Do Investors Value Corporate Sustainability and What Firm Characteristics Determine the Reaction? Evidence from Europe

Linda Nyberg

Department of Finance
Hanken School of Economics
Helsinki
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**Title of thesis:**
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**Abstract:**
After recognizing the business benefits of corporate sustainability (CS), companies are raising their ambitions and taking meaningful steps to address economic, social and environmental challenges. By these actions companies aim to ensure their long-term survival and profitability, as well as equipping them to respond to regulatory and policy changes.

Despite a range of research on the relationship between CS and market value, the results of previous research are fragmented. The debate focuses primarily on the issue whether investors find CS as value creating like the stakeholder theory, legitimacy theory and resource-based view indicates, or as a waste of resources as the value maximization theory argues. Hence, the purpose of this thesis is to find out whether investors value CS and what firm characteristics might lie behind the reaction. The aim is to fill the gap in previous literature which has primarily focused on CSR or corporate financial results.

In this thesis, corporate sustainability is measured by inclusions to and exclusions from the sustainability index DJSI Europe. The research is performed on the European market during the time period 2011 to 2016. The contribution of the study is twofold, as the interest lies in the reaction as well as possible reasons behind it. By using event study methodology, the effect of an unexpected event on the share price is measured, in this case the announcement of DJSI Europe index components. After that, firm specific characteristics (financial performance, industry and country of origin) are measured with an OLS Regression.

The result from the event study show that both additions to and deletion from the DJSI index lead to a significant negative reaction, hence none of the discussed theories could be accepted or ruled out. The negative results for the added sample can to some extent be explained by the big amount of companies from countries opposing CS activities. In addition, the result from the deleted sample was highly significant, on contrary to the added sample that showed weak evidence. Consequently, it might be argued that the market, in fact, values CS, since it clearly punishes companies that lose reputation as a sustainable corporation. Hence, the findings are consistent with the notion that investors are concerned about the sustainability performance of firms they invest in. In addition, third-party endorsement is one mechanism through which information is conveyed to investors, who then act on this information when making their investment decisions.

The results from the OLS regression finds a significant positive relation between investor sensitivity to CS activities and financial performance. This finding is in line with the hypothesis reasoning, and indicates that a corporation’s financial health plays a role when discussing investors’ sensitivity to corporate sustainability activities.

**Keywords:** corporate sustainability, DJSI index, investor sensitivity, value maximizing, stakeholder theory, legitimacy theory, resource-based view, financial performance, company specific characteristics, market value, event study, OLS regression
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1 INTRODUCTION

The impact of human behavior on nature and our role in climate change has been widely noted in both media and academic journals. Though it is not always apparent, societies and economies are changing to meet the environmental challenges that face them; green financing and climate related concerns have become an integrated part of companies’ strategies. Whether it is through distributed electricity generation or urban water recycling, the world is in the process of fundamentally re-thinking key aspects of the environmental burden and any company not factoring this into their planning and asset allocation risks being left behind.

Corporate social responsibility (henceforth CSR) programs have been integrated into company strategies for almost half a century. The interest has mostly been in governmental and social aspects, such as charity, employee healthcare and avoiding child labor. Recently, many companies have started to strive to achieve long term value creation, which also goes under the term sustainability. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations (United States Environmental Protection Agency (EPA) 2017). From a more economic view, RobecoSAM (2017) defines corporate sustainability as a business approach that creates long-term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments. They state that increasing amounts of investments have been made into companies committed to corporate sustainability, arguing that this is mainly driven by two factors; (1) corporate sustainability is attractive to investors because it aims to increase long-term value for shareholders, and (2) sustainability leaders are expected to show better performance and favorable risk-return profiles. For instance, PriceWaterhouseCoopers (2010) found that companies implementing policies to reduce their carbon emissions seem to perform better on the stock market than companies that do not.

The past decade has seen considerable growth in corporate sustainability reporting, partly due to new regulatory statements, but also largely driven by claims that the practice can lead to significant business benefit. As engagement in environment awareness is becoming more valued, companies face mounting pressure to disclose their sustainability performance to their investors and to develop strong internal control. This is why many companies turn to accounting and advisory companies such as the Big Four to get help with green disclosure services. Studies have shown that the quality of the
report in terms of the scope of social and environmental indicators being reported on, significantly influences the market reaction. Companies issuing high-quality reports exhibit significantly more positive market reactions than firms releasing lower quality reports. (Guidry & Patten, 2010)

The globalization of the sustainability challenge poses reputational risks to companies identified as unwilling to adapt to this new reality. At the same time, those companies that are capable of achieving genuine first-mover status may find a stakeholder base with a significant appreciation of the value of their actions. Due to the fear of being left behind or losing market share, companies have shown tendency towards green washing, meaning that green PR or environment disclosures are deceivingly used to make the company seem more environmentally friendly. This means that investors have to be critical towards the information they use in evaluating a company’s sustainability status, if it is not verified by an impartial party.

The challenge then becomes how to build a reputation for sustainability. The desire of companies to credibly signal socially and environmentally responsible behavior and to benefit from a good reputation has contributed to the development of a whole new business sector that is charged with reviewing and reporting on the sustainability activities of companies (Fowler & Hope, 2007). Against this background, I aim to study whether there is a market reaction when a company is endorsed for its sustainability work from a reliable unbiased source. I am also interested in exploring whether a loss of endorsement regarding corporate sustainability leads to a reaction on the stock market. Also, since investors are shown to react differently on sustainability activities of different companies, some company specific characteristics are analyzed to get a deeper understanding of the investor sentiment.

1.1 Purpose of the study

The purpose of the study is to find whether investors appreciate corporate sustainability, and what company specific characteristics might be behind the reaction.

1.2 Contribution and motivation

CSR has been the focus of previous research for almost half a century. However, during the previous decades there has been a shift from CSR towards long-term value creation, in other words sustainability. Economists and ecologists are paying increasing attention to the influence human behavior has on the evolutionary potential of natural systems.
This broadening of perspectives has led to many new areas of interdisciplinary research, which findings are still somewhat lacking.

Many of the studies that address corporate sustainability or sustainable investing focus on the analysis of the impact on corporate performance or corporate value. They have considered the impact of sustainability on valuation ratios such as Tobin’s Q, return on equity (ROE) or return on assets (ROA). Another common topic is to see how sustainably screened portfolios perform compared to more diversified stock market indices. Studies have shown varying results, both in favor of and against the profitability of corporate sustainability programs. Previous studies also give quite a clear picture of how stakeholders such as employees and consumers, view corporate sustainability. However, what I found was that studies about how shareholders react gave a more vague result and the field of studies is still rather deficient.

Many see shareholders as the most important stakeholder group since they provide the company with capital. If shareholders are not happy with the company’s performance, they might sell their share. They might also use, if they possess a big enough share, their voting rights against the management. Up until today, previous research has not found an unanimous conclusion as to whether shareholders appreciate sustainability or not. Shareholders do, first and foremost, seek the highest possible return on their investments. Previous research has had a hard time showing only a positive impact on corporate value from sustainability, which could describe the negative relation between stock market and sustainability that has been detected in previous studies. However, due to the current attention on environmental awareness and rising popularity of green investing, one could expect that the appreciation of corporate sustainability can be seen on the stock market.

There are also quite few studies and also contradictive results regarding deteriorated corporate sustainability and the reaction on the share market. There is a logical explanation to why positive sustainability is more studied than negative, and that is lack of data about lacking sustainability. Companies that pursue in sustainability work are usually also happy to inform about it, whilst companies that do not, seldom mentions it.

Based on the points mentioned above, I argue that there is still room for studies about sustainability and stock market reaction. The European market has experienced a large growth in sustainability based investments during the last decade (the European Sustainable Investment Forum (Eurosif) 2016), which makes the market a really interesting target for a study like this. Hence, I am going to base my study on the Dow...
Jones Sustainability Europe Index, which is a relatively new index as it was launched in 2010. I am going to study market reaction of both positive and negative announcements about sustainability. I have not found similar previous studies with this specific index. I will contribute with newer data and a broader perspective, since I am going to study both positive and negative sustainability announcements and also study company specific characteristics that lie behind a possible reaction. With this study, I aim to find whether sustainability has become more valuable for investors during this last decade, and reduce the gap in literature that exists at the moment.

1.3 Restrictions

This paper will focus on investor sensitivity to corporate sustainability activities on the European market during the time period 2011 to 2016. Inclusions in and exclusions from the DJSI Europe index are used as a proxy for corporate sustainability activities. The study is limited to the market response in the short-run, and it aims to clarify the signalling effects of the DJSI announcements. Some, but not all, firm specific characteristics that are found to have a relation to investor sensitivity to corporate sustainability announcements are studied in this research, with the focus on financial performance.

