



SCHOOL OF  
ECONOMICS AND  
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# Beyond the words

A correlational study of the tone of CEO letters in relation to the stock market performance in Japan, Sweden, and the United States

by

Lukas Pantenburg & Markus Nordbring

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Supervisor: Ola Mattisson  
Examiner: Bo Göransson

# Abstract

Previous research has shown the importance of the CEO letter in a company's annual report, with it being one of the most widely read parts. Despite this, it is compared to most other parts in the annual report not audited, meaning that the CEO can write whatever they see fit without any precautions. Based on this research, the purpose of this study was to analyse whether the tone of reported information in CEO letters is somehow connected to future stock market performance, and therefore assess if the tone is a useful indicator for investors when deciding to invest in a company or not. Since similar studies have mostly focused on the United States, this study focused on three countries on three continents, Sweden, Japan, and the United States, to see if the trends previously found in the United States are transferable to other countries and contexts. A text analysis of CEO letters from 300 companies, 100 letters per country, was conducted to analyse tone and later compared to the stock market performance measure of market-adjusted return. The results of this study showed that there is a significant, however weak, correlation between tonality in the CEO letters and future stock market performance, with positive tone having the strongest correlation. The study found different relationships between the tone and stock market performance across countries, with Japan standing out as the most dissimilar to Sweden and the US. These results might indicate that CEOs in different countries of the world act dissimilar when communicating with their shareholders through the CEO letter. It is suggested that future research further investigates the differences between the tone in the CEO letter and future stock market performance across countries and the possible reasons for these differences.

**Keywords:** CEO letters, Stock market performance, Textual analysis, Tone, Correlational study, United States, Sweden, Japan

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# List of Abbreviations

CEO	Chief Executive Officer
CRSP	Center for Research in Security Prices
EY	Ernst & Young Global Limited
FDA	Food and Drug Administration
FY	Fiscal year
KPMG	KPMG International Limited
MAR	Market-adjusted return
MD&A	Management Discussion and Analysis
NegTONE	Negative Tone
NetTONE	Net Tone
PosTONE	Positive Tone
PWC	PricewaterhouseCoopers
S&P 500	Standard and Poor's 500
US	United States of America



# 1 Introduction

Company one:

We finished the year with record results on nearly every clinical and business metric and fortified our leadership position with expanded FDA indications. ... We enter FY 2019 with purpose and confidence in our mission and each other. The rising tide of Heart Recovery is growing and we are positioned for another outstanding year (Minogue, 2019, pp. 6).

Company two:

The number of active acquisition dialogs remains high, and we are continuously allocating resources to stay abreast of and advance these dialogs. Our financial position is solid and we are well prepared for future acquisitions and for continued acquisition-based growth (Stenlund, 2019, pp.7).

What you just read were two quotes from the letters of the Chief Executive Officer (CEO) of two different companies. Based on the choice of words and general tone in these quotes, which company do you think would have the better stock market performance one year after these letters were published? This example illustrates the difficulty of interpreting the state of a company by reading the CEO's thoughts about their own company. After all, will the CEO use the opportunity to market and present the company in a favourable light to attract investors? Or is the tone in CEO letters justified by future stock market performance? These are the questions this study wishes to answer. The correct answer to the initial question is for record company two, with an incredible stock return of +139.95%, compared to company one with a devastating return of -47.44% (see Table 12 in appendix E).

## 1.1 Background of CEO letters and tonality

All publicly traded companies must release an annual report to their shareholders. The annual report consists of a variety of information regarding the financial situation and performance of the company, but also some narrative parts such as the management discussion and analysis (MD&A), where the management team discusses the financial statements. Another part of the annual report is the CEO letter, in which the company's CEO has the opportunity to give a personal interpretation of the past year and make predictions about the company's future performance (Yuthas, Rogers & Dillard, 2002). The interesting thing about CEO letters is that they are not a mandatory part of the annual report and are therefore not audited, which means that CEOs can write whatever they see fit without taking any precautions (Boudt & Thewissen, 2019; Kruglanski & Thompson, 1999; Davis, Piger & Sedor, 2012). Since the CEO letter is providing a vision and future outlook for the company it is also forward-looking, compared to the financial parts of the annual report solely looking backwards. This makes the CEO letter an important part for future investors and other stakeholders interested in the company's future performance (Yan, Aerts & Thewissen, 2019).

The CEO letter is a relatively new concept compared to the mandatory and audited parts of an annual report but has gradually become a natural part of annual reports in the last decades (Davis, Piger & Sedor, 2012). The number of words that have been used in annual reports has increased by 90% from 1980 to 2003 (Davis, Piger & Sedor, 2012). An annual report with more words than numbers in them can have both benefits and disadvantages. One disadvantage is that management might take advantage of unaudited parts and portray themselves in a falsely positive light. Conversely, one benefit is that complex financial statements might be easier for investors to comprehend by adding more narrative parts (Bartlett & Chandler, 1997). In fact, a study by Bartlett and Chandler (1997) showed that 48% of investors thoroughly read the CEO letter, compared to only 17% thoroughly studying the balance sheet<sup>1</sup>. These results indicate the importance of the CEO letter, as many investors might only focus on reading this part of the annual report.

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<sup>1</sup> The balance sheet is a financial statement in the annual report showing a company's assets and liabilities (Greener, 1980).

As the usage of CEO letter has increased, so has the literature analysing it (inter alia: Prasad & Mir, 2002; Rutherford, 2005; Loughran & McDonald, 2011; Yekini, Wisniewski & Millo, 2016). Due to the CEO letter not being audited and the ensuing risk of CEOs taking advantage of this (Kruglanski & Thompson, 1999; Davis, Piger & Sedor, 2012), the question arises if they are describing the actual company-performance and providing useful additional information in the CEO letter or if they use the information asymmetry in relation to shareholders and future investors to gloss over poor past performance and rhetorically hype the company's upcoming year. This could be important information for shareholders and future investors to properly evaluate a company.

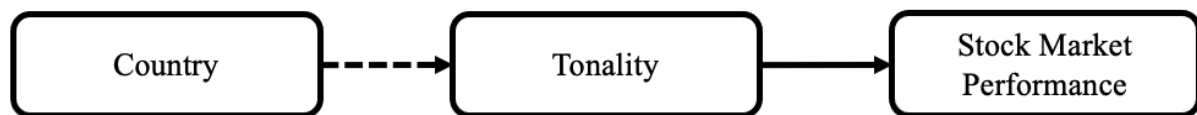
In addition, investors and shareholders may be interested in whether the tone of the CEO letter changes due to external circumstances, such as the country in which the company is listed, in order to make international investments. Therefore, an analysis of tone in only one country may not be sufficient to deduce an overall effect and could be biased by country-specific characteristics. For academia, a comparative study of multiple countries is interesting because it provides an opportunity to test the generalisability of the effects. Moreover, there are hardly any studies comparing the effects across countries. Only one study is analysing effects in the UK and the US (Aerts & Yan, 2017), with the remaining majority of research concentrating on the US market. Subsequently, very little is known about country differences, and an analysis of more than two countries has potential to fill this research gap by using the same methodology while comparing and analysing the impact of tone across countries and continents.

Moreover, research on annual reports and the CEO letter currently focuses mainly on the immediate period around the publication date (Davis, Piger & Sedor, 2012; Huang, Teoh & Zhang, 2014; Henry, 2008). To extend these findings, a broader analysis is beneficial. To study from a broader perspective whether the CEO letter is a useful indicator of the company's future performance, the stock market performance at the end of the following financial year could be examined. This would allow an analysis of the relationship between the tone of the CEO letter and the actual stock market performance of the company in the following year, rather than just the immediate, short-term impact on the day of publication.

## 1.2 Research purpose and question

The purpose of this study is to analyse whether there is an underlying pattern in the use of words in CEO letters that indicate future stock market performance and help investors, and other interested parties, to understand whether it may be a good company to invest in or not. On these grounds, this study addresses and answers the following two research questions:

1. How is the tonality in a CEO letter connected with the company's stock market performance at the end of the following fiscal year?
2. How is the aforementioned relationship between tonality and stock market performance affected by the context of the country in which they are listed?



*Figure 1: Model of assumed effects*

## 1.3 Outline of the thesis

After this introductory chapter, chapter 2 presents a literature review and summary of previous research as well as the hypotheses of the study. Following, chapter 3 outlines the methodology of the study and discusses its trustworthiness and possible limitations. Chapter 4 reports the results of the study and consecutively, chapter 5 discusses these results. Finally, in chapter 6 a conclusion of the study is drawn before the contributions are highlighted, possible limitations are described in their entirety, and recommendations for future research are given.

## 2 Literature review and theory

The following paragraphs define the main variables of *tonality*, *CEO letters*, and *stock market performance*. Previous research will be reviewed before identifying the research gap this study aims to fill. Further, the hypotheses are derived in this chapter from the state of research. Simultaneously, chapter 2 forms the theoretical basis of this study.

### 2.1 Tone

The word tone has different definitions. While many researchers rely on the reader's intuition of what tone means in their context, this study is defining tone in the following way.

The Cambridge Dictionary (2021) defines tone, inter alia, in relation to the voice, sound, colour, or mood. The meaning of tone in relationship with mood, which is of particular interest and the focus of this study, is defined as “the mood or general feeling of something” (Cambridge Dictionary, 2021, n.p.) or especially in the literature as a written piece which “expresses the writer’s attitude towards the subject or the reader” (Cambridge Dictionary, 2021, n.p.). Similarly, Henry (2008) is defining tone as the “affect or feeling of a communication” (p.376). Furthermore, Henry (2008) describes that tone can be more positive by simply focusing on positive aspects and “by describing outcomes in a positive way” (p.377). Rogers, Van Buskirk and Zechman (2011) are acknowledging the influence of which outcomes an author of a text emphasises as well as how and with what rhetoric they describe those outcomes.

In other words, the tone indicates the author's opinion on certain topics and how they evaluate past and future events. Thereby, tone is often used to analyse qualitative information of a text, such as press releases (Davis, Piger & Sedor, 2012; Henry, 2008; Huang, Teoh & Zhang, 2014) or annual reports (Abrahamson & Amir, 1996; Loughran & McDonald, 2011), giving the reader a better understanding of the accompanying quantitative and financial data.

Just as tone is defined differently, so are the approaches to measure it. The quality and reliability of text analysis has strongly improved in the last decade (Davis, Piger & Sedor, 2012) due to

new automated programs, like *DICTION*, and genre specific word lists (Henry, 2008; Loughran & McDonald, 2011). However, there are not only different ways to conduct a text analysis but also different approaches to qualitatively measure tone. One of the most established ways of measuring tone is by measuring the number of positive and negative words<sup>2</sup> (e.g. Henry, 2008; Davis, Piger & Sedor, 2012; Huang, Teoh & Zhang, 2014; Yekini, Wisniewski & Millo, 2016; Luo & Zhou, 2020; Bonsón, Perea & Azevedo, 2021) and to calculate the ratio of them (e.g. Yekini, Wisniewski & Millo, 2016; Bonsón, Perea & Azevedo, 2021), which might indicate the optimism or pessimism of a text.

Having defined tone and how it can be measured, the following describes the CEO letter in more detail.

## 2.2 CEO letters

Previous research has shown that the CEO letter is one of the most widely read parts in the annual report (Bartlett & Chandler, 1997). Despite the popularity of the letter, it is compared to other parts of the annual report not mandatory and not audited, placing fewer restriction on the content of CEO letters (Abrahamson & Amir, 1996). The CEO letter is predominantly placed at the beginning of the report, conveying the CEO's perspective on the overall yearly performance and what to expect in the upcoming year (Smith & Taffler, 2000).

The concept of including CEO letters and any voluntary disclosures in general, is relatively new in comparison to the mandatory and audited parts of the annual report, but it has quickly grown in usage and popularity (Davis, Piger & Sedor, 2012). According to Ahmed and Courtis (1999), one reason for this development is the dissatisfaction of investors and stakeholders with mandatory financial statements, leading them to demand more information on strategy and performance. This development has further been driven by the increasing popularity of the *stakeholder approach*, with the result that many companies now no longer focus solely on the needs of shareholders but take a more holistic approach and seek to satisfy the needs of all stakeholders (Ahmed & Courtis, 1999). This more holistic approach has led to the realisation

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<sup>2</sup> A positive or negative word is a word with a positive/negative meaning or connotation, or a word that gives a positive/negative meaning to another word (Henry, 2008).

that a company does not only need to interact with its shareholders, but that there are other stakeholders who demand and need information, making the voices of dissatisfaction even louder and thus leading to more voluntary statements being published (Ahmed & Courtis, 1999). However, these are not the only reasons for publishing voluntary disclosures in annual reports, as there can be many, such as market conditions, value creation in a long-term perspective, and the company's desire to build a solid reputation (Ahmed & Courtis, 1999). The importance a company places on stakeholder management and the information needs of investors are also driving factors for the publication of voluntary disclosures, leading to companies wanting to show more transparency towards external parties (Boesso & Kumar, 2007). Research has shown that factors contributing to the likelihood of a CEO letter being published are when the company has been audited by one of the Big 4 audit firms (PwC, Deloitte, EY, and KPMG), when profitability levels are high, and when the company has a high proportion of foreign subsidiaries (Costa, Oliveira, Rodrigues & Craig, 2013).

After defining tone and the CEO letter, the following part analyses the state of research on tone in CEO letters.

## 2.3 Tone and CEO letters

The tone in CEO letters is a particularly interesting research object due to the importance of the CEO letter as stated above, and the possibility for CEOs to shape the narrative of how their company is perceived by shareholders and future investors. But the approaches differ to measure the tone of a CEO letter.

