



UNIVERSIDADE CATÓLICA PORTUGUESA

Are Chairmen and CEOs aligned in their style of disclosure?

Measuring Tone, Complexity and Forward-Looking Narratives
and Their Predictability of Firm Future Performance

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April, 2022



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Final Work in Academic Context
presented to Universidade Católica Portuguesa
in order to obtain the master's degree in Finance

by

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April 2021

Acknowledgments

I would like to thank Professor Paulo Alves for all the guidance and availability and Leonor Soares for all the advice throughout the process.

Resumo

Este estudo analisa o impacto da complexidade (medida pelo Fog Index e pelo Flesch Score), do tom (medido pelas listas de palavras de Loughran & McDonald, e Henry) e das narrativas *forward-looking* na performance futura de uma empresa nos segmentos do Chairman e do CEO dos seu relatório anual e o alinhamento destes dois indivíduos no seu estilo de discurso textual.

Das cinco medidas usadas, apenas a medida utilizada para as narrativas de *forward-looking* apresenta um impacto significativo (e negativo) na performance futura da empresa, que é medida pelo rácio *return on assets*, na secção do CEO.

Relativamente às inconsistências no discurso, descobrimos que a review do CEO tem um maior nível de complexidade medida pelo Fog Index e tem uma narrativa mais *forward-looking* do que a secção do Chairman. Pelo contrário, esta tem um maior nível de complexidade medida pelo Flesch Score e um tom mais positivo medido pelas duas listas de palavras utilizadas. Os resultados mantêm-se para empresas financeiras, enquanto para empresas não-financeiras, o CEO passa a ter também um discurso mais positivo do que o Chairman medido pelo Flesch score.

Palavras-chave: narrativas financeiras; tom; complexidade; *forward-looking*; carta do Chairman; CEO review; desacordo; previsibilidade; inconsistência de discurso

Abstract

This paper analyses the impact of complexity (measured by the Fog and the Flesch indexes), tone (measured by Loughran & McDonald and Henry wordlists) and forward-looking (measured by an updated version of Hussainey et al. 2003 wordlist) in firm future performance for the Chairman and CEO sections of a firm's annual report and the alignment of these two later figures on their style of discourse.

Of the five measures used, only the measure used for forward-looking narratives showed a statistically significant negative impact on future firm performance measured by the future return on assets, on the CEO section.

When looking at discourse inconsistencies, results find that the CEO review portrays a higher level of complexity measured by the Fog index and holds a more forward-looking text than the Chairman section, whilst the Chairman has a higher level of complexity measured by the Flesch index and a more positive tone measured by the two different wordlists used. The results hold for financial firms, with the CEO having a more complex discourse measured by the Flesch Index for non-financial firms.

Keywords: financial narratives; tone management; readability; complexity; forward-looking; chairman's letter; CEOs review; disagreement; predictability; discourse inconsistency

Number of words: 8340

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1. Introduction

For corporations, what firstly began as a way of merely reporting financial data to outsiders, quickly became a form of providing additional and extensive information that otherwise could not be understood only by numbers. Financial narratives, i.e. using financial data and reporting tools to build a narrative around a firm's financial performance, started by solely analysing the financial aspects of a firm's annual disclosures (Easton et al., 1992; Easton & Harris, 1991; Lipe, 1986; Ou & Penman, 1989). It has since grown into a more complex and wide analysis, focusing on the textual narratives portion of disclosures, such as the chairman letter and MD&A segments, that has been found to provide further context to the numeric information contained in financial statements (Li, 2011).

Throughout the years, researchers have been trying to understand if the boards of companies use annual reports as a valuable way of surpassing information asymmetry between different types of shareholders or if it serves as a mean for top managers to hide what is really happening in a corporation, deceiving the public's eye (Bushee et al., 2018; Huang et al., 2014; Loughran & McDonald, 2011, 2016; Smith & Taffler, 2000). It is becoming more and more relevant to understand the meaning behind a certain type of disclosure of information.

This process of perceptions manipulation can be measured with several discourse characteristics, such as tone, complexity, forward-looking, uncertainty and causality. Studies have found that complexity can either serve as a manner of information obfuscation or a required method to provide more elaborate information in itself (Bushee et al., 2018; Loughran & McDonald, 2016) and that typically, stable and profitable firms tend to have easier to read narratives (Li, 2008).

In regards to tone, studies show that disclosure tone is linked to firm performances (Loughran & McDonald, 2011; Smith & Taffler, 2000) and that investors react more strongly to negative than to positive text (Huang et al., 2014). On the other

hand, as much as complexity, tone management, that has been defined as “choice of the tone level in qualitative text that is incommensurate with the concurrent quantitative information” by Huang, Teoh and Zhang (2011), has also been found to have a correlation with manipulation of shareholders perceptions (Huang et al., 2014).

Regarding forward-looking, (Li, 2010) finds that, specifically in the MD&A segment, it has a positive correlation with future firm performance. As for the remaining sections, evidence points to forward-looking information on profits helping the market predict future earnings (Hussainey et al., 2003).

The focus point of this study will be the Chairman letter and the CEO review, given the different incentives and objectives these two individuals face within a corporation. The study analyses complexity, tone management and forward-looking narratives with different measures for each category. For linguistic complexity the study uses the Gunning Fog Index – that estimates the years of formal education a person of average intelligence needs to read the text once and fully understand its meaning – and the Flesch Reading Ease Score – that rates text by a U.S. grade school level on a 100 point scale. For tone management – indicating the difference between the number of positive and negative words divided by their sum – the paper uses the wordlists proposed by Loughran & McDonald (2011) and Henry (2006). As for forward-looking, the study uses an updated version of the wordlist proposed by Hussainey et al. in 2003. This thesis contributes to the literature providing a joint analysis of different measures for each category.

Regarding data collection, the paper uses narratives data from the CFIE project, The Corporate Financial Information Environment, a platform lead by UK researchers that separates annual reports into sections and provides values for measures of complexity, tone, forward-looking, causality and uncertainty. For financial data, the study uses the platform Datastream from Thomson Reuters. The final sample consists of 3,031 observations across 956 firms and 6 years (2012 through 2017), that comprise a total of 530 financial firms observations and 2,501 non-financial firms observations.

Results show that complexity and tone, measured by the different indexes and wordlists, hold no predictive ability of future firm performance for the two segments analysed, both for financial and non-financial firms. On the other hand, when looking at forward-looking narratives, results demonstrate a significant negative correlation between the forward-looking discourse of the CEO review and future firm performance for non-financial firms. In which regards the Chairman, results are not relevant, which suggests no impact in the future return on assets of a firm.

When looking at discourse inconsistencies, results show that the CEO review portrays a higher level of complexity measured by the Fog index and holds a more forward-looking text than the Chairman section, whilst the Chairman has a higher level of complexity measured by the Flesch index and a more positive tone measured by the three different wordlists used. The results hold for financial firms, with the CEO having a more complex discourse measured by the Flesch Index for non-financial firms.

The remainder of this dissertation is organized as follows: Section 2 presents a literature review containing a theoretical framework on the dynamic of the Chairman vs. the CEO and on the financial narratives. Section 3 presents the methodology used and the process of sample collection. Section 4 presents and discusses the results. Section 5 presents the conclusions.

2. Literature Review

Financial reporting is the most common instrument used by firms to communicate financial information to stakeholders. It is still a main focus of financial researchers whether this type of disclosure helps surpass information asymmetry or if it serves as a mean for managers to obfuscate what really is happening in the corporation. Through impression management research, it is possible to conceive how managers use financial narratives in order to alter the perception of its recipients (Merkl-Davies & Brennan, 2007).

Prior literature suggests that financial narratives began as a way of analysing the financial aspects of a firms annual disclosures, such as earnings, earning components and financial ratios (Easton et al., 1992; Easton & Harris, 1991; Lipe, 1986; Ou & Penman, 1989). Recently, existing financial reporting researchers, more specifically 10-K Filings analysts, have begun to primarily focus on the individual narrative portions of corporate annual reports, such as the chairmen letters, financial reviews and MD&As, or the financial disclosures as a whole (Abrahamson & Amir, 1996) since it provides some further context to the numeric information contained in financial statements (Li, 2011). There is already extensive literature concerning analysis of speech of a company's Chairman, CEO and CFO individually, however, after a comprehensive research, a comparison of tone, complexity and forward looking discourse between these specific individuals of board of directors is still lacking. Although there's already some evidence, the existing research is still in its early stages, with, for example, (Liu & Nguyen, 2020) show that compared to the Management Discussion and Analysis (MD&A) sections of an annual 10-K, the CEO letters to shareholders have a more positive tone when portraying the same firm performance, which can be attributed to a certain overconfidence presented by CEOs, that tend to overvalue their skills and abilities and underestimate possible firm risk.

