (0.1504)
Tone_OpeFin	-0.0006 (0.9190)
Forwardlooking_MD&A	-0.2078 (0.6708)
Forwardlooking_CEO	0.4621 *** (0.0073)
Forwardlooking_Chair	-0.0228 (0.8612)
Forwardlooking_OpeFin	-0,3867 (0.1675)
Wordcount_MD&A	0.0020 (0.4233)
Wordcount_CEO	0.0018 (0.2151)
Wordcount_Chair	0.0014 (0.4503)
Wordcount_OpeFin	-0.0050 *** (0.0016)
Industry fixed effects	Yes
Year fixed effects	Yes
Number of observations	1456
Adjusted R ²	0.0018

P-values reported in parentheses are computed using the robust standard errors to obtain unbiased OLS coefficients. * < 0.1; ** < 0.05; *** < 0.01.

5.1. Tone

To evaluate the influence of the tone of annual reports on annual residual returns, it is necessary to focus primarily on model [1] in table 3. The outcomes of the four individual regressions (model [1a], model [1b], model [1c], and model [1d]) indicate that the tone of the four sections does not have the ability to independently account for the annual residual returns. In order to supplement the analysis, it is also essential to refer to model [4] in table 4, which yields similar conclusions to the grouping of the tone of the four sections being analysed. Thus, it can be observed that none of the sections' tone has the capability of explaining the annual residual returns. This conclusion remains consistent when examining tables 5 and 6 that mix different narrative measures and sections, where none of the five models demonstrates that the tone in each section is capable of accounting for the residuals. Therefore, it is reasonable to conclude that the hypotheses, H_{1a} , H_{1b} , H_{1c} and H_{1d} , are rejected based on these interpretations.

The results of the study indicate that the tone of annual reports does not have a significant impact on annual residual returns, which is contrary to what was expected. This implies that investors cannot rely on the tone of the reports to improve their assessment of a company's value, as it does not assist in predicting expected returns. Therefore, it is also possible to conclude that the tone of annual reports cannot be considered a factor that contributes to reducing the information asymmetry that exists between insiders and outsiders of a given company.

Furthermore, it is noteworthy to highlight that in both model [1] and model [4], where the tone variable is not combined with other narrative measures, the Adjusted R^2 consistently registers a value of zero. This implies that the models have no predictive power. This limitation may be attributable to several factors, of which the reduction in the sample size of almost 50% in certain models appears

to be the most salient. This reduction in the number of observations has the potential to reduce the models' capacity to capture the complexity of the relationship between variables.

5.2. Forward-looking

Regarding the impact of the number of forward-looking words on the annual residual returns, it is relevant to initially examine model [2] in table 3. The four individual regressions, wherein the forward-looking words of each section serve as the independent variable (model [2a], model [2b], model [2c], and model [2d]), indicate that solely the forward-looking words of the CEO Review (model [2b]) have a discernible effect on the annual residual returns. A similar conclusion can be drawn when scrutinizing model [5] in table 4, which involves analysing the forward-looking words of all four sections collectively, wherein only the forward-looking words of the CEO Review exhibit a meaningful effect on the residuals.

Upon analysing the outcomes presented in tables 5 and 6 to augment the findings, a consistent conclusion is reached. Specifically, when examined in conjunction with other narrative measures or sections, the influence of the forward-looking words of the CEO Review on the residual returns is further magnified, underscoring the significance of analysing the various sections within a report. In light of these observations, hypotheses H_{2a} , H_{2c} and H_{2d} are refuted, while H_{2b} is corroborated.

The results reveal that the presence of forward-looking words in the CEO Review of a company's annual report has a significant effect on the annual residual returns. By considering these forward-looking words, investors and

market participants can obtain a deeper understanding of a company's potential future performance, which can enable them to make more informed decisions. This finding is particularly significant as it can help to reduce information asymmetry issues that often cause instability in the capital markets. Overall, by analysing this narrative measure in annual reports, particularly in the CEO Review section, it is possible to gain valuable insights into a company's prospects.

It should be noted that the Adjusted R^2 values for model [2] and model [5] are equal to zero. However, it is important to consider that the focus of this study is to explain the part of the expected returns that are not accounted for by the Fama French 3-factor model. Therefore, there may be additional factors that were not captured by this model. Overall, our results indicate a significant effect of forward-looking words in the CEO Review section, which is in line with our initial expectations.

