Article

The Relationship between the Company's Value and the Tone of the Risk-Related Narratives: The Case of Portugal

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Abstract: The present study aims to identify the impact of the tone of risk reporting narratives on company market value. The paper uses a sample of 34 Portuguese non-finance companies with shares traded at the Euronext Lisbon stock exchange market. The paper conducts an automated content analysis of the risk reporting narratives included in the risk and risk management sections of the annual reports for 2018 by using the software DICTION 7 (Digitext, Inc., Austin, TX, USA) to retrieve the speech tone. Main findings indicate that the tone category "activity" is associated negatively with the company's market value. This result shows that investors misprice risk information that incorporates traces of overconfidence, narcissistic self-confidence and heroic leadership. The present study extends prior literature by analyzing the economic incentives of the tone of risk reporting narratives, not yet studied. Findings are both relevant to investors to support their decision-making processes and managers to strategically manage their risk communication tactics and benefit from the advantages emanated from them. Limitations related to the research setting do not undermine the generalization of findings because the automated algorithm provided by DICTION assures the content analysis's reliability. The sample used corresponds to the population of the Portuguese non-finance listed companies.

Keywords: risk reporting; risk disclosure; impression management

1. Introduction

Globalization, business fraud scandals and the complexity of risks are some of the aspects that have intensified companies' search for effective alternatives for risk control and management (Shad et al. 2019; Lechner and Gatzert 2018). Factors such as these have also aroused the detailed attention of investors on the information issued by companies in their annual reports, assigning expectations on financial performance, economic and social organizations (Hassan 2014; Campbell et al. 2014). A company's annual report and accounts is a fundamental mean of communication among stakeholders, which must reflect not only the past events but also those that may occur in the future. As a result, although the existence of an effective accounting process within companies, accounting information becomes irrelevant if not properly communicated in corporate reports (Merkl-Davies and Brennan 2017). Therefore, managers should not just channel their efforts to measure the performance and the company's position but also must worry about providing information to an audience with different needs, skills, and knowledge (Merkl-Davies and Brennan 2017). In this sense, due to the importance of corporate reports in the decision-making process of these multiple stakeholders, many studies focus their attention on the narratives included in these reports, approaching "tone" as an element of writing style. This happens

because managers' messages include informative content about their personal feelings (Luo et al. 2019; Henry 2008). This study aims to analyze the tone of the risk and risk management narratives and their influence on the market value of Portuguese listed companies.

As such, the following research question arises:

RQ1. Does the tone of risk reporting narratives, specifically those from Portuguese non-financial listed companies, influence their market value?

To answer the research question, we examined a sample of 34 non-financial companies listed on the regulated market of Euronext Lisbon on 31 December 2018. The analysis of the data took place in two stages. First, we carried out an automated content analysis to assess the tone attributes of the risk and risk management sections included in a company's annual report of 2018. Second, we tested the associations between the companies' market value and the tone of the risk reports through an Ordinal Least Square regression.

Some studies on the tone of narratives address non-financial aspects, such as sustainability and social responsibility information (Fisher et al. 2019), while others are focused on financial issues, such as disclosures and debt financing costs (Luo et al. 2019), or even the combined effects of financial and non-financial information in integrated reports (Roman et al. 2019; Beretta et al. 2019). However, any study has addressed the economic consequences of the optimized tone in risk information hitherto. The present study tries to fill this void by analyzing the tone of the risk reporting narratives' effects on the company's market value. We focus on a Portuguese setting and in the year 2018, due to the adoption of specific regulations in Portugal, such as (a) the Decree-Law 89/2017 transcribed from Directive 2014/95 of the European Union (EU); (b) and the new corporate governance Code, issued by the Portuguese Institute of Corporate Governance (IPCG) in 2018. These regulations require companies to present non-financial information in their annual reports regarding issues of social and environmental nature and risk information (risk exposures and risk mitigation policies). However, although these regulations have been providing more security to investors and regulators in the inspection process, it is clear that from the preparer's perspective, many of these narratives can include rhetorical manipulation strategies with the potential to generate market distrust (Shrives and Brennan 2017).

Besides, prior literature on risk reporting focuses on Anglo-Saxon countries in which corporate governance models are shareholder-oriented and incentives to risk reporting and related to agency costs reductions (Khlif and Hussainey 2016; Elshandidy et al. 2018). However, the corporate governance models of European Latin countries (such as Portugal and Spain) have stakeholder-oriented corporate governance models. And prior literature on risk reporting shows that in these countries, the incentives to risk reporting are both associated with agency and legitimacy issues (Oliveira et al. 2011). Therefore, since motivations to risk reporting are different and rely on corporate governance models, certainly the managers' mental models and the risk communications strategies would be different too. We focus on a Portuguese setting to explore the specificities of these risk communication strategies related to a stakeholder-oriented corporate governance model research setting, never studied hitherto.

The main findings indicate a significant negative relationship between the "activity" tone variable and the company's market value. Activity tone denotes traces of overconfidence, narcissistic self-confidence, emphasizes accomplishments and ability to implement transformation change, and deliver positive performance results related to leadership traits of heroism (Patelli and Pedrini 2015). Findings indicate that investors misprice this kind of tone in risk reporting. Moreover, this evidence indicates that a company's market value can be strategically optimized by the tone of managers' discourse. The way information is expressed in corporate reports can say a lot about the organization and its leaders. Therefore, stakeholders must seek to understand and evaluate the several stylistic characteristics of narratives to identify and measure the biased strategies adopted and the impacts that these tactics may have on their investments. Our results point out three major theories that guide this research, namely: the social psychology theory of impression management, the agency theory agency and, finally, the legitimacy theory.

This study contributes to prior literature in several ways. First, analyzing the tone elements of corporate narratives allows different stakeholders to have a deeper view of the textual characteristics of disclosures. This provides an adequate assessment of the reports and, consequently, a more weighted assessment of the company's risk profile. Second, the results found can serve as a support for regulators and standard-setters in the identification of failures and gaps in risk regulations. It can even assist auditors in detecting possible frauds expressed verbally in the narratives of reports. Third, by revealing the association between the tone and the market value, it appears that the tone of the speech can have serious consequences for the company's market value. Therefore, it is up to managers to strategically evaluate their communications strategies and finding a balance between the costs and benefits of disclosure.

The present study's potential limitations are associated with the subjectivity of the coding instrument used (content analysis) and the implications of a small sample (34 non-finance listed companies). We believe that these limitations do not jeopardize the generalization of findings. First, because we used an automated algorithm provided by the software DICTION, which is based on a dictionary frequently used in corporate finance, accounting and psychology literature. Second, the sample used corresponds to the population of Portuguese non-finance listed companies.

The present study has the following structure: Section 2 presents the concept of risk; Section 3 documents the theoretical frameworks used in the risk reporting literature; Section 4 develops the literature review and hypothesis; Section 5 describes the research design; Section 6 discusses the main findings; and, finally, Section 7 presents the main conclusions, limitations and clues for further research.

2. Risk Concepts

According to Elamer et al. (2019), the risk is seen as uncertainty that highlights the possibility of a yield obtained that does not meet the expectations. Thus, it is clear that risk takes into account the probabilities and not the concrete facts. Furthermore, risk cannot be interpreted only as a bad prospect because great opportunities also come from some risk degrees. Some authors (Elamer et al. 2019; Ibrahim and Hussainey 2019) address in their studies that risks can mean both positive and negative events. Although the risks are seen from these two points of view, Ibrahim and Hussainey (2019) analyze whether the positive results of the events should be considered in the definition of risk or not. They concluded that risk should be defined only on the negative side: as a loss. In this way, it can be said that risk is inevitable in any project and must be disclosed in a timely manner to allow stakeholders to assess their investments (Amran et al. 2009).

For more than a decade, research on risk reporting has provided empirical evidence on the number of risk narratives presented in companies' annual reports. The results show that the information contained in these reports is generic and inconsistent, making it difficult for investors to assess the company's risk properly. However, some studies emphasize that risk reporting is essential to improve market discipline and ensure transparency (Abraham and Cox 2007; Beretta and Bozzolan 2004). In the light of this, some recent studies address issues related to transparency, and information asymmetry in risk reports released not only voluntarily (Schiemann and Sakhel 2019; Kang and Gray 2019) but also mandatorily (De Luca et al. 2020; Leopizzi et al. 2019; Lobo et al. 2019; Campbell et al. 2014). Due to these puzzling arguments, it is expected that managers use specific risk communication strategies to achieve several goals: reduce agency costs, potential litigation costs, and ensure a certain level of transparency. Therefore, the present study aims to identify some economic incentives of a specific risk narratives communication strategy: speech tone.

3. Explanatory Theories of Disclosure of Risk Information

Previous studies have focused on several theories to explore risk disclosure research, such as proprietary cost theory, institutional theory, signaling theory, agency theory, stakeholder theory, and legitimacy theory.

3.1. Proprietary Costs Theory

The decision to retain or disclose certain information depends not only on the economic effects that it may have on the company's market value but also on the investors' expectations regarding the information content (Verrecchia 1983). Managers are discretionary about which contents should be reported to users. If their risk management activities are perceived as discreet, they can be labeled as weak and their disclosures limited. However, if they are perceived as transparent, they may face proprietary costs (Abraham and Shrives 2014). With this, it is up to managers to identify and balance the benefits against the costs of risk disclosures.

3.2. Institutional Theory

The institutional theory provides an in-depth view of organizations. One of the classics of institutional theory, written by the authors DiMaggio and Powell (1983), in work "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields", aims to present homogeneity and similarity between organizations. In this study, the authors emphasize that organizations seek alternatives, instigated by rationalization and bureaucratization, to ensure legitimacy through institutional and market pressures. These pressures are described through three isomorphic processes: (a) coercive that derives from political influence and the problem of legitimacy, (b) mimetic that results from responses to uncertainty, and (c) normative that is associated with professional bodies. These pressures create an institutional context for the company's risk reporting practices.

3.3. Signaling Theory

This theory was proposed by Akerlof (1970). However, it was developed in the management field in the studies of Spence (1973), namely in his work "Job Market Signaling". His study illustrates issues related to the labor market, specifically about the uncertainty in hiring employees. Thus, the signaling theory describes the behaviors and the forms of interpretation between organizations or individuals when they have access to different information levels (Connelly et al. 2011).

3.4. Agency Theory

The agency theory is formalized in the work Jensen and Meckling (1976) titled "Theory of the firm; managerial behavior, agency costs and ownership structure". This theory is based on the analysis of conflicts of the existing contractual relationship between who establishes the company's objectives (the principal–shareholders) and who, through delegation, is responsible for taking decisions to achieve those objectives (the agent–managers). The agency conflict arises when managers make decisions that differ from those expected by investors. Thus, Jensen and Meckling (1976) mention that these divergences can be reduced by establishing proper incentives to managers and the implementation of monitoring activities.