It is widely known that different characters of a board of directors withhold their own personal objectives (Ball et al., 2003), apart from the common goal of

increasing the value of the firm, as well as different personality styles, which can impact their type of discourse concerning financial reports (Argamon et al., 2003, 2009). Recent studies on board directors narcissism provide evidence that CFOs with this certain characteristic are associated to reports with a higher level of earnings management and higher probability of restatements (Ham & Lang, 2017) and that CEOs which portray are also more likely to be related to earning management, directly influencing financial decisions in order to compensate for the poor performance (Lin et al., 2020). Martikainen et al. (2019) find that a board's member age, gender, education and financial expertise are also correlated to disclosure style (Martikainen et al., 2019). On the other hand, by analysing external incentives for managerial individuals actions, specifically stock and stock options, Wruck and Wu confirm a negative relation between a CEOs Vega – that represents the measure of an options price sensitivity to variation in the underlying's asset volatility – and the reliability and quality of the firm's disclosures (Wruck & Wu, 2021). Additionally, evidence provided by Jiang et al. suggests that because CFOs are primarily responsible for preparing the financial statements, the influence of their equity incentives on financial reporting outweighs that of CEOs equity incentives (Xuefeng Jiang et al., 2010).

The focal point of the present paper is to analyse different styles of disclosure between the Chairman and the CEO of a firm following different measures and to understand the level of alignment of what they are trying to portray to the public eye. One of the most controversial matters in corporate governance is whether the Chairman and CEO roles should be held simultaneously by a single individual, or if these titles should be separated and allocated to different subjects, which, according to existing literature, would improve a firm's corporate performance (Baliga et al., 1996; Pi & Timme, 1993; Rechner & Dalton, 1991). On the other hand, there is another view on this issue, with authors stating that the most common point of view overlooks important costs, that make it difficult to prove that one leadership structure is better than the other (Brickley et al., 1997). Because the point of interest is to study those cases where the roles are divided, a further look into the incentives of each individual is

required. Setting apart these two main roles of action in a company typically eliminates conflict regarding the CEO compensation, performance evaluation and even the recruitment of new board members. This inevitably allows the CEO to focus on the more operational side of the firm, whilst the Chairman becomes responsible for overlooking the actions of the CEO, the overall board leadership and more corporate governance issues. From this perspective, and in the case of impression management being used by the CEO, the use of complex text, positive tone and forward-looking language is expected from the CEO review, as opposed to the Chairman letter, that is expected to have a more neutral and transparent tone, less complex narratives and less forward-looking terms, due to its responsibilities of management and CEO control.

To study impression management across specific sections of annual 10-Ks, this paper will make use of forward-looking, tone and complexity measures. In which concerns readability, i.e. linguistic complexity, prior research views complex disclosures as a vehicle for information obfuscation by managers in order to increase information processing costs for investors. On the other hand, it may serve as a required method of providing more elaborate information to stakeholders (Bushee et al., 2018; Loughran & McDonald, 2016). Li (2008) uses the Gunning Fog Index - a readability test that estimates the years of formal education a person of average intelligence needs to read the text once and fully understand its meaning (Gunning, 1952) – to measure complexity and finds that firms with lower earnings tend to have a higher Fog Index (Li, 2008). In addition to the Fog Index, the paper will employ the Flesch Readability Score that was introduced in 1948 by Rudolf Flesch (Flesch, 1949). Regarding forward-looking, Li finds that, specifically in the MD&A segment, it has a positive correlation with future firm performance (Li, 2010), excluding chances of impression management in forward-looking narratives. As for the remaining sections, evidence points to forward-looking information on profits helping the market predict future earnings (Hussainey et al., 2003). In terms of tone management, prior studies show that a negative disclosure tone (measured with wordlists) is linked to lower firm

performances (Loughran & McDonald, 2011) and that investors react more strongly to negative than to positive text (A. H. Huang et al., 2014).

2.1. Empirical Hypothesis Formulation

As previously seen, there's a vast literature that sustain the hypothesis that the discourse in annual reports have the ability to predict the future of a firm, however, studying the predictiveness of individual segments within the same report is still in its early stages (Alves et al., 2016). Because of different segment objectives, different authors and different personalities and textual styles, an opportunity arises to investigate whether distinct segments written by the most important individuals in a firm are aligned in their predictive ability of a company's future performance. In order to do so, this paper will be using several different models, analysing the tone, complexity and forward-looking of the Chairman's letter and CEO reviews segments.

Due to the literature providing mixed evidence regarding the direction of the relation between the tone, complexity and forward-looking characteristics of text and future firm performance, the paper presents the formulations in the null hypothesis, as per below:

Hypothesis 1. *Ceteris paribus, there is no relation between future firm performance and the narrative characteristic of the Chairman/CEO segment*

To measure the level of alignment between the Chairman and the CEO in their individual segments, this study will follow the methodology proposed by Alves et al. 2016, presenting the below hypothesis:

Hypothesis 2. *There is no difference in the predictive ability of the narrative characteristic of Chairman and CEO segments for future firm performance.*

3. Methodology and Data

3.1. Sample and Data

The first set of data needed to analyse the proposed research question was retrieved from the CFIE project, The Corporate Financial Information Environment, a platform lead by UK researchers that makes information freely available to investigators – available at <https://ucrel.lancs.ac.uk/cfie/>. The platform uses natural language processing (NLP) and corpus linguistics methods to explore accounting and financial market text. The general sample consists in panel data of a total of 26282 firm-year observations of the whole annual reports for fiscal years ending between 15 January 2002 and 31 December 2017 published by firms listed on the London Stock Exchange (El-haj et al., 2019). The main focus of the CFIE research project are non-financial firms, meaning that the retrieval and classification methods are optimized bearing these firms in mind. As such, the sample is divided into financial and non-financial firms, to test the robustness of the models and check if the results portrayed might be different.

To build the sample, all annual reports without a Chairman's letter and a CEO review are excluded, to make sure all observations contain these 2 separate roles. After, all firms without one-year-ahead return on assets are excluded, as well as annual reports with no data and the ones dated before 2012. The paper excludes data prior to 2005 since the CFIE app does not process image-based PDF files reliably, excluding these results from the sample, which results in low coverage from 2002 to 2005, when firms began to use digital PDFs to distribute their reports. The paper also excludes data prior to 2012 due to the possibility of noise in the results related to the global financial crisis of 2008/2009. The dataset of textual analysis provided by CFIE contains a dummy variable that equals one when the annual report retrieval and classification is questionable, so those observations are dropped. In order to analyse the correlation between the narrative metrics used (tone, readability and forward-looking) and future

firm performance, this study recovers market data for firms listed on the London Stock Exchange from 2012 to 2017 from Datastream.

The final sample consists of 3,031 observations across 956 firms and 6 years (from 2012 to 2017), that comprise a total of 530 financial firms observations and 2,501 non-financial firms observations.

3.2. Independent Variable Measurements

To measure readability, the paper will use the Gunning Fog Index, the Flesch Readability Score and the number of pages and words. The Fog Index, that estimates the years of formal education a person of average intelligence needs to read the text once and fully understand its meaning (Gunning, 1952), is calculated as per below:

$$Fog = 0.4 \times (\text{average number of words per sentence} + \text{percent of complex words}),$$

where complex words are classified as words with 3 or more syllables. Higher levels of Fog represent a more complex text while lower levels mean easier to read passages (see Table A2 – Appendix). Although being the most commonly used index, it has limitations. The fact that a word has 3 or more syllables does not mean that the word is complex just on itself and it shows evidence of not being the best fit for financial applications (Loughran & McDonald, 2014).

The Flesch Index, that rates text by a U.S. grade school level on a 100 point scale (Flesch, 1949), is measured as:

$$Flesch = 206.835 - (1.015 \times \text{words per sentence}) - (84.6 \times \text{syllables per word}),$$

where higher levels of Flesch score indicate an easier to read text (see Table A3 – Appendix). Although less common, it faces the same limitations as the previous (Loughran & McDonald, 2014).