The most prominent measurement is a combination of ‘negativity’ and ‘positivity’ (Hildebrandt & Snyder, 1981; Rutherford, 2005; Demers & Vega, 2008; Henry, 2008; Davis, Piger & Sedor, 2012; Aerts & Yan, 2017; Marquez-Illescas, Zebedee & Zhou, 2019). Others solely focus on ‘negativity’ (Abrahamson & Amir, 1996), ‘positivity’ (Yekini, Wisniewski & Millo, 2016; Sataloff, Johns & Kost, 2020; Bonsón, Perea & Azevedo, 2021) and net tone (Huang, Teoh & Zhang, 2014). A well-established way to measure the positivity and negativity is Henry’s (2008) wordlist (Henry & Leone, 2009; Yekini, Wisniewski & Millo, 2016; Luo & Zhou, 2020).

The other most common way to measure tone is ‘optimism’ (Rogers, Van Buskirk & Zechman, 2011; Davis, Piger & Sedor, 2012; Huang, Teoh & Zhang, 2014), as well as a combination of

'optimism' and 'pessimism' (Lang & Lundholm, 2000; Demers & Vega, 2008; Davis & Tama-Sweet, 2012).

A broader approach to analyse not only positivity (optimism) and negativity (pessimism) of a text was made by Loughran and McDonald (2011) who created a wordlist especially to measure tone in financial text. This word list is used frequently (e.g., Davis & Tama-Sweet, 2012; Huang, Teoh & Zhang, 2014; Yan, Aerts & Thewissen, 2019) and measures besides 'negativity' and 'positivity' also 'uncertainty', 'strong modal', 'weak modal' and 'litigious' of tone. Apart from that, there are other aspects of tone in annual reports and CEO letters which can be measured, e.g., Li (2008) who analysed the 'readability' and 'length'. An overview of tone measure in research is listed in Table 1. Given the various approaches, this study uses the well-established measurement of both positivity, negativity and net tone, which is a ratio of positive to negative words.

Since there is a variety of approaches to measuring tone, different word lists, and thesauri to use, there is no established standard in research, making it difficult to compare studies. Nonetheless, scholars agree upon methods for analysing qualitative data such as text documents have improved with more fine-tuned programmes and specialised word lists for financial reports (Henry, 2008; Loughran & McDonald, 2011). This development highly improved the quality, scope, and reliability of qualitative research regarding financial documents (Davis, Piger & Sedor, 2012). The most common methods for measuring the tone of CEO letters are *DICTION*, as a software and dictionary, Henry's (2008) word list, and Loughran and McDonald's (2011) word list (see Table 8 in the appendix A). The advantage of Henry's (2008) and Loughran and McDonald's (2011) word lists over standardised word lists or dictionaries such as *DICTION* and *Harvard's General Inquirer* is that they are designed specifically for financial documents, thereby capturing the tone of these texts more accurately and avoiding distortions (Loughran & McDonald, 2011; Luo & Zhou, 2020).



Table 1: Measurement of tone

Measurement of tone	Authors
Negativity	Abrahamson and Amir (1996)
Positivity	Bonsón, Perea and Azevedo (2021), Sataloff, Johns and Kost (2020), Yekini, Wisniewski and Millo (2016)
Net tone	Huang, Teoh and Zhang (2014),
Negativity & positivity	Aerts and Yan (2017), Davis, Piger and Sedor (2012), Demers and Vega (2008), Hildebrandt and Snyder (1981), Marquez-Illescas, Zebedee and Zhou (2019), Rutherford (2005), Henry (2008)
Optimism	Davis, Piger and Sedor (2012), Demers and Vega (2008), Huang, Teoh and Zhang (2014), Rogers, Van Buskirk and Zechman (2011)
Optimism & pessimism	Davis and Tama-Sweet (2012), Demers and Vega (2008), Lang and Lundholm (2000)
Readability & length	Li (2008)
Negative, positive, uncertainty, strong modal, weak modal, litigious	Loughran and McDonald (2011), Yan <i>et al.</i> (2019)
Certainty	Demers and Vega (2008)

At the same time, most of the research on tone and CEO letters is based on American companies (see Table 9 in appendix B) using financial and historic data of, e.g., the *CRSP/Compustat merged database* (Li, 2008, 2010; Rogers, Van Buskirk & Zechman, 2011; Davis, Piger & Sedor, 2012; Sataloff, Johns & Kost, 2020). In contrast, only a few researchers are observing companies in the United Kingdom (Rutherford, 2005; Yekini, Wisniewski & Millo, 2016) and only one article is comparing the tone between US and UK companies (Aerts & Yan, 2017)<sup>3</sup>.

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<sup>3</sup> A detailed list, Table 9, which does not aim to be exhaustive, is attached in the appendix B and shows the countries in which the analysed companies are listed.

Aerts and Yan (2017) discovered that CEO letters in the UK are longer than the letters in the US and found evidence that there is a significant “country effect on the intensity of rhetorical [Impression Management]” (p.425) with US letters including or taking advantage of more metadiscourse devices. This indicates that country context has an impact on CEO letters and a comparative analysis of qualitative features such as tonality of CEO letters in different countries is a research strand that needs to be further explored.

The results of analysing the tone of CEO letters are various as a logical consequence of the different approaches. Some researchers concluded that the annual reports tend to contain more positive than negative words, even in years with bad performance, what they explained by the so-called *Pollyanna effect*<sup>4</sup> (Hildebrandt & Snyder, 1981; Rutherford, 2005; Henry, 2008). Aerts and Yan (2017) conclude that a positive tone gives a CEO the opportunity to leave an optimistic impression to the reader and thereby signalling progress and potential future improvements. Yekini, Wisniewski, and Millo (2016) state that the annual report is used as a marketing tool and therefore optimistic language should not be surprising. Beyond that, managers might be inclined to opportunistically hype stock prices out of private interest, which could result in an overly positive and optimistic tone (Luo & Zhou, 2020).

However, Yekini, Wisniewski, and Millo (2016) explain that “the tone can still be viewed as price-sensitive in nature” (p. 421), indicating that the tone of the CEO letter contains useful information. Furthermore, Henry (2008) and Davis, Piger, and Sedor (2012) argue that positive or optimistic tone is positively correlated with economic attributes of a company and therefore not completely detached from the company performance. Huang, Teoh, and Zhang (2014) found that the tone “is more positive when the firm is small, profitable, growing, and has more volatile stock returns, fewer business segments, and strong performance relative to analyst earnings forecast” (p.1091). Marquez-Illescas, Zebedee, and Zhou (2019, p.404) analyse the tone from a psychological perspective and reason that ‘conscientiousness’ and ‘humility’ are potential personality traits that could reduce the positivity bias in the CEOs mode of expression. Furthermore, Yekini, Wisniewski, and Millo (2016) explain that CEOs might be reluctant to be falsely overly positive in writing the annual reports, as they fear a potential costly loss in reputation and litigation risk (Luo & Zhou, 2020).

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<sup>4</sup> Simplified, the Pollyanna effect describes the tendency for positive words to be used more often than negative words (Rutherford, 2005).

There are also several studies that look at potential variables which could moderate the tone of CEO letters. Aerts and Yan (2017) found that litigation risk is related to report length, with companies that have higher litigation risk being more cautious and writing longer disclosures. Marquez-Illescas, Zebedee, and Zhou (2019), discovered that older CEOs are more likely to use a less optimistic, ‘sugar-coating’ tone in their earnings announcement, which they explained by a psychological development as the CEO ages. According to them, older people score higher on the ‘Honesty-Humility’-scale which is associated with less delinquent, self-focused, anti-social and manipulative behaviour and could translate in a more ‘realistic’ picture in their disclosure compared to younger CEOs (Marquez-Illescas, Zebedee & Zhou, 2019). Furthermore, they analysed the effect of gender and concluded that compared to male CEOs, female CEOs are more likely to use a positive tone in their earnings reports (Marquez-Illescas, Zebedee & Zhou, 2019). Other researchers have analysed company specific features. Huang, Teoh, and Zhang (2014) postulate that older firms with an established reputation are more persuasive for investors. In addition, the size of the company also seems to affect the tone with larger firms being more conservative, meaning more negative, in their tone (Huang, Teoh & Zhang, 2014). Similarly, Li (2010) concludes that larger companies, with more stake- and shareholders are more conservative and not ‘hyping’ their company as they are more closely scrutinised and aim to avoid potential litigations. Although these are very important findings, for feasibility reasons, this study will focus on the main relationship between tonality and stock market performance and will not go into more detail on the specifications of CEOs as well as companies but will return to them in the future research section.

In the next section, the state of research on tone in CEO letters and the financial performance of companies will be reviewed.

## 2.4 Tone, CEO letters, and stock market performance

Many studies have been conducted on the short-term stock market reaction to tone in CEO letters, demonstrating that stock prices rise short term when tone is positive (Davis, Piger & Sedor, 2012; Huang, Teoh & Zhang, 2014; Yekini, Wisniewski & Millo, 2016), and that stock prices falls in the short term when the tone is negative (Henry, 2008). This is done by calculating the normal stock movements for different companies and then analysing if there are abnormal stock movements on the days following the release of an annual report (Henry, 2008; Davis,

Piger & Sedor, 2012; Huang, Teoh & Zhang, 2014). In light of all this research, it is safe to assume that the tone of CEO letters has a tangible impact on the decisions of investors and shareholders. For example, Davis (2012) showed that the tone of an earnings press release has a direct effect on the investor's perception of the company's future performance, leading to a change in their opinion concerning the future of the company based on if the tone is positive or negative.

One explanation on why the tone has such a strong influence on an investor's perception of the company could be explained by *prospect theory*, Henry (2008) claims. This theory alleges that framing financial information in a positive manner will lead to investors seeing the information in a heightened and increased manner regarding to their reference point (Tversky & Kahneman, 1981; Henry, 2008).

However, studies that focus on the relationship between tone in CEO letters and long-term stock market performance are not as common or as well studied as short-term stock market reactions to CEO letters. Wisniewski and Yekini (2015) assert that it is important to invest time in reading annual reports, as their research found that they contain a lot of valuable information that may not yet have been incorporated into the stock price. They discovered that two other narrative indicators; activity and realism, had a significant connection to long-term stock market returns (Wisniewski & Yekini, 2015). Additionally, Abramson and Amir (1996) report significant results regarding the connection between negative tone in the CEO letter and long-term stock market performance. Given this sparse research landscape, the focus of this study is tonality in the CEO letter and long-term stock market performance.

Taking into account the research presented above, the first three hypotheses were formulated. To analyse potential country differences, each hypothesis is divided into *a* and *b*. Here, the *a* hypotheses measure the overall effect for the entire sample (*simultaneously*) and the *b* hypotheses look at the effect in each country individually (*separately*). Due to the very limited previous research regarding the exploration of differences between countries on these two variables, there is no reason to argue that there would be a specific difference across countries. Therefore, the hypotheses expect the relationship between tonality and stock market performance to be identical in all three countries. The first three hypotheses of the study are as follows:

*Hypothesis 1a:* The level of positive tone in CEO letters will positively correlate with market-adjusted returns in all countries *simultaneously*.

*Hypothesis 1b:* The level of positive tone in CEO letters will positively correlate with market-adjusted returns in all countries *separately*.

*Hypothesis 2a:* The level of negative tone in CEO letters will negatively correlate with market-adjusted returns in all countries *simultaneously*.

*Hypothesis 2b:* The level of negative tone in CEO letters will negatively correlate with market-adjusted returns in all countries *separately*.

*Hypothesis 3a:* The level of net tone in CEO letters will positively correlate with market-adjusted returns in all countries *simultaneously*.

*Hypothesis 3b:* The level of net tone in CEO letters will positively correlate with market-adjusted returns in all countries *separately*.

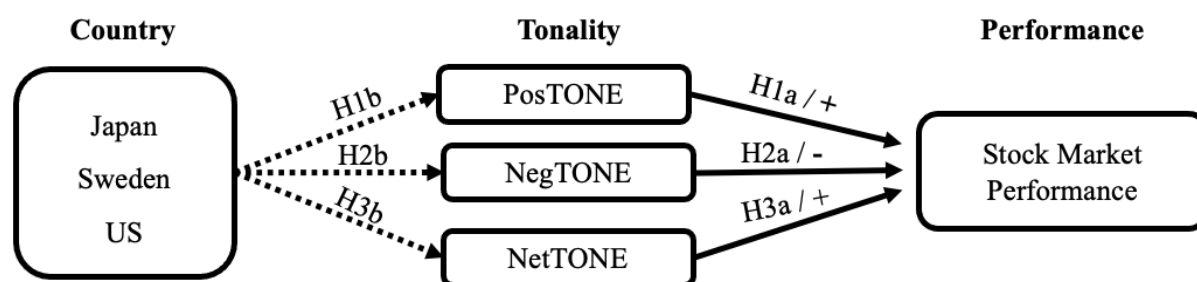


Figure 2: Assumed effects of hypotheses 1 to 3.

Note: The hypotheses show the assumed effects and a positive effect is symbolised by a '+' and a negative effect by a '-'.

Results by Abrahamson and Amir (1996), one of the only studies examining long-term effects, although solely studying the usage of negative words, show that the sample of companies with a below-median usage of negative words had a significantly higher market-adjusted return (MAR) than the above-median group for the upcoming three years. The reason they use only negative words is as follows:

a quick look at a number of president's letters reveals that they are 'sugar coated'. That is, they are full of positive statements. Coding such positive statements, most of the sugar-coating turns out to be irrelevant and ritualistic (our employees are happy, our sales went

up, etc.). It would be a waste of effort to sift through this large number of meaningless statements to find the important ones. (Abrahamson & Amir, 1996, p.1163).

Abrahamson and Amir (1996) are not the only ones to identify a positivity bias in annual reports. The reason for this could be that CEOs see an opportunity to portray their company in a favourable light to attract new investors (Henry, 2008; Wisniewski & Yekini, 2015). Accordingly, Schleicher and Walker (2010) found that companies that were threatened by future declines in sales and profit margin tended to skew the tone in the outlook section positively upwards, while companies facing a more acute decline in earnings had a more negative tone. Keusch, Bollen and Hassink (2012) echo this sentiment, saying that they want investors to be aware and alert of misleading phrasing in annual reports. They uncovered that CEOs tend to use *self-serving bias* to frame themselves more positively - minimising the impact of external circumstances when succeeding and minimising the effect of internal circumstances when failing, particularly in a state of crisis, when they often blame unlucky circumstances (Keusch, Bollen & Hassink, 2012).

