UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Readability in sustainability reporting

before and after the financial crisis of 2008

Bachelor Thesis in Accounting
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Foreword

We would like to thank our supervisor, Gunnar Rimmel, Full Professor in accounting, Phd, at Jönköping International Business School & Gothenburg Research Institute, for introducing us to the subject of readability and guiding us through the process of writing this thesis. Magnus Söderberg, lecturer at CERNA mines ParisTech, deserves a thank you as well, for providing tips regarding the use of statistical methods.

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Abstract

Title: Readability in sustainability reporting before and after the financial crisis of 2008

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Problem: Sustainability reporting is becoming more and more of a standard business practice. However, during the financial crisis of 2008, many companies experienced hard times from an economic perspective. This could have led to a decrease, an increase or no effect on the level of readability in sustainability reporting. Ameer and Bakar (2010) concluded that Malaysian companies tend to obfuscate their sustainability communication by adjusting the readability.

Purpose: The purpose of this study is to examine how readability and amount of disclosure in sustainability reporting changed in Sweden during the financial crisis of 2008.

Method: The Flesch Reading Ease formula was used to estimate the level of readability and the amount of disclosure was measured in number of words. Two samples containing the same 34 large and publicly listed companies were examined for 2006 and 2010. Statistical tests, in terms of Wilcoxon signed-rank test and the matched pairs t-test, were applied to the data in order to determine whether a significant difference was present between the years.

Theoretical framework: Readability, obfuscation, stakeholder theory and legitimacy theory are presented in the theoretical framework.

Results: The mean Flesch Reading Ease ratings increased from 32,8 in 2006 to 34,1 in 2010, however there was no significant difference. The mean number of words increased from 2600 words in 2006 to 7205 words in 2010. This difference was statistically significant.

Analysis: The results were interpreted in relation to the theoretical framework.

Conclusion: Readability, measured in Flesch Reading Ease, did not change during the financial crisis of 2008, while the amount of disclosure increased. This implies that overall no obfuscation was present.

Contents

1. Introduction

This chapter includes a background on sustainability reporting, followed by a problem discussion regarding readability and the impact on sustainability reporting from the financial crisis. The research questions and the purpose of the study are presented and the contribution to previous research is discussed.

1.1 Background

Sustainability has emerged as a global trend among corporations over the past decades. The World Commission on Environment and Development (WCED) (1987) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Another well-known definition of sustainability is the triple bottom line (Elkington 1998), which states that sustainability relies on three basic dimensions, namely the economic, social and environmental dimensions. The meaning of the triple bottom line is that a corporation's success and health should be judged not only by the economic performance, but also by its impact on the environment and community.

Environmental sustainability relates to the footprint a corporation leaves behind as a consequence of its business. This can be referred to as resource and energy use, such as waste, pollution or use of hazardous materials (Gimenez, Sierra and Rodon 2012). Furthermore social sustainability is about supporting public health, skills and education (Elkington 1998). Social sustainability means that organisations "provide equitable opportunities, encouraging diversity, promote connectedness within and outside the community, ensure the quality of life and provide democratic processes and accountable government structures" (Gimenez, Sierra and Rodon 2012).

A more intensive focus in sustainability has also meant increasing demands on external communication from corporations regarding their sustainability performance. GRI (Global Reporting Initiative) is a non-profit organization that evolved in 1997 "with the goal of enhancing the quality, rigor and utility of sustainability reporting" (GRI 2002). GRI provides guides on how to disclose sustainability reporting, however it is voluntary for corporations to comply with these guidelines.

Today, even though some consider sustainability reporting to be a waste of time and money, it is becoming more and more of a standard business practice all over the world and almost all

of the 250 largest companies in the world report on sustainability. The debate on whether to report on sustainability or not is said to be over and now focus is directed more towards the quality of the reporting, meaning what to report and how (KPMG 2013).

There are different ways of communicating sustainability performance. Separate Sustainability Reports can e.g. be established, but sustainability can also be included in the annual reports. In a survey conducted by KMPG (2013), it was shown that 51% out of 4100 large companies from across the world report on Corporate Responsibility in their annual reports. Among the companies that report on Corporate Responsibility 58% report in a separate chapter only, 24% report in a separate chapter and in the director's report and 18% report in the director's report only. By reporting on sustainability, transparency can be enhanced and stakeholders can receive the information they need. Terms such as Corporate Social Responsibility (CSR) and Corporate Responsibility (CR) are treated as synonyms to sustainability in this study.

Looking at trends for Sweden specifically, the number of companies reporting on sustainability is increasing and the amount of information disclosed is also increasing. Both in number of pages and in relation to total amount of information the sustainability information is increasing in both annual reports and sustainability reports (ESRA 2009).

1.2 Problem discussion

One aspect of quality in the sustainability reporting is the readability of the text. Readability research of narratives within annual reports has been done since 1952 (Courtis 1998) and examines how easy or hard it is for a reader to comprehend with the text. Readability can for example take into account aspects such as length of words, use of vocabulary, grammatical structures or focus in the content.

One issue regarding presentation of narratives in annual reports is obfuscation, which is a narrative writing technique. Obfuscation means that the intended message is obscured in a way that distracts or confuses the reader, which leaves them with a feeling of perplexity. Obfuscation can be defined by the simultaneous use of low reading ease and high readability variability. Explanations to the presence of obfuscation can be either deliberate or unintentional. Obfuscation can be used as a technique called "impression management" in order to handle the reporting of bad news, by masking or misleading in order to reduce the attention from the reader. However, there can be many different people involved in writing different sections within annual reports and therefore obfuscation can occur unintentionally.

In either way obfuscation becomes a barrier in the communication between management and stakeholders (Courtis 2004).

Another problematic aspect of annual report narratives is the absence of objective verification from auditors. Traditionally annual report narratives are unaudited and therefore managers might try to manipulate the impression of the receiver (Deegan and Gordon 1996). Since reporting on sustainability is voluntary, auditing of this information is not mandatory either. According to Clatworthy and Jones (2003) auditors typically have no responsibility to audit the information such as accounting narratives contained in the annual report.