In order to identify forward-looking narratives, the sample uses an updated version of the wordlist presented by Hussainey et al. in 2003 (Hussainey et al., 2003).

The tone management measures used are the Loughran and McDonald wordlist (Loughran & McDonald, 2011), that appears a better fit for business purposes than the previously more common metric used, the Diction (Loughran & McDonald, 2014), and the set of words proposed by Henry, used to develop the tone measures for earnings press releases (Henry, 2006).

3.3. Dependent and Control Variables

Following Li (2008), this study will use future ROA as a proxy for measuring future firm performance, which will be our dependent variable.

As for the control determinants of the models, the study uses equity market value to control for dimension, that captures many aspects of a firm's operational and business environment, market-to-book ratio to control for investment opportunities and growth potential, current ROA to control for a firm's current performance, firm age to control for a firm's longevity, the number of business segments and geographic segments to control for operations complexity, a dummy variable of net income, that distinguishes loss making firms from profit making firms and the length of the whole report, Chairman and CEO segments (Li, 2008, 2010; Liu & Nguyen, 2020; Patelli & Pedrini, 2014).

3.4. Research Methodology

To test the previously mentioned hypothesis, the study makes use of the below OLS estimations, that regress future firm performance on complexity, tone and forward-looking measures of the Chairman and CEO segments of the annual reports, using the previously mentioned control variables.

(1 – 10)

$$\begin{aligned} FROA_{it} = & \beta_0 + \beta_1 NarrativesCharacteristic_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 CROA_{it} \\ & + \beta_5 BSEG_{it} + \beta_6 GSEG_{it} + \beta_7 Age_{it} + \beta_8 LengthReport_{it} \\ & + \beta_9 LengthSection_{it} + \beta_{10} Loss_{it} + Industry\ fixed\ effects \\ & + Year\ fixed\ effects + \varepsilon_{it} \end{aligned}$$

For model 1, *NarrativesCharacteristic_{it}* represents the Gunning Fog Index of the Chairman segment for firm i in year t. For model 2, *NarrativesCharacteristic_{it}* represents the Gunning Fog Index of the CEO segment for firm i in year t. For model 3, *NarrativesCharacteristic_{it}* represents the Flesch Ease Reading Score of the Chairman segment for firm i in year t. For model 4, *NarrativesCharacteristic_{it}* represents the Flesch Ease Reading Score of the CEO segment for firm i in year t. For model 5, *NarrativesCharacteristic_{it}* represents the net tone, measured by the Loughran & McDonald wordlist, of the Chairman segment for firm i in year t. For model 6, *NarrativesCharacteristic_{it}* represents the net tone, measured by the Loughran & McDonald wordlist, of the CEO segment for firm i in year t. For model 7, *NarrativesCharacteristic_{it}* represents the net tone, measured by the Henry wordlist, of the Chairman segment for firm i in year t. For model 8, *NarrativesCharacteristic_{it}* represents the net tone, measured by the Henry wordlist, of the CEO segment for firm i in year t. For model 9, *NarrativesCharacteristic_{it}* represents the forward-looking discourse of the Chairman segment for firm i in year t. For model 10, *NarrativesCharacteristic_{it}* represents the forward-looking discourse of the CEO segment for firm i in year t.

Across all models, $FROA_{it}$ represents the future return on assets – net income in t+1 divided by total assets in t+1 – for firm i in year t; $Size_{it}$ represents the logarithm of equity market value of firm i in year t; MTB_{it} represents the book-to-market ratio – a firm's book value scaled by its market value, i.e. shareholders equity divided by the firm's market capitalization – of firm i in year t; $CROA_{it}$ represents the current return on assets of firm i in year t; $BSEG_{it}$ represents the logarithm of the number of business segments plus one of firm i in year t; $GSEG_{it}$ represents the logarithm of the number of geographic segments plus one of firm i in year t; Age_{it} represents the logarithm of age plus one of firm i in year t; $LengthReport_{it}$ represents the number of pages of the narratives portion of the annual report for firm i in year t; $LengthSection_{it}$ represents the number of pages of the Chairman and CEO sections (depending on the model) of the annual report for firm i in year t; $Loss_{it}$ is a dummy variable that equals one when firm i in year t has a negative net income and zero otherwise.

To test the alignment in predictability between the two chosen sections of the annual report, this study replicates the model proposed by Alves et al. 2016. The methodology captures discourse inconsistencies by regressing one segment on the other. In this case, the paper regresses the Chairman's segment on the CEO's segment for each measure studied, and then capture the discourse inconsistencies through the regression residuals of each model (ε_{it}) – see equation below.

(11 – 15)

$$MeasureChair_{it} = \beta_0 + \beta_1 MeasureCEO_{it} + \varepsilon_{it}$$

For model 11 the measure variables correspond to Fog_{it} ; for model 12 the measure variables correspond to $Flesch_{it}$; for model 13 the measure variables correspond to $ToneLM_{it}$; for model 14 the measure variables correspond to $ToneH6_{it}$; for model 15 the measure variables correspond to $FLook_{it}$.

Given the research question of this study, the focus point of this model will be observations in which the tone, complexity and forward-looking oriented narratives of the CEO review are higher than those of the Chairman section ($\varepsilon < 0$) since they are

more likely to portray information obfuscation, leading to lower predictability of firm future performance.

For a description of the variables used, please refer to Table A1 in Appendix.

4. Results

Table 1 presents the descriptive statistics for the independent variables – complexity, tone and forward-looking measurements.

In which concerns complexity measured by the Fog Index, the median report has an extremely complex to read disclosure (Fog higher than 17 – see Appendix A), with the whole narratives portion of the report being the most difficult to understand, followed by the CEO review and then the Chairman section. As per the Flesch Index, all segments have a difficult to read text (scores between 50.0 – 30.0 – see Table 4 – Appendix), with the most complex being, again, the global narratives portion, followed by the CEO review and then the Chairman section. Both measures seem to portray approximate results that preliminary point to the CEO having a more complex style of disclosure than the Chairman, which is in line with the expectations.

Regarding tone, measured by the two wordlists used, Loughran & McDonald and Henry, the median report has a positive tone (tone being higher than 0) in all sections, with the highest one being the Chairman’s letter, followed by the CEO review and lastly the narratives portion of the report for all the different wordlists used. The word list created by Henry portrays the highest level of positive tone amongst the two measurements. The present preliminary results are opposite from what is expected (CEO review having the most positive tone).

Forward-looking text is higher for the Chairman’s segment, followed by the CEO and the narrative portion of the report, which, as with tone, is opposite from what is expected.

The paper uses the Flesch Score and the Henry wordlist as measures to test the robustness of the models.

Table 2 presents descriptive statistics for the independent and control variables mentioned above. The median firm has a future return on assets of 0.0358, an equity market value of 294,390 pounds, a market-to-book ratio of 0.5458, a current return on assets of 0.0358, three business segments, three geographic segments, 21 years of age

since its initial listing and made a net profit of 7619 pounds in the current year. Additionally, the median firm has a length of 56 pages for its narratives portion of the annual report, 2 pages for the Chair segment and 3 pages for the CEO review segment.

For descriptive statistics segregated by financial and non-financial firms, please refer to tables A4, A5, A6 and A7 – see Appendix.

Tables 3, 4 and 5 present the OLS estimates of complexity for models 1, 2, 3 and 4. Table 6, 7 and 8 present the OLS estimates of tone for models 4, 6, 7 and 8. Table 9, 10 and 11 present the OLS estimates of forward-looking for models 9 and 10. Table 12 contains the number of observations with $\varepsilon < 0$ and $\varepsilon > 0$. Table 13 contains descriptive statistics for discourse inconsistency.