5.3. Complexity

To examine the impact of the complexity of annual reports on residual returns, we employed the logarithmic form of the number of words for each section as a metric. To analyse this impact, we begin by examining model [3] in table 3. By scrutinizing the results of the four individual regressions (model [3a], model [3b], model [3c], and model [3d]), it becomes evident that only the number of words in the Operational and Financial section (model [3d]) has a significant impact on residual returns. Similarly, when examining model [6] in table 4, we reach the same conclusion. Even when analysing the number of words in all four sections together, the only one that remains statistically significant is the Operational and Financial section.

The results presented in Table 5 and 6 also support this conclusion, as all five models that combine narrative measures with different sections (model [7], model [8], model [9], model [10] and model [11]) consistently demonstrate that the number of words in the Operational and Financial section is the only measure that has a significant impact on residual returns. Based on these findings, it can be concluded that hypotheses H_{3a}, H_{3b} and H_{3c} are not supported by the data, while hypothesis H_{3d} is corroborated.

These findings suggest that the complexity of annual reports is a relevant factor to consider when evaluating the value of a company since managers can try to influence the assessment that investors make by increasing (decreasing) the length of the document. Specifically, the number of words in the Operational and Financial section has a discernible impact on the annual residual returns, indicating that this section is crucial to analyse in order to gain deeper insights into a company's expected returns.

Given that the Operational and Financial section is the more technical in this study, it has been demonstrated that valuable insights can be gleaned not only from the purely narrative components of a report but also from the explanations given in more numerical sections. Such information is crucial for gaining a clear understanding of a company's value resulting in a diminishing of the information asymmetry.

It is important to note that in all models where a strong relationship between variables was observed, the coefficient was consistently negative, indicating a negative correlation between the dependent and independent variable. Additionally, in contrast to the other hypotheses examined, the adjusted R² in this case was consistently positive, indicating that the model was appropriate and the results were reliable.

6. Conclusions

In light of the increasing importance of qualitative data in the market and the established impact of financial narratives on firm performance in existing literature, this dissertation aimed to investigate the extent to which financial narratives can enhance the explanatory power of residual returns in firm valuation models. By doing so, it sought to aid investors in making more informed decisions by reducing information asymmetry.

The study hypothesized that financial narratives, specifically the tone, number of forward-looking words, and complexity of annual reports, have an impact on residual returns and can contribute to informed investment decisions. The sample used in the study consists of 286 non-financial companies from the UK FTSE350 index.

Our study found that the tone variable did not have any statistically significant impact on firm valuation across any of the models analysed. Therefore, our results do not support the idea that analysing the tone of annual reports can aid investors in making more informed decisions. On the other hand, the forward-looking variable had significant results when analysed in the CEO Review section. Finally, complexity, measured by the number of words, was found to be relevant for the Operational and Financial section of the report.

Overall, we are able to find that both the use of forward-looking words in CEO review and complexity in the Operational & Financial section are able to reduce information asymmetry between the company and investors, leading to improve communication and financial decision making.

In summary, our study's results indicate a meaningful association between residual returns and both the use of forward-looking words in the CEO review

section and the complexity of the Operational & Financial section. By scrutinizing and evaluating these variables, it is possible to mitigate information asymmetry between companies and investors. This, in turn, can improve communication and result in better financial decision making.

Subsequent research should aim to examine the robustness of our findings by employing a larger sample size and exploring potential variations in the impact of other variables. One limitation of our study was the unavailability of the factors required to calculate the Fama-French 5-factor model, which could provide more accurate insights. It would also be beneficial to extend the study's geographical scope to capture diverse dynamics and yield distinct results.

References

- Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84(3), 488–500.
- Alves, P., Rayson, P., Walker, M., & Young, S. (2016). Heterogeneous narrative content in annual reports published as pdf files: extraction, classification and incremental predictive ability. *SSRN Electron*. http://brunide.iscte.pt/?pt=seminar_series
- Amir, E., & Lev, B. (1996). Accounting & Economics Value-relevance of nonfinancial information: The wireless communications industry. In *Journal of Accounting and Economics* (Vol. 22).
- Argamon, S., Pennebaker, J. W., Schler, J., & Koppel, M. (2009). Automatically Profiling the Author of an Anonymous Text. *Communications of the ACM*, 52(2), 119–123.
- Athanasakou, V., & Hussainey, K. (2014). The perceived credibility of forward-looking performance disclosures. *Accounting and Business Research*, 44(3), 227–259. <https://doi.org/10.1080/00014788.2013.867403>
- Bannier, C., Pauls, T., & Walter, A. (2017). CEO-speeches and stock returns. *Center for Financial Studies Working Paper*, 583. <https://ssrn.com/abstract=3051151No.583>
- Barron, O. E., Kile, C. O., & O'Keefe, T. B. (1999). MD&A Quality as Measured by the SEC and Analysts' Earnings Forecasts. *Contemporary Accounting Research*, 16(1), 75–109. <https://doi.org/10.1111/j.1911-3846.1999.tb00575.x>
- Botosan, C. A. (1997). Disclosure Level and the Cost of Equity Capital. In *Source: The Accounting Review* (Vol. 72, Issue 3).
- Boubaker, S., Gounopoulos, D., & Rjiba, H. (2019). Annual report readability and stock liquidity. *Financial Markets, Institutions and Instruments*, 28(2), 159–186. <https://doi.org/10.1111/fmii.12110>
- Brown, S., Lo, K., & Lys, T. (1999). Use of R in accounting research: measuring changes in value relevance over the last four decades. In *Journal of Accounting and Economics* (Vol. 28).