3.5. Stakeholder Theory

The stakeholder theory explains the relationship between the company and all its interested parties. Its theoretical basis is found in the work of Freeman (1984), "Strategic management: a stakeholder approach", having its origin in the areas of sociology and administration. The term stakeholder refers to groups or individuals that are affected or may affect the organization's objectives (Freeman 1984). Donaldson and Preston (1995) portray the importance of stakeholders for the organization's survival and mention that the organization's objectives should be geared towards stakeholder needs.

3.6. Legitimacy Theory

Organizations are increasingly flexible and adapted to the changes required by society due to the existence of a contractual relationship between them. In this contract, the company follows moral and social rules that guarantee its legitimacy and allows the growth and continuity of its activities (Shocker and Sethi 1973). Dumay et al. (2015) have introduced

the model of "material legitimacy", which consists of a win–win relationship between internal and external interests influencing the disclosure of non-financial information. In summary, the organization increases its value, making itself legitimate for the public, not only in a more reputable way but also more predictable and reliable (Suchman 1995). In light of the legitimacy theory, risk reports have been used as a legitimacy strategy. Oliveira et al. (2011) consider public visibility as a crucial factor of risk reporting needed to increase legitimacy and manage corporate reputation. Accordingly, managers remain resistant when expressing, in their risk reports, the reality that is actually experienced by organizations and, consequently, they start to standardize risk reports to maintain legitimacy (Abraham and Shrives 2014).

4. Literature Review and Hypothesis Development

4.1. Risk Reporting

The literature on risk reporting is constantly evolving. Appendix A summarizes prior literature on risk reporting. Many researchers attribute this development to some triggering factors, such as the financial crises, corporate fraud and regulatory changes (Elamer et al. 2019; Elshandidy et al. 2018). This research topic is being researched in several emerging countries, such as Italy (De Luca et al. 2020; Leopizzi et al. 2019; Beretta and Bozzolan 2004), China (Neri et al. 2018) and Portugal (Oliveira et al. 2011), but it is also present in developed countries, such as the UK (Athanasakou et al. 2020; Kang and Gray 2019; Abraham and Cox 2007) and the USA (Lobo et al. 2019; Zhang et al. 2019; Bravo 2017).

Studies show that larger companies use risk disclosures as a means of managing their reputation (Oliveira et al. 2011) and, in line with this practice, increase the company's market value (Bravo 2017). In this sense, it is up to the managers to evaluate the type of information that must be communicated to the interested parties. For example, information on management performance, governance, and compensation reduces the cost of capital (Athanasakou et al. 2020). However, huge amounts of risk disclosure do not mean that they meet the quality requirements. De Luca et al. (2020) confirm that companies with high levels of structural capital must have better risk reporting quality, establishing credibility to explore the effects of uncertainties. Thus, it is clear that the quality of the information may also depend on the characteristics of the company.

Schiemann and Sakhel (2019) investigate whether the decision to voluntarily disclose a company's exposure to physical risks is associated with less information asymmetry. Main findings indicate that information asymmetry is generally smaller when companies report on their physical risks. They also mention that reporting a greater exposure to physical risks is associated with a lower information asymmetry for companies that fall under the regulation of the EU Emissions Trading Scheme, while for other companies, the relationship is inversed. Campbell et al. (2014) analyzed the mandatory informative content of the "risk factor" section of Form 10-K of North American companies. They discovered that the type of risk and their frequency determine the disclosures issued by managers. Leopizzi et al. (2019), in one of their objectives, analyze the level of risk disclosures after the introduction of the Directive, 2014/95 of the European Parliament and the Council of the EU, according to which the disclosure of non-financial risks has become mandatory. Findings demonstrate that the level of disclosure of non-financial risks is better than before the adoption of the Directive. Risk reporting is mainly oriented towards the past or present rather than towards the future.

In general, companies disclose their information when the benefits outweigh the business costs (Verrecchia 1983). With this in mind, it is assumed that only favorable events are communicated to investors, thus extinguishing any possibility for the company to incur costs associated with bad news. Kang and Gray (2019) evidenced several types of costs related to voluntary disclosures, such as regulation costs, information collection and processing costs, litigation costs, political costs and proprietary costs. However, the decision to report or not relevant information is part of the impression that the manager wants to create on the interested parties. Therefore, they use verbal and nonverbal psychological

markers (such as tone) to create diverse social impressions to attract investors positively (Fisher et al. 2019). With this, for example, many companies choose to voluntarily disclose environmental information to increase transparency and reduce information asymmetry. As a result, they create favorable conditions for companies to obtain debt financing at lower costs (Luo et al. 2019). Thus, it is expected that annual reports are useful and easy to understand (Demaline 2020). Their narratives play an extremely relevant role (Merkl-Davies and Brennan 2017), mainly in investor's decision-making.

4.2. Impression Management

The concept of impression management (IM) originates in social psychology with the dramaturgical work "The Presentation of Self in Everyday Life" of Goffman (1959). The writer uses theatrical language to approach human behavior in society and its form of manifestation, leading the reader to have a perception of how individuals are favorably understood by their peers. In accounting research, the predominant conceptualization of IM is based on economics, applying in a context of business reporting through biased discretionary narrative disclosures (Merkl-Davies and Brennan 2011). The IM are symbolic representations of the substantial actions originated by the organizations (Bansal and Kistruck 2006). These substantive actions, such as investments, goals and processes, are exposed to uncertainties, the results, of which often benefit society and not the company. As a result, the representations are now managed to influence stakeholders, controlling how and what should, in fact, be disclosed. Thus, IM tactics serve as incentives for managers since they do not need to make changes to their investment strategies to enjoy the same benefits if they had done so (Roman et al. 2019). Managers, through their rational attitudes, exploit information asymmetry to deceive investors, highlighting positive outcomes and overshadowing negative outcomes in their business reports (Merkl-Davies et al. 2011). However, managers consciously adopt IM strategies (Merkl-Davies and Brennan 2007) designed to manipulate stakeholder's opinions (Martínez-Ferrero et al. 2019), building in their reports the organization's desired identity (Roman et al. 2019).

IM strategies are seen as intentional and timely acts both to hide bad news and to emphasize good news (Diouf and Boiral 2017). Merkl-Davies and Brennan (2007) and Brennan et al. (2009) address seven IM strategies in corporate reports, namely: (1) manipulation of the reading facility. This strategy is used to overshadow business performance, especially when outcomes are negative, using language that is more difficult to read; (2) rhetorical manipulation. It relies on rhetorical devices to overshadow the company's negative performance. Persuasion languages are used to impress readers; (3) thematic manipulation. They are oriented to form, analyzing words and phrases to extract inferences. It also emphasizes financial performance; (4) visual and structural manipulation. It is the way in which information is presented, giving visual, verbal, or numerical emphasis through presentation, repetition and reinforcement; (5) performance comparisons. This technique is biased and involves the choice of benchmarks to portray the current financial performance in the best possible way; (6) choice of winning numbers. It is a selectivity technique. The company selects the most attractive performance numbers, portraying them in the best possible way, and finally, (7) attribution of organizational outcomes. Thematic studies are oriented towards meaning. Strategies 1 and 2 obfuscate bad news, while numbers 3, 4, 5 and 6 strategies emphasize good news (Merkl-Davies and Brennan 2007). The obfuscation technique obscures the intended message, masking adverse organizational outcomes, evidencing positive organizational performance (Martínez-Ferrero et al. 2019). Accordingly, assertive tactics are used to promote qualities and improve skills, while defensive tactics are used to repair or justify negative results (Bian et al. 2020).

Communication plays a crucial role in accounting. However, it is not enough to focus concerns and interests only on measuring the company's financial performance and position, but also on managing the printing of narrative information that will be portrayed to stakeholders (Merkl-Davies and Brennan 2017) and, consequently, also meet the regulatory requirements (Fisher et al. 2019). The IM topic has been constantly analyzed

in accounting research, mainly in the disclosure of business risks. Empirical studies address developing typologies to examine IM strategies both in the research on noncompliance with the corporate governance Codes (Shrives and Brennan 2017) and on the analysis of narratives of organizational failures (Kibler et al. 2020). Other studies analyze IM on the quality and content of intellectual capital disclosures (Beretta et al. 2019; Melloni 2015), on the quality of sustainability reports (Boiral et al. 2020a; Diouf and Boiral 2017), in using strategies as a form of agility in the regulatory approval of a new enterprise (Srikant 2019) and in narratives as a form of lexical manipulations, such as tone and legibility (Luo et al. 2019; Fisher et al. 2019; Roman et al. 2019; Chakrabarty et al. 2018; Hummel et al. 2017; Bonsall et al. 2017).

The tone is a stylistic element by which the author attributes a desired connotation to the narrative, often called textual feeling (Gatzert and Heidinger 2019). Readability, on the other hand, determines the ease of reading and the clarity of what is exposed (Loughran and Mcdonald 2016; Merkl-Davies and Brennan 2007). Related to readability, Demaline (2020) examines whether the disclosure readability is lower for the target companies of the US Securities and Exchange Commission (SEC) investigation than for medium-sized companies that are publicly traded in the USA. They find that disclosures of companies being investigated for "book and record" infringements are more difficult to read than of publicly-traded mid-sized companies in the USA. Other current IM studies address IM practices as a way to maintain top management positions. Liu (2020) suggests that recently appointed CEOs take initiatives to publicize issues related to corporate social responsibility as an IM strategy to gain positive visibility with stakeholders and to protect themselves from early layoffs. Another issue currently addressed is the way in which businessmen favorably publicize serious and often irreversible events, such as the business dissolution. Kibler et al. (2020), through public narratives of business dissolution, show that the assertive and defensive strategies are dominant for the actors to explain their organizational failures.

The tactics used by companies as an IM method are expressed in corporate narratives. These reports usually assume a complex, subtle and shadowy textual genre that covers an audience sufficiently intellectual to appreciate the results (Rutherford 2013). Characteristics, such as these ones, of complex and unreadable narratives may be linked to a negative event that companies are going through. Hence, it is up to investors to redouble their attention to narratives that are not so readable, especially when they are being investigated for a breach of the regulation (Demaline 2020). As a result, IM usually occurs in less regulated regions, and disclosures have a greater focus on financial outcomes (Brennan et al. 2009). These peculiarities of corporate reports have been constantly analyzed by regulators. However, tactics, such as the absence of communication, that is, silence, do not allow adequate supervision (Merkl-Davies and Brennan 2017). In the current scenario of regulatory changes, risk disclosures become an allied tool for managers in obtaining and sustaining legitimacy. Companies use tactics to manipulate the perceptions of stakeholders since accounting regulations do not determine the content or the way in which disclosures should be presented (Arena et al. 2015).