Table 1. Independent variables descriptive statistics

Independent Variables Descriptive Statistics							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
Complexity							
<i>FogReport</i>	23.2918	22.3404	3.7867	14.8353	56.5841	19.5181	30.2093
<i>FogChair</i>	20.2055	19.9117	3.8513	0.0000	121.3151	16.4833	24.2174
<i>FogCEO</i>	20.2608	19.9069	4.0629	10.0741	123.4585	16.2085	24.3172
<i>FleschReport</i>	32.6217	35.3920	23.7426	-504.0562	244.1998	12.9832	47.7049
<i>FleschChair</i>	45.4077	46.8805	23.0492	-436.8957	260.7335	30.6634	61.3569
<i>FleschCEO</i>	42.1909	43.5067	22.8014	-402.7997	211.5874	26.8276	59.6340
Tone							
<i>ToneLMReport</i>	0.1025	0.1092	0.1435	-0.5034	0.6091	-0.1492	0.3328
<i>ToneLMChair</i>	0.3700	0.3843	0.1730	-0.3889	0.8772	0.0574	0.6353
<i>ToneLMCEO</i>	0.3697	0.3842	0.1741	-0.3890	0.8727	0.0533	0.6357
<i>ToneHReport</i>	0.4286	0.4493	0.2274	-1.0000	1.0000	0.0244	0.7447
<i>Tone Chair</i>	0.7147	0.7647	0.2279	-0.5000	1.0000	0.2778	1.0000
<i>ToneHCEO</i>	0.7090	0.7600	0.2312	-0.5000	1.0000	0.2653	1.0000
Forward-looking							
<i>FLookReport</i>	0.0124	0.0124	0.0027	0.0000	0.0429	0.0083	0.0166
<i>FLookChair</i>	0.0170	0.0167	0.0067	0.0000	0.0733	0.0067	0.0284
<i>FLookCEO</i>	0.0153	0.0145	0.0067	0.0000	0.0636	0.0056	0.0271

Note: The statistics presented are computed across 3,031 observations.

Table 2. Control variables descriptive statistics

Dependent and Control Variables Descriptive Statistics							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
<i>Future ROA</i>	-0.0360	0.0358	0.7175	-25.5370	4.2358	-0.4332	0.1823
<i>Market Value</i>	3057,834	294,390	10600,000	30.0000	153000,000	7,840	13300,000
<i>Market-to-Book</i>	0.7259	0.5458	1.4863	-0.4427	62.6900	0.1220	1.5849
<i>Current ROA</i>	-0.0129	0.0358	0.3113	-6.0665	4.2358	-0.4266	0.1841
<i>Business Seg</i>	3.0178	3.0000	1.9544	1.0000	10.0000	1.0000	7.0000
<i>Geographic Seg</i>	3.0383	3.0000	2.1232	1.0000	10.0000	1.0000	7.0000
<i>Age</i>	26.4421	21.0000	16.4916	5.0000	58.0000	8.0000	58.0000
<i>Net Income</i>	134,452	7,619	980,139	-8995,000	27900,000	-58,258	631,000
<i>Report Length</i>	59.7757	56.0000	37.3029	6.0000	418.0000	15.0000	117.0000
<i>Chair Length</i>	1.9673	2.0000	1.0508	1.0000	16.0000	1.0000	4.0000
<i>CEO Length</i>	3.8034	3.0000	2.9804	1.0000	60.0000	1.0000	8.0000

Note: The statistics presented are computed across 3,031 observations.

4.1. Complexity

Regarding the complexity of the text, literature tends to confirm a negative relation between complex text and future firm performance, which would be demonstrated by negative coefficient estimates both in Chairman segments and CEO segments. Analysing the results portrayed in Table 3 it is possible to see that the coefficients are negative for both sections confirming the existing literature. However, in order for these results to be statistically significant, the p-values would need to be lower than 0.10 for a significance level of 10%, which is not the case. As such, the null hypothesis of models 1 and 2 are not rejected, determining that the complexity of the narratives in the Chairman and CEO segments, measured by the Fog Index, is not a predictor of firm performance, measured by the future return on assets. To test the robustness of the model for the readability characteristic, the paper regresses the Flesch Score on future firm performance. It is possible to determine that results are robust, since that, measured with a different index, complexity still holds no predictive ability of future firm performance.

Analysing the level of impact of the measures, it is possible to observe that, for the Chairman section, the Fog Index has a higher impact than the Flesch Score and that for the CEO section the impact is the same for both measures.

Observing non-financial firms – see Table 5 – the results remain, as no measure of complexity seems to have an impact on future firm performance, although the coefficient estimates match the existing literature. On financial firms – see Table 4 –, that hold the same outcome, results show a negative coefficient for the Chair section measured by the Fog Index, a positive coefficient for the CEO section measured by the Fog Index, a positive coefficient for the Chair section measured by the Flesch Score and a negative coefficient for the CEO section measured by the Flesch Score, which seem to go against the findings in mentioned papers.

Financial firms hold the highest impact for the coefficient measured through the Fog Index, both in the Chairman letter and the CEO review. As for non-financial

firms, in the Chairman section the highest impact is measured through the Fog Index, whilst in the CEO review, the highest impact is measured through the Flesch Score

Table 3. OLS estimates of complexity

Variables	Complexity			
	Fog Index		Flesch Score	
	Chairman (1)	CEO (2)	Chairman (3)	CEO (4)
<i>Fog Index</i>	-0.0017 (0.0019)	-0.0001 (0.0013)		
<i>Flesch Score</i>			-0.0001 (0.0002)	-0.0001 (0.0002)
<i>Equity market value</i>	0.0185*** (0.0053)	0.0179*** (0.0053)	0.0186*** (0.0054)	0.0179*** (0.0053)
<i>Market-to-Book</i>	-0.0026 (0.0114)	-0.0027 (0.0114)	-0.0025 (0.0114)	-0.0027 (0.0114)
<i>Current ROA</i>	0.5663*** (0.2163)	0.5681*** (0.2172)	0.5662*** (0.2162)	0.5682*** (0.2173)
<i>Business segments</i>	0.0103 (0.0157)	0.0103 (0.0159)	0.0103 (0.0157)	0.0102 (0.0160)
<i>Geographic Segments</i>	0.0292 (0.0222)	0.0296 (0.0222)	0.0289 (0.0221)	0.0292 (0.0219)
<i>Age</i>	0.0253 (0.0179)	0.0226 (0.0183)	0.0264 (0.0185)	0.0253 (0.0181)
<i>Loss</i>	-0.0747 (0.0608)	-0.0764 (0.0610)	-0.0749 (0.0608)	-0.0765 (0.0611)
<i>Report Length</i>	-0.0006 (0.0004)	-0.0005 (0.0004)	-0.0006 (0.0004)	-0.0005 (0.0004)
<i>Section Length</i>	0.0118 (0.0086)	-0.0005 (0.0037)	0.0116 (0.0085)	-0.0005 (0.0038)
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>F Statistic</i>	16.4100	16.2500	16.3700	16.3500
<i>Adjusted R Squared</i>	0.1066	0.1063	0.1065	0.1063

Note: All specifications include a constant term and are based on 3,031 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

Table 4. OLS estimates of complexity on financial firms

Variables	Complexity			
	Fog Index		Flesch Score	
	Chairman (1)	CEO (2)	Chairman (3)	CEO (4)
<i>Fog</i>	-0.0004 (0.0010)	0.0004 (0.0008)		
<i>Flesch</i>			0.0003 (0.0003)	-0.0001 (0.0001)
<i>Equity market value</i>	0.0019 (0.0034)	0.0020 (0.0034)	0.0019 (0.0034)	0.0018 (0.0033)
<i>Market-to-Book</i>	-0.0423** (0.0180)	-0.0428** (0.0180)	-0.0426** (0.0179)	-0.0427** (0.0180)
<i>Current ROA</i>	0.3322** (0.1550)	0.3317** (0.1558)	0.3332** (0.1539)	0.3319** (0.1563)
<i>Business segments</i>	-0.0217*** (0.0082)	-0.0203** (0.0082)	-0.0212*** (0.0081)	-0.0205** (0.0082)
<i>Geographic Segments</i>	0.0071 (0.0074)	0.0071 (0.0075)	0.0074 (0.0075)	0.0068 (0.0075)
<i>Age</i>	-0.0101* (0.0060)	-0.0098 (0.0060)	-0.0103* (0.0060)	-0.0099* (0.0060)
<i>Loss</i>	-0.0326 (0.0249)	-0.0335 (0.0252)	-0.0326 (0.0249)	-0.0341 (0.0251)
<i>Report Length</i>	0.0000- (0.0001)	0.0000- (0.0001)	0.0000- (0.0001)	0.0000- (0.0001)
<i>Section Length</i>	0.0010 (0.0033)	-0.0011 (0.0011)	0.0011 (0.0033)	-0.0011 (0.0011)
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>F Statistic</i>	10.5400	11.0000	10.4500	10.8700
<i>Adjusted R Squared</i>	0.3088	0.3095	0.3095	0.3098

Note: All specifications include a constant term and are based on 530 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10. 0.000+ denotes a value greater than 0.000 and smaller than 0.001. 0.000- denotes a value greater than -0.001 and smaller than 0.000.