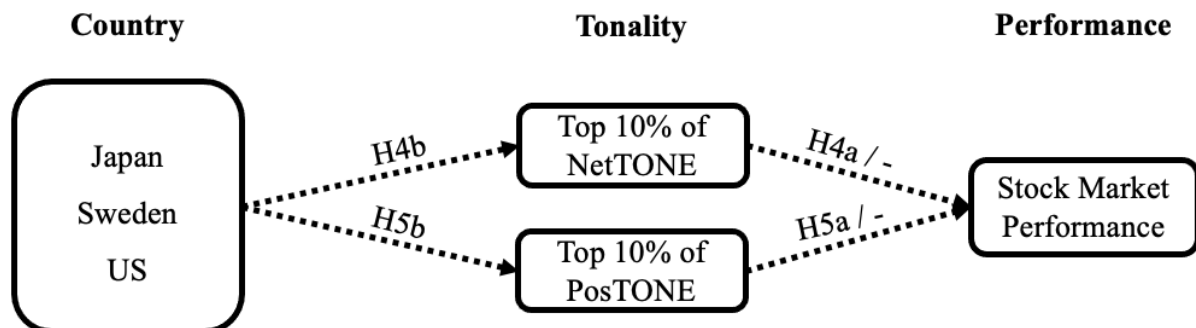
Building on this, Huang, Teoh and Zhang, (2014) found that an abnormal positive tone, i.e., a tone that is far more positive in an annual report, is more likely to predict negative future performance in the long run. This abnormal positivity in the annual report tends to lead to an immediate and overly optimistic reaction on the stock price, only to have the opposite effect later (Huang, Teoh & Zhang, 2014), making the relationship between positivity in the CEO letter and stock market performance more complex. Based on these findings, the fourth and fifth hypotheses are as follows:

*Hypothesis 4a:* Companies above the 90th percentile in terms of net tone ratio will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries ***simultaneously***.

*Hypothesis 4b:* Companies above the 90th percentile in terms of net tone ratio will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries ***separately***.

*Hypothesis 5a:* Companies above the 90th percentile in terms of positive tone will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries ***simultaneously***.

*Hypothesis 5b:* Companies above the 90th percentile in terms of positive tone will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries *separately*.



*Figure 3: Hypothesis 4 and 5 - Abnormal positivity and stock market performance. Note: The hypotheses show the assumed effects and a positive effect is symbolised by a '+' and a negative effect by a '-'.*

This chapter demonstrated that tonality is an important property of texts which can be measured with special word lists. The analysis of tonality has already been research with different methods using different databases with different objectives. It was shown that there is indeed a correlation between CEO word usage, tonality and financial performance. At the same time, the research gap was highlighted that there are almost no comparative studies examining the effect of tone in CEO letters on stock market performance in different countries, and hardly any studies analysing a longer-term effect. Based on this state of research, the five hypotheses were formulated.

## 3 Data and method

In the following, the dataset and methodology will be discussed before analysing the data, explaining the trustworthiness and limitations of the research design.

### 3.1 Methodological approach

The purpose of this study is to analyse whether there is an underlying pattern in the use of words in CEO letters that indicate future stock market performance and help investors, and other interested parties, to understand whether it may be a good company to invest in or not. With this purpose in mind and to best answer the research questions of the study, we opted for a correlational study with a deductive approach. This was done with a method drawing on previous research and testing the generalisability of tonality by comparing 100 companies in each of the three countries. Due to the focus on data and statistics it is to be viewed as quantitative research built on logical positivism. With a quantitative approach it allows the study to focus on a large number of data points, making it easier to remain objective and at the same time draw more generalisable conclusions. The study has a cross-sectional design with a non-contrived study setting, meaning that the study solely focused on data from one specific point in time and that the settings for the study were not controlled or created for the study. The decision to use this research design was made because it was considered the most valid approach for the purpose and intent of the study. With this methodological approach, the results are expected to show that there is a correlation between the tone of a CEO letter and future stock market performance.

### 3.2 Method and data gathering

Before gathering the company's CEO letters and financial performance, a thorough literature search was conducted as presented in chapter two. For this purpose, *Google Scholar* and *LUBsearch* were systematically searched with the following keywords: 'CEO letter',



'shareholder letter', 'letter\* shareholders', 'network analysis', 'discourse network analysis', 'discourse analysis'. Boolean operators were used to narrow down the search. Important literature was analysed, and a snowball system was used to find all relevant literature. Through this combination, the most current literature was found and the most important articles in the area of study could be identified.

In the initial phase of data gathering we randomly selected 100 companies from Japan's index Nikkei 225, the United States' index S&P 500, and Sweden's index OMXSPI (see Table 11 in the appendix D for the entire list of companies). The reason for using these three indices and countries is due to the size and importance of the US and Japan in the world economy, as well as Sweden as a European country and the country where this study took place. In addition, the three indices were chosen because they are among the most important and largest in their respective countries.

We collected the CEO letters for each of the 300 companies from their 2018 annual reports. The reason we used the 2018 annual report rather than a later report is to avoid 2020, when the COVID19 pandemic had an immense impact on the stock market, making it an extraordinary year and therefore the results may not be generalisable. Since the study should be as up to date as possible, the year 2018 was chosen.

To randomly select 100 companies from each index, all companies of each index were randomised using the website *random.org* and the annual report of the first 100 companies for each index were searched. If a company did not have a CEO letter in its annual report, if the annual report was not published in English or if the annual report was not accessible, the company was excluded from the sample and the next company from the randomised list was used. With this approach in place, the annual report of 2018 was downloaded from the company's investor relations section on their website or for American companies using the website *annualreports.com*. Following, all other pages before and after the CEO letter of the annual report were deleted. To put them in the right format for the text analysis programme, the *.pdf* documents were transformed into *.docs* and all extra information - pictures, names of the CEOs, signatures, greeting and end phrases, tables, graphs, and footnotes – were deleted to have only the same body of text for each CEO letter. Afterwards, all documents were named according to the standard *Country\_CompanyName\_2018* to upload them into the text analysis program *LIWC2015*.

After that, the index return and stock market return were gathered from the different companies over the same time period to calculate the market-adjusted return (MAR) (see 3.2.2 for the calculation of MAR). Index and stock market return are calculated by taking the ending price minus the starting price, dividing it with the starting price and finally multiplying it with 100, giving the percentage of either gain or loss. The data for this was retrieved from *Avanza* for the Swedish and American companies and from *Yahoo finance* for the Japanese companies. While most Swedish and American companies have fiscal years corresponding to the calendar year, most Japanese companies end their fiscal year at the end of march. This led us to retrieve financial data for the Swedish and American companies between 2/1-2019 to 31/12-2019 (30/12-2019 for Swedish companies since the stock market is closed on the 31/12 in Sweden) and for the Japanese companies between 2/4-2018 to 31/3-2019. Once this data was collected, the MAR for all 300 companies were calculated.

Then a text analysis was conducted with the previously collected CEO letters using the text analysis program *LIWC2015*. Using Henry's (2008) list of positive and negative words (see Table 2), we created our own dictionary with the variables NegTONE for the negative words and PostTONE for the positive words for the analysis with *LIWC2015*. Furthermore, the spelling of Henry's list for American and British spelling was checked and 'unfavourable' was added to the list. By using Henry's (2008) thesaurus of positive and negative words, we used a proven tool to measure tonality and to analyse the use of these words in the letters to determine a ratio of positive and negative words and thus the tone of the letter. As the program only calculated the ratio of positive (PostTONE) and negative (NegTONE) words, we used an excel spreadsheet to calculate the NetTONE for every company. Subsequently, we gathered all results, tonal and financial information, in one Excel spreadsheet (see Table 12 in appendix E). Lastly, we conducted the appropriate tests for our hypotheses which will be explained in the data-analysis section of this study.

### 3.2.1 Measurement of tone

As already mentioned, there are plenty of ways to measure the tone of CEO Letters. We decided to use Henry's (2008) word list, as it is specifically designed for financial documents and an established tool in scientific research (Henry & Leone, 2009; Yekini, Wisniewski & Millo, 2016; Luo & Zhou, 2020). Similar to other research analysing tone in CEO letters we used a frequency measure of positivity and negativity (Abrahamson & Amir, 1996; Lang & Lundholm,

2000; Henry, 2008; Henry & Leone, 2009; Rogers, Van Buskirk & Zechman, 2011; Huang, Teoh & Zhang, 2014; Yekini, Wisniewski & Millo, 2016). This approach may seem simplistic, but it is a well-established procedure in research (Henry, 2008). Furthermore, frequency measures have not only been used to measure positivity, optimism, negativity and pessimism of tone but also, among others, to measure persuasive elements of CEO letters (Hyland, 1998).

Table 2: Henry's (2008, p.387) word list of positive and negative words

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**Positivity word list:**

*positive positives success successes successful succeed succeeds succeeding succeeded accomplish accomplishes accomplishing accomplished accomplishment accomplishments strong strength strengths certain certainty definite solid excellent good leading achieve achieves achieved achieving achievement achievements progress progressing deliver delivers delivered delivering leader leading pleased reward rewards rewarding rewarded opportunity opportunities enjoy enjoys enjoying enjoyed encouraged encouraging up increase increases increasing increased rise rises rising rose risen improve improves improving improved improvement improvements strengthen strengthens strengthening strengthened stronger strongest better best more most above record high higher highest greater greatest larger largest grow grows growing grew grown growth expand expands expanding expanded expansion exceed exceeds exceeded exceeding beat beats beating*

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**Negativity word list:**

*negative negatives fail fails failing failure weak weakness weaknesses difficult difficulty hurdle hurdles obstacle obstacles slump slumps slumping slumped uncertain uncertainty unsettled unfavorable downturn depressed disappoint disappoints disappointing disappointed disappointment risk risks risky threat threats penalty penalties down decrease decreases decreasing decreased decline declines declining declined fall falls falling fell fallen drop drops dropping dropped deteriorate deteriorates deteriorating deteriorated worsen worsens worsening weaken weakens weakening weakened worse worst low lower lowest less least smaller smallest shrink shrinks shrinking shrunk below under challenge challenges challenging challenged*

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Following Henry (2008) and using her word list, we defined positive and negative tone as the frequency of the positive words and negative words in her word list, scaled by the total word count of the CEO letter. We calculated the variable PosTONE by dividing the number of positive words from Henry's word list of each CEO letter through the total number of words of the respective CEO letter. We used the same procedure to calculate NegTONE, by using the negative words from Henry's word list. Furthermore, we measured the NetTONE for each CEO letter by first subtracting the NegTONE from the PosTONE variable and secondly dividing the difference by the sum of PosTONE and NegTONE (Henry & Leone, 2009). We thereby

established an indicator, NetTONE, which has the value -1 if the CEO letter is purely negative, the value 0 for a neutral CEO letter, and the value +1 if the CEO letter is purely positive (Henry & Leone, 2009, p. 13). NetTONE thereby indicated if the tone of a text was in general positive, negative or neutral.

$$(1) \textit{PosTONE} = \frac{\textit{Number of positive words}}{\textit{Total number of words}}$$

$$(2) \textit{NegTONE} = \frac{\textit{Number of negative words}}{\textit{Total number of words}}$$

$$(3) \textit{NetTONE} = \frac{(\textit{PosTONE} - \textit{NegTONE})}{(\textit{PosTONE} + \textit{NegTONE})}$$

### 3.2.2 Measurement of stock market performance

Our way of measuring stock market performance was inspired by the study of Abrahamson and Amir (1996) who utilised annual MAR. The MAR is calculated by comparing the designated company's stock return to its market index return, indicating if a company's stock over- or underperformed in relation to its index. It is calculated by taking the company's stock return over a certain time period, in this case 12 months, and subtracting it with its market index return during the same time period. The calculation of MARs took companies potential dividends during that year into account. The reason for doing a return analysis instead of an accounting-based performance measure such as growth of earnings, comes from Abrahamson and Amir (1996), claiming that returns can be considered as a purer measure due to returns not being as affected by accounting methods or potential management manipulation.

### 3.2.3 Measurement of correlation

When measuring the strength for the correlations we used the guidelines of Cohen (1977). These guidelines read as follows; .10 indicating a weak correlation, .30 a moderate correlation and .50 a strong correlation.

## 3.3 Data-analysis

First, we started with the text analysis using the *LIWC2015* programme. We analysed the CEO letters from Japan, Sweden and the US individually and then combined them in an Excel

spreadsheet. We used our own dictionary based on Henry's (2008) word list and analysed the NegTONE and PosTONE. Then we calculated the NetTONE using the above-mentioned formula three in an Excel spreadsheet. Finally, we added two more columns with the yearly return and the MAR for each company, which we have collected and calculated as described above (see Table 12 in appendix E).

Before calculating the correlation between our tone variables and MAR we removed outliers from the sample using the statistical software *Jamovi*. Outliers were defined as a value that deviates from a standardised value of more than  $\pm 3.29$  (Field, 2013). Thereby we attained the final set of 291 companies, with 100 companies from Japan, 92 companies from Sweden and 99 companies from the US.

To determine what kind of correlation we could calculate to answer hypotheses 1 to 3, we tested the assumptions for the Pearson correlation by analysing the descriptive results of our data, which are shown in Table 3. The assumptions of the data to calculate the Pearson correlation are the level of measurement, related pairs, the absence of outliers, skewness, and kurtosis (Field, 2013). Our sample met all these assumptions. However, the requirements of linearity and homoscedasticity were not met, as the results of the Shapiro-Wilk test are significant (see Table 3). For this reason, we could not use the Pearson correlation and used the Spearman correlation instead. With Spearman correlation being a non-parametric test, it means that it does not rely on the assumptions of normality (Field, 2013), therefore it was a good fit for the study and its sample.