According to Courtis (1986) narratives that are hard to read are just as likely to occur in a big profitable corporation as in one that is not so profitable and regardless of industrial classification. A readability study regarding CSR communication in Malaysia (Ameer and Bakar 2010) concluded that poorly performing companies, to a higher degree than well performing companies, deliberately disclose CSR-communication with difficult language. This supports the obfuscation hypothesis, but contradicts with Courtis findings from 1986 regarding profitability. However there are more studies that show a relationship between performance and readability in annual reports, e.g. Subramanian, Insley and Blackwell (1993) or Smith and Taffler (1992).

The relationship between financial performance and readability in CSR sections implies that a possible reason for companies to obfuscate bad news could be a financial crisis. The financial crisis of 2008, which began in the US and then spread to western economies, is argued to be the worst financial crisis since the great depression in the early 1930s. Many important and big financial institutions collapsed or were taken over by the state and some survived only because of public support. The whole world was affected by the crisis to different degrees, with the US and Europe in the center, as world trade, industrial production and equity market values fell rapidly and heavily (Helleiner 2014).

Times of financial crisis usually means big uncertainty for the business environment in a corporation and this can lead to defensive strategies, such as cost reducing activities, postponing of investments and reduction in budgets (Karaibrahimoglu 2010). As mentioned before, sustainability efforts can be viewed as costly and time-consuming activities and that could be a dilemma in the presence of a serious financial crisis. Karaibrahimoglu has found in his research (which was executed on data from 2008) that CSR-projects drop significantly in numbers and extent during times of financial crisis. Having less focus on CSR-projects could

possibly be a motive for companies to adjust the readability of sustainability reporting in order to obfuscate the decrease in sustainability investments.

However, in relation to the findings of Karaibrahimoglu, there is conflicting research (Giannarakis & Theotokas, 2011) which indicates that CSR-projects increased during and after the crisis of 2008, with the exception of a period of 2009-2010. The presented explanations for the increase in CSR activities are that corporations try to build or sustain their brand name by good reputation and consumer trust and by "redefining the relationship between companies and society". In that way it is possible for corporations to turn the threat of CSR in the context of a financial crisis into an opportunity.

Furthermore the financial crisis of 2008 did waken some serious question marks regarding transparent and open communication about business information and credibility. Having the view of CSR as a management tool to gain trust among stakeholders, focus has shifted more towards a stakeholder perspective (García-Benau et al. 2013). This indeed raises the question of how readability changes in sustainability reporting during financial crisis. Outside pressures for transparency could possibly motivate corporations to disclose sustainability information, which is friendlier to the reader through a high level of readability. Another possibility could be that more sustainability information is requested and therefore corporations might disclose more, but with less satisfying readability.

1.3 Research question

By analyzing sustainability sections in annual reports from large Swedish companies, which are publicly listed, the following question will be investigated:

- How did the readability of sustainability sections in annual reports change during the financial crisis of 2008?

In order to answer the above question the following sub queries will be investigated:

- o How did the readability, in terms of Flesch Reading Ease score, change in sustainability sections of annual reports during the financial crisis?
- o How did the amount of disclosure, measured in number of words, in the sustainability sections of annual reports change during the financial crisis?

1.4 Purpose

The purpose of this study is to examine how readability and amount of disclosure in sustainability reporting changed in Sweden during the financial crisis of 2008.

1.5 Contribution to previous research

Many studies have been made on readability in annual reports. However there are few studies with focus on sustainability reporting. There is one study that we know of which examined CSR communication in Malaysia, comparing the readability of profitable and unprofitable companies (Ameer and Bakar 2010). Our study on the other hand contributes with a focus on Swedish companies, as well as a focus on the impact by the financial crisis. Research has previously been done on the link between financial crisis and sustainability reporting, but as far as we know it has not been done in terms of readability. In addition, this study examines the amount of information disclosed, which according to ESRA (2009) is increasing in Sweden. This study contributes with an examination of number of words rather than number of pages.

2. Theoretical framework

This chapter describes readability and readability formulae more in detail. The Flesch Reading Ease formula, which is used in this study, is described. Obfuscation is described, as well as theories that can be used to understand sustainability. These are mainly stakeholder theory and legitimacy theory.

2.1 Readability

The term readability can simply be explained as how easy it is to read a text and how distinctly a text expresses ideas and emotions. Such things are associated with the concept of readability. The process to amend texts, to develop communication, is not a new phenomenon. It reaches back to ancient Greek and Aristoteles (Bailin and Grafstein 2001). During the last century mathematical formulae have been developed to quantify readability. Main parts of readability formulae were developed using general assumptions about reading difficulty. Shorter words, shorter sentences, fewer syllables, and more frequently used words are easier to read. Different formulae have been used for many purposes like determining the readability ease of for example newspaper articles, government documents, schoolbooks and medical documents (Begeny et al. 2001).

The general assumption about reading difficulty is discussed further in terms of vocabulary difficulty and syntactic complexity. Vocabulary difficulty means how familiar and/or difficult a word is for the recipient of a text. Syntactic complexity refers to grammatical difficulty in a text. Most standard readability formulae use word difficulty as a criterion. Syntactic complexity is strongly related to sentence length. How to determine average sentence length varies from different tests, but the assumption that length of a sentence in a text correlates with the reading difficulty is the same for all formulae. For example, sentences with 10 words are easier to comprehend than sentences with 15 words.

Using a two-variable general-purpose formula as mentioned, relatively good predictions of readability can be accomplished. These two variables have been found to be good hints of difficulty, but do not automatically cause difficulty (Courtis 1998).

2.1.1 Flesch Reading Ease

The most common measure used to value syntactical complexity is the Flesch readability formula. Rudolph Flesch invented that formula in 1948. It has been frequently used in pedagogic and non-pedagogic fields since 1948 (Clatworthy and Jones 2001). The Flesch index is based on the McCall Crabbs standard test lesson in reading. In a calculation, called

Flesh reading ease equation, a score is produced. The calculation consists of number of words per sentence and number of syllables per word.

$$206{,}835 - 1{,}015 \left(\frac{total\ words}{total\ sentences} \right) - 84{,}6 \left(\frac{total\ syllables}{total\ words} \right)$$

The score that the Flesch formula produces can be translated in to a degree of reading difficulty. Higher score means that a narrative is easier to read than a narrative with lower score. The following table describes the Flesch Reading Ease (FRE) ratings (Courtis 1995):

Table 1: Flesch Reading Ease ratings		
Flesch Reading Ease rating	Description of level	Typical style of magazine
0-30	Very difficult	Scientific
30-50	Difficult	Academic
50-60	Fairly difficult	Quality
60-70	Standard	Digests
70-80	Fairly easy	Slick fiction
80-90	Easy	Pulp Fiction
90-100	Very easy	Comics

2.1.2 Validity of reading ease formulae

One of the godfathers of readability, George Klare, has over the years discussed the practical use of readability formulae. He carefully points out what readability formulae are good for and not. Klare tells us that if the limitations of the formulae are kept in mind, they can be used for quantitative objective estimates of reading difficulty (Shriver 2000). Jones and Schoemaker (1994) challenge the validity and the application of readability formulae. They argue that even though objectivity and reliability are criteria considered satisfied, the question of validity is still problematic. Some critics point out that readability formulae do not measure understandability or comprehension because the formulae focus on number of syllables and mean sentence length witch ignores the textual features that affect comprehension (Dreyer 1984).