Faced with so many persuasion techniques, stakeholders have difficulties in properly assessing the corporate risk profile, especially in the most difficult risks to be measured due to their unpredictability, such as, for example, sustainability risks (Boiral et al. 2020a, 2020b). Although sustainability rating agencies (SRAs) have a fundamental role in ensuring the reliability and materiality of the information provided in sustainability reports, Boiral et al. (2020a) claim that these agencies use rhetorical strategies of IM to differentiate themselves and remain competitive in the market, influencing the perceptions of sustainability reports and, consequently, making information less reliable for investor decision-making. In this sense, Boiral et al. (2020b) question the reliability and sustainability risk assessment offered by the agencies since the products they offer to quantify the risk do not match what they actually present. The authors find that the SRAs use reassuring speeches to address questions about the rationality and rigor of the very exaggerated sustainability risk measures, which may resemble a rational myth. With this, there is growing research on the quality of sustainability

reports and on the IM strategies adopted, mainly from a socially responsible investment (SRI) professionals perspective) (Diouf and Boiral 2017). These professionals are based on more sustainable companies, excluding any possibility of engaging in activities that do not have a good reputation and thereby affect the market value (Boiral et al. 2020a). It should be noted that there are some elements capable of contributing to the analysis of IM tactics in risk disclosures, such as, for example, the types of narratives (Fisher et al. 2019), the compliance of corporate reports (Shrives and Brennan 2017), the social influence of stakeholders (Hassan 2014) or even the Pollyanna effect, that is, when positive words are often used more than negative words (Rutherford 2013). Upon the presentation of these studies, it is possible to notice creating innumerable scenarios that make it possible to observe the variety of IM strategies created in different contexts to shape the reader's perceptions.

4.3. The Tone of the Speech

Corporate reports use numerous forms of communication to report material financial and non-financial information to a range of different audiences. As a result, the tone used in the corporate texts published in the capital market has been a line of research that is expanding rapidly in the accounting area. In this sense, several types of narratives address the stylistic element "tone" as a tool for detecting the reliability of the message portrayed by managers. The tone is seen as a composition of words that, when accumulated, start to produce standardized expectations, expressing to the recipients something important about the author's perspective (Fisher et al. 2019). In other words, the tone refers to the attitude of the text, while readability is the ease with which the reader can capture the message of the text (Mittelbach-Hoermanseder et al. 2020). In this conception, the tone is a lexical element that involves words to create social expressions, attributing a certain connotation to the narrative, often called textual feeling (Gatzert and Heidinger 2019). This feeling has a basic element of measurement: the qualification of words as positive, negative or neutral (Boudt and Thewissen 2019). When it is expressed in letters to shareholders in a positive tone, in times of economic crisis, in addition to transmitting a positive expectation of internal actions in terms of future performance, it can also positively reflect the characteristics of top managers in the search for new opportunities in the midst of the crisis (Pengnate et al. 2020). In addition to this analysis of CEOs' incentives in times of crisis, Quigley et al. (2020) address the informational advantage of CEOs, driven by information asymmetry, in using strategies created in periods prior to granting an option to guarantee their own benefits. The authors note that mandatory communications regulated by the SEC are of greater relevance than information provided voluntarily. They find that investors can understand the tactics of manipulating discretionary narratives and that mandatory information is clearly more pertinent to shareholders. However, although the regulations require relevant information, they end up offering no guidance on the content of the narratives. As such, CEOs use the time and deadlines of press releases to subtly manipulate the tone of the narratives and reduce the company's stock price for personal gain. They use more negative tones than positive ones. Thus, executives, in addition to meeting legal requirements, manipulate the market and shareholders in an opportunistic manner.

Due to the countless ways of sending a message, Merkl-Davies and Brennan (2017) state that business reports are mainly concerned with communication between organizations and external audiences for the purposes of accountability or decision-making. However, studies portray that managers use complex language in their disclosures, which may indicate both the existence of complex technical content and the managerial obfuscation of information (Bushee et al. 2018).

Appendix B summarizes prior literature on the tone of speech. Among the types of corporate narratives evidenced in the studies, we find the integrated reports (Beretta et al. 2019; Roman et al. 2019), the CEO letter (Quigley et al. 2020; Boudt and Thewissen 2019; Craig and Amernic 2018), the president's statement (Moreno et al. 2019), press releases (media) (Luo et al. 2019), social responsibility reports (Clarkson et al. 2020; Martínez-Ferrero et al. 2019; Hummel et al. 2017), among others.

From these narratives, different theoretical approaches were presented to explore and understand the tone used by those responsible for preparing and disseminating business reports. Roman et al. (2019) explore the legibility and optimistic tone of the narratives in the integrated annual reports, chosen randomly from the Integrated Reporting database, configured by the International Integrated Reporting Council (IIRC). They find that the poor performance of companies is reflected in longer and less readable reports, demonstrating a higher level of optimism. This may be related to a manipulation strategy to try to convince stakeholders that the reality of the company is different. They also clarify that younger companies with lower financial performance tend to provide shorter and more optimistic disclosures since they have a greater need to consolidate themselves with stakeholders and build a good reputation.

Beretta et al. (2019) analyze the relationship between companies' financial and non-financial performance (ESG) and the tone of intellectual capital disclosures (ICD) in integrated reports. The authors suggest that ICDs are discursive and oriented towards the past, with a limited focus on human capital. Its results support the incremental information approach, in which as the optimistic tone of the ICDs increases, so does their non-financial performance.

Clarkson et al. (2020), through textual analysis, explore whether the different linguistic resources reveal the true business performance in their CSR reports and the relevance of the incremental evaluation of textual resources in obtaining information on how investors capture the differences disclosed in the CSR reports. The authors note a positive relationship between CSR performance and the level of disclosure. They verify that good performances in CSR reports are more advanced in their writing, presenting a more sociable and friendly language, exhibiting resources that suggest greater ambition, achievement and level of sophistication, consistent with their proactive CSR strategies. In addition, they discover that these linguistic resources are also incremental, corroborating the interpretation that it is relevant not only what companies say but also how they say it.

Luo et al. (2019) also contribute to the literature, studying the effect of the positive and negative tone of the media report on the relationship between the quality of the disclosure of environmental information and the debt financing costs of Chinese companies. They demonstrate that the impact of negative media reports and the quality of the disclosure of environmental information in reducing debt financing costs are mitigated. They show that the negative feeling of the media damages the reputation of the company both for creditors, who already have an impression of the company, making it difficult to grant loans and for creditors, who are investors vulnerable to the tone used by the media, causing them to increase the interest rate on loan to offset the risk premium.

4.4. Hypothesis Development

Agency theory addresses the way risk is shared between investors and managers (Jensen and Meckling 1976). The conflicts that arise from the relationship between them are characterized by an unequal level of information available, promoted by the opportunistic behavior of managers. This information asymmetry can lead to mispricing of a firm's shares due to adverse selection issues. Investors with less available information tend to price-protect or exit the market to reduce losses. Collateral effects may be lower liquidity and higher cost of capital (Francis et al. 2008).

The quality of corporate information (such as risk reporting) impacts share price (Hughes et al. 2007). This available information can help mitigate adverse selection problems arising from the existence of information asymmetry, with positive effects on share prices, higher liquidity and lower cost of capital.

However, we contend that according to agency theory, the balancing effect that the available corporate information has on the relationship between share prices and information asymmetry is not straightforward. The conflicts between managers and investors may be managed psychologically.

Consistent with the social psychology theory of IM, managers use IM communication tactics as a communication strategy to influence stakeholders' perceptions about the company (Hooghiemstra 2000). From an economic perspective, underpinned by agency theory and economic rationality assumptions, IM is associated with the obfuscation of bad news (Bloomfield 2002). In the case of the tone of speech, persuasion language is used to divert investors' attention from bad news. This will increase information processing costs, delay market reaction to bad news, and maximize the manager's utility opportunistically by boosting share prices in the short term. Since the market reacts more quickly to good news than bad news, using IM strategies, such as tone, has a pervasive effect on corporate information and consequently on share prices (Brennan et al. 2009).

However, consistent with legitimacy theory, we contend that companies disclose risk information to conform to societal expectations to prosper. Risk reporting is required to legitimize companies in the eyes of their relevant stakeholders (such as market participants) instead of maximizing the manager's self-interest. Relevant stakeholders are those able to provide vital resources to the survival of companies. Oliveira et al. (2011) document that risk information is used to manage the perception stakeholders have on the company's risk management abilities, its skills to ameliorate litigation risks and, therefore, achieve stakeholders' expectations through increased risk reporting. Consequently, risk reporting is closely intertwined with the company's reputation management.

From a sociological point of view of the social psychology theory of IM, underpinned by legitimacy theory and substantive rationality assumptions, IM communication strategies are used as a symbolic tool to (re)establish organizational legitimacy (Brennan et al. 2009). Consequently, we contend that to achieve proper states of organizational legitimacy, companies disclose risk information using persuasive language (such as tone of speech) to achieve stakeholders' expectations of the company's reputation. Companies that do not meet these market participants' expectations will be considered as being hiding adverse risk information, with negative impacts on share prices.

Hypothesis 1 (H1). *The tone of the risk reporting narratives is associated with the company's market value.*

5. Research Design

5.1. Sample and Data Collection

To identify the impact of the tone of risk reporting narratives on the company's market value, we focus specifically on the risk and risk management sections included in the annual reports and accounts for the year 2018 of Portuguese non-financial companies with securities traded on the regulated market of Euronext Lisbon.

This period was selected intentionally, as it is an important year of the adoption of relevant risk reporting regulation in Portugal. Since 2005 Regulation, 1606/2002 of the European Commission requires Portuguese listed companies to prepare and present their consolidated annual accounts following International Accounting Standards/International Financial Reporting Standards (IAS/IFRS). These rules apply to all listed companies, but they specifically address financial risks. The IAS/IFRS more closely related to risk disclosures are IAS 1 (*Presentation of Financial Statements*); IAS 14—Superseded by IFRS 8—(*Operating Segments*); IAS 30—Superseded by IFRS 7 (*Financial Instruments: Disclosures*); IAS 32 (*Financial Instruments: Presentation*); and IAS 39—Superseded by IFRS 9—(*Financial Instruments*); and IAS 37 (*Provisions, Contingent Liabilities and Contingent Assets*) (Oliveira et al. 2011).