Since our data was not normally distributed, we could not calculate a t-test. Therefore, we used the Mann-Whitney U-test, which is a suitable alternative for a not normally distributed sample (Laerd Statistics, 2018). We used this test to analyse whether there is a more complex pattern of the influence of the tone and to analyse the fourth and fifth hypothesis. The Mann-Whitney U-test is used to “compare differences between two independent groups when the dependent variable is either ordinal or continuous, but not normally distributed” (Laerd Statistics, 2018). Our data fit the prerequisite assumptions and we were therefore able to use this test.

Table 3: Descriptive results

<b>Variables</b>	<b>NegTONE</b>	<b>PosTONE</b>	<b>NetTONE</b>	<b>MAR</b>
n	291	291	291	291
Mean	0.439	3.99	0.794	0.520
Median	0.400	3.96	0.808	-0.180
Standard deviation	0.287	1.18	0.131	29.1
Minimum	0.00	1.49	0.432	-84.0
Maximum	1.46	6.99	1.00	93.3
Skewness	0.739	0.181	-0.447	0.0706
Std. error skewness	0.143	0.143	0.143	0.143
Kurtosis	0.503	-0.670	-0.402	0.721
Std. error kurtosis	0.285	0.285	0.285	0.285
Shapiro-Wilk W	0.959	0.985	0.970	0.984
Shapiro-Wilk p	<.001	0.005	<.001	0.002

### 3.4 Trustworthiness of the study

This study's method was inspired by Abrahamson and Amir (1996). As this study is considered very valid, has been frequently cited (inter alia: Henry, 2008; Smith & Taffler, 2000; Patelli & Pedrini, 2014; Yekini, Wisniewski & Millo, 2016), and is the only study similar to our research interest. Hence to fill the research gap, we based the methodology to some extent on Abrahamson and Amir's (1996) to make this study more trustworthy and reliable.

Additionally, this paper used the thesaurus and measurement tool by Henry (2008). Henry's (2008) word list was specifically created for accounting and financial contexts, is considered valid and contains both positive and negative words, which is why we considered it well-suited for this research (Henry & Leone, 2009; Yekini, Wisniewski & Millo, 2016; Luo & Zhou, 2020).

Furthermore, analysing tonality by measuring positivity and negativity is a well-established tool in business research and thus a proven method for this study (Abrahamson & Amir, 1996; Lang & Lundholm, 2000; Henry, 2008; Henry & Leone, 2009; Rogers, Van Buskirk & Zechman, 2011; Huang, Teoh & Zhang, 2014; Yekini, Wisniewski & Millo, 2016).

The choice of tools for this study was based on accessibility, data feasibility, and reliability of the methodology. These well-established tools allowed this study to expand the field of research by comparing three countries, taking a longer-term perspective, thereby addressing the presumed research gap. However, other methods and tools could have also been used for this purpose. For example, previous studies (e.g., Abrahamson & Amir 1996) relied on specialised coders to qualitatively analyse the tone of a text. This was more accurate and precise but required much more time and resources than a standardised list. Another option would have been a qualitative study based on interviews with top investors and CEOs to investigate the influence the CEO letter's tone. However, due to the time limitations of this study and the multinational interest, a quantitative approach was preferred.

### 3.5 Methodological limitations

Regarding our decision to use a return analysis to measure performance, and the positive aspects of using this type of analysis already mentioned, it should be said that the method also has potential disadvantages. Since the stock market is not always rational, one could claim that it is not a perfect measure for company performance in general - a company could make great profits and have high earnings growth but still be valued low by the stock market and vice versa. However, since we are interested in doing this research from an external stakeholder approach and not an internal approach, we argue that a return analysis is the best measure, since stock market return might be one of the main objectives for most investors investing capital into publicly listed companies. Consequently, we found it more appropriate to use a return analysis to measure company performance instead of an accounting-based performance measure such as growth of earnings.

During the data collection period, we had to replace some companies from the randomised selection because they either did not have a CEO letter, or their annual report was not available in English. It is possible that these excluded companies are either very high-performing or very low-performing companies, by excluding them it could make our results less reliable. As with

random sampling in general, there is the risk that the randomly selected companies are skewed in some way and are not a fair representation of the entire population. Another limitation of the study is its sample size although we have a large sample with 300 data points, it could of course be even larger. With an even larger sample of companies, it might have been possible to get even more significant results.

While conducting the literature research, we also came across Impression Management, which is used to influence other people's perceptions. This is already a well-researched area. While this phenomenon relates to this study, as the CEO might also use Impression Management tools when writing the CEO letter, it is not relevant to its theory and scope of this study, as we are measuring tone in a quantitative way. It is therefore not further discussed in this study. Furthermore, a more detailed analysis of how different characteristics such as CEO narcissism (Marquez-Illescas, Zebedee & Zhou, 2019) and other moderating effects may influence tone is an interesting research objective that is unfortunately beyond the scope of this study.



## 4 Results

After the description of the data set and the method of the study, this chapter presents the results. First, to analyse the overall relationship between tone and the stock market performance, the Spearman correlation<sup>5</sup> results are reported for the whole sample and for each country independently. Second, for the analysis of a more complex than linear relationship between tone and stock market performance, the results of various Mann-Whitney U-tests are then reported. A brief summary explaining the results is given in Table 6.

### 4.1 All countries, NetTONE, PosTONE, NegTONE and MAR

Spearman correlation between NetTONE and MAR was positive, weak and significant for all countries at once. The correlation between PosTONE and MAR was positive, weak, and highly significant. The results for NegTONE and MAR were very weak and further the only negative and non-significant correlation (see Table 4).

### 4.2 Single country results for NetTONE, PosTONE, NegTONE and MAR

In the following, the correlations were calculated for each country, Japan, Sweden, and US, and variable, NetTONE, PosTONE, and NegTONE, separately.

The correlations for NetTONE and MAR were non-significant for each separate country (see Table 4). The directions, positive or negative, differed slightly between countries, but not in a meaningful way due to the non-significance and the low rho values.

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<sup>5</sup> In the following only the term correlation will be used, but it always refers to the Spearman correlation.

Table 4: Summary results from Spearman correlation

		<b>MAR</b>
<b>NetTONE</b> <i>(all countries)</i>	Spearman's rho	.110*
	p-value	.031
	n	291
<b>PosTONE</b> <i>(all countries)</i>	Spearman's rho	.200***
	p-value	<.001
	n	291
<b>NegTONE</b> <i>(all countries)</i>	Spearman's rho	-.048
	p-value	.209
	n	291
		<b>NetTONE</b>
<b>MAR (Japan)</b>	Spearman's rho	-.015
	p-value	.558
	n	100
<b>MAR (Sweden)</b>	Spearman's rho	.092
	p-value	.192
	n	92
<b>MAR (US)</b>	Spearman's rho	.064
	p-value	.265
	n	99
		<b>PosTONE</b>
<b>MAR (Japan)</b>	Spearman's rho	-.049
	p-value	.685
	n	100
<b>MAR (Sweden)</b>	Spearman's rho	.352***
	p-value	<.001
	n	92
<b>MAR (US)</b>	Spearman's rho	.165
	p-value	.051
	n	99
		<b>NegTONE</b>
<b>MAR (Japan)</b>	Spearman's rho	-.016
	p-value	.438
	n	100
<b>MAR (Sweden)</b>	Spearman's rho	.008
	p-value	.529
	n	92
<b>MAR (US)</b>	Spearman's rho	-.028
	p-value	.392
	n	99

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed

For Japan, the results for PosTONE and MAR were negative, very weak, and non-significant. For Sweden, however, the correlation was positive, moderate, and highly significant. The correlation for the US was positive, weak, and almost significant (see Table 4).

Furthermore, the results for NegTONE and MAR were non-significant for each country (see Table 4). Again, the directions of the correlation differed slightly between countries, but this is not meaningful due to the non-significance and small effect size.

### 4.3 Mann-Whitney U-Test results

After all correlation coefficients have been presented, the most important, i.e., significant and almost significant results of the Mann-Whitney U-test are presented below. A detailed list of all results can be found in the appendix F to J (Table 13-17).

#### 4.3.1 Mann-Whitney U-Test for NetTONE

For all countries at once and for each country separately, the test showed a non-significant difference in the MAR of ‘Above Average NetTONE’ and ‘Below Average NetTONE’ (see Table 13 in the appendix F).

#### 4.3.2 Mann-Whitney U-Test for abnormal positivity of NetTONE

Next, the abnormal positivity of NetTONE was analysed. For the whole sample and for the countries separately, the test showed a non-significant difference in the MAR of ‘Top 10% NetTONE’ and ‘Above Average NetTONE’ (see Table 14 in the appendix G).

#### 4.3.3 Mann-Whitney U-Test for PosTONE

The results for the Mann-Whitney U-test for PosTONE were different. For all countries at once and the Swedish sample, the test showed a significant difference of ‘Above Average PosTONE’ and ‘Below Average PosTONE’ (see Table 8). The results for the Japanese and US samples were non-significant, but with only slightly non-significant results for the US (see Table 5 and Table 15 in the appendix H).

Table 5: Mann-Whitney U-test - significant and almost significant results

	n	mean	median	p-value
MAR Above Average PosTONE (all countries)	145	5.97	7.17	<.001***
MAR Below Average PosTONE (all countries)	146	-4.89	-3.95	<.001***
MAR Above Average PosTONE (Sweden)	46	8.92	11.1	.009**
MAR Below Average PosTONE (Sweden)	46	-8.99	-7.12	.009**
MAR Above Average PosTONE (US)	49	8.18	9.84	.058
MAR Below Average PosTONE (US)	50	1.95	1.05	.058
MAR Top 10% PosTONE (all countries) †	30	16.4	10.9	.026*
Above Average PosTONE (all countries) †	115	3.25	5.48	.026*

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed. †For This test the preconditions of the test have been changed to: Top 10% PosTONE > Above Average PosTONE.

#### 4.3.4 Mann-Whitney U-Test for abnormal positivity of PosTONE

Afterwards, the abnormal positivity of PosTONE was analysed. For all countries at once and for each country separately, the test showed a non-significant difference in the MAR of ‘Top 10% PosTONE’ and ‘Above Average PosTONE’ (see Table 16 in the appendix I). However due to the very high p-value ( $p = .974$ ) for all countries at once, the Mann-Whitney U-Test for abnormal positivity of PosTONE was further conducted in the opposite direction to analyse if the top 10% PosTONE perform better than the ‘Above Average PosTONE’ companies. The result for this test was significant (see Table 5).

### 4.3.5 Mann-Whitney U-test for NegTONE

The final test focused on NegTONE. For all countries at once and for each country individually, the test showed a non-significant difference in the MAR of ‘Above Average NegTONE’ and ‘Below Average NegTONE’ (see Table 17 in the appendix J).

After the presentation of the results, the implications are discussed in the next chapter.

Table 6: Explanation of the results

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<b>Results Spearman correlation:</b>
For all <i>non-significant results</i> : Based on the calculations, there is <i>no</i> correlation/relationship between the tonality variable and the stock market performance variable.
For the <i>significant results</i> : Based on the calculations, there is a correlation/relationship between the tonality variable and the stock market performance variable.
<ul style="list-style-type: none"><li>• <i>NetTONE</i> and <i>MAR</i> for all countries: is significant (<math>p &lt; .05</math>) and weak (<math>\rho = .110</math>), which means that these variables are positively correlated and when the value of one increases, the value of the other also increases.</li><li>• <i>PosTONE</i> and <i>MAR</i> for all countries: is highly significant (<math>p &lt; .001</math>) and weak (<math>\rho = .200</math>), which means that these variables are positively correlated and when the value of one increases, the value of the other also increases.</li><li>• <i>PosTONE</i> and <i>MAR</i> for Sweden: is highly significant (<math>p &lt; .001</math>) and moderate (<math>\rho = .352</math>), which means that these variables are positively correlated and when the value of one variable increases, the other also increases.</li></ul>
<b>Results Mann-Whitney U-test</b>
The Mann-Whitney U-test indicates whether there is a difference between two groups or not. If the test is <i>significant</i> , a difference between the two analysed groups can be assumed. If the test is <i>non-significant</i> , there is no difference between the two groups on the observed variable.
<ul style="list-style-type: none"><li>• The group <i>MAR Above Average PosTONE</i> is significantly different from the group <i>MAR Below Average PosTONE</i> for all countries. This shows that the companies with above average PosTONE in their CEO letters have a significantly higher MAR than companies with below average PosTONE in their CEO letters.</li><li>• The group <i>MAR Above Average PosTONE</i> is significantly different from the group <i>MAR Below Average PosTONE</i> for Sweden. This shows that the companies with above average PosTONE in their CEO letters have significantly higher MAR than companies with below average PosTONE in their CEO letters in Sweden.</li><li>• The group <i>MAR Top 10% PosTONE</i> is significantly different from the group <i>Above Average PosTONE</i> for all countries. This suggests that the companies with the most positive words in their CEO letters, the top 10%, have a significantly better MAR than companies with above average positive words in their CEO letters.</li></ul>

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## 5 Discussion

This study's purpose was to research the relationship of tonality in CEO letters with future stock market performance and to analyse if this relationship was affected by the context of the country in which they were listed. The research questions for the study were:

1. How is the tonality in a CEO letter connected with the company's stock market performance at the end of the following fiscal year?
2. How is the aforementioned relationship between tonality and stock market performance affected by the context of the country in which they are listed?

These research questions led to five hypotheses. The first hypothesis researched the correlation of the positive tone in the CEO letter and market-adjusted returns (MAR) with all countries simultaneously and separately, the second hypothesis researched the correlation of the negative tone in the CEO letter and MARs with all countries simultaneously and separately, and the third hypothesis researched the correlation of net tone in the CEO letter and MARs with all countries simultaneously and separately researched. The fourth hypothesis examined whether abnormal positivity in CEO letters has a different relationship with MAR than positivity in general with all countries simultaneously and separately when positivity is defined as net tone (NetTONE). The last and fifth hypothesis examined the same relationship but defined positivity as positive tone (PosTONE). A summary of the results and the conformation or rejection of the hypothesis is listed in Table 7.