1.4 Structure of the paper

This paper will start with a thorough definition of sustainability in chapter two (2), describing how different academics and organizations define sustainability, how it differs from CSR and chapter three (3) presents how corporate sustainability is present on the market and how it might be measured. After that, in chapter four (4), the theoretical basis for the relationship between sustainability and market value is presented and discussed, both traditional views and newer interpretations. In chapter five (5) the link between news about change in sustainability and market reaction is presented. After that, in chapter six (6), the most relevant previous studies are presented in-depth and discussed. In chapter seven (7) the data used in the study is presented and chapter eight (8) discusses the methodology used. Finally, in results are presented in chapter nine (9) and discussed in chapter ten (10). Chapter eleven (11) ends the thesis with a concluding note.
2 CORPORATE SUSTAINABILITY – LONG TERM VALUE CREATION

Nowadays, almost all business decisions involve social and environmental issues. Decisions such as what technologies to install in a new manufacturing facility, to what extent should renewable energy be used, management compensation, and how and when to retire old plants, all affect the firm’s stakeholders and its natural environment. In fact, most organizations now discuss the impacts of social and environmental issues on their homepages and voluntarily publish a social responsibility report in addition to their annual reports. Historically, social issues research has been grounded in Corporate Social Responsibility (CSR) and environmental issues research in Environmental Management (EM). However, in recent years Corporate Sustainability (CS) — that includes both social and environmental issues—has entered the field of management, further widening research boundaries. (Montiel, 2008)

Sustainability is a concept that embraces three equally important pillars - environmental, economic and social - that need to be balanced. Since the late 1990’s, sustainability has come to be the universal goal of societal planning, and due to the growing urban population, cities and corporations play vital roles in sustainable development. (Dempsey, Bramley, Power & Brown, 2009)

2.1 How to define corporate sustainability?

Although corporate sustainability has been under debate in academic literature for some time now, the academics have not yet found a unanimous definition. Unlike other concepts, academics claim that it is possible to track down the first time when the interest in corporate sustainability emerged. One of the first definitions of sustainability can be found in the Brundtland Report *Our Common Future* made for the World Commission on Environment and Development (WCED) in 1987, which states that:

"Sustainability is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

Montiel (2008) states in his article that many scholars base their work on the WCED definition, even though CS did not reach star status in business journals until the 1990s. Montiel finds six important articles that define CS, and these come to shape the path of the concept. In Table 1 below you can find the definitions Montiel highlighted in his research.
<table>
<thead>
<tr>
<th>References</th>
<th>Terminology</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gladwin and Kennelly (1995)</td>
<td>Sustainable Development</td>
<td>Process of achieving human development in an inclusive, connected, equitable, prudent, and secure manner. SD components are: (1) Inclusiveness (environmental and human systems, near and far, present and future); (2) Connectivity (world’s problems interconnected and interdependent); (3) Equity (fair distribution of resources and property rights); (4) Prudence (duties of care and prevention); (5) Security (safety from chronic threats).</td>
</tr>
<tr>
<td>Shrivastava (1995)</td>
<td>Ecological Sustainability</td>
<td>It can be achieved through following mechanisms: (1) Total quality environmental management; (2) Ecological sustainable competitive strategies; (3) Technology for nature swaps; (4) Corporate population impact control.</td>
</tr>
<tr>
<td>Starik and Rands (1995)</td>
<td>Ecological Sustainability</td>
<td>Ability of one or more entities, either individually or collectively, to exist and flourish for lengthy timeframes, in such a manner that the existence and flourishing of other collectivities of entities is allowed at related levels and in related systems.</td>
</tr>
<tr>
<td>Banerjee (2003)</td>
<td>Sustainable Development</td>
<td>States that the Brundtland definition is not a definition but a slogan. Emphasizes that sustainable development is managed through ethnocentric, capitalistic notions of managerial efficiency (sustainable capitalism).</td>
</tr>
<tr>
<td>Bansal (2005)</td>
<td>Corporate Sustainable Development</td>
<td>Introduces the new CSD construct based on three principles: (1) Economic integrity; (2) Social equity; (3) Environmental integrity</td>
</tr>
</tbody>
</table>

Table 1 Corporate sustainability definition table, source Montiel (2008)

Montiel (2008) argues that there are two very different ways of defining and conceptualizing CS. One approach uses the term ecological sustainability to identify CS primarily with the environmental dimension of business. The strategy believed that humans must recognize the world’s nature resources as finite, with limited capacities to support life. The objective is to conserve natural resources to ensure continued development and to support all life. Nowadays, this narrow definition is not that commonly used (Moldan, Janousková & Hák, 2012). Other academics and practitioners follow the Brundtland definition in a broader sense, identifying CS as a tri-dimensional construct that includes environmental, economic and social dimensions.

In 2002 the World Summit on Social Development organized by the UN finally defined three core areas that contribute to the philosophy and social science of sustainable development. They were influenced by studies done in the 90’s and combined it into three equally important pillars of sustainability; economic development, social...
development and environmental development. After that, many scholars started to further spin on this ideology.

Sustainable development means using renewable natural resources in a manner that does not eliminate, harm or degrade their usefulness for future generations. Furthermore, it implies using non-renewable mineral resources in a way that prevent easy access to them by future generations. Lastly, it requires a slow-rate depletion of non-renewable energy resources to ensure the probability of an orderly transition to renewable ones. (Moldan et al., 2012)

2.1.1 Economic Development

Economic development is about giving people what they want without compromising quality of life, especially in the developing world, and reducing the financial burden of doing the right thing. In fact, it is about providing incentives for businesses and other organizations to follow sustainability guidelines beyond their normal legislative requirements. The economic pillar provides a counterweight to extreme measures that companies are sometimes forced to adopt, such as pressure to abandoning fossil fuels in a rapid phase. (Moldan et al. 2012)

Goodland (1995) states that the widely accepted definition of economic sustainability is “maintenance of capital” or keeping capital intact. This has been the definition for ages; accountants since the Middle Ages have used this to let the merchant traders know how much of their sales receipts they and their families can consume. The author emphases that economic sustainability should be defined in a similar way as Hicks defined income in 1948 – the amount one can consume during a period and still be as well off at the end of the period.

Goodland and Daly (1996) identify four forms of capital; (1) human made capital; (2) natural capital; (3) social capital; and (4) human capital. The definition by Hicks in 1948 covers the first type of capital, but it should be expanded to embrace the three other forms of capital as well. The authors state that economists have rarely been concerned with natural capital because until now there has been no reason. However, as the human economic system has grown large in contrast to its supporting ecosystem, it has become a real concern, why the academics emphases that traditional economic criteria of allocation and efficiency have to be restructured. As economists value things in monetary terms, they have had major problems in valuing the natural capital, especially the intangible aspects and common access such as air and water. This is why there has to be a shift toward long term value creation instead of quick profits.
To be sustainable, a business must be profitable. Baumgartner and Ebner (2010) state that economic sustainability embraces general features of an organization that has to be respected in order to remain in the market for a long time. However, profit cannot outplay the other two pillars. In fact, profit at any cost is not what the economic pillar is about. The management should regard aspects that are necessary in order to obtain economic success rather than concentrating on aspects that show only financial results. Hence, according to the authors, the aspects of the economic dimension of corporate sustainability are innovation and technology, collaboration, knowledge management, processes, purchase and sustainability reporting. The idea behind these is presented in Table 2.

<table>
<thead>
<tr>
<th>The aspects of the economic dimension of corporate sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Innovation and Technology</strong></td>
</tr>
<tr>
<td><strong>Collaboration</strong></td>
</tr>
<tr>
<td><strong>Knowledge management</strong></td>
</tr>
<tr>
<td><strong>Processes</strong></td>
</tr>
<tr>
<td><strong>Purchase</strong></td>
</tr>
<tr>
<td><strong>Sustainability reporting</strong></td>
</tr>
</tbody>
</table>

Moldan et al. (2012) stated that given the latest financial and economic crisis, the economic aspects of development are under close scrutiny. The authors state that the economic crisis shows that maintaining economic growth is an essential and universally accepted objective for the broad public. They noted that growth has been the most important policy goal across the world for the last five decades. Moldan et al. emphases that this is the reason why it has been difficult to find a balance between sustainability and the economic growth of countries. The authors further highlighted how the current global economic crisis has brought into focus the economic pillar and questioned the sustainability of development based on economic progress. They stated that the
importance of economic sustainability is now increasingly recognized even by top political representatives. Citing the former US president Barack Obama who in his speech 2009 stated that “...it is simply not sustainable to have an economy where, in one year, 40 per cent of [the US] corporate profits came from a financial sector that was based on inflated home prices, maxed-out credit cards, over-leveraged banks and overvalued assets” (Klein 2009). The economic development means to fully address the economic issues on their own merits and in no apparent connection with the environmental aspects.

2.1.2 Social Development

Among the three stated pillars, the social aspect of sustainability is the least studied and has only been seriously considered after the turn of the millennium. There is general agreement that the different dimensions of sustainable development have not been equally prioritized by policy makers, leaving social development as underdog (Colantino, 2010). Experts at RobecoSAM (2017), a leading evaluator of corporate sustainability activities, state that during the last years, social development has strengthened its position alongside the other two pillars and a balance between these might be observable in the near future.

Many academics argue that a specific definition of the social dimension of sustainable development has been less clear-cut (Landorf, 2011). Gilbert (1996, p. 12) states that social sustainability requires the cohesion of society and its ability to work towards common goals be maintained. Furthermore, individual needs, such as those of health and well-being, nutrition, shelter, education and cultural expression should be met. Torjman (2000, p. 2) characterizes social sustainability as that human wellbeing cannot be sustained without a healthy environment and is equally unlikely in the absence of a vibrant economy. However, Colantino (2010) argues that these definitions and others alike are merely statements of the general goals of social policy rather than serious attempts to define the social dimension of sustainable development. Litting and Grießler (2005) argue that approaches to the social sustainability concept have not been based on theory, but rather on practical understandings of current political agendas. The authors point out that social sustainability was dealt with in connection to the social implication of environmental politics rather than as an equally constitutive component of sustainable development.