- Clatworthy, M., & Jones, M. J. (2003). Financial reporting of good news and bad news: Evidence from accounting narratives. *Accounting and Business Research*, 33(3), 171–185. <https://doi.org/10.1080/00014788.2003.9729645>
- Core, J. E. (2001). A review of the empirical disclosure literature: discussion. In *Journal of Accounting and Economics* (Vol. 31).
- Davis, A. K., & Tama-Sweet, I. (2012). Managers' Use of Language Across Alternative Disclosure Outlets: Earnings Press Releases versus MD&A. *Contemporary Accounting Research*, 29(3), 804–837. <https://doi.org/10.1111/j.1911-3846.2011.01125.x>
- Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, Liquidity, and the Cost of Capital. *The Journal of Finance*, 46(4), 1325–1359.
- Easley, D., Hvidkjaer, S., & O'Hara, M. (2002). Is information risk a determinant of asset returns? *Journal of Finance*, 57(5), 2185–2221. <https://doi.org/10.1111/1540-6261.00493>
- Easley, D., & O'Hara, M. (2004). Information and the cost of capital. In *Journal of Finance* (Vol. 59, Issue 4, pp. 1553–1583). <https://doi.org/10.1111/j.1540-6261.2004.00672.x>
- Eisenhardt, K. M. (1989). *Agency Theory: An Assessment and Review*. 14(1), 57–74.
- El-Haj, M., Alves, P., Rayson, P., Walker, M., & Young, S. (2020). Retrieving, classifying and analysing narrative commentary in unstructured (glossy) annual reports published as PDF files. *Accounting and Business Research*, 50(1), 6–34. <https://doi.org/10.1080/00014788.2019.1609346>
- El-Haj, M., Rayson, P., Alves, P., & Young, S. (2018). Towards a Multilingual Financial Narrative Processing System. *The First Financial Narrative Processing Workshop: In Proceedings of the 11th Edition of the Language Resources and Evaluation Conference – Miyazaki, Japan*. Ed, 52–58. <http://ucrel.lancs.ac.uk/cfie/>
- El-Haj, M., Rayson, P., Walker, M., Young, S., & Simaki, V. (2019). In search of meaning: Lessons, resources and next steps for computational analysis of financial discourse. *Journal of Business Finance and Accounting*, 46(3–4), 265–306. <https://doi.org/10.1111/jbfa.12378>

- Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance*, 47(2), 427–465. <https://doi.org/10.1111/j.1540-6261.1992.tb04398.x>
- Feldman, R., Govindaraj, S., Livnat, J., & Segal, B. (2010). Management's tone change, post earnings announcement drift and accruals. *Review of Accounting Studies*, 15(4), 915–953. <https://doi.org/10.1007/s11142-009-9111-x>
- Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics*, 39(2), 295–327. <https://doi.org/10.1016/j.jacceco.2004.06.003>
- Francis, J., & Schipper, K. (1999). Have Financial Statements Lost Their Relevance? In *Source: Journal of Accounting Research* (Vol. 37, Issue 2).
- García Osma, B., & Guillamón-Saorín, E. (2011). Corporate governance and impression management in annual results press releases. *Accounting, Organizations and Society*, 36(4–5), 187–208. <https://doi.org/10.1016/j.aos.2011.03.005>
- Hassanein, A., Zalata, A., & Hussainey, K. (2019). Do forward-looking narratives affect investors' valuation of UK FTSE all-shares firms? *Review of Quantitative Finance and Accounting*, 52(2), 493–519. <https://doi.org/10.1007/s11156-018-0717-6>
- Healy, P. M., Hutton, A. P., & Palepu, K. G. (1999). Stock Performance and Intermediation Changes Surrounding Sustained Increases in Disclosure. *Contemporary Accounting Research*, 16(3), 485–520.
- Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature . In *Journal of Accounting and Economics* (Vol. 31).
- Henry, E. (2008). Are investors influenced by how earnings press releases are written? *Journal of Business Communication*, 45(4), 363–407. <https://doi.org/10.1177/0021943608319388>
- Hirschey, M., Richardson, V. J., & Scholz, S. (2001). Value Relevance of Nonfinancial Information: The Case of Patent Data. In *Review of Quantitative Finance and Accounting* (Vol. 17). Kluwer Academic Publishers.
- Huang, X., Teoh, S. H., & Zhang, Y. (2014). Tone management. *Accounting Review*, 89(3), 1083–1113. <https://doi.org/10.2308/accr-50684>