Table 7: Summary of the confirmation and rejection of the hypothesis

Hypothesis	Confirmation/Rejection
<b>H1a:</b> The level of positive tone in CEO letters will positively correlate with market-adjusted returns in all countries <i>simultaneously</i> .	<b>confirmed</b>
<b>H1b:</b> The level of positive tone in CEO letters will positively correlate with market-adjusted returns in all countries <i>separately</i> .	<b>rejected</b>
<b>H2a:</b> The level of negative tone in CEO letters will negatively correlate with market-adjusted returns in all countries <i>simultaneously</i> .	<b>rejected</b>
<b>H2b:</b> The level of negative tone in CEO letters will negatively correlate with market-adjusted returns in all countries <i>separately</i> .	<b>rejected</b>
<b>H3a:</b> The level of net tone in CEO letters will positively correlate with market-adjusted returns in all countries <i>simultaneously</i> .	<b>confirmed</b>
<b>H3b:</b> The level of net tone in CEO letters will positively correlate with market-adjusted returns in all countries <i>separately</i> .	<b>rejected</b>
<b>H4a:</b> Companies above the 90th percentile in terms of net tone ratio will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries <i>simultaneously</i> .	<b>rejected</b>
<b>H4b:</b> Companies above the 90th percentile in terms of net tone ratio will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries <i>separately</i> .	<b>rejected</b>
<b>H5a:</b> Companies above the 90th percentile in terms of positive tone will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries <i>simultaneously</i> .	<b>rejected</b>
<b>H5b:</b> Companies above the 90th percentile in terms of positive tone will have lower market-adjusted returns than companies in the 50-80th percentile range in all countries <i>separately</i> .	<b>rejected</b>

## 5.1 Hypothesis 1: Positive tone and market-adjusted return

The result between positive tone and MAR was a significant, but weak positive correlation ( $\rho = 0.200$ ,  $p\text{-value} = <.001$ ). This result confirms hypothesis 1a, indicating that more positive words in a CEO letter relate to a higher MAR. The Mann-Whitney U-test showed a significant result ( $p\text{-value} = <.001$ ), when comparing above and below average positive tone of all countries. These results, too, indicate that there is a significant but weak relation between

positive word use in a CEO letter and the MAR. This is in line with the research of Davis, Piger and Sedor (2012), Huang, Teoh and Zhang (2014), and Yekini, Wisniewski and Millo (2016). However, it contradicts the claim of Abrahamson and Amir (1996) that positive words are irrelevant because companies ‘sugar coat’ their CEO letter by being opportunistically positive without basis. These results indicate that CEOs indeed base their positivity on an actually promising outlook for their company's future, rather than ‘sugar coating’ their company's performance and presenting it in an unfoundedly positive light.

When countries were examined separately, a significant result was found only for Sweden, with a moderate correlation ( $\rho = 0.352$ ,  $p\text{-value} = < .001$ ) and a significant difference of MAR of the Mann Whitney U-test for the above and below average on positive tone ( $p\text{-value} = 0.009$ ). Both tests imply that when a Swedish company's CEO letter contains a lot of positive words it is more likely to perform well on the stock market the year after. The US were very close to a significant result ( $p\text{-value} = 0.051$ ), with a weak positive correlation ( $\rho = 0.165$ ), and a close to significant result on the Mann-Whitney U ( $p\text{-value} = 0.058$ ). The interesting part here, however non-significant, is that Japan showed a tendency towards the opposite direction ( $\rho = -0.049$ ,  $p\text{-value} = 0.685$ ), as well as a non-significant Mann-Whitney U-test where this opposite trend also existed. This might imply that the strong results and tendency observed in Sweden are not as transferable to other countries. Further, this may hint at country-specific differences concerning positive tone and future MAR. The non-significant results of the US and Japan lead to a rejection of hypothesis 1b, meaning that there was no significant correlation between positive tone and MAR for the countries separately.

## 5.2 Hypothesis 2: Negative tone and market-adjusted return

The correlation between negative tone and MAR when all countries were included was non-significant. Simultaneously, the Mann-Whitney U-test comparing above and below average negative tone was also non-significant, leading to a rejection of hypothesis 2a. This indicates that there is a non-significant correlation between the usage of negative words and poorer MAR. This goes against the previous research of Abrahamson and Amir (1996) who found that the use of negativity in CEO letters corresponded to poorer long-term stock market performance.



When examining countries separately, no significant results were found on either test, leading to a rejection of hypothesis 2b. This suggests that there is a non-significant negative correlation between negative tone and MAR for all countries separately. Neither Japan nor Sweden showed any significant trends. Furthermore, the results showed trends contrary to expectation. The market-adjusted mean score of the group with above-average use of negativity was higher than that of the group with below-average use of negativity. This, even though non-significant, indicates that the Swedish and Japanese companies performed better when the CEO letters used more negative words. The American companies showed non-significant tendencies towards the, perhaps, more expected outcome of a lower use of negative words indicating a better future for the company and the stock market performance.

The reason for these results contradicting the previous research of Abrahamson and Amir (1996) could be many. One reason could be that their research is 25 years old and that the usage of negative words in CEO letters has changed. Moreover, CEOs might nowadays prefer a more open dialogue with their investors, being more honest about potential setbacks and challenges. Regardless, it is interesting to see that the American companies were much closer to confirming Abrahamson and Amir's (1996) hypothesis than the other countries, potentially since they solely focused on American companies in their study. This might indicate that if they had looked into Swedish or Japanese companies CEO letters in the 90's they would have gotten a different result.

### 5.3 Hypothesis 3: Net tone and market-adjusted return

In accordance with Hypothesis 3a this study found significant and positive, but weak correlation ( $\rho = 0.110$ ,  $p\text{-value} = 0.031$ ) between the net tone of all countries combined and MAR. Suggesting that the higher the net tone of the CEO letter, the higher the MAR of the company in the following fiscal year. This result is in line with previous research of Davis, Piger and Sedor (2012), Huang, Teoh and Zhang (2014), and Yekini, Wisniewski and Millo, (2016), although, in comparison to this study, they researched short-term effects. Yet, when looking closer at the correlation of countries separately, there were no significant results leading to a rejection of hypothesis 3b, meaning that a significant correlation was not found between net tone and MAR for all countries separately.

The Mann-Whitney U-test showed no significant results when dividing into above and below average net tone, neither when comparing all three countries simultaneously nor when comparing the countries separately. There may be several reasons for these results being weaker than expected. One possible interpretation of the results is that net tone as a variable has a weaker relationship to MAR due to the complexity of usage of negative words, disturbing the effect of net tone and making it less reliable as an indicator. This may suggest that positivity is potentially a more reliable indicator for MARs than negativity, leading to the correlational effect of positivity being reduced by including negativity in the measurement. This interpretation is confirmed by hypotheses 1 and 2, showing a stronger relation between positive tone and MAR.

## 5.4 Hypothesis 4 and 5: Abnormal positivity and market-adjusted return

Hypothesis 4 proposed that companies above the 90th percentile in terms of net-tone ratio will have lower MARs than companies in the 50-80th percentile range in all countries simultaneously. Contradicting earlier research (Huang, Teoh & Zhang, 2014), hypothesis 4 was not confirmed. Subsequently, this means that the top 10% regarding net tone for all countries compared with the above average net tone of all companies was non-significantly different. Neither the calculations for hypothesis 4a, with all countries simultaneously, nor hypothesis 4b treating them separately, obtained a significant result. This indicates that companies with an abnormal positive net tone do not perform significantly worse than the above average net tone group. After that, the same test was conducted but with positive tone instead of net positivity. This yielded a significant result (p-value = 0.026) opposite of what was expected. For that reason, the top 10% of positive tone had a significantly higher MAR than the companies with above average use of positive tone for all countries simultaneously. This rejects hypothesis 5a claiming that the top 10% of positive tone would have lower MARs than the above average use of positive tone. Hypothesis 5b, claiming the same relation for individual countries produced no significant results. They were, however, close to significance concerning an opposite relation for Sweden (p-value = 0,09), and the US (p-value = 0,061). Leading to a rejection of hypothesis 5b, meaning that the country's top 10% of positive tone did not perform worse than the companies having an above average use of positive tone. This result indicates that the usage of positive words in a CEO letter is perhaps not as complex as previously shown. Indicating that

the more positive words used the more likely the company is to have a better stock market performance in the upcoming year.

In sum, after analysing and discussing the results of this study, the first research question regarding the relationship between the tone of the CEO letter and the company's stock market performance can be answered as follows. The positivity of a CEO letter, measured by the frequency of positive words and net positivity, measured by the ratio of positive and negative words, is a weak but significant indicator of higher MAR compared to less positive CEO letters. This is consistent with research by Davis, Piger and Sedor (2012), Huang, Teoh and Zhang (2014), and Yekini, Wisniewski and Millo, (2016), who have previously demonstrated a connection between tonality in CEO letters and stock market performance. Regarding the second research question about country-specific impacts on this effect, this study implies that the relationship between tone and stock market performance varies across countries.

## 6 Conclusion

The results of this study show that there is a significant, however weak, correlation between tonality in the CEO letters and future stock market performance. In particular, a positive tone is significantly related to future stock market performance. Further the results demonstrated, in contrast to previous research, that an abnormal positive tone is not related to negative stock market performance, but rather the opposite. This suggests that positive tone is a less complex variable than expected and that the more positive a CEO letter is, the better the future stock market performance will be, making the fear of 'sugar coating' in CEO letters questionable. This conclusion is of relevance since it shows that non-financial information reported in the CEO letter and the tone used in the letter is a useful indicator and relevant for investors and other stakeholders when deciding whether to invest in a company or not. Negative tone on the other hand proved to be more complex than expected with no significant results and showing unexpected tendencies of more negative tone being related to better stock market performance. The study further found different relationships of tone and stock market performance across countries, with Japan standing out as the most dissimilar to Sweden and the US. These results are very interesting since most similar studies that reported significant results between the tone and stock market performance earlier mostly focused on the US. The results of this study might indicate that CEOs in other countries of the world act differently when communicating with their shareholders through the CEO letter. To tie this to the opening questions regarding the two quotes from CEO letters, where *company two* performed a return of +139,95% and *company one* a return of -47.44%. This study's results shows that you would have been more likely to correctly answer that question by using this study's instrument of measuring tone with the outperforming *company two* having a much higher net tone and a higher positive tone than the underperforming *company one*.

## 6.1 Contributions

In a nutshell, this study has filled the research gap by comparing three different countries and analysing a longer-term connection of tone of the CEO letter and stock market performance. In doing so, this study extended the research by using a well-established method for measuring tone, Henry's (2008) word list, and demonstrated that the frequency measure of positive words seems to be the best way to indicate future stock market performance. Also, that the net tone is a possible measuring tool, but not as conclusive as positive tone. Further, this study showed that negative tone alone has a more complex effect than previously expected (Abrahamson & Amir, 1996), meaning that more negative words are not necessarily related to a worse stock market performance. This study also contradicted previous research which observed a 'sugar-coating' (Huang, Teoh & Zhang, 2014; Rutherford, 2005) effect which meant that abnormal use of positive words led to poorer performance. This study showed a more straightforward relationship, meaning that more positive words are connected with better performance and thereby disproved a sugar-coating effect. Last but not least, this study was the first to analyse more than two countries, Japan, Sweden, and US, to measure tone in CEO letters and to show that country-specific differences exist, and by that opening up new potential research possibilities.

## 6.2 Limitations

As previously addressed, this study's method was, in part, inspired by Abrahamson and Amir (1996) due to their study being considered as very valid and its focus on a similar subject. This study also used a renowned and validated way of measuring tone with Henry's (2008) thesaurus. Due to employing these already validated and well-established methods, this study's results and conclusions should be to reliable and valid. Nonetheless, there are of course limitations to this study.

One limitation of the study is the cross-sectional design and its ensuing focus on one specific year. Therefore, the results might show possible trends in tonality and stock market performance particular for that specific year and might not be representative of the relationship in general. For instance, 2018 was a somewhat unfortunate year for the Japanese economy in general compared to Sweden and the US. It is possible that perhaps the results would have

looked different for Japan if the year yielded different economic results. Another limitation might be the limited number of companies that were analysed for the study. By analysing all companies of the used indexes, the results would have been more reliable and generalisable.

Furthermore, the selection of Japan, Sweden and the US is another limitation. As explained earlier, these countries were selected because of their economic importance and size, and because they are located on three different continents. However, it is possible that this limited selection of countries also influenced the results, and that the selection of other countries would have led to different results. For example, it is possible that a sample of Anglo-Saxon countries, which are more influenced by the US, would have produced more similar results between countries.

### 6.3 Further note on individual countries

In this section, we will shortly provide a summary of the differences and characteristics seen in the different countries.

The US had the highest net tone of all countries. The contribution to the highest net tone was not primarily from being very positive, since Sweden had the highest positive tone of all countries, but rather that they had much lower use of negative words in their CEO letters on average than Sweden and Japan. Based on this, one could interpret that there might be some aversion towards the usage of negative words in the CEO letters for the American companies. The reasons for this could indeed be many. We could see that American companies with an above-average use of negative words performed worse than the below-average ones, however insignificantly, indicating that American companies have a tendency of only using negative wordings when expecting bad results. This could be one explanation of the overall low usage of negative words for American companies.

The Swedish companies had as mentioned the highest positive usage of all countries, but also the strongest results of the relation between positive tone and MAR. This indicates that the Swedish companies do not mind sounding very optimistic in their CEO letters, but that they most often also base this positive tone in some sort of truth or belief on future performance rather than being optimistic for the sake of being optimistic. What becomes interesting here is that for Sweden, the companies who had an above-average use of negative words performed

better than the companies with a below-average use, however with an insignificant difference between the two. This would indicate that for Sweden, companies who are likely to outperform the index, are neither afraid of using either positive or negative words in their CEO letter. One might interpret this as companies who are well-positioned for the future are, to a larger extent, willing to be more honest about both their upcoming challenges and opportunities, while companies worse positioned for the future might want to cover up both challenges and opportunities and be more neutral towards the future.