Intercessors of readability formulae response such criticism by arguing they never claimed readability formulae could handle all these components. Instead the formulae were intended as a quick objective benchmark for indexing readability (Shriver 2000).

Readability formulae applicability to technical text like annual reports is questionable. Readability formulae were developed in order to valuate children's writing and are particular inadequate to measure comprehension skill of adult readers who possess a vocabulary and knowledge base not held by the average reader. Material considered to be difficult to read according to the formulae can be quite easy for a person with skills that are required within a certain profession (Shriver 2000).

2.2 Obfuscation

Courtis (2004, 291) defines obfuscation as: "the simultaneous use of writing with (a) low reading ease and (b) high readability variability". Therefore, low reading ease and high variability in combination, is used as a proxy of obfuscation. Obfuscation is used as a technique of impressions management. For example, management might use obfuscation in a report to mask bad news and enhance good news (Courtis 2002).

2.3 Theories to understand sustainability

The outbreak of the financial crisis of 2008 led to a deep and protracted recession, which forced even the most profitable companies to overlook and cut costs. The costs that first will be cut during recessions are costs that not can be related to core business. Recessions will tend to discard sustainability programs that are done mainly for show (Quelch and Jocz 2009).

Other theories suggest another path when it comes to sustainability and recessions. Those theories argue that companies' sustainability focus is increasing during recession. Yelkikalan and Köse (2012) suggest that the financial crisis of 2008 led to more interest in companies social responsibilities among consumers. The crisis could thereby have created more and new business opportunities. This could have increased profitability for companies that invest in projects regarding sustainability.

Prior research has pointed out certain theories connected to sustainability research: stakeholder theory (Arvidsson 2010), legitimacy theory (Mia and Al-Mamun 2011) and shareholder theory (Blombäck and Wigren 2009). A great deal of overlap exists among these theories and the differences among these theories are often unclear. This is because all the theories are concerned with the interface between the corporations and its stakeholders. The standpoint from which they are observed and tested seems to be the main difference (Mia and Al-Mamun 2011).

2.3.1 Stakeholder theory

A common trend during the 1980s and 1990s was maximizing shareholder value. The prime stakeholder whom the management team should respond to was the shareholder (Arvidsson 2010). Leaders of publicly owned firms that did invest in sustainability projects defended their actions with arguments that such projects benefit shareholders by improving the company's reputation and brands, which leads to higher profits (Quelch and Jocz 2009).

Around the turn of the millennium many corporate scandals took place regarding social, ethical and environmental issues (e.g. Enron, WorldCom). This led to an increasing mistrust against management teams. Criticism against shareholder theory for having contributed to short sightedness and lack of sustainability responsibility amongst management teams was raised. If management teams does not broaden their focus of just satisfying shareholders, that will lead to boycott from other stakeholders (Arvidsson 2010).

Stakeholder theory can be seen as system whose survival depends on their capability to satisfy a certain set of stakeholders. It relies on ideas that ties exist between a company's activities and stakeholders' situations. In essence, to provide health for all parties, corporations and their stakeholders must exist in alignment. Different stakeholder groups impose different legitimacy, urgency and power, in connection to firms (Blombäck and Wigren 2009). Moir (2001) suggests that in a sustainability perspective, this means that activities between companies and stakeholders are not a general response but guided by how important each stakeholder is to the company at a certain point of time.

2.3.2 Legitimacy theory

Legitimacy theory is closely linked to stakeholder theory (Guthrie et al. 2004). Suchman (1995) explains the basis for legitimacy theory as: "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, 574).

Suchman also suggests that an organization's legitimacy is valued by how acceptable its behavioural patterns are according to a group of beholders. For a company point of view, legitimacy led to positive outcomes like persistence, since people are likely to provide resources to the company and support by actively support the firm's activities. O`Donovan (2002, 344) argues that: "Legitimacy theory is based on the idea that in order to continue

operating successfully, corporations must act within the bounds of what society identifies as socially acceptable behaviour".

Legitimacy theory shows that if companies are conscious of the change in society perception and are aware of the importance of the need for business to be socially responsible, then they will attempt to seek legitimacy and will respond to public awareness by increasing their sustainability disclosures in annual reports (Mia and Al-Mamun 2011). Those social contracts can easily be broken if companies do not follow the norms and values which are considered socially acceptable of a society. This can lead to negative impact on companies' legitimacy and threaten their survival. To gain legitimacy is one reason why companies voluntarily disclose information about their sustainability investments. More and more companies have adjusted to the demand on sustainability from stakeholders and regulators by increasing the quantity of sustainability disclosure (Guthrie et al. 2004).

3. Methodology

In this chapter a quantitative research method is presented, followed by a description of the working procedure, data collection and the samples used in the study. Furthermore the statistical methods are presented and finally the reliability and validity of the study is discussed.

3.1 Quantitative vs. qualitative research methods

Bryman and Bell (2011) argues that it could be helpful to distinguish between quantitative and qualitative research regarding methodological issues. Quantitative approaches collect numerical data to answer the research questions. Statistical methods are used to examine the hypothesis. By comparing data with predictions it is possible to determine the likelihood whether the hypothesis is true or not. When using hypothesis in that way one must consider the likelihood of random errors, which are always present when we use numerical data as a base for conclusions. Tests of hypotheses are built in a procedure where the research questions are reformulated in reverse form as null hypotheses. The results show the probability of the null hypothesis being true and based on that a decision can be made on whether to reject or retain the null hypothesis (Malterud 2014).