Table 5. OLS estimates of complexity on non-financial firms

Variables	Complexity			
	Fog Index		Flesch Score	
	Chairman (1)	CEO (2)	Chairman (3)	CEO (4)
<i>Fog</i>	-0.0016 (0.0021)	-0.0004 (0.0015)		
<i>Flesch</i>			-0.0001 (0.0002)	-0.0008 (0.0003)
<i>Equity market value</i>	0.0214*** (0.0068)	0.0203*** (0.0066)	0.0215*** (0.0069)	0.0204*** (0.0066)
<i>Market-to-Book</i>	-0.0015 (0.0113)	-0.0017 (0.0112)	-0.0015 (0.0113)	-0.0017 (0.0113)
<i>Current ROA</i>	0.5650** (0.2251)	0.5672** (0.2260)	0.5650** (0.2250)	0.5672** (0.2261)
<i>Business segments</i>	0.0140 (0.0187)	0.0133 (0.0186)	0.0139 (0.0187)	0.0132 (0.0185)
<i>Geographic Segments</i>	0.0357 (0.0275)	0.0359 (0.0276)	0.0355 (0.0275)	0.0357 (0.0273)
<i>Age</i>	0.0318 (0.0227)	0.0310 (0.0229)	0.0330 (0.0234)	0.0313 (0.0227)
<i>Loss</i>	-0.0811 (0.0670)	-0.0829 (0.0668)	-0.0813 (0.0669)	-0.0830 (0.0669)
<i>Report Length</i>	-0.0007 (0.0007)	-0.0005 (0.0006)	-0.0007 (0.0007)	-0.0005 (0.0006)
<i>Section Length</i>	0.0147 (0.0105)	-0.0002 (0.0042)	0.0146 (0.0105)	-0.0002 (0.0042)
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>F Statistic</i>	16.1100	16.0000	16.0600	16.0900
<i>Adjusted R Squared</i>	0.1049	0.1045	0.1048	0.1045

Note: All specifications include a constant term and are based on 2,501 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

4.2. Tone

Analysing the tone management – see Table 6 –, it is possible to see that, in spite of the measure used, results show positive coefficients for the Chair Section and negative coefficients for the CEO segments, which are in line with the expectations for these two different individuals, with different objectives and functions. The Chairman, that is in charge of controlling the CEO, is expected to have a more unbiased view of the company, whilst the CEO, that usually has some type of benefits associated with good firm performance, is expected to use enhanced tone as a means of obfuscating company problems that might not be easily perceived by the public eye.

It is also important to observe that the scale of impact varies across measures used. Whilst in the Chairman section the Loughran & McDonald wordlist withholds the higher positive impact and Henry wordlist the lower, in the CEO section it is the Henry wordlist that has the highest negative coefficient and Loughran & McDonald the lowest.

Even though the coefficients match the expectations, they do not have statistic relevance, which is why the null hypothesis of models 5, 6, 7 and 8 are not rejected. This implies that the tone, measured by the two different wordlists chosen, has no predictive ability of future firm performance, measured by the return on assets.

Looking at the distinction between financial and non-financial firms – see Table 7 and 8 –, results remain unchanged for the Chair section, both for financial and non-financial firms, whilst on the CEO segment there's a change in direction from a negative to a positive coefficient measured by the Henry wordlist for financial firms, and a change in direction from a negative to a positive coefficient measured by the Loughran & McDonald wordlist for non-financial firms.

As for the scale of the impact in financial firms, Loughran & McDonald wordlist has the higher levels both for Chairman and CEO sections. In non-financial firms, Loughran & McDonald wordlist has the highest impact for the Chairman section and Henry wordlist has the highest impact for the CEO segment.

Table 6. OLS estimates of tone

Variables	Tone			
	Loughran & McDonald		Henry	
	Chairman (5)	CEO (6)	Chairman (7)	CEO (8)
<i>ToneLM</i>	0.0772 (0.0690)	-0.0046 (0.0696)		
<i>ToneH</i>			0.0269 (0.0353)	-0.0336 (0.0386)
<i>Equity market value</i>	0.0170*** (0.0053)	0.0180*** (0.0056)	0.0184*** (0.0053)	0.0185*** (0.0055)
<i>Market-to-Book</i>	-0.0018 (0.0108)	-0.0028 (0.0111)	-0.0022 (0.0115)	-0.0031 (0.0115)
<i>Current ROA</i>	0.5636*** (0.2166)	0.5682*** (0.2180)	0.5657*** (0.2159)	0.5689*** (0.2177)
<i>Business segments</i>	0.0099 (0.0154)	0.0104 (0.0153)	0.0100 (0.0157)	0.0108 (0.0161)
<i>Geographic Segments</i>	0.0299 (0.0226)	0.0295 (0.0223)	0.0294 (0.0222)	0.0292 (0.0220)
<i>Age</i>	0.0299 (0.0191)	0.0250 (0.0175)	0.0274 (0.0195)	0.0236 (0.0170)
<i>Loss</i>	-0.0667 (0.0573)	-0.0767 (0.0576)	-0.0725 (0.0624)	-0.0778 (0.0601)
<i>Report Length</i>	-0.0005 (0.0004)	-0.0005 (0.0004)	-0.0005 (0.0004)	-0.0005 (0.0004)
<i>Section Length</i>	0.0126 (0.0083)	-0.0005 (0.0034)	0.0120 (0.0087)	-0.0006 (0.0037)
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>F Statistic</i>	16.3900	16.5300	16.4500	16.2100
<i>Adjusted R Squared</i>	0.1070	0.1063	0.1066	0.1064

Note: All specifications include a constant term and are based on 3,031 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

Table 7. OLS estimates of tone on financial firms

Variables	Tone			
	Loughran & McDonald		Henry	
	Chairman (5)	CEO (6)	Chairman (7)	CEO (8)
<i>ToneLM</i>	0.0235 (0.0309)	-0.0203 (0.0163)		
<i>ToneH</i>			0.0176 (0.0202)	0.0097 (0.0141)
<i>Equity market value</i>	0.0017 (0.0035)	0.0021 (0.0034)	0.0019 (0.0034)	0.0018 (0.0034)
<i>Market-to-Book</i>	-0.0399** (0.0176)	-0.0460** (0.0179)	-0.0419** (0.0180)	-0.0418** (0.0179)
<i>Current ROA</i>	0.3370** (0.1513)	0.3294** (0.1561)	0.3358** (0.1547)	0.3299** (0.1549)
<i>Business segments</i>	-0.0232*** (0.0082)	-0.0180** (0.0085)	-0.0223*** (0.0081)	-0.0210** (0.0082)
<i>Geographic Segments</i>	0.0071 (0.0075)	0.0068 (0.0074)	0.0074 (0.0075)	0.0077 (0.0075)
<i>Age</i>	-0.0086 (0.0059)	-0.0114* (0.0061)	-0.0092 (0.0059)	-0.0094 (0.0059)
<i>Loss</i>	-0.0285 (0.0231)	-0.0356 (0.0247)	-0.0303 (0.0248)	-0.0333 (0.0249)
<i>Report Length</i>	0.0000- (0.0001)	0.0000- (0.0001)	0.0000- (0.0001)	0.0000- (0.0001)
<i>Section Length</i>	0.0011 (0.0034)	-0.0014 (0.0011)	0.0009 (0.0033)	-0.0010 (0.0011)
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>F Statistic</i>	10.3400	11.4000	10.5500	10.8800
<i>Adjusted R Squared</i>	0.3108	0.3114	0.3099	0.3098

Note: All specifications include a constant term and are based on 530 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10. 0.000+ denotes a value greater than 0.000 and smaller than 0.001. 0.000- denotes a value greater than -0.001 and smaller than 0.000.

Table 8. OLS estimates of tone on non-financial firms

Variables	Tone			
	Loughran & McDonald		Henry	
	Chairman (5)	CEO (6)	Chairman (7)	CEO (8)
<i>ToneLM</i>	0.0941 (0.0918)	0.0016 (0.1038)		
<i>ToneH</i>			0.0283 (0.0412)	-0.0503 (0.0526)
<i>Equity market value</i>	0.0193*** (0.0068)	0.0203*** (0.0074)	0.0212*** (0.0068)	0.0213*** (0.0071)
<i>Market-to-Book</i>	-0.0007 (0.0105)	-0.0017 (0.0108)	-0.0011 (0.0113)	-0.0022 (0.0113)
<i>Current ROA</i>	0.5605** (0.2261)	0.5672** (0.2279)	0.5642** (0.2244)	0.5683** (0.2267)
<i>Business segments</i>	0.0150 (0.0193)	0.0133 (0.0189)	0.0136 (0.0187)	0.0134 (0.0186)
<i>Geographic Segments</i>	0.0366 (0.0281)	0.0359 (0.0275)	0.0359 (0.0276)	0.0356 (0.0275)
<i>Age</i>	0.0362 (0.0237)	0.0312 (0.0218)	0.0340 (0.0245)	0.0293 (0.0214)
<i>Loss</i>	-0.0718 (0.0618)	-0.0829 (0.0617)	-0.0788 (0.0687)	-0.0852 (0.0656)
<i>Report Length</i>	-0.0005 (0.0007)	-0.0005 (0.0007)	-0.0006 (0.0006)	-0.0005 (0.0006)
<i>Section Length</i>	0.0158 (0.0102)	-0.0002 (0.0037)	0.0150 (0.0107)	-0.0004 (0.0041)
<i>Year Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes	Yes	Yes
<i>F Statistic</i>	16.1400	16.2400	16.1500	15.8900
<i>Adjusted R Squared</i>	0.1054	0.1045	0.1049	0.1046

Note: All specifications include a constant term and are based on 2,501 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

4.3. Forward Looking

Tests on forward-looking – see Tables 9, 10 and 11 below – reveal that, for the CEO section, the use of forward-looking narratives has predictive ability of firm future performance for a significance level of 5%, when the null hypothesis of model 10 is rejected. This impact is negative and significant, which indicates that when CEOs use forward-looking words (present in our updated version of Hussainey et al. in 2003 wordlist), future firm performance tends to be poor, which is in line with what was expected, in cases of impression management. On the other hand, for the Chairman section, results show a positive impact, which is also in line with the expectations, since the Chairman is usually more neutral and transparent, however, this impact is not significant since the estimation does not reject the null hypothesis of model 9. These results withstand when analysing non-financial firms. To the contrary, having a look at financial firms, it is possible to note that both the coefficient directions of the Chairman and the CEO sections remain the same, although none is significantly relevant.

Table 9. OLS estimates of forward-looking

Variables	Forward-looking	
	Chairman (9)	CEO (10)
<i>Forward Looking</i>	0.0515 (1.0260)	-2.9472** (1.1647)
<i>Equity market value</i>	0.0186*** (0.0054)	0.0176*** (0.0052)
<i>Market-to-Book</i>	-0.0025 (0.0114)	-0.0022 (0.0112)
<i>Current ROA</i>	0.5660*** (0.2160)	0.5670*** (0.2167)
<i>Business segments</i>	0.0104 (0.0158)	0.0106 (0.0160)
<i>Geographic Segments</i>	0.0291 (0.0222)	0.0275 (0.0217)
<i>Age</i>	0.0262 (0.0186)	0.0236 (0.0178)
<i>Loss</i>	-0.0749 (0.0608)	-0.0731 (0.0610)
<i>Report Length</i>	-0.0006 (0.0004)	-0.0005 (0.0004)
<i>Section Length</i>	0.0117 (0.0085)	-0.0009 (0.0038)
<i>Year Fixed Effects</i>	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes
<i>F Statistic</i>	16.4400	16.2100
<i>Adjusted R Squared</i>	0.1065	0.1070

Note: All specifications include a constant term and are based on 3,031 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

Table 10. OLS estimates of forward-looking on financial firms

Variables	Forward-looking	
	Chairman (9)	CEO (10)
<i>Forward Looking</i>	0.0224 (0.8599)	-0.7731 (0.8238)
<i>Equity market value</i>	0.0020 (0.0033)	0.0015 (0.0033)
<i>Market-to-Book</i>	-0.0425** (0.0180)	-0.0431** (0.0177)
<i>Current ROA</i>	0.3316** (0.1556)	0.3332** (0.1559)
<i>Business segments</i>	-0.0218*** (0.0081)	-0.0198** (0.0082)
<i>Geographic Segments</i>	0.0070 (0.0074)	0.0066 (0.0075)
<i>Age</i>	-0.0101* (0.0059)	-0.0107* (0.0061)
<i>Loss</i>	-0.0325 (0.0254)	-0.0321 (0.0254)
<i>Report Length</i>	0.0000- (0.0001)	0.0000- (0.0001)
<i>Section Length</i>	0.0010 (0.0033)	-0.0012 (0.0011)
<i>Year Fixed Effects</i>	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes
<i>F Statistic</i>	11.4200	12.1200
<i>Adjusted R Squared</i>	0.3087	0.3110

Note: All specifications include a constant term and are based on 530 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10. 0.000+ denotes a value greater than 0.000 and smaller than 0.001. 0.000- denotes a value greater than -0.001 and smaller than 0.000.

Table 11. OLS estimates of forward-looking on non-financial firms

Variables	Forward-looking	
	Chairman (9)	CEO (10)
<i>Forward Looking</i>	0.0964 (1.2389)	-3.4681** (1.4054)
<i>Equity market value</i>	0.0216*** (0.0070)	0.0204*** (0.0066)
<i>Market-to-Book</i>	-0.0015 (0.0112)	-0.00192 (0.0109)
<i>Current ROA</i>	0.5647** (0.2247)	0.5655** (0.2254)
<i>Business segments</i>	0.0140 (0.0189)	0.0127 (0.0185)
<i>Geographic Segments</i>	0.0357 (0.0277)	0.0339 (0.0271)
<i>Age</i>	0.0328 (0.0234)	0.0300 (0.0224)
<i>Loss</i>	-0.0814 (0.0670)	-0.0793 (0.0668)
<i>Report Length</i>	-0.0007 (0.0007)	-0.0005 (0.0006)
<i>Section Length</i>	0.0147 (0.0105)	-0.0008 (0.0042)
<i>Year Fixed Effects</i>	Yes	Yes
<i>Industry Fixed Effects</i>	Yes	Yes
<i>F Statistic</i>	16.1100	15.8400
<i>Adjusted R Squared</i>	0.1048	0.1053

Note: All specifications include a constant term and are based on 2,501 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

4.4. Discourse Inconsistency

After capturing discourse inconsistencies through the regression residuals (ε_{it}) of each model of (see Tables A8, A9 and A10 in Appendix) – where $\varepsilon < 0$ represents observations in which the tone, complexity and forward-looking oriented narratives of the CEO review are higher than those of the Chairman section – the analysis retrieves that, measured by the Fog Index, the CEO presents a more complex discourse than the Chairman, measured by the Flesch Score, the Chairman presents a more complex discourse than the CEO, measured by the Loughran & McDonald (2011) and Henry wordlists, the Chairman has a more positive tone than the CEO, and, measured by an updated version of Hussainey et al. in 2003 wordlist, the CEO presents a more forward-looking oriented narrative than the Chairman – see table 12 below. The results hold for financial firms, with the CEO having a more complex discourse measured by the Flesch Index for non-financial firms.

Table 12. Number of observations with $\varepsilon < 0$ and $\varepsilon > 0$

	Number of observations with $\varepsilon < 0$ and $\varepsilon > 0$				
	IncFog	IncFlesch	IncLM	IncH	IncFLook
Whole sample					
$\varepsilon < 0$	1,681	1,489	1,453	1,265	1,593
$\varepsilon > 0$	1,350	1,542	1,578	1,766	1,438
% of $\varepsilon < 0$	0.5546	0.4913	0.4794	0.4174	0.5256
Financial firms					
$\varepsilon < 0$	292	247	257	239	288
$\varepsilon > 0$	238	283	273	291	242
% of $\varepsilon < 0$	0.5509	0.4660	0.4849	0.4509	0.5434
Non-financial firms					
$\varepsilon < 0$	1,112	1,260	1,191	1,033	1,311
$\varepsilon > 0$	1,389	1,241	1,310	1,468	1,190
% of $\varepsilon < 0$	0.5554	0.5038	0.4762	0.4130	0.5242

These results are also sustained by the descriptive statistics, where it is possible to see that the median report has a negative change in Fog Index and forward-looking words, which suggests that the CEO from the median firm utilizes a more complex

(measured by Fog) and forward-looking discourse than the Chairman – see table 13 below. The results hold for financial firms, with the CEO having a more complex discourse measured by the Flesch Index for non-financial firms.

Table 13. Discourse inconsistency descriptive statistics

Discourse Inconsistencies Descriptive Variables							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
Whole sample							
<i>IncFog</i>	0.0000+	-0.3052	3.7946	-19.9660	101.1673	-3.5200	3.8029
<i>IncFlesch</i>	0.0000+	0.2079	17.0849	-281.0403	295.7615	-14.6301	15.0011
<i>IncLM</i>	0.0000+	0.0103	0.1942	-1.1048	0.7312	-0.3285	0.2873
<i>IncH</i>	0.0000-	0.0350	0.2094	-1.2052	0.6737	-0.3879	0.2552
<i>IncFlook</i>	0.0000+	-0.0004	0.0064	-0.0202	0.0436	-0.0099	0.0107
Financial firms							
<i>IncFog</i>	0.0000-	-0.2328	3.0794	-13.0064	36.2615	-6.0219	4.0082
<i>IncFlesch</i>	0.0000+	0.7215	10.8662	-85.0407	79.2019	-30.6674	13.3103
<i>IncLM</i>	0.0000+	0.0072	0.2088	-1.0989	0.6321	-0.5264	0.3002
<i>IncH</i>	0.0000-	0.0269	0.2295	-1.1557	0.5937	-0.5828	0.2986
<i>IncFlook</i>	0.0000+	-0.0006	0.0062	-0.0183	0.0247	-0.0154	0.0100
Non-financial firms							
<i>IncFog</i>	0.0000	-0.2859	3.9265	-19.9575	0.0000	-3.4869	3.7884
<i>IncFlesch</i>	0.0000-	-0.0564	16.7192	-281.6667	0.0000-	-15.1226	15.8632
<i>IncLM</i>	0.0000	0.0122	0.1905	-1.0593	0.0000	-0.3273	0.2818
<i>IncH</i>	0.0000-	0.0322	0.2034	-1.2093	0.0000-	-0.3863	0.2481
<i>IncFlook</i>	0.0000	-0.0003	0.0065	-0.0202	0.0000	-0.0101	0.0109

Note: The statistics presented are computed across 3,031, 530 and 2,501 observations respectively. 0.000+ denotes a value greater than 0.000 and smaller than 0.001. 0.000- denotes a value greater than -0.001 and smaller than 0.000.

5. Conclusion

This paper analyses the predictive ability of complexity (measured by the Fog and the Flesch indexes), tone (measured by Loughran & McDonald, Henry 2006 wordlists) and forward-looking (measured by an updated version of Hussainey et al. 2003 wordlist) in firm future performance for the Chairman and CEO sections of a firm's annual report and the alignment of these 2 later figures on their style of discourse.

Results regarding complexity and tone show no impact in future firm performance for the two segments analysed, both for financial and non-financial firms, even though the direction of the coefficients match the expectations. On the other hand, when looking at forward-looking narratives, evidence portrays a significant negative correlation between the forward-looking discourse of the CEO review and future firm performance for the whole sample and for non-financial firms. In which regards the Chairman, results are not relevant, which suggests no impact in the future return on assets of a firm.

When looking at discourse inconsistencies, results show that the CEO review portrays a higher level of complexity measured by the Fog index and holds a more forward-looking text than the Chairman section, whilst the Chairman has a higher level of complexity measured by the Flesch index and a more positive tone measured by the two different wordlists used. The results hold for financial firms, with the CEO having a more complex discourse measured by the Flesch Index for non-financial firms.

Analysing all the results, some were expected according to literature, but the majority opposes to what was expected. This may be due to the lack of observations that matched all the criteria, since there were a lot of observations that were dropped that didn't have both a Chairman's letter and a CEO review in the same report. Additionally, the few years used for analysis might also be a limitation that can be addressed in the future.

For future research, it would be of interest including the CFO in the analysis or including the CFO in the case where the Chairman and CEO are the same person, since these individuals hold different objectives and incentives within a firm. It would also be relevant to study causal and uncertainty narratives.

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Appendix

Table A1. Variable descriptions

Variable Descriptions	
Variable Name	Description
FROA	Future return on assets, i.e. future firm performance
Flesch*	Flesch Reading Ease
Fog*	Gunning Fog Index
ToneLM*	The difference between the number of positive and negative words divided by their sum. Definition of positive and negative words according to Loughran and McDonald's wordlist
ToneH*	The difference between the number of positive and negative words divided by their sum. Definition of positive and negative words according to Henry (2006) wordlist
FLook*	The number of forward-looking words according to an updated version of Hussainey et al. (2003) wordlist
Size	Log (Equity market value)
MTB	Market-to-book ratio
CROA	Current return on assets, i.e. current firm performance
BSEG	Log (1 + Business segments)
GSEG	Log (1 + Geographic segments)
Age	Log (1 + Firm age)
LengthReport	The number of pages of the narratives portion of the annual report
LengthSection*	The number of pages of an individual section of the annual report
Loss	Indicator variable that takes the value one if the firm has a negative net income and zero otherwise
MeasureChair	Variable that represents the Fog, Flesch, ToneLM, ToneH6, ToneH8 and FLook for the Chairman section depending on the model
MeasureCEO	Variable that represents the Fog, Flesch, ToneLM, ToneH6, ToneH8 and FLook for the CEO section depending on the model
IncFog	Discourse inconsistency measured by the Fog Index
IncFlesch	Discourse inconsistency measured by the Flesch Score
IncLM	Discourse inconsistency measured by the Loughran & McDonald wordlist
IncH	Discourse inconsistency measured by the Henry 2006 wordlist
IncFLook	Discourse inconsistency measured by an updated version of Hussainey et al. (2003) wordlist

Note: Variables with an * in front are used across the Chairman and CEO segments

Table A2. Gunning fog index scores

Gunning Fog Index Scores	
Fog Index	Reading level by grade
20+	College graduate plus
17	College graduate plus
16	College junior
15	College sophomore
14	College freshman
13	High school senior
12	High school junior
11	High school sophomore
10	High school freshman
9	Eight grade
8	Seventh grade
7	Sixth grade

Table A3. Flesch reading ease scores

Flesch Reading Ease Scores		
Score	School level (US)	Notes
100.00 - 90.00	5th grade	Very easy to read.
90.00 - 80.00	6th grade	Easy to read.
80.00 - 70.00	7th grade	Fairly easy to read.
70.00 - 60.00	8th & 9th grade	Plain English.
60.00 - 50.00	10th to 12th grade	Fairly difficult to read.
50.00 - 30.00	College	Difficult to read.
30.00 - 10.00	College graduate	Very difficult to read.
10.00 - 00.00	Professional	Extremely difficult to read.

Table A4. Independent variables descriptive statistics for financial firms

Independent Variables Descriptive Statistics							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
Complexity							
<i>FogReport</i>	23.9279	22.9455	4.4551	14.9474	56.5841	19.6003	32.1819
<i>FogChair</i>	20.3746	20.1581	3.2210	12.8626	59.1552	16.4202	24.4975
<i>FogCEO</i>	20.4081	20.0154	4.0027	11.1662	69.7383	15.9870	24.6949
<i>FleschReport</i>	32.4442	34.9543	14.5863	-106.6146	58.3521	7.3127	47.6886
<i>FleschChair</i>	46.6386	47.2137	11.0688	-39.8575	129.6696	30.7779	60.5914
<i>FleschCEO</i>	43.0142	44.4491	23.4036	-395.0807	125.9436	28.9523	59.0644
Tone							
<i>ToneLMReport</i>	0.0000	0.0079	0.1609	-0.5034	0.4702	-0.2691	0.2659
<i>ToneLMChair</i>	0.3441	0.3585	0.2488	-1.0000	1.0000	-0.0909	0.6842
<i>ToneLMCEO</i>	0.2820	0.3298	0.2919	-1.0000	1.0000	-0.2632	0.6847
<i>ToneHReport</i>	0.2426	0.2509	0.1930	-0.3889	0.6990	-0.1172	0.5462
<i>ToneHChair</i>	0.6469	0.6735	0.2409	-0.4783	1.0000	0.2000	1.0000
<i>ToneHCEO</i>	0.6098	0.6667	0.2862	-1.0000	1.0000	0.0450	0.9238
Forward-looking							
<i>FLookReport</i>	0.0117	0.0114	0.0029	0.0056	0.0429	0.0081	0.0160
<i>FLookChair</i>	0.0165	0.0160	0.0064	0.0000	0.0416	0.0075	0.0270
<i>FLookCEO</i>	0.0146	0.0140	0.0061	0.0000	0.0416	0.0052	0.0236

Note: The statistics presented are computed across 530 observations.