- Hussainey, K., Schleicher, T., & Walker, M. (2003). Undertaking large-scale disclosure studies when AIMR-FAF ratings are not available: The case of prices leading earnings. *Accounting and Business Research*, 33(4), 275–294. <https://doi.org/10.1080/00014788.2003.9729654>
- Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. In *American Economic Review* (Vol. 76, Issue 2). <http://papers.ssrn.com/abstract=99580>.
- Jensen Michael C., & Ruback Richard S. (1983). The Market For Corporate Control: The Scientific Evidence. *Journal of Financial Economics* , 11, 5–50. <http://papers.ssrn.com/abstract=244158>.
- Jurafsky, D., & Martin, J. H. (2000). Speech and language processing: an introduction to natural language processing, computational linguistics, and speech recognition. *Prentice Hall*.
- Kothari, S. P., Li, X., & Short, J. E. (2009). The Effect of Disclosures by Management, Analysts, and Financial Press on Cost of Capital, Return Volatility, and Analyst Forecasts: A Study Using Content Analysis. *The Accounting Review*, 84(5), 1639–1670. <https://ssrn.com/abstract=1113337>
- Lawrence, Alastair. (2013). Individual investors and financial disclosure. *Journal of Accounting and Economics*, 56(1), 130–147.
- Lee, Y. J. (2012). The Effect of Quarterly Report Readability on Information Efficiency of Stock Prices. *Contemporary Accounting Research*, 29(4), 1137–1170. <https://doi.org/10.1111/j.1911-3846.2011.01152.x>
- Lewis, C., & Young, S. (2019). Fad or future? Automated analysis of financial text and its implications for corporate reporting. *Accounting and Business Research*, 49(5), 587–615. <https://doi.org/10.1080/00014788.2019.1611730>
- Li, F. (2008). Annual Report Readability, Current Earnings, and Earnings Persistence. *Journal of Accounting and Economics*, 45(2–3), 221–247.
- Li, F. (2010a). Textual Analysis of Corporate Disclosures: A Survey of the Literature. *Journal of Accounting Literature*, 29, 143–165.
- Li, F. (2010b). The information content of forward- looking statements in corporate filings-A naïve bayesian machine learning approach. *Journal of Accounting Research*, 48(5), 1049–1102. <https://doi.org/10.1111/j.1475-679X.2010.00382.x>

- Loughran, T., & McDonald, B. (2011). When Is a Liability Not a Liability? Textual Analysis, Dictionaries, and 10-Ks. *Journal of Finance*, 66(1), 35–65. <https://doi.org/10.1111/j.1540-6261.2010.01625.x>
- Loughran, T., & McDonald, B. (2014). Measuring readability in financial disclosures. *Journal of Finance*, 69(4), 1643–1671. <https://doi.org/10.1111/jofi.12162>
- Loughran, T., & McDonald, B. (2016). Textual Analysis in Accounting and Finance: A Survey. *Journal of Accounting Research*, 54(4), 1187–1230. <https://doi.org/10.1111/1475-679X.12123>
- Manning, C. D., & Schütze, H. (1999). *Foundations of statistical natural language processing*. The MIT Press.
- Mckay Price, S., Doran, J. S., Peterson, D. R., & Bliss, B. A. (2012). Earnings conference calls and stock returns: The incremental informativeness of textual tone. *Journal of Banking and Finance*.
- Merkel-Davies, D. M., & Brennan, N. M. (2007). Discretionary disclosure strategies in corporate narratives: incremental information or impression management? *Journal of Accounting Literature*, 27, 116–196. <http://hdl.handle.net/10197/2907>
- Miller, B. P. (2010). The effects of reporting complexity on small and large investor trading. *Accounting Review*, 85(6), 2107–2143. <https://doi.org/10.2308/accr.00000001>
- Miller, G. S., & Piotroski, J. D. (2000). *Forward-Looking Earnings Statements: Determinants and Market Response*.
- Muslu, V., Radhakrishnan, S., Subramanyam, K. R., & Lim, D. (2011). Firm's Information Environment and Forward-Looking Disclosures in the MD&A. *University of Texas at Dallas and University of Southern California Working Paper*. <https://www.researchgate.net/publication/260299179>
- O'Sullivan, M., Percy, M., & Stewart, J. (2008). Australian Evidence on Corporate Governance Attributes and their Association with Forward-looking Information in the Annual Report. *Journal of Management and Governance*, 12(1), 5–35. <http://www.springerlink.com>
- Price, S. M. K., Doran, J. S., Peterson, D. R., & Bliss, B. A. (2012). Earnings conference calls and stock returns: The incremental informativeness of