In addition to IAS/IFRS, the European Parliament and the Council of the European Union issued the Directive, 2014/95/EU to address issues of transparency and quality of non-financial information. This Directive was transposed into Portuguese law by the Decree-Law 89/2017, to which companies must comply since January 2017. This reinforces the magnitude of non-financial information in terms of transparency, reliability and consistency between member countries of the EU. In this regard, companies should disclose the recommendations guided by Decree-Law 89/2017, together with the "risk" matters

requested by the Portuguese companies code (CSC—Código das Sociedades Comerciais), the Portuguese securities exchange market Code (CVM—Código dos Valores Mobiliários), and the Portuguese corporate governance code.

Moreover, prior literature shows that risk reporting incentives are different across countries, mainly due to different corporate governance models (shareholder-oriented vs. stakeholder-oriented). Thus, it is expected that to find different risk communications strategies across countries because cultural aspects shape manager's mental models. Oliveira et al. (2011) found that incentives for risk reporting among Portuguese and Spanish countries, with stakeholder-oriented corporate governance models, are explained by agency, legitimacy and institutional reasonings. We focus on a Portuguese setting to explore the specificities of these risk communication strategies related to a stakeholder-oriented corporate governance model research setting, never studied hitherto.

Initially, we selected a total of 51 Portuguese companies listed on the regulated market of Euronext Lisbon on 31 December 2018. All financial companies and Sports Companies are excluded. The final sample comprises 34 non-financial companies, subdivided into different industries, such as manufacturing, telecommunications, information technology, construction and materials, and energy. Data related to risk disclosure was manually extracted from the English version of the annual reports and accounts made available on the companies' websites. In particular, risk information is taken from specific risk/risk management sections of three parts of the annual reports: corporate governance report, management report and notes to financial statements. All 34 companies included a risk and risk management section in the corporate governance report and notes to financial statements. However, only 19 companies included a risk and risk management section in the management report. The market data were extracted from the DataStream database.
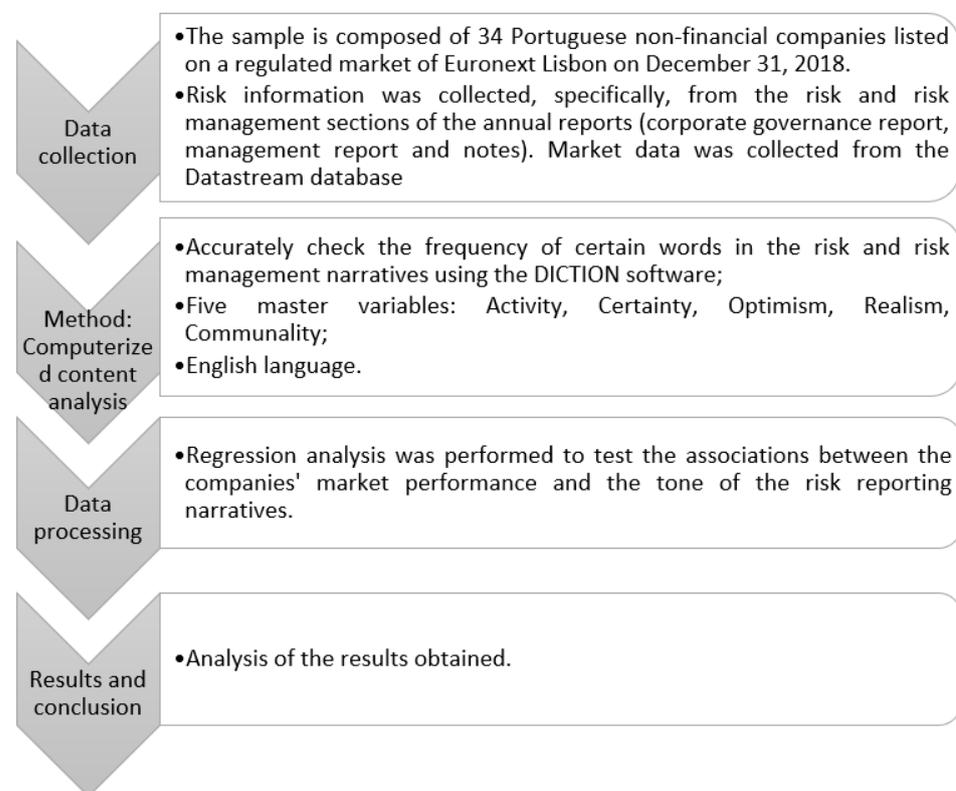

Figure 1. Research method steps.

The present research performs a quantitative computerized content analysis through the textual analysis of the narratives. This technique is the most used by content analysts because it reduces the volume of the text processed, it allows understanding and man-

agement of the information contained therein, making it possible to accurately check the frequency of certain words in the documents (Krippendorff 2013). However, it should be noted that there are many software options that analyze the content of a text digitally. However, the DICTION software, in contrast to other techniques, excels in focusing on the choice of words determined by various social researchers and also by using elements of artificial intelligence (Short and Palmer 2007), based mainly on the managers' textual communications. Figure 1 summarizes the steps of the research method.

5.2. Econometric Model

To analyze the influence of the tone of the risk reporting narratives on a company's market value, we propose the following econometric model:

$$TobinQ_{i,t} = \beta_0 + \beta_1 Tone_{i,t-1} + \beta_2 Complex_{i,t-1} + \beta_3 Extfin_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 Roa_{i,t-1} \\ + \beta_6 Leverage_{i,t-1} + \beta_7 Pnexec_{i,t-1} + \beta_8 BDSize_{i,t-1} + \beta_9 Industry_i + \mu_i \quad (1)$$

where β_0 is a constant, i is the index for the company, t is the index for time, and μ is the residual of the regression.

In this study, we use Tobin's Q as a proxy for the company's market value. Tobin's Q represents the market value of the assets in proportion to their replacement costs (McShane et al. 2011). The index is calculated at the market value of equity plus the book value of the liability divided by the book value of assets. The higher the index, the better the market is judging the company (Florio and Leoni 2017). Tobin's Q has some advantages over accounting performance measures, as it does not require risk adjustment or normalization (Hoyt and Liebenberg 2011). Moreover, it is free of managerial manipulation and presents a future-oriented vision, which provides long-term risk management benefits since the reflection of the adoption of measures like this does not have an immediate impact (Lechner and Gatzert 2018). Thus, Tobin's Q can reflect market expectations.

The study's independent variable is the tone of the risk reporting narratives, which is measured by a computerized textual analysis software called DICTION, developed by Hart (1984). This software presents an excellent word counting tool based on linguistic theory, offering useful alternatives for accounting research on IM (Sydserff and Weetman 2002). With this, the program has been used gradually by research that analyses the tone in business discourse (Fisher et al. 2019; Craig and Amernic 2018; Melloni et al. 2017; Patelli and Pedrini 2015). Due to its automated nature, it guarantees the reliability and validity of information for both coding and quantification (Cho et al. 2010), also becoming a great ally in content analysis in obtaining objective measures of non-quantitative disclosure for larger samples (Davis et al. 2012).

The software consists of 10,000 research words divided into 31-word lists or dictionaries, compiled after analyzing 20,000 different texts. These dictionaries are used, for lexical analysis, using five master variables: activity, optimism, certainty, realism, and commonality. The first three categories are closely linked with unethical behaviors, such as the satisfaction of managers' self-interests explained in the light of agency theory. The last two ones are linked to ethical behaviors that stimulate risk reporting transparency and commitment with stakeholders creating a sense of community (Patelli and Pedrini 2015).

Activity includes traces of overconfidence, narcissistic self-confidence, and leadership traits of heroism. Optimism includes words endorsing some person, group, concept, or event or highlighting their positive entailments. It includes positive terms conveying a sense of praise and satisfaction. Certainty indicates resoluteness, inflexibility, completeness, and a tendency to speak authoritatively to reach approval rather than mutual understanding. Realism describes tangible, immediate, recognizable matters that affect everyday life to report the faithful representation of things. Commonality emphasizes the agreed-upon values of a group creating an environment of engagement, cooperation and mutual understanding (Hart and Carroll 2014). The scores for these five main variables begin with the comparison of the words in the analyzed text with the words contained in the 31 exclusive dictionaries.

The scores for each of the five main variables are linear combinations of the standardized scores of sub-resources (subordinate variables) and the four "calculated" variables (1)

insistence (the degree to which a text relies on the repetition of lexical words); (2) embellishment (ratio of descriptive to functional words) (Boder 1940); (3) variety (type–token ratio) (Johnson 1951); (4) complexity (word length) (Flesch 1951). Table 1 shows the subordinate variables and the calculated variables, which, when combined, determine the score of the master variable.

Table 1. Master diction variables.

Variables Master	Formula
Activity	(aggression + accomplishment + communication + motion) − (cognitive terms + passivity + embellishment)
Certainty	(tenacity + leveling + collectives + insistence) − (numerical terms + ambivalence + self reference + variety)
Optimism	(praise + satisfaction + inspiration) − (blame + hardship + denial)
Realism	(familiarity + spatial awareness + temporal awareness + present concern + human interest + concreteness) − (past concern + complexity)
Communality	(centrality + cooperation + rapport) − (diversity + exclusion + liberation)

Some studies, which address the elements of DICTION, are constantly evidenced in the literature on corporate narratives. Among them stand out Davis et al. (2012) and Henry (2008), who deal with press releases, Sydserff and Weetman (2002), who analyze the president's statement and the manager's report; and Yuthas et al. (2002), who investigate the discourse of annual reports.

Some economic factors were selected as control variables that may affect the relationship between risk reporting and a company's market value. These factors are described in more detail below and are presented briefly in Table 2, along with the dependent and independent variables.

Table 2. Description of dependent, independent and control variables.

Name	Variable	Variable Type	Definition	Data Source
QTOBIN	TobinQ	Dependent	Market value of equity plus the book value of total liabilities divided by total assets	(Lechner and Gatzert 2018; Callahan and Soileau 2017; Florio and Leoni 2017)
Reporting score index	Tone	Independent	Tone index of the risk section of the annual reports (activity, certainty, optimism, realism, communality)	(Fisher et al. 2019; Craig and Amernic 2018; Patelli and Pedrini 2015)
Complexity	Complex	Control	Factors: (1) number of business segments; (2) company size; and (3) proportion of intangible assets in total assets. Dummy variable (=1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 otherwise)	(Lee and Yeo 2016)
External financing	Extfin	Control	Capital expenditures less cash flow from operations divided by capital expenditures. Dummy variable (=1 if the index of external financing needs is greater than the median value and 0 otherwise)	(Neri et al. 2018; Elshandidy et al. 2013)
Total assets	Size	Control	Natural logarithm of the book value of total assets	(Lee and Yeo 2016; Oliveira et al. 2011; Beretta and Bozzolan 2004; Linsley and Shrives 2006)
Return on assets	Roa	Control	Net income divided by total assets	(Lechner and Gatzert 2018; Florio and Leoni 2017; Lee and Yeo 2016)
Debt	Leverage	Control	Long-term debt divided by the book value of total assets	(Oliveira et al. 2011; Luo et al. 2019)
Non-executive directors	Pnexec	Control	Proportion of non-executive directors on the board of directors	(Abraham and Cox 2007; Oliveira et al. 2011)
Board size	BDSize	Control	Total number of directors on the board	(Lee and Yeo 2016; Abraham and Cox 2007)
Industry	Industry	Control	Dummy variable (=1 if the company belongs to the manufacturing industry and 0 if not)	(Roman et al. 2019; Abraham and Cox 2007)

Complex: Companies with a complex operational and informational environment are characterized by expensive information processing (Lee and Yeo 2016). Thus, it is understood that the tone used, in the annual reports, to convey messages about corporate risk can influence the market value of companies with greater organizational complexity.