There can be identified two hesitant conceptual interpretations of the social aspect of sustainability; either social dimension is related to the environment pillar, or distinct
from the environmental and economic pillars. According to the first view, the social pillar was considered as an assisting tool for sustainable development and was detached from sustainable debates in reality. Later, scholars recognized the crucial role of social aspects and through the second interpretation they attempted to discuss social sustainability distinct from environmental or economic sustainability. (McKenzie, 2004)

Maloutas (2003) says that the social aspect should be considered as the goal of sustainable development. Moldan et al. (2012) go as far as to say that the social pillar of sustainable development is probably the most important and critical for the long-term survival of human civilizations. Despite this recognition, it is not yet fully clear what the critical elements of social sustainability are. Lately, there have been serious attempts to define social development. Spangenberg and Omann (2006) identified three analytical views that frame the social sustainability discussions. They found (1) a functional approach, which is popular in studies of rural, urban or communal sustainability, (2) a capital approach, which views social sustainability from perspective of economic thinking, and (3) a system approach that views each domain as a system that should be capable of reproduction.

Most of the discussions on definitions, dimensions and measurement of social sustainability literature are related to the functional approach. In this group, the definitions focus more on the conditions i.e. they usually describe social sustainability as either a currently existing positive condition, or as a goal that remains to be achieved (McKenzie, 2004). Yiftachel and Hedgcock (1993) argue that urban social sustainability is about the long-term survival of a viable urban social unit. Polese and Stren (2000, p. 229) argue that the policies contributing to social sustainability must try to cause cohesion through bringing people together and increasing the accessibility to public services and employment.

In the second group, the capital approach, the definitions exploit measurement frameworks. Mackenzie (2004) states that these definitions present main principles and dimensions and often involve a series of indicators, which can either be positive or negative. However, usually scholars target the positive aspects while defining social sustainability through the measurement framework (Dempsey et al., 2009). Bramley et al. (2009) emphasize the importance of social equity such as access to services, facilities and opportunities. Colantonio (2010) highlights that there has been a recent shift from almost statistics-based indicators to hybrid sets, which mix qualitative and quantitative data. The author argues that traditional “hard” social sustainability themes such as
employment and poverty alleviation are increasingly being complemented or replaced by the emerging “soft” and less measurable concepts such as employee happiness, social mixing and sense of place.

The last group, the **system approach**, looks on the social aspect in a similar way as the Burtland definition (1987) of sustainability. They have a future focus which refers to the improvement of a just society for current and future generations. Castillo, Price, Moobela and Marthur (2007) present that social sustainability can be defined as ensuring the well-being of current and future generations, by recognizing every person’s right to belong to and participate as a valued member of his or her community. Holden (2012) emphasized process attribute and defines social sustainability as a process of urban development supported by policies and institutions that ensure harmonious social relations, enhance social integration and improve living conditions for all groups.

Social sustainability is aimed to positively influence all present and future relationships with stakeholders. To fulfil the social development, corporations need to focus on assuring stakeholders’ loyalty for the company. Baumgartner and Ebner (2010) presented vital internal and external aspects that a company has to manage in order to be socially sustainable. These aspects are briefly discussed in Table 3. The authors state that these aspects are based on and are similar to those of big corporate sustainable evaluators like DJSI, FTSE and GRI (Global reporting Initiative).
Internal social aspects of corporate sustainability

<table>
<thead>
<tr>
<th>Corporate governance</th>
<th>Transparency in all its activities in order to improve relationship towards its stakeholders. Giving insight into relevant data; following rules of stock markets on corporate governance and defining responsibilities and behavior of the board.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation and Incentives</td>
<td>Awareness of needs, claims and motivation factors of employees in order to implement sustainability sufficiently into the organization. Show support of management for acting in sustainable way (e.g. by providing time, resources).</td>
</tr>
<tr>
<td>Health and Safety</td>
<td>Operation of programs for employees to prevent dangers, and health and safety risks occur when working in/for the organization.</td>
</tr>
<tr>
<td>Human capital development</td>
<td>Development of human capital for sustainability related issues through specific programs such as permanent education, mentoring or training. Become aware of the different challenges and issues of corporate sustainability.</td>
</tr>
</tbody>
</table>

External social aspects of corporate sustainability

<table>
<thead>
<tr>
<th>Ethical behavior and Human rights</th>
<th>Important elements are a culture of respect, fair rules and behavior within an organization and fair wealth/profit allocation, as well as serious consideration of stakeholders’ ideals and needs. No harm of employees, either concerning their religious belief, gender, nationality, color, handicap or age.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Controversial activities</td>
<td>No holding of shares in organizations that are mostly defined as not sustainable (e.g. uranium mining). No use or sale of own assets and goods for non-sustainable activities.</td>
</tr>
<tr>
<td>No Corruption and Cartel</td>
<td>Behaving fairly on the market and avoiding manipulating business practices. This includes no rule breaking, no price-fixing or joining a cartel and no corruption for gaining advantage.</td>
</tr>
<tr>
<td>Corporate citizenship</td>
<td>Being a good corporate citizen on a national level. Support of stakeholders (and others) and their issues on regional level. Orientation on future generations without exploiting the present (or nature).</td>
</tr>
</tbody>
</table>

Table 3 Social aspects of corporate sustainability, source Baumgartner and Ebner (2010)

2.1.3 Environmental Development

Sustainable development used to be more or less understood as social and economic development that should be environmentally sustainable. Since the three pillars were introduced, economic and social sustainability have gradually been recognized as having their own specific and concrete meaning as a part of human, social, political and economic development (Moldan et al., 2012). This said, it is important to closely examine the third pillar and that way give a comprehensive definition of corporate sustainability.

Firstly, it is important to understand the difference between the terms environmental and ecological. Morelli (2011) explains that “environmental” is quite often associated with some kind of human impact on natural systems, whilst ecological can be characterized as a concept of interdependence of elements within a system; ecological
goes beyond the human experience. That is why the author thinks that the word environmental should be a subset of the broader concept of ecological, i.e. it should be thought of as the intersection of human activities and ecological systems. The author concludes that the word environmental is almost always used in reference to human interaction with the ecosystem. Hence, the term environmental is going to be used in this thesis.

Moldan et al. (2012) speculate that environmental development was probably first developed by scientists at the World Bank, since originally the term environmentally responsible development was used by the World Bank in 1992. After that there were a few attempts to define the concept, but it was finally developed by Goodland (1995), according to whom environmental sustainability seeks to improve human welfare by protecting the sources of raw materials used for human needs and ensuring that the sinks for human wastes are not exceeded, in order to prevent harm to humans. The author continues by stating that the humanity must learn to live with the limitation of the biophysical environment. Biophysical sustainability means maintaining or improving the integrity of the life supporting systems of Earth. The environment must be maintained in such a way that it is able to provide the needed natural capital as well as able to carry the waste.

Morelli (2011) studied previous definitions of environmental development and actions to pursue it in academic journals, and sorted the findings into five categories, (1) societal needs; (2) preservation of biodiversity; (3) regenerative capacity; (4) reuse and recycle; and (5) constraints of nonrenewable resources and waste generation.

**Societal needs** refer to satisfying all human needs through actions that will burden the ecosystem the least. This can be done by producing nothing that will require future generations to maintain vigilance. The society should also review the environmental attributes of raw materials and make environmental sustainability a key requirement in the selection of ingredients for new products and services. To be able to design and deliver products and services that contribute to a more sustainable economy should be everybody’s mission. Consequently, the society should support local employment and fair trade and in this way reduce for example the carbon footprint of products.

**Preservation of biodiversity** implies selecting raw materials that maintain biodiversity of natural resources. One way is to use environmentally responsible and sustainable energy sources and invest in improving energy efficiency. Holdren, Daily and Ehrlich (1995) state that sustaining the biosphere with its necessities for maximizing
future opportunities requires that current and future generations achieve economic and social sustainable improvement within a framework of cultural diversity. This should be accomplished while maintaining biological diversity of the biosphere by means of conservation and proper use of air, water, and land resources.

Furthermore, the regenerative capacity of the biosphere has to be sustained. The society should keep harvest rates of renewable resource inputs within regenerative capacities of the natural system that generates them, simultaneously keeping depletion rates of nonrenewable resource inputs below the rate at which renewable substitutes are developed (Goodland & Daly, 1996). As the resources are finite, reuse and recycling will achieve a big role. Robinson (2004) states that manufacturing and business processing should be designed as closed-loop systems, reducing emissions and waste to zero.

Constraints of nonrenewable resources and waste generation brings many challenges to society. Goodland (1995) emphases that the scale (population x consumption per capita x technology) of the human economic subsystem should be limited to a level that is at least within the carrying capacity of the earth and therefore sustainable. The author continues by stating that waste emissions should be kept at a level that does not affect the ecosystems future waste absorptive capacity or other important ecological services. This fifth category also includes development of transportation criteria that prioritize low-impact transportation models. Consequently, all product development and product management decisions should be with full consideration of the environmental impact of the product throughout its life cycle.

The environmental development deals with environmental impacts due to corporate activities. These environmental impacts are caused by resource use, and emissions into air, water or ground, as well as waste, to name a few. More specifically, environmental sustainability could be defined as a condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems capability to continue to regenerate the services necessary to meet those needs, nor by human actions diminishing biological diversity (Morelli, 2011).
2.2 How does corporate sustainability differ from corporate social responsibility?

Management literature uses both corporate social responsibility, often called simply CSR and corporate sustainability to refer to social and environmental management issues, but there is no clear distinction between the two terms. CSR articles began appearing in the 1970s, while CS articles came later, in the 1990s. The CSR and CS constructs have similar conceptualizations of economic, social, and environmental dimensions. However, the researchers tend to have different views about these concepts. These two terms can seem interchangeable, but there are some subtle, and not so subtle, differences between them.

The differences between the two have been debated for a long time. When comparing them, the one difference that is primarily pointed out is that sustainability relates to making a company a greener, more energy efficient operation, and to protect the environment in addition to taking care of both the community and economic success. Traditionally, CSR does not include the commitment to the environment. The most cited definition of CSR is defined by Caroll (1979) who states that “the social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time”. Caroll leaves out, as many other scholars at that time, an environmental aspect all together. The scholars did not necessarily ignore environmental issues, but they did not integrate them into their CSR conceptualization; they rather argue that environmental issues are a subset of social issues. The World Business Council for Sustainable Development (WBCSD) (2017) defines CSR as, "the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the work force and their families as well as a local community and society at large". There is no mention of an environmental angle here either.

Another difference between CSR and CS definitions relates to their conceptualization of the economic dimension. Bansal (2005) defines the CS economic dimension as economic prosperity through value creation, and states that firms create value with goods and services they produce. Therefore, firms increase the value created by improving the efficiency of those goods and services efficiently, by concentrating on long term solutions instead of quick profits. According to Carroll (1979) the business institution is the basic economic unit in our society. As such, it has a responsibility to produce goods and services that society wants and sell them at a profit. All other business roles are grounded in this fundamental assumption. In Carroll’s definition of CSR, social responsibility
supplements the primary fundamental responsibility of businesses—economic prosperity. In Bansal’s definition of CS, social, environmental, and economic responsibilities are complementary—the three elements must be integrated to achieve perfection, i.e. sustainability. (Montiel 2008)

CSR refers to doing business in ways that benefit, rather than harm, society and the environment whilst corporate sustainability refers to a company's ability to survive into the future by implementing sustainable values into the core business and this way ultimately outlive its current owners. Some may also say that CSR devotes itself more to the community activities that are non-economic (profitable) factors, whilst corporate sustainability has a long term value creation in mind with every decision. Sustainability is more about protecting the corporation's impact on the environment and the environment's impact on the corporation. CSR activities are more about doing good on a local level, such as charity, as a way to boost up the image. A socially responsible oil company would build local schools or hospitals to compensate communities for their resource extraction. However, such measures do not always acknowledge the long-term impact on communities; one has to keep in mind that schools and hospitals require staff and ongoing service. Therefore, CSR measures can actually impose long-term liabilities on affected communities, making good-intentioned actions unsustainable. (Bansal, 2005)

While CS and CSR have evolved from different pasts, they have started to address the same issues, which leads to there not being any clear distinction between the two terms in the literature. On one hand, CS scholars tend to argue that the economic, social, and environmental pillars are interconnected. In fact, CS describes a nested system that recognizes that the economy is a part of society, which in turn is part of the larger ecological system. On the other hand, most empirical CSR research treats social and economic performance as independent components, and treated environmental issues as a subset of social responsibility or social performance. (Montiel, 2008)
3 UNDERSTANDING CORPORATE SUSTAINABILITY

Corporate sustainability has been of interest to academics in the recent years, but what is the situation on the market in reality and can it actually be evaluated in corporate performance? To bring some clarification to this matter, this chapter will present how corporate sustainability has been integrated to the market through supply/demand, discuss how regulators have reacted to this increased market and interest, as well as ways for investor to measure corporate sustainable performance.

3.1 Market demand

As discussed earlier, the focus on the effects of human actions on nature has grown steadily during the last years, and now the interests have also reached the investors. The investors are constantly looking for new markets and investment opportunities that could lead to excess returns. The increase in investments can be traced to mainly two factors; (1) corporate sustainability is attractive to investors because it aims to increase long-term value for shareholders, and (2) sustainability leaders are expected to show better performance and favorable risk-return profiles. Even if studies have given mixed outcomes for sustainability based investments, the market keeps growing. Investors are looking for sustainable investment opportunities whilst corporations aware of the trend are willing to answer this demand. (Kajander, Sivunen, Vimpari, Pulkka & Junnila, 2012)

Ziegler and Schröder (2010) explain that investment strategies that refers to the practice of choosing stocks on the basis of environmental and social screens, i.e. socially responsible investing (SRI) (also called sustainable investing) has attracted an increased interest in the last years. They continue by stating that SRI assets have experienced a strong growth around the world, experiencing a growth of 1200% between 1995 and 2005 in the USA, and the trend has continued since then. This growth has led to a current share of about 10 % SRI assets in total assets under management in the USA and a share of over 10 % in European funds.

As it comes, the European market for sustainable investments is the leading market in the world. The European market is younger than its American counterpart, but it has grown faster and was almost double the size of the American market in 2014 (Eurosif, 2016). Since 2005, the SRI investments in Europe have grown by an amazing 5200 %, with the highest peak between 2009 to 2013, after which the growth has been steady. An illustration is presented in Figure 1.
According to Eurosif (2016) perhaps the most interesting shift in SRI investments is linked to sustainability themed investments, which in 2015 registers the spectacular growth of 146%, after being the slowest the year before with a growth rate at 22.6%. The report stated that a series of high level events and international agreements have pushed sustainability themed investments to feature heavily in investors’ strategies. Renewable energy and energy efficiency have been the top categories of investment for the last few years, which have benefitted significantly from an increasing awareness of the implications of climate change. Institutional investors still lead the market, but there has been a growth in the retail sector as the amount went up from 3.4 % to 22.0 % between 2013 and 2015 (illustration in Figure 2) , which according to Eurosif (2016) signals an important shift in the industry and greater focus on other categories of investors.
The growing interest in ESG factors from institutional investors reflects the view that environmental, social and corporate governance issues can affect the performance of investment portfolios, and should therefore be given appropriate consideration by investors.

The opportunity to maintain strong financial performance coupled with value-based investing is extremely attractive to many types of investors, especially millennials. According to a study published by the Morgan Stanley Institute for Sustainable Investing (2015) on the American market, as many as 84% of millennial investors are interested in sustainable investing. The research showed that the behavior of millennial investors stands out from the rest of the individual investor population. The millennials were proven to be:

- Nearly twice as likely to invest in companies or funds that target specific social or environmental outcomes (22% compared to 12%)
- Nearly twice as likely to invest in companies or funds that aim to use environmental, social or economic practices to create a value differentiator (17% compared to 9%)
- Over twice as likely to exit an investment position because of objectionable corporate activity (15% compared to 7%)

They were also found to be more likely to factor sustainability into their daily lives, as workers and consumers. Demographic trends signal that millennial investors are likely to drive demand for sustainable investing well into the future.
In addition to millennial investors, female investors were found to be on the leading edge of adopting sustainable investing. They turned out to be more likely than their male counterparts to factor sustainability into investment decisions, and see the benefits of doing so.

### 3.2 Regulations and directives

According to the Eurosif (2015) which is a pan-European network whose mission is to develop sustainability through European financial markets, the massive growth in sustainability investments in Europe has to do with the fact that there have been efforts to do so. With all the discussion regarding climate change, dwindling energy resources, and environmental impact, it is no surprise that different legislative entities are enacting regulations to protect the environment. The European Commission has come out with big targets and guidelines on different topics. One important example is the Europe 2020 program launched by the European commission. The program includes strategies on how to cut down on greenhouse effects and how to reach smart, sustainable and inclusive growth for corporations. This program aims to affect the corporate strategies on how to tackle the emission and sustainability problems. (European commission, 2017)

Also, in December 2014 the EU Accounting Directive (2013) was adopted, and it requires disclosure of non-financial and diversity information by certain large companies. The Accounting Directive introduces measures that will strengthen the transparency and accountability of approximately 6000 companies in the EU. Member states had two years to transpose it into national laws, and it is expected that the first company reports will be published in 2018 covering the financial year of 2017-2018. These directives will require companies to report on environmental, social and employee-related, human rights, anti-corruption and bribery matters. (The European Parliament, 2014)

The Accounting Directive will also encourage companies to rely on recognized frameworks such as International Organization for Standardization (ISO) 26000, GRI's Sustainability Reporting Guidelines, the United Nations Global Compact (UNGC), the UN Guiding Principles on Business and Human Rights, OECD Guidelines, and the International Labour Organization (ILO) Tripartite Declaration.

All of these standards aim for the same goal; a sustainable future. One of the best known might be the ISO Standards, which enable businesses to plan their future growth around meeting consumer expectations. The standards enable transparency about products and best practices for limiting their impacts. In the past, many of the costs of doing business were hidden, however, ISO Standards allow them to be quantified and factored in to
decision-making processes which leads to more responsive, and responsible businesses. (International Organization for Standardization (ISO) 2017)

The ISO standards recognize that there are different needs for communities, corporations and so on, so they have a wide range of sustainability standards. ISO 14001:2015 specifies the requirements for an environmental management system that an organization can use to improve its environmental performance. The standard is intended to be used by organizations that are seeking to manage their environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability. ISO 26000:2010 goal is to guide governments, businesses and non-governmental organizations to operate according to a set of global social standards. In applying the standard, ISO (2017) advises organizations to take into consideration societal, environmental, legal, cultural, political and organizational diversity, as well as differences in economic conditions, while being consistent with international norms of behavior.

Big guidelines like these given to corporations from a central commission will influence the market. Even if the EU Accounting Directive will be active in one year, companies can already be expected to integrate sustainability into their business, because it will position it to meet changing regulations in a timely manner. This will increase business ability to comply with regulation, and it can be seen in the amount of voluntary reporting that is already available on the market.

3.3 How to measure corporate sustainability?

More than ever, both consumers and manufacturers have started to recognize the impacts of their choices and actions. Although sustainability issues are omnipresent, a company’s contribution to sustainability is still hard to measure. Parisi and Maraghini (2010) state in their article that now when sustainability issues are so high on the agenda for businesses, it is no surprise that more than 80 % of Fortune500 companies have sustainability issues on their websites, and as many as 90 % of major US corporations show a commitment to sustainability issues. Yet only 35 % are able to prove they stick to their principles. There is a definite gap when it comes to performance measurement and sustainability. Some measures are already intact, which aim to minimize the information asymmetries.


3.3.1 Value measures

Since corporate sustainability is a broad concept, it might be hard for stakeholders to grasp the value of it in monetary or numerical terms. That is why there has been attempts to turn the value of sustainability into comparable numerical terms. The objective of a sustainable measure is to assess the contribution of an entity (e.g., a company) to sustainability by including all three dimensions: environmental, social and economic (Figge & Hahn, 2004).

Figge and Hahn (2004) developed one of the most common methods for measuring corporate sustainability, namely the triple bottom line approach which incorporates the three dimensions of sustainability. The way to measure, the triple bottom line is absolute Sustainable Value Added (SVA), which can be expressed as follows:

\[
\text{Absolute SVA} = \text{Value Added} - \text{external environmental and social costs} + \text{relative SVA}
\]

The concept of SVA is the first value-based approach to measure corporate sustainability. The absolute SVA shows how much value a company has created or damaged as a result of its economic, environmental and social resources, compared to a benchmark. Instead of focusing on costs of moving to a particular set of resources, the SVA approach focuses on the return that can be achieved from using the same set of resources.

The relative SVA used in the calculation represents the size of a company’s contribution to increased sustainability expressed in monetary terms. The concept of the relative SVA is useful as it strips out external factors and instead gives a comprehensive view of a company’s contributions to sustainability. It consists of four important steps; (1) the change in use of resources compared to the previous period is determined; (2) the opportunity cost of the increase (/decrease) in consumption of resources is calculated with the help of a suitable benchmark; (3) average of opportunity cost of all resources; and finally (4) the total opportunity cost is compared to the economic growth of the company.

Another well-known measure for sustainability is ESG Screening, namely environmental, social and governance (also called economic) screening (RobecoSAM, 2017). ESG is now-a-days a general term used in capital markets and by investors to evaluate corporate behavior and to determine the future financial performance of companies. ESG has become a way to describe the performance of investment and fund portfolios on ESG criteria and a way to measure the quality of their performance against measurable ESG factors that are reported to shareholders.
According to Della Croce, Stewart and Yermo (2011) ESG analysis can provide insight into the long-term prospects of companies, allowing mispricing opportunities to be identified. Investors can find new market opportunities with companies that place the management of ESG factors at the core of the business.

The European Federation of Financial Analysts Societies (EFFAS) (2010) has identified nine topical areas for the reporting of ESG issues, and developed Key Performance Indicators (KPIs) for use in financial analysis of corporate performance. The topical areas that apply to all sectors and industries are (1) Energy efficiency; (2) Greenhouse gas (GHG) emissions; (3) Staff turnover; (4) Training & qualification; (5) Maturity of workforce; (6) Absenteeism rate; (7) Litigation risks; (8) Corruption; and (9) Revenues from new products. There are also identified company-specific ESG factors that offer a benchmark for investors to judge the overall quality of the board’s governance and risk management processes, and their positioning within an industry sector.

Many companies, with encouragement from both the EU and The UN, have started to integrate these ESG values into their core businesses. To bring some much-needed clarity to corporations about sustainability measurements as well as the new regulations and directives, there are organizations specializing in evaluating and defining corporations’ sustainability activities. Such entities are for example the Big Four accounting firms (Deloitte, PwC, Ernst&Young and KPMG) that help companies to manage an effective sustainability strategy by looking at all of the components that can affect one’s business, and this way also give their endorsement or label to the companies’ sustainability activities.

### 3.3.2 Sustainability indices

As it is time consuming and difficult for stakeholders to evaluate a company’s ability to follow these norms, there has emerged numerous different entities that aim to clarify a corporation’s sustainability activities. Since the late 1990’s one of the entities displaying the largest growth is corporations that produce sustainable indices.

Fowler and Hope (2007) state that sustainability indices serve as informational intermediaries between companies and their various stakeholders - such as analysts, brokers, and financial institutions - by evaluating the sustainability information reported by individual companies. They continue by saying that these intermediaries are viewed by stakeholders as being objective, professional benchmarks assessed by neutral parties.
Doh, Howton, S. D., Howton, S. W. and Siegel (2010) found that third-party endorsement, conveyed by social indices, is one mechanism through which information is conveyed to investors, who then act on this information in making their investment decisions. They stated that the share price will rise in the aftermath of an unexpected announcement of a firm’s inclusion in a social index, because of the newly revealed information about an endorsement. An announcement of the addition should cause the market to increase its estimate of the probability that a firm will be a good social performer and thus increase the estimate of expected future cash flows. Similarly, they expect that the share price will decline in the aftermath of an unexpected deletion from a social index. They continue by stating that firms seeking external endorsement of their social activities appear to undertake reforms that improve their financial and social responsibility standing so that they will receive these institutional endorsements.

There are some studies done to determine whether inclusion of a company to sustainability indices is viewed by stakeholders as a credible signal of that company’s commitment to sustainability. Even if the sign of this relationship has differed, many have found significant results. Robinson, Kleiffner and Bertels (2011) provide evidence that there is a sustained increase in a firm’s market value following its addition to the DJSI World index, which indicates that shareholders consider inclusion in a sustainable index as an indication of better sustainable performance.

The leading corporations on this market are Morgan Stanley Capital International (MSCI), FTSE Group, KLD Research & Analytics and RobecoSAM to name a few, producing the indices MCSI Sustainable Impact Indices, FTSE4Good, Domini 400 Social, and DJSI family indices respectively. There are also numerous ESG indices to be found on the market. For a company to be added to a sustainability index they go through a thorough screening process, usually consisting of public information and questionnaires. The index used in this paper is DJSI Europe index, and the screening process is explained in detail in the data chapter (7.1 The Dow Jones Sustainability Index).

Sustainability indices are said to be objective evaluators of corporate sustainability performance. However, in most cases the selection process of the companies is based on the answers provided by the companies themselves and their subjective evaluations. Also, as only public information is used, the companies might be reluctant to enclose information that might be considered harmful. The new regulations and directives are targeting this problem through more transparent reporting. Still, this is an important
aspect to keep in mind when using sustainability endorsements from indices as indicator of corporate sustainability.

3.3.3 Index as an indicator of rising or declining corporate sustainability

In many previous studies, inclusion in a sustainability index has been considered as an indication of rising sustainability, whilst exclusion has been considered as a signal of declining corporate sustainability (Fowler & Hope 2007; Curran & Moran 2007; Robinson et al. 2011, etc.). To be able to draw this conclusion, the reason for the inclusion and exclusion has to be due to sustainability reasons and no other. Hence, when using the endorsement by a sustainability index as indication of corporate sustainability activities, there are some aspects that have to be kept in mind and be critically discussed.

The first important thing is that the index should not have a definite number of companies that can be included. An index that uses a definite number of components instead of, for example, a percentage amount of some other underlying index, risk to exclude companies because some other company performed better, not because the company's sustainability has reduced. Social indexes such as FTSE4Good and Domini 400 Social index series both have a definite amount of companies they can include, meaning that a company has to be excluded for another company to be included. In this way a company’s sustainability status is dependent on some other company’s performance. There are also those index families- such as the DJSI index family – that have looser criteria concerning the amount of additions and deletions each year; it is around a certain percentage of the underlying index. These type of indices could be argued to better represent change in corporate sustainability activities (Consolandi, Jaiswal-Dale, Poggiani, and Vercelli, 2009).

As an example, Curran and Moran (2007) studied the FTSE4Good index, which listed the 50 best performing companies in the UK. The authors defined the addition of a company to the index as a signal to the market that it had reached a certain level of environmental and social performance. In addition, it also signaled its economic strength at the same time as behaving sustainably. This means that the company added to the index showed good management in all three components of sustainability as it managed to outperform others. Hence, this type of index works well as an indicator for increased sustainability. However, its possibility to measure reduced sustainability should be critically viewed. The authors stated that if a company was deleted from the index, it was most likely because it had been outperformed in terms of market capitalization, i.e. another company in the index had grown larger and had pushed it down the list and it
was no longer in the top 50 best performing companies. Therefore, the removal from the index did not necessarily signal a deterioration in the sustainable activities of the company, only that some other company was able to beat it.

It is also vital that the index considers inter-industry differences, since a firm’s industry influences its environmental efforts and performance. For example, the top three firms in sustainability rankings tend to be firms from the computer technology industry, while the firms toward the bottom tend often to be represented by utilities (Cordeiro and Tewari, 2015). Simply put, a certain ranking score may not be very impressive for a firm from a cleaner industry such as technology, but would be quite impressive for a firm from a dirty industry such as paper, chemicals, or utilities. This is due to industry specific aspects; what is considered proactive environmental management in some industries may in fact be considered as being just above compliance in other industries (Hunt & Auster, 1990).

Sustainability indices that use a best-in-class approach\(^1\), meaning choosing best performers from each industry, eliminate this problem. Such an index family is for example Dow Jones Sustainability Indices. This, however, might raise similar problems as a strictly restricted index. Consolandi et al. (2009) argued that the best-in-class approach could lead to a deletion of the company even if it had improved its ESG score because someone else had performed better within the sector. Meaning that the deletion from the index does not mean a deterioration of the sustainability policies of the company in absolute terms.

To be able to use sustainability endorsement announcements as a viable variable for corporate sustainability in an event study, the announcement of the inclusion/exclusion cannot happen at the same time as the actual inclusion. Many previous studies have shown that inclusion in an index has an impact on the share price, in other words, the excess return of the company share. Chen, Noronha and Singal (2004) discuss the price pressure hypothesis in relation to inclusion in an index, and states that a sudden change in the demand (or supply) of a security can lead to abnormal return. When using sustainability indices as indication of corporate sustainability, the interest lies in the “endorsement” or “recognition” a company gets/loses when being included in/excluded from a sustainability index. That is why it is important that nothing else but the endorsement should affect the share price. This way, if abnormal return is

\(^1\) More in chapter 7.1 The Dow Jones Sustainability index
detected, it can be thought to be a reward or punishment for the corporate sustainability activities.

Lastly, the information used when evaluating companies should consist of only public information. Even if this was somewhat criticized in the previous part, it is important; if this was not the case, investors could read into this announcement and think that the evaluators have superior information, and speculate according to that.
4 THE THEORETICAL BASIS FOR A LINK BETWEEN SUSTAINABILITY AND COMPANY VALUE

In this chapter, some classical theories are presented that can describe shareholder relation to corporate sustainability. The discussion of sustainability stems from the question of a company's role and its responsibilities towards the society. Lopatta and Kaspereit, (2014) identified four views of corporate sustainability activity; value maximization theory, stakeholder theory, resource-based view and legitimacy theory. Additionally, some profits and costs related to corporate sustainability activities are presented, since these have an impact on how shareholders evaluate sustainable practices.

4.1 Value maximization theory

The neoclassical theory developed by Milton Friedman in 1970 emphases that managers are only agents who should work in a manner that is in the shareholders' best interest. A shareholder’s goal is to increase profits, and therefore that should be corporation’s sole goal. Thus, it is neither realistic nor possible for companies to carry out their business in a manner that promotes social ambitions. Friedman believed that if management invests in social programs, beyond what is required by law, it is a selfish decision by the management to show a better public image. Since these engagements do not directly maximize shareholder value, the management spends other people’s money to pursue their own interest. (Dunn & Burton, 2006)

Friedman (1970) argues that managers do not have any comparative advantage in getting involved in social programs. The companies are financial institutions; they are experts in producing, selling or financing products and should therefore stick to what they do best. The corporations that choose to use company resources for socially responsible activities are involved in a form of taxation without representation. The management is elected by the shareholders to act as an agent for them. This justification disappears if management imposes on the company an "illegal tax" and uses the generated profits for a social purpose. It then becomes a representative of society rather than shareholders, and a community representative should be chosen through free elections. In this way, social responsible doctrine is leaning on the socialist approach rather than, for example, advocacy of the free market.

Dunn and Burton (2006) state that Friedman’s article (1970) is likely one of the most assigned and most debated papers in social issues pedagogy. Written 45 years ago, it was not an academic paper since it was published in the New York Times Magazine, however,
many academics have responded to it. Friedman’s approach is very drawn to extremes and he likely represents the most conservative representative for this concept. For the value maximization theory to hold in this study, the results from the event study should show a negative reaction to news about inclusion to the index, since this would indicate an inefficient way to use company resources. On the contrary, a positive reaction should be detected when a company is deleted, since this would indicate that the company is concentrating its resources on the core business and by this way maximizing shareholder value.

Today's development with corporate scandals, acute environmental problems highlighted by the 2015 United Nations Climate Change Conference, and not to forget the recent financial crisis, makes Friedman’s approach rather obsolete in today's world. As a counterpoint to the value maximization view, stakeholder theory that is presented in the next section.

### 4.2 Stakeholder theory

According to the stakeholder theory, first introduced by Edward Freeman in 1984, an organization’s success is highly dependent on how well they manage their relationships with stakeholders such as customers, employees, suppliers, the community, investors and others that may affect a company’s capability to achieve their purpose. According to Freeman (1984, p. 104), a company can no longer be considered solely a private institution; instead, it must be regarded as a social institution. Even though a company’s primary mission has been to increase shareholder value, the managers must now consider other stakeholder groups in their decision-making process. The management’s role is to support all these groups by balancing and maximizing their interests.

The stakeholder theory model can directly be applied to sustainability. Godfrey (2005) developed a comprehensive framework that describes how social responsibility can lead to further shareholder value thanks to the positive impact that this kind of activity gives; so-called moral capital. Moral capital can serve as a kind of insurance coverage for the intangible assets of companies that relies on company relationships. This can reduce risks related to company stakeholders, which in turn can lead to higher value for the company (Lopatta & Kaspereit, 2014).

Ruf, Muralidhar, Brown, Janney and Paul (2001) discuss stakeholder theory in relation to companies’ decisions to carry out socially responsible programs. Firms must on some level satisfy stakeholder demands as an unavoidable cost of doing business. Firms can view meeting stakeholder demands as a strategic investment; by strategically investing
in stakeholders’ demands, firms gain a competitive advantage by developing additional, complementary skills that competitors find nearly impossible to imitate (Russo & Fouts, 1997).

Firms must address all stakeholder demands or else face negative confrontations from non-shareholder groups, which can lead to diminished shareholder value through boycotts, lawsuits, protests, etc. Cordeiro and Tewari (2015) expect the pressure on corporations to be more active in proactive environmental behavior to be bigger on industries that are “dirtier” or have a worse reputation due to industrial reputational common effect.

According to Waddock and Graves (1997), stakeholder theory claims that good sustainability efforts will increase competition and thus provide better financial performance. There is a tension between a company's implicit costs to shareholders and the implicit costs to stakeholders. A company trying to reduce the latter by acting in an irresponsible manner towards society will raise their implicit costs and thus have a comparative disadvantage. According to this, the real cost of sustainability is small, while the positive benefits are noticeable. From either perspective, improving sustainability management should lead to higher financial performance, whether it is due to reduced costs or increased revenues.

In other words, according to stakeholder theory companies try to work in a way that meets as many stakeholders’ interests as possible. According to the social development part of corporate sustainability, one way to achieve a sustainable future is by keeping good relations with various stakeholders. Corporate sustainability aims to bring longevity to corporations and thus long-term value creation, hence sustainability should be of interest for shareholders. Depending on whether shareholders understand or agree with the value created by sustainable activities, the result of the event study will show their evaluation. If they agree, the result should show a positive reaction when a company is added to an index and a negative reaction when it is deleted.

4.3 Legitimacy theory

Stakeholder theory has been developed into another area of focus when it comes to corporate sustainability, namely legitimacy theory, because it often requires that you know whom and what ensures your organizational survival (Freeman, 2004). Suchman (1995) defines legitimacy as a generalized awareness or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions. If the behavior of a firm is in conflict with these
norms, values, beliefs and definitions, there is a risk that customers or suppliers will refuse to do business with that firm. Then, the firm lacks legitimacy, which implies a decline in profit or even corporate failure. Legitimacy delays the expected end of the time frame of future cash flows to infinity and in this way increases a firm's long term value. (Lopatta & Kaspereit, 2014)

Suchman (1995) identifies three types of organizational legitimacy; pragmatic legitimacy, moral legitimacy and cognitive legitimacy. The idea behind **pragmatic legitimacy** is that a company agrees with the requirements of stakeholders and monitors their interests. The **moral legitimacy** means that the company agrees with the ideals of the stakeholders and monitors the ethics that are out on the market. Stakeholders focus in this case on that the company's operations are meaningful and the right thing to do. The **cognitive legitimacy** is based on the companies agreeing with the models and standards, and monitor future outlooks.

In their article, Lopatta and Kaspereit (2014) presented an example of the economic consequences of violating customers' norms. Stakeholders started to boycott Shell after the company announced plans to dump its oil storage buoy Brent Spar in the Atlantic Ocean in 1995. Even though none of its customers were directly affected in an economic sense, many refused to buy gasoline from Shell gas stations, which caused revenues and the share price to decline considerably. Similar case studies can be found for firms that employ workers in developing countries under questionable conditions, e.g. Coca-Cola and Nike.

Legitimacy theory predicts that firms adopt specific business behaviors to achieve access to resources and support by critical stakeholders. Doh et al. (2010) state that as social investors are a growing share of the overall investment community, attention to their interests could broaden the pool of capital available to firms and help bolster firm legitimacy more broadly. In particular, attention to environmentally friendly practices may be especially advantageous, given the increasing interest in sustainable enterprise and additional investment capital that is being channeled to green business.

Doh et al. (2010) state that an external endorsement of legitimacy, i.e. long-term value creation, has the potential to increase resource flows to the firm. These resources can take several forms—financial, human, and technological—resulting, to some extent, in positive reputation benefits. Roberts and Dowling (2002) found that firms with fairly good reputations were better able to sustain superior profit outcomes over time. Whereas Waddock and Graves (1997) stated that firms with a strong reputation for social
responsibility can generate enhanced support from consumers, employees, and investors.

In the context of this research, consideration as a sustainable firm through endorsement by a sustainability index indicates better reputation, greater cash flows to the company, more effective processes and long-term value creation. All of this is expected to have an effect on firm value; hence a reaction to an announcement of endorsement should be detected. According to theory, the event study should be able to show a positive reaction when a company is added to an index and a negative reaction when it is deleted.

4.4 Resource-based view

Researchers in the field of strategic management have long understood that competitive advantage depends upon the match between distinctive internal (organizational) capabilities and changing external (environmental) circumstances. However, it was only in the late 1980s that the resource-based view of the firm emerged, uttering the relationship between firm resources, capabilities, and competitive advantage. (Hart, 1995)

Waddock and Graves (1997) tested the slack resource theory in context with corporate sustainability. The authors suggest that the availability of slack financial or other resources due to a better financial performance lead to the opportunity for firms to invest in environmental and social activities, such as implementation of environmental management systems, environmentally friendly composition of firm-internal processes, or good employee relations. Thus, it may be that firms with available resources choose to spend those resources on 'doing good by doing well', and that those resource allocations may result in improved sustainability overall.

Telle (2006) argued that firms with a better financial performance have less difficulties with paying attention to stakeholder groups and obeying moral standards. It also gives them an opportunity to invest in new capital, which inevitably (even when not intended) leads to a better sustainability performance. Waddock and Graves (1997) empirically tested this relation and show that corporate sustainability performance is positively affected by different indicators of corporate financial performance such as return on sales, return on equity, and return on assets. However, they point out that causality may run in both directions. That is, better financial performance may lead to improved sustainability, or better sustainability may lead to improved financial performance, ceteris paribus.
Ziegler and Schröder (2010) studied the economic variables that might lay behind superior sustainability activities. The authors used economic variables similar to Waddock and Graves (1997), and found that return on assets and Tobin’s Q have a positive relation to being added to the DJSI sustainability index. Therefore, the slack resource theory would be confirmed if the inclusions in these sustainability stock indices is considered as a good indicator for corporate sustainability performance. Also, Ziegler and Schröder (2010) and Waddock and Graves (1997) discussed that companies with less debt have more flexibility to finance environmental and social activities. Both of them found a negative relation, which would strengthen the thought, but the results were not statistically significant. The same goes for firm size, both papers discussed that big firms had it easier to find resources to finance sustainable activities, but could not find a significant relation.

The resource-based view sees expenditures for environmentally friendly and socially desirable business practices as investments that lead to a better reputation and in turn to higher long-term profits. Lopatta and Kaspereit (2014) state that according to the resource-based view, corporate sustainability can be regarded as a management practice that reduces manufacturing costs, produces competitive advantages by enhancing production efficiency, and lowers compliance and liability costs. This is known to attract investors and a reaction on the market can be expected.

4.5 Gains and costs associated to corporate sustainability activities

The debate about the relationship between sustainability and share price is fundamentally about whether stakeholders assume that sustainability activities create value as the Stakeholder theory, Legitimacy theory and Resource-based view argue, or is value-destroying as the traditional approach asserts. When companies invest in safer products, a safer work environment, or “green” technology, they ought to recognize the impact it will have on future revenues and costs. It is possible to argue in favor of both aspects; whether sustainability activities are a competitive asset or a liability for the company.

The most obvious financial disadvantages are the direct investment costs that arise with high sustainable performance. Walley and Whitehead (1994) discuss that in order to respond to all sustainability challenges, a company pays a huge amount of capital on investments that have very low repayment capacity. Direct costs of sustainability can include investments in emission technology, environmentally friendly materials and implementation of new strategies or management systems. Furthermore, some of these
investments require ongoing maintenance that lead to operational costs. Indirect costs that may arise regarding a company's sustainability can, for example, be administrative costs, such as reporting costs. Moreover, alternative costs are an aspect of sustainability investments that must be taken into account. Capital invested in sustainability investments could have been placed in other more profitable investments and thus led to increased financial value.

In addition, there are researchers who have pointed out that there may be agent costs related to sustainability activities. This view stems from the value maximization theory and for example Cordeiro and Tewari (2015) claim that the management themselves might be interested in sustainability issues and choose to invest in them, even though they are not in the best interests of the company and can therefore be classified as agent costs that are unfavorable to those shareholders who do not share their interest.

Cornell and Shapiro (1987) explain that even though the costs of social responsibility can be significant, they are offset by a reduction in other costs. They specify by stating that the value of a company depends on both explicit claims, such as those made by shareholders and employees, as well as implicit claims, which include considerations such as service quality and social responsibility. The authors continue by stating that acquiring a reputation for environmental and social sustainability can reduce the cost of explicit claims, such as the cost of capital and wages, as well as signaling the value of implicit claims.

Waddock and Graves (1997) state that another potential benefit of environmental and social responsibility is an expected decrease in the variability of future cash flows, whereas disregard of implicit stakeholder claims, i.e. being socially and environmentally irresponsible, may lead to uncertain future explicit claims and higher cash flow volatility. Robinson, Keffer and Bertals (2011) spin further on this thought, and explains that, for example, parties external to the firm that are concerned about the environment may accept less environmental regulation if they are convinced about a company's commitment to sustainability, which might lead to direct financial gains through efficiency. In contrast, being irresponsible may result in parties with implicit claims attempting to transform their claims into costlier explicit claims by lobbying for increased regulations.

Favorable reputations can generate excess returns by permitting companies to charge premium prices, hire the best employees, and attract new investors. As was discussed, the demand for SRI products has grown, and there is a lot of capital circulating on that
market. Also, Roberts and Dowling (2002) discuss the gains of good sustainable reputation by stating that companies with a good reputation will be able to negotiate better terms of trade with all stakeholders because they are able to signal the quality of their products and services, and their ability to honor claims in the future. Customers might be willing to pay a higher price for products for firms with a better reputation, since this serves as a signal of good quality. In addition, employees ought to prefer to work for firms with a good reputation and therefore should either work harder or accept lower compensation, lowering the firm’s costs. By these examples, the authors aim to illustrate that investments in sustainability are not simply unselfish but rather value maximizing.

Epstein and Schneitz (2002) find further evidence of importance of reputation when they study whether a social responsible reputation helps firms to protect them from shareholder losses. In their research, the authors studied if companies that were included in the Kinder, Lyndenberg and Domini (KLD) Social Index suffered less loss as a result of the failure of the 1999 Seattle World Trade Organization meeting, given that the meetings were derailed due to protests against irresponsible corporate social practices. The authors found that this event had a larger negative impact on firms with a bad reputation regarding social responsibility.

On the other hand, Lopez, Garcia and Rodriguez (2007) compared a sample of DJSI versus non-DJSI firms and found that the firms included in the DJSI suffered from a temporary, negative dip in accounting-based performance indicators during the early years in which they joined the index. The authors discuss that this may reflect the costs associated with being included in a sustainability index, namely costs to undertaking the changes needed to gain admission to the index, or due to costs associated to reporting on them.

Klassen and McLaughlin (1996) state that corporate sustainability has the potential to reduce expenditures that result from material waste, recruitment and improvement of inefficient processes. Furthermore, Trudel and Cotte (2009) discuss the empirical evidence that shows that certain customer groups tend to favor “green” products from firms that respect environmental and social standards. However, Luchs, Naylor, Irwin and Raghunathan (2010) emphases that the net effect of sustainability is case sensitive and no general prediction is possible. The authors state that sometimes people say that they hold values that, in reality, they do not. The positive effect of product sustainability
on consumer preferences is reduced when strength-related attributes are valued, sometimes even resulting in preferences for less sustainable product alternatives.

Sustainability has its costs, but these costs may be justified when compared to the benefits: a reduction in other costs or an increase in revenue. The studies presented in this chapter imply that a reputation of sustainability impacts stakeholders’ awareness of a company in a way that increases expected cash flows, and therefore value. The scholars agree that a better sustainable reputation leads to competitive advantages, which is hard to measure in monetary terms. Also, sustainable activities cut down on previous fixed costs and this way makes the business more efficient and increases productivity, which leads to an increase in corporate value.
5 SUSTAINABILITY AND MARKET REACTION

This chapter addresses why news about change in sustainability can be expected to have an impact on the share price and what factors may affect the reaction. The theory presented comprises theory that can be linked to evaluation of a corporation and how the market absorbs new information. In addition, findings from previous studies about shareholders’ reaction to endorsement by sustainability indices, and company specific factors are discussed.

5.1 The effective market hypothesis

To be able to understand why new information is expected to lead to a market reaction, one of the most fundamental financial theories has to be presented. The theory about market efficiency has been the central proposition of finance in recent decades. Eugen Fama (1970) presented the efficient market hypothesis (EMH) as it is known today. For a market to be classified as efficient, it requires all available information to be reflected in the price of financial assets. In other words, an investor should not be able to achieve excess returns by trading on the basis of general information. When the market is presented with new information, this information must have an immediate impact on the market and prices are adjusted so that no arbitrage profits can be achieved, but only if the information is of fundamental value.

According to Fama the market is always efficient because all market participants have the same information, transaction costs and all investors act rationally. This means that the market adjusts quickly to all abnormality in prices. Also, all information should be available to all investors. The following criteria must be met in order for a capital market to be called effective: (1) no transaction costs, (2) all general information accessible to all participants free of charge (3) all agree on the interpretation of current information available for the present price.

This can be seen as a utopia in the financial markets that exist today, even so, Fama does not see this as a reason to reject the theory. Fama emphasises that as long as investors have taken into account all available information when pricing a financial asset, the EMF holds even if transaction costs are present. Fama (1970) has also provided an explanation for today’s information society when he presented three forms of EMH; the weak, the semi-strong and strong form. When share prices only reflect historical prices the market efficiency is weak. When prices take into account both historical prices and public information, the market is said to be semi strong. The market efficiency is strong when
the prices take historical prices into consideration, as well as public and private information.

What is common with all these forms of EMH is that when new information is presented, the market will instantly price the new information in the asset. In addition, it is assumed that investors will not act on any information other than the information that has fundamental value. Towards this background, it is logical to expect that information regarding change in corporate sustainability will be reflected in the share price. As discussed before, sustainability operations have been shown to bring both costs and benefits to a company. Some argue that the long-term profits that sustainable operations generate for a company outweighs the possible costs. It is up to every shareholder to value this information and then evaluate the new value of the corporation, which will be shown in the share price.

Jones and Murrel (2001) state that it may be unrealistic to expect that investors have the ability to accurately estimate the true impact of corporate sustainability activities and social performance in future cash flows. Freeman and Harrison (1999) state that this can be a result of investors' inability to absorb, process and interpret all available information as a result of the lack of participation in the company's daily operations and decision-making activities. This is why one could believe that a reaction can be found to an announcement made by a recognized third party that is known to have experience in evaluating corporate sustainability.

5.2 Information asymmetry and signaling

In the absence of complete information, investors may base investment decisions on different signals given out by the target company. Signaling is derived from the existence of information asymmetries on the market, and is closely related to the theory of market efficiency and defining of share prices. Generally, information asymmetry refers to situations where one party has more (or less) adequate information than the other party. In financial theory, information asymmetry indicates that management has more information than outside investors regarding the company's plans, risk and values. This is why Jones and Murrel (2001) emphases that companies should pay attention to the signals they send out to the market regarding the company's values, beliefs and interests, as these signals are used by stakeholders in decisions about the company's attractiveness.

One of the biggest problems related to valuating corporate sustainability activities is uncertainty due to absence of complete information. Firstly, it is difficult for stakeholders to observe a company's true commitment to sustainability. They are forced to rely on the
available information, leaving many stakeholders doubting whether companies really fulfill what they are reporting or promising. Secondly, it is very difficult for companies to know exactly the shareholders ethical stand. Companies can only try to do their best when trying to evaluate what value stakeholders give to their engagement in sustainability. Both of these dilemmas create uncertainty, which undeniably makes it very difficult to accurately assess the sustainability impact of the company's share value.

Increasingly, stakeholders demand that firms demonstrate their commitment to sustainability. Although some sustainability characteristics may be easy to observe, investors and other stakeholders may find it difficult to assess a firm's sustainable performance. The degree of asymmetric information relating to social practices can be reduced by the firm itself or intermediaries. Voluntary sustainability reporting from firms have been motivated by the fact that the information these reports bring will reduces information asymmetries leading to more effective markets. Those companies that make thorough sustainability reports have been shown to have their sustainability effort incorporated faster into their share price (Guidry & Patten, 2010). This requires that there is no doubt about the accuracy of the information a company presents.

Nowadays the majority of big corporations publish some sort of annual CSR or sustainability reports, which can be viewed as a form of reputation preservation and enhancement (Doh et al., 2010).

Some consumers and investors, however, may say that company-based information on sustainability is biased because it is filtered through senior management. Robinson, Kleifflner and Bertels (2011) state that several researchers have proposed that under conditions of evaluative uncertainty, one way by which a corporations’ sustainability actions can be assessed is certification contests and endorsement from reputable third parties, such as sustainability index. DJSI (2017) argues that a company's public recognition of sustainability can serve as a positive signal of the company's financial performance to shareholders. Apart from signaling that a company is interested in environmental issues and long-term survival, public recognition of superior sustainability performance also promotes the company's reputation and image, which in turn can attract new potential investors.

Evidence of asymmetric information can be observed on the financial market by, for example, observing the share price fluctuations for a company caused by announcements made by third parties (Brealey, Myers & Allen, 2006). The next chapter will more
thoroughly discuss market reactions due to endorsement by being included in a sustainability index.

5.3 Investor reaction to endorsement by sustainability indices

In the case of investor assessment of a company’s sustainability, if the market has difficulty to determine the difference between good and bad corporate sustainable performers due to evaluative uncertainty, an endorsement from an expert—such as a sustainability index—can cause new information about sustainable performance to be conveyed to the market (Doh et al., 2010). It should be noted that a crucial assumption for this argumentation is that the inclusion in a sustainability stock index is a reliable signal for a higher sustainable performance, whilst removal indicates a decline. The way investors react when stocks are added to or deleted from a sustainability index can provide an indication as to how and whether investors value corporate sustainability (Cheung & Roca, 2013).

One of the first studies done on the topic of investor reaction to endorsement by social indices is by Curran and Moran (2007). They studied inclusions to and deletions from the FTSE 4 Good Index UK, and even though they were not able to find significant results, most likely due to a small sample, the authors were able to find a trend that many of the following studies base their hypotheses on. They found that when a corporation was added to a social index, their share price showed a short-term rise, whilst corporations removed from the index showed a short-term decline around the announcement day.

Consolandi et al. (2009) examines the reaction of European stock markets to index addition and deletion announcement of the DJSI Stoxx Index. They found a sizeable positive reaction in the case of additions, and a slightly bigger negative reaction in the case of deletions. On the other hand, Cheung (2011) studies the reaction of American stock markets to similar announcements of index additions and deletions to the DJSI World Index. The study found that on the day of change, stocks added to the index experience a significant but temporary increase in return, while removed stocks registered a slightly lower decrease. Then again, Cheung and Roca (2013) analyze the effects on the performance of stocks that are included into and deleted from the DJSI World Index (DJSWI) in the Asia Pacific stock markets. The authors found negative and statistically significant abnormal returns for both index additions and index deletions after the announcement day.
These three papers, when viewed together, suggest that the impact of sustainability seems to be region-specific, since they studied index additions and deletions to the same index family, during the same time period i.e. beginning of the 21st century, but on different markets. Cheung and Roca (2013) state that the negative reaction found could be seen as evidence that sustainability matters to investors, although in a negative way in the context of the Asia-Pacific markets. Thus, concluding that Asia Pacific investors behave in a different way than investors in the European and US markets in relation to corporate sustainability.

Doh et al. (2010) studied inclusions and exclusions to the Calvert social index, and found no significant positive impact on a company’s share when it was endorsed by a sustainable entity for its activities. However, they found a negative impact when a company lost it. They discussed the reasoning behind this and concluded that when a company is endorsed they are more likely to already give out information about their activities, leading to a market that already anticipates the addition and thus there is no significant upward movement during the announcement day. On the contrary, a company that loses the endorsement is more often reluctant to give out negative information about their social performance in advance, resulting in a surprised market that quickly adjusts to the new information.

Oberndorfer, Schmidt, Wagner and Ziegler (2013) empirically analyse the effect of the inclusion of German corporations in two different sustainability stock indices to find out whether there is a difference to be found depending on how well known the index is. Their results showed that abnormal returns are insignificant if a firm is included in the DJSI STOXX, whilst the inclusion in the DJSI World leads to strong negative impacts. The results showed that the inclusion in a more visible sustainability stock index has a larger reaction among investors. The authors concluded that the German stock market obviously penalizes the inclusion of a firm in a sustainability stock index, and the results therefore suggest that a higher corporate environmental or social performance and possible associated reputation gains or cost savings are not financially rewarded.

Consolandi et al. (2009) argued that the best-in class approach adopted by SAM Group could lead to deletion of the company even if it has improved its ESG score because someone else has performed better within the sector or industry. Meaning that the deletion from the index does not imply a deterioration of the sustainability policies of the company in absolute terms. In order to clarify this issue, the authors performed an event study analysis for a subsample consisting of those companies deleted from the DJSSI
which registered a lower sustainability score compared to the previous year. The results showed that sustainability matters; firms deleted from the index with a decreased level of sustainability policies show negative cumulative abnormal return for each event window, confirming a persisting negative market reaction to such bad news. The authors were unable to find any effect on the total sample of deleted companies. The authors conclude that the inclusion in a sustainability stock index can be negatively assessed by investors as a purely symbolic action. Hence, the inclusion in a sustainability index is only a reaction to institutional pressures, which have required corporate activities and which have therefore led to additional unproductive costs not appreciated by the shareholders. Therefore, the authors do not support voluntary corporate activities aiming at the inclusion in a sustainability stock index.

5.4 Firm specific characteristics and investor sentiment on sustainability activities

Investors have been shown to react differently to news about corporate sustainability depending on firm or industry characteristics. As mentioned earlier, a company’s financial health plays a big role in a company’s sustainability activities, and can therefore also affect an investor’s view on sustainability. Ziegler and Schröder (2010) argued based on previous studies that firms with a better financial performance find it easier to pay attention to stakeholder groups and to obey moral standards, by investing more capital in corporate sustainability performance attributes. The authors found evidence to this thought by showing a positive relation between financial performance and corporate sustainability. Hence, one could expect that investors react more positively to sustainability activities by corporations whose financials are in good shape, and more skeptically if a company is in distress.

Recently, sustainability issues in an industry context have received considerable attention from researchers. Etzion (2007) found that there is an environmental footprint-based distinction in sustainability processes and stakeholder sentiment between “clean” industry sectors (such as banking and other services) and “dirty” industry sectors (mainly the heavy industry sector, such as the chemical industry, the automobile industry, and the forestry/pulp/paper and energy sectors). Stakeholder’s have been shown to expect better sustainability performance from “clean” industry sectors than from “dirty” industry sectors.

Werther and Chandler (2006) argue that sometimes financial companies and banks can be less affected by social and environmental responsibility, because stakeholders may
find it harder to identify the victim or the amount of damage caused by the irresponsible behavior. The writers continue by claiming that industries that are generally considered polluting, such as the heavy industries, would be more responsive to sustainability and environmental friendly involvement. However, it is not certain that the market would react strongly to information about reduced sustainability, as the industry is already acting against many of the values in, for example, the environmental pillar of sustainability. This would indicate that some industries are more vulnerable to social responsibility considering the share price.

Studies have shown that in industries where firms sell “final goods” directly to the consumer, there is more pressure to be environmentally and sustainably proactive, since investors have been shown to put more pressure regarding sustainability on corporations in this line of business (Cordeiro & Tewari, 2015). Khanna and Anton (2002) found that, in fact, firms involved in the sale of final products directly to consumers are more likely to invest in high-quality environmental management systems than primary or intermediary good producers. Also, due to the heavy regulations that target dirtier industries more intensely - due to their noticeably greater negative impact on the environment - as well as enforced penalties and personal lawsuits targeting corporate officers with significant fines and imprisonment, there is evidence that firms from dirtier industries are more likely to engage in proactive environmental strategies (Cordeiro & Tewari, 2015).

