THE FIRST TIME ASSURANCE ON SUSTAINABILITY REPORTS AND RISK PREMIUMS

Authors
Nawras Akkam
Bih Norberter Andusa Ambele

Supervisor
Prof. Catherine Lions

Students
Umeå University
Umeå School of Business and Economics - Accounting Department
Autumn Semester 2015
Master Degree Thesis, 2-year, 30hp
Abstract

The economic utility of sustainability has been a recent domain under scrutiny by several academicians. More specifically, researchers have investigated the positive effects of sustainability reporting on firms from different angles. One of these angles is sustainability’s effect on firms’ prestige in the market, which is inevitably connected to market indicators, such as, risks and returns. Consequently, this research paper is positioned as a complement to previous researchers’ work within the field of sustainability reporting and its positive effects on firms. This paper’s foremost aspiration is to fill a knowledge gap in research by finding empirical evidence whether the first time assurance on sustainability reports causes a lower subsequent cost of equity capital. For this matter, the researchers’ methodology was deductive in nature, which relied on investigating established theories that are connected to the two dimensions of the research question; cost of equity capital and assurance on sustainability reports. This investigation formed the researchers’ theoretical schemata upon which they both neglected certain theories in favour of others and formed a verifiable theoretical research hypothesis. In this research, Sweden, a country known for its dedication for sustainability, was chosen as a market from which a sample was collected. The researchers conducted their study in a panel format where the same information about 44 different companies was collected on several years. Due to the fact that the number of listed firms that had been reporting their sustainability reports was quite moderate, a census study was convenient and applicable. The researchers ended up with a sample of 44 firms that constituted 352 observations, which formed the basis for the statistical inference. The empirical study employed several regression models of panels to reach the most representative model that fitted the data in hand. Also, to guarantee higher quality results the fitted model, the Two-way Error Component Fixed-effects Model, was tested for heteroskedasticity, cross-sectional correlation, autocorrelation and non-stationarity. This model revealed a relatively low explanatory power that drove the researchers to interpret their statistical findings with great caution. At a specific level of statistical significance, the regression model revealed a significant correlation between assurance on sustainability reports and a subsequent lower cost of equity capital. This result was refuted at higher levels of significance. Thus, the researchers were able to answer the research question affirmatively, to a certain extent, and to demonstrate that the research’s results verify the underpinnings of neo-institutional and signalling theories.

Key Words: Sustainability, Assurance, Cost of Equity, Reporting, Risk, Environment & Sweden.
Acknowledgement

We, the researchers behind this academic paper, would like to address our greatest gratitude to all the unknown soldiers whom without their kind assistance, guidance and support none of this work would have seen the light. First and foremost, the greatest gratitude is attributed to the brilliant professor Catherine Lions whom was more than just a supervising professor. She surrounded us with such outstanding care, love and dedication that only a mother and caring mentor, who is deeply passionate about her work, would be willing to provide. Thankfulness is also credited to our friends and colleagues, Sebastian Würtz and David Deoben, whom provided us with a highly insightful critique during the process of writing this paper and whom also wrote a high quality master-degree thesis that inspired us and helped us to benchmark our work with a superior paper that dealt with a dataset quite similar to the one used in this study. Gratitude is also credited to the Swedish Institute (SI) whom without its generous scholarship we would not have been here to write this master degree thesis. Umeå University also has a very unique place in our hearts. Without the dedication of its staff and the facilities they have provided us, the process of enlightenment and becoming more knowledgeable about the world would have been inevitably difficult. Finally, we would like to thank our families and friends whom constantly supported us during the process of writing this thesis and were there for us whenever needed.

For everything you have done for us, Thank You!

Nawras Akkam & Bih Norbeter

25 September 2015
Table of Contents

List of Figures VII
List of Tables VIII
List of Abbreviations IX
List of Appendices X

Chapter One – Introduction 1
1.1 Subject Background 1
1.2 Conceptualization 2
1.2.1 Sustainability 2
1.2.2 Sustainability Reporting (SR) 3
1.2.3 SR Assurance 4
1.2.4 Cost of Equity Capital (COEC) 6
1.2.5 The Connection between SR Assurance and COEC 6
1.3 Identification of a Knowledge Gap 7
1.4 Research Question and Purpose 7
1.5 Research Contributions 8
1.6 Delimitations 9
1.7 Thesis Disposition 10

Chapter Two – Research Methodology 11
2.1 Introduction to Research Philosophy 11
2.2 Researchers Background and Preconceptions 12
2.3 Ontology – Nature of Reality 12
2.4 Epistemology – How to Build-up Knowledge about Reality 13
2.5 Research Paradigms 15
2.5.1 Assumptions about the Nature of Social Science 15
2.5.2 Assumptions about the Nature of Society 17
2.5.3 Four Paradigms: Two Dimensions 18
2.6 Research Approach 19
2.7 Research Design 21
2.7.1 Research Classification 21
2.7.2 Data Sources 22
2.7.3 Time Horizon 23
2.7.4 Research Strategy 24
2.8 Literature Sources 24

Chapter Three - Theoretical Framework 26
3.1 Literature Review 26
3.1.1 Demand on Voluntary Audit 26
3.1.2 SR Assurance 27
3.1.3 SR Assurance and COEC 29
3.1.4 Literature Review Summary 30
3.2 Theoretical Rationality
   3.2.1 Philosophical Underpinnings
   3.2.2 Neo-Institutional Theory
   3.2.3 Signalling Theory
3.3 Theoretical Positioning
3.4 Theoretical Model
3.5 Theoretical Hypothesis Development

**Chapter Four – Empirical Methodology**
4.1 Data Collection
4.2 Sampling
   4.2.1 A Census Study
   4.2.2 Sampling Survivorship Bias
4.3 Empirical Regression Model
   4.3.1 Fixed Effects Model
   4.3.2 Random Effects Model
   4.3.3 Applied Model
   4.3.4 Variables Identification
4.4 Study Time-Line
4.5 Data Analysis Software
4.6 Statistical Aspects
   4.6.1 Theme 1 - Regression Assumptions
   4.6.2 Theme 2 - Statistical Tests
4.7 Hypotheses

**Chapter Five – Empirical Results**
5.1 Descriptive Statistics
   5.1.1 Preliminary Panel Analysis
   5.1.2 Classical Multiple Linear Regression (OLS) Model
   5.1.3 Normality of Residuals
5.2 Fitted Model Statistical tests
   5.2.1 One-way Error Component FE Model
   5.2.2 One-way Error Component RE Model
   5.2.3 Two-way Error Component FE Model
   5.2.4 Two-way Error Component RE Model
   5.2.5 Mixed Effects Model
5.3 Diagnostic Tests
   5.3.1 Heteroskedasticity
   5.3.2 Cross-sectional Dependence
   5.3.3 Autocorrelation (Serial Correlation)
   5.3.4 Stationarity
5.4 Correcting Measures

**Chapter Six – Analysis of Results**
6.1 Reflections on Observational Distributions
6.2 Significant Results
6.2.1 Association between COEC and SR Assurance 76
6.2.2 Other Significant Results 77
6.3 Insignificant Results 78
6.4 Tests of Hypotheses 79
6.5 Verification of Theory Mirror Model 80
6.6 Constraints on the Analysis of Results 81

Chapter Seven - Conclusion 83
7.1 Conclusion 83
7.2 Quality Criteria 84
7.2.1 Reliability 84
7.2.2 Validity 85
7.2.3 Limitations 87
7.3 Recommendations for Future Research 87

Chapter Eight – Ethical & Societal Aspects 89
8.1 Ethical and Societal Considerations 89
8.2 Societal Contributions 92

References 94
Appendices 107
Glossary 113
List of Figures

Figure 1. A Scheme for Analysing Assumptions about the Nature of Social Science, 16
Source (Burrell & Morgan, 1985, p.3)
Figure 2. Four Paradigms for the Analysis of Social Theory, 18
Source (Burrell & Morgan, 1985, p.22)
Figure 3. Research Methodology 24
Figure 4. Literature Review Summary 30
Figure 5. Theoretical Model 38
Figure 6. Applied Regression Model 46
Figure 7. Study Time Frame 50
Figure 8. Statistical Analysis Roadmap 57
Figure 9. Normality of Residuals 61
Figure 10. Heteroskedasticity MW Test 68
Figure 11. Pesaran CD Test for Cross-Sectional Dependence 69
Figure 12. Autocorrelation Test 69
Figure 13. Verification of Theory Mirror Model 81
## List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Observations Distribution</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>OLS Regression Model</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>One-way Error Component FE Model</td>
<td>62</td>
</tr>
<tr>
<td>4</td>
<td>One-way Error Component RE Model</td>
<td>63</td>
</tr>
<tr>
<td>5</td>
<td>LM Test (1)</td>
<td>64</td>
</tr>
<tr>
<td>6</td>
<td>Two-way Error Component FE Model</td>
<td>65</td>
</tr>
<tr>
<td>7</td>
<td>Time Effects Significance Test</td>
<td>66</td>
</tr>
<tr>
<td>8</td>
<td>Mixed Effects Model</td>
<td>67</td>
</tr>
<tr>
<td>9</td>
<td>LM Test (2)</td>
<td>68</td>
</tr>
<tr>
<td>10</td>
<td>Hadri Stationarity Test</td>
<td>70</td>
</tr>
<tr>
<td>11</td>
<td>Robust SD, t- &amp; F- Statistics</td>
<td>72</td>
</tr>
<tr>
<td>12</td>
<td>Corrected Fitted Model</td>
<td>73</td>
</tr>
<tr>
<td>13</td>
<td>Summary of Tests of Hypotheses</td>
<td>80</td>
</tr>
</tbody>
</table>
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCA</td>
<td>Association of Certified Chartered Accountants</td>
</tr>
<tr>
<td>AICPA</td>
<td>Association of Charted Public Accountants</td>
</tr>
<tr>
<td>BODs</td>
<td>Boards of Directors</td>
</tr>
<tr>
<td>COC</td>
<td>Cost of Capital</td>
</tr>
<tr>
<td>COD</td>
<td>Cost of Debt</td>
</tr>
<tr>
<td>COEC</td>
<td>Cost of Equity Capital</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
</tr>
<tr>
<td>EMAS</td>
<td>Eco-Management and Audit Scheme</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>EY</td>
<td>Ernst &amp; Young</td>
</tr>
<tr>
<td>FE</td>
<td>Fixed Effects</td>
</tr>
<tr>
<td>GRI</td>
<td>Global Reporting Initiative</td>
</tr>
<tr>
<td>IPOs</td>
<td>Initial Public Offerings</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-governmental organizations</td>
</tr>
<tr>
<td>OFs</td>
<td>Organizational Fields</td>
</tr>
<tr>
<td>PE</td>
<td>Political Economy</td>
</tr>
<tr>
<td>RE</td>
<td>Random Effects</td>
</tr>
<tr>
<td>SR</td>
<td>Sustainability Reporting</td>
</tr>
<tr>
<td>SRs</td>
<td>Standalone (non-financial) Sustainability Reports</td>
</tr>
<tr>
<td>UNWCED</td>
<td>United Nations World Commission on Environment and Development</td>
</tr>
<tr>
<td>USBE</td>
<td>Umeå School of Business and Economics</td>
</tr>
</tbody>
</table>
List of Appendices

Appendix 1: History of SR 107
Appendix 2: Assurance - Definition 108
Appendix 3: LSDV Estimation 110
Appendix 4: Sample Participants 111
Chapter One – Introduction

This chapter serves as a prologue for this thesis; therefore, the reader will be initially introduced to the subject background. Secondly, the necessary conceptualization to form the mental schemata of the reader will be presented. Conceptualization will clarify the concepts of ‘Sustainability’, ‘Sustainability Reporting Assurance’ and ‘Cost of Equity Capital’. The link between SR assurance and COEC is then established. Thirdly, an identification of a knowledge-gap is presented, which the authors by its fulfilment attempt to provide a contribution to the research arena. Fourthly, the research question, purpose, contribution and delimitation are discussed. This chapter is finally concluded by the disposition of this dissertation.

1.1 Subject Background

Sustainability has gained much of researchers’ attention in the last couple of decades’ literature. Although recent papers are in favour of the economic utility of sustainability, the wax-and-wane debate on such a utility has not rested till now on either side. Empirical and theoretical evidences are quite mixed. On one hand, some authors, who have political economy and agency theories as their theoretical underpinnings, argue that being sustainable is an extra cost on firms that should be minimized whenever possible so that shareholders’ value is maximized and interest of investors is increased (Mahaparta, 1984, p.29). Other authors, on the other hand, who have resource-based theoretical underpinnings (e.g. supporters of competitive advantage theory), have argued that a better utilization of resources that stems from entities green portfolio (i.e. behaving sustainably) can increase firms’ economic efficiency. The vision of these authors contradicts the first argument that sustainability fails the cost-benefit battle (Bansal, 2005, p.197; Barney, 1991, p.771; Darnall & Edwards, 2006, p.301; Hart, 1995, p.986; Sharma & Verdenburg, 1998, p.729); (Sharfman & Fernando, 2008, p.569). Notwithstanding, companies today are increasingly publishing separate, general purpose, non-financial sustainability ‘standalone’ reports (SRs). Some authors posit that this practice of SRs publication is becoming mainstream and an expected common part of the business conduct.

Assurance on these reports is voluntary; therefore, assured and non-assured sustainability reports are both evident. This assurance service is mostly provided by firms known in the audit profession (e.g. EY, PwC, etc.) or by specialized consultancy firms. Yet, SRs assurance benefits have been the fuel for a hot debate between scholars. From one perspective, some consider SR assurance a mechanism to enhance the credibility of sustainability reports, to build-up the corporate reputation, to signal a higher level of transparency and commitment to social issues, especially in a stakeholder oriented country (Simnett et al., 2009, p.937), and to develop efficient internal reporting systems (Park & Brorson, 2005, p.1095). From another perspective, others have argued that SR assurance losses the cost-benefit battle when making a managerial decision, and that there is not enough empirical support to argue in favour of its role in enhancing the credibility of SRs or in maximizing shareholders value (Park & Brorson, 2005, p.1095).
The research in the field of voluntary assurance on sustainability reports is still modest (Simnett et al., 2009, p.942), as later explained in this chapter. This fact makes this topic worthwhile for further investigation and questioning whether SR assurance is beneficial for companies’ performances in the financial markets. For that matter, utilizing certain measures (proxies) (e.g. assurance on SRs) as indicators of better environmental ‘sustainability’ performance (i.e. better environmental risk management) by connecting them to certain proxies of better economic performance (e.g. cost of equity capital (COEC) or stock returns) would provide insights and enhance the current knowledge about the market’s dynamics.

Thus, and in relation to the conceptualization and previous literature review and the identification of a knowledge gap paragraphs provided hereunder, the researchers will try to investigate whether the assurance on sustainability reports as a service causes a reduction in risks resembled by a reduced COEC.

Apropos this research intention, the authors would like to address this paper to those people who have a relative background in accounting and finance disciplines. Ideally, the audience should be indulged in sustainability and/or assurance services to find the material and knowledge provided digestible and interesting simultaneously.

1.2 Conceptualization

1.2.1 Sustainability

Sustainability (Sustainable development as a predecessor term (White, 2013, p.213)) is contentious in an organizational context. It has raised lots of arguments in previous literature and till today there is no concrete consensus on what sustainability means in an organizational context. The case of organizations is argumentative, as they are in a sustainable-development context unsustainable with an ultimate focus on profits. Previous literature has neither addressed organizations’ sustainability issue nor has it attempted to understand these organizations in a sustainable development context (Bebbington & Larrinaga, 2014, p.395-397). Nevertheless, we can witness a consensus about two general approaches towards the meaning of sustainability in previous literature. The first one is based, and most frequently been referred to, on UNWCED’s Brundtland Report 1987 (p.8) as ‘meeting the needs of the present without compromising the ability of future generations to meet their own needs’ (Bebbington & Larrinaga, 2014, p.395-396; Unerman et al., 2007, p.70). This gives sustainability an equity goal (i.e. assuring equal rights to the current living human beings and the future generations to come) (Bebbington et al., 2014, p.56). The second one is an ecosystem-based approach, which considers the cumulative effect of firms’ activities on environmental change and economies (Gray & Milne, 2002, p.69). It is an approach that is concerned about today’s coexistence with the surroundings and the current status of humanity’s environmental footprint. Thus, in the sense of this elusion in conceptualization and the various
perspectives people have about sustainability White (2013, p.217) has proposed to simply consider it as a ‘vision of the future’. This is a vision that is shared by the researchers of this paper due to its plurality and inclusion of different elements, yet in simple terms.

Notwithstanding, the authors would like to raise the reader’s attention to the fact that in some occasions sustainability ‘as a term’ is confused with the very common phrase of Corporate Social Responsibility - CSR”. This term is in fact congruent with the second approach for defining sustainability and it is usually used to determine if an entity is socially responsible. It incorporates the 5 dimensions of ‘ethical behaviour, transparency, communities’ progression, commercial success and environmental consideration’ (Dahlsrud, 2008, p.6-11). This means that the right of future generations (equity) is not in fact one of the roles of CSR, as the first approach for defining sustainability proposes. Thus, the authors of this paper have decided to rely on the term ‘Sustainability’ instead of CSR as it reflects a broader perspective of humanity’s righteous code of conduct.

1.2.2 Sustainability Reporting (SR)

The main aims of sustainability and its numerous benefits have initiated the need for companies to report on their sustainable activities. This reporting is what is referred to, herein an after, as Sustainability Reporting (SR). The benefits of SR has been summarized by EY (one of the leading Big-4 firms in assurance and consultancy services) in its 2013’s empirical study associated with the Boston College Center for Corporate Citizenship (p.12-15) in 7 dimensions; SR 1- ensures a better financial performance, 2- facilitates a greater access to capital, 3- contributes to more invocation, waste reduction and efficiency 4- functions as a tool for risk management, 5- has a greater influence on reputation and consumer trust, 6- elevates employees retention and recruitment, 7- has other social benefits. SR works as a mechanism to fulfil accountability requirements. Through its development phases (social, environmental and triple-bottom-line) it has been influenced by the corporations’ accountability doctrine; i.e. to whom corporates think they are accountable and what they are accountable for. In other words, companies’ sustainability reports (SRs) are based on a certain message, motivation and a calculated purpose to influence society’s discourse. Such an influence would frame the public opinion and expectations; consequently, it would shape regulations and laws (Bebbington et al., 2014, p.59; Unerman et al., 2007, p.62). Nature wise, in most cases SR reporting is still voluntary rather than compulsory, even though there are several bodies that promote specific guidelines and frameworks for SR; such as, the Global Reporting Initiative (GRI).

Standalone sustainability reports is one out of many other forms that companies communicate their sustainability activities by (Bebbington et al., 2014, p.53; Unerman et al., 2007, p.58). The focus of this study is solely on this mean of communication. Also, standalone SRs have developed through lots of stages in history until they reached their current shape, these stages are summarised in Appendix 1.
1.2.3 SR Assurance

1.2.3.1 Background

The demand for assurance is not new in nature. It descends back to old Greece (500-300 BC) where 3-board-of-state accountants assured accountability and control over governmental revenues and expenditures in a verification process by a system of checks-and-balances (Costouros, 1978, p.41, p.44-45). Not only laws give assurance and audit their necessity, but also the current development in today’s business and the massive amount of information that requires assurance (Eilifsen et al., 2014, p.5). The massive amount of today’s information requires the need for its reliability, understandability, relevance, and timeliness to be considered as high quality for end-users to make informed decisions. The assurance profession comes as a guarantee-provider of a triple criteria in business information; reliability, credibility and relevance. This guarantee is paramount to the functionality of the economic system we live in (Eilifsen et al., 2014, p.3, p.5).

Qualities of the assurance providers are also needed. Independent auditors’ reputation for competence, independence, objectivity and concern for the public interest are the main reasons behind charging them with providing assurance services. They are able to add credibility to the information produced and reported by management to outside parties (Eilifsen et al., 2014, p.6-7). Thus, it is not a surprise that audit firms (Big-4) and other consultancy companies where utilized to provide assurance services on sustainability reports. Thus, a provision of an overview of what is SR assurance and why SR assurance is prominent are inevitable in the subsequent 2 paragraphs to provide the reader a clear distinction in terminology and a better understanding of the research topic. A definition for assurance, as a term, can be referred to in Appendix 2.

1.2.3.2 SR Assurance - A Definition

All sustainability reporting standards issuing bodies have a common goal in increasing the quality of sustainability reports and the information provided by utilizing assurance, which has been defined by those bodies and set-up within certain criteria to ensure this provision of higher quality. SR assurance is quite a complex concept that has different dimensions.

From a conceptualization dimension, the global reporting initiative (GRI) has recommended “external assurance in the form of activities that result in published conclusions, systems or processes” as a voluntary measure to enhance the quality of sustainability report and the quantitative and/or qualitative information contained within it, or to report on certain processes such as the application of materiality principal or stakeholder engagement process. This definition excludes certifications of performance or compliance assessment processes that aim at validating the quality or level of performance. GRI has not excluded the importance of internal assurance resembled in the processes of checks and balances (internal control systems) to mitigate risks and assist in ‘controlling and corporate governance’ processes; hence, adding to the overall credibility and integrity of SRs (GRI, 2014. p.22).
From the dimension of the qualities required from an assurer, SR assurance providers are required to be external to the firm and to follow certain professional standards for assurance or apply systematic, documented, and evidence based processes. Additionally, AICPA in its white paper acknowledges that it is essential not only that an assurer meets the seven key qualities identified by GRI, but also that the assurance services are performed pursuant to professional standards established under due processes and accompanied by an independent oversight (GRI, 2014, p.31).

From the dimension of the scope of an SR assurance engagement, it is seen as unlimited, yet it can be focused on certain issues; such as, data quality or processes. This scope is left for the assurer’s discretion to collect the necessary data that allows him to report his opinion (GRI, 2014, p.21, 47, 48).

From the dimension of the outcome of SR assurance, an assurance report is the final result of an SR assurance engagement. This is where the assurer expresses his opinion regarding the credibility of the assured sustainability report. This statement of opinion may be disclosed as part of the sustainability report, drafted and often signed by the assurer. The form and content of this statement of opinion is relative to the assurance standards implemented, assurance provider, level and scope of external assurance (GRI, 2014, p.39).

1.2.3.3 Prominence of SR Assurance

There are two mainstream benefits that stem from assurance on SRs, external and internal. On one hand, external benefits are resembled in enhanced credibility and reliability of sustainability information provided (Bebbington et al., 2014, p.72; Unerman et al., 2007, p.168) especially in the case of positive disclosures. Readers are more willing to believe the negative disclosure than the positive, hence, assurance appears to be inevitable for adding an equal level of credibility and believability to the positive disclosure (EY, 2013, p.17); which would allow stakeholders to make well-informed decisions (GRI, 2014, p.4). Generally, in a sustainability context, parties responsible for external assurance and such services are responsible for organization’s transparency in providing relevant, reliable and understandable information in their sustainability reports (i.e. the assurance opinion would increase the confidence of report-users in the reliability of reported information). Hence, firms which ‘fail to obtain assurance on their reports are likely to face issues of credibility’ (ACCA, 2004, p.15). This is achieved by assurance providers’ statements of opinion communicated to external parties, which certify such transparency in organizations’ reports. Whereas, the people who are responsible for sustainability accounting are responsible for serving the ethic of accountability by providing the necessary information to make the actions of the firm understandable to others and to hold those responsible for the ramifications of such actions (Unerman et al., 2007, p.48, 168). On the other hand, internal benefits are resembled in 3 aspects; ‘improved overall management of performance in relation to existing policies and commitments, improved risk management and better understanding of emerging issues’ (Zadek et al., 2004, p.16; Bebbington et al., 2014, p.72; Unerman et al., 2007, p.168).
Agreeing with what has been said above; different SR-advocate bodies, such as; the GRI and AICPA have also provided their insights on the importance of such practice. Initially, GRI has declared the importance of robust assurance for sustainability reports by emphasizing its role in ‘strengthening the quality of reporting and final reports, promoting the correct application of GRI Guidelines and strengthening companies’ ability to continually improve their performance and ensure quality management decisions (GRI, 2014, p.12). Thus, increased credibility, improved stakeholder engagement, reduction of risk and increment of value are the central issues that drive firms to assure their SRs (GRI, 2014, p.18). Other benefits that show the importance of sustainability assurance would be increased recognition and trust (i.e. it evades tactics; such as, Green-washing. It strengthens CSR and it ensures comparability across sectors), improved board and CEO level engagement, strengthening internal reporting and management systems and improved stakeholder communications (GRI, 2013, p.6-7; GRI, 2014, p.19). Secondly, AICPA in its 2013 white paper has also emphasized the important role external assurance has in ensuring credibility in sustainability reporting; and therefore, lowering transaction costs and reducing uncertainty levels. Consequently, SR assurance increases the confidence of decision makers in the information they rely on (AICPA, 2013, p. 3, 4; GRI, 2014, p.17).

1.2.4 Cost of Equity Capital (COEC)

The cost of equity capital (COEC) is one component than when added to the cost of debt (COD) would constitute a firm’s cost of capital. In definition the cost of capital (COC) is ‘the expected rate of return demanded by a firm’s investors for investing in the firm therefore, it resembles the amount of risks perceived in the market regarding investing in a particular firm. Deterministically, a COEC is ‘the rate of return a firm pays, from a theoretical perspective, to its equity investors (shareholders) to compensate them for the risk they undertake by investing their capital’ (Sharfman & Fernando, 2008, p.572). Further discussion on COEC is left to later chapters.

1.2.5 The Connection between SR Assurance and COEC

Assurance on sustainability reports should be viewed as a proxy for improved risk-management for a variety of reasons. The benefits of assurance described earlier should reduce both immediate risks (from known hazards) and future risks (from currently unknown hazards); which both cause a level of uncertainty that begets a financial impact on the entity. When a firm reduces those hazards, it would reduce the possibilities of future conflicts and their associated costs; such as, claims from stakeholders or the government and their associated litigation costs. This reduction in potential claimants would increase the possibility of making future higher profits by reducing the cost burden. Simultaneously, these higher future profits would contribute to strengthening the entity’s financial position (i.e. solvency and liquidity) and prospects. This would allow it to pay its debts earlier, make more investments or acquisitions. From an investment point of view, the market is supposed to read (signal) these good future prospects and reward the entity accordingly by considering it a less-risky business. From one perspective, better environmental ‘sustainable’ risk management (i.e. improving a firm’s risk
exposure) can reduce an entity cost of capital (COC) in 3 ways (Sharfman & Fernandon, 2008, p.573):
1- By reducing the firm’s cost of debt (COD).
2- By reducing the firm’s debt capacity; i.e. benefiting from the tax shield that stems from increasing the amount of income the firm can protect from corporate taxation.
3- By reducing the firm’s cost of equity (COEC).

This paper, nevertheless, is only concerned with the last possibility of reducing the firm’s cost of equity. Thus, the authors of this paper will test several theoretical and statistical hypotheses to decompose what drives such a reduction and to see if such a relationship exists.

1.3 Identification of a Knowledge Gap

To better understand the position of this thesis in relation to previous research, the authors would briefly examine earlier work conducted based on 3 dimensions. First, they would examine the previous work conducted on the demand for voluntary audit, second on assurance on sustainability reports and third on the relationship between assurance on SRs and the cost of equity capital. Their examination is reported explicitly in chapter 3 under the title “Literature Review”. Based on this literature review, the researchers have observed that research in SR assurance practice is still immature or ‘in its infancy’ as O’Dwyera et al. (2011, p.50) describes it. Given the societal and political attention being afforded to corporate social and environmental activities and consequences (Cf. O’Dwyera et al., 2011, p.32), the authors are provided with a vivid domain that can be studied from different angles. The rapid increase in sustainability standalone reports’ assurance, which exceeded 45% of total reporting firms (GRI, 2014), raises lots of questions among researchers; e.g. what are the rationales behind this type of voluntary assurance? What benefits do firms gain by spending resources on SR assurance?

The cost of equity capital (COEC) can potentially provide an explanation for the increasing trend in SR assurance. The focus on COEC is due to mainly two aspects; initially, its crucial role in firm’s financing and general operations decisions (Dhaliwal et al., 2011, p.60). Secondly, the existence of a long standing interest among scholars on the relationship between disclosures ‘in general’ and COEC (Diamond & Verrecchia, 1991, p.1325; Botosan, 1997, p.323; Leuz & Verrecchia 2000, p.91; Botosan & Plumlee, 2002, p.323). This relationship between standalone SRs assurance and subsequent financial performance (resembled in the effect on COEC) has not been investigated yet, especially from institutional and signalling theories perspectives; therefore, a knowledge gap is empirically evident for this paper’s researchers to attain.

1.4 Research Question and Purpose

Following the previous established connection between the cost of equity capital and assurance on sustainability reports and in relation to the knowledge gap identified earlier, the authors are proposing the following question as a topic under investigation in their research paper:
Does voluntary assurance on standalone sustainability reports reduce the cost of equity capital?

As the discussion before suggests, this research question would be tackled by a focal viewpoint resembled in the form of a main theoretical hypothesis. The verification of this hypothesis should establish an answer for the research question.

The purpose of this research is, therefore, to establish a connection between first time adoption of standalone SR assurance and the subsequent reduction of cost of equity capital. For this purpose both institutional and signalling theories would be utilized to develop the researchers’ theoretical hypothesis and to provide better insights while analysing the results. Thus, this research aims at shedding the light on one of the roles of assurance on standalone sustainability reports as appraiser of credit worthiness (hence, as a proxy for improved risk management) reflected in the increment in perceived legitimacy and its relation to corporates’ cost of equity capital. This benefit, which is associated with the market consensus of a better performance, might be read as one of the many drivers of firms’ decision to follow the current increasing trend in acquiring standalone SRs assurance; hence, this research paper would indicate if this reduction is a factor in the decision making process.

1.5 Research Contributions

This research paper has an aim in mind to provide three main contributions, academic, social and personal.

The academic contributions of this paper are inherent in its anticipated findings. The findings ought to enrich theory by showing that assured standalone SRs signal to the financial markets that firms represent a less risky investment that deserves lower equity risk premiums (i.e. a lower COEC). In other words, the authors are trying to extend the traditional research of voluntary disclosure beyond the narrow focus of financial disclosure, by providing evidence on the rationales behind and the consequences of SR assurance purchase.

The social contributions of this paper are business-oriented, which means the paper is hoped to provide practical implications for firms. By the conclusion of this research paper, the authors would be able to report on the importance of SR assurance and its role in singling better risk management performance to the market that is resembled in a lower cost of equity capital. This is beneficial in a business context as it would contribute to the decision making process. Assurance services’ fees are always perceived high, especially when provided by big-4 firms; hence, reporting the importance of SR assurance would support the claim that SR assurance wins the cost-benefit battle (i.e. such a service is worthwhile its costs). This indicates that firms are supposed to acquire such a service to signal higher transparency and legitimacy to the market, even if those costs are a bit high. If the conclusion, on the other hand, deemed the unimportance of SR assurance, this would aid managers in their argument against the high costs of SR assurance that exceed
its benefits. This would allow them, if accepted by other stakeholders, to lower these costs associated with SR assurance.

The personal contributions of this paper are inherent in satisfying the researchers’ curiosity about the financial markets and how they operate. Also, it would allow them to fulfil the last step of their academic process as master degree students, so that they can pursue their career goals and achieve their 2-year-old established commitment to provide useful knowledge to the academic arena.

By the end of this thesis a further discussion on the successfulness of this thesis in reaching these goals is provided.

### 1.6 Delimitations

One of the delimitations of this research paper is the plurality of the sample used. The authors referred to GRI database to collect the necessary information about firms that assure their standalone sustainability reports. Thus, there might be other firms within the country of investigation (Sweden) that have reported their sustainability reports in accordance with other bodies’ guidelines and acquired assurance on them, but have not been included in this study. Regarding this matter, the authors perceive that the likelihood of such incidences is very minimal as GRI guidelines are widely accepted and adhered to in and outside the EU. Additionally, there is no other official body that provides the same level of comprehensive data sources which was available compared with the GRI database that the authors did not attempt to refer to.

Also, because the registration of reports with GRI is not a requirement, there might be some reports that have not been included in this research. To overcome this shortcoming, the authors referred to all the companies’ websites (the ones that are active in the financial market and listed) and checked whether they have published assured SR reports that were not included in the GRI database.

Another delimitation concerns the database utilized. Although GRI data-base includes usually the sign + to indicate that SRs are assured, the authors decided to check all the reports available in the database manually, one by one, whether these signs were attached to the reports or not, to ensure a higher level of data trustworthiness and to minimize the possibilities of any systematic errors in the database.

Moreover, this research paper has not, by any means, investigated the different scopes, interpretation or other key qualities in assurance reports and their link to COEC. This is beyond what the authors are trying to investigate and would require a whole different research question and development of new hypotheses and research methodology. Therefore, their main aim was to investigate the linkage between the two variables, but not to describe their underpinning phenomena.
1.7 Thesis Disposition

The first chapter aims at introducing the topic and what the researchers are trying to find an answer for.

The second chapter presents the research methodology adopted by the researchers. In this chapter the authors address several issues. Initially, the main methodological concepts that constitute the conceptual base for their paper are discussed. Secondly, the research paradigms (i.e. ontology and epistemology), approach and design are discussed to provide the reader with a sufficient background about the methods and techniques the paper is build upon.

The third chapter presents the theoretical framework, which constitutes the theoretical underpinnings by which the hypotheses of this study would be developed.

The fourth chapter presents a description of the data collection procedures and models used to analyse the data and to provide legitimate statistical inferences.

The fifth chapter presents the empirical results and how each statistical hypothesis was verified by each empirical finding.

The sixth chapter provides a discussion of the interpretation of results and how the empirical findings verify established theory and previous empirical studies.

The seventh chapter presents the authors’ concluding remarks, quality criteria and recommendation for future research.

The eighth chapter provides insights on the ethical and societal consideration, and societal contributions of this paper.

The authors would like to inform the readers that the attached appendices constitute an integral part of this thesis and they contribute to additional pedagogical knowledge in the subject matter. Thus, the authors recommend the readers to take them into their consideration while processing and assessing the quality of knowledge provided.
Chapter Two – Research Methodology

“Methodology is concerned with the logic of scientific inquiry; in particular with investigating the potentialities and limitations of particular techniques or procedures. As a term it pertains to the science and study of methods and the assumptions about the ways in which knowledge is produced” (Grix, 2002, p.179).

In this chapter, the research methodology the authors adopted in their research is explained. A detailed description of the way they understand the nature of reality and how they intend to build-up and contribute to existing knowledge are illustrated. In addition, an anatomy of their strategies of inquiry and chosen research design and techniques will also be elaborated. All of which coupled by an in-depth philosophical reasoning would dissolve together to enlighten the reader of the methodological bedrock that this study is established upon.

2.1 Introduction to Research Philosophy

Conducting any research is supposed to be based on a concrete and clear method, so that philosophical criticism risk is mitigated (Ryan et al., 2002, p.8). This used method by the researchers should present their philosophical stances clearly regarding how knowledge is built and from where it originates (i.e. ontology and epistemology) (Saunders et al., 2012, p.128-129), because of two reasons. Initially, these stances, worldviews, will shape the entire research paper that the researchers are aiming to present (Creswell, 2009, p.5, 6; Saunders et al., 2012, p.128; Burrell & Morgan, 1985, p.24). Secondly, they allow the researchers to ‘avoid confusion when discussing theoretical debates and approaches to social phenomena’ (Grix, 2002, p.176).

Following on Plato’s notion on science where it was described as ‘justified true belief’ (Ryan et al., 2002, p.11) the authors will compose a framework upon which they would explain and justify their methodological choices and philosophical positions. Their aim is to justify their knowledge (beliefs) about an objective truth (reality) through logical, mathematical, and observational methods.

In an approach to fulfil the academic requirements of a scientific thesis, the authors will initially provide the reader with a feedback on their backgrounds and any preconceptions they might hold. Secondly, an elaboration of their ontological and epistemological positions that conform to their philosophy in research will be discussed. Thirdly, they will take the reader into a journey around scientific research paradigms and how their thesis is positioned in compliance with those paradigms. Finally, a discussion of the research approach, design, strategy and methods will be presented to provide their justification for an objective reality.
2.2 Researchers Background and Preconceptions

The authors of this thesis are currently in their final year of a master degree program in accounting at the Umeå School of Business and Economics (USBE). They have during the last year of coursework developed a keen interest in sustainability related issues. Both authors possess prior experience in the assurance practice arena coupled with a prior academic knowledge and interest in accounting and finance disciplines. Both of these experiences constituted the driving force to choose their research topic.

The idea of this research paper was influenced greatly by the publications of well-known academic researchers that have a profound reputation and interest in sustainability related issues, such as Jan Bebbington, Jeffery Unerman and Brendan O’Dwyer. The authors of this paper attribute their thesis largely to the scientific knowledge contributed by these phenomenal professors whom have influenced them tremendously especially while formulating their theoretical framework. Other ideas from other researchers were also taken into consideration and referenced whenever needed to enrich the material provided with state-of-the art quality information. Although the influence is evident from the previous work of these researchers, the authors of this paper did not have any personal preconception that would affect their attitude towards the researched topic. In that sense, personal biases are minimized if not nullified, as all built-up arguments were based on scientific facts and established knowledge in the academic arena.

2.3 Ontology – Nature of Reality

In simple terms ontology represents ‘what is out there to know about’ (Grix, 2002, p.175). The ontological assumptions (claims) are the researcher’s thoughts about what he or she thinks constitute the social reality (Blaikie, 2000, p.8). Thus, ontology is the initial station that a researcher should cease at in any research he or she conducts before proceeding more in research (Grix, 2002, p.177). Each individual is the product of his experiences, environment and cultural context; hence, he or she has his own view of what constitutes social reality. This personal ontology is supposed to be understood, explained and defended so that a clear answer (Grix, 2002, p.177); i.e. an empirically irrefutable assumption (Hughes & Sharrock, 1997, p.5-6) is being provided to what the researcher’s vision about the ‘nature of the social and political reality to be investigated’ is (Hay, 2002, p.63).

There are two main opposing perspectives of how social reality is constructed; ‘Objectivism’ and ‘Constructivism’ (Grix, 2002, p.177); i.e. how a researcher can make sense of the milieu of organized facts that surround him.

On one hand, ‘Objectivity’ is defined as “a method of acquiring knowledge by reasoning solely based on the facts of reality and in accordance with the laws of logic” (Wallage, 2000; cited in Çakir, 2012, p.665). In this sense, an objectivist (realist or protagonist) researcher has ‘an ontological position which asserts that social phenomena and their meanings have an existence that is independent of social actors’ (Bryman, 2001, p.16-18); hence, he or she advocates the statement which indicates that only reason can reveal
true knowledge (Çakir, 2012, p.665). This posits that personal perceptions have no effect on reality (Grix, 2002, p.177). Reality is just given out there in the world (Burrell & Morgan, 1985, p.1). It is one-dimensional (Collis & Hussey, 2009, p.59).

On the other hand, a constructivist (relativist or antagonist) researcher has an alternative ontological position that ‘asserts that social phenomena and their meanings are continually being accomplished by social actors. Social phenomena and categories are not only produced through social interaction but they are also in a constant state of revision’ (Bryman, 2001, p.16-18) Reality is multi-dimensional (Collis & Hussey, 2009, p.60). This means that social phenomena are determined by the interaction of social actors within their environment that is shaped by their preconceptions (Saunders et al., 2012, p.132); hence, the researcher advocates that all knowledge claims ‘are relative to individual and cultural bias’. This would lead the researcher to posit that true knowledge is not possible as everything is linguistically relative and contextual (Çakir, 2012, p.665). This perspective of ontology requires the researchers to perform personal observations on the studied phenomenon so that he or she understands it within its context (Saunders et al., 2012, p.132). Accordingly, the researcher’s personal perceptions (the way he perceives and understands the phenomena) would affect reality (the results of the study). Reality here is the product of one’s mind (Burrell & Morgan, 1985, p.1).

Objectivism seems to conform to the research purpose. Initially, the aim of the study is to test if SR assurance as a phenomenon reduces a firm’s cost of equity capital (COEC). SR assurance as a practice is evident in the business arena regardless of the social actors’ (different stakeholders in the context of this study) opinion or perception about it. Also, the researchers of this study are not trying to study SR assurance or its dynamics in a contextual manner; i.e. they are not trying to observer the phenomenon of SR assurance or to explain how it works in the business arena based on their mental schemata or personal interpretation. The researcher’s main aim is to build-up knowledge by scrutinizing the existence of such an effect of SR assurance (Plato’s Truth) on COEC. Thus, following objectivism, as an ontological underpinning, seems to be a more appropriate ontological assumption the authors of this paper should adopt.

2.4 Epistemology – How to Build-up Knowledge about Reality

Epistemology is ‘how we come to know what we know’ (Grix, 2002, p.175). In linguistics, epistemology is derived from the Greek ‘Episteme = knowledge’ and ‘Logos = reason’; therefore, it focuses on the knowledge-gathering process (Blakie, 2000, p.8) and about communicating this knowledge to other human beings (Burrell & Morgan, 1985, p.1). In that sense, it resembles claims about how what is assumed to exist (truth or reality) can be known (Blakie, 2000, p.8); hence, it is concerned with the theory of knowledge regarding its methods, validation and ways of information collection (theories and models) (Grix, 2002, p.177; Blakie, 2000, p.8). The importance of understanding epistemology stems from its role in helping researchers to reflect on the assumptions and origins of developed theories and concepts, so that an accurate theoretical framework is built to shape their study and to develop their hypotheses contextually (Grix, 2002, p.177-178).
There are mainly two contrasting epistemological positions, ‘Positivism’ and ‘Interpretivism’ (or anti-positivism). The choice of which will affect the research methodology adopted by the researchers (Grix, 2002, p.178).

On one hand, positivists advocate the application of natural sciences methods to the study of social reality and beyond (Bryman, 2001, p.12-13). In this sense, Aristotle empiricism that is based on observation and categorization is the right way to acquire knowledge (Ryan et al., 2002, p.13). This implies that researchers are requested to justify their beliefs through experience, logic or mathematics. Reasoning and mental rationality are both irrelevant and meaningless. They cannot provide legitimate implications and justifications for beliefs. Accordingly, empiricism is used as the basis for scientific research (Saunders et al., 2012, p.134). Moreover, positivism searches for causality and regularity in relationships in social research in a scientific manner that borrows elements from the scientific research conducted in natural sciences (Burrell & Morgan, 1985, p.5).

More elaborately, there are two positivistic tenets in research that a positivist should be aware of, ‘Measurability’ and ‘Role of Values’. The first tenant restricts a researcher to study only measurable phenomena. A measurable phenomenon is one that can be quantified and separable from the world; for instance, metaphysics is not a topic that a positivist can investigate. The second tenant restricts a researcher from indulging his or her personal judgments while making observations, because such judgments would affect the research itself (Kolakowski, 1972, p.11-18; Saunders et al., 2012, p.134). In that sense, a positivist research is a value-free research (Saunders et al., 2012, p.134, Ryan et al., 2000, p.13).

More deterministically, there are two main classes of knowledge sources that a researcher should be aware of, ‘Empiricism’ and ‘Rationality’ (Kolakowski, 1972, p.205). While rationality (logical positivism) advocates that the processes of observation and experience are the solo foundations of truth (Çakir, 2012, p.665), empiricism advocates mathematics and logic (Kolakowski, 1972, p.205). These knowledge-source classes are not mutually exclusive rather different shades of scientific research where they mostly work in a raw. While observations and experiences are the primary sources of knowledge (data collection), logic and mathematics constitute the tools to analyse the data gathered by observation to consequently answer the research question.

Following on the previous discussion and based on the idea that ‘the growth of knowledge is a cumulative process where new knowledge is added to existing knowledge and false hypotheses are eliminated’ (Näslund, 2002, p.323), the authors’ research is based on data collection and is looking for causalities and regularities in the relationship between two variables. This is to develop their theoretical hypotheses; and then, put them to test so that new knowledge is built-up. Thus, their viewpoint towards knowledge acquisition is based on observation and categorization that would allow them to generalise their findings, by using mathematical and statistical tools (quantitative methods), like natural scientists. Also, they do not intend to indulge their personal tastes or experiences or to make any judgments while performing their study. Accordingly, a positivist epistemological stance – which is methodologically empiricist, yet influenced by rationality – seems appropriate for their research.
On the other hand, interpretivists encourage scientists to ‘grasp the subjective meaning of social action’. This means they are supposed to ‘develop a research strategy that respects the differences between people and the objects of the natural sciences’ (Bryman, 2001, p.12-13). Notwithstanding, the authors do not intend to interpret the reasons behind the studied phenomenon where they would have to incorporate their personal opinions or judgments. Also, they have no intention to perform a qualitative study on any human behaviour, which might affect the facts being studied. Thus, the basic assumptions of interpretivism are rejected to a larger extent.

In philosophical anatomy, the ‘truth’ (reality) that the researchers are investigating is ‘SR assurance’ and the ‘belief’ (knowledge) applicable to the context of their study is ‘the reduction in COEC’. Hence, the platonic ‘True Belief’ is whether the cost of equity capital stems from SR assurance. Also, the justifications for the ‘True Belief’ are the methods and data used so that new knowledge is developed.

### 2.5 Research Paradigms

‘A paradigm is a way of examining social phenomena from which particular understandings of these phenomena can be gained and explanations attempted’ (Saunders et al, 2012, p.141). It includes three elements: epistemology, ontology and methodology (Denzin & Lincoln, 1994, p.99) and an additional element, added by Burrell & Morgan (1985, p.3), called human nature. Since a paradigm is ‘a commonality of perspective which binds the work of a group of theorists together’, it is vital for the researchers to situate their work in a certain dimension of a paradigmatic model – that compresses the notions of ontology, epistemology, method, view of human nature and how the social world works – as it will lead the reader to better understand the authors’ assumptions about the nature of social science and the nature of society (Burrell & Morgan, 1985, p.22, 24). This necessity rhymes with Kuhn’s (1970, p.viii) definition of research paradigm as ‘universally recognized scientific achievements that for a time provide model problems and solutions to community of practitioners’. The authors will embrace for this matter the typological model that consists of 4 paradigms based on 2 assumptions (dimensions) about the nature of social science and the nature of society, suggested by Burrell & Morgan (1985, p.3-24), as the integration of both assumptions (dimensions) and the comprehension of their interrelated relationship would develop a coherent scheme for the analysis of social theory (Burrell & Morgan, 1985, p.21) and they will thereby explain the position of their study.

#### 2.5.1 Assumptions about the Nature of Social Science

##### 2.5.1.1 The First Dimension (Subjective-Objective)

This dimension severs as an explanation for the difference between the positivist and interpretivist (anti-/non-positivist or German idealist) traditions in social sciences (Näslund, 2002, p.323; Burrell & Morgan, 1985, p.7). It reveals the philosophical assumptions that underwrite different approaches to social sciences (Burrell & Morgan,
Thus, it is conceptualized into four aspects, ontology, epistemology, human nature and methodology. These aspects are summarized in figure 1, which represents a scheme for analysing assumptions about the nature of social science (Burrell & Morgan, 1985, p.1-3).

<table>
<thead>
<tr>
<th>The subjective approach to social science</th>
<th>The objective approach to social science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominalism</td>
<td>&lt;--------Ontology--------&gt;</td>
</tr>
<tr>
<td>Anti-positivism</td>
<td>&lt;--------Epistemology--------&gt;</td>
</tr>
<tr>
<td>Voluntarism</td>
<td>&lt;--------Human nature--------&gt;</td>
</tr>
<tr>
<td>Ideographic</td>
<td>&lt;--------Methodology--------&gt;</td>
</tr>
<tr>
<td>Realism</td>
<td></td>
</tr>
<tr>
<td>Positivism</td>
<td></td>
</tr>
<tr>
<td>Determinism</td>
<td></td>
</tr>
<tr>
<td>Nomothetic</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. A Scheme for Analysing Assumptions about the Nature of Social Science, Source (Burrell & Morgan, 1985, p.3)

Initially, the difference in both ontological and epistemological doctrines is synonymous to our previous discussion and the differentiation constructed in previous paragraphs about ontology and epistemology. Nominalism is equal to constructivism, realism is equal to objectivity, and anti-positivism is equal to interpretivism.

Secondly, the differentiation between a deterministic and voluntary human nature stems from the notion of free will. While determinism perceives man as being determined by the situation and environment he is in, voluntarism perceives man as being completely autonomous and possessing free will (Burrell & Morgan, 1985, p.6). SR assurance (as discussed in the theoretical framework) is perceived to stem from social institutional pressures. In other words, the acquisition of assurance, which is a reflection of a human behaviour, stems from the environment and situation a human being (management in the context of this study) lives in. Additionally, the posited reduction in COEC reflects a ramification of a human behaviour, which is the increment in stock demand for firms that possess SR assurance. Although this behaviour might be perceived as being derived from the free will of human beings and their autonomy in making deliberate decisions, it is in reality affected by the situation and environment itself, where the acquisition of SR assurance (situation) has stimulated the increment in investment which led eventually to the hypothetical reduction in COEC. Correspondingly, the authors are led to be more deterministic in their comprehension of human nature.

Thirdly, the differentiation between a nomothetic and ideographic methodology stems from the way a researcher is planning to conduct his or her research by. Whereas ideographic methodology relies on detailed observation of the society; i.e. there is a greater stress on the researcher upon getting close to one’s subject and exploring its
detailed background and life history (e.g. through diaries or biographies) and on evolving oneself in everyday flow of life (e.g. through qualitative techniques like interviews), that would allow this subject to reveal its nature and characteristics during the investigation process), the nomothetic methodology involves hypothesis testing and employees quantitative methods; such as, surveys and other standardized research tools; i.e. there is an emphasis on basing the research upon systematic protocols and techniques like the ones used in natural sciences (Burrell & Morgan, 1985, p.6-7). Thus, a nomothetic methodology is more rhythmic with the ontological and epistemological stances taken in this study.

2.5.2 Assumptions about the Nature of Society

Different schools of thoughts have different meta-sociological assumptions they rely on. These different assumptions set these assumptions in 2 different sets of groups. A researcher should understand these assumptions so that he or she can make a better assessment of established theories and their underpinnings (Burrell & Morgan, 1985, p.10).

2.5.2.1 The Order-Conflict Debate

While some theorists (e.g. Daherndorf 1959 & Lockwood 1956) differentiate the view on society’s nature between order and conflict, others argue that these two views are complementary in a sense they are reciprocal (e.g. Cohen, 1968) (Burrell & Morgan, 1985, p.10-16). While the order (integrationist) view of society emphasizes: stability, integration, functional co-ordination & consensus, the conflict (coercion) view of society emphasizes: change, conflict, disintegration & coercion. The terms used to distinguish these theories were ambiguous and contentious; therefore, this debate had roots that lasted for more than 2 decades. The differences between a conflict theory that advocates radical change and a structural conflict that leads to complete transformation within the society are contradictory to a functionalist one. Thus, a reconceptualization is still necessary to clarify the differences between them so a clear analysis of social theory is identified (Burrell & Morgan, 1985, p.16).

Although the terminology is problematic as Burrell & Morgan (1985, p.16) suggest and a ‘regulative vs. radical-change’ notion should be used instead, the researchers prefer to set their standpoint, based on their interpretation of the order-conflict debate, as the two sets of theories have been the topic of a long-standing debate. Thus, by following the somehow terminologically fuzzy distinction between functionalist and conflict theories, an adoption of a functionalist perspective will better serve the needs of this research paper. The authors are not concerned with providing an explanation behind the anticipated radical change within a society that drives firms to report on sustainability issues. In other words, the topic of their study is not about why sustainability reporting emerges in society – which can be explained from a desire to perform a radical change within a society – rather to explain why assurance was acquired as an extra credit enhancer service to these reports (e.g. to lower COEC). Such a goal would be better reached by what functionalist theorists might suggest, like providing more legitimacy to
the entity, or by adhering to social values\(^1\). Accordingly, the authors here will take the stand of functionalism.

2.5.2.2 The Second Dimension (Regulation-Radical Change)

This dimension serves to explain the two fundamentally distinct views, interpretations and frames of reference of the nature of society, both of which can be considered alternative models of the analysis of social processes (Burrell & Morgan, 1985, p.18). To a larger extent it serves as an attempt of reconceptualization for the order-conflict debate mentioned above. While the first view is the ‘sociology of regulation’ which is concerned with; the status quo, social order, consensus, social integration and cohesion, solidarity, need satisfaction and actuality, the second view is the ‘sociology of radical change’ which is concerned with; radical change, structural conflict, modes of domination, contradiction, emancipation, deprivation and potentiality (Burrell & Morgan, 1985, p.18, 19).

Based on this dimension, and based on the position taken by this paper’s authors in being functionalists. The better alternative that shines in the horizon as a righteous path is the perspective of ‘sociology of regulation’. Although a change in society is not negligible, it is not the main focus of this study. The main aim of this research paper is to investigate a phenomenon within the status quo, rather than investigating the structural conflicts or change aspects within a society.

2.5.3 Four Paradigms: Two Dimensions

The two dimensions described earlier, taken together, interact to define four distinct (mutually exclusive) sociological paradigms (critical parameters) that can be utilized to analyse a wide range of theories. These paradigms are presented in figure 2 (Burrell & Morgan, 1985, p.22), where each paradigm defines a different perspective for the analysis of social phenomena; therefore, it generates quite different concepts and utilizes quite different analytical tools (Burrell & Morgan, 1985, p.23, 25).

![Figure 2. Four Paradigms for the Analysis of Social Theory, Source (Burrell & Morgan, 1985, p.22)](image)

\(^1\) The theoretical framework would provide additional insights on this issue.
2.5.3.1 The Functionalist Paradigm

Following on the previous discussion, the researchers are placed within the functionalist paradigm, as they are ontologically objectivist, epistemologically positivists and the main focus of their research is within the sociology of regulation than radical change.

For lots of reasons, the functionalist paradigm is the dominant paradigm in finance-related research (Ardalan, 2003a, p.722; Ardalan 2003b, p.1040). It utilizes empirical evidence (pragmatism) and objectivity in research. Also, it supports the sociology of regulation by its focus on maintaining order and equilibrium within a society (Ardalan, 2003a, p.721; Burrell & Morgan, 1985, p.25). It is characterized by providing explanations for the status quo, social order, consensus, social integration, solidarity, need satisfaction and actuality by utilizing a standpoint that tends to be realist (objectivist), positivist, determinist and nomothetic (Burrell & Morgan, 1985, p.26). All of which rhyme with the perspectives of the authors of this research paper, which allow this paper to be situated adjutant to most of other papers written within finance and accounting research.

2.6 Research Approach

To make well-informed decisions about the design of the research study, a researcher must clearly, comprehend, discuss and state his or her approach to research (Saunders et al., 2012, p. 147). The main stimulus to research is theory; hence, theory constitutes either a main result or tool or both for research. Accordingly, the utilization of theory as either an instrument or by-product determines the research approach that a researcher adopts (Saunders et al., 2012, p. 143). The main approaches prevalent in scientific research today are induction, deduction and abduction.

The inductive approach is ‘logical inference in research that passes from singular statements (particular statements); such as, accounts of the results of observations or experiments, to universal statements (e.g. hypothesis or theories)’ (Popper, 1959, p.3-4). Thus, this method is based on the logic of knowledge, which is concerned only with logical relations; i.e. questions of facts (Kant’s quid facti?) (Popper, 1959, p.7). It can be seen, thereby, as a method where a scientist starts with data and ends with generated theories; i.e. generalizability is derived from the specific (Saunders et al., 2012, p.144). This method has been argued by Popper to raise problems of validity (truth) to the hypotheses and theoretical systems of empirical science because inductive logical inferences are probable not certain, which is problematic to empiria in the sense that it would either lead to infinite regress or to the doctrine of apriorism (Popper, 1959, p.4, 6). Also, inductive logic does not provide a suitable criterion of demarcation and causes lots of inconsistencies; i.e. it does not provide a suitable distinguishing mark of the empirical character of a theoretical system (Popper, 1959, p.11), whereas a deductive approach provides falsifiability as a criterion of demarcation, where a scientist can test a hypothesis and falsify it by proving its empirical erroneousness (Popper, 1959, p.18). Another aspect of inductive reasoning is its reliance on subjectivity (the subjective experiences or
feelings of conviction of a scientist), which Popper argues to never justify any statement, except in psychological investigation (Popper, 1959, p.22).

The *deductive* approach in research, which is based on Euclidean geometry and Aristotelian logic (Balikie, 2000, p.104), was advocated by the philosopher Karl Popper (1959) in his book ‘The Logic of Scientific Discovery’ to analyse the method of the empirical science and to provide a new methodology for scientists that value logical rigour and freedom from dogmatism simultaneously. Popper describes the deductive method of testing as ‘the view that a hypothesis can only be empirically tested, and only after it has been advanced’ (Popper, 1959, p.7, 15). By that Popper means that it is a ‘method of critically testing theories, and selecting them according to the results of tests, which are drawn by means of logical deduction and compared with one another to find what logical relations (such as equivalence, derivability, compatibility or incompatibility exist between them’ (Popper, 1959, p.9). Thus, this method is based on the psychology of knowledge, which deals with empirical facts. It is concerned only with questions of justification of validity (*Kant’s quid juris?*) (Popper, 1959, p.7). Yet, it is reliant on falsifiability (not verifiability) that allows a scientist to argue from the truth of singular statements to falsify universal statements (e.g. hypotheses) (Popper, 1959, p.19) in a manner that builds-up resultant knowledge. In simple terms, established theories provide the deductive scientists with the idea to where to look for data and how; and then, to utilize this data to test (verify/falsify) the righteousness of these theories (Blaikie, 2000, p.105). Thus, deductive reasoning serves as means to explore the possible causal relationship between a variable and a concept (Saunders et al., 2012, p.145). Another aspect of deductive reasoning is its reliance on objectivity (objective logical relations), which provides the righteous grounds for scientific justification and falsification (the testability criteria of knowledge), nevertheless, scientific statements suffer from inter-subjectivity in the way they are tested which scientists should admit (Popper, 1959, p.22); i.e. objective reasons can be seen as ‘subjective causes of judging, to reach a cogent belief in a hypothesis correctness (Popper, 1959, p.23). In other words, a scientist should acknowledge that there are different levels to test a statement, from general to very specific empirical elements within the statement itself.

The abductive approach is more ‘back and forth’ approach that combines deductive and inductive research approaches. Almost all business related research has got elements of this mixing approach (Saunders et al., 2012, p.147). This approach has been characterized as being epistemologically interpretivist and ontologically social-constructivist (Blaikie, 2000, p.115). It is primarily used to achieve understanding of phenomena (Blaikie, 2000, p.76). Thus, it cannot be seen as the ultimate approach for this study.

Following the previous discussion on the different research approaches, the most suitable approach for the purpose of this thesis is deduction. The authors are originating from certain theories that constitute the basis for their hypotheses. These hypotheses are in turn testable and falsifiable. In that sense, the researchers here are deductive in moving from general thoughts (theories or hypothesis) about SR demand and about the determinant of COEC reduction to the specifics of empiria and its results that will falsify these thoughts.
2.7 Research Design

A research design is ‘an action plan for getting from here to there’. It is an initial set of procedures to get answers for certain questions (Yin, 1989, p.28). Thus, it aims at controlling, as far as possible, the work to be conducted by researchers. Its importance stems from several reasons. Initially, it would facilitate the precision and subsequent evaluation of design decisions; i.e. it ensures that these decisions will be consistent with each other and with the ontological and epistemological assumptions adopted by the researchers. Secondly, it would assure that the possibility of successful outcomes is at its highest level (Blaikie, 2000, p.35). In other words, a research design is ‘the plan, structure, and strategy of investigation conceived so as to obtain answers to research questions and to control variance (Kerlinger & Pedhazur, 1973, p.300). Accordingly, the researchers are supposed to indicate the following before commencing their actual work (Blaikie, 2000, p.42-44):

1- What they will study (Plan) and why they plan to study it (e.g. filling a research gap)
2- How they will study; which requires an indication of:
   a- Research strategy.
   b- Source (type) of data and how the data will be collected.
   c- Time horizon that indicates the time each stage of the research would be carried out in.

As the first point has already been discussed, the natural second step is to discuss how the authors will perform their study; the classification of their work from a scientific perspective, data sources utilized, overall strategy and time horizon.

2.7.1 Research Classification

This research is explanatory in objective, because it seeks to identify causes of events or regularities and the factors (mechanisms) that produce them (Blaikie, 2000, p.75). It aims at describing the relationship between SR assurance and COEC in a financial market context. Accordingly, it cannot be seen as a research that anticipates ‘gaining understanding’ because the authors are not concerned with the meaning of the phenomenon within a social context (Blaikie, 2000, p.75). The deductive research approach taken by the authors is harmonious with the nature of their explanatory research (Blaikie, 2000, p.76, 124)

In conformity to research purposes, the researchers have chosen to take a ‘detached observer’ position, although its complete achievement might be tricky. They will act as uninvolved spectators, particularly in the process of data collection. They have taken objectivity as an ontological stance, which conforms to this position. They do not intend to indulge any of their personal values or preferences in any step of this research, so that the value of its results is preserved. Their main aim is at providing reliable knowledge.
In definition, in natural sciences a quasi-experimental design ‘tests causal relationships by using some compromise on random assignment to the experimental and control group and then applying different procedures or treatments to these groups’ (Blaikie, 2000, p.41), thus, this study can be categorized as quasi-experimental. Its main objective is to test if there is a causal relationship between the first time adoption of voluntary SR assurance and the reduction in COEC, yet it cannot be considered completely experimental due to the nature of its method of study that is based on a census approach. Also, to determine causal relationships, like the one studied in this research paper, the quasi-experiment incorporates correlation studies and specific single subject experiments that allow the use of several variables in complex experiments by involving complex models and equations (Creswell, 2009, p.12).

A point to be mentioned here is that this study overcomes the criticism of ‘fallback position’ in approximating a full random experiment that quasi-experimental research suffers from (Blaikie, 2000, p.41) by the fact that it relies on a census that is based on collecting all the observations that satisfy the research’s criteria from the study population.

Although a quantitative research design is criticized for its probability to beget distortion of results (Steckler et al., 1992, p.2-4; Abusabha & Woelfel, 2003, p.566), it relies on a numerical data set that shows the relationship between variables when analysed directly by statistical tools to produce generalizable results that are researcher-independent and analytically objective (Saunders et al., 2012, p.162; Parker, 2012, p.56). The authors consider a quantitative study an appropriate design for their research. It is consistent with their philosophical view and chosen research approach; i.e. positivism and deduction. A Quantitative research design satisfies the research question given that the researchers are very precise with what they intend to study and that they know exactly what to control for. In this study a quantitative set of data from Swedish firms will be used to identify the linkage between first time SR assurance and the effect on cost of equity capital.

2.7.2 Data Sources

Historical data can be classified as primary, secondary or tertiary based from data-source perspective. Primary data is data published for the first time, which can be difficult to approach and process. It is usually the data collected from researched subjects directly in the form of interviews, questionnaires phone calls, etc. Secondary data is the data already collected and published by third parties (Saunders et al., 2012 p. 82-83), which the researchers will use in this study. Tertiary data is already categorized data in database (Saunders et al., 2012 p.82-83); i.e. data analysed by another researchers (Blaikie, 2000, p.184). Tertiary data is not used in this research paper.

The reason for choosing secondary data is the nature of the study and the type of research question the researchers are trying to answer. Initially, as the research topic is about the correlation between assurance on sustainability reports and the subsequent reduction in the cost of equity capital, it is inevitable to refer to data from the financial markets. On one hand, it is quite difficult to refer to all the market participants and investigate their
personal perceptions about firms’ associated risks. Referring to mathematical computations that symbolize these risks, resembled by the COEC, is the most efficient way to accomplish such a task. Such mathematical computations rely heavily on data that is already provided by the financial market and specific software that were designed for this purpose. On the other hand, due to the fact that GRI provides an already prepared list for all the firms that report on their SR activities, it is less time-consuming and more efficient to refer to such a list rather than inquiring listed firms whether they assure their sustainability reports or not. Accordingly, it is the suitability of secondary data and the nature of study that drove the researchers to conduct a research dependent on already available secondary data.

Any research requires scrutiny in every stage of the process. Data is the key element on which the findings of such a scrutiny are based on. “The data source has to be decided upon criteria such as “suitability of dataset to purpose”, “up to date” source, “reputable and authoritative”, “reliable methods”, “timely and economic” (Smith, 2011, p.143) given the constraints of our research budget. Considering all these criteria, secondary data is most suitable for this study. Collecting primary data is expensive in terms of time and cost, as the authors will target all Swedish firms that assure their sustainability standalone reports. The authors will use secondary data collected initially from GRI’s database, which is supposed to provide information about all the firms that report on their sustainability activities based on GRI guidelines. Secondly, they will rely on Datastream database, which is a reliable and recognised database for financial data, to collect the remaining information necessary about the control variables for their study. In case of any lack of information, the authors will refer to companies’ individual websites and published financial statements.

2.7.3 Time Horizon

Time is the ‘critical defining characteristic of all types of research design’ (Balikie, 2000, p.228). A researcher has 3 options when it comes to how to perform a study with regard to time. These options are; cross sectional (when the researcher is confined to the present time), longitudinal (when the researcher wants to perform the study over a period of time) and historical (when the researcher in confined to the past) (Balikie, 2000, p.228). Saunders et al. (2012, p.190) describe the difference between the first two types based on a snapshot perspective; i.e. a cross-sectional study is a snapshot study, while a longitudinal is performed in a series of snap-shots. The choice between any of these horizons is research-question oriented; depending solely on what the researcher is trying to investigate.

The context of this study requires a form of data analysis that combines both a cross-sectional and longitudinal approaches because the researchers are studying the same companies but over a number of years. A form that fulfils this criterion is the panel variety of longitudinal study. The data set here has both a time-series and cross-sectional components (Koop, 2006, p.11). Also, one of the benefits of panel data analysis compared with the classical cross-sectional OLS regression is that it allows eliminating the effect of omitted unobservable variables that differ across entities but are constant.
over time by studying the changes in the dependent variable (Stock & Watson, 2014, p.396).

It should be noted that change in COEC that this study is concerned about is a change in a phenomenon not the change in social behaviour that is describe by Burrell & Morgan (1985, p.16) which stems from enlightenment and seeks emancipation and radical change within a society. The researchers are better suited with a panel-longitudinal study as they are investigating the change in COEC from one year to the second one that stems from the first time adoption of SR assurance.

Historical studies deal with social events (phenomena) in the past and aim to study them within their context (Blaikie, 2000, p.230). This type of research is not suitable in the context of this study.

2.7.4 Research Strategy

The research strategy presents the plan of action to be implemented to answer the research question. No matter how a researcher thinks his research strategy should be like, it should serve as a bridge between the philosophical assumptions he holds and ultimately the methods he adopts (Saunders et al., 2012, p.173).

As the major aspects of what a research strategy constitutes of have been discussed elaborately in the previous paragraphs of this chapter, the authors will be satisfied here by only presenting figure 3 that illustrates a summary of their philosophical assumptions, nature of their study and methods to be utilized and how these aspects are interrelated.

Figure 3. Research Methodology
2.8 Literature Sources

For their theoretical sources the authors used resourceful academic textbooks, published papers and PhDs, where most of the used journals were peer-reviewed.

The search for academic articles was conducted using EBSCO, Google-Scholar, Business Source Premier, and Science Direct. These academic journal articles and search-engine sources provided a rich resource of information about the topic investigated. The majority of these journals are peer-reviewed scientific journals with a main focus on economic and business related issues. Umeå University Library’s database was mainly utilized for the search for articles relative to the research question. For that matter the main words used, separately or in combination, for this research were: Sustainability, Cost of Equity Capital, Risk Premium, Assurance, Sustainability Reports and Sustainability Reporting. Academic textbooks from taught courses at USBE were also employed and referenced whenever needed to obtain additional sources. Additionally, lots of descriptive statistical studies performed by big audit firms (e.g. EY and KPMG) and reporting agencies (e.g. GRI) were utilized to provide insights about practical information regarding the status quo of the assurance on sustainability reports and sustainability reporting as both of them are still under-development practices and there is often something new in their trends, standards and code of conduct each year.

A critical assessment on academic articles was performed to indicate their weight and trustworthiness. Peer-reviewed articles were always given priority especially where a contrast in opinion was evident by less-ranked articles. Other papers were also critically analysed regarding their research methodologies, sampling techniques and other criteria whenever it was needed to refer to their findings.
Chapter Three - Theoretical Framework

“Research without theory is blind, and theory without research is empty”
(Bourdieu & Wacquant, 1992, p.162)

“Theories are nets cast to catch what we call ‘the world’: to rationalize, to explain and to master it. We endeavour to make the mess ever finer and finer’ (Popper, 1959, p.37-38)

In this chapter the authors present the previous work conducted and theories that constitute the lens to conduct this research. The aim of this chapter is to theoretically link sustainability assurance practice and the cost of equity capital. The authors have decided to rely mainly on neo-institutional and signalling theory in their discussion of the interrelationship between the two variables of the research question. The interaction of these two theories would assist in developing the research theoretical hypothesis. The choice of these two theories was made according to the researcher’s thorough literature review, which initiates the discussion of this chapter. Eventually, the theoretical positioning of the researchers is presented, which encapsulates the foundation for the development of the research theoretical model and hypothesis.2

3.1 Literature Review

To better understand the position of this thesis in relation to previous research the authors will briefly examine earlier work conducted within the domain of sustainability assurance and the cost of equity capital from three perspectives. Initially, they will examine previous literature on the demand for voluntary audit. Secondly, they will examine previous literature on assurance on sustainability reports. Thirdly, they will examine previous literature on the relationship between assurance on SRs and the cost of equity capital. A summary diagram that links previous literature to its theoretical underpinning is then presented. This literature review will serve as a mediator to this paper’s theoretical positioning. It provides a summary of what has been written earlier in connection to this research question from theoretical and empirical points of view.

3.1.1 Demand on Voluntary Audit

There are some papers that have examined voluntary audit and its demand. These papers considered the reasons the derive firms to voluntary audit their statements from different theoretical perspectives, such as, agency theory, organisational design theory and signalling higher quality theory.

Initially, Chow (1982, p.272) was one of the major papers that examined voluntary audit from an ‘agency theory’ perspective. The paper found that the demand for voluntary audit on ‘financial statement’ is associated with agency costs. Similar results were achieved by Carey et al. (2000) in an Australian context. Consistent with the information asymmetry

2 Other theories that dealt with this paper’s research question were considered and refuted as explained.
proposed by agency theory, Blackwell et al. (1998, p.57, 65-68) have argued that institutional creditor’s (e.g. banks) consider audit as an effective mean of control that ensures the reduction in uncertainty and information asymmetry risk.

Secondly, Abdel-Khalik (1993, p.31-35) utilized ‘organizational design’ hypothesis to argue for the demand of voluntary audit. His study resulted in associating voluntary audit with entity’s desire to overcome the moral hazard that stems from the loss of control, which is caused by the organization’s design and the ramification of its loss-of-communication on a sub-ordinate level. These papers indicate the importance of voluntary audit as a mechanism to enhance information credibility, and therefore user-confidence, which will result in better informed decisions by various stakeholders (Simnett et al., 2009, 940, 941).

Thirdly, other papers have examined audit quality and the demand over its higher quality. The Big-4 firms’ characteristics where investigated as means to explain their higher-quality assurance and the demand associated with their services (DeAngelo, 1981, p.183; Watts & Zimmerman, 1986; Craswell et al., 2002, p.253). In a sustainability context this kind of research might be unimportant because of the higher fees that Big-4 firms might charge on SR assurance engagements compared with consultancy companies’ fees, which would make the proposition that higher-quality assurance is demanded on such reports fall apart, simply because such engagements with Big-4s fail the cost-benefit battle (Simnett et al., 2009, p.941).

3.1.2 SR Assurance

There are both professional and academic papers that were written on the demand on voluntary assurance on sustainability reports.

On one hand, the professional research has been conducted in the form of descriptive research performed by international firms and organizations such as EY and KPMG. The purpose of that research was mostly to define the current trends in research on sustainability reporting and assurance practice and how it has been developing internationally through the years. Almost every year KPMG and EY produce a new research paper on sustainability reporting that includes a description of assurance services (Simnett et al., 2009, p.942).

On the other hand, the academic reports addressed the issue of demand on SR assurance from different theoretical perspectives, such as, political economy, agency theory, regulatory institutional theory, normative institutional theory, and cognitive institutional theory.

From a political economy theory perspective, in 2011 and in a German context Gamerschlag et al. (p.233) investigated the determinants of voluntary audit through the lens of political economy theory and resulted that CSR content disclosure is affected by visibility, shareholder structure and relationship with US stakeholders. Higher profitability (better performance) was not surprisingly found positively associated with more environmental disclosures. Yet, size of the company and the industry it operates in were found determinants for the amount of environmental disclosure.
From an agency theory perspective, researchers can locate two main papers. Initially, Simnett et al. (2009) addressed a knowledge gap in their paper and tried to answer what drives companies to purchase assurance on SR reports and what drives their choice of assurance provider. The theoretical underpinning of Simnett et al., 2009 (p.942, 943) were influenced mainly by agency theory and its costs in explaining why firms choose to audit and whom they choose (i.e. assurance was derived by agency costs and increasing the validity of provided information). Secondly, in 2013 Ruhnke & Gabriel (p.1063, 1065-1067) investigated the determinants of SR assurance also through the lens of agency theory and its theoretical underpinnings, where the demand for assurance on SR was associated to agency costs. They also revealed that some factors; such as existence of a sustainability-department and the size of the company are associated with the demand for voluntary assurance.

From a regulatory institutional theory perspective, Simnett et al. (2009) have partially utilized regulatory institutional theory to explain whether the functional benefits of assurance stem from the legal environment of the country and industry. This means that firms operating in a less regulated country (i.e. firms that operate in countries that suffer from a low application level of the code of law) have higher tendency to purchase this service to increase the information credibility. In the same sense, firms that operate in industries with high environmental and social risks (e.g. mining, oil & gas, energy…etc.) are more prone to purchase this service to mitigate those risks by highly credible sustainability reports. Simnett et al. (2009)’s research eventually concluded that increasing the credibility of SRs is a function related to three main factors, the company, industry and country. They also concluded that credibility is gained through the acquisition of assurance. Choosing an audit or non-audit firm was found irrelevant in increasing information credibility. Finally, they provided evidence that stakeholder-oriented countries (e.g. Sweden) are more likely to choose the auditing profession as an assurer.

From a normative institutional theory perspective, Park & Brorson’s 2005 study (p.1095, 1096) in the Swedish context has provided suggestions that stem from the normative institutional theory. They both suggested that institutionalizing SR assurance in a normative manner - by utilizing peer-pressure, leading-firms proactive approach towards assurance, standardization of the assurance practice, increment in pressures from stakeholders, and increment of understanding of the economic benefits that stems from increased transparency or enhanced credibility - is an inevitable tool to increase this phenomenon in business arena.

From a cognitive institutional theory perspective, Perego & Kolk’s study (2012, p.173) have indicated that assurance was conceived to present a symbol of a higher level of accountability, hence, resembling a higher sense of credibility. One of the study’s main findings was that institutional pressures in combination with internal resources and capabilities were underlying factors driving companies’ decision to purchase SR assurance services. The paper concluded that the current practice in assurance is still undeveloped and needs reconceptualization and re-theorizing.
In earlier literature, assurance on sustainability reports, per se, has not been linked to the reduction in COEC. Nevertheless, if SR assurance is seen as a tool for environmental risk management to raise a firm value in the market and lower its associated risks we can identify 3 main different groups of papers. All of which had signalling theory as the bedrock-lens by which their empirical findings were analysed.

Initially, sustainability reporting and environmental risk management and their association with firms’ economic performance (e.g. stock returns or cost of capital) have been investigated in several papers. For instance, a considerable quantity of previous research has questioned sustainable-economic relationship from different perspectives, such as, internal strategic environmental investments that improve resources efficiency (Bansal & Roth, 2000, p.717; Branzei et al., 2004, p.1075; Buysee & Verkbeke, 2003, p.453), institutional and other external factors that have an impact on entities’ survival (Singh et al., 1986, p.171), stock market reaction to improved environmental performance through market returns (Dowell et al., 2000, p.1059; Gottsman & Kessler, 1998, p.15; Mahapatra, 1984, p.29) and stock market reaction to improved environmental performance through the reduction in the cost of capital (Sharfman & Fernando, 2008, p.569).

Secondly, some researchers have investigated the relationship between financial disclosures and COEC (Core, 2001, p.441; Healy & Palepu, 2001, p.405; Leuz & Wyoscki, 2008) and resulted that higher quality financial disclosures lowers the COEC by reducing firm’s individual betas that are begotten from the reduction in the covariance of their individual cash flows with the cash flows of other firms (Hughes et al. 2007, p.705; Lambert et al. 2007, p.385). This implies that there is a negative association between higher quality disclosures and the COEC. A positive correlation was found between these higher quality disclosures and improving risk-sharing and increasing the awareness of firm’s existence, which contributes to enlarging their investors base (Merton, 1987, p.483). Higher quality disclosures were also found to reduce the information asymmetry between shareholders and investors. This would decrease the signalled risks associated with the firm in the market, which would decrease the bid-price spread (caused by higher demand on stocks) and transactions costs (Verrecchia, 2001, p.97). This in turn would lower the required rate of return (COEC) (Amihud & Mendelson, 1986, p.223). As long as the information provided is valuable, this mechanism is likely to be the same with higher quality non-financial ‘Sustainability’ disclosure (Dhaliwal et al., 2011, p.62), proxied by assurance. Yet, such a generalizable assumption is vague in research (Dhaliwal et al., 2011, p.62); therefore, whether voluntary SR assurance would lower the COEC is a question of empiria.

Thirdly, other researchers have investigated the relationship between the quality of voluntary sustainability reporting and firms’ value (Plumlee et al., 2008) and the relationship between COEC and the social and financial disclosures (Richardson & Welker, 2001, p.597). Dhaliwal et al. (2011, p.59), for instance, have investigate the initiation of sustainability reports and its association with higher COEC prior to the
initiation year and with lower COEC subsequent to the initiation year. Their study resulted that firms generate many performance linked benefits, such as a lower subsequent COEC, attraction of institutional investors, subsequent raise of large amounts of equity capital and lower absolute forecast errors and dispersion.

3.1.4 Literature Review Summary

The above discussion is summarised in Figure 4. This diagram links the papers of the 3 fields of research, SR assurance, voluntary audit & the connection between SR assurance and COEC, to their theoretical underpinnings.

![Figure 4. Literature Review Summary](image)

3.2 Theoretical Rationality

As the literature review has indicated, previous researchers have explained the demand on SR assurance from different theoretical perspectives. They have utilized their empirical findings to verify the hypotheses of political economy, agency, and institutional (regulatory, normative & cognitive) theories. These theories differ in their philosophical underpinnings compared with other theories that were utilized to explain the demand on sustainability reporting – which can be extended to explain SR assurance – such as accountability and stakeholder theories. Initially, such philosophical underpinning will be explained to enhance the reader’s understanding of these theories and the theoretical positioning of this paper. Moreover, building up a connection between COEC and
assurance in previous literature was more implied rather than explicitly indicated. Yet, based on the fact that signalling theory was a common lens that previous researchers utilized, the researchers of this paper will employ it for a similar purpose in connection to their research question. Accordingly, the researchers in this paper will utilize their empirical findings to verify the premises of neo-institutional and signalling theories. This fact reveals this paper’s point of departure. It is pluralistic in its consideration of the 3 dimensions of institutional theory, instead of relying on only one of the domains as previous literature has done. These two theories are explained elaborately and are connected to the research question in the second and third paragraphs of this section. The theoretical positioning of the paper, which motivates the choice of theories, then follows in section (3.3). In section (3.4), a theoretical model is presented. Finally, the development of the main theoretical hypothesis that reformulates the research question in a statement is presented in section (3.5).

3.2.1 Philosophical Underpinnings

The theoretical underpinnings that rationalize sustainability activities (including SR assurance) stem from organizations’ vision on accountability and how they conceive the notion of ‘stakeholders’; i.e. why and to whom are they held accountable for. In literature, there are 2 main streams of theories that define what stakeholders are, and thus rationalize sustainability reporting in two different perspectives.

The first stream of theories – which includes Political Economy, Legitimacy and Institutional theories – looks at stakeholders from a narrower perspective. Stakeholders, to whom reporting should be targeted, are the ones that have the power to influence the achievements of an organization’s economic goals that are resembled (usually) in maximizing profits; hence, maximizing shareholders’ value. Sustainability reporting is used by firms as a strategic tactic and a marketing tool to align their environmental and social polices’ perspectives with the ethical values of only the economically influential stakeholders (Bebbington et al., 2014 p.86-89). This stream of theories is driven by a profit-oriented economic mentality. The ethical underpinnings of which can be linked to the first philosophical proposition of the Habermasian’ discourse mechanisms of ethics – proposed by Jürgen Habermas (1992, p.88, 89) and advocated by Unerman & Bennett (2004, p.686, 687) – which stem from Immanuel Kant’s Categorical Imperative Theory (1949). The latter is based on the prioritization of stakeholders’ expectations in association with the negative impact of a firm’s SR activities on those stakeholders. Any moral preposition in this case is validated by the willingness of the person proposing this moral value to accept its validity in all possible situations (i.e., a moral preposition is only seen moral when it is considered from the least privileged – power-wise – group’s perspective; thus, relativism, pluralism and quietism are the charges that correspond to SR (Rawls, 1971; Lehman, 1995, p.393; Bebbington et al., 2014, p.99) This means that powerful economic stakeholders are the ones to constitute the main power to derive sustainability decisions. Stakeholders are the ones that define what is moral and what is not.
The second stream of theories – which includes Accountability and Stakeholder theories – looks at stakeholders from a wider perspective; stakeholders’ definition in this sense encapsulates both the close and the far stakeholders whose lives and operations are affected by the organization’s code of conduct; such as, consumers, suppliers, employees, trade unions, government, the media and NGOs (P.S. NGOs are used as a proxy for stakeholders that cannot express their opinions and thoughts like future generations, nature and disadvantaged people). Sustainability reporting in this context is derived from an ethical stand of organizations to serve the interest of the general public; it is a holistic motivation for SR. The argumentation to support this steam of theories is derived from the usual negative impacts of short-term economic profits maximization on the society and environment (Gray, 2006, p.793, 809, 810) and from the importance of substantive environmental issues and challenges that affect the society and the ecosystem at large (e.g. unequal distribution of income, over-consumption of finite resources and climate change) (Hopwood et al., 2010; Bebbington et al., 2014, p.89), not only a prioritized number of stakeholders by the management. The ethical underpinnings of the holistic mentality of this stream of theories can be linked to the second philosophical proposition of the Habermasian’s discourse mechanisms of ethics, which is based on an evaluation that each person performs on his or her morals and values, which is based on the debate he or she has with other member of the society who have alternative views. In this case the better argument, which is supposed to be done in an ideal speech situation with zero-coercion, openness, honesty and willingness, enforces what is moral (Habermas, 1992, p.89). The debate is democratic among all stakeholders, which alternates the view of stakeholders of being only the economically influential ones and transforms the purpose of SR from being only economically driven to holding corporations holistically accountable for the society at large (Bebbington et al., 2014, p.86-89, 100).

Most of these theories in fact overlap, yet institutional theory in its neo-classical version, together with signalling theory, open the room for lots of ontological perspectives and assumptions that allows a researcher to interpret the results of his or her study and then verify these assumptions in multiple ways. This fact allows this theory to have a superior explanatory power compared with others.

3.2.2 Neo-Institutional Theory

Intuitional theory is concerned with two concepts ‘institutions and organizational fields’. Institutions are ‘rules, regulations, ideas, understandings and cultural frameworks’ that have reached a level of influence on organizations that they can be seen permanent in a particular context (Zucker, 1987, p.444). The individual here is seen external to the social phenomena he is just a machine controlled (coerced) by the possessed reality of those institutionalized ideas (Berger & Luckmann, 1966, p.58); hence, organizations actions and rationality are shaped by the social context itself. Accordingly, homogenization (the process of isomorphism (DiMaggio & Powell, 1983, p.149)) of organizations is the inevitable expected outcome that would assure organizations survival, success and legitimacy (Scott, 1995, p.45). Organizational fields (OFs) are the contexts by which institutions influence organizations (e.g. industry, technology, regulations that firms operate in). An OF is ‘that partake of a common meaning system and whose participants
interact more frequently and fatefully with one another than with actors outside the field’ (Scott, 1995, p.56). OFs include ‘key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products’ (DiMaggio & Powell, 1983, p.145)

Moreover, the homogenization (isomorphism) is derived by three institutional mechanisms (pillars) that exert different sorts of pressures. These three institutional mechanisms, which are coercive, normative and mimetic (DiMaggio & Powell, 1983, p.150-154)³, do not exclude one another, but simply operate on different levels (Bebbington et al., 2014, p.275, 276). It is likely that ‘SR is the result of a mixture of those 3 mechanisms, taking different weights in different contexts and in different stages of the institutionalization of SR’ (Bebbington et al., 2014, p.283). Accordingly, on an institutional level, SR is a combination of those mechanisms where it has structures that stem from regulations, norms and cognition to answer the question of why, to whom, by whom and what to report (Bebbington et al., 2014, p.276).

The Coercive (Regulative) Institutional Mechanism – supported by institutional economics (transaction costs theory) (Williamson, 1985, p.400-401) – is based on a reward-and-punishment system that is reinforced by the rules of law, where the organizational filed (e.g. industry, regulatory system or market) acts over individual organizations by imposing specific structures (the law forces the firm to comply and align its structure with the dominant rule so that it is granted legitimacy, hence, survival) (DiMaggio & Powell, 1983, p.150 - 151; Scott, 1987, p.501). In this sense, ‘instrumentalism’ is the logic behind the responsiveness of firms to regulatory mechanisms (social realism) (Rhodes et al., 2006, p.116). This means that self-interest (e.g. fear from losing legitimacy) is the main driver to comply with the code of law in the decision making process. Contextually, this mechanism can explain the increment in voluntary SR adoption and assertions in certain countries like the US (e.g. the SEC’s rules and regulations regarding corporate governance, environmental responsibility and climate change (Kolk et al., 2008, p.741, 742) and the EU (e.g. the EMAS recommendations to EU countries to legislate in the matters of corporate governance, sustainability reporting and environmental issues (Criado et al., 2008, p.258-259)

The Normative Institutional Mechanism – supported by neo-institutional sociology – is based on the norms and values domiciled within a society and applicable to all its members or to certain subparts (DiMaggio & Powell, 1983, p. 150, 152, 153; Scott, 2001, p.54-55). It reflects the doctrine of following the expectations of what is ‘the right thing to do’ which constitutes the main driver for following norms and values in the decision making process. Contextually, this mechanism can explain the increment in voluntary SR adoption and assertions, regardless of SRs economic revenue, from two angles. Initially, by arguing that SR has emerged as shared social values that shape the legitimacy status of firms; hence, for a firm or its actors to be considered legitimate, they must comply with those shared social values and to report on their sustainability activity accordingly (e.g. philanthropy in the US where firms are thought to possess social values to donate for

³ These mechanisms are the ones described by Scott (2001, p.51) as being regulative, normative and mimetic respectively.
greater purposes such as building public schools). Secondly, by arguing that SR has emerged (along with its assurance) because of given values and norms that have become common in certain professions, by certain academic institutions or by certain professional networks (DiMaggio & Powell, 1983, p.150-154) because they reveal compliance with expected business-conduct within a specific context (Bebbington et al., 2012, p.82, 83). In other words, they help firms acquire a ‘normative authority’ (Scott, 1987, p.498, 499, 502, 503). For example, it has been a norm that a proper sustainability report ought to be assured by an external party, regardless of the negative or positive consequences that might stem from such an assurance to the reporting entity (Bebbington et al., 2014, p.278). Also, it has been a norm in the EU for companies working in certain industries to publish SRs due to the normative pressures from EMAS (Wenk, 2004, p.62, 69, 70).

Mimetic (Cognitive) Mechanisms – supported by neo-classical sociology – is based on two things. Initially, it is based on the importance of cultural symbols, rules and meanings in social action, which are seen as objective and external to individuals (social constructionism) (Scott, 1995). Those cultural symbols and their meanings bring about legitimacy. In this sense, for firms to symbolize their commitment to sustainability and value-based competitive positioning (to be considered legitimate), they would have to publish and assure their SRs to comply with what is understood from a social perspective as the ‘normal and taken-for-granted’ or the ‘obvious and proper’ (Oliver, 1992, p.564; Kolk et al., 2011, p.669). Secondly, it is based on mimicry (cognitive imitation) that stems from its underlying orthodoxy logic, the latter being based on preferring actions that are conventional (traditional) and based on routines (DiMaggio & Powell, 1991, p.11-18). This means that firms mimic more successful and legitimate peers (Tolbert & Zucker, 1983, p.26). Hence, mimicry is used for competitive reasons (Bebbington et al., 2009, p.595). A good example of this orthodoxy mimetic process is firms’ convergence towards reporting their SRs based on GRI standards because GRI-based reporting has attained a tipping point (Bebbington et al., 2012, p.82, 83) in the organizational field. The same logic applies here to assurance on SR reports and companies tending to assure these reports through big-4 firms services that might be explained by mimicry.

Accordingly, neo-institutional theory can be utilized to provide a new spirit of explanation for spread and demand of sustainability reporting and to provide insights into why such practice is supposed to be assured. Its major theme is emphasizing the conditioning role of the social context on SR (Bebbington et al., 2014, p.271), which means how social institutions. For instance, firms working within the same industry or technological field, affected by the same set of laws and regulations or following the same strategies – trying to look responsive to or differentiated by sustainability (Bebbington et al., 2009 p.593, 594; Higgins et al., 2011, p.21, 22) – have driven firms to both report and assure their SRs. Also, it should be mentioned, in the context of what have been said, that the development and institutionalization of global sustainability and reporting standards, especially GRI (Kolk et al., 2011, p.669-671) and to a lesser extent the UN Global Impact (Chen & Bouvain, 2009, p.299) and the Carbon Disclosure Project (Kolk et al., 2008, 741,742), have shaped the global convergence into the current increase in SR reporting and assurance. Thus, this theory, by its focus on homogeneity in corporate behaviour that is resembled in the norms dominant in business culture, is seen
as complimentary to both stakeholders and legitimacy theory. Its best addition is probably its ontological stances. The regulative pillar embraces a realistic (objective) ontology, the cognitive pillar embraces a constructionist (interpretivist) one and the normative pillar embraces a somewhat-in-between ontological position, but closer to the cognitive pillar of constructionism. This theory gives explanations and insights on how entities comprehend and respond to the changing nature of both social and institutional pressures and expectations. It links basically organizational practices to two main things. First, it links them to the values of the society where the entity operates. Second, it links them to the need to maintain legitimacy. The norms are derived from the society or from the expectation of a powerful group within that society. These norms legitimate the existence and activities of entities; hence, a deviation from them would hinder entities’ existence (Deegan, 2014, p.386). Thus, legitimacy theory can be seen as a subpart of institutional theory, yet with two differences. The first difference is legitimacy theory’s concentration to the strategic management role of corporate activities. The second difference is its lower explanatory power to explain sustainability reporting (Ji, 2013, p.107-110; Bebbington et al., 2014, p.253, 274) and its assurance.

Notwithstanding, this theory, as any other theory, suffers from some criticism in literature that is summarized in the points below:

1- Its failure to address change. It is static; it is concerned with similarity, stability and inertia; the processes by which organizations converge around common practices and structures. Also, it does not give concrete explanations of why firms show changes in SR patterns over time. In other words, the three pillars explain SR from a static perspective, but they do not show the evident organizational evolution and discontinuations in environmental reporting at certain periods of time (Greenwood & Hinnings, 1996, p.1023, 1027, 1048; Hoffman, 1999, p.351, 367). Oliver (1992, p.564) has described this shortcoming by ‘an ignorance of deinstitutionalization (‘the process by which the legitimacy of an established or institutionalized organizational practice erodes or discontinues’) in explaining organizational change and behaviour’.

2- Its assumption of ‘organizational passivity’; it ignores the role of social actors, especially managers, in the institutionalization process (Oliver, 1991, p.173) as they are seen as mechanism constructed by the environment.

3.2.3 Signalling Theory

As the second incision of this paper’s research question is concerned with COEC, it was inevitable for the researchers to understand how this COEC is manifested in the financial market and how it gets affected by SR assurance. For this matter, they have considered signalling theory as an appropriate established theory that can provide a legitimate explanation for COEC fluctuations in the market. Signalling theory is concerned with how information is transmitted within the financial market. It allows the researcher to connect firms’ attitude (e.g. first time SR assurance) with the reactive behaviour of investors in the financial market. Accordingly, it has an explanatory power regarding the change in cost of equity capital that is begotten by the firm’s first time SR assurance.
Joseph Stiglitz (2002, p.473) says ‘... the fact that actions convey information leads people to alter their behaviour, and .... this is why information imperfections have such profound effects’. In the spirit of this author’s implied message, Signalling Theory is beneficial to explain the behaviour in the cases of information asymmetry, where two persons or organizations have access to different information. The sender of the information (signaller) chooses how and where to communicate (signal) his intended information, whereas the receiver chooses how to interpret the signal (Connelly et al., p.39). Therefore, signalling theory is concerned with reducing information asymmetry between two parties (Spence, 2002, p.445). There are two important types of information asymmetry that this theory is concerned about. The first one is about the quality of information; when one party is not fully aware of the characteristics of another party. The second one is about another party’s behaviour or behavioural intentions (Stiglitz, 2000, p.1453). Moreover, the signals can be used for multiple reasons, such as, sending messages about firms’ legitimacy and their adherence to social values. For instance, leaders of young firms are keen on staffing their BODs with a diverse (heterogeneous) group of managers, who are reputable in the market, in an IPO to signal their firms’ legitimacy (Certo, 2003, p.432; Filatochev & Bishop, 2002, p.942) and commitment to social values (Miller & Triana, 2009, p.763). Also, through the quality of the financial statements, CEOs signal the unobservable quality of their firms to potential future investors (Zhang & Wierserna, 2009, p.693). Dhaliwal et al. illustrate that ‘Voluntarily disclosing CSR activities demonstrates firms’ confidence in their CSR performance, which sends a positive signal to investors, or, in the case of poor CSR performance, allows firms to offer explanations’ (2011, p.62)… ‘Voluntary compilation and publication of standalone CSR reports demonstrates its special effort and commitment to improving transparency regarding long-term performance and risk management’ (2011, p.63), so adding these facts to the axiom that SR assurance’s main role, also voluntary in nature, as a service is to enhance this transparency and long-term risk-averse vision, it can be said, accordingly, that assurance on SRs is supposed to signal the quality of firms’ environmental performance and their commitment to a higher level of transparency, which in turn would increase the consensus about their legitimacy in the financial market. This would associate such firms to lower risks.

Notwithstanding, the notion of quality is relative; each person has his own interpretation of its meaning, although in the context of signalling theory it refers to ‘the underlying unobservable ability of the signaler to fulfil the needs or demands of an outsider observing the signal... that would stem two socially constructed terms; reputation and prestige to the signalling entity’ (Connelly et al., 2011, p.43). Accordingly, and by reflecting on the singling model presented by Kirmani & Rao (2000, p.68) that distinguishes between high-quality firms and low-quality firms, it can be inferred that a lower cost of equity capital is the payoff that high-quality firms would be rewarded by the market for signalling their higher transparency through SR assurance; hence, they have a higher motivation to assure their SR reports. On one hand, this is logical in a separating equilibrium where low-quality firms will not get such a benefit from SR assurance; i.e. the costs of acquiring the service will overcome the benefits. Also, the outsiders can distinguish accurately between the two types of firms; therefore, low-
quality firms would rather keep their SR reports un-assured. On the other hand, in a pooling equilibrium, where the ramification of assurance is mutual to both types of firms and outsiders cannot, hence, distinguish the two types of firms, the high-quality firms would not be motivated to assure their SRs, as the benefits are not ascertained in assuring them a competitive advantage.

3.3 Theoretical Positioning

The overview provided in the previous paragraphs with the shortcomings of other theories that the researchers have considered during the process of building up the theoretical framework for this research paper can be abridged as follows.

1- Institutional theory provides a different insight. It refuses both posits of morality and rationality as explanations for SR reporting and assurance. It proposes, when a clear rational is absent (regulatory), that such activity is explained by the dominance of norms in the social context a firm operates in (e.g. peers pressure and considering SR to be taken for granted). It explains why SR and its assurance happen and how the social context has affected it (Bebbington et al., 2014, p.273).

2- Accountability theory (coupled by critical theory) emphasizes the deliberate willingness of managers to be ethically responsible. Managers here show a higher sense of morality and a personal interest to report voluntarily on their social and environmental activities to fulfil their moral obligation to disclose sustainability information (Gray et al., 1996 cited Bebbington et al., 2014, p.273). Accountability nevertheless is quite too general as a theory and underpins lots of other notions under its umbrella, such as legitimacy, institutionalism and stakeholder isomorphism. Both legitimacy and stakeholder theories emphasize the deliberate calculated message of managers to shape and alternate the expectations of powerful stakeholders (the case of legitimacy theory) or the general community (the case of stakeholder theory) (Deegan, 2002, p.293).

Following the previous discussion, the best approach, to explain the results of this paper, is to rely on two theories; neo-institutional and signalling theories, for the following reasons:

1- While legitimacy theory has an explanatory power over short-term determinants of SR, institutional theory is concerned with longitudinal research and it explains the long-terms determinants (motives) of such a service (Bebbington et al., 2014, p.282). This is the case of this study, where the data in hand is longitudinal of the panel variety.

2- Institutional economics that emphasize the regulative/coercive elements (Williamson, 1985) cannot be utilized solely to explain the finding of this research. Only the neo-institutional sociology that favours norms and cognitive structures can be utilized because till today SR assurance is unregulated.

3- Political economy, legitimacy and stakeholder theories can be seen as sub-theories within institutional theory because of its broader 3 mechanical perspectives; therefore, institutional theory would provide a broader lens to tackle the research question from a wider perspective. Institutional theory ‘permits different motives to be explored, primarily based on the logics of appropriateness and on the social
construction of reality. It does not favour any of the normative, regulatory or cognitive explanation, but argues that they operate at different levels’ (Bebbington et al., 2014, P.282).

4- By utilizing signalling theory; the findings of this research paper would show that assured SRs signal to the financial markets that the firms represents a less risky investment that deserves lower equity risk premiums (a lower COEC). Such lowered costs of equity capital should, in turn, lower the costs of capital that would in turn increase the firm’s overall economic performance (Scott & Pascoe, 1984, p.228-229) and thereby help to explain the observed positive relationship between economic and sustainable performance.

5- As their study is contextual, utilizing institutional theory sounds more convenient compared with other theories, due to its framework that allows firms to be examined within their context; ‘the notion of organizational fields is examined and helps to explain the behaviour inside firms’ (Bebbington et al., 2014, p.282).

6- The critique for institution theory regarding its failure to provide explanations for change in pattern is not of concern in this paper, as it is not related to the research question. Their main goal is discovering the economic effect of first time adoption of SR assurance on risks associated with investing in firms, yet they are not studying this effect in a trend basis. Trend here refers for studying the phenomena (reduction in COEC) over several years after the adoption of SR assurance.

3.4 Theoretical Model

Figure 5 represents a summary of the previous discussion. It demonstrates how the theoretical hypothesis would be extracted. This extraction would be elaborately explained in paragraph 3.5.
### 3.5 Theoretical Hypothesis Development

“Hypotheses are nets: only he who casts will catch” (Novalis)

“There is nothing more necessary to the man of science than its history, and the logic of discovery... The way error is detected, the use of hypothesis, of imagination, the mode of testing” (Lord Acton)

Following the theoretical positioning of the researchers and to answer the research question, a basic posit will be introduced. The hypothesis is in relation to the subsequent lower cost of equity capital that prevails after the first time adoption of SR assurance.

An investor trades-off risks and returns; she would either try to maximize her returns for a certain amount of systematic risks or try to minimize her risks for a certain amount of expected returns. If the assurance on SR reports, as a mechanism to signal better environmental performance, begets better financial performance (which is caused by a lower systematic risk) then the market should reward this better performance with lower COEC. As SR assurance increases a firm’s credibility, it can be argued that it increases its legitimacy from an investor’s perspective. This would encourage more firms to adopt such a practice because the higher future prospects of better performance of a firm, the greater the market would be willing to invest. This means that the market either expects from the firm higher return (for a certain level of systematic risk) or expects from the firm lower systematic risk ‘BETA’ (for a certain level of returns). This would drive the firm to pay more for the opportunity to capture these returns; hence, would drive-up the company’s stock prices. The market should reward the increment in legitimacy and accommodation to social norms, from the institutional theory perspective, by a lower cost of equity capital (Sharfman & Fernando, 2008, p.574). Thus,

**Theoretical Hypothesis:** The first time voluntary assurance on standalone sustainability reports reduces the cost of equity capital in the subsequent year.
Chapter Four – Empirical Methodology

In this chapter the authors will establish the empirical section of their study. An explanation of the data collection, sampling techniques, tests of hypotheses, empirical regression model, variables identification, study time frame, and the statistical aspects of this study are presented. This chapter will be finalized with a presentation of the statistical hypotheses that are connected to the theoretical hypothesis, and a statistical roadmap that sums up these tests and constitutes a scientific step-by-step process to analyse the data. By the end of chapter five the authors will try to verify these statistical hypotheses along with the theoretical one. This chapter is an attempt to make the reader well informed about the researchers’ fieldwork and how it was organised.

4.1 Data Collection

The data for this study is collected from two sources; GRI and DataStream databases. Initially the authors referred to GRI to identify the companies that will form the population of their study. Their aim was to detect not only listed Swedish firms that report on their sustainability reports, but also the ones that assure these report. This is because they want to identify the first time assurance on SR reports occurred as a practice in Sweden, which would constitute a starting point in time to collect information on entities. This is an endeavour to possess a balanced panel. Thus, they referred to the first year GRI started declaring information about firms that report on their sustainability reports in accordance with GRI guidelines. This year was 1999 (SR publication year). Starting from that year, they checked manually the information related to each subsequent year about all companies and gathered all the information necessary about them; i.e. name of company, reporting year, report publication year, assurance on report, type of assurer, scope of assurance, level of assurance, type of report in accordance with GRI guidelines, size of the firm, industry, type, etc. The authors did not only rely on the information declared on GRI’s website; they also referred to each SR report published by those firms to double-check for the accuracy of the data reported on GRI database. Eventually, the number of SR reports published from 1999 till the year 2014 (SR publication year) were 307 reports from a number of different companies. The observations were filtered by using Excel to make the year of first time SR assurance the initial year, where data collection is supposed to start. This manual filtration process resulted in 21 different firms that have acquired SR assurance for the first time, where such a practice (SR assurance) was only evident since 2007 onwards. Therefore, to conduct the study, data for 60 different firms issuing their SRs from 2007 till 2014 had to be collected (whether they assure their SRs or not; as the control group for the study is firms that did not assure their SR reports for the first time – which means an entity that reassures its sustainability report is included in the control group). This totalled the observations to 540 observations (= 9 years * 60 companies). Then, these observations had to be restricted to only 396 (9 years * 44 companies) due to lots of difficulties that the researchers faced in the process of data collection. Such difficulties occurred due, for instance, to the withdrawal of some firms from the Swedish Stock Market, lack of
financial information in certain years, etc. This exclusion of firms that suffered from missing data assessed the researchers to conduct their study on highly balanced panel data, which facilitates the acquisition of a robust statistical result with fewer disturbances. The reason why it is 9 not 8 years is because the researchers are studying the change in COEC which implies having to collect observation for one additional year prior to the year of the first time adoption of SR assurance. While performing the final analysis, the number of years was then restricted and reduced by one year (2014 was deleted in the analysis) because of the nature of variables. Each variable is a percentage change from one year to the next; therefore, the observations for year 2013 inherently include the values related to 2014. This restriction in turn has lowered the number of observations to 352 (8 years * 44 companies). Refer to Appendix 4 for a list of these 44 companies.

The most important reason why the researchers restricted their study to listed companies is the availability of data. The second reason is the dependent variable of this study; the change in COEC, which stems from the financial market’s consensus where only listed companies’ stocks usually trade. In other words, the firms to be included in this study have to be large enough to access the capital market regularly to enable an accurate estimate of their COEC.

The intuition for using GRI as the main data source is because it is considered the broadest and most objective sustainability-reporting database available, and because most companies comply with GRI standards in Europe for Sustainability reporting purposes.

The year 2015 was excluded from this study, as the subsequent effect on COEC is not feasibly measureable. The researchers conducted their research within the first half of 2015, before an effect of SR assurance can be observed on the COEC in the market.

DataStream was used at a later stage to collect the necessary financial data about the dependent, independent and control variables of the study, which the hypotheses testing model includes. DataStream is an efficient database and is widely used in accounting and finance research. Also, it is the major database accessible in USBE library.

## 4.2 Sampling

### 4.2.1 A Census Study

The best way to conduct this study is through a census method that *involves all units in a population* (Parasuraman, 1991, p.474) because it fulfils the two qualifying criteria of a census study. Although this method has its non-sampling errors risks, Parasuraman (1991) explains that the best way to minimize the risks of non-sampling errors that may occur during the process of data collection and analysis is for the researcher to have full-control over the entire process of data gathering, coding and analysis (1991, p.476). Additionally, the study itself should fulfil two criteria for a census method to be scientifically perceived convenient. These two criteria are (1991, p.477):

1- Feasibility: a census study will only be feasible when the population is relatively small.
2- Necessity: a census study is only necessary when the population units are extremely varied; i.e. when each population unit is likely to be very different from all other units.

In this study the researchers had full control over the entire process of data gathering, coding and analysis. They also double-checked each other’s work to make sure that human-commission errors are minimized as far as possible, especially that the data was manually collected for each company from DataStream and published financial statements. Also, the number of firms, which is 44 entities, is not relatively that big. These firms are also very heterogeneous in nature; i.e. they have different sizes, dealt with different products, and belonged to varied industries. Thus, a census study appeared to be the most suitable technique, so that the results of the study are both reliable and contextually generalizable.

4.2.2 Sampling Survivorship Bias

By definition, a Bias ‘is the lack of internal validity or incorrect assessment of the association between an exposure and an effect in the target population in which the estimated statistic has an expectation that does not equal the true value’ (Delgado-Rodriguez & Llorca (2004, p.635). This means that biases are distortion caused during the scientific investigation that might affect the quality of obtained results. Thus, a researcher should be aware of the different types of biases and design and process his study with adequate and appropriate procedures to overcome these biases. In general, biases have many different classifications that depend greatly on the type of research being conducted (Delgado-Rodriguez & Llorca, 2004, p.635). Due to the plurality of the sampling method, census, most sampling biases are neglected and their chances to affect the results obtained are nullified. Yet, the most important classification of biases that a researcher should take be aware of at the beginning of his study is the ‘bias of selection’, which is referred to as the ‘inappropriate definition of the eligible population (ascertainment bias)’. This type of bias can be caused by what is so-called survivorship (survival) bias that might occur in any type of study, including a census study (Delgado-Rodriguez & Llorca, 2004, p.635).

Survivorship bias is ‘the logic error of concentrating on the people or things that “survived” some process and inadvertently overlooking those that did not because of their lack of visibility.’ (Survivorship bias, n.d.) This logic error (fallacy) might lead the researchers to distorted conclusions. Such conclusions will cause the establishment of inaccurate arguments that are based on faulty reasoning, which would negatively affect the quality of the research paper. This survivor bias causes an integral issue of focus, as David McRaney describes it, which drives the researcher to make inferences only from the firms that survived the initial screening and neglects the information that can be derived from non-survivor firms. This point is quite clear from this quote ‘the advice business is a monopoly run by survivors. When something becomes a non-survivor, it is either completely eliminated, or whatever voice it has is muted to zero’ (Klein K., 2014, August 11; David McRaney, May 23, 2013).
By reflecting on the utilized final sample, an observer can notice that it consists of 44 survivor firms out of 60 firms, where 16 companies were neglected (considered non-survivors) for various reasons as explained before, mainly for the lack of data availability. This bias is absolutely inevitable and unfortunately inescapable in the case of this study. The lack of data availability was the main cause of the exclusion of firms from the sample. Unfortunately, any other alternative was not available due to the fact that the researchers included in their study all the firms operating in the Swedish market. Thus, because of the context of this study, no more firms can be added to the sample to lessen the negative influence of survivor bias. The researchers admit the presence of this bias and perceive it to be one of the possible hidden reasons why certain conclusions were reached.

### 4.3 Empirical Regression Model

Previous research in statistics and econometrics has indicated that there are special ways to model panel data due to its singularity in violating the assumption that observations are independently distributed across time. These methods allow controlling for variables that cannot be observed or measured like individual heterogeneity (Torres-Reyna, 2007). There are basically 2 different models that researchers utilize for this purpose, Fixed Effects Model (FE) and Random Effects Model (RE). Pooled OLS is usually invalid in the case of panel data due to the fact that its standard errors and tests’ statistics are generally invalid because they often ignore the serial correlation in the composite error (Wooldridge, 2009, p.373). A note to be mentioned here is that random coefficient models and hierarchal models are not possible with the data set in hand, due to its relatively small size. Also, Chow 1960 test of poolability (.xtrc command) that is advised by Park (2011, p.13) before using panel analysis techniques was rejected by STATA because of the small in size dataset, hence, this step was skipped while performing data analysis procedures.

#### 4.3.1 Fixed Effects Model

The estimation of the Fixed Effects (FE) model eliminates time-invariant explanatory variables (it controls for their effects) – these are known as individual-specific effects (Wooldridge, 2009, p.381), and controls for entity-invariant variables – these are known as time-effects (Baltagi, 2013, p.39). In other words, it allows the researchers to conduct a ceteris paribus study and to control for time and entity fixed effects (Wooldridge, 2009, p.340), which solves the problem of endogeneity.

The least square dummy variable (LSDV) method to estimate the FE model allows the researchers to use OLS fitted values for parameters estimation, unlike the within-group or first differences fixed-effects versions (Dougherty, 2007, p.414). This version of the model has the following form.

$$y_{i,t} = a_i + \beta_1 x_{i,t} + \beta_2 x_{i,1} + \beta_3 x_{i,t} + \ldots + \beta_k x_{i,t} + \epsilon_{i,t}$$
Where:
\( y_{i,t} \): is the dependent variable of entity ‘i’ in time ‘t’
\( x_{i,t} \): is the independent variable of entity ‘i’ in time ‘t’
i: refers to the company studied
t: refers to the time dimension of the observation
\( \beta_0 \): is the intercept,
\( \beta_k \): is the parameter associated with each independent variable,
\( \epsilon_{i,t} \): is the error term.

In more detail, the fixed-effects model comes in two distinct flavours to estimate the regression equation. These are the one-way error component regression form and the two-way error component form. These two forms differ in the components of their regression error term. While the one-way error component form includes the unobservable individual-specific effects, such as industry or location, that constitute fixed (N-1) parameters to be estimated and a remainder disturbance that varies across entities and time, the two-way error component form includes both the unobservable individual-specific effects and unobservable time effects, such as strike or economic distress years and remainder disturbance (Baltagi, 2013, p.13-55).

As explained before, the intuition behind the fixed effects model is controlling for omitted variables. Thus, the unobserved or entity fixed-effects regression is a method that can be used when \( t > 2 \) to control for omitted variables in panel data when these variables vary across entities but do not change over time. This is because the intercepts of each entity absorb the influence of all omitted variables that differ from one entity to the next but are constant over time (Stock & Watson, 2014, p.403). The model of this regression takes the form:

\[
y_{i,t} = a_i + \beta_1 x_{i,t} \ldots + \beta_{k,i} x_{i,t} + \epsilon_{i,t} : \quad \epsilon_{i,t} = u_i + v_{i,t}
\]

Where:
\( u_i \): unobservable individual-specific effects.
\( v_{i,t} \): remainder stochastic disturbance term.

Including dummy variables for the different companies, which data was collected from, controls for individual-specific effects. Without this control the traditional OLS will provide biased statistics (Stock & Watson, 2014, p.403-405).

In addition to the individual-specific effects dummy variables the two-way error component fixed-effects model includes dummy variables for the years that constitute the time-span for which data was collected for each entity. The time fixed-effects dummies are a method used to control for the omitted variables in panel data that evolve over time but are constant across entities. The model of this regression takes the form:

\[
y_{i,t} = a_i + \beta_1 x_{i,t} \ldots + \beta_{k,i} x_{i,t} + \epsilon_{i,t} : \quad \epsilon_{i,t} = u_i + \lambda_t + v_{i,t}
\]

Where,
\( u_i \): unobservable individual-specific effects.
\( \lambda_t \): unobservable time effect.
\( v_{i,t} \): remainder stochastic disturbance term.
Time fixed-effects (unobserved time heterogeneity) $\lambda$, controls for the influence that time has over variables. Years vary in their influence due to economic and financial situations that were not caused by the entities (constant between entities); therefore, to control for their effect they should be associated with $(T-I)$ dummy variables (Stock & Watson, 2014, p.407-409).

In this study the researchers tested the importance of controlling for time-fixed effects (by using the command `testparm i.publicationyear` in Stata). This is to check if the data better fits a two-way error component FE model than the one-way error component FE model. Different years might have insignificant effect on the model and the interpretation of its statistics, hence, there would be no need to control for their effect.

4.3.2 Random Effects Model

Unlike the fixed effects model, the random effects model assumes that the variation across entities is random and uncorrelated with regressors (independent variables) in the model ($X_j$ is uncorrelated with unobserved individual effects). This assumption is of course held in a one-way error component random effects model. The same assumption is extended in the case of a 2-way error component random effects model to include no-correlation between the regressors and unobservable time effects (Baltagi, 2013, p.20-24 & 42-46; Torres-Reyna, 2007, p.25). Torre-Reyna (2007, p.25-26) explains that when the model includes time invariant variables, it is better to use a random effect model, because when the fixed-effects model is used the effect of time is absorbed by the intercept. However, this application is with caution for omitted variables bias that the random effects model might beget. One of the positive sides of the RE is its generalizability to cases beyond the sample included in the study.

A note to mention here is that it is also possible for the model to have mixed effect. That is to for one of effects to be fixed and ought to be estimated by assigning them to dummy variables (whether it is time or entity-specific) while at the same time for the other effects to be random and uncorrelated with the syncretic error. In this case an LM test to check for the existence of random effects after controlling for the fixed effects (whether they are related to time or entities) is necessary.

4.3.3 Applied Model

SR assurance can be perceived as being part of a firm’s overall voluntary disclosure strategy; hence, the authors will identify from the previous literature concerned with cost of equity capital the factors that contribute to the change in a firm’s COEC from a strategic perspective. These factors will constitute the control variables of this study.

The authors will provide a graphical representation in figure 6 of the applied regression model utilized for testing the theoretical hypothesis before explaining it algebraically. This representation illustrates how the variables, extracted from previous literature, are linked to the research question’s independent and dependent variables. This illustration is to facilitate the reader’s understanding of how the empirical model is built to verify the theoretical hypothesis.
To test the research’s theoretical hypothesis, the researchers will utilize a multiple regression model similar to the one estimated by Dhaliwal et al. (2011, p.69), yet with slight variations in the variables utilized due to the difference in nature of this study. This model provides an identification of the causal relationship between the independent (first time SR assurance) and dependent (change in COEC) variables of this study; i.e. to test whether a reduction in COEC exists due to the first time SR assurance. This estimated regression model is presented by the following formula.

\[
\Delta \%\text{COEC}_{i,t+1} = \beta_0 + \beta_1 \text{ASS}_{i,t} + \beta_2 \text{DISC}_{i,t} + \beta_3 \text{ASS.DISC}_{i,t} + \beta_4 \Delta \text{SIZE}_{i,t} + \beta_5 \Delta \text{LEV}_{i,t} + \beta_6 \Delta \text{MB}_{i,t} + \beta_7 \Delta \text{ROA}_{i,t} + \beta_8 \Delta \text{BETA}_{i,t} + \epsilon_{i,t}
\]

4.3.4 Variables Identification

The regression model used in this study is a multiple regression one. It has independent variables that explain the changes in the dependent variable and it also allows for ceteris paribus analysis that controls for other variables that might affect the dependent variable under investigation. In the following paragraphs explanations for the explained (dependent) variable, explanatory (independent) and control variables, regression parameters and idiosyncratic error term of this study are presented. A point to note here is that the dependent and all independent variables are continuous in nature (i.e. they can take any value in an infinite set of numbers) except for the 3 variables (ASS, DISC & ASS.DISC) that are dichotomous (taking only one of two values (0 or 1). This classification is according to Blumberg et al. (2011, p.28, 29).

4.3.4.1 Dependent Variable

\(\Delta \%\text{COEC}_{i,t+1}\): is the percentage change in the cost of equity capital in company \(i\) from year \(t\) (SR preparation year) to year \(t+1\) (SR publication year). A point to illustrate here is that the control variables also have to adopt this percentile change form. A discussion on the calculation of COEC is presented below.

\(\text{COEC}\): is the cost of equity capital calculated based on CAPM model (Sharpe, 1964, p.432; Lintner, 1965, p.14, 25-28) which indicates that the cost of equity capital (COEC) equals the risk-free interest rate plus the firm’s beta multiplied by the market’s risk premium; thus,

\[
\text{COEC} = r_E = r_f + \beta_E (r_m - r_f)
\]
$r_f$: is the risk-free rate. In this study the authors used the 10-year Swedish government bonds yearly rates (Long-run-yield) to determine the risk free rate that corresponds to the years concerned with each assured SR report. As explained, those reports relate to different companies at different periods; therefore, the authors used different risk free rates which prevailed at the end of each preparation year of assured SRs and at the end of the issue (publication) year.

$\beta_E$: is Beta or the covariance of the market’s return with the individual company’s common stock return scaled by the market’s variance; thus, $\beta_E = \frac{Cov(r_E, r_m)}{Var(r_m)}$. In this study the authors used the betas computed by the daily data provided byDataStream database for each company. BETA is also one of the dependent variables that would be controlled for due to its direct influence on COEC. BETA was taken in the form of the natural logarithm ($ln$) change from year ($t-1$) till year ($t$) to assure a distribution of observations that approximates a normal one.

$(r_m - r_f)$: is the market risk premium ($r_P$). This market risk premium, just like the risk-free interest rate, was different for each year and had to be calculated accordingly based on the data provided by DataStream. It resembles the difference between the risk-free rate of return ($r_f$) and the yearly return on the market portfolio ($r_m$). The latter ($r_m$) is the return an investor would receive, if he or she holds a portfolio that consists of all the stocks exchangeable in the stock market. The researchers have calculated the yearly ($r_m$) as the average of the daily market returns for each year respectively.

The COEC raises lots of questions about its precision and reliability due to the sensitivity of its calculation because of the subjective estimation of both, beta and risk premiums. Thus, while interpreting the results of this research paper, the reader should be cautious about the reliability of such estimates. Due to the lack of access to other databases the researchers had to rely on their estimates solely while building up their testing model, although they would have preferred to utilize other databases for comparison purposes that would mitigate such a shortage in research outcomes. In other words, the researchers could have mitigated such a risk (i.e. lower measurement errors) by building-up a score that resembles the outcome of a Varimax rotation analysis between what the authors have estimated in their calculations for COEC and what would have been calculated by using the estimates provided by, for instance, Bloomberg database. Any difference between the two compared calculations lies in the methods used to construct estimates. For instance, for the purpose of beta estimates, the researchers utilized daily-generated data, while Bloomberg database utilizes weekly-generated data. Also, Bloomberg database issues its own firm-specific estimates of risk-premiums, unlike the ones calculated by the researchers in this study.

4.3.4.2 Independent & Control Variables

$ASS_{i,t}$ is the independent variable that explains the percentage change in the dependent variable. The analysis of this variable’s coefficient is central to this study. It is a binary (dummy) variable that represents a firm $i$ when it assures its SR report for the first time in
year $t$. This indicator (dichotomous) variable takes the value of 1 when the SR has been assured for the first time and the value of 0 otherwise. In that sense, the experiment (treatment) group is the companies that assure their sustainability reports for the first time. Yet, the control (base or benchmark) group, the group against which comparisons are made (Wooldridge, 2009, p.185), of this study will be the firms whose reports are assigned the value of 0; i.e. the firms that have either assured their sustainability reports in previous periods or have not assured their sustainability reports at all. Ceteris paribus, accepting the null hypothesis $H_0: \beta_1 = 0$, by utilizing $t$-statistic, about the coefficient of this variable would indicate that there is no difference between an assured or un-assured SR report when it comes to lowering the cost of equity capital. In the alternative case of not having enough statistical evidence to refuse $H_0$ (i.e. accepting $H_1: \beta_1 < 0$) then a negative coefficient would indicate a lower cost of equity capital that is caused by SR first time assurance. In simple terms, a negative coefficient on the variable $ASS_{i,t}$ would support the theoretical hypothesis of this study.

Control variables are other independent variables that would affect the independent variable based on the associations approved by previous research. In the context of this study, previous research indicated that the initiation of sustainability reports ($DISC_{i,t}$) (Dhaliwal et al., 2011), ‘firm financial leverage ($LEV$), industry membership ($IND$), and firm size ($SIZE$)’ (Gebhardt et al., 2001, p.135), market to book ratio ($MB$) Fama & French, 1992, p.440, 441), long-term growth rate ($LTG$) (Gebhardt et al., 2001, p.135; Gode & Mohanram, 2003, p.405, 406), analyst forecast dispersion ($LnDisp$) (Gebhardt et al., 2001, p.135 & Dhaliwal et al., 2005, p.667, 687) and return on assets ($ROA$) (Dhaliwal et al. 2011, p.68) are constructs that might affect COEC of any sample of firms in a way that would make the correlation between assurance on SR and COEC spurious.

For instance, big firms indulge in SR management strategies (e.g. SR assurance) to generate more resources and please the wider spectrum of stakeholders (Bansal, 2005, p.200 - 203). This corresponds to the fact that size is negatively associated with firm’s returns (Fama & French, 1992, p.445-447); therefore, it needs to be controlled for. In other words, Size captures various factors motivating firms to issue their SR reports such as public pressure or financial resources (Lang & Lundholm 1993, p.246) and to assure those reports for the same reasons. This variable ($SIZE$) is measured by the market capitalization as it is what the financial market analyst would likely work with (Sharfman & Fernando, 2008, p.579). Due to the fact that this measure is highly skewed the researchers decided to conduct a natural logarithmic transformation on it before its utilization in their analysis. This transformation would reduce the skewness to conventional levels (cf. Muthen & Kapalan, 1985, p.187, 188).

$DISC_{i,t}$. It is an indicator variable for the first time initiation of sustainability report that Dhaliwal et al. (2011) study concluded its effect in lowering the COEC. This dummy variable will be utilized to control for the effect of the first-time SR assurance on COEC. Additionally, the authors will use an interactive variable $ASS.DISC_{i,t}$ between the two dummy variables $ASS_{i,t}$ and $DISC_{i,t}$ to detect if there is a significant interaction between first-time assurance and first-time initiation of SR report and to estimate the change in COEC differential between control and experiment groups.
Also, the degree of leverage (LEV) was found to be positively associated with the cost of equity capital (Fama & French, 1992, p.441-444). It can be measured by the debt ratio obtained by dividing total debt on total assets. This ratio should be controlled for because debt holders usually demand greater disclosures and excessive monitoring (Leftwich et al., 1981, p.56, 57; Dhaliwal et al. 2011, p.69; Dhaliwal et al., 2006, p.691). Accordingly, they would increase the demand for SR assurance.

MB is the market-to-book ratio. This variable has to be controlled for because expected returns were found positively correlated to MB ratio (Fama & French, 1992, p.440, 441).

Return on assets (ROA) is computed as (income – before extraordinary items) scaled by the firm’s total assets. This variable indicates the financial performance of firms. Companies with higher financial performance have sufficient resources to initiate sustainability reports (Dhaliwal et al. 2011, p.68); therefore, they also possess more resources to assure these reports.

The original model proposed by Dhaliwal et al. (2011) includes a variable called “HIPERFORM” that controls for a firm’s sustainability performance in accordance to its peers. Dhaliwal et al. controlled for this variable based on the intuition that investors may favour investing in firms that have superior sustainability performance in comparison to their peers. In the context of this study, as it is being performed on Swedish firms, there is no accrediting agency that publishes such sustainability performance ranking for all firms operating in Sweden, like KLD in the USA, which might affect the perception of investors. There are in fact 3 bodies that report sustainability rankings for firms on a global level with an inclusion for Sweden. These bodies are Corporate Knights, the Dow Jones Sustainability World Index and London Stock Exchange subsidiary FTSE Group. At most they report the indices for 6 firms out of all public firms operating in Sweden (Swedish Institute, 2014), which is not considered enough by the researchers of this paper to make a peer-assessment. There is, however, one additional body, the Sustainability Brand Index, that might have been of use by the researchers of this paper if it had reported certain numerical rankings for all the companies that it includes in its annual survey. In fact, this body only reports a numerical percentile that is a response to how well the best 10 firms performed (sustainability wise indeed). The rest of the companies are included in a chronological order without percentile specifications. Unfortunately, this was not enough to make a scientifically acceptable peer-assessment. Another drawback of this index is that it is based on the opinion of 18,000 customers all over Sweden about the brands they deal with (Sustainability Brand Index, 2014); therefore, the generalizability of the survey used to build up such rankings is also a matter of concern. Thus, such a measure for the performance of each firm in comparison to its peers is unfortunately unpractical. The researchers of this paper stress on the word ‘unfortunately’ due to the fact that Dhaliwal et al. (2011, p.79, note 19) have reported that assurance doubles the effect of CSR disclosure by using an alternative model that they have estimated, which includes this variable, but was not reported explicitly in their paper. Therefore, it would have been really interesting to test if this empirical finding holds in the Swedish context of this study by including such a variable.
In the main regression model there were two other variables that the researchers had to skip (not to control for) due to unavailability of data from Swedish firms. The first variable was a proxy for long-term growth rate that is measured by an empirical proxy of long-term growth rate based on I/B/E/S analyst EPS forecasts (ΔLTG). This variable is measured as the difference between the two-year-ahead consensus EPS forecast and the one-year-ahead consensus EPS forecast scaled by the one-year-ahead consensus EPS forecast. The second variable was the analyst forecast dispersion ΔLNDISP, which is calculated as the logarithm of the standard deviation of analyst EPS forecasts divided by the consensus forecast. Both of these variables were found associated with less implied cost of equity capital.

4.3.4.3 Regression Parameters

\( \beta_0 \) is the overall intercept parameter, which is the average of the entity-specific intercepts. It is an unbiased and consistent estimator of the population \( \beta_0 \). Yet, its consistency decreases when \( N \) reaches infinity for fixed \( T \). This intercept is rarely central for statistical analysis (Wooldridge, 2009, p.33, 369) as the case is in this study.

\( \beta_j \) are the slope parameters in the relationship between the dependent variable and each of the other independent and control variables. Those parameters describe the degree of correspondence between the mentioned variables; therefore, they are considered central to statistical analysis (Wooldridge, 2009, p.33, 369).

4.3.4.4 Regression Disturbance (Error Term - \( \varepsilon_{i,t} \))

\( \varepsilon_{i,t} \) is the regression idiosyncratic error (time-varying error) because it represents the unobserved factors that affect \( y_{i,t} \) (Wooldridge, 2009, p.350). In the case of panel data this error term may include the variables that vary both across entities and across time (Stock & Watson, 2014, p.418).

4.4 Study Time Frame

The variables are calculated based on a two-year variation. The first year (\( t \)) is the year of SR preparation; it corresponds to the first time firms are acquiring assurance service on those reports. The second year is the effect year (\( t+1 \)), or the year when the SR is issued (published), which is usually during March or April of the subsequent year to the preparation year of the SR. At the end of this subsequent year there should be a signal for the effect of SR assurance in the financial market that is hypothetically resembled in a decrease in the firm’s COEC. Figure 7 illustrates this time frame.
4.5 Data Analysis Software

Organising and analysing data were both performed by using STATA and Excel. These two programmes are widely used analytical tools among academics and professionals.

4.6 Statistical Aspects

The accuracy and reliability of developed models are crucial in economic studies, such as finance and accounting. Thus, to develop a study with high accuracy and to construct validity the authors have run several statistical tests on the data and models utilized to test the nature of the relationship between the variables. These tests with other statistical aspects are summarized below. To facilitate the reader’s understanding of the analysis of results chapter, the discussion will be sub-grouped into two themes. Initially, the statistical assumptions, upon which the regression models are estimated, are discussed. Secondly, the statistical tests performed to validate those assumptions and any alternative tests when those assumptions do not hold are discussed.

4.6.1 Theme 1 – Regression Assumptions

Following Stock & Watson (2014, p.411 - 413), the basic regression assumptions that contribute to unbiased regression-line estimation, for both fixed and random effects models constitute an extension to OLS regression assumptions in cross-sectional analysis. These assumptions are summarized as follows.

1) The error term has conditional mean zero $E(\varepsilon_{iit}|x_{i1}, x_{i2}, \ldots, x_{iT}, a_i) = 0$. This assumption implies that there is no omitted variable bias because the error term does not depend on (i.e. is not correlated with) any $x$ variable for that entity (past, present or future).

2) $(x_{i1}, x_{i2}, \ldots, x_{iT}, \varepsilon_{i1}, \varepsilon_{i2}, \ldots, \varepsilon_{iT})$, $i = 1,..., n$ are i.i.d. draws from their joint distribution. This assumption implies that the variables for one entity are distributed identically to, but independently of, the variables for another entity. This assumption holds by random sampling of entities. This assumption is different from OLS assumption No.2. While the later holds that each observation is independent, the first one does not hold such a restriction within an entity; it only indicates that variables are independent across entities. This means that a variable can be serially autocorrelated (at different dates) for a given entity in panel data fixed-effect regression (i.e. what happens one year tends to be correlated with what happens next year). A reader should observe here that as long as some omitted factors are autocorrelated then the error term is autocorrelated.

3) Large outliers are unlikely; $(x_{iT}, \varepsilon_{iit})$ have nonzero finite fourth moments.

4) There is no perfect multicollinearity. A note to be mentioned is that the assumption of multicollinearity here is relaxed due to the fact the nature of panel data contributes to reduced multicollinearity among the variables, since the cross-sectional dimension adds lots of variability that yields more informative data (Baltagi, 2013, p.7).

5) Fixed effects specific assumptions:
   a- One-way model (Baltagi, 2013, p.14):
Individual-specific effects $u_i$ are assumed to be fixed parameters to be estimated.

The remainder disturbances are assumed to be stochastic with $v_{it}$ independent and identically distributed (IID) $(0, \sigma_v^2)$.

All independent variables $X_{it}$ are assumed to be independent of the error term $v_{it}$ for all $i$ and $t$.

**b- Two-way model** (Baltagi, 2013, p.39):

- Individual-specific effects $u_i$ and time effects $\lambda_t$ are assumed to be fixed parameters to be estimated.
  - The errors $u_{it}$ are independent and identically distributed with mean zero and variance $\sigma_u^2$, where $\sigma_u^2 > 0$.
  - Individual effects $\mu_i$ are independent of each other with mean zero and variance $\sigma_{\mu i}^2$, and the variance $\sigma_{\mu i}^2$ can be allowed to be zero.
  - Time effects $\lambda_t$ are independent of each other with mean zero and variance $\sigma_{\lambda t}^2$, and the variance $\sigma_{\lambda t}^2$ can be allowed to be zero.
  - The errors $v_{it}$ are independent of the explanatory variables $X_{it}$ for all $i$ and $t$.

6) Random effects specific assumptions:

**a- One-way model** (Baltagi, 2013, p.20):

- Individual-specific effects $u_i$ are assumed to be random in this case (not fixed) and independent of the remainder stochastic disturbance term $v_{it}$.
  - All independent variables $X_{it}$ are assumed to be independent of the error term $v_{it}$ for all $i$ and $t$.

**b- Two-way model** (Baltagi, 2013, p.42):

- Individual-specific effects $u_i$ and time effects $\lambda_t$ are assumed to be independent of each other and independent of the syncretic error $v_{i,t}$.
  - All independent variables $X_{it}$ are assumed to be independent of $u_i$, $\lambda_t$ and $v_{it}$ for all $i$ and $t$.

4.6.2 Theme 2 - Statistical Tests

Regression has some underlying assumptions that must be satisfied to produce reliable and robust results. These assumptions are subject to statistical tests that verify them. Also, other alternative measures can be taken in case these assumptions do not hold. These tests along with the alternative measures are discussed below.

4.6.2.1 Normality

Normality can be tested either graphically (by scatterplots or by normality plots) or numerically (Hair, 2010, p.72). If the error term is not normally distributed, the distribution of a $t$-statistic is not exactly $t$, and $F$-statistic is not exactly $F$ (Wooldridge, 2009, p.41). In this research we relied on normality plots for the residuals to verify the assumption of normality.

It should be noted that the fixed-effects model is sensitive to non-normality, heteroskedasticity and serial correlation in the idiosyncratic errors; therefore, it is important to address these issues while making statistical inference based on this model (Wooldridge, 2009, p.370).
4.6.2.2 Hypothesis Testing

Following on Wooldridge (2009, p.106-140) testing the hypotheses of the regression parameters can be done by testing the null hypotheses ($H_0$: $\beta_j = 0$) of single population parameters $\beta_j$. The test of $t$-distribution for standardized estimators will be used according to the theorem:

$$(\hat{\beta}_j - \beta_j)/se(\hat{\beta}_j) \sim t_{n-k-1}$$

Where;

$n$: number of observations.

$k + 1$: number of parameters (and intercept).

$n-k-1$: degrees of freedom.

$\beta_j$: the value of the population parameter that the test of hypothesis is about.

A Z-distribution could have been used if the variance of the population is known, yet this is not provided in the context of this study; therefore, a $t$-test that uses the standard deviation of sampling as an approximation of the population variance is a sufficient alternative.

To test the null hypothesis of $\beta_j = 0$ the $t$-test is used to check whether the unknown population value of the parameter is zero. Thus, when there is no significant statistical evidence to refute the null hypothesis (i.e. the null hypothesis statistically holds or the researchers fail to reject $H_0$ at the $x\%$ level of significance) based on the comparison between the $t$-critical value that is based on a specific significance level and the $t$-calculated value that is based on the above theorem (i.e. $|t_{\beta_j}| > c$), the independent variable $x_j$ related to the parameter $\beta_j$ tested is assumed to have no effect on the expected value of the dependent variable $y$.

For convenience purposes, the researchers will utilize $p$-value measures to test the null hypotheses. That is, when $p$-value $< \alpha$ (significance level of the test) $H_0$ is rejected; otherwise, $H_0$ is not rejected at the $100 \times \alpha \%$ significance level.

Based on the fact that a two-sided test is more prudent, even in the occasion where established theory has indicated the direction of the ceteris paribus effect, the researchers of the paper have decided to perform the $t$-test in a two-tailed format.

In the case of joint-significance tests, such as the case of joint significance of time model variables to indicate how much the model fits the data and resembles the ceteris paribus relationship, an $F$-test will be used for statistical inferences purposes (the technique is very similar to the $t$-test).

4.6.2.3 Goodness-of-Fit

To capture the goodness-of-fit a researcher has to check the coefficient of determination ($R^2$), which resembles how much the regression line is accurate in resembling the relationship between the variables (i.e. how much the independent variables in the model all together explain the percentage variation in the dependent variable). It is the
proportion of the sample variation in $y$ that is explained by the regression line, which takes any value from 0 to 1. Generally speaking, a low $R^2$ value can at most tell if it is hard to predict individual outcomes on $y$ with abundant accuracy. Because the statistical software already reports this measure, any additional technical mathematical discussion is not necessary. Notwithstanding, as the size of the ordinary $R^2$ does not account for both the joint significance of variables and for the number of regressors (i.e. when a new independent variable is added the value of $R^2$ does not decrease), which would distort the accuracy of interpretation, an $F$-statistic test should be used to overcome the first mishap and an adjusted-$R^2$, which adjusts $R^2$ for the degrees of freedom should be used to overcome the second mishap (Wooldridge, 2009, p.47, 77-79, 133; Verbeek, 2012, p.21-22). A point to note here is that the degrees of freedom in the case of panel studies equals $N^*(T-1) - k$ (Wooldridge, 2009, p.366).

4.6.2.4 Suitability of the Regression Model

Initially, to test if a fixed-effects model is an efficient estimator of the regression model, an $F$-test would be used to confirm the presence of fixed effects in data, which implies the inefficiency and bias of OLS estimator. Secondly, the researchers will perform the Durbin-Wu-Hausman (DWH) test (1978) which indicates whether a random effects model provides a better estimate for the regression parameters of variables compared with the fixed-effects model. In the case where a random model is statistically more appropriate, the researchers will use Breush-Pagan Lagrange Multiplier test (LM test) to check for the presence of random effects that would statistically signify a random effects model on a pooled-OLS regression one. As Wooldridge (2009, p.373) explains this comparison of the three sets of estimates can help us determine the nature of the biases caused by leaving the unobserved effect entirely in the error term (the case of pooled OLS) or partially in the error term (the case of random-effects transformation), but a note of caution is that the $t$-statistics of pooled OLS are always invalid due to their ignorance of the often substantial serial correlation in the composite errors, which combines the unobserved effect with the idiosyncratic error.

4.6.2.5 Heteroskedasticity

Heteroskedasticity is considered a minor issue in regression. It does not cause bias or inconsistency in OLS estimates and the interpretation of the goodness-of-fit measures are also unaffected. The only problem with heteroskedasticity is that it makes the estimators of the variance $\text{Var}(\hat{\beta}_j)$ biased; hence, the standard errors $\text{SE}(\hat{\beta}_j)$ which are based on those variances will no longer be valid for constructing $t$- and $F$-statistics. Where heteroskedasticity is present $t$- and $F$-statistics do not have $t$- and $F$-distributions respectively (Wooldridge, 2009, p.210, 211). The presence of heteroskedasticity in panel data is an issue in FE models. If it is present by using the Modified Wald test for group-wise heteroskedasticity in the FE regression model (by utilising the command `xttest3` in STATA), the use of robust standard errors will be computed (by using the option `robust` after the command `xtreg`) and reported.
4.6.2.6 Cross-sectional Dependence

Cross-sectional (contemporaneous) dependence leads to biased estimate results in the model chosen. Baltagi (2013, p.1) has noted though that the problem of cross-sectional dependence is not an issue in short panels (less than 20 years) like in the case of this study. Nevertheless, the error component will be tested in this study for cross-sectional dependence for indication reasons by using xtdsd pesaran, abs command in STATA. This test tests the hypothesis of cross-sectional independence in panel-data model with small T and large N by implementing the parametric testing procedure proposed by Pesaran (2004). Pesaran test has a null hypothesis of residuals not being correlated.

4.6.2.7 Serial Correlation

Autocorrelation or serial correlation is the correlation of a variable with its previous values. Serial correlation in the error term causes the standard errors of the coefficients to be smaller and $R^2$ to be higher than they should be. This means that ignoring serial correlation when it exists can result in consistent, but inefficient, estimation and biased standard errors (Baltagi, 2005, p. 84). It should be noted, however, that serial correlation is not an issue that would affect the interpretation of results in short panels (less than 20 years) (Baltagi, 2013, p.1) as in the case of this study. Serial correlation would be tested however for indication reasons only by using the command xtserial in STATA which runs the Lagram-Multiplier test (based on Wooldridge (2002) test for serial correlation) with a null hypothesis of no serial correlation in the model’s residuals.

4.6.2.8 Stationarity

Stationarity is related to the time-series aspect of panel data. A stationary time series is one whose probability distributions are stable over time, and a non-stationary one reveals the opposite. When a time series is non-stationary, i.e. when there is more than one trend in the series, it resembles an issue for the researcher that needs to be dealt with so that efficient and consistent estimators of parameters are obtained. Nevertheless, a short time-series (like the ones in micro panels similar to the one of this study) does not need to be corrected for such an issue, since T is short for each entity (Baltagi, 2013, p.1). For indication reasons, the researchers will only test the variables for stationarity without correcting for its influence if existent. This test will be conducted through Hadri 2000 unit roots test based on Baltagi’s (2013, p.278-285) illustration.

4.7 Hypotheses

To summarize the above discussion, the authors will present statistical hypotheses, which will be verified in chapter five through statistical tests. These hypotheses will only be presented in their null form, where the alternative of absolute opposite is skipped for brevity purposes. To prepare the reader for the 5th chapter, a verification roadmap (a step-by-step statistical analysis procedure) that the verification of these hypotheses follows is
presented in figure 8. This roadmap can be used to shape the reader’s expectations of what follows in chapter 5.

**Hypothesis a:**

\( H_{a0} \): OLS regression model does not fit the data or resemble the ceteris paribus relationship between COEC and SR assurance.

**Hypothesis b:**

\( H_{b0} \): The model residuals (error term) are not normally distributed.

**Hypothesis c:**

\( H_{c0} \): One-way error term FE regression model does not fit the data or resemble the ceteris paribus relationship between COEC and SR assurance.

**Hypothesis d:**

\( H_{d0} \): Two-way error component FE regression model does not fit the data or resemble the ceteris paribus relationship between COEC and SR assurance.

**Hypothesis e:**

\( H_{e0} \): One-way error component RE regression model does not fit the data or resemble the ceteris paribus relationship between COEC and SR assurance.

**Hypothesis f:**

\( H_{f0} \): Two-way error component RE regression model does not fit the data or resemble the ceteris paribus relationship between COEC and SR assurance.

**Hypothesis g:**

\( H_{g0} \): The fitted regression model is homoscedastic.

**Hypothesis h:**

\( H_{h0} \): The error component is not cross-sectionally dependent.

**Hypothesis i:**

\( H_{i0} \): The error component is not serially correlated (autocorrelated).

**Hypothesis j:**

\( H_{j0} \): Panels are stationary.

**Hypothesis k:**

\( H_{k0} \): The regression model’s variables comply with previous literature.

**Hypothesis l:**

\( H_{l0} \): There is a significant inverse relationship between the change in COEC in year \( t+1 \) and SR assurance in year \( t \).
Figure 8. Statistical Analysis Roadmap
Chapter Five – Empirical Results

In this chapter, the researchers will present the results of their empirical study. To facilitate the reader’s understanding, the results will be discussed in a logical order starting with an explanation for and a representation of the descriptive statistics and normality tests of residuals. Secondly, the results of statistical tests that based the decision of suitability among the empirical models are presented. Thirdly, the results of other statistical diagnostic tests are discussed to reveal any nuisance that might affect the results obtained and based on which corrective measures were performed. Fourthly, the corrected fitted model is presented in its mathematical and statistical forms.

5.1 Descriptive Statistics

In this section the variables’ main statistics are provided. For simplicity, the researchers have chosen to initially present a preliminary overview of how the SR reports (observations) are distributed among different industries, and how this distribution rhymes with what has been mentioned in previous literature. Secondly, the researchers will discuss the relationship between the research variables from a standard (classical) linear multiple regression perspective, the results of which are provided in table 1. Thirdly, they will discuss the normality of residuals by utilizing graphical means.

5.1.1 Preliminary Panel Analysis:

Panel table (table 1) shows the distribution of sample’s observations in the positive case; i.e. the distribution of companies acquiring SR assurance for the first time from the years 2006 till 2014 among different industries.

The data collected is very heterogeneous in nature; i.e. companies vary in size, industry, type of products and many other aspects.

From the table the reader can also infer the increasing, yet with a slower rate, number of companies that acquired assurance on their SR reports in Sweden. This provides confirmative evidence on Bebbington et al. (2014) research, which shows that on an international scale SR assurance on SRs, is increasing yet in a slower rate in the last couple of years. This means that Swedish companies show a pattern similar to the international trend and are getting affected by the international increased interest in this domain.
Table 1. Observations Distribution

<table>
<thead>
<tr>
<th>Year/industry</th>
<th>Mining</th>
<th>Utilities</th>
<th>Production</th>
<th>Finance</th>
<th>Other</th>
<th>Total</th>
<th>% ASS of 44</th>
<th>No. of Ass. SRs</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2007</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2%</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>2008</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2%</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>2009</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>4</td>
<td>9%</td>
<td>6</td>
<td>200%</td>
</tr>
<tr>
<td>2010</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>2%</td>
<td>7</td>
<td>17%</td>
</tr>
<tr>
<td>2011</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>2%</td>
<td>8</td>
<td>14%</td>
</tr>
<tr>
<td>2012</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>9%</td>
<td>12</td>
<td>50%</td>
</tr>
<tr>
<td>2013</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>4</td>
<td>5</td>
<td>11%</td>
<td>17</td>
<td>42%</td>
</tr>
<tr>
<td>2014</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>4</td>
<td>9%</td>
<td>21</td>
<td>24%</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>10</td>
<td>21</td>
<td>48%</td>
<td>42</td>
<td>100%</td>
</tr>
<tr>
<td>%</td>
<td>5%</td>
<td>5%</td>
<td>29%</td>
<td>14%</td>
<td>48%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of 44</td>
<td>2%</td>
<td>2%</td>
<td>14%</td>
<td>7%</td>
<td>23%</td>
<td>48%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.1.2 Classical Multiple Linear Regression (OLS) Model

Table 2 presents the result of regressing the dependent variable COEC on the independent and control variables by a standard multiple linear regression OLS model. It resembles a preliminary screening of the ceteris paribus relationship between $COEC_{t+1}$ and $ASS_t$. The preliminary screening of this model shows its unfitness for available data. An $F$-statistic test (of joint significance of the regression parameters) with a $p$-value ($Prob. > F = 0.5065$) $> 0.05$ provides enough statistical evidence not to reject the null hypothesis $H_{a0}$ at a 0.05 level of significance. This means an OLS regression model does not fit the data or present the ceteris paribus relationship between the two variables. Also, adjusted $R$-squared with a very low value of (-0.0020) reveals the very weak goodness of fit of the model; only 0.2% of the variation in the dependent variable is explained by the independent variables. A $t$-statistic on the independent variable of interest with $p$-value $= 0.042 < 0.05$ is considered significant at a 0.05 level of significance. A negative coefficient of this variable (-0.3178591) indicates the inverse relationship between the $COEC_{t+1}$ and $ASS_t$ where almost 31% of the decrease in COEC is explained by 1% increase in assurance on sustainability reports. The rest of the parameters provide insignificant statistical results. This screening, nevertheless, is only preliminary and shows that other variables need to be controlled for, such as, year and entity-specific characteristics. This screening is helpful in providing a rough picture of how the data is interrelated. Based on this OLS regression model residuals were estimated so that a normality test can be performed as explained in paragraph 5.1.3.
5.1.3 Normality of Residuals

Based on the OLS regression model estimated above, residuals are predicted and tested for normality. As explained before, normality of residuals is a necessary measure for the consistency and efficiency of estimated parameters in regression analysis. Figure 9 shows a normal quantile plot of the model’s residuals (quantiles of residuals against quantiles of normal distribution). This figure shows that the residuals follow a distribution that approximates normal distribution as the fitted residuals almost lie on the fitted line of normal distribution; therefore, there enough statistical evidence that would make the researchers refute the null hypothesis $H_{00}$. This indicates the normality of the regression residuals.

5.2 Fitted Model Statistical tests

In this section the researchers will present the results of FE and RE one-way and two-ways error component models. The procedure for choosing the most appropriate model is based on applied econometrics, mostly on the writing of Baltagi 2013 and Wooldridge 2009. To fit the data into a fixed effect or a random effect model, the data must initially be declared panel in STATA by using the command `xtset`. Upon this application, STATA indicated that the panel data in use is strongly balanced. Then, the regression analysis by using the FE and RE models was continued.

### Table 2. OLS Regression Model

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 352</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>2.36236744</td>
<td>8</td>
<td>.29529593</td>
<td>F( 8, 343) = .91</td>
</tr>
<tr>
<td>Residual</td>
<td>111.066657</td>
<td>343</td>
<td>.323809497</td>
<td>Prob &gt; F = .5065</td>
</tr>
<tr>
<td>Total</td>
<td>113.429025</td>
<td>351</td>
<td>.323159615</td>
<td>R-squared = .0208</td>
</tr>
</tbody>
</table>

| Coef.     | Std. Err. | t     | P>|t|  | [95% Conf. Interval] |
|-----------|-----------|-------|--------|---------------------|
| ASS       | -.3170591 | .1559308 | -2.04  | .042    | -.6245601 to -.0115801 |
| DISC      | .0020864 | .1074988 | .056   | .575    | -.1511534 to .2717263 |
| ASSDISC   | .1688875 | .381919 | .42    | .674    | -.5903106 to .9120055 |
| SIZE      | .2884153 | .3513502 | .82    | .412    | -.4026569 to .9794875 |
| LEV       | .035562  | .049536 | .73    | .468    | -.0687251 to .131849 |
| MB        | .0000776 | .0008401 | .09    | .926    | -.0015749 to .0017301 |
| ROA       | -.0007597 | .0069514 | -.11  | .913    | -.0141432 to .012913 |
| BETA      | -.026104 | .0260429 | -1.00  | .317    | -.0773270 to .0251190 |
| _cons     | -.1333714 | .0638927 | -2.09  | .038    | -.2590422 to -.0077006 |
Following the discussion in chapter 4, the first step for a researcher is to test if a one-way error component FE model fits the panel data in hand. In this case, entity-specific effects are being controlled for and estimated by assigning them to dummy variables. There are in practice many ways to estimate the FE model in STAT. The researchers have chosen to estimate the FE model by using the command `xtreg with fe` as an option (after declaring the data to have a panel form using `xtset Company Year` command) due to fact it estimates the FE model without overburdening the presentation with 44 different dummies that do not contribute to the analysis. Table 3 shows the result of utilizing this command and one-way error component FE model.

An $F$-statistic of joint significance of the regression parameters of all variables with a $p$-value ($Prob. > F = 0.5018 > 0.05$) provides enough statistical evidence not to reject the null hypothesis $H_{c0}$ at a 0.05 level of significance. This means that a one-way error component FE regression model does not fit the data or represent the ceteris paribus relationship between the variables. Accordingly, the researchers fail to reject the null hypothesis $H_{c0}$. This means that the model needs to be tested for a one-way error component random effects model and for 2-ways error component FE or RE models. All of which will be performed as explained below.

It should be mentioned here that an $F$-statistic of joint significance of the entity-specific effects parameters (they were assigned to dummy variables - absorbed in the model) with a $p$-value ($Prob. > F = 0.4602 > 0.05$) provides enough statistical evidence not to reject the null hypothesis of entity-specific fixed effects at a 0.05 level of significance. This means that controlling for entity-specific effects is not statistically significant and does not provide a higher explanatory power in the regression model.

Also, an $R^2$-statistic of 0.0239 shows that the independent variables can only explain 2.39% of the variation in the dependent variable, which is considered a week goodness of fit. This statistic is bigger than the one obtained by OLS regression and resembles a higher goodness of fit in comparison.
5.2.2 One-way Error Component RE Model

The second estimate is the one-way error component random effects. In practice there are multiple ways to estimate this model, but the researchers performed it by using the command `xtreg`, with two options `re` and `theta`. The results of this estimate are presented in table 4.

This estimated model gives a $\chi^2$-statistic with a $p$-value ($\text{Prob.} > \text{Chi}^2 = 0.4933 > 0.05$) that provides enough statistical evidence not to reject the null hypothesis $H_{e0}$ at a 0.05 level of significance. This means that a one-way error component RE regression model does not fit the data or represent the ceteris paribus relationship between the variables. Accordingly, the researchers fail to reject the null hypothesis $H_{e0}$.

A `theta`-statistic value indicates the goodness of fit of the random effects model. A theta value of 0.06896862 can be read that a one-way random effects model explains almost
6.9% of the variability in the dependent variable. This is considered a week goodness of fit.

To double-check the results of this model’s estimate, the researchers performed an LM test for random effects with a null hypothesis that affirms the existence of random effects. Refuting the null hypothesis means that a random effects model is a better estimate than a classical OLS. The results of this test are presented in table 5. This test is performed by the command `xttest0` in STATA, which resulted a $\chi^2$-statistic $p$-value ($\text{Prob.} > \chi^2 = 0.4836 > 0.05$) that provides enough statistical evidence not to reject the null hypothesis. This means that there are no significant differences across entities (or random effects). This result confirms the researchers above conclusion that a one-way error component RE model does not fit the data.

Thus, the researchers are left to investigate the third estimate where they have to estimate 2-way error component FE and RE models and test for the significance of controlling for the effects of time by assigning time to dummy variables as explained in 5.2.3 & 5.2.4.

**Table 4. One-way Error Component RE Model**

| COEC   | Coef.  | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|--------|--------|-----------|-------|------|---------------------|
| ASS    | -.3204237 | .1555158 | -2.06 | 0.039 | -.625229 to -.0156183 |
| DISC   | .0642052  | .1068639 | 0.60  | 0.548 | -.1452441 to .2736546 |
| ASSDISC| .1602625  | .381988  | 0.42  | 0.675 | -.5884203 to .9089452 |
| SIZE   | .2881524  | .356099  | 0.82  | 0.411 | -.3998304 to .9753552 |
| LEV    | .0356937  | .0488256 | 0.73  | 0.465 | -.660026 to .1313901 |
| MB     | .0008079  | .0008402 | 0.10  | 0.917 | -.0015589 to .0017346 |
| ROA    | -.0008114 | .0069527 | -0.12 | 0.907 | -.0144385 to .0128157 |
| BETA   | -.0255455 | .0261145 | -0.98 | 0.328 | -.0767291 to .0256361 |
| _cons  | -.1325832 | .0649472 | -2.04 | 0.041 | -.2597973 to -.0052091 |

| sigma_u | .07881134 |
| sigma_e | .56869259 |
| rho     | .01884346 | (fraction of variance due to u_1) |
5.2.3 Two-way Error Component FE Model

The third estimate performed is the two-ways fixed effects model. As explained in chapter 4, the entity-specific and time-specific effects are considered fixed; hence, they should be assigned to dummy variables. This estimate is performed in STATA by using the command `xtreg`, with the option `fe` and by assigning dummy variables to time T by indicating a variable with the symbol `i.` before the notation of the variable `Year` in the regression code. This estimate is presented in table 6. This estimate is followed by a joint significance test of time variables’ parameters, which is presented in table 7.

This estimated model shows an $F$-statistic for the joint significance test for the regression model parameters with a $p$-value ($Prob. > F = 0.0000$) < 0.05 is considered enough statistical evidence to reject the null hypothesis of the joint significance of the model parameters. Thus, the researchers reject the null hypothesis $H_{0}$ and conclude that a 2-way error component FE model fits the data.

A within-$R^2$ of 0.2228 indicates the goodness of fit of the 2-way error component FE regression model. This means that 22.28% of the variability in COEC is explained by this FE model. An adjusted-$R^2$ for the degrees of freedom = 0.18814051 shows that only 18.8% of the variability in the COEC is explained by this FE model.

The joint significance test of time-effects parameters indicates an $F$-statistic of 5.60 with a $p$-value ($Prob. > F = 0.0000$) < 0.05 which is considered enough statistical evidence to reject the null hypothesis of time-fixed effects. This result confirms the result above and sets this model as an appropriate model to describe the ceteris paribus relationship between the two variables of interest in this study.

It should be noted here, however, that the intercept, $F$-statistic and $R^2$ figures are incorrect with the `xtreg` command; therefore, they should be derived from regressing the variables through LSDV transformation instead of `xtreg, fe` (Park, 2011, p.32). Using
LSDV estimation (with a 2-way error component) provides very close results to the ones obtained above. $R^2 = 0.3190$ and adjusted-$R^2 = 0.1842$, while the F-statistic = 2.37 and a regression intercept coefficient = 0.1700871 with a standard deviation (0.79). The result of this estimation can be referred to in Appendix 3.

The discussion on the significance of variables of parameters will be postponed until all diagnostic tests have been performed with their correcting measures.

The discussion now will move towards estimating a 2-way error component RE model and a mixed effects model to check if they fit the data; to check if they provide a higher explanatory power than the FE model; especially where the F-statistic of the joint significance test of entity-specific fixed effects parameters with a p-value ($\text{Prob. } > F = 0.1407 > 0.05$) provides enough statistical evidence not to reject the null hypothesis of the nonexistence of entity-specific fixed-effects at 0.05 level of significance.

Table 6. Two-way Error Component FE Model

<table>
<thead>
<tr>
<th>Fixed-effects (within) regression</th>
<th>Number of obs = 352</th>
<th>Number of groups = 44</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-sq: within</td>
<td>0.2220</td>
<td>Obs per group: min = 8</td>
</tr>
<tr>
<td>between</td>
<td>0.0053</td>
<td>avg = 8.0</td>
</tr>
<tr>
<td>overall</td>
<td>0.1924</td>
<td>max = 8</td>
</tr>
<tr>
<td>corr(u_i, Xb) = -0.0129</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| COEC | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] |
|------|-------|-----------|---|-----|---------------------|
| ASS  | -0.2239849 | .1511142 | -1.48 | 0.139 | -0.5213919 | 0.073422 |
| DISC | 0.1404378 | .1853135 | 0.76 | 0.446 | -0.4688209 | 0.742732 |
| ASSDISC | -0.0195871 | .3783694 | -0.05 | 0.959 | -0.7642365 | 0.7295062 |
| SIZE | 0.2913076 | .3437003 | 0.85 | 0.397 | -0.3851266 | 0.9677419 |
| LEV  | 0.0043666 | .0471659 | 0.09 | 0.926 | -0.0846033 | 0.0971936 |
| MB   | 0.0004518 | .0008218 | 0.55 | 0.583 | -0.0011656 | 0.0020692 |
| ROA  | 0.0022633 | .0068268 | 0.33 | 0.740 | -0.0111726 | 0.0156991 |
| BETA | 0.0049159 | .0263855 | 0.19 | 0.852 | -0.0470134 | 0.0568451 |

| Year | Coef. | Std. Err. | t | P>|t| |
|------|-------|-----------|---|-----|
| 2007 | -0.317746 | .1118657 | -2.86 | 0.004 |
| 2008 | -0.6935235 | .1110496 | -5.75 | 0.000 |
| 2009 | -0.409231 | .1119923 | -3.65 | 0.000 |
| 2010 | -0.2867156 | .1099534 | -2.61 | 0.010 |
| 2011 | -0.4527376 | .112492 | -4.02 | 0.000 |
| 2012 | 0.1892538 | .1113713 | -0.98 | 0.327 |
| 2013 | -0.7203694 | .1119149 | -6.44 | 0.000 |

| _cons | Coef. | Std. Err. | t | P>|t| |
|-------|-------|-----------|---|-----|
| 0.2658374 | .09366 | 2.84 | 0.005 |

F test that all $u_i=0$: $F(43, 293) = 1.26$ \hspace{1cm} Prob > $F = 0.1407$
Table 7. Time-effects Significance Test

<table>
<thead>
<tr>
<th>. testparm i.Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 1) 2007.Year = 0</td>
</tr>
<tr>
<td>( 2) 2008.Year = 0</td>
</tr>
<tr>
<td>( 3) 2009.Year = 0</td>
</tr>
<tr>
<td>( 4) 2010.Year = 0</td>
</tr>
<tr>
<td>( 5) 2011.Year = 0</td>
</tr>
<tr>
<td>( 6) 2012.Year = 0</td>
</tr>
<tr>
<td>( 7) 2013.Year = 0</td>
</tr>
</tbody>
</table>

$F(7, 293) = 10.71$

Prob $> F = 0.0000$

5.2.4 Two-way Error Component RE Model

Testing the time fixed effects parameters showed the significance of controlling for years effects and the necessity to assign them to dummy variables; therefore, a 2-way random effects model cannot be considered suitable to fit the data because the assumption of random time effects is being violated. Accordingly, the researchers have enough statistical evidence not to reject the null hypothesis $H_0$. This means, that the researchers are led here to only estimate a mixed-effects model. This mixed effects model considers time-effects to be fixed and entity-specific effects to be random.

5.2.5 Mixed Effects Model

To estimate the mixed effects model, the researchers utilized the command `xtreg` in STATA with the option `re` and by assigning dummy variables to time T by indicating a variable with the symbol $i$ in front of the notation of the variable `Year` in the regression code. This estimate will hold the time-specific effects fixed, but the entity-specific effects random. The results of this estimate are presented in table 8.

The joint significance test of the variables parameters yields a $\chi^2$-statistic with a $p$-value $(Prob. > Chi^2 = 0.000) < 0.05$ that provides enough statistical evidence to reject the null hypothesis at a 0.05 level of significance that regression parameters are equal to zero; i.e. the mixed effects model is suitable and it fits the data. However, this test statistic is not enough to make a final conclusion. An LM test for random effects should follow the initial mixed effect model estimate to test for the existence of random effects, which the rejection of its null hypothesis indicates the need to consider the fixed effects model, with time fixed effects, as a better estimator. The LM test results are presented in table 9.

The LM test was performed by the command `xttest0` in STATA, which resulted a $\chi^2$-statistic $p$-value $(Prob. > Chi^2 = 0.1152) > 0.05$ that provides enough statistical evidence
to reject the null hypothesis of no significant differences across units (variances across entities are zero; no random effects exist). This result contradicts the researchers above conclusion and it implies that a mixed effects model does not fit the data and it is better to use the fixed effects model as an estimate for the ceteris paribus relationship between the independent and dependent variables.

A point to mention is that the Hausman test is not necessary in this case as the LM test is used instead. The case here is a two-way FE model versus a mixed effects model. Therefore, the comparison between consistent vs. efficient models (as in the case of comparing an FE with an RE) is not evident.

Accordingly, the researchers conclude that the best fitted model for the data is the two-way FE effects model. Nevertheless, issues of heteroskedasticity, autocorrelation, serial correlation, etc. might affect the statistics of this model. Thus, in the next paragraphs some diagnostics tests are run on the fitted model. The correcting measures were taken whenever needed and the results were reported accordingly.

Table 8. Mixed-Effects Model
5.3 Diagnostic Tests

In the following paragraphs the researchers have performed diagnostic tests to check on the consistency and efficiency of the regression model chosen to describe the ceteris paribus relationship between the dependent and independent variables. There are 4 diagnostic tests that the researchers will run, heteroskedasticity, cross-sectional dependence, serial correlation and non-stationarity. Upon the results of these tests some correcting measures might be necessary.

5.3.1 Heteroskedasticity

Testing for heteroskedasticity was performed according to the *Modified Wald test for group-wise heteroskedasticity in a fixed effect regression model*. The results of which are presented in figure 10 through the command `xttest3` in STATA.

Heteroskedasticity test’s $p$-value $(\text{Prob.} > \chi^2 = 0.0000) < 0.05$ provides enough statistical evidence to reject the null hypothesis of homoscedasticity; therefore, the researchers are directed to reject $H_0$ and to accept the alternative of heteroskedasticity. Accordingly, a correcting measure that adjusts $SD$s and $t$- and $F$- statistics is necessary. This adjustment is explained in paragraph 5.4.
5.3.2 Cross-sectional Dependence

Because cross-sectional dependence causes bias in estimations, it is necessary to test the residuals for it. This is as mentioned in chapter 4 is not an issue to worry about in short panels, as the case of this study, but for indication research the researchers decided to test the data for cross sectional dependence through Pesaran CD (Cross-sectional dependence). The test is performed in STATA by using the command `xtcsd, pasaran abs` directly after estimating the 2-way fixed effects model. The result of this test is provided by figure 11.

Pesaran CD test’s $p$-value ($Pr. = 0.0586 > 0.05$) provides enough statistical evidence not to reject the null hypothesis of no cross-sectional (contemporaneous) dependence in the residuals, therefore, the researchers are directed not to reject $H_{0}$ of no cross-sectional dependence.

![Pesaran CD Test for Cross-sectional Dependence](image)

Figure 11. Pesaran CD Test for Cross-sectional Dependence

5.3.3 Autocorrelation (Serial Correlation)

Testing for autocorrelation was performed according to Wooldridge 2002 test for autocorrelation in panel data. The results of which are presented in figure 12 through the command `xtserial independent_variables independent_variables` in Stata.

Wooldridge test’s $p$-value ($Prob. > F = 0.4505 > 0.05$) provides enough statistical evidence not to reject the null hypothesis of no serial correlation (autocorrelation) in the residuals, therefore, the researchers are directed not to reject $H_{0}$ of no autocorrelation.

![Autocorrelation Test](image)

Figure 12. Autocorrelation Test

5.3.4 Stationarity

Testing for stationarity was performed on all variables by using the Hadri LM unit-root test by using the command `xtunitroot hadri Var_name, trend robust` in STATA, because this test has an option that allows for heteroskedasticity across panels and it can be applied to panels of moderate size. These two conditions are evident in the dataset of this
study. This test, which has stationarity as its null hypothesis, revealed no statistical evidence that any of the variables suffer from non-stationarity. The $p$-values of this test are summarized in table 10. All of which are bigger than 0.05; therefore, they provide enough statistical evidence not to reject the null hypotheses of stationarity. This directs the researchers not to reject the hypothesis $H_0$ and to reject the alternative that some of the panels contain a unit root (are non-stationary).

<table>
<thead>
<tr>
<th>Var_name</th>
<th>Statistic</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>COEC</td>
<td>-1.3154</td>
<td>0.9058</td>
</tr>
<tr>
<td>ASS</td>
<td>-6.5331</td>
<td>1.0000</td>
</tr>
<tr>
<td>DISC</td>
<td>-3.1518</td>
<td>0.9992</td>
</tr>
<tr>
<td>ASS.DISC</td>
<td>-10.0924</td>
<td>1.0000</td>
</tr>
<tr>
<td>SIZE</td>
<td>-2.2150</td>
<td>0.9866</td>
</tr>
<tr>
<td>LEV</td>
<td>-1.3556</td>
<td>0.9124</td>
</tr>
<tr>
<td>MB</td>
<td>-2.2851</td>
<td>0.9888</td>
</tr>
<tr>
<td>ROA</td>
<td>-1.2293</td>
<td>0.8905</td>
</tr>
<tr>
<td>BETA</td>
<td>0.1252</td>
<td>0.4502</td>
</tr>
<tr>
<td>Residuals</td>
<td>-1.2315</td>
<td>0.8909</td>
</tr>
</tbody>
</table>

### 5.4 Correcting Measures

The diagnostic tests performed above have only indicated the presence of heteroskedasticity in the syncretic error. Thus, the standard deviations of regression model have to be corrected for the presence of heteroskedasticity. According to Torres-Reyna (2007, p.35) this procedure can be done by using the same command for the fitted regression model with the option robust that presents new $SD$s and $t$- and $F$- statistics according to White/Huber sandwich estimator (White, 1980). Table 11 shows the result of this procedure with the new robust $t$- and $F$-statistics. A note to be mentioned here is that the parameters and their signs that should be considered as the main representative of the ceteris paribus relationship are the ones obtained by the 2-way error component FE model, without the robust option, while the tests of significance and standard errors that should be reported are the ones robust to heteroskedasticity. Table 12 presents the final table that should be considered for the final interpretation and analysis of results. The parameters related to years and companies’ dummy variables are skipped from the table, as they do not constitute an integral part of the analysis in this study. This table is followed by the mathematical representation of the regression model.

After correcting the standard deviations for heteroskedasticity, the $F$-statistic for the model with a $p$-value ($Prob. > F = 0.0000) < 0.05$ provides enough statistical evidence to reject the null hypothesis of the joint significance of the regression parameters at the 0.05 level of significance, thus, $B_j \neq 0$. Therefore, the regression model is still considered suitable and fitted.
At the 0.05 level of significance, the $t$-statistics of tests of significance of each parameter show that MB is a significant variable in this regression model with a $p$-value ($\text{Prob.} > t = 0.024) < 0.05$ at a 0.05 level of significance. The rest of the variables are insignificant.

At the 0.1 level of significance, the $t$-statistics of the significance of each parameter show that there are 2 significant variables in this regression model. These are ASS and SIZE with $p$-values ($\text{Prob.} > t = 0.069, 0.082) < 0.10$ respectively. Accordingly, the researchers fail to reject the null hypothesis $H_{0o}$ at the 10% level of significance and conclude that there might be a significant relationship between the change in COCEC in year $t+1$ and the assurance on SR in year $t$.

A negative sign of a variable’s coefficient implies an inverse relationship between this variable and the dependent variable. Accordingly, the researchers can infer an inverse relationship between ASS and COEC, and between ASS.DISC and COEC. All the other variables have shown a positive relationship due to their positive coefficients, yet with a very low level of statistical significance (the parameters estimates of coefficients have all shown a $t$-statistic $> 0.05$, therefore, the researchers failed to reject the null hypotheses of their insignificance.

Accordingly, the researchers do not have enough statistical evidence to say whether they fail to reject or not the null hypothesis $H_{0k}$ at 5% or 10% levels of significance for certain parameters, because the results are mixed in a model that shows a minimal goodness of fit ($\text{adj-R}^2 = 18.42\%$).

More analysis on the final results obtained in table 12 is left to 5.5 that will connect the statistical and theoretical hypothesis of this study to the empirical results obtained.

In mathematical terms, the regression model can be written as:

$$\Delta \%\text{COEC}_{i,t+1} = 0.1700871 - 0.2239849\text{ASS}_{i,t} + 0.1404378\text{DISC}_{i,t} - 0.0195701\text{ASS.DISC}_{i,t} + 0.2913076\Delta \text{SIZE}_{i,t} + 0.0043666\Delta \text{LEV}_{i,t} + 0.0004518\Delta \text{MB}_{i,t} + 0.0022633\Delta \text{ROA}_{i,t} + 0.0049159\Delta \text{BETA}_{i,t} + \varepsilon_{i,t} : \varepsilon_{i,t} = u_i + \lambda_t + v_{it}$$
Table 11. Robust SD, \( t \)- & \( F \)-Statistics

\[
\begin{align*}
\text{xtreg COEC ASS DISC ASSDISC SIZE LEV MB ROA BETA i.Year, fe vce(robust)}
\end{align*}
\]

Fixed-effects (within) regression

<table>
<thead>
<tr>
<th>Group variable: Company</th>
<th>Number of obs</th>
<th>352</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-sq: within</td>
<td>0.2228</td>
<td></td>
</tr>
<tr>
<td>between</td>
<td>0.0853</td>
<td></td>
</tr>
<tr>
<td>overall</td>
<td>0.1924</td>
<td></td>
</tr>
<tr>
<td>Obs per group:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>min</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>avg</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>max</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>corr(u_i, Xb)</td>
<td>-0.0129</td>
<td></td>
</tr>
<tr>
<td>F(15, 43)</td>
<td>61.14</td>
<td></td>
</tr>
<tr>
<td>Prob &gt; F</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

(Std. Err. adjusted for 44 clusters in Company)

| COEC  | Robust Coef. | Robust Std. Err. | \( t \) | \( P>|t| \) | [95% Conf. Interval] |
|-------|--------------|------------------|--------|-------------|----------------------|
| ASS   | -.2239849    | .1202278         | -1.86  | .069        | -.4664474 .0184775  |
| DISC  | .1404378     | .1170523         | 1.20   | .237        | -.0956207 .3764962  |
| ASSDISC | -.0195701   | .1907643         | -0.10  | .919        | -.4042831 .3651428  |
| SIZE  | .2913076     | .1634322         | 1.78   | .082        | -.0302848 .6209001  |
| LEV   | .0043666     | .0185771         | 0.24   | .815        | -.0330976 .0418309  |
| MB    | .0004518     | .0001924         | 2.35   | .024        | .0000639 .0008397   |
| ROA   | .0022633     | .0021731         | 1.04   | .303        | -.0021192 .0066458  |
| BETA  | .0049159     | .0365134         | 0.13   | .894        | -.0667204 .0785522  |

| Year  | Coef. | Std. Err. | \( t \) | \( P>|t| \) | [95% Conf. Interval] |
|-------|-------|-----------|--------|-------------|----------------------|
| 2007  | -.1317746 | .1977178 | -0.67  | .509        | -.5305107 .2669614  |
| 2008  | -.6385325 | .1696922 | -3.76  | .001        | -.9807494 -.2963155 |
| 2009  | -.4092311 | .1697248 | -2.41  | .020        | -.7515136 -.0669484 |
| 2010  | -.2867156 | .2037625 | -1.41  | .167        | -.6976419 .1242187 |
| 2011  | -.4527376 | .1764531 | -2.57  | .014        | -.8085891 -.0968861 |
| 2012  | -.1092538 | .1955605 | -0.56  | .579        | -.5036392 .2851315  |
| 2013  | -.7203694 | .1874869 | -3.84  | .000        | -1.098473 -.3422661 |

| _cons | .2658374    | .2023225 | 1.31   | .196        | -.1421848 .6738596  |

\( \sigma_u \) .20431986
\( \sigma_e \) .51346654
\( \rho \) .13669731 (fraction of variance due to \( u_i \))
Table 12. Corrected Fitted Model

<table>
<thead>
<tr>
<th>Var-Name</th>
<th>2-way FE Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASS(_t)</td>
<td>-.2239849*</td>
</tr>
<tr>
<td>DISC(_t)</td>
<td>.1404378</td>
</tr>
<tr>
<td>ASS.DISC(_t)</td>
<td>-.0195701</td>
</tr>
<tr>
<td>SIZE(_t)</td>
<td>.2913076*</td>
</tr>
<tr>
<td>LEV(_t)</td>
<td>.0043666</td>
</tr>
<tr>
<td>MB(_t)</td>
<td>.0004518**</td>
</tr>
<tr>
<td>ROA(_t)</td>
<td>.0022633</td>
</tr>
<tr>
<td>BETA(_t)</td>
<td>.0049159</td>
</tr>
<tr>
<td>Intercept (base line)</td>
<td>0.1700871 (0.8)</td>
</tr>
<tr>
<td>F-test (model)</td>
<td>2.37</td>
</tr>
<tr>
<td>DF</td>
<td>58</td>
</tr>
<tr>
<td>R(^2)</td>
<td>0.3190</td>
</tr>
<tr>
<td>Adjusted-R(^2)</td>
<td>0.1842</td>
</tr>
<tr>
<td>SSE (SRMSE) or (\hat{\sigma})</td>
<td>.51347</td>
</tr>
<tr>
<td>(\hat{\sigma})</td>
<td>0.204319</td>
</tr>
<tr>
<td>Entity-effects F-Test</td>
<td>1.26</td>
</tr>
<tr>
<td>Time-effects F-Test</td>
<td>10.71</td>
</tr>
<tr>
<td>N</td>
<td>352</td>
</tr>
</tbody>
</table>

Standard errors in parenthesis;
Statistical significance: * <.1, ** <.05

Note: The \(R^2\), adjusted-\(R^2\), intercept, SSE and F-statistics in table 12 are reported according to LSDV transformation before allowing for heteroskedasticity. Appendix 3 provides these statistics before and after controlling for heteroskedasticity.
Chapter Six - Analysis of Results

In this chapter the researchers will provide the interpretation of the empirical findings explained in the previous chapter and will connect them to established theories. This interpretation will be divided into six parts. The first part is an interpretation of the trends in SR assurance observed in table 1 (Observations distribution). This interpretation is used to verify the assumptions of established theories. The second part deals with statistically significant results. The significant results will be connected to the theories that constitute the lens of analysis, neo-institutional and signalling theory. This connection establishes the tool used to verify the assumptions of both theories. This paper’s empirical results will also be connected to the established empirical research because some of these results are related to the variables of the regression model. Identically, the third part will present an interpretation, yet for the insignificant results. A similar connection to established theory and empirical studies is also established. The forth part presents the results of the tests of hypotheses and connects them to the theoretical dimension of the paper. This connection establishes the answer for the research question. The fifth part presents a mirror model of the theoretical model, which was presented by figure 5. This mirror model helps the reader to understand how the suppositions of neo-institutional and signalling theories were verified through this study’s results. The sixth part discusses the constraints on the interpretation of results.

6.1 Reflections on Observational Distribution

Table 3 at the beginning of chapter reveals that there is an increasing trend in SR assurance in Sweden, yet by a slowing rate in the last couple of years. This trend can verify established theory in multiple ways.

Initially, the isomorphism speculation by institutional theory (DiMaggio & Powell, 1983, p.149) where companies aspire homogenization to acquire more legitimacy can be verified by the fact that the data is very heterogeneous in nature. Companies belong to different industries, operate on different levels of production and deal with different products. Thus, an observer might agree with the notion that says that firms in Sweden are trying to be harmonic and to rhyme in their approach and strategy no matter what industry they operate in. It is the desire to operate in conventional terms with other peers that drive their strategies.

Secondly, the domination of ‘norms and values’ assumption posited by normative neo-institutional theory receives a big applause in this study. It can be argued that EMAS III and GRI have received ‘normative authority’ (Scott, 1987, p.498, 499, 502, 503) in the EU through the years. Thus, firms in Sweden, as being part of the EU, might have been

---

4 All the interpretation of results has been performed in the context of ceteris paribus effect (i.e. holding all other factors consonant) even if the text does not explicitly say so.
influenced by the promotional activities of EMAS and GRI and were afraid of losing legitimacy if they did not comply with their recommendations. Simply, in a social context, following ‘the right thing to do’ (DiMaggio & Powell, 1983, p.150-154) is what brings about legitimacy to firms. Thus, firms should confirm to the social norms and values and apply a higher level of transparency in sustainability reporting through acquiring assurance services. This explains the increasing trend in SR assurance and explains why firms from different industrial sectors are acquiring assurance.

Thirdly, cognitive (mimetic) neo-institutional theory’s assumptions on the importance of cultural symbols and cognitive imitations are also verifiable through the increasing trend in SR assurance. Initially, assurance on SR can be seen by firms as the ‘normal and taken for granted (obvious & proper)’ (Oliver, 1992, p.564; Kolk et al., 2011, p.669), hence, to realise their legitimacy they have to assure their SR reports. Cultural symbols within a society are in nature progressive, as they start with a few numbers of individuals and then they expand to others. A reader can spot such a progressive mechanism in how the SR assurance is increasing as a cultural symbol of transparency and legitimacy in table 1. In 2006, there were no firms assuring their SR reports, yet in 2014 they were 21 firms. Secondly, the supposition of mimicry, where firms mimic more successful and legitimate peers (Tolbett & Zucker, 1983, p.26) for competitive reason (Bebbington et al., 2012, p.82, 83) that is to signal to the market a less risk business and a better environmental management and performance, can be verified through the increasing trend in SR in each industry separately. Companies operating within the same industry are always competing for higher revenue and a stronger ‘prestige’. In this sense, to signal a better prestige and stronger reputation (Connelly et al., 2011, p.43) in the market, which should hypothetically increase revues, they have to rhyme with what is conventional by more successful firms. In Sweden, the firms that started assuring their SR reports were initially hyper multinational successful firms, such as, Ericson. Thus, in an attempt to acquire a similar prestige within the society, other firms operating in the same industry might have started assuring their SR reports.

Fourthly, the assumption of instrumentalism of regulative neo-institutionalism (Rhodes et al., 2006, p.116) where companies maintain their legitimacy out of fear of legislations, cannot find support by the rapid increment in SR assurance from 2009 onwards in all types of industries. It can only explain why certain firms operating in certain industries are assuring their SR reports. Although EMAS III received a huge support by EU lobbies, which is evident through the informational and promotional activities that the EU held from 2008 onwards, its recommendations and guidelines along with GRI are still non-compulsory. Thus, the fear of losing legitimacy because of not complying with the codes of law and regulations falls short to explain such an increment in trend especially when firms are not dealing with dangerous products that might harm the environment. This regulative pillar of institutional theory (Bebbington et al., 2014, p.271) can in fact explain why firms operating in mining and production industries assure their SR. Their main products are highly polluted, so the fear of being persecuted will drive to provide higher transparency in their SR reports by acquiring assurance.
6.2 Significant Results

In this section the researchers will verify established theory by interpreting (analysing) the study’s empirical results. The empirical results under interpretation are those directly linked to the regression model; therefore, the interpretation will have two sides. The first one will be a discussion on the relationship between the study’s dependent and main independent variable and how they are interconnected with the theoretical framework of this study. The second one will be a discussion on other significant independent variables that have an explanatory power to describe the fluctuations in the dependent variable and how they confirm or disconfirm the findings of prior empirical research.

6.2.1 Association between COEC and SR Assurance

At a 10% level of significance, the researchers have concluded that assurance on sustainability reports has a significant negative effect on COEC_{t+1}; therefore, the statistical hypothesis \( H_0 \) was not rejected. This statistical hypothesis is directly linked to the theoretical hypothesis of this research, which states, “The first time voluntary assurance on standalone sustainability reports reduces the cost of equity capital in the subsequent year.” This link is inherited in the fact that the verification of \( H_0 \) means the verification of the theoretical hypothesis itself, as the first hypothesis is simply the statistical representation of the theoretical one. The researchers have failed to reject \( H_0 \); hence, they failed to reject the theoretical hypothesis of this study. This failure to reject the theoretical hypothesis, at a certain level of significance, allows the researchers to answer the research question on the affirmative side. This means that SR first time assurance is associated with a subsequent lower COEC. More elaborately, in the case of the data in hand, the regression model communicates to the reader that a first time SR assurance can lead to a decrease in the COEC in the subsequent year by 22.39% compared with the control group, which includes non-assured SR reports and re-assured SR reports. This result can be interpreted through the lens of both institutional and signalling theories in multiple ways.

Initially, he or she might agree with Sharfman & Fernando (2008, p.574) who indicated that the market should reward the increment in legitimacy and accommodation to social norms by a lower cost of equity capital. In other words, the assurance on SR reports has increased the market consensus on the legitimacy of entity’s actions. The firm is deliberately communicating its sustainability activity and is increasing the level the transparency and affirmativeness in these reports by acquiring voluntary assurance. This deliberate communication is to maintain the socially constructed reputation of the firm and its prestige in the market, which would lead eventually to better status for the firm compared with its rivals in the market. The increment in market consensus is what the signalling theory refers to as the signal that purports actions. The action in this case was the increment in legitimacy that caused a subsequent decrease in the COEC.

Secondly, this subsequent reduction in COEC caused by SR assurance can be perceived as one of the economic advantages – described by Park & Brorson’s 2005 study (p.1095-
1096), which was linked to a better understanding of market economics in a normative institutional theory lens – that should derive companies to increase their demand on this service. This normative underpinning drives firms to assure their sustainability reports to cope with ‘what is the right thing to do’ (DiMaggio & Powell, 1983, p.150-154) even when it is not obligatory by certain laws or regulations. Moreover, as Wenk (2004, p.62, 69,70) explains, in other occasions the driving force for companies to deliberately assure their SR reports is the compliance with norms and values of a certain profession, institution or academic network. This assumption is quite applaudable in the case of this study as Sweden is a highly institutionalised country. Firms have concrete connections with academia, the later of which keeps persistently promoting sustainability and higher transparency issues through their academic and professional networks. This doctrine in the academic arena might be an enormous driving force for firms to deliberately assure their sustainability reports. A note for the reader here is that the verification of such an opinion (interpretation) by the researchers of this study can be done through a qualitative study that inquire firms about the causes of their deliberate actions to assure SR reports.

Thirdly, from a signalling theory perspective, investors can interpret assurance on SR as a signal of a reduction in information asymmetry (Spence, 2002, p.445) that was interpreted by the investors in the market by associated lower risks. Such a reduction in risk would lead to less transactions costs and a ‘decrease in the bid-price spread’ (Verrecchia, 2001, p.97). This consequently leads to a lower COEC (Amihud & Mendelson, 1986, p.223). This shows how the assumptions of signalling theory where the market has as sender of a signal (the company) sends a message or a signal (lower risks and higher transparency) that can be interpreted by the receiver in the way the company has already planned (lower COEC), even though the receiver has a concrete freedom to chose the kind of reaction he considers appropriate for such a signal.

Fourthly, applying the assumption of the signalling model proposed by Kirmani & Rao (2000, p.68) is possible in this study. A reader can agree with the fact that the market in the years of the study was in a state of equilibrium where the receivers of signals could differentiate between high quality and low quality firms. Hence, the receivers (investors) rewarded high quality firms, which communicated their long-term performance, risk management skills and good environmental performance by the deliberate SR assurance, by lower COEC. Low quality firms that did not communicate their commitment to such issues where simply drawn out of the picture, where their associated risks remained the same or did not decrease.

### 6.2.2 Other Significant Associations

$H_{ho}$ was the statistical hypothesis that had mixed results; it concerns more than one variable and their statistical results varied between significant and insignificant. In this paragraph a discussion on the statistically important variables and how they verify the finding of previous research is provided. The rest of the variables, which their connections with the dependent variable were found insignificant, are presented in paragraph 5.5.3.
At the 10% level only ASS and SIZE were found significant. Based on this study’s regression model. An increase by 1% in size would lead to an increase in COEC by 29.13%. This means that when a firm’s size in year $t$, the COEC in the subsequent year $t+1$ is supposed to increase by 29.13%. This finding is considered contradictory to Fama & French (1992, p.445-447) findings that showed a negative correlation between returns and firms SIZE. It also means that having more resources, because of economies of scale, is not necessary an incentive to acquire assurance on SR reports. This coefficient, however, is only significant at the 10% level but not at higher levels of significance such as 5% or 1%.

Furthermore, at the 5% level of significance only MB was found significant in the regression model. An increase by 1% in MB from year $t$ till year $t+1$ would contribute to a 0.045% increment in COEC. This finding is contradictory to Fama & French (1992, p.440, 441) findings, which showed a negative association between a company’s returns and MB ratio. More returns signals less risk to the market; therefore, COEC and MB should have showed a negative association instead of the positive one for its coefficient to be in compliance with Fama & French. The MB coefficient, however, is quite small and does not resemble a huge influence on the COEC.

One last flag the researchers of this paper would like to raise is related to the significance of year variables. Although the discussion on their importance has been neglected to some extent in the previous chapter due to the fact that they do not constitute an integral part of the answer to the research question, a reader should be informed that the significant years that showed significant influence, on the 1% level of significance, on the market consensus of the risks associated with firms were 2008, 2009, 2010 and 2013. An explanation for the significant effect of the first 3 years could be in the sovereign debt crisis Europe suffered from in that period, where all firms operating in the EU market were associated with higher risks including the ones in Sweden. The significant effect of the year 2013 might be explained by the inflation Sweden suffered from in the begging of 2013 onwards which affected lots of industries especially properties companies, where the prices of housing increased notably compared with previous periods. This inflation could have affected the way the market interprets the risks associated with firms. More interpretation of this issue is beyond the context of this study and requires the incorporation of more theories that reflect on behavioural finance and market dynamics.

### 6.3 Insignificant Results

The regression model’s insignificant results included the variables of DISC, ASS.DISC, LEV, ROA and BETA.

DISC showed a positive correlation with COEC. This is contradictory to Dhaliwal et al. (2011, p.94, 95) findings that showed a negative association between the two variables at high significance results. This finding can be explained by the small sample size. Due to fact that the observations are not big enough to make final and absolute conclusions, it is quite acceptable to see some of the findings of this study in contradiction to established empirical research.
ASS.DISC is an interaction variable that measured the influence of having the SR report assured for the first time at the same time it was issued for the first time. This variable showed a negative correlation with COEC, where the issued sustainability report (for the first time) is assured in year \( t \) contributes to a smaller COEC by 1.95% in the subsequent year compared to the control group. This can be interpreted by the fact that the market conceives an assured SR report in a better way than a non-assured one, especially in the case where an SR report is issued for the first time. An assurance in this case has increased the possibility of an SR report to increase the legitimacy of the firm and to signal its dedication to a higher transparency and environmental dedication level.

LEV showed a positive association with the COEC. An increase by 1% in a firm’s leverage in year \( t \) leads to a subsequent reduction in the COEC by 0.437%. This result is similar to the findings of Fama & French (1992, p.441-444). It also means that investors are putting pressure over firms for an excessive monitoring and a demand for greater disclosures of a higher quality (Leftwich et al., 1981, p.56, 57; Dhaliwal et al. 2011, p.69; Dhaliwal et al., 2006, p.691) through assurance. This result, although insignificant, reaffirms the previous findings where higher quality disclosures, by acquiring assurance, always signal lower risks, long-term performance and bigger confidence in firms’ operations to the markets.

ROA showed a positive correlation with COEC. An increase by 1% in a firm’s ROA in year \( t \) leads to a subsequent reduction in the COEC in year \( t+1 \) by 0.23%. This finding contradicts Dhaliwal et al. (2011, p.68) that showed that more resources would derive firms to acquire assurance on sustainability reports and would lead to a lowered COEC. This finding can be translated by the fact that all firms in Sweden regardless how big or how much revenue they are earning are affected by the norms in the society and by the mimicry mechanism to maintain their legitimacy and prestige in the market.

BETA showed a positive correlation with COEC. An increase in BETA by 1% in year \( t \) would lead to a subsequent increase in COEC in year \( t+1 \) by 0.49%. This finding is identical to the proposition of CAPM model that has BETA as an integral part of the formulation of COEC.

### 6.4 Tests of Hypotheses

In this section the authors will provide a summary for the verification of their statistical and theoretical hypotheses. Table 13 presents a visualisation for this summery, so that a reader can easily connect the rejected from the non-rejected hypotheses.

The researchers failed to reject all of the statistical hypotheses about the fitted model except for \( H_{d0} \) that indicated that a 2-way error component fixed effect model is a good fit for the data and it resembles the ceteris paribus relationship between the dependent and independent variables. The failure to reject \( H_{a0}, H_{c0}, H_{e0} \) and \( H_{j0} \) showed that the OLS, One-way error term FE, One-way error component RE, and Two-way error component RE regression models do not fit the data or resemble the ceteris paribus relationship between COEC and SR assurance.
The researchers rejected the hypothesis $H_{b0}$ and concluded the error term in the regression model is naturally distributed, which increase the reliability of the 2-way error component regression model.

The researchers failed to reject all the statistical tests hypotheses (i.e. $H_{b0}$, $H_{i0}$, $H_{j0}$) to verify the reliability of the regression model’s results except for $H_{k0}$, which showed that the data suffers from heteroskedasticity. Upon which the standard deviations, $F$- and $t$-statistics results were adjusted and reported.

The verification of hypothesis $H_{k0}$ that linked the variables of the study with previous empirical findings showed mixed results. While some variables confirmed the results of previous empirical research, others did not. An interpretation of these contradiction was discussed and presented whenever possible.

$H_{l0}$, which all of the rest of statistical hypotheses served to find an answer for, resembled the main theoretical hypothesis of the study. At a certain level of significance (10%) the researcher verified this hypothesis on the affirmative side and concluded that there is a significant inverse relationship between the change in COEC in year $t+1$ and SR assurance in year $t$.

<table>
<thead>
<tr>
<th>Table 13. Summary of Tests of Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis</td>
</tr>
<tr>
<td>$H_{a0}$</td>
</tr>
<tr>
<td>$H_{b0}$</td>
</tr>
<tr>
<td>$H_{c0}$</td>
</tr>
<tr>
<td>$H_{d0}$</td>
</tr>
<tr>
<td>$H_{e0}$</td>
</tr>
<tr>
<td>$H_{f0}$</td>
</tr>
<tr>
<td>$H_{g0}$</td>
</tr>
<tr>
<td>$H_{h0}$</td>
</tr>
<tr>
<td>$H_{i0}$</td>
</tr>
<tr>
<td>$H_{j0}$</td>
</tr>
<tr>
<td>$H_{k0}$</td>
</tr>
<tr>
<td>$H_{l0}$</td>
</tr>
</tbody>
</table>

6.5 Verification of Theory Mirror Model

The model presented in figure 13 mirrors the theoretical model and shows how the results of this study verify the suppositions of signalling and neo-institutional theories. This model gives a rough summary of what the researchers have accomplished by the end of this thesis. The trend in SR assurance and the empirical results of the model used to establish the relationship between the dependent and independent variables verified the assumptions of the two theories. As the model explains, the first time SR assurance has reduced the COEC (at a certain level of significance), which verifies the assumptions of the signalling and neo-institutional theories. Neo-institutional theory was verified by
considering the suppositions of its three dimensions, regulative, normative and cognitive. The suppositions of signalling theory were also verified by considering lots of aspects as the analysis of significant results has provided. The signalling and institutional theory in fact interact and overlap to provide a connection between the reduction in COEC and SR first time assurance.

![Figure 13. Verification of Theory Mirror Model](image)

### 6.6 Constraints on the Analysis of Results

As in any other research errors might occur, whether in the research process or in the interpretation of results part, where the researchers input and cognition are used to a larger extent to establish a connection between the achieved empirical results and the established theory that constituted the lens to read the results of this study. The researchers would like to spot some of these potential errors to readers, so that caution is taken while reading and assessing the results of this paper.

Initially, the analysis of results is based on the adoption of a regression model that has a week goodness-of-fit (≈18%). This means that type II error, where a researcher might not reject a hypothesis that is false is quite possible. Yet, based on the fact that all the performed statistical tests have revealed that this model is the best model that fits the data in hand, the researchers had no other option but to build their interpretation on it. The reader should be aware that any interpretation is restrained by this fact and that an expanded research that can offer more data in a wider context may provide a better goodness-of-fit model that would provide a higher explanatory power and increased confidence.
Secondly, the theoretical framework of the study and the previous empirical studies might have overloaded or under-loaded this study with extra or less necessary variables respectively. The researchers took this fact very seriously while conducting their research. Every research paper that they spotted was looked at in detail and analysed before it was incorporated within their research. Some of these papers indicated the need to include more variables within their study, but unfortunately such incorporation was not possible due to both the nature of this study and the lack of necessary data. In such cases the researchers explained the reasons behind their decisions why not to incorporate these extra variables. These unincorporated variables might have affected the results obtained and caused the insignificance in a number of them. Furthermore, other researchers might have preferred to utilize other theories in the theoretical framework to provide additional interpretation on how the variables interact and why certain trends exist. The researchers believe that their theoretical point of departure and their choice of theory were highly informative and were adequate enough to provide a high level of interpretation. These theories provided lots of assumptions that could be verified through the obtained results.

Thirdly, technical issues regarding the sample size and models utilized to conduct the research might have affected the results obtained. To overcome the issue of small sampling the researchers decided to rely on a census approach where all the listed firms operating in Sweden were considered and functionalised to serve the needs of the study. The researchers believe that this was the best approach, although daunting, due to the fact that the number of listed Swedish firms is quite limited and could be handled by the right amount of dedication. To overcome the issue of the utilized models, the researchers have incorporated highly advanced academic papers and books in econometrics that deal specifically or partially with panel studies to build up a solid and scientific statistical analysis. This statistical analysis had a high level of abstraction so that concrete results are established and the right fitted model is eventually chosen to indicate the association between the dependent and independent variables of the study.

All in all, the researchers tried their best to overcome all the mishaps and shortcomings of their research by incorporating reasoning and consulting with established academic papers. Their goal was to establish a study that is highly credible and reliable. These credibility and reliability criteria are later assessed in the next chapter after they provide a conclusion to this research paper.
Chapter Seven - Conclusion

_In this chapter the researchers will initially present the conclusion of their research paper. Then they will discuss a final assessment on the paper as a whole regarding quality criteria; i.e. validity, reliability and limitations. Finally, the researchers’ recommendations for future research are discussed._

7.1 Conclusion

In conclusion, this research paper was to shed more light on the economic benefit of being green. The researchers wanted to understand more about why companies report on their sustainability activities and why are they keen in certain occasions on increasing the credibility of these reports by acquiring assurance. The approach taken by the researchers was an economic one, where they tried to investigate the impact of SR assurance on the COEC. Their deductive approach was based on building up a hypothesis through established theory, then verifying this hypothesis through statistical tests. This verification is what adds more credibility to theory and brings it upfront in application. The theories that constituted the building blocks of this study were neo-classical institutional theory and signalling theory. Mimicry and normative behaviour of firms were found as explanatory drivers for firms to assure their SR reports. The regulative side of institutional theory also provided answers, yet in limited occasions. Then, SR assurance was interpreted as a signal from entities to the market to associate firms with fewer risks, which means smaller subsequent COEC. The statistical results obtained, by no means, were 100% conclusive. The results were mixed in significance and connection to previous empirical findings. The more significant result obtained was the one related to answering the main theoretical hypothesis of this study that leads to answering the research question. Yet, again the researchers would like to draw the reader’s attention to fact that statistical test are not conclusive rather than highly probable. Notwithstanding, the ultimate goal of the researchers in this paper was to provide empirical evidence in order to properly answer the formulated research question:

_Does voluntary assurance on standalone sustainability reports reduce the cost of equity capital?_

The answer that the researchers managed to interpret through the performed statistical tests and the followed verification process is ‘Yes’. Voluntary assurance on standalone sustainability reports reduces the cost of equity capital. The statistical results showed a significant negative association between first time assurance on SR reports and COEC.

At other higher level of significance rather than those utilized by the researchers, this result was refuted and the answer in that case for this research question would be the absolute opposite; therefore, future research that is being made on a bigger scale with
more data and years to analyse may provide higher confidence in the results obtained.

Some of the findings of this study, whether significant or insignificant, were contradictory to the findings of previous empirical research, while others were not. It was quite challenging to understand why the data showed such contradictory results, yet possible answers were discussed and evaluated. The suppositions of institutional and signalling theories were verified through the results of this study in a higher level of abstraction that incorporated theoretical reasoning while trying to answer the research question.

All in all, assurance on sustainability reports can be perceived by the market as an indication of better environmental performance that associate issuing firms with fewer risks and smaller costs of equity capital. This research paper aimed at filling a gap in knowledge by finding an evidence of this association. The researchers hope that they were successful in filling this gap, provided that the paper is perceived within the statistical constraints explained and within the Swedish context utilized, and that they were successful in adding a value to library of academia.

7.2 Quality Criteria

This section is a reflection on the degree of trustworthiness in the research, which is also termed as research quality. Research quality is determined by the degree of legitimacy in procedures followed by the researchers, which will influence its usability and trustworthiness. More deterministically, quality is assessed through scrutiny of the two criteria of reliability and validity. Stated to be the fundamental criteria for research, these two concepts reliability and validity are broadly tied to each other, but a separation in their underlying definition is necessary (Bryman & Bell, 2011, p. 42). Also, being keen on the limitations of the study is also necessary so that no over-expectations are drawn about the results.

7.2.1 Reliability

Reliability involves consistency in measurement. It is achieved when results are replicable and will always give the same outcome irrespective of the researcher or time (Bollen, 1989, p.206). The researchers have been highly transparent in their writings. They have also elaborated excessively in the theoretical and empirical chapters of this paper to allow the reader who is interested in replicating their study to be able to do so in an easy manner. The theoretical part has explicit explanation of most of the theories that have connections to the research topic and the empirical part provides a statistical model that any researcher dealing with a similar topic or a similar type of data can utilize to formalize solid conclusions. Thus, reliability is evident and provides more evidence on the achievement of the goal of replication.

Moreover, neutrality of evidence is an underlying requirement for reliability (Ryan et al., 2002, p.155). More elaborately, threats to reliability may exist in scenarios where a
qualitative study involving qualitative data sources like interviews and questionnaires. Both of which pose the likelihood of bias and errors (Drost, 2011, p.106, 107) due, for instance, to transcribing the recordings, or misinterpreting the responses. Nevertheless, this study is based on a quantitative approach with data collected from independent sources; hence, the likelihood of error and bias are greatly neutralised. Also, the data obtained is free from alterations and directly derived from their resources (i.e. published financial statements, DataStream). Also, to enable adequate understanding of the research variables and the importance of the specific data gathered and utilised in the study, in-depth explanations were given as to the choice and reason for their specific usage.

The authors ensure that further comprehension, and therefore higher reliability, is enhanced by two criteria. Initially, a detail explanation of how the models are arrived at in a clear and orderly manner was provided. Secondly, explanations derived from the data are backed by theories. Accordingly, relying on the fact that all prior mentioned processes and methods are explained, the researchers consider this study reliable and possible for replication.

7.2.2 Validity

The validity of a study investigates the quality of the results. The four indicated categories of validity are; statistical conclusion validity, internal validity, construct validity and external validity (Drost, 2011, p.115). According to Trochim (2006), these different categories are constructed on one another; hence, their scrutiny in this study will follow the recommended logical sequence.

Statistical conclusion validity is located in the cycle of observations and it questions as to if there is an established correlation amongst the research variables (Drost, 2011, p. 115). This implies that to obtain an appropriate response to its reality, it is fundamental to establish the statistical importance of correlation, for the purpose of this study, statistical choices and procedures have been prudently examined and the reasons for their usage explained in chapters (4, 5) wherein the likelihood of error is explained. Also all conclusions were based on statistical significance tests, which established the base to conclude on the answer of the research question. A setback to this form of validity will come if there is evidence of a feeble statistical connotation.

Internal validity is based on the power between the dependent and independent variables. Internal validity stands at risk if there is an inability to stop the unutilised variables in the model from disturbing the dependent variables (Onwuegbuzie, 2000, p. 6). As in most finance researches the deductive-quantitative research design is always preferred to get answers to the research question. Low internal validity will be triggered if there is a degree of bias in the sample and a flaw in the research design (Ryan et al., 2002, p. 122-124). To eliminate this, the authors did a thorough check of the sample and tried to reduce any biased evidence therein. They relied on a census study that constituted all the participants in the population. Firms were only excluded in the cases of lack of information or cease of operations during the time dimension considered for this study.
Measurement or construct validity according to Bryman & Bell is “whether or not a measure that is devised of a concept really does reflect the concept that it is supposed to be denoting” (Bryman & Bell, 2011, p. 42). The methods used in this research paper have been used severely in prior research. The authors utilized an empirical multiple regression model similar to the one estimated by Dhillon et al. (2011, p.69), and subsequently they applied STATA and Excel in carrying out the statistical tests. Both of which are widely accepted analytical tools in today’s academic research. The use of a census study for sampling was to ensure that all units of the sample were considered. This method has its non-sampling errors risks, yet as Parasuraman (1991) explains, the best way to minimize the risks of non-sampling errors that may occur during the process of data collection and analysis is for the researcher to have full-control over the entire process of data gathering, coding and analysis (Parasuraman, 1991, p.476). This was proved during the whole process of conducting this study. Additionally, the study itself should fulfill two criteria for a census method to be scientifically perceived convenient, feasibility and necessity (Parasuraman, 1991, p.476). Although the data gathering process was a bit daunting, the researchers managed to do the work at the end. All these issues constitute an important role in ensuring a raised level of measurement validity in results, thereby exhibiting a low falsification level for this study.

Equated to generalizability of results, External validity according to Price & Murnan (2004, p. 66) is given if the analysis of all 44 companies gives the same outcomes as the sample from which it was derived. Results that can be generalised are deemed appropriate for constructing knowledge. As this study is based on a census study. The researchers have a reasonable sense of confidence that the final sample obtained is representative of its population. In assessing this form of validity, a relationship value with respect to time and context needs to be observed. Ryan et al. (2002, p.123) explained 2 levels for external validity.

Initially, Population Validity is the level that deals with total constitution of the sample. In order to ensure a representative sample that represents its population, the researchers chose their data set from a relatively large sample of Swedish firms that issue sustainability reports (a census study in the context of Sweden). Thus, this study is highly contextual and would be generalizable most probably within the context of Sweden to make predictions about the future.

Secondly, Time Validity is the next level of external validity, which examines whether findings are to some extent influenced by the timespan used for the study. This study was on a period spanning from 2006 till 2015. The statistical tests ran showed the importance of controlling for time effects; therefore, it can be interpreted that the observations were affected by the years of the study. Nevertheless, based on the fact that the final model utilized controlled for the time-effects, the researchers can assume that time was nullified and had no effect on their main findings.

All in all, generalizability of this study should be done cautiously as it is time and context specific. Results may differ if another time span was chosen or other companies other the Swedish ones were observed.
With external and internal validity placed at two opposing ends by Ryan et al. (2002, p. 123) the researchers feel that their study is meeting the quality criteria for research, although this study can be perceived as being a bit weak on the external validity end, but stronger on the internal front.

7.2.3 Limitations

Although this research paper has reached its aim, there were some unavoidable limitations. In as much as the authors strive to make their work as relevant and legitimate as possible, the most evident limitation was the time needed to carry out the study as only four months were initially allocated for the entire study. Collecting data about the 44 companies was a daunting task that forced the researchers to work beyond the allocated time for this master thesis. This fact has forced them to harness their ambition and not to expand their data set to include all the Nordic countries for instance, which lessened the degree of generalizability of their findings. With this in mind the authors had to focus only on what could be done within the time allocated and any other ideas that could have potentially added more light but were deemed to be time consuming where decidedly scrapped. This fact has played a major role in how the methodology and theoretical frameworks were structured.

Another limitation the researchers confronted was the lack of necessary data in the context of the Swedish context of this study. There were a couple of variables that the empirical model should have incorporated, but due to the lack of data, the authors had unfortunately to neglect them. If this study is replicated in another context or at a later point in time in the same context, where such data would be available, the incorporation of these variables would be possible. The results of which might be in model of a higher explanatory power.

7.3 Recommendations for Future Research

A paper’s quality increases by the room it opens for future researchers to conduct further research that stems from its findings or approach. The researchers behind this paper believe that there are several rooms for future research that can be inspired by this thesis.

Initially, the study can be extended to include previous periods in association with the COEC. That is to study the decision making process of why firms decide to assure their sustainability reports. Such a research can be performed quantitatively by employing a probit regression model with indicative variables that can be used to find association between firms’ conditions before and after assuring their sustainability reports, such as, high COEC that persisted for several years. Such a persistent high COEC might have drove firms to assure their SR as a tactic to reduce it.

Secondly, the context of this study itself can be extended to include more than one country, not only Sweden. Such a bigger context can include the Nordic countries for instance or the European and Northern American market. Such a wider context, however, might be a bit daunting for a master degree project and would probably be more suitable
for a PhD or a published paper. Extending a study to bigger contexts and verifying its results on bigger scales increases the level of its generalizability and reliability. Thus, the researchers believe that it is very interesting to see if the results of this study are verifiable on a wider scale.

Thirdly, future scholars can make an interpretive study about the content of assurance statements and the reasons behind their differentiation. While conducting their study, the researchers of this paper have noticed that there is no certain unified level or scope of assurance that can be interpreted as a norm between assurers. Even when the level and scope of assurance was similar, the wording and size of opinions texts differed between assurers and through the years. Thus, it would be interesting to see why there has not been a unified set of claims, responsibilities or wording in these reports, although they all aim towards one thing; “increasing credibility and transparency”.

Fourthly, future researchers can also investigate the different scopes, interpretation or other key qualities in assurance reports and their link to COEC. Such studies will shed more light on the SR assurance industry and how it can be advanced and better perceived as a profession that seeks to increase legitimacy and integrity in the market in the future.

Fifthly, future researchers can perform and an interpretive study on the reasons why firms assure their sustainability reports, and then, link the findings to the results of this study. The assumptions of both institutional and signalling theories can be verified by such a study. Such a research can be done qualitatively by acquiring information from firms themselves through interviews and questionnaires about whether they assure SR reports as a managerial tactic to signal less risks and better environmental performance or for other specific reasons.
Chapter Eight – Ethical & Societal Aspects

In order to enhance the credibility and to foster the acceptance of this research paper by other researchers, this chapter will discuss the ethical and societal considerations. Such aspects if not taken seriously by the researchers, they might hinder the quality and trustworthiness of any academic paper. Lastly, this paper will present a glimpse on its societal contributions.

8.1 Ethical and Societal Considerations

Ethical issues are pivotal to scientific research. They reflect the existing social norms and permeate all aspects of social exchange (Saunders et al., 2012, p.226-227). Ethics in that sense, would affect everything while conducting a research starting by the researcher’s philosophical stances and ending with the presentation of results. Thus, in this section the authors will present an abstraction of ethics and their theories, and how they affected the ethical perspectives of the researchers while conducting their research. This discussion, which might be a bit philosophical, is to ensure to the reader that this paper is of a high value due to the trustworthiness and ethicality of its writers.

Following on the writings of Finken (2008, p.791-792) and Kolb (2000) ethics, by definition, are ‘the philosophies that deal with moralities’. Ethics’ aim is to establish an understanding of what constitutes a moral and non-moral nature, values, judgements, attitudes, actions and significant mental states. Accordingly, ethical theories are the lens to understand these aspects and their associated enquires. Notwithstanding, these theories differ in purpose, for instance, some of them refer to merely describing these aspects while others concern both describing and judging (prescription). Thus, moral theorists have established a categorisation that distinguishes descriptive theories from prescriptive ones. The main theme that all these theories roam around is moral judgements and their different dimensions. That is their meaning, truth or falsity, objectivity or subjectivity and how they can be tested, justified and made.

The categorisation of ethics theories consists of 3 main divisions. These divisions are the meaning of moral judgment, values and obligations.

Initially, the theories of the meaning of moral judgement are concerned with meta-ethics that have build-in connections with all areas of ethics. Meta-ethics are broadly about feelings that do not describe anything. They are simply reactions to certain actions. Everything is relative, contextual and circumstantial. There is no right or wrong because everything follows the demands and humans’ states of minds.

Secondly, the theories of values, known for axiology, are concerned with 2 different types of questions. These are the meaning of value terms (goodness); what differentiates the good (value) from the bad, and the status of value; what are the things that have the highest value (goodness). While the meaning of value can be objective or subjective
(relative to the person) according to the view of ethicist, the status of value has got many shadows under its umbrella. Theorists differ in their understanding of what constitutes the highest value. The state of feelings (e.g. pleasure and satisfaction; Epicurus, J.S. Mill & Hobbes), power (Friedrich Nietzsche), intellect (e.g. knowledge; Plato & the good intentions; Kant) and will (e.g. virtue; Epictetus) can all be of a high value to the human being. The researchers in this study are probably more in line with Kant’s, Plato’s and Epictetus perceptions of what constitutes the highest value in this research and the ultimate good the researchers are anticipating. They are the states of intellect, resembled by the knowledge the researchers want to contribute to academia, and will, resembled the their good intentions behind doing their study, should contribute to the virtue of a more informed humanity.

Thirdly, the theories of obligation are concerned with 2 different types of questions. These are the meanings of the terms ‘right’ and ‘wrong’, and the status of ‘right’ and ‘wrong’; things are considered right when they are morally obligatory. These theories have two opposing philosophical subdivisions that consist of teleology and deontology (non-teleology).

On one hand, teleology is concerned with the end result. It ultimately agrees with the notion ‘the mean justifies the end’ regardless of who is the beneficiary of the end result. This is because an absolute teleologist considers an action to be righteous according to how much goodness it brings (or can bring) to the whole world, while the end beneficiary is the agent according to Epicurus’s egoist and the world as a whole to the utilitarianism’s universalist. Thomas Aquinas, however, perceives intentions to be the mechanism behind righteousness, where better intentions bring about more righteousness to actions.

On the other hand, deontology is never concerned with the end result. An end result can never justify the means. An action is perceived mandatory regardless of its consequences on held values or humans’ happiness. A motto that captures what deontology is about would say ‘Let justice be done though heaven’s fall’. Based on this obligatory element, deontology consists of 3 different versions resembled by moral laws, normative (virtue ethics) and deity.

Moral laws are based on the teachings of Kant, where the righteous (moral) conduct is based on priori principles of rights and laws. The respect for the moral law is pivotal. It always wins in a conflict with other motives; such as, benevolence, prudence and habits. Thus, actions are taken based on the agent’s intention to follow the moral law. Otherwise, actions are perceived unmoral. A good example of moral laws is the idea of ‘do not lie even to save a life’, which means that if a human being perceives lying to acquire tangible things immoral, lying is absolutely immoral in life and death situations.

The authors of this paper are indeed affected by Kant’s moral deontological values. Succeeding in their paper is absolutely not a good motive not act with a higher sense of ethicality or to abide to the traditional ethical code of conduct. The things that are ethically right or wrong are universal and cannot be overridden. The authors were very
cautious in their attitudes, behaviour and conduct to respect of the required elements of a highly ethical behaviour, as further points will explain.

Normative deontology, also known for the virtue of ethics, is concerned with a man’s characteristics, not his actions. These characteristics ascribe that what makes a good person (e.g. courage, prudence, wit, trustworthiness, temperance and justice) leads to the creation of a good life. Although the authors cannot claim the possession of certain characteristics as this is a subjective perspective that does not reflect the researchers’ required humbleness, they can assure the reader that they tried all their best to be as trustworthy and just in their attitude, the way they dealt with previous scientific articles and papers, and the way they conducted their field work, as possible.

Deity theories are derived from divine commands. Regardless of what the consequences might be, a man is forced to abide to deity’s (God’s) commands. This type of ethical theories is derived from a religious perspective. Among others, Islam, Christianity and Judaism have certain commands that control every aspect of human life. This side of deontology is quite far from what the researchers are dealing with, except for the fact that they are both influenced by their cultural heritage that is influenced by the teachings of Islam and Christianity. Thus, an ethical obligation was doubled in their sentiment, due to the fact that both of these religions have made it clear that ethicality is a virtue and immorality is punished by deity.

Generally, the researchers of this paper consider themselves deontologists. They are considering the ethicality of their actions in each step they take to attain the end result. Such a vision is in compliance with USBE code of conduct that adopts the Swedish Research Council (Swedish Research Council, 2014) code of ethics.

Moreover, the topic that the researchers are dealing with has ethical and societal considerations in its cellular entity. It is concerned with sustainability in its broader aspect, which, as it has been constructed beforehand in this paper, concerns not only the current living beings but also the globe in its larger spectrum that includes all existing and to-exist units. Thus, any results that this paper may propose, the authors are very cautious to present in a simple and accurate manner that would minimize the chances for misinterpretation. Such mishap, if evident, would lead to probable negative effects that the researchers do not anticipate. To mitigate this misinterpretation the authors have attempted their best to keep an unbiased attitude as far as possible (which is evident from the beginning by the stand that have as objectivist observers). They have also acknowledged the tentative and relative character of the results of their research but they have not concealed their own ideological positions.

Deception in research presentation, where the researchers purposely claim certain achievements that they have not reached, has its ethical and societal consequences (Saunders et al., 2012, p.238). The way this research has been built and the clarity of its researchers in each step they have taken and how they integrated the research question, purpose, theories, methods, findings and conclusion have mitigated the risk of attempting such a purposeful deception.
Throughout the investigation, the authors have acted with a view to maintain the image and integrity of their own disciplines, while keeping a questioning mind and a critical eye open on the fundamental assumptions, methods, achievements that guard those disciplines. Although it was the first time for one of the researchers to write a scientific thesis, he tried his best not spare any single effort to ensure a higher quality scientific product that pleases the eye of the reader.

The principles of openness, criticism and respect (International Sociological Association, Code of ethics, 2001) were followed by the researchers in a professional manner, were ethicality was always the guarding solider on everything being done.

There have been no specific grants or contracts associated with this production; therefore, there were no specific covenants inconsistent with their scientific judgment, which would hinder the integrity and reliability of this paper’s results.

The data gathering procedures are also another aspect that ethics is indulged in. For that matter, the researchers have disclosed elaborately all the information about data gathering and the original sources of data. As the data gathered was publically available; hence, the researchers are convinced that the anatomy and privacy of research subjects has been respected rigorously, especially, that they have performed their study in conformity with all the standards accepted by the international academic community. Notwithstanding, the researchers confirm that there has been no consent of research subject or informants that have been obtained in advance, but again due to the fact that the information is publically available, it made sense to consider it as an implied permission to deal with it in any scientific or practical context.

Whenever an expertise was needed for specific fields that the researchers had not got the necessary depth of research knowledge in, it was referred to and asked for assistance. The researchers acknowledged any sort of such contribution and gave credit to its owners wherever needed.

8.2 Societal Contributions

The societal contributions of this paper are inherited within the topic it deals with. Sustainability in its broader aspect is what today’s world is concerned about. Businesses specifically and the milieu they operate in they are today concerned with transparency, raising credibility and responsibility; thus, any research concerned with sustainability is concerned with the whole world. In a more deterministic way, this research paper can be read as a contribution to mainly two arenas within today’s and the future societies.

One societal aspect of this paper is it contribution to the decision making process in businesses. It has proven to management officials that acquiring a higher level of transparency is rewarded by the market participants through an association with lower risks. Investors have associated assurance on sustainability reports with a lesser systematic risk (at least in a Swedish context); therefore, managers cannot claim that assurance on SR is not important. Their claim that SR assurance should cease or should
be obtained from the start in an attempt to reduce costs is not applaudable any longer. Even if SR assurance might be costly on the short run, the reward from the market seems to be worthy.

The second aspect of this paper is its academic contribution. From one perspective, it tried to fill-up a gap within knowledge (previous research). The researchers tried to add more insights about how the market participants interact and what are some of the dynamics that control such an interaction. Their utilizing of neo-classical institutional theory and signalling theory while interpreting the empirical results of this study is also a unique point of departure that differentiate this paper and gives it a higher theoretical contribution, especially that most previous research has interpreted SR assurance by other sets of theories such as legitimacy and agency theories. From another perspective, the statistical roadmap proposed by the researchers, as a scientific step-by-step process, can be utilized by the researchers to analyse any panel data set in an efficient and timesaving manner. Econometrics textbooks and associated reference papers can be quite daunting and drowned by technicalities that non-experts can skip by simply applying the statistical approach of this paper.

In conclusion, by the end of this paper, the researchers hope that they have provided the reader with an interesting piece of writing that contributed to his or her decision-making process or academic knowledge. At the end, any research is by no means flawless, but the researchers anticipate that their paper has fulfilled the criterion of a high quality paper that is aimed to contribute to the benefit of both the society and academia.


Retrieved [May, 15, 2015].


Retrieved [May, 13, 2015].


Appendices

Appendix 1: History of SR

Sustainability reporting in its wider spectrum saw its birth with the beginning of corporate modernization (Unerman et al., 2007, p.59). In a similar manner but quite slower to financial reporting, SR is following a standardization process that has started in less than one hundred years ago. Historically, this process firstly started in an American context by the beginning of 1885 till around 1979 with corporations reporting on employees’ issues; such as, safety, building facilities in workplace, and financial assistance … etc. (Unerman et al. 2007, p.59-60; Bebbington et al., 2014, p.53). Secondly, social issues and CSR dominated corporate reports. Evidence gathered in different research papers in the US and UK shows a precedence of social reporting in the 1970s till 1980s over other sustainability aspects (Unerman et al. 2007, p.60; Bebbington et al., 2014, P.54). Nevertheless, in the 1980s interest in environmental discourse came to the surface with more companies reporting on their environmental behaviour till 1987. This social and environmental reporting pattern suffered from lots of fluctuations in disclosure size and topics covered. For instance, due to the tough economic times and the conservative politics of Margaret Thatcher (Gray et al., 1996, p.97) and Ronald Reagan (Bebbington et al., 2014, p.54) the interest in social reporting deceased in the UK and USA respectively, yet due to the environmental disasters; such as, Exxon Valdez oil spill in Alaska in 1989 (Patten, 1992, p. 471-473) and Bhopal gas leak in India in 1984, the interest in environmental disclosure increased (Unerman et al. 2007, p.60). Thirdly, when Brundtland Report (Our Common Future) was issued in 1987 by UNWCE sustainability reporting entered a new era that was referred to as ‘sustainable development reporting’. This new era was evident in the 5-stage Deloitte & Touche Tohmatsu’s International and Sustainability Report in 1993 which established in its 5th stage a triple-bottom-line link between environmental, social and economic aspects of corporate performance (Bebbington et al., 2014, p.54; Unerman et al., 2007, p.60-61). However, the same report did not connect the notions of justice, equity and timeframe; therefore, it cannot be considered – as most of today’s corporate sustainability reports – equivalent to sustainability or sustainable development reporting as anticipated (Bebbington & Larrinaga, 2014, p.396; Unerman et al., 2007, p.61). In some articles, such reports are named sustainability reports to ‘denote organizational activity and reporting in the name of sustainability’ where in practice they are genuinely far from the real meaning of sustainability that considers the interests of future generations (Bebbington et al., 2014, p.52).
Appendix 2: Assurance - Definition

Assurance, as a service, has its own definition that differentiates it from audit performed on firms’ financial statements. In the context of this study and in language Assurance is “a statement that something will certainly be true or will certainly happen, particularly when there has been doubt about it (promise)” (Hornby, 2000). This statement is provided by an assurer (practitioner) that certifies the rightfulness of a subject matter in his or her statement of opinion. However, in the context of assurance services this assurance is not absolute, as the previous definition proposes, rather than reasonable; it is limited by the sampling procedures that allow the generalizability of rightfulness (Eilifsen et al., 2014, p.12-13, 24). It is the provision of high but not absolute level of assurance (i.e. only an acceptably low-level of assurance-risk is taken by assurers) (Eilifsen et al., 2014, p.24, p.59). The subject matter of an assurance may come in different forms. It can either be the reporter’s financial statement – here the assurance service would be called an audit – or a non-financial performance or performances of systems and controls (e.g. sustainability) (Eilifsen et al., 2014, p.12). In sustainability setting there are certain criteria that are published by specific international bodies, such as the Global Reporting Initiative (GRI), which the subject matter would be evaluated and measured against (Unerman et al., 2007, P.71; Eilifsen et al., 2014, p.12). Different international bodies have got almost the same perspective of what an assurance engagement is. For instance, The International Federation of Accountants (IFAC) defines an “assurance engagement” as: “an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria” (IFAC, 2005, p.6). AICPA’s Special Committee on Assurance Services (commonly referred to as the Elliott Committee) in its White Paper (p.5) defines it as “a service provided by an independent professional to enhance the degree of decision-maker confidence in the information. In an assurance service, an outside professional applies procedures designed to probe the credibility of the information and reports on the results, where the independent professional providing it has to engender trust, not only as a provider of the service but also in the process the professional uses to deliver it.” Accordingly, a general definition, that would summarize what an assurance engagement is, would be “An Assurance Engagement is an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria” (Eilifsen et al., 2014, p.12).

The authors would like to raise the reader’s attention that ‘audit is a special case of assurance’ (Eilifsen et al., 2014, p.13). It is a process to evaluate two issues; initially, the relevance and reliability of financial information presented by management and secondly, the systems and processes responsible for recording and summarizing this information. An auditor evaluates the assertions (claims) of management and reports this evaluation to other parties (Eilifsen et al., 2014, p.4). The evaluation of the fairness of presentation of information is conducted through the systematic – well-planned and thorough – collection of evidence ‘in order to assess the degree of correspondence between those
assertions and established criteria’ (Eilifsen et al., 2014, p.12). A general definition that represents auditing would be “Auditing is a systematic process of objectively obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between those assertions and established criteria and communicating the results to interested users” (Eilifsen et al., 2014, p.12). This distinction in terminology between assurance and audit as IFRS only uses the term ‘audit’ when it describes assuring financial statements and firm’s internal control systems (Eilifsen et al., 2014, p.12). Thus, we would rely in our study on the term “Assurance” as it is scientifically and practically more accurate than the term ‘audit’.
### Appendix 3: LSDV Estimations

#### LSDV Estimation (not robust)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS df MS</th>
<th>Number of obs =</th>
<th>992</th>
<th>F(16, 293) =</th>
<th>2.37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>16.10818369</td>
<td>16</td>
<td>1.01111874</td>
<td>0.046306</td>
<td>0.840443</td>
</tr>
<tr>
<td>Residual</td>
<td>77.24953152</td>
<td>987</td>
<td>0.07814300</td>
<td>0.008000</td>
<td>0.999999</td>
</tr>
<tr>
<td>Total</td>
<td>315.43052153</td>
<td>992</td>
<td>0.31543052</td>
<td>0.031506</td>
<td>0.997000</td>
</tr>
</tbody>
</table>

#### LSDV Estimation (robust)

<table>
<thead>
<tr>
<th>Source</th>
<th>SS df MS</th>
<th>Number of obs =</th>
<th>992</th>
<th>F(16, 293) =</th>
<th>2.29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>16.10818369</td>
<td>16</td>
<td>1.01111874</td>
<td>0.046306</td>
<td>0.840443</td>
</tr>
<tr>
<td>Residual</td>
<td>77.24953152</td>
<td>987</td>
<td>0.07814300</td>
<td>0.008000</td>
<td>0.999999</td>
</tr>
<tr>
<td>Total</td>
<td>315.43052153</td>
<td>992</td>
<td>0.31543052</td>
<td>0.031506</td>
<td>0.997000</td>
</tr>
</tbody>
</table>

#### Linear regression

<table>
<thead>
<tr>
<th>Source</th>
<th>SS df MS</th>
<th>Number of obs =</th>
<th>992</th>
<th>F(16, 293) =</th>
<th>2.37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>16.10818369</td>
<td>16</td>
<td>1.01111874</td>
<td>0.046306</td>
<td>0.840443</td>
</tr>
<tr>
<td>Residual</td>
<td>77.24953152</td>
<td>987</td>
<td>0.07814300</td>
<td>0.008000</td>
<td>0.999999</td>
</tr>
<tr>
<td>Total</td>
<td>315.43052153</td>
<td>992</td>
<td>0.31543052</td>
<td>0.031506</td>
<td>0.997000</td>
</tr>
</tbody>
</table>

---

**Notes:**
- The LSDV estimations are presented for both robust and non-robust models.
- Linear regression results are also provided for comparison.

---

**References:**
- [LSDV Estimation](#)
- [LSDV Estimation](#)
- [Linear regression](#)
Appendix 4: Sample Participants

Hereunder the reader can find a list of the listed Swedish companies that constituted the investigated sample in this study.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AF Consult AB</td>
</tr>
<tr>
<td>2</td>
<td>Alfa Laval</td>
</tr>
<tr>
<td>3</td>
<td>ASSA ABLOY</td>
</tr>
<tr>
<td>4</td>
<td>Atlas Copco</td>
</tr>
<tr>
<td>5</td>
<td>Atrium Ljungberg</td>
</tr>
<tr>
<td>6</td>
<td>AxFood</td>
</tr>
<tr>
<td>7</td>
<td>BillerudKORSNÄS</td>
</tr>
<tr>
<td>8</td>
<td>Boliden</td>
</tr>
<tr>
<td>9</td>
<td>Catena</td>
</tr>
<tr>
<td>10</td>
<td>Electrolux</td>
</tr>
<tr>
<td>11</td>
<td>Ericsson</td>
</tr>
<tr>
<td>12</td>
<td>Fabege AB</td>
</tr>
<tr>
<td>13</td>
<td>Fagerhult Group</td>
</tr>
<tr>
<td>14</td>
<td>Fenix Outdoor</td>
</tr>
<tr>
<td>15</td>
<td>H&amp;M (Hennes &amp; Mauritz)</td>
</tr>
<tr>
<td>16</td>
<td>Handelsbanken</td>
</tr>
<tr>
<td>17</td>
<td>Holmen</td>
</tr>
<tr>
<td>18</td>
<td>Hufvudstaden AB</td>
</tr>
<tr>
<td>19</td>
<td>Husqvarna AB</td>
</tr>
<tr>
<td>20</td>
<td>ICA Gruppen</td>
</tr>
<tr>
<td>21</td>
<td>Meda</td>
</tr>
<tr>
<td>22</td>
<td>Modern Times Group</td>
</tr>
<tr>
<td>23</td>
<td>NCC</td>
</tr>
<tr>
<td>24</td>
<td>NIBE Industrier AB</td>
</tr>
<tr>
<td>25</td>
<td>Nolato</td>
</tr>
<tr>
<td>26</td>
<td>Nordea Bank</td>
</tr>
<tr>
<td>27</td>
<td>Nordnet</td>
</tr>
<tr>
<td>28</td>
<td>Peab</td>
</tr>
<tr>
<td>29</td>
<td>SAAB</td>
</tr>
<tr>
<td>30</td>
<td>Sandvik</td>
</tr>
<tr>
<td></td>
<td>Company Name</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>31</td>
<td>SAS</td>
</tr>
<tr>
<td>32</td>
<td>SCA - Svenska Cellulosa Aktiebolaget</td>
</tr>
<tr>
<td>33</td>
<td>Scania</td>
</tr>
<tr>
<td>34</td>
<td>SEB</td>
</tr>
<tr>
<td>35</td>
<td>Skanska</td>
</tr>
<tr>
<td>36</td>
<td>SKF Group</td>
</tr>
<tr>
<td>37</td>
<td>SSAB</td>
</tr>
<tr>
<td>38</td>
<td>Swedbank</td>
</tr>
<tr>
<td>39</td>
<td>Swedish Match</td>
</tr>
<tr>
<td>40</td>
<td>Tele2</td>
</tr>
<tr>
<td>41</td>
<td>Teliaisonera</td>
</tr>
<tr>
<td>42</td>
<td>Trelleborg Group</td>
</tr>
<tr>
<td>43</td>
<td>Wallenstam</td>
</tr>
<tr>
<td>44</td>
<td>Wihlborgs Fastigheter AB</td>
</tr>
</tbody>
</table>
Glossary

Hereunder the reader can find a summary of the key terms and definitions that constitute an integral part of the research question.

**Sustainability**: a vision for the future White (2013, p.217) that consists of meeting the needs of the present without compromising the ability of future generations to meet their own needs (UNWCED’s Brundtland Report, 1987, p.8; Bebbington & Larrinaga, 2014, p.395-396; Unerman *et al.*, 2007, p.70).

**Sustainability Reporting**: The activity of reporting sustainability activities in different forms communicated to the public through different means of communication.

**Standalone Sustainability Report**: is a specific mean of communicating sustainability activities of firms in the form of a public written report.

**Assurance Engagement**: An Assurance Engagement is an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria (Eilifsen *et al.*, 2014, p.12).

**SR Assurance**: is external assurance in the form of activities that result in published conclusions, systems or processes (GRI, 2014. p.22).

**COEC**: is the rate return a firm pays, from a theoretical perspective, to its equity investors (shareholders) to compensate them for the risk they undertake by investing their capital (Sharfman & Fernando, 2008, p.572).