Extfin: Companies with risky activities and with higher levels of financing tend to disclose a greater amount of information (Neri et al. 2018; Elshandidy et al. 2013). In this way, it is perceived that risk disclosure plays a fundamental role in reducing information asymmetry, which can provide the company with more profitable investments and lower external financing costs. Therefore, the tone used in risk disclosures may be associated with the market value of companies with higher external financing.

Size: This variable (measured by the book value of total assets) is considered to control for company's size (Lee and Yeo 2016). Larger companies typically have broad public visibility to the stakeholder community. This means that it is possible for larger companies to use risk reporting to manage their reputation (Oliveira et al. 2011) and, consequently, to maintain and attract new investors. Beretta and Bozzolan (2004) and Linsley and Shrives (2006) find a positive relationship between the level of risk disclosures and the size of the company. As a result, it is assumed that larger companies disclose more risk information to avoid being penalized by market participants.

Roa: The ROA (return on assets) variable is extremely important in studies on corporate risk management. Florio and Leoni (2017) use ROA as a proxy for financial performance and Tobin's Q for market performance. Lechner and Gatzert (2018) isolate the relationship between risk management and Tobin's Q, controlling the ROA variable that is included to examine companies' profitability. Therefore, we add the control variable ROA as an indicator of profitability because, in summary, companies with stronger disclosures have better financial performance (Lee and Yeo 2016).

Leverage: Indebtedness is an economic factor that affects risk reporting. Companies with high levels of debt tend to be leveraged (Oliveira et al. 2011). The use of a negative tone can damage the company's reputation and increase difficulties in obtaining loans (Luo et al. 2019). For reasons like these, the tone used in risk management reports is becoming an essential task in the business environment, enabling managers to establish more stable relationships with their creditors and investors.

Pnexec: Proportion of external directors (non-executive directors) on the board. External directors are directors who have a greater degree of independence. They attribute to the company a key quality indicator of corporate governance (Abraham and Cox 2007) and are important in reducing information asymmetry (Oliveira et al. 2011), thus reducing manager's opportunistic behavior and increasing the company's market value.

BDSize: Number of board directors (Lee and Yeo 2016). Companies that have a greater number of external directors are in a stronger position concerning shareholders' wishes, both in terms of responsibility and in terms of transparency (Abraham and Cox 2007). Therefore, it is essential to include the size of the board as a control variable in this study.

Industry: The industry variable is extremely relevant both for IM studies (Roman et al. 2019) and for risk reporting research (Abraham and Cox 2007). The industry can be a determining factor in managers' disclosure choices due to the fact that many companies operate in environmentally sensitive industries and, therefore, are subject to greater pressures from their stakeholders (Roman et al. 2019). In this way, managers are encouraged to report their information in a more strategically favorable way, attracting investors and increasing the company's market value.

6. Results and Discussion

The descriptive statistics are shown in Table 3. Regarding the *Tobin's Q* variable, there is a considerable difference between the minimum (96.47) and the maximum (1720.08) value. Moreover, there is a high degree of dispersion around its average (281.85), which shows that the inequalities within this metric are not only in the tails of its statistical probability distribution.

Table 3. Descriptive statistics (all samples).

Continuous Variables	N	Min.	Max.	Mean	Std. Dev.
TobinQ	34	96.47	1720.08	650.58	281.85
Size	34	9.63	17.52	13.50	1.82
Roa	34	−0.16	0.54	0.05	0.11
Leverage	34	0.00	71.88	35.06	17.41
Pnexec	34	0.00	100.00	60.37	22.43
BDSize	34	3.00	29.00	10.06	5.96
Tone:					
Activity	34	44.65	47.68	47.19	0.59
Optimism	34	46.09	49.28	48.50	0.63
Certainty	34	49.07	61.15	55.05	2.94
Realism	34	29.12	41.36	30.53	2.02
Commonality	34	48.95	53.52	49.64	0.78
Categorical Variables	**N**	**%**			
Complex					
Yes	17	50%			
No	17	50%			
Extfin					
Yes	15	44%			
No	19	56%			
Industry					
Yes	28	82%			
No	06	18%			

Note: Tobin's Q is the ratio between the market value of a physical asset and its replacement value; size is the logarithm of total assets; Roa is the return on total assets; leverage is the ratio between long-term debt and the book value of total assets; Pnexec is the percentage of non-executive directors over the total number of directors on the board of directors; BDSize is the total number of directors on the board; activity, optimism, certainty, realism, commonality are the five main variables, provided by diction, that reflect a more robust understanding of the tone of the narratives; complex is a binary variable that receives a value of 1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 if it is not; Extfin is a binary variable that receives a value of 1 if the index of external financing needs is greater than the median value of the sample and 0 if it is not; and industry is a binary variable that assumes 1 if the company belongs to the manufacturing industry and 0 if not.

Regarding the *size* variable, it is clear that the companies' total assets are more harmonious. Its minimum and maximum values are closer to its mean, and its standard deviation is not high. Regarding the *ROA* and *leverage* variables, the values found are in line with those expected. Their mean values are 0.05 and 35.06, respectively. It is normal for some companies to have higher debts than others since the companies analyzed have different behaviors. Therefore, it is not surprising the apparent divergence in their minimum and maximum values. In addition, Luo et al. (2019) also attribute an explanation for this divergence. They find that the inconsistency in the level of indebtedness, the channels, and the financing methods influence the leverage costs of companies. The *ROA* varies considerably, which is expectable since each company has a specific degree of risk. On average, 60.37% of the board of directors is composed of non-executive directors, which represents a stronger position of the company concerning the shareholders' wishes, both in terms of responsibility and in terms of transparency (Abraham and Cox 2007).

Regarding the variables that reflect the tone of the narratives, it is noticed that the *activity*, *optimism* and *commonality* scores have more balanced values. Their minimum and maximum values are close to their average values. The *certainty* and *realism* scores show a greater oscillation between the samples used, pointing out that there are differences between the analyzed reports of each company. Finally, the analysis of the categorical variables shows that: (a) 50% of companies present higher levels of organizational complexity; (b) 56% of the companies have an index of external financing needs that is lower than the median value of the sample, and (c) 82% of the companies belong to the manufacturing industry.

The results suggest that half of the companies in the sample experience environments of organizational complexity. In this study, complexity is measured by the number of business

segments, intangible assets and size. This can potentially promote inefficient allocation of resources across business segments, information asymmetries related to intangible assets, higher levels of management skills. Consequently, they experience more expensive information processing costs and need to disclose more and better to reduce information asymmetries and increase the market assessment (Lee and Yeo 2016). In terms of external financing, the results show that 56% of the companies in the sample do not have external financing. Instead, they are financed internally because the costs of external financing are more expensive. Consistent with Verrecchia (1983), lower costs of external financing are related to lower levels of information asymmetries. Consequently, these companies can attract new projects and increase their market value.

The mean differences in the tone of risk reporting narratives across the different sections of the annual report are shown in Table 4. For the variables *optimism*, *certainty*, and *commonality*, differences are not statistically significant across corporate governance reports, notes to financial statements and management reports. The variables *activity* and *realism* present mean values that are statistically different between the three types of sections of the annual report (p-value < 0.01).

Table 4. Tone descriptive statistics and Kruskal–Wallis tests.

Description	N	Min.	Max.	Mean	Std. Dev.
Corporate Governance report:					
Activity	34	47.08	49.40	47.58	0.43
Optimism	34	40.46	49.31	48.22	1.58
Certainty	34	44.44	66.49	55.65	5.79
Realism	34	26.78	42.92	29.78	2.54
Commonality	34	48.71	58.19	49.61	1.54
Notes to Financial Statements:					
Activity	34	42.30	47.57	46.77	1.25
Optimism	34	47.48	50.97	48.81	0.61
Certainty	34	39.57	62.46	54.58	4.76
Realism	34	27.48	39.08	31.28	1.72
Commonality	34	48.67	51.78	49.70	0.65
Management report:					
Activity	19	44.06	47.97	47.16	0.89
Optimism	19	45.56	49.72	48.48	0.99
Certainty	19	47.42	63.76	54.23	4.48
Realism	19	29.53	42.07	30.96	2.76
Commonality	19	49.01	52.52	49.66	0.86

Test Kruskal-Wallis:	**Test Statistics—Chi-Square**
Activity	15.018 ***
Optimism	3.330
Certainty	1.353
Realism	35.355 ***
Commonality	4.941

Note: Differences statistically significant at a *** 0.01 level (2-tailed).

Table 5 present the correlation matrix. The main findings indicate that (a) *Tobin's Q* variable has a positive and significant correlation with *ROA* variables and *leverage*; (b) the *activity* variable has a positive correlation with the *optimism* variable and a negative correlation with *industry*; (c) there is a positive correlation between the variables *realism* and *commonality*; (d) the *size* variable has a positive correlation with the following variables: *Pnexec*, *board size*, *complex* and *Extfin*; (e) there is a positive correlation between the variables *Pnexec* and *board size*; and, finally, (f) a positive correlation is seen between the variables *complex* and *Extfin*. Correlations between independent and control variables present low coefficients, which indicate that colinearity problems are minimal.

Table 5. Correlation matrix.

Description		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Pearson's Correlation (Continuous Variables)															
(1)	TobinQ	1.00													
	Tone:														
(2)	*Activity*	−0.13	1.00												
(3)	*Optimism*	−0.04	**0.59**	1.00											
(4)	*Certainty*	−0.08	−0.06	0.23	1.00										
(5)	*Realism*	−0.05	0.13	0.03	−0.31	1.00									
(6)	*Commonality*	−0.15	0.16	0.07	−0.12	**0.84**	1.00								
(7)	Size	−0.24	−0.19	−0.10	0.26	0.21	0.32	1.00							
(8)	Roa	**0.40**	−0.06	−0.17	−0.12	−0.11	−0.14	−0.23	1.00						
(9)	Leverage	**0.80**	0.08	−0.04	−0.14	−0.12	−0.19	−0.08	0.25	1.00					
(10)	Pnexec	−0.07	−0.16	−0.14	0.13	0.01	0.20	**0.43**	0.19	−0.10	1.00				
(11)	BDSize	−0.15	0.02	−0.05	0.06	0.16	0.24	**0.36**	0.02	−0.23	**0.43**	1.00			
Pearson's correlation (categorical variables)															
(12)	Complex	−0.04	−0.12	−0.25	0.19	−0.02	−0.01	**0.71**	0.11	−0.11	0.13	0.13	1.00		
(13)	Extfin	0.02	−0.14	0.05	0.23	−0.01	0.18	**0.59**	0.05	−0.02	0.03	−0.04	**0.65**	1.00	
(14)	Industry	0.24	**−0.40**	0.08	−0.09	−0.06	−0.09	−0.34	0.12	0.19	−0.19	−0.28	−0.15	0.10	1.00

Note. Values in bold represent coefficients statistically significant at 0.05 level (2-tailed). Tobin's Q is the ratio between the market value of a physical asset and its replacement value; size is the logarithm of total assets; Roa is the return on total assets; leverage is the ratio between long-term debt and the book value of total assets; Pnexec is the percentage of non-executive directors over the total number of directors on the board of directors; BDSize is the total number of directors on the board; activity, optimism, certainty, realism, commonality are the five main variables, provided by diction, that reflect a more robust understanding of the tone of the narratives; complex is a binary variable that receives a value of 1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 if it is not; Extfin is a binary variable that receives a value of 1 if the index of external financing needs is greater than the median value of the sample and 0 if it is not; and industry is a binary variable that assumes 1 if the company belongs to the manufacturing industry and 0 if not.

Table 6 presents the regression results for the entire sample. The F-statistics indicate that all the regression models are statistically valid (*p*-value < 0.01) with explanatory powers (R^2 adjusted) greater than 60%.

Table 6. The effects of the tone of risk narratives on the company's market value (entire sample).

Description	Dependent Variable: Tobin's Q				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	5718.75 **	−118.90	3.92	−131.78	−1686.34
Tone:					
Activity	−108.10 [††]				
Optimism		11.81			
Certainty			9.26		
Realism				18.02	
Commonality					43.01
Complex	31.05	54.44	56.02	55.24	64.35
Extfin	−22.99	−20.57	−22.55	−37.20	−41.42
Size	−38.28	−30.47	−35.03	−29.66	−31.13
Roa	328.62	401.88	401.02	399.57	409.88
Leverage	12.87 ***	12.21 ***	12.43 ***	12.22 ***	12.33 ***
Pnexec	−0.09	0.37	0.27	0.54	0.25
BDSize	6.39	4.84	5.24	4.08	4.24
Industry	22.05	86.35	81.30	121.45	118.59
Model Adjustment:					
R^2	0.76	0.72	0.73	0.73	0.73
R^2 Adjusted	0.67	0.61	0.62	0.63	0.63
Statistic F	8.36 ***	6.83 ***	7.09 ***	7.30 ***	7.17 ***
Durbin-Watson	2.07	2.38	2.23	2.39	2.31
VIF	<3.9	<3.8	<3.9	<3.8	<3.8

Note: Statistically significant at a level of *** 0.01; ** 0.05 (2-tailed); [††] 0.05 (1-tailed). Tobin's Q is the ratio between the market value of a physical asset and its replacement value; size is the logarithm of total assets; Roa is the return on total assets; leverage is the ratio between long-term debt and the book value of total assets; Pnexec is the percentage of non-executive directors over the total number of directors on the board of directors; BDSize is the total number of directors on the board; activity, optimism, certainty, realism, commonality are the five main variables, provided by diction, that reflect a more robust understanding of the tone of the narratives; complex is a binary variable that receives a value of 1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 if it is not; Extfin is a binary variable that receives a value of 1 if the index of external financing needs is greater than the median value of the sample and 0 if it is not; and industry is a binary variable that assumes 1 if the company belongs to the manufacturing industry and 0 if not.

The main findings indicate that the tone category *activity* is negatively associated with *Tobin's Q*. The more prominent the dimension of the *activity* tone is, the lower the company's market value will be. This result supports hypothesis 1. Companies use adjectives to embellish their reports. These words that adorn the communication can be expressed in excess of self-confidence, narcissistic self-confidence, or even leadership traits of heroism with hyperbolic linguistic choices that transmit good performances when in reality, the company experiences other scenarios. This is consistent with agency theory assumptions. Managers use tone to obfuscate bad news. However, this kind of tone of the narratives is perceived by investors as a manipulation strategy, compromising the credibility of the corporate reports and, therefore, they react negatively to it, mispricing the company's market value.

These findings are in line with Sydserff and Weetman (2002). They find that companies that perform poorly use more emphatic *activity* tones in their annual reports. Thus, it is clear that companies with low-performance tend to present more unbalanced reports in relation to *activity*, diverting the investor's attention from objective performance measures (Clarkson et al. 2008).

Congruent with these results, Thorpe et al. (2017) also found evidence for the *activity* tone. The authors conclude that universities with a low level have a tone of high *activity*, while universities of a high level show a tone of low *activity*. In fact, our results also point to this inverse relationship between the tone category of *activity* and the company's market value, signaling that companies have the power to deceive the perceptions of their stakeholders through their narratives, resulting in a negative change in the company's market value.

In contrast to these findings, Fisher et al. (2019) find support in two tonal variables related to performance, namely *activity* and *optimism*. For both variables, the authors find that the greater using words that characterize *activity* and *optimism*, the greater the business accounting-based performance. The present study extends Fisher et al. (2019) findings by analyzing the relationship between tone of speech categories and market-based performance measures.

Findings also show that the coefficients of *optimism*, *certainty*, *realism* and *commonality* are not statistically associated with *Tobin's Q*. These findings allow us to conclude that Portuguese companies use the tone of risk reporting narratives to manage agency costs rather than organizational legitimacy. Table 6 also shows that *leverage* is associated positively with *Tobin's Q*. This shows that an increase in the ratio between long-term debt and the book value of a company's total assets causes an increase in the ratio between its market value and its replacement cost. These findings suggest that companies, regardless of their level of risk, tend to increase their market value through debt (Oliveira et al. 2011), enhancing the economic and financial benefits of equity and shareholders. McShane et al. (2011) found the opposite relationship between leverage and Tobin's Q. Lechner and Gatzert (2018) and Florio and Leoni (2017) did not find any relationship between the variable leverage and Tobin's Q, among German and Italian companies, respectively.

To verify the robustness of our results, the sampled data were divided into three types of sections of the annual reports in which we can find risk narratives: corporate governance report, management report, and notes to financial statements. Tables 7–9 present the effects of the tone of risk reporting narratives on the company's market value.

The results were found to corroborate the previous ones. The *leverage* variable has a positive and significant impact on *Tobin's Q* across the three types of reports. The *activity* variable is associated negatively with Tobin's Q when the risk narratives are included in the notes (Table 8). The tone of speech used in the risk narratives included in the corporate governance reports and management reports are not associated with *Tobin's Q* (Tables 7 and 9). These results help the various stakeholders to identify the textual characteristics of the disclosure. The detailed analysis of the reports allows interested parties to identify the type of business risk, possible management failures and the presence of fraud. It is also clear that it is extremely important that managers find a balance between the benefits and costs of disclosure so that, through their narratives, they can guarantee a credible image and create market value for the company.

Table 7. The effects of the tone of risk narratives on a company's market value (risk and risk sections of the corporate governance report included in the company's annual report).

Description	Dependent Variable: Tobin's Q				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	936.99	264.63	126.78	−59.65	−513.13
Tone:					
Activity	−10.13				
Optimism		3.67			
Certainty			5.53		
Realism				16.94	
Commonality					19.50
Complex	44.29	49.17	55.04	67.53	58.46
Extfin	−15.36	−19.53	−27.26	−47.05	−37.87
Size	−29.60	−29.30	−31.40	−33.52	−31.73
Roa	391.32	399.68	397.26	345.95	391.82
Leverage	12.15 ***	12.19 ***	12.75 ***	12.30 ***	12.33 ***
Pnexec	0.29	0.32	0.59	0.84	0.31
BDSize	4.88	4.95	4.37	4.29	4.67
Industry	82.22	88.56	94.38	125.73	115.22
Model Adjustment:					
R^2	0.72	0.72	0.73	0.74	0.73
R^2 Adjusted	0.61	0.61	0.63	0.64	0.62
Statistic F	6.81 ***	6.82 ***	7.19 ***	7.47 ***	7.10 ***
Durbin-Watson	2.34	2.37	2.32	2.40	2.39
VIF	<3.8	<3.8	<3.8	<3.8	<3.8

Note: Statistically significant at a level of *** 0.01 (2-tailed). Tobin's Q is the ratio between the market value of a physical asset and its replacement value; size is the logarithm of total assets; Roa is the return on total assets; leverage is the ratio between long-term debt and the book value of total assets; Pnexec is the percentage of non-executive directors over the total number of directors on the board of directors; BDSize is the total number of directors on the board; activity, optimism, certainty, realism, commonality are the five main variables, provided by diction, that reflect a more robust understanding of the tone of the narratives; complex is a binary variable that receives a value of 1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 if it is not; Extfin is a binary variable that receives a value of 1 if the index of external financing needs is greater than the median value of the sample and 0 if it is not; and industry is a binary variable that assumes 1 if the company belongs to the manufacturing industry and 0 if not.

Table 8. The effects of the tone of risk narratives on a company's market value (risk and risk management section of the notes to financial statements).

Description	Dependent Variable: Tobin's Q				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	2815.63 ***	−552.32	406.38	204.51	−1018.73
Tone:					
Activity	−48.72 †††				
Optimism		20.42			
Certainty			1.03		
Realism				7.26	
Commonality					29.25
Complex	37.44	58.28	46.33	46.42	53.37
Extfin	−43.52	−23.11	−16.79	−23.51	−22.01
Size	−34.32	−30.61	−30.16	−28.34	−29.21
Roa	352.20	402.91	399.51	416.32	417.74
Leverage	12.93 ***	12.18 **	12.09 ***	12.12 ***	12.18 ***
Pnexec	−0.10	0.37	0.25	0.32	0.19
BDSize	6.87	4.66	5.09	4.42	5.33
Industry	52.88	102.66	84.87	97.15	97.95

Table 8. *Cont.*

Description	Dependent Variable: Tobin's Q				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
	Model Adjustment:				
R^2	0.75	0.72	0.72	0.72	0.72
R^2 Adjusted	0.66	0.61	0.61	0.62	0.62
Statistic F	8.20 ***	6.85 ***	6.81 ***	6.86 ***	6.95 ***
Durbin-Watson	2.09	2.40	2.32	2.35	2.22
VIF	<3.8	<3.8	<3.8	<3.8	<3.8

Note: statistically significant at a level of *** 0.01; ** 0.05 (2-tailed); ††† 0.01 (1-tailed). Note: Tobin's Q is the ratio between the market value of a physical asset and its replacement value; size is the logarithm of total assets; Roa is the return on total assets; leverage is the ratio between long-term debt and the book value of total assets; Pnexec is the percentage of non-executive directors over the total number of directors on the board of directors; BDSize is the total number of directors on the board; activity, optimism, certainty, realism, commonality are the five main variables, provided by diction, that reflect a more robust understanding of the tone of the narratives; complex is a binary variable that receives a value of 1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 if it is not; Extfin is a binary variable that receives a value of 1 if the index of external financing needs is greater than the median value of the sample and 0 if it is not; and industry is a binary variable that assumes 1 if the company belongs to the manufacturing industry and 0 if not.