As mentioned previously, the Japanese companies were, by far, the most dissimilar ones. Being the country with the lowest use of positive words, the highest use of negative words, and at the same time showing no relationship between tone and MAR, it is clear to say that they differ from Sweden and the US. In comparison with Abrahamson and Amir (1996) claiming that American companies having a tendency of sugar-coating, one could claim by these results that Japanese companies are rather doing the opposite. With a non-significant difference, the Japanese companies with above-average net tone even performed worse than the below-average ones, not by much, and as said with a non-significant difference, but in comparison with the American and Swedish companies, this is truly different and indeed interesting.

## 6.4 Future research

Future research should continue to study the differences of the tone in the CEO letter and future stock market performance across countries. The use of a longitudinal research design with all companies of an index would strengthen the validity and generalisability. Furthermore, it may prove fruitful to examine the reasons for the differences of phrasing and communication between countries further. For this purpose, future studies could examine personal characteristics of the CEOs in more detail, e.g., in terms of age, gender and tenure, as well as company specifics, e.g., in which industry/sector they work and the age of the companies. Furthermore, it could be very interesting to investigate if cultural differences are affecting those country differences. Moreover, the abnormal positive tone and negative tone in CEO letters could also be further explored to get a better understanding of the complexity of the two and how they work in relation to future stock market performance.

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# Appendix A

Table 8: Word lists and dictionaries used to analyse CEO letter

Henry's (2008) word list	Aerts and Yan (2017), Davis and Tama-Sweet (2012), Henry (2008), Rogers, Van Buskirk and Zechman (2011), Yekini, Wisniewski and Millo (2016)
Loughran and McDonald's (2011) word list	Aerts and Yan (2017), Bonsón, Perea and Azevedo (2021), Davis and Tama-Sweet (2012), Huang, Teoh and Zhang (2014), Marquez-Illescas, Zebedee and Zhou (2019), Rogers, Van Buskirk and Zechman (2011), Sataloff, Johns and Kost (2020), Yan <i>et al.</i> (2019)
DICTION's word list	Buskirk and Zechman (2011), Davis and Tama-Sweet (2012), Davis, Piger and Sedor (2012), Demers and Vega (2008)
Bayesian machine learning algorithm	Li (2010)
LIWC's word list	Aerts and Yan (2017)

# Appendix B

Table 9: Countries of observation

<b>Countries of Observation</b>	<b>Authors</b>
United States of America	Abrahamson and Amir (1996), Davis and Tama-Sweet (2012), Davis, Piger and Sedor (2012), Demers and Vega (2008), Henry (2008), Hildebrandt and Snyder (1981), Huang, Teoh and Zhang (2014), Lang and Lundholm (2000), Loughran and McDonald (2011), Marquez-Illescas, Zebedee and Zhou, (2019), Rogers, Van Buskirk and Zechman (2011)
United Kingdom	Rutherford (2005) Yekini, Wisniewski and Millo (2016)
United States of America & United Kingdom	Aerts and Yan (2017)
Spain	Bonsón, Perea and Azevedo (2021)
China	Yan <i>et al.</i> (2019)
Hong Kong & international companies registered Companies at three Chamber of Commerce	Hyland (1998)

# Appendix C

Table 10: Variable definition

<b>Variable</b>	<b>Definition</b>
PosTONE	It is the frequency of positive words in a CEO letter. PosTONE is the quotient of the sum of all positive words from Henry's word list divided by the total number of words of the respective CEO letter.
NegTONE	It is the frequency of negative words in a CEO letter. NegTONE is the quotient of the sum of all negative words from Henry's word list divided by the total number of words of the respective CEO letter.
NetTONE	Is the ratio of positive to negative words in a CEO letter. NetTONE is the quotient of the difference of PosTONE and NegTONE and the sum of PosTONE and NegTONE. NetTONE can have a value between -1 and +1. The value -1 indicates that the CEO letter is purely negative, the value 0 represents a neutral CEO letter, and the value +1 indicates that the CEO letter is purely positive.
MAR	The market-adjusted return compares the stock return of a given company with its market index. The value indicates how well/badly the company has performed compared to the index. It is calculated by taking the company's share return over a given period, here 12 months, and subtracting it with the market index return over the same period.

# Appendix D

Table 11: Sample of companies

Japan / Nikkei 225	Sweden / OMXSPI	US / S&P 500
1. AEON	1. AAK	1. Abiomed
2. Ajinomoto	2. ActiveBiotech	2. AdvancedAutoParts
3. AsahiKasei	3. Addlife	3. AlexandriaRealEstate
4. Ashai	4. AlimakHekGroup	4. Amcor
5. AstellasPharma	5. ArcticPaper	5. AMD
6. BandaiNamco	6. ASSAABLOY	6. Amgen
7. Canon	7. AtlasCopco	7. AtmosEnergy
8. Casio	8. Attendo	8. BerkshireHathawayInc
9. ChibaBank	9. Autoliv	9. Biogen
10. COMSYS	10. Bactiguard	10. BookingHoldings
11. CyberAgent	11. BalcoGroup	11. BostonProperties
12. Dai-ichiLifeHoldings	12. BeijerAlma	12. Campell
13. DaiichiSankyo	13. BeijerRef	13. CapitalOne
14. DaikinIndustries	14. BetterCollective	14. CBRE
15. DaiNippon	15. BHGGroup	15. CDW
16. EastJapanRailway	16. BioArctic	16. CentralPointEnergy
17. ENEOSJXTG	17. BioGaia	17. CenturyLink(LUmen)
18. FastRetailingCompany	18. BjornBorg	18. Chevron
19. GsYuasa	19. Boliden	19. CHRobinson
20. HitachiZosenGroup	20. Bong	20. Chubb
21. Idemitsu	21. Boozt	21. CitiGroup
22. IHI	22. Bravida	22. Citizens
23. INPEXCORP	23. Bulten	23. CMSEnergy
24. IsetanMitsukoshiHolding	24. ByggmaxGroup	24. CocaCola
25. IsuzuMotors	25. C-rad	25. ConsolidatedEdison
26. ITOCHU	26. Catella	26. Corning
27. JapaneseTabaco	27. Catena	27. Costco
28. JTEKT	28. CloettaB	28. CVS
29. KDDI	29. Collector	29. Danaher
30. Kikkoman	30. COOR	30. DaVita
31. KirinHoldings	31. Eastnine	31. Dexcom
32. KobeSteel	32. ElectroluxB	32. Dish
33. Kubota	33. Elekta	33. DukeRealtyCorporation
34. Kuraray	34. Elos	34. EATON
35. Kyowa	35. Epiroc	35. ESSEX
36. MatsuiSecurities	36. Ericsson	36. EversourceEnergy
37. Mazda	37. Etrion	37. ExtraSpaceStorage
38. Meiji	38. Fagerhult	38. F5

39. MitsubishiCorporation	39. G5Entertainment	39. FastenalCompany
40. MitsubishiElectric	40. GetingeB	40. FidelityNationalInfoServices
41. MitsubishiHeavyInd	41. Granges	41. FirstRepublicBank
42. MitsubishiMotors	42. Handelsbanken	42. FranklinTempleton
43. MitsuiAndCo	43. Hexagon	43. GeneralElectric
44. MitsuiFudosan	44. HM	44. GoldmanSachs
45. MitsuiMiningSmelting	45. Holmen	45. Hasbro
46. NEC	46. Humana	46. HCP
47. NHFoods	47. I.A.RSystemsB	47. HuntingtonBancshares
48. NipponLightMetalgs	48. IcaGruppen	48. HuntingtonIngallsIndustries
49. NissanMotor	49. Immunicum	49. IHSMarkit
50. NisshinSeifun	50. InvisioCommunication	50. Intel
51. Nitto	51. Irras	51. InterpublicGroup
52. NSK	52. ITABShopConcept	52. JackHenry
53. NSSMC	53. KindredGroup	53. JBHunt
54. NTT	54. KnowIT	54. JohnsonAndJohnson
55. NYK	55. LeoVegas	55. KeyCorp
56. Obayashi	56. Lifco	56. KLATencor
57. OdakyuElectricRailway	57. LimeTech	57. LAMResearchCorp
58. OKI	58. Loomis	58. LasVegasSands
59. Okuma	59. Medivir	59. LockheedMartin
60. Olympus	60. Mekonomen	60. MarketAxess
61. Omron	61. MicroSystemations	61. MarshAndMcLennan
62. Rakuten	62. Mips	62. MartinMarietta
63. Ricoh	63. MobergPharma	63. Microsoft
64. Sapporo	64. NCAB	64. MidAmericaApartment
65. Screen	65. Nibe	65. MohawkIndustries
66. SECOM	66. Nobia	66. NewsCorp
67. Sharp	67. NordicWaterproofing	67. Nike
68. ShinEpsu	68. NOTE	68. NorthropGruman
69. ShinseiBankGroup	69. Pandox	69. Nucor
70. ShowaDenkoKK	70. PROACT	70. ParkerHannifin
71. SoftbankGroup	71. Probi	71. Paychex
72. Sojitz	72. Projektengagemang	72. PepsiCo
73. Subaru	73. RaysearchLabs	73. PNC
74. SUMCO	74. RNB	74. ProcterAndGambel
75. SumitomoChemical	75. Saab	75. PVH
76. SumitomoHeavyInd	76. Sagax	76. RealtyIncomeCorp
77. SumitomoMetalMining	77. Sandvik	77. RobertHalf
78. SumitomoRealty	78. SAS	78. Rollins
79. SuzukiMotors	79. SCA	79. Roper
80. TaiseiGroup	80. ScandicHotelsGroup	80. RossStores
81. TDK	81. SEB	81. SouthernCompany



82. TEPCO	82. SkanskaB	82. Stryker
83. TokaiCarbon	83. SKF	83. Sysco
84. TokioMarineHoldings	84. Sobi	84. Target
85. Tokuyama	85. StoraEnso	85. Textron
86. TokyoElectron	86. Studsvik	86. TJX
87. TokyoGasCo	87. SWECO	87. TractorSupply
88. TokyuCorp	88. SwedishMatch	88. TraneTechnology
89. Toppan	89. Tele2	89. TransDigm
90. Tosoh	90. TeliaCompany	90. UnderArmour
91. Toto	91. Thule	91. UnionPacificCorporation
92. Toyoba	92. VBG	92. UniversalHealthServices
93. ToyotaTsusho	93. VeoneerSDR	93. USBancorp
94. UBE	94. VikingSupplyShips	94. Verisign
95. YamahaGroup	95. Vitec	95. Vornado
96. YamotoHoldings	96. VolvoA	96. WesternDigital
97. Yaskawa	97. XANOIndustri	97. WestRock
98. Yokogawa	98. Xbrane	98. Weyerhaeuser
99. Yokohama	99. XSprayPharma	99. Zebra
100. ZHoldings	100. XVIVOPerfusion	100. Zoetis

# Appendix E

Table 12: Data

<b>Companies</b>	<b>PosTONE</b>	<b>NegTONE</b>	<b>NetTONE</b>	<b>Yearly return</b>	<b>MAR</b>
JP_AEON_2018.docx	3,88	0,27	0,87	23,09	24,25
JP_Ajinomoto_2018.docx	2,29	0,29	0,78	-5,63	-4,47
JP_AsahiKasei_2018.docx	3,56	0,59	0,72	-16,03	-14,87
JP_Ashai_2018.docx	2,74	0,90	0,51	-12,8	-11,64
JP_AstellasPharma_2018.docx	3,13	0,52	0,72	6,63	7,79
JP_BandaiNamco_2018.docx	3,43	0,79	0,63	53,89	55,05
JP_Canon_2018.docx	4,54	1,30	0,55	-12,87	-11,71
JP_Casio_2018.docx	2,43	0,28	0,79	-4,85	-3,69
JP_ChibaBank_2018.docx	2,88	0,49	0,71	-24	-22,84
JP_COMSYS_2018.docx	4,02	0,55	0,76	10,71	11,87
JP_CyberAgent_2018.docx	6,99	0,00	1,00	-12,62	-11,46
JP_Dai-ichiLifeHoldings_2018.docx	4,17	0,29	0,87	-17,62	-16,46
JP_DaiichiSankyo_2018.docx	1,90	0,54	0,56	45,5	46,66
JP_DaikinIndustries_2018.docx	4,94	0,27	0,90	11,93	13,09
JP_DaiNippon_2018.docx	3,35	0,39	0,79	24,64	25,8
JP_EastJapanRailway_2018.docx	3,12	0,83	0,58	11,32	12,48
JP_ENEOSJXTG_2018.docx	3,83	1,60	0,41	-17,29	-16,13
JP_FastRetailingCompany_2018 .docx	3,20	0,00	1,00	20,9	22,06
JP_GsYuasa_2018.docx	2,96	0,44	0,74	-22,73	-21,57
JP_HitachiZosenGroup_2018.docx	1,94	0,77	0,43	-35,17	-34,01
JP_Idemitsu_2018.docx	3,26	0,44	0,76	-4,63	-3,47
JP_IHI_2018.docx	2,94	1,06	0,47	-17,05	-15,89
JP_INPEXCORP_2018.docx	2,55	0,88	0,49	-18,03	-16,87