Table A5. Dependent and control variables descriptive statistics for financial firms

Dependent and Control Variables Descriptive Statistics							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
<i>Future ROA</i>	0.0511	0.0422	0.1099	-0.7112	0.7001	-0.0915	0.2096
<i>Market Value</i>	4521,528	530,675	15200,000	1,130	153000,000	13,080	21800,000
<i>Market-to-Book</i>	0.7733	0.7939	0.4633	-0.1911	4.4266	0.1497	1.4591
<i>Current ROA</i>	0.0483	0.0407	0.1326	-1.9384	0.7001	-0.0841	0.2025
<i>Business Seg</i>	3.1491	3.0000	2.1535	1.0000	10.0000	1.0000	7.0000
<i>Geographic Seg</i>	2.3358	1.0000	2.0152	1.0000	9.0000	1.0000	7.0000
<i>Age</i>	24.9377	19.0000	15.8215	5.0000	58.0000	7.0000	58.0000
<i>Net Income</i>	169,998	29,815	1115,289	-8995,000	9977,267	-40,900	985,000
<i>Report Length</i>	72.6528	65.0000	52.9216	6.0000	418.0000	17.0000	166.0000
<i>Chair Length</i>	2.0132	2.0000	0.9999	1.0000	10.0000	1.0000	4.0000
<i>CEO Length</i>	3.7509	3.0000	2.6415	1.0000	22.0000	1.0000	8.0000

Note: The statistics presented are computed across 530 observations.

Table A6. Independent variables descriptive statistics for non-financial firms

Independent Variables Descriptive Statistics							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
Complexity							
<i>FogReport</i>	23.1570	22.2812	3.6160	14.8353	55.4662	19.4988	29.9048
<i>FogChair</i>	20.1697	19.8873	3.9717	0.0000	121.3151	16.4889	24.1429
<i>FogCEO</i>	20.2296	19.8908	4.0757	10.0741	123.4585	16.2897	24.1854
<i>FleschReport</i>	32.6593	35.4703	25.2624	-504.0562	244.1998	13.6386	47.7049
<i>FleschChair</i>	45.1469	46.7969	24.8511	-436.8957	260.7335	30.6634	61.6768
<i>FleschCEO</i>	42.0165	43.4071	22.6727	-402.7997	211.5874	26.6336	59.6340
Tone							
<i>ToneLMReport</i>	0.1242	0.1277	0.1296	-0.3307	0.6091	-0.0952	0.3455
<i>ToneLMChair</i>	0.4465	0.4667	0.2185	-0.6364	1.0000	0.0541	0.7500
<i>ToneLMCEO</i>	0.4231	0.4512	0.2140	-0.8400	1.0000	0.0370	0.7143
<i>ToneHReport</i>	0.3970	0.4040	0.1557	-0.2865	0.8772	0.1260	0.6445
<i>ToneHChair</i>	0.7291	0.7778	0.2225	-0.5000	1.0000	0.2973	1.0000
<i>ToneHCEO</i>	0.7156	0.7662	0.2230	-1.0000	1.0000	0.3084	0.9623
Forward-looking							
<i>FLookReport</i>	0.0126	0.0126	0.0027	0.0000	0.0378	0.0084	0.0166
<i>FLookChair</i>	0.0171	0.0168	0.0067	0.0000	0.0733	0.0066	0.0285
<i>FLookCEO</i>	0.0154	0.0146	0.0069	0.0000	0.0636	0.0056	0.0274

Note: The statistics presented are computed across 2,501 observations.

Table A7. Dependent and control variables descriptive statistics for non-financial firms

Dependent and Control Variables Descriptive Statistics							
Variable Name	Mean	Median	St Dev.	Min.	Max.	P5	P95
<i>Future ROA</i>	-0.0544	0.0349	0.7870	-25.5370	4.2358	-0.4985	0.1704
<i>Market Value</i>	2747,655	268,720	9319,121	30.0000	115000,000	7,330	11500,000
<i>Market-to-Book</i>	0.7159	0.5090	1.6222	-0.4427	62.6900	0.1165	1.6100
<i>Current ROA</i>	-0.0259	0.0354	0.3358	-6.0665	4.2358	-0.4878	0.1812
<i>Business Seg</i>	2.9900	3.0000	1.9088	1.0000	10.0000	1.0000	6.0000
<i>Geographic Seg</i>	3.1871	3.0000	2.1161	1.0000	10.0000	1.0000	7.0000
<i>Age</i>	26.7609	21.0000	16.6157	5.0000	58.0000	8.0000	58.0000
<i>Net Income</i>	126,919	6,000	949,109	-5293,132	27900,000	-60,104	548,000
<i>Report Length</i>	57.0468	54.0000	32.4234	6.0000	220.0000	15.0000	112.0000
<i>Chair Length</i>	1.9576	2.0000	1.0612	1.0000	16.0000	1.0000	4.0000
<i>CEO Length</i>	3.8145	3.0000	3.0477	1.0000	60.0000	1.0000	8.0000

Note: The statistics presented are computed across 2,501 observations.

Table A8. Discourse inconsistency

Discourse Inconsistency					
Variables	FogChair	FleschChair	LMChair	HChair	FLookChair
	11	12	13	14	15
<i>FogCEO</i>	0.1621*** (0.0442)				
<i>FleschCEO</i>		0.6785*** (0.1325)			
<i>LMCEO</i>			0.5020*** (0.0191)		
<i>HCEO</i>				0.3769*** (0.0229)	
<i>FLookCEO</i>					0.2681*** (0.0236)
<i>F Statistic</i>	13.4300	26.2100	692.7800	271.000	128.5600
<i>Adjusted R Squared</i>	0.0293	0.4506	0.2707	0.1558	0.0736

Note: All specifications include a constant term and are based on 3,031 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

Table A9. Discourse inconsistency for financial firms

Discourse Inconsistency					
Variables	FogChair	FleschChair	LMChair	HChair	FLookChair
	11	12	13	14	15
<i>FogCEO</i>	0.2360** (0.0982)				
<i>FleschCEO</i>		0.0901 (0.0601)			
<i>LMCEO</i>			0.4638*** (0.0398)		
<i>HCEO</i>				0.2551*** (0.0428)	
<i>FLookCEO</i>					0.2794*** (0.0521)
<i>F Statistic</i>	5.770	2.2500	136.0900	35.5800	28.7000
<i>Adjusted R Squared</i>	0.0860	0.0363	0.2961	0.0919	0.0703

Note: All specifications include a constant term and are based on 530 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.

Table A10. Discourse inconsistency for non-financial firms

Discourse Inconsistency					
Variables	FogChair	FleschChair	LMChair	HChair	FLookChair
	11	12	13	14	15
<i>FogCEO</i>	0.1467*** (0.0460)				
<i>FleschCEO</i>		0.8109*** (0.1061)			
<i>LMCEO</i>			0.5000*** (0.0219)		
<i>HCEO</i>				0.4037*** (0.0269)	
<i>FLookCEO</i>					0.2651*** (0.0262)
<i>F Statistic</i>	10.1900	58.4600	520.9800	225.5100	102.0100
<i>Adjusted R Squared</i>	0.0227	0.5474	0.2398	0.1638	0.0735

Note: All specifications include a constant term and are based on 2,501 observations. Robust standard errors in parenthesis. *** denotes p-values <0.01, ** denotes p-values <0.05, * denotes p-values <0.10.