Qualitative methods are built upon theories of human experiences and interpretation. Data is collected through interviews, surveys and observations. The purpose is to investigate the content in social phenomenon such as the participants are experiencing in their natural context. The researcher is seen as an active participant in a knowledge development that never can be complete. It is more about finding new questions than universal truths (Malterud 2009).

This study is mainly quantitative, as statistical methods are applied to the quantification of texts. Hypotheses are examined and decisions are made on whether to reject or retain the null hypotheses.

3.2 Working procedure

The process of writing this thesis consists of different stages. First, an examination of literature, articles and previous research was performed, in order to collect knowledge about the subject. Keywords were identified and used for searching more information about the subject. Simultaneously a frame of reference was created. Then a research question was defined and a hypothesis was formulated. Next was the procedure for collecting data. The

processed data was then used for analysis. The frame of reference was used for analysing the results. Electronic databases and university library were used when gathering information.

Our first idea was to use a software tool called Wmatrix, which is a tool for corpus analysis and comparison (Rayson 2008). Due to limitations of time and the effort it would take to learn how to master Wmatrix, we decided to use another method to measure readability. Instead we used the Flesch Reading Ease Formula for the task.

3.3 Data collection

The data was collected by downloading annual reports in the form of pdf files from each company's website. Unfortunately no database containing all of the annual reports, with sustainability sections included, could be found. The pdf files were converted in to text files (txt) in Adobe Reader and then the sustainability chapter was manually cut out from each file.

The reason for converting to txt format was that it was needed for Wmatrix, which, as previously explained, was our initial ambition to use for analysis. Instead of cutting out the sustainability sections once again from the pdf files, the txt files were used, as they already were prepared.

The sustainability chapter was easy to identify in most cases. In a few cases there was a separate chapter for employees, but in these cases we only included employee sections if it was clearly defined as a part of the sustainability chapter.

Annual reports are not the only way to communicate on sustainability, as corporations also may report through separate sustainability reports or through their websites as well. However, looking in to other forms of communication than the annual report is out of the scope of this study.

3.2.1 Sample

The two samples of the study contains sustainability reporting from the same companies at two different occasions, namely two years before and two years after the financial crisis of 2008. The first sample was picked from 2006 in order to have some margin to the start of the financial crisis and the second sample was set to 2010 in order to make sure that the effects of the crisis had reached the sample companies at the time. This means that companies would have had enough time to adjust the readability in the sustainability reporting.

As stated in the purpose of the study the publicly listed companies in Sweden are the ones that focus is put on. Our initial ambition was to investigate all of the publicly listed companies in

Sweden, but due to limitations of time the Large Cap list on Nasdaq Stockholm was chosen. Studying the large companies makes it easier to find the required information compared to companies listed on Mid Cap or Small Cap and the large companies play an important role in society at many levels. Due to exclusions the sample does not consist of all companies listed on the Large Cap list. However, what our final sample represents is the large and publicly listed companies in Sweden.

A list from DI (Dagens Industri 2014), containing all the listed stocks on the large cap list, was used as base for the sample. Out of 66 companies, almost half were dropped, as shown in table 2.

Table 2: Sample	
Number of companies listed on large cap list 2014	66
Less:	
- Annual reports that could not be found	10
- Annual reports missing a sustainability chapter	10
- Pdf files that not could be transformed in to txt files	12
Sample size	34

The companies whose annual reports were missing sustainability chapters for either 2006 or 2010 did either not report on sustainability or did report on sustainability, but in a separate sustainability report only. Furthermore some of the file conversions resulted in txt files where text was missing or had not been interpreted correctly.

3.2.3 Calculation of readability statistics

Microsoft Word 2010 was used for calculation of the Flesch scores, as the program has a built in readability statistics function. Other readability studies have previously used this program, for example Ameer and Bakar (2010), Subramanian et al. (1993) and Fitzsimmons et al. (2010). Microsoft Word has been proven to be valid and reliable for readability reasearch (Paasche-Orlow 2003). Using computerized programs when calculating readability is efficient and it eliminates human error (Goolsby 2010). This program also provides information about total number of words and this function was used in order to analyze the length of the sample texts of 2006 and 2010.

3.4 Statistical analysis

A statistical test was applied in the study in order to determine whether there is a significant difference in readability between 2006 and 2010 according to the Flesch Reading Ease formula. Statistical methods have been applied before in research that focus on comparison of scores from readability formulae (for example Chiang et al. 2008, Ameer and Bakar 2010, Paasche-Orlow et al. 2003 and Flory et al. 1992). In this study a statistical method was applied in order for the interpretation of the results to be more reliable and substantiated.

Despite the common use of statistical methods in readability research, one should be aware that this practice has been questioned. McConnell (1983) argue that the statistical basis for readability formulae can be questioned due to lack of validity. Furthermore, in the process of calculating averages of words per sentence and syllables per word, there is a loss of information and this results in an ordinal data level rather than an interval data level for the Flesch scores (Flory et al. 1992). This means for example that a score of 40 is not necessarily half as good as a score of 80 in terms of readability. All we know is that 40 is worse than 80.

When analyzing the number of words on the other hand, the data is on interval level. A second statistical test was applied in the study in order to test the difference in number of words.

3.4.1 Non-parametric tests

Because of the ordinal data level a non-parametric test is suitable (Flory et al. 1992). Non-parametric tests are typically less powerful than parametric tests (McCrum-Gardner 2007). However parametric tests put higher demands on the data, through assumptions about the population from which a sample is taken and through requirements of the data level, which must be at interval or ratio level. By using non-parametric methods there are fewer requirements to be met regarding the data and these methods can be applied regardless of the shape of the population distribution (Cortinhas and Black 2012). This makes it possible to analyze ordinal data such as Flesch scores.

3.4.2 Wilcoxon signed rank test

As the intention of this study is to analyze the difference in Flesch scores between two different occasions, for the same companies, the samples of 2006 and 2010 are viewed as related. In case the data would have met the requirements for a parametric method, the t- test for related measures should be used (McCrum-Gardner 2007). However, as in our case, these requirements cannot always be met and then the Wilcoxon's signed rank test provides a non-

parametric alternative. This test is suitable for before and after studies (Cortinhas and Black 2012) and therefore it has been applied in this study.

The Wilcoxon test compares the median differences in the two samples, compared to the paired t-test, which compares the mean differences. What the Wilcoxon test does is that it computes the differences for all pairs in the sample and ranks them from smallest to largest. Negative differences are taken into account by adding a negative sign. Ties between ranks are handled by calculating an average of the ranks and zero differences are ignored. The smallest sum of ranks (positive or negative) is represented by the T statistic in the analysis. This value is compared to a critical value of T which depends on sample size. When having a large sample (n > 15) the z statistic can be used, as the T-statistic is approximately normally distributed (Cortinhas and Black 2012). The following equations describe the procedure of the test, according to Cortinhas and Black:

$$\mu_T = \frac{(n)(n+1)}{4}$$

$$\sigma_T = \sqrt{\frac{(n)(n+1)(2n+1)}{24}}$$

$$z = \frac{T - \mu_T}{\sigma_T}$$

where:

n = number of pairs
T = the smallest sum of ranks for either positive or negative differences

In this study the computerized Statistical Package for the Social Sciences (SPSS, version 22) is used and therefore the above equations will not be used manually.

The Wilcoxon signed-rank test must not be confused with the Mann-Whitney U-test, which is also known as the Wilcoxon rank-sum test, as this test is feasible for independent samples rather than related samples (not before and after studies).

According to Cortinhas and Black (2012) there are two assumptions, which the Wilcoxon signed-rank test is based on. First, the sample pairs are assumed to be randomly chosen. In our case this assumption can be viewed as satisfied, since the 34 companies that were left in the

15

sample were chosen because those annual reports could be found and transformed into text files.

The second assumption is that the differences of the two samples have a symmetrical distribution. For this reason a histogram was created, which in our case indicates a symmetrical distribution (see Appendix 1). However the histogram does not show a perfect symmetry, which could be a potential problem for the reliability of the test results, but still there is an indication of symmetry, which in this study is assumed to be enough.

3.4.3 T-test for paired samples

The data is on interval level when comparing the number of words between 2006 and 2010. This makes it appropriate to use a parametric test. Since the samples are dependent, the parametric counterpart to the Wilcoxon signed-rank test is appropriate, namely the t-test for paired samples. Parametric tests are preferable if the assumptions can be justified (McCrum-Gardner 2007). Using a t-test for matched pairs assumes normally distributed differences of the pairs (Cortinhas and Black 2012). This assumption can be justified in our case (see appendix 2).

Just like the Wilcoxon signed-rank test, the t-test for paired samples is appropriate for before and after studies. What the test does is that it compares the mean of differences between the pairs. A t value is calculated and then compared to a critical value of t. The following equation shows how to perform the test with a formula (Cortinhas and Black 2012):

$$t = \frac{\bar{d} - D}{\frac{s_d}{\sqrt{n}}}$$

Where:

Df = n-1

n = number of pairs

d = sample difference in pairs

D = mean population difference

s_d = standard deviation of sample difference

$\bar{d}$ = mean sample difference

By using the differences of the two samples, the test converts the problem of having two samples in to one sample of differences, which makes it possible to use the above formula. The following formula shows how to calculate $\bar{d}$ and s_d (Cortinhas and Black 2012):

$$\bar{d} = \frac{\sum d}{n}$$

$$s_d = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

SPSS will be used for this test as well and therefore the above calculations will not be handled manually.

3.5 Reliability and validity

Reliability and validity can be taken for synonyms but they have quite different meanings. Although reliability and validity are analytically separated, they are connected in term of that validity presumes reliability. In other words, if a measure is not reliable, it cannot be valid (Bryman and Bell 2011). The following two sections distinguish the differences and explain how reliability and validity are related to each other.

3.5.1 Reliability

Reliability is concerned with the question of whether a tool systematically measures what it is intended to measure (Bui 2009). Quantitative research is especially associated with reliability because the question whether a measure is stable or not is of the highest importance. For example, if we found that car emissions of carbon dioxide fluctuate, so that the emissions of one car is different when administered on two or more occasions, we would consider it an unreliable measure with no reliability (Bryman & Bell 2011).

Bryman and Bell (2011) highlights two important factors when judging whether a measure is reliable or not:

The stability factor tells us if a measure is stable over time. The example above regarding the measure of carbon dioxide is connected to the stability factor.

Internal reliability concerns whether different parts of the measure correlate and thereby measure the same thing. It is for example desirable that different questions in an IQ-test measure intelligence in the same way.

To improve stability in this thesis, annual reports from certain years were sampled. Microsoft Word was used to measure readability in the reports. The result is thereby independent of when the test is performed and by whom. This was controlled by letting different persons perform the test on different occasions on randomly chosen annual reports of the study. One thing that can affect Word to provide different results for the same text is the choice of language in the settings and therefore it was carefully controlled that English was chosen as language for all of the texts in the sample.

Regarding internal reliability, the Flesch Reading Ease formula handle two parts, namely total words per sentence and total syllables in words. Both factors measure readability (Flesh 1948).

3.5.2 Validity

If an instrument does not measure what it was intended to measure it would be difficult to value the results in a proper way. In other words the results would have low validity (Bui 2009).

Any knowledge is not universally concerning that it is valid under any circumstances and any purpose. Generalizing is therefore a problematic term. The researcher should consider validity about what the study tells us, and what transferability those conclusions have over and above the context where the study was performed. It is hard to know whether certain findings are true or false. It is more important to evaluate what it is true about and what range and transferability the results have. For example typical symptoms for heart attacks for men are not automatically the same as symptoms for women (Malterud 2014).

The first question about validity is whether we selected methods in a way that gives us a solid picture about the subject we are going to investigate. This is known as *internal validity*. Relevance is a keyword for such considerations. Have we used relevant concepts and methods for studying a certain phenomenon? Regardless of how exact data we can bring, internal validity gets low if the methods we use for measuring do not support our purpose of the study (Malterud 2014). In this study the Flesh Reading Ease formula is used for measuring readability. As discussed earlier there are some ambiguities regarding if the formula measures readability or not. The main purpose of the study is not to measure exactly how difficult a text is to read, but to measure if there are any differences in readability from one year to another. Hence the Flesch Reading Ease formula is used for benchmarking. Validity is higher when

using readability formulae for benchmarking compared to measuring exactly how difficult a certain text is to read (Shriver 2000).

Another type of validity is *external validity,* which concerns transferability. A useful keyword connected to external validity is context. In what context are our results valid beyond the origin thesis? A statistical research produced with representative sample of the Swedish population may for example be used for making the same conclusions in an American context. The external validity becomes low if we relate to the local context without considering the terms of transferability of the knowledge (Malterud 2014). We study Swedish listed companies at OMX Stockholm Large Cap list. Those companies operate in a global context so the transformability of the knowledge may in some, but not every aspect, be externally valid. Even though reporting is a worldwide matter and moves towards harmonisation, local differences may still occur regarding reporting. Additionally there can possibly be differences between large companies and small companies and therefore the results of this study might not be valid for companies from the Small Cap list.

3.6 Hypothesis formulation

The change in readability from 2006 until 2010 will be examined by the following null hypothesis:

$$H_0: There\ is\ no\ difference\ in\ Flesch\ reading\ ease\ score\ between\ 2006\ and\ 2010$$

There is a difference in readability in terms of Flesch Reading Ease scores if the null hypothesis can be rejected. The decision to reject or retain the null hypothesis will be based on median differences between 2006 and 2010. Statistical level of significance was set at 0,05.

The change in total number of words from 2006 until 2010 will be examined by the following null hypothesis:

$$H_0: There\ is\ no\ difference\ in\ total\ number\ of\ words\ between\ 2006\ and\ 2010$$

In this case as well, the statistical level of significance was set at 0,05. The decision to reject or retain the null hypothesis will be based on mean differences between 2006 and 2010. Due to the use of a two-sided test, a possible rejection of the null hypothesis would prove that there is a difference, not taking into account whether it is positive or negative.

4. Results

This chapter presents descriptive statistics over the results from the Flesch Reading Ease test, followed by statistical results of the Wilcoxon signed-rank test and finally a decision on whether to reject the null hypothesis or not.

4.1 Flesch Reading Ease ratings

The Flesch Reading Ease (FRE) ratings for each company can be found in appendix 3. Descriptive statistics for the samples can be found in table 3 below.

Table 3: Descriptive Statistics						
	N	Minimum	Maximum	Mean	Median	Std. Deviation
VAR_2006	34	17,50	61,30	32,8118	33,15	9,43812
VAR_2010	34	13,60	55,60	34,1029	34,3	8,52503

VAR_2006 and VAR_2010 are the variables of Flesch Reading Ease ratings for 2006 and 2010 respectively. As shown in the table both the minimum and maximum ratings of FRE has decreased towards a more difficult readability in 2010. However the mean of 2010 is slightly larger, indicating an overall higher level of readability. Still the mean ratings of FRE lies close to each other and therefore the Wilcoxon signed-rank test can show whether the difference has statistical significance or not.

As shown in appendix 4, the number of annual reports with very difficult readability (0-30 in terms of FRE) in the sustainability sections decreased from 14 (41%) in 2006 to 9 (26%) in 2010. This shows that the number of companies presenting very difficult texts have dropped in the sample. However 33 companies (97%) presented texts that were either difficult or very difficult both 2006 and 2010.

4.1.1 Wilcoxon signed-rank test

Table 4 below shows the results generated by SPSS at significance level 0,05.

Table 4: Wilcoxon signed-rank test			
Null hypothesis	Test	Sig.	Decision
The median of differences between VAR_2006 and VAR_2010 equals 0.	Related samples Wilcoxon signed-rank test	0,397	Retain the null hypothesis.

The difference in medians between 2006 and 2010 has significance at 0,397, which means

that the Wilcoxon signed-rank test does not provide sufficient evidence to reject the null hypothesis. This does not necessarily mean that the difference is 0 in the population of all large and publicly listed companies in Sweden, only that the difference is not large enough to have statistical significance.

4.2 Amount of information in number of words

The number of words in the sustainability reporting for each company can be found in appendix 1. The mean number of words increased from 2723 words in 2006 to 5882 words in 2010. This clearly shows an increase in amount of information presented in the sample. The standard deviation increased from 2600 words in 2006 to 7205 words in 2010. In order to test for statistical significance a t-test was executed.

4.2.1 T-test for paired samples

Table 4 below shows the results generated by SPSS for the paired sample t-test.

Table 5: T-test for related samples							
	Paired Differences						
	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Decision
VAR_2010 - VAR_2006	3232	7125	1222	2,645	33	,012	Reject the null hypothesis

The test shows statistic significance at 0,012. With regard to the level of significance, which was set at 0,05 in the test, the null hypothesis can be rejected. This means that there is a difference in the mean number of words between 2006 and 2010. The test does not tell us whether the difference is positive or negative. However, when looking at the increase in the sample from 2723 to 5882 words, it can be suspected that the actual difference in the population is positive as well.

5. Analysis

This chapter provides an interpretation of the results of the study and a discussion about possible explanations for and implications of the results. The results are discussed mainly in relation to the obfuscation theory, stakeholder theory and legitimacy theory. A comparison to the results of Ameer and Bakar (2010) is also conducted.

5.1 Analysis of change in readability and amount of disclosure

There were no significant change in overall readability between 2006 and 2010, which means that overall the sample companies did not obfuscate their sustainability reporting in connection with the financial crisis of 2008. Therefore this study cannot support the obfuscation hypothesis presented by Courtis (2004) for the Large Cap list in Sweden. When looking at the sample there even was a small increase in readability, although not with statistical significance, and the companies providing sustainability reporting with very difficult readability decreased.

Even though the obfuscation hypothesis cannot be supported by this study, it cannot be rejected either. This is due to the fact that all companies in the sample did not necessarily struggle or cut down their sustainability projects. As mentioned in the problem discussion of this study there is conflicting research regarding the effects of financial performance and sustainability investments, as Karaibrahimoglu (2010) showed a decrease in sustainability projects for companies with economic struggle and Giannarakis & Theotokas (2011) showed the opposite, namely that sustainability projects increased during the financial crisis.

Should the theory of increasing sustainability investments during the financial crisis be correct, then perhaps there might not have been any incentives to obfuscate the sustainability reporting. According to Courtis (2004) companies tend to obfuscate bad news. In case the sustainability investments increased during the financial crisis, that would rather be good news than bad news in a sustainability perspective and therefore there might not have been any reason to hide it. That could be a possible explanation for the results of the Flesch Reading Ease test.

Should companies have reduced their focus on sustainability during the financial crisis, then there could have been incentives for companies to obfuscate these "bad news" according to the obfuscation theory. In this case the obfuscation theory might not be applicable on sustainability reporting in Sweden. However this cannot be concluded for sure on the basis of this study and therefore future research might want to look closer in to this, especially since

Ameer and Bakar (2010) found support for the obfuscation theory in their study of sustainability reporting in Malaysia.

The amount of disclosed information has increased since 2006, as the results of this study confirm the results from ESRA (2009) about increasing amounts of sustainability information. The statistical test in this study was two-tailed, but considering the reports from ESRA together with the increase in the sample, the overall difference can be assumed to be positive for the population. Increasing amount of information seems to have been a trend already before the financial crisis of 2008 (ESRA 2009), but the financial crisis could possibly have contributed with outside pressures on companies will to disclose more sustainability information. However this study does not prove that the relation between the financial crisis and the increase in words has a causal relationship, meaning that the increase in words is not necessarily a consequence of the financial crisis itself.

In either way of increasing or decreasing sustainability investments, the financial crisis raised, as mentioned before, serious question marks about open and transparent communication from companies (García-Benau et al. 2013). These outside pressures from stakeholders could have motivated companies to disclose more information while at least not having decreased the level of readability. This can be related to stakeholder theory, which, as described in the theoretical framework, states that a broader set of stakeholders needs to be satisfied (Arvidsson 2010). A decrease in readability would possibly have prevented a larger number of stakeholders from perceiving the true messages of the sustainability information, but this was not the case in this study. A long-term approach to sustainability seems to be more present in the companies of this study, as opposed to the shortsightedness of shareholder theory.

Legitimacy theory could also explain the results, as the raising demands from society on transparency could have motivated companies to disclose more, without decreasing readability, in order to act within the boundaries of what is socially acceptable and to gain legitimacy.

Furthermore, as stated by KPMG (2013), focus is put more and more on improving the quality of sustainability reporting. Having no significant difference in readability before and after the financial crisis, this study does not show a better quality in terms of readability, but rather an improvement of the quantity presented.

Quelch and Jocz (2009) stated that companies tend to discard sustainability in times of recessions, but from a reporting perspective this is not the case according to the results of this study.

6. Conclusion

Given the results and analysis above the research questions of the study can be answered. Conclusions for each of the two sub queries are presented here, followed by a conclusion for the main research question.

- How did the readability, in terms of Flesch Reading Ease score, change in sustainability sections of annual reports during the financial crisis?

This study shows that readability, in terms of Flesch Reading Ease score, of sustainability sections in annual reports of large Swedish companies did not change during the financial crisis. The mean Flesch Reading Ease rating increased from 32,8 in 2006 to 34,1 in 2010 for the 34 companies investigated. However this increase did not have statistical significance. The number of companies with sustainability reporting of very difficult readability level (0-30 according to FRE) decreased from 41% to 26% from 2006 to 2010. However the number of companies providing either difficult or very difficult sustainability reporting was the same both in 2006 and 2010 (97%).

- How did the amount of disclosure, measured in number of words, in the sustainability sections of annual reports change during the financial crisis?

The amount of information, measured in number of words, increased with statistical significance during the financial crisis from a mean number of 2600 words in 2006 to a mean number of 7205 words in 2010.

- How did the readability of sustainability sections in annual reports change during the financial crisis of 2008?

The two sub queries of this study lead to the conclusion that the readability, in terms of Flesch Reading Ease, in sustainability reporting did not change, while the amount of disclosure increased, during the financial crisis of 2008. Therefore, obfuscation has overall not been present in the sustainability reporting of the sample companies. This contradicts with the findings of Ameer and Bakar (2010), who found that obfuscation was present in sustainability reporting of Malaysian companies.

6.1 Further research

This study does not claim to cover all aspects of interest regarding readability in sustainability reporting during times of financial crisis. Consequently there are many aspects to explore with further research on this subject. First of all it is possible to do similar studies with some variations in methodology. The Flesch Reading Ease formula is only one of many ways to measure readability. Other measures can be used in order to capture readability in a broader context. Furthermore greater samples can contribute to more reliable results and apart from the Large Cap list, the Mid Cap and Small Cap lists could also be investigated, in order to cover different company sizes. Companies from other countries than Sweden could also be examined.

Furthermore this study has focused on the change in readability during the financial crisis of 2008. However the study does not tell how strong the link is between the crisis and the results of the two tests. Other factors than the financial crisis might have affected the results. Therefore a possible next step would be to examine whether a causal relationship exists on financial crisis and readability in sustainability reporting. For example companies from a certain sample could be grouped after financial measures, such as profitability measures, liquidity measures or debt measures, in order to compare the readability of stronger and weaker companies. For inspiration, see the study made by Ameer and Bakar (2010).

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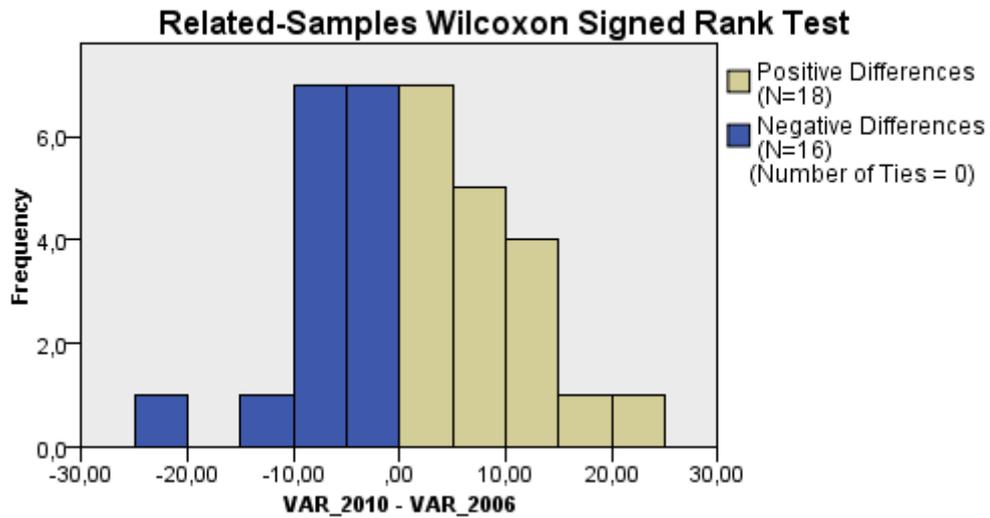http://www.oxfordscholarship.com.ezproxy.ub.gu.se/view/10.1093/acprof:oso/9780199973637.001.0001/acprof-9780199973637-chapter-1#p2 (hämtad 2014-11-17).

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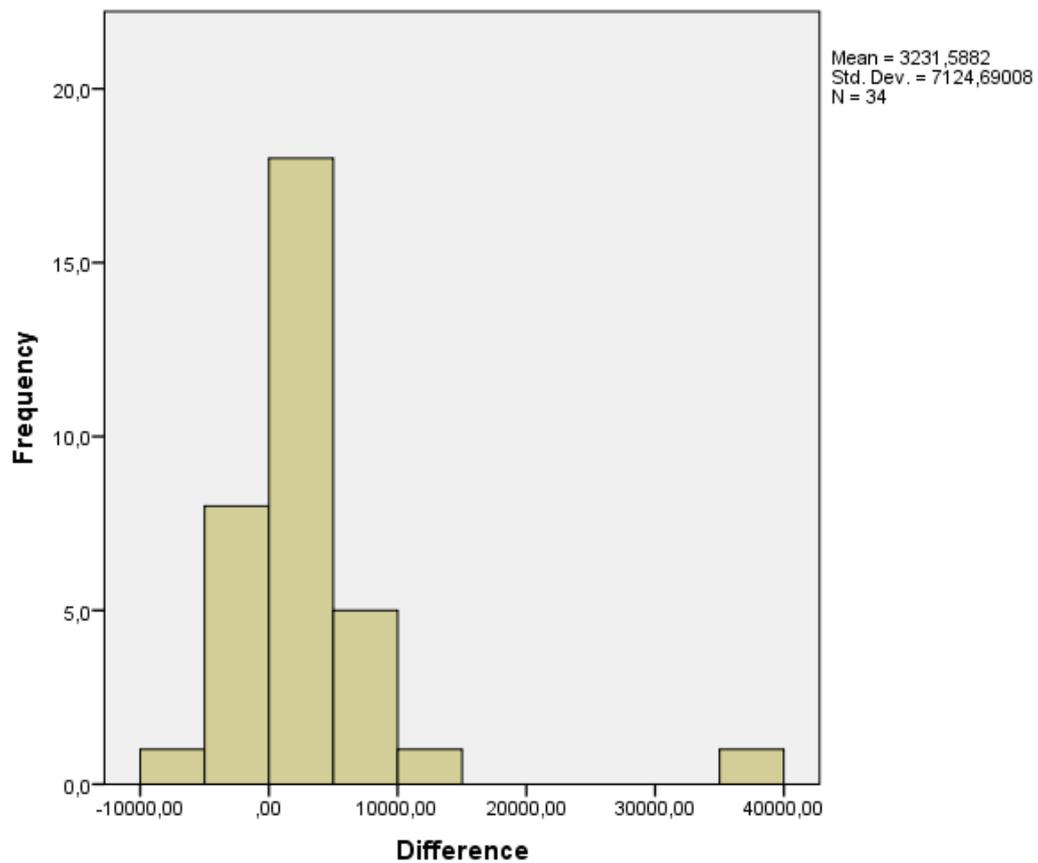http://www.sustainablereporting.eu/sweden (Hämtad 2014-11-17).

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Appendix 1 – FRE distribution of differences

Appendix 2 – Word count distribution of differences

Appendix 3 – FRE and word count results

Företag	Flesch Reading Ease Score			Word count		
	2006	2010	difference	2006	2010	difference
Alfa Laval	40,3	34,5	-5,8	2322	2099	-223
Assa Abloy	40,6	37,3	-3,3	1861	3683	1822
Astra Zeneka	21,5	30,8	9,3	1162	7446	6284
Atlas Copco	37,5	29,1	-8,4	10461	14686	4225
Autoliv	26,1	44,2	18,1	1247	2426	1179
Axfood	61,3	38,2	-23,1	2348	7015	4667
Billerud	42,4	35,9	-6,5	2779	11886	9107
Castellum	34,3	31,8	-2,5	1855	1869	14
Electrolux	37,5	36,3	-1,2	6109	1450	-4659
Ericsson	20,1	20	-0,1	518	1232	714
Getinge	21,7	19,5	-2,2	1386	5180	3794
H&M	44,5	55,6	11,1	2434	3683	1249
Handelsbanken	44,2	47,1	2,9	3084	40012	36928
Hufvudstaden	17,5	39,5	22	588	2012	1424
Husqvarna	27,8	21,8	-6	2412	3320	908
JM	37,9	40,3	2,4	3007	4110	1103
Lundin	38,5	34,1	-4,4	1724	15445	13721
Millicom	32,1	42,6	10,5	1156	1804	648
NCC	20,7	30	9,3	2449	4748	2299
Nibe	20,4	33,9	13,5	548	5949	5401
Nordea	32,6	41,4	8,8	2328	1248	-1080
Oriflame	33,7	36,1	2,4	1192	4634	3442
Saab	42,1	36,1	-6	574	5502	4928
Sandvik	26,1	23,3	-2,8	639	932	293
SEB	26,2	13,6	-12,6	1630	1043	-587
Skanska	34,4	37,3	2,9	4388	4893	505
SKF	27,1	34	6,9	10879	15324	4445
Sobi	30,7	32,1	1,4	1501	1296	-205
SSAB	45,1	46,7	1,6	3408	2440	-968
Swedbank	34,2	27,6	-6,6	1668	1372	-296
Swedish Match	22,9	32,9	10	2076	9974	7898
Tele2	37,2	27,8	-9,4	1351	395	-956
Trelleborg	27,4	31,4	4	2014	10372	8358
Volvo	29	36,7	7,7	9742	3234	-6508

Appendix 4 – FRE frequencies and proportions

Difficulty level	FRE rating	Frequencies		Percentages	
		2006	2010	2006	2010
Very difficult	0-30	14	9	41%	26%
Difficult	31-50	19	24	56%	71%
Fairly difficult	51-60	-	1	-	3%
Standard	61-70	1	-	3%	-
Fairly easy	71-80	-	-	-	-
Easy	81-90	-	-	-	-
Very easy	91-100	-	-	-	-
Sum		34	34	100%	100%