JP_IsetanMitsukoshiHolding_2018.docx	2,23	0,39	0,70	-3,99	-2,83
JP_IsuzuMotors_2018.docx	6,01	1,46	0,61	-7,9	-6,74
JP_ITOCHU_2018.docx	2,09	0,72	0,49	1,63	2,79
JP_JapaneseTabaco_2018.docx	3,76	0,54	0,75	-5,37	-4,21
JP_JTEKT_2018.docx	2,83	0,79	0,56	-10,21	-9,05
JP_KDDI_2018.docx	3,11	0,31	0,82	-7,62	-6,46
JP_Kikkoman_2018.docx	5,42	0,45	0,85	29,03	30,19
JP_KirinHoldings_2018.docx	4,23	0,49	0,79	-7,31	-6,15
JP_KobeSteel_2018.docx	2,25	0,20	0,84	-20,8	-19,64
JP_Kubota_2018.docx	2,30	0,66	0,55	-11,03	-9,87
JP_Kuraray_2018.docx	3,16	0,21	0,88	-18,55	-17,39
JP_Kyowa_2018.docx	2,17	0,56	0,59	7,42	8,58
JP_MatsuiSecurities_2018.docx	2,15	0,39	0,69	14,22	15,38
JP_Mazda_2018.docx	3,27	0,64	0,67	-9,39	-8,23
JP_Meiji_2018.docx	3,52	0,43	0,78	11,88	13,04
JP_MitsubishiCorporation_2018.docx	3,46	0,53	0,73	12,88	14,04
JP_MitsubishiElectric_2018.docx	4,47	0,94	0,65	-20,18	-19,02
JP_MITSUBISHIHEAVYINDUSTRIES_2018.docx	2,74	0,62	0,63	17,11	18,27
JP_MITSUBISHIMOTORSCORP_2018.docx	4,13	0,28	0,87	-20,93	-19,77
JP_MitsuiAndCo_2018.docx	3,66	0,32	0,84	-0,19	0,97
JP_MitsuiFudosan_2018.docx	3,60	0,51	0,75	11,67	12,83
JP_MitsuiMiningSmelting_2018.docx	3,38	0,62	0,69	-39,26	-38,1
JP_NEC_2018.docx	2,41	0,40	0,72	28	29,16
JP_NHFoods_2018.docx	4,09	1,17	0,56	-7,07	-5,91
JP_NipponLightMetalHoldings_2018.docx	4,31	1,37	0,52	-11,26	-10,1
JP_NissanMotor_2018.docx	4,03	0,43	0,81	-12,53	-11,37
JP_NisshinSeifun_2018.docx	3,86	0,30	0,86	21,89	23,05
JP_Nitto_2018.docx	2,43	0,47	0,68	-24,43	-23,27

JP_NSK_2018.docx	2,59	0,35	0,76	-24	-22,84
JP_NSSMC_2018.docx	3,50	0,55	0,73	-12,61	-11,45
JP_NTT_2018.docx	1,49	0,37	0,60	-1,49	-0,33
JP_NYK_2018.docx	1,95	0,65	0,50	-23,16	-22
JP_OBAYASHI_2018.docx	3,05	0,35	0,79	-0,52	0,64
JP_OdakyuElectricRailway_2018.docx	3,36	0,00	1,00	28,03	29,19
JP_OKI_2018.docx	2,67	0,55	0,66	-3,5	-2,34
JP_OKUMA_2018.docx	3,02	0,58	0,68	-1,05	0,11
JP_Olympus_2018.docx	2,54	0,00	1,00	19,01	20,17
JP_Omron_2018.docx	4,45	0,39	0,84	-14,96	-13,8
JP_Rakuten_2018.docx	3,37	0,49	0,75	17	18,16
JP_Ricoh_2018.docx	2,63	0,88	0,50	12,48	13,64
JP_Sapporo_2018.docx	2,18	0,21	0,82	-19,8	-18,64
JP_Screen_2018.docx	3,87	0,44	0,80	-53,82	-52,66
JP_SECOM_2018.docx	2,24	0,45	0,67	22,83	23,99
JP_Sharp_2018.docx	3,75	0,25	0,88	-61,84	-60,68
JP_ShinEpsu_2018.docx	4,49	0,12	0,95	-13,66	-12,5
JP_ShinseiBankGroup_2018.docx	2,22	0,52	0,62	-4,03	-2,87
JP_ShowaDenkoKK_2018.docx	3,69	0,57	0,73	-11,77	-10,61
JP_SoftbankGroup_2018.docx	2,29	0,40	0,70	37,21	38,37
JP_Sojitz_2018.docx	3,40	0,65	0,68	19,7	20,86
JP_Subaru_2018.docx	2,75	0,43	0,73	-24,22	-23,06
JP_SUMCO_2018.docx	5,26	0,47	0,84	-53,58	-52,42
JP_SUMITOMO_CHEMICAL_2018.docx	4,16	0,32	0,86	-12,82	-11,66
JP_SumitomoHeavyIndustries_2018.docx	5,08	0,52	0,81	-8,6	-7,44
JP_SumitomoMetalMining_2018.docx	2,68	0,42	0,73	-24,96	-23,8
JP_SumitomoRealtyDevelopment_2018.docx	5,28	0,70	0,77	19,3	20,46
JP_SuzukiMotors_2018.docx	3,06	0,45	0,74	-13,75	-12,59

JP_TaiseiGroup_2018.docx	3,32	0,90	0,57	-0,94	0,22
JP_TDK_2018.docx	2,89	0,32	0,80	-9,34	-8,18
JP_TEPCO_2018.docx	2,13	0,35	0,72	72,68	73,84
JP_TokaiCarbon_2018.docx	4,55	0,84	0,69	-16,5	-15,34
JP_TokioMarineHoldings_2018.docx	3,75	0,54	0,75	15,96	17,12
JP_Tokuyama_2018.docx	2,74	0,17	0,88	-24,4	-23,24
JP_TokyoElectron_2018.docx	4,82	0,20	0,92	-16,89	-15,73
JP_TokyoGasCo_2018.docx	2,87	0,39	0,76	9,58	10,74
JP_TokyuCorp_2018.docx	2,61	0,56	0,65	-11,32	-10,16
JP_Toppan_2018.docx	2,88	0,93	0,51	-1,5	-0,34
JP_Tosoh_2018.docx	3,72	0,56	0,74	-14,7	-13,54
JP_Toto_2018.docx	2,18	0,44	0,66	-15	-13,84
JP_TOYOBA_2018.docx	6,20	1,00	0,72	-29,98	-28,82
JP_TOYOTA_Tsusho_2018.docx	2,68	0,25	0,83	3,92	5,08
JP_UBE_2018.docx	3,69	1,03	0,56	-24,27	-23,11
JP_YamahaGroup_2018.docx	2,81	0,60	0,65	20,34	21,5
JP_YamatoHoldings_2018.docx	4,22	0,50	0,79	7,16	8,32
JP_Yaskawa_2018.docx	2,23	0,16	0,87	-27,35	-26,19
JP_Yokogawa_2018.docx	2,91	0,31	0,81	5,44	6,6
JP_Yokohama_2018.docx	3,53	0,86	0,61	-14,75	-13,59
JP_ZHoldings_2018.docx	2,34	0,44	0,68	-46,15	-44,99
SE_AAK_2018.docx	5,15	0,26	0,90	46,3	13,66
SE_ActiveBiotech_2018.docx	2,17	0,23	0,81	-25,12	-54,76
SE_Addlife_2018.docx	3,80	0,21	0,90	48,16	18,52
SE_AlimakHekGroup_2018.docx	2,77	0,43	0,73	27,78	-1,86
SE_ArcticPaper_2018.docx	8,11	1,62	0,67	15,05	-14,59
SE_ASSAABLOY_2018.docx	4,75	0,29	0,88	42,63	12,99
SE_AtlasCopco_2018.docx	5,38	0,52	0,82	70,96	41,32

SE_Attendo_2018.docx	5,36	0,36	0,87	-31,42	-61,06
SE_Autoliv_2018.docx	4,49	0,39	0,84	29,3	-0,34
SE_Bactiguard_2018.docx	4,68	0,55	0,79	104,9	75,42
SE_BalcoGroup_2018.docx	4,45	0,42	0,83	86	56,36
SE_BeijerAlma_2018.docx	5,83	0,46	0,85	22,42	-7,22
SE_BeijerRef_2018.docx	4,21	0,19	0,91	85,87	56,23
SE_BetterCollective_2018.docx	5,37	0,00	1,00	26,35	-3,29
SE_BHGGroup_2018.docx	4,46	0,42	0,83	81,39	51,75
SE_BioArctic_2018.docx	2,54	0,00	1,00	10,17	-19,47
SE_BioGaia_2018.docx	3,84	0,82	0,65	39,26	9,62
SE_BjornBorg_2018.docx	4,26	0,61	0,75	37,76	8,12
SE_Boliden_2018.docx	4,81	1,06	0,64	39,8	10,16
SE_Bong_2018.docx	3,99	0,74	0,69	-22,95	-52,59
SE_Boozt_2018.docx	3,91	0,33	0,84	17,13	-12,51
SE_Bravida_2018.docx	5,22	0,49	0,83	50,5	20,86
SE_Bulten_2018.docx	4,82	0,36	0,86	-6	-35,64
SE_ByggmaxGroup_2018.docx	4,01	1,95	0,35	-17,37	-47,01
SE_C-rad_2018.docx	5,72	0,15	0,95	72,48	42,84
SE_Catella_2018.docx	4,59	1,09	0,62	24,57	-5,07
SE_Catena_2018.docx	4,04	0,00	1,00	91,44	61,8
SE_CloettaB_2018.docx	5,42	0,86	0,73	35,12	5,48
SE_Collector_2018.docx	4,83	0,50	0,81	2,02	-27,62
SE_COOR_2018.docx	4,28	0,11	0,95	26,87	-2,77
SE_Eastnine_2018.docx	5,19	0,38	0,86	51,68	22,04
SE_ElectroluxB_2018.docx	5,76	0,76	0,77	27,6	-2,04
SE_Elekta_2018.docx	5,60	0,11	0,96	17,54	-12,1
SE_Elos_2018.docx	6,49	0,00	1,00	54	24,36
SE_Epiroc_2018.docx	5,13	0,43	0,85	41	11,36

SE_Ericsson_2018.docx	3,95	0,31	0,85	7	-22,62
SE_Etrion_2018.docx	3,61	1,20	0,50	-4,56	-34,2
SE_Fagerhult_2018.docx	3,59	0,42	0,79	-20,74	-50,38
SE_G5Entertainment_2018.docx	5,86	0,00	1,00	-19,44	-49,08
SE_GetingeB_2018.docx	4,35	0,00	1,00	122,92	93,28
SE_Granges_2018.docx	6,05	0,13	0,96	27,73	-1,91
SE_Handelsbanken_2018.docx	3,24	0,67	0,66	4,71	-24,93
SE_Hexagon_2018.docx	1,89	0,24	0,77	29,01	-0,63
SE_HM_2018.docx	3,98	0,68	0,71	57,58	27,94
SE_Holmen_2018.docx	5,20	0,41	0,85	65,37	35,73
SE_Humana_2018.docx	4,43	0,41	0,83	0,16	-29,48
SE_I.A.RSystemsB_2018.docx	2,72	0,35	0,77	-19,24	-48,88
SE_IcaGruppen_2018.docx	4,52	0,60	0,77	41,1	11,46
SE_Immunicum_2018.docx	2,01	0,14	0,87	41,4	11,76
SE_InvisioCommunication_2018.docx	2,83	0,09	0,94	81,4	51,76
SE_Irras_2018.docx	2,44	0,00	1,00	-30,97	-60,61
SE_ITABShopConcept_2018.docx	2,12	1,51	0,17	12,13	-17,51
SE_KindredGroup_2018.docx	3,45	0,38	0,80	-22,79	-52,43
SE_KnowIT_2018.docx	4,17	0,00	1,00	40,98	11,34
SE_LeoVegas_2018.docx	3,69	0,63	0,71	-25,82	-55,46
SE_Lifco_2018.docx	4,52	0,09	0,96	73,15	43,51
SE_LimeTech_2018.docx	3,29	0,41	0,78	85,4	55,76
SE_Loomis_2018.docx	4,82	0,27	0,89	37,36	7,72
SE_Medivir_2018.docx	2,34	0,00	1,00	-48,23	-77,87
SE_Mekonomen_2018.docx	3,45	1,18	0,49	1,69	-27,95
SE_MicroSystemations_2018.docx	4,52	0,13	0,94	-31,01	-60,65
SE_Mips_2018.docx	4,74	0,26	0,90	82,63	52,99
SE_MobergPharma_2018.docx	2,88	0,44	0,73	45,17	15,53

SE_NCAB_2018.docx	4,77	0,31	0,88	88,8	59,16
SE_Nibe_2018.docx	5,91	0,51	0,84	78,63	48,99
SE_Nobia_2018.docx	4,21	0,98	0,62	51,29	21,65
SE_NordicWaterproofing_2018.docx	4,26	0,35	0,85	34,92	5,28
SE_NOTE_2018.docx	6,25	0,53	0,84	89,4	59,76
SE_Pandox_2018.docx	6,40	0,70	0,80	48,42	18,78
SE_PROACT_2018.docx	5,01	0,27	0,90	14,72	-14,92
SE_Probi_2018.docx	4,55	0,15	0,94	-38,33	-67,97
SE_Projektengagemang_2018.docx	3,37	0,65	0,68	-54,41	-84,05
SE_RaysearchLabs_2018.docx	4,58	0,18	0,92	11,09	-18,55
SE_RNB_2018.docx	3,74	0,79	0,65	-82,2	-111,68
SE_Saab_2018.docx	4,86	0,12	0,95	3,54	-26,1
SE_Sagax_2018.docx	2,62	1,64	0,23	108,82	79,18
SE_Sandvik_2018.docx	5,95	0,50	0,84	48,63	18,99
SE_SAS_2018.docx	3,65	0,68	0,69	-26,64	-56,12
SE_SCA_2018.docx	5,71	0,34	0,89	40,26	10,62
SE_ScandicHotelsGroup_2018.docx	4,90	0,55	0,80	38,28	8,64
SE_SEB_2018.docx	3,63	0,28	0,86	9,7	-19,94
SE_SkanskaB_2018.docx	4,88	1,15	0,62	54,45	24,81
SE_SKF_2018.docx	4,66	0,63	0,76	48,42	18,78
SE_Sobi_2018.docx	4,48	0,27	0,89	-19,95	-49,43
SE_StoraEnso_2018.docx	4,04	0,18	0,91	30,1	0,46
SE_Studsvik_2018.docx	3,41	0,93	0,57	-16,96	-46,6
SE_SWECO_2018.docx	6,59	0,40	0,89	92,12	62,48
SE_SwedishMatch_2018.docx	5,20	0,85	0,72	42,81	13,17
SE_Tele2_2018.docx	4,28	0,24	0,89	32,35	2,71
SE_TeliaCompany_2018.docx	2,20	0,73	0,50	1,06	-28,58
SE_Thule_2018.docx	4,99	0,90	0,69	40,5	10,86