Table 9. Effects of the tone of risk narratives on the company's market value (risk and risk management sections of management report).

Description	Dependent Variable: Tobin's Q				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	−110.92	2257.65	−77.74	−486.11	−1076.66
Tone:					
Activity	−1.79				
Optimism		−56.70			
Certainty			−4.45		
Realism				11.85	
Commonality					18.15
Complex	35.05	−10.68	19.97	42.10	43.50
Extfin	−78.98	−84.98	−86.00	−78.35	−83.80
Size	23.34	45.20	34.23	13.71	21.36
Roa	−1321.84	−1336.92 *	−1330.40 *	−1159.58	−1311.97
Leverage	10.11 ***	9.09 ***	9.76 **	10.42 ***	10.15 ***
Pnexec	−0.03	−0.71	−0.25	0.42	0.14
BDSize	4.50	4.99	4.85	3.86	3.33
Industry	207.87	327.09 **	218.10 *	230.25 **	215.40 *
	Model Adjustment:				
R^2	0.90	0.93	0.91	0.91	0.91
R^2 Adjusted	0.81	0.85	0.82	0.83	0.81
Statistic F	9.35 ***	12.34 ***	9.84 ***	10.56 ***	9.60 ***
Durbin-Watson	2.02	2.04	2.01	1.98	2.04
VIF	<7.8	<7.8	<7.9	<7.5	<7.17

Note: statistically significant at a level of *** 0.01; ** 0.05; * 0.1 (2-tailed). Tobin's Q is the ratio between the market value of a physical asset and its replacement value; size is the logarithm of total assets; Roa is the return on total assets; leverage is the ratio between long-term debt and the book value of total assets; Pnexec is the percentage of non-executive directors over the total number of directors on the board of directors; BDSize is the total number of directors on the board; activity, optimism, certainty, realism, commonality are the five main variables, provided by diction, that reflect a more robust understanding of the tone of the narratives; complex is a binary variable that receives a value of 1 if the common factor score for organizational complexity is greater than the median value of the sample and 0 if it is not; Extfin is a binary variable that receives a value of 1 if the index of external financing needs is greater than the median value of the sample and 0 if it is not; and industry is a binary variable that assumes 1 if the company belongs to the manufacturing industry and 0 if not.

7. Conclusions

The complexity of the risks and the regulatory requirements contributed to advancing the information contained in the annual reports. Due to the importance of annual reports in

the business world, this research aims to analyze the effect of the tone of the risk reporting narratives on the market value of Portuguese non-financial listed companies.

Findings show that the tone of risk reporting narratives is associated with the company's market value. More specifically, we found a significant negative relationship between the tone category activity and Tobin's Q. The more emphatic the activity tone is, the lower its market value (Sydserff and Weetman 2002). Activity is related to using persuasive language expressing overconfidence, narcissistic self-confidence and leadership traits of heroism. Consistent with the economic perspective of the social psychology theory of impression management (grounded on agency assumptions), managers use the tone of risk reporting narratives to obfuscate bad news, and therefore, maximize their self-interests. However, market participants seem to very sensitive to this kind of linguistic style since they penalize companies in the market. They consider they are trying to hide adverse information, which will increase adverse selection problems. To prevent losses, they price-protect through a reduction in share prices.

It is noteworthy that we did not find any relationship between the other tone categories (certainty, realism, optimism and commonality) and the company's market value. This fact may be related to the type of disclosure. Realism, for example, has a greater effect on CEOs' letters (Craig and Amernic 2018; Patelli and Pedrini 2015) due to its explanatory effect. Some researchers find managers' language to be optimistic when reporting future performances in press releases and when reporting poor financial performances in integrated reports (Melloni et al. 2017).

Findings also show that there is a relationship between the level of leverage and Tobin's Q. This is in line with the agency theory's assumptions (Jensen and Meckling 1976), which portrays that higher leverage is related to improved efficiency. In line with this argument, Margaritis and Psillaki (2010) explain that higher levels of indebtedness encourage managers to act in the interests of shareholders. As a result, managers of companies with higher debts are encouraged to report more information about the business risks, minimizing the information gap between the company and the investor and, consequently, increasing the company's market value.

Thus, it is clear that analyzing the tone of the risk discourse is fundamental for managers to be able to optimize their economic and market gains, working on their image and reputation through their narratives. This means that it is possible to find out, through using words, the best way to report business risks to interested parties, obfuscating bad news and emphasizing the good news, focusing on the company's market value creation. However, managers must consider that there is a balance between the benefits and the costs of this risk disclosure so that the competition does not perceive its weaknesses or opportunities and investors their manipulation strategies.

The results are useful for both theory and practice. First, this study is the first one to address the economic consequences of the optimized tone in risk information, contributing considerably to academic risk reporting research. It extends prior literature on risk reporting that mainly focuses on the drivers and economic incentives of the quantity of risk reporting. The present study further analyses the economic incentives of a specific strategy of risk communication, never studied hitherto: the tone of speech. Second, this is particularly important to managers (potential economic advantages they can have from strategically evaluate their risk communications strategies by managing their tone of speech), investors (because it can inform their investment decision-making), auditors (to detect possible frauds, expressed verbally, in the reports' narratives), and regulators (to establish a mechanism that can constrain manager's opportunistic behaviors detected through the tone of speech).

The present study presents some limitations. First, the subjectivity associated with the content analysis can affect its reliability. To overcome this, we used an automated procedure provided by the software DICTION. However, this software relies on predefined dictionaries. Other software must be used to assess if results remain unchanged. Second, the study is limited to a small sample and one year of analysis. However, this limitation

does not undermine the generalization of findings since the sample corresponds to the population of Portuguese non-finance listed companies. Further studies may include larger samples, comprising cross-country and longitudinal research settings, as well as other sources of risk information (such as interim reports, IPO, press releases, conference calls or even web sites) to assess the impact of the tone of risk narratives on company's market value over time.

Appendix A

Table A1. Summary of empirical articles on disclosure of risk reports.

Author	Sample	Objective	Theory	Main Results
Elamer et al. (2019)	100 listed commercial and Islamic banks in the MENA region. Total 14 Middle East and North Africa (MENA) countries (2006–2013).	Examines the impact of multilayer governance mechanisms on the level of bank risk disclosure.	Resource dependence theory	Authors find that the presence of a Sharia supervisory board is positively associated with the level of risk disclosure. Ownership structures have a positive effect on the level of risk disclosure. At the country level, our evidence suggests that control of corruption has a positive effect on the level of bank risk disclosure.
De Luca et al. (2020)	51 Italian large public interest entities right after the issuance of the Legislative Decree No., 254 of 30 December 2016 on the nonfinancial disclosure CSR requirements. Italy.	Discusses the possible relationship between intellectual capital (IC) and non-financial information (NFI), particularly related to SDGs and corporate social responsibility (CSR), in a stakeholder engagement perspective.	Legitimacy theory and resources-based perspectives	Authors find that Companies with high levels of structural capital must have better quality in the disclosure of their risk-related information since they have better organizational philosophy, knowledge and techniques in the preparation process to support and even explore the effects of uncertainties. The quality of the information can also depend on the characteristics of the company.
Leopizzi et al. (2019)	202 public interest companies (EIP), Italian, required to follow decree, 254/2016 (2016/2017). Italy.	Investigate the level of disclosure of non-financial risk after the introduction of Directive, 2014/95/EU on non-financial information.	Not specified	Results show how the level of disclosure of non-financial risks in Italian companies is better than before the introduction of the directive and also based on the past and present perspective rather than the future.
Beretta and Bozzolan (2004)	Non-financial companies listed on the Italian Stock Exchange (2001). Italy.	Propose a structure for the analysis of risk communication and an index to measure the quality of risk disclosure.	Not specified	Authors find that the amount of disclosure is not influenced by size or sector. Thus, the synthetic measure can be used to classify the quality of risk disclosure.
Oliveira et al. (2011)	81 Portuguese companies registered by the CMVM. Our sample comprised all 42 non-finance companies listed on the regulated Euronext Lisbon market as of 31 December 2005, together with 39 non-finance companies not listed on any regulated market (2005). Portugal.	Assess the risk-related disclosure (RRD) practices in annual reports for 2005 Portuguese companies in the non-finance sector.	Agency theory, legitimacy theory and resources-based perspectives	Authors find that Disclosures are generic, qualitative and backward-looking. Public visibility (as assessed by size and environmental sensitivity) is a crucial influence in explaining RRD: companies appear to manage their reputation through disclosure of risk-related information.
Athanasakou et al. (2020)	CFIE dataset for UK annual reports published in calendar years (2003–2014). UK.	Test for a U-shaped relation between the cost of equity capital and the level of disclosure in annual report narratives.	Not specified	Authors find a negative relation with the cost of equity capital at low levels of disclosure, and a positive relationship at higher levels of disclosure, together with implying the presence of an optimal level of disclosure.

Author	Sample	Objective	Theory	Main Results
Kang and Gray (2019)	185 of the largest firms listed on the London Stock Exchange (FTSE, 100 plus top, 100 from FTSE, 250) (2013/2014). UK.	To examine the voluntary disclosure behavior of leading British multinational firms in respect of country-specific risks.	Voluntary disclosure theory	Results show that British multinationals are less likely to voluntarily report their segment and risk information on a disaggregated geographic country-by-country basis if they are engaged in operations in countries associated with higher levels of country-specific risks.
Abraham and Cox (2007)	71 FTSE, 100 non-financial firms (2002). UK.	Investigated the relationship between the quantity of narrative risk information in corporate annual reports and ownership, governance, and US listing characteristics.	Agency theory	Authors find that corporate risk reporting is negatively related to sharing ownership by long-term institutions, therefore, suggest put forth that this important class of institutional investor has investment preferences for firms with a lower level of risk disclosure. Concerning governance, find that different types of board directors fulfill different functions, with both the number of executive and the number of independent directors positively related to the level of corporate risk reporting, but not the number of dependent non-executive directors.
Lobo et al. (2019)	Item 7A from 83,402 10-K filings from the SEC's EDGAR database.	They examine whether the risk disclosures in the 10-K files contain useful information about companies' risk management efforts.	Not specified	Authors find that (1) managers are more likely to disclose risks when they receive higher-quality information about risks; (2) managers are more likely to disclose risks when they are confident in their ability to achieve a better risk management outcome; (3) the disclosure of higher quality risks helps to direct management's attention and to focus on the task of risk management. They support the argument that the disclosure of higher quality risks is a sign of the result of risk management.
Bravo (2017)	95 companies included in the Standard and Poor's 500, belonging to the manufacturing industry (2009). USA.	To test the effect of risk disclosures on firm value.	Voluntary disclosure theory	Results show that the disclosure of information on risks is positively associated with the value of a firm. In addition, findings highlight that this association is mediated by corporate reputation, which improves for enhanced risk disclosure practices.
Schiemann and Sakhel (2019)	717 European companies- ETS and non-ETS firms (operating in high-emitting industries) (2011–2013). EU.	They investigate whether the decision to voluntarily disclose a company's exposure to physical risks is associated with less information asymmetry. They also test whether the relationship between disclosure and information asymmetry differs depending on whether or not a company is regulated by climate policy.	Socio-political theories	Authors find that reporting of higher exposure to physical risks is associated with lower information asymmetry for firms falling under the regulation of the EU Emissions Trading Scheme, whereas for other firms, the direction of the relationship reverses. The results are driven by other climate change-related risk disclosures and by disclosures about opportunities arising from climate change.
Campbell et al. (2014)	"Risk factor" section in their Form 10-K 9076. 9076 firm-year observations (2005–2008). USA.	Examine the content of the information in the "risk factor" section on Form 10-K.	Not specified	Authors find that (1) The firms facing greater risk disclose more risk factors and that the type of risk the firm faces determines whether it devotes a greater portion of its disclosures towards describing that risk type. That is, managers provide risk factor disclosures that meaningfully reflect the risks they face. (2) find that the information conveyed by risk factor disclosures is reflected in systematic risk, idiosyncratic risk, information asymmetry, and firm value. The evidence supports the SEC's decision to mandate risk factor disclosures, as the disclosures appear to be firm-specific and useful to investors.

Appendix B

Table A2. Summary of empirical articles on the tone of speech.

Author	Sample	Objective	Theory	Main Results
Fisher et al. (2019)	The largest companies listed on the ASX100 (Australia) and NZX50 (New Zealand) (2008/2009). Australia and New Zealand.	Investigate how dimensions of tone vary across different forms of corporate accountability narrative; the impact of tone on readability; and the determinants of tone, including consideration of its use in impression management	Not specified	Authors' analysis reveals that dimensions of tone vary significantly across narrative types (genres), suggesting that tonal patterns form part of the specific stylistic conventions of each genre. Tone is found to be a significant determinant of readability.
Gatzert and Heidinger (2019)	48 publicly listed insurers in the EU that published an English SFCR. (15 countries). (After the disclosure of the SFCRs). EU.	Analyze market reactions to the first SFCRs for all publicly listed insurers in the EU that published an English report based on an event study	Not specified	Authors show that SFCR key figures matter more than textual features. Specifically, we find a significantly positive market impact of the solvency ratio calculated without transitionals or adjustments and a significantly negative one for the solvency capital requirement (SCR).
Boudt and Thewissen (2019)	CEO letters of the firms included in the DJIA for the 12 consecutive fiscal years, 2000 to 2011. 30 of the largest firms in the USA (2001–2012). USA.	Highlight the strategic positioning of positive and negative words in a letter from the CEO as a subtle form of impression management	The serial position effect and peak-end rule theory	Authors show that managers tend to present information in such an order that the reader of the CEO's letter has a more positive perception of the underlying message. They uncover a smile in the frequency of positive words within the letter, and a half-smile in the intratextual distribution of negative words, with a prevalence of negative words at the beginning of the letter. Furthermore, find a significant positive association between this qualitative impression management and using abnormal accruals in earnings management.
Pengnate et al. (2020)	100 firms: 50 from the USA and 50 from Japan, with broad industry representation. Sample firms' letters to shareholders were published immediately after the Lehman Brothers bankruptcy announcement in September 2008. USA and Japan.	Investigate the relationships between sentiment, as an aspect of emotions extracted from the letters to shareholders, managerial discretion and the firms' subsequent performance and performance trajectory during the crisis	Upper echelons theory	Authors show that (1) Managerial sentiment identified in letters to shareholders can potentially be related to the firm's subsequent performance in the economic crisis, and (2) managerial discretion moderates the relationship between managerial sentiment and subsequent firm performance.
Quigley et al. (2020)	1753 option grant dates representing 659 CEOs across 627 firms. Option grants to CEOs of large US publicly traded companies (2009 to 2013). USA.	Theorize aspects of agency theory that leave information asymmetry in place, offer CEOs an informational advantage that can be used, via print management techniques, to circumvent some of the intended benefits of granting options	Agency theory	Authors argue that the period leading up to an option grant creates a scenario where CEOs are incentivized to reduce the stock price of their firm for personal gain. CEOs respond to incentives by adjusting the tenor of releases from the firm during the pre-grant period, providing CEOs a substantial economic gain.
Bushee et al. (2018)	60,172 firm-quarters with conference call transcripts and the necessary CRSP, Compustat, and I/B/E/S data (2002–2011). USA.	Develop a novel empirical approach to estimate two latent components within (obfuscation and information) the context of quarterly earnings conference calls	Economic theory	Authors contend that our estimate of the information component is negatively associated with information asymmetry, while our estimate of the obfuscation component is positively associated with information asymmetry.
Beretta et al. (2019)	102 integrated reports from European listed companies and available in the IIRC's integrated reporting emerging practice examples database as of 15 December 2017. (2011 to 2016). UK, The Netherlands, Italy, Germany, Spain, France, Switzerland, Denmark, Greece, Luxembourg, Sweden.	Examine how the content and semantic properties of intellectual capital disclosure (ICD) found in integrated reports are associated with firms' performance	Impression management and incremental information	Authors contend that ICDs in integrated reports are mainly discursive, with a backward-looking orientation and a limited focus on human capital. On average, more than half of each ICD is conveyed in a positive tone. As the optimistic tone in firms' ICDs increases, so too does their non-financial performance, as measured in terms of environmental, social and governance aspects. This finding supports the incremental information approach.
Roman et al. (2019)	30 annual integrated reports of the Integrated Reporting examples database setup by IIRC. Most of the selected companies are based in South Africa (11 organizations) and the UK (9 organizations), while the others operate in the following countries: Australia, Brazil, Italy, Japan, Luxembourg, Netherlands, New Zealand, Singapore and Sri Lanka (2017).	Investigate the determinants of readability and optimism, which build the disclosure style of integrated reports	Impression management theory and legitimacy theory	Authors contend that (1) the higher the revenues of the reporting company, the more balanced their integrated reports, while younger companies use a more optimistic tone when reporting. Additionally, optimism seems to be inversely correlated with the length of the reports. (2) entities based in countries with a stronger tendency towards transparency surprisingly provide less readable integrated reports. It was also revealed that companies operating in non-environmentally sensitive industries, as well as International Financial Reporting Standards adopters deliver foggier and thus less readable integrated reports.

Table A2. *Cont.*

Author	Sample	Objective	Theory	Main Results
Craig and Amernic (2018)	193 letters to shareholders, comprising about 368,000 words, focusing initially on 23 letters signed by CEOs, who are alleged to be hubristic: Browne (BP), Goodwin (Royal Bank of Scotland), and Murdoch (news).	Explore whether DICTION text analysis software reveals distinctive language markers of a verbal tone of hubris in annual letters to shareholders signed by CEOs of major companies	Not specified	Authors contend that language high in REALISM is not a distinctive marker of hubris but is likely to be a genre effect that is common in CEO letters to shareholders.
Moreno et al. (2019)	Multiple textual characteristics of the content of the chairman's statements (1948–1996). Ireland.	Analyze the evolution of multiple narrative textual characteristics in the chairman's statements of Guinness from 1948 to 1996, with the aim of studying impression management influences	Not specified	Findings show that Guinness consistently used qualitative textual characteristics with a self-serving bias but did not use those with a more quantitative character. Continual profits achieved by the company, and the high corporate/personal reputation of the company/chairpersons, inter alia, may well explain limited evidence of impression management associated with quantitative textual characteristics.
Clarkson et al. (2020)	The complete set of 2056 stand-alone CSR reports relate to 1835 distinct firm years. EUA (2002–2016)). USA.	Examine disclosure patterns for a sample of US corporate social responsibility (CSR) reports from the period 2002–2016	Not specified	Findings show that the two most commonly used disclosure characteristics, number of words and number of sentences, alone can be used to predict reporting firms' CSR performance type with 81% accuracy. The accuracy of prediction increases to 96% when the top 50 linguistics features most relevant to firms' CSR performance are included in the prediction model. In addition, we find that the linguistic features of CSR disclosure identified are incrementally value relevant to investors even after controlling for the actual CSR performance score from the professional CSR rating agencies. This finding suggests that the linguistic features of CSR disclosure can be an important venue for capital market participants in evaluating firms' CSR performance type, especially when professional CSR performance ratings are not available.
Martínez-Ferrero et al. (2019)	273 firm-year observations spanning 9 years. 12 countries: Canada, France, Germany, Hong Kong, Japan, Luxembourg, the Netherlands, Singapore, Spain, Switzerland, UK, USA (2006–2014).	Examine the association between the CSR performance of the firm and the socially responsible disclosure strategy adopted by managers to obtain insights into the factors associated with balance, accuracy, clarity, comparability, and reliability of the information	Impression management theory	Results show that, according to an obfuscation disclosure strategy, firms with the worst CSR performance disclose information that is less balanced, accurate, and clear. Moreover, these reports incorporate more optimistic, longer, and less readable information. Within the realm of impression-management strategy, firms use thematic content and verbal tone manipulation as well as quantity and syntactical reading as impression-management tools.
Hummel et al. (2017)	973 voluntary CSR disclosures were provided by firms located in the USA and the UK over a reporting period of eight years. USA and the UK.	Test the Matten and Moon (2008) framework on these two dimensions: language and topics, concerning CSR. Matten and Moon (2008) argue that firms' CSR practices and disclosure respond to the institutional environment	Not specified	Results mainly support the rationale of the implicit-explicit framework. The results show that the voluntary disclosure of CSR by companies in LMEs is, in fact, more positive in tone and more explicit concerning education, philanthropy and parental policy.

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