- textual tone. *Journal of Banking and Finance*, 36(4), 992–1011. <https://doi.org/10.1016/j.jbankfin.2011.10.013>
- Sengupta, P. (1998). Corporate Disclosure Quality and the Cost of Debt. In *Source: The Accounting Review* (Vol. 73, Issue 4).
- Smith, M., & Taffler, R. J. (2000). The chairman's statement - A content analysis of discretionary narrative disclosures. *Accounting, Auditing & Accountability Journal*, 13(5), 624–647. <https://doi.org/10.1108/09513570010353738>
- Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *Journal of Finance*, 62(3), 1139–1168. <https://doi.org/10.1111/j.1540-6261.2007.01232.x>
- Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, 32(1–3), 97–180. [https://doi.org/10.1016/S0165-4101\(01\)00025-8](https://doi.org/10.1016/S0165-4101(01)00025-8)
- Wang, M., & Hussainey, K. (2013). Voluntary forward-looking statements driven by corporate governance and their value relevance. *Journal of Accounting and Public Policy*, 32(3), 26–49. <https://doi.org/10.1016/j.jaccpubpol.2013.02.009>
- Wang, Q., Wu, D., & Yan, L. (2021). Effect of positive tone in MD&A disclosure on capital structure adjustment speed: evidence from China. *Accounting and Finance*, 61(4), 5809–5845. <https://doi.org/10.1111/acfi.12777>
- Xing, F. Z., Cambria, E., & Welsch, R. E. (2018). Natural language based financial forecasting: a survey. *Artificial Intelligence Review*, 50(1), 49–73. <https://doi.org/10.1007/s10462-017-9588-9>
- You, H., & Zhang, X. jun. (2009). Financial reporting complexity and investor underreaction to 10-k information. *Review of Accounting Studies*, 14(4), 559–586. <https://doi.org/10.1007/s11142-008-9083-2>

Appendix

Table 7 - Variables Definition

Variable name	Definition	Source
Dependent variable		
Residuals_Absolute	Absolute value of the residual annual returns for each company, derived from the Fama French 3-factor model	Thomson Reuters Datastream Database Finance and Accounting Department - University of Exeter
Independent variables		
Tone_MD&A	MD&A: Net tone: The difference between the number of positive and negative words scaled by their sum	El-Haj et al. (2020)
Tone_CEO	CEO Review: Net tone: The difference between the number of positive and negative words scaled by their sum	El-Haj et al. (2020)
Tone_Chair	Chairman's section: Net tone: The difference between the number of positive and negative words scaled by their sum	El-Haj et al. (2020)
Tone_OpeFin	Operational & Financial section: Net tone: The difference between the number of positive and negative words scaled by their sum	El-Haj et al. (2020)
Forwardlooking_MD&A	MD&A: number of forward-looking words scaled by the total number of words of the section	El-Haj et al. (2020)
Forwardlooking_CEO	CEO Review: number of forward-looking words scaled by the total number of words of the section	El-Haj et al. (2020)
Forwardlooking_Chair	Chairman's section: number of forward-looking words scaled by the total number of words of the section	El-Haj et al. (2020)
Forwardlooking_OpeFin	Operational & Financial section: number of forward-looking words scaled by the total number of words of the section	El-Haj et al. (2020)
Wordcount_MD&A	MD&A: log(number of words)	El-Haj et al. (2020)
Wordcount_CEO	CEO Review: log(number of words)	El-Haj et al. (2020)
Wordcount_Chair	Chairman's section: log(number of words)	El-Haj et al. (2020)
Wordcount_OpeFin	Operational & Financial section: log(number of words)	El-Haj et al. (2020)