SE_VBG_2018.docx	5,95	0,78	0,77	27,36	-2,28
SE_VeoneerSDR_2018.docx	3,29	0,64	0,67	-33,27	-62,91
SE_VikingSupplyShips_2018.docx	1,22	1,07	0,07	1,18	-28,46
SE_Vitec_2018.docx	4,60	0,14	0,94	139,95	110,31
SE_VolvoA_2018.docx	3,60	0,33	0,83	44,62	14,98
SE_XANOIndustri_2018.docx	5,24	0,58	0,80	49,35	19,71
SE_Xbrane_2018.docx	1,72	0,09	0,90	-24,62	-54,26
SE_XSprayPharma_2018.docx	2,82	0,31	0,80	18,18	-11,46
SE_XVIVOPerfusion_2018.docx	4,97	0,00	1,00	28,79	-0,85
US_Abiomed_2018.docx	4,45	1,13	0,59	-47,44	-76,34
US_AdvancedAutoParts_2018.docx	5,06	0,09	0,97	1,66	-27,24
US_AlexandriaRealEstate_2018.docx	3,96	0,07	0,97	48,73	18,83
US_Amcor_2018.docx	4,79	0,39	0,85	15,32	-13,58
US_AMD_2018.docx	5,95	0,19	0,94	157,26	128,36
US_Amgen_2018.docx	3,81	0,74	0,67	28,51	-0,39
US_AtmosEnergy_2018.docx	2,67	0,21	0,85	26,8	-2,1
US_BerkshireHathawayInc_2018.docx	2,04	0,45	0,64	11,84	-17,06
US_Biogen_2018.docx	3,57	0,25	0,87	-2,6	-31,5
US_BookingHoldings_2018.docx	4,63	0,15	0,94	19,43	-9,47
US_BostonProperties_2018.docx	3,68	0,27	0,86	28,72	-0,18
US_Campell_2018.docx	3,89	0,80	0,66	56,92	28,02
US_CapitalOne_2018.docx	3,00	0,36	0,79	35,26	6,36
US_CBRE_2018.docx	5,19	0,18	0,93	53,38	24,48
US_CDW_2018.docx	5,56	0,18	0,94	81,98	53,08
US_CentralPointEnergy_2018.docx	3,28	0,11	0,94	1,46	-27,44
US_CenturyLink(LUmen)_2018.docx	3,70	0,00	1,00	-7,96	-36,86
US_Chevron_2018.docx	4,57	0,57	0,78	13,14	-15,76
US_CHRobinson_2018.docx	4,82	0,46	0,83	-5,4	-34,3

US_Chubb_2018.docx	3,41	0,90	0,58	24,32	-4,58
US_CitiGroup_2018.docx	3,28	0,65	0,67	57,21	28,31
US_Citizens_2018.docx	4,94	0,64	0,77	41,23	12,33
US_CMSEnergy_2018.docx	4,52	0,00	1,00	33,23	4,33
US_CocaCola_2018.docx	5,60	0,56	0,82	21,33	-7,57
US_ConsolidatedEdison_2018.docx	3,03	0,89	0,55	24,31	-4,59
US_Corning_2018.docx	5,50	0,18	0,94	0,06	-28,84
US_Costco_2018.docx	4,09	0,33	0,85	44,83	15,93
US_CVS_2018.docx	3,69	0,40	0,80	16,36	-12,54
US_Danaher_2018.docx	4,88	0,09	0,96	53,46	24,56
US_DaVita_2018.docx	2,30	0,59	0,59	45	16,1
US_Dexcom_2018.docx	5,64	0,18	0,94	82,57	53,67
US_Dish_2018.docx	2,25	0,17	0,86	42,08	13,9
US_DukeRealtyCorporation_2018.docx	4,87	0,47	0,82	40,81	11,91
US_EATON_2018.docx	4,95	0,17	0,93	42,5	13,6
US_ESSEX_2018.docx	5,13	0,40	0,86	30,41	1,51
US_EversourceEnergy_2018.docx	2,66	0,32	0,79	37,3	8,4
US_ExtraSpaceStorage_2018.docx	3,62	0,45	0,78	23,35	-5,55
US_F5_2018.docx	3,72	0,24	0,88	-13,84	-42,74
US_FastenalCompany_2018.docx	4,39	0,64	0,75	47,1	18,2
US_FidelityNationalInformationServices_2018.docx	3,38	0,42	0,78	38,52	9,62
US_FirstRepublicBank_2018.docx	5,91	0,58	0,82	35,2	6,3
US_FranklinTempleton_2018.docx	4,10	0,60	0,74	-9,48	-38,38
US_GeneralElectric_2018.docx	4,08	0,59	0,75	39,3	10,4
US_GoldmanSachs_2018.docx	4,27	0,67	0,73	36,07	7,17
US_Hasbro_2018.docx	2,97	0,39	0,77	35,45	6,55
US_HCP_2018.docx	3,24	0,26	0,85	33,2	4,3
US_HuntingtonBancshares_2018.docx	4,10	0,91	0,64	28,72	-0,18

US_HuntingtonIngallsIndustries_2018.docx	3,01	0,00	1,00	32,14	3,24
US_IHSMarkit_2018.docx	5,82	0,32	0,90	56,91	28,01
US_Intel_2018.docx	4,63	0,34	0,86	29,7	0,8
US_InterpublicGroup_2018.docx	3,46	0,14	0,92	18,65	-10,25
US_JackHenry_2018.docx	3,63	0,19	0,90	18,56	-10,34
US_JBHunt_2018.docx	2,71	0,21	0,86	26,14	-2,76
US_JohnsonAndJohnson_2018.docx	3,51	0,28	0,85	17,13	-11,77
US_KeyCorp_2018.docx	5,10	0,53	0,81	39,46	10,56
US_KLATencor_2018.docx	5,57	0,35	0,88	99,55	70,65
US_LAMResearchCorp_2018.docx	3,48	0,63	0,69	114,7	85,8
US_LasVegasSands_2018.docx	6,77	0,00	1,00	33,1	4,2
US_LockheedMartin_2018.docx	3,02	0,67	0,64	50,51	21,61
US_MarketAxess_2018.docx	6,61	0,18	0,95	82,1	53,2
US_MarshAndMcLennan_2018.docx	4,87	1,00	0,66	43,11	14,21
US_MartinMarietta_2018.docx	3,29	0,63	0,68	63,78	34,88
US_Microsoft_2018.docx	3,39	0,26	0,86	57,61	28,71
US_MidAmericaApartment_2018.docx	5,78	0,12	0,96	46,45	17,55
US_MohawkIndustries_2018.docx	5,33	0,57	0,81	16,67	-12,23
US_NewsCorp_2018.docx	4,52	0,35	0,86	26,61	-2,29
US_Nike_2018.docx	4,50	0,20	0,91	38,03	9,13
US_NorthropGruman_2018.docx	5,21	0,00	1,00	41,66	12,76
US_Nucor_2018.docx	5,20	0,45	0,84	10,92	-17,98
US_ParkerHannifin_2018.docx	6,15	0,12	0,96	39,1	10,2
US_Paychex_2018.docx	4,10	0,32	0,86	34,44	5,54
US_PepsiCo_2018.docx	6,91	0,10	0,97	28,5	-0,4
US_PNC_2018.docx	3,75	0,61	0,72	40,33	11,43
US_ProcterAndGambel_2018.docx	6,08	0,53	0,84	40	11,1
US_PVH_2018.docx	3,98	0,40	0,82	12,6	-16,3

US_RealtyIncomeCorp_2018.docx	2,89	0,61	0,65	23,22	-5,68
US_RobertHalf_2018.docx	3,45	0,89	0,59	13,96	-14,94
US_Rollins_2018.docx	4,12	0,13	0,94	-6	-34,9
US_Roper_2018.docx	5,16	0,36	0,87	33,55	4,65
US_RossStores_2018.docx	4,97	0,75	0,74	40,17	11,27
US_SouthernCompany_2018.docx	2,78	0,54	0,67	51,32	22,42
US_Stryker_2018.docx	5,40	0,15	0,95	37,25	8,35
US_Sysco_2018.docx	6,02	0,00	1,00	40,34	11,44
US_Target_2018.docx	5,82	0,26	0,91	96,86	67,96
US_Textron_2018.docx	3,16	0,20	0,88	-2,95	-31,85
US_TJX_2018.docx	5,11	0,17	0,94	38,74	9,84
US_TractorSupply_2018.docx	4,52	0,09	0,96	15,28	-13,62
US_TraneTechnology_2018.docx	4,85	0,50	0,81	45,26	16,36
US_TransDigm_2018.docx	2,06	0,08	0,93	73,7	44,8
US_UnderArmour_2018.docx	5,31	0,66	0,78	21,25	-7,75
US_UnionPacificCorporation_2018.docx	5,01	0,88	0,70	33,89	4,99
US_UniversalHealthServices_2018.docx	4,09	0,18	0,92	22,62	-6,28
US_USBancorp_2018.docx	3,40	0,42	0,78	31,35	2,45
US_Verisign_2018.docx	2,85	0,00	1,00	31,18	2,28
US_Vornado_2018.docx	1,83	0,35	0,68	17,77	-11,13
US_WesternDigital_2018.docx	4,19	0,23	0,90	69,78	40,88
US_WestRock_2018.docx	5,21	0,36	0,87	14,98	-13,92
US_Weyerhaeuser_2018.docx	4,52	0,32	0,87	46,58	17,68
US_Zebra_2018.docx	4,44	0,19	0,92	63,78	34,88
US_Zoetis_2018.docx	5,43	0,09	0,97	57,44	28,54

# Appendix F

Table 13: Results Mann-Whitney U-test NetTONE

	n	Mean	Median	p-value
MAR Above Average NetTONE (All countries)	146	2.98	2.98	.105
MAR Below Average NetTONE (All countries)	145	-1.95	-2.04	.105
MAR Above Average NetTONE (Japan)	50	-4.51	-5.31	.405
MAR Below Average NetTONE (Japan)	50	-2.38	-8.64	.405
MAR Above Average NetTONE (Sweden)	46	1.15	1.58	.467
MAR Below Average NetTONE (Sweden)	46	-1.22	6.80	.467
MAR Above Average NetTONE (US)	50	7.85	5.10	.164
MAR Below Average NetTONE (US)	49	2.17	4.99	.164

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed

# Appendix G

*Table 14: Results Mann-Whitney U-test Abnormal Positivity with NetTONE*

	n	Mean	Median	p-value
MAR Top 10% NetTONE (All countries)	30	3.77	4.27	.675
MAR Above Average NetTONE	116	2.77	1.24	.675
MAR Top 10% NetTONE (Japan)	10	-5.65	-12.00	.429
MAR Above Average NetTONE (Japan)	40	-4.22	-4.34	.429
MAR Top 10% NetTONE (Sweden)	10	-2.04	-2.07	.372
MAR Above Average NetTONE (Sweden)	36	2.03	4.00	.372
MAR Top 10% NetTONE (US)	10	4.84	4.27	.457
MAR Above Average NetTONE (US)	40	8.60	6.95	.457

*Note. \*p < .05, \*\*p < .01, \*\*\*p < .001, one-tailed*

# Appendix H

Table 15: Results Mann-Whitney U-test PosTONE

	n	Mean	Median	p-value
MAR Above Average PosTONE (All countries)	145	5.97	7.17	<.001***
MAR Below Average PosTONE (All countries)	146	-4.89	-3.95	<.001***
MAR Above Average PosTONE (Japan)	50	-3.75	-7.84	.411
MAR Below Average PosTONE (Japan)	50	-3.13	-4.08	.411
MAR Above Average PosTONE (Sweden)	46	8.92	11.1	.009**
MAR Below Average PosTONE (Sweden)	46	-8.99	-7.12	.009**
MAR Above Average PosTONE (US)	49	8.18	9.84	.058
MAR Below Average PosTONE (US)	50	1.95	1.05	.058

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed

# Appendix I

Table 16: Results Mann-Whitney U-test Abnormal Positivity with PosTONE

	n	Mean	Median	p-value
MAR Top 10% PosTONE (All countries)	30	16.4	10.9	.974
MAR Above Average PosTONE (All countries)	115	3.25	5.48	.974
MAR Top 10% PosTONE (Japan)	10	-7.42	-9.45	.304
MAR Above Average PosTONE (Japan)	40	-2.84	-7.19	.304
MAR Top 10% PosTONE (Sweden)	9	20.0	19.0	.910
MAR Above Average PosTONE (Sweden)	37	6.22	10.6	.910
MAR Top 10% PosTONE (US)	10	21.0	11.3	.939
MAR Above Average PosTONE (US)	39	4.91	8.35	.939

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed



# Appendix J

Table 17: Results Mann-Whitney U-test NegTONE

	n	Mean	Median	p-value
MAR Above Average NegTONE (All countries)	145	-.538	-.390	.345
MAR Below Average NegTONE (All countries)	146	1.57	.720	.345
MAR Above Average NegTONE (Japan)	49	-1.96	-6.15	.760
MAR Below Average NegTONE (Japan)	51	-4.87	-8.18	.760
MAR Above Average NegTONE (Sweden)	46	3.56	9.89	.875
MAR Below Average NegTONE (Sweden)	46	-3.63	-1.38	.875
MAR Above Average NegTONE (US)	49	3.10	4.65	.173
MAR Below Average NegTONE (US)	50	6.93	6.95	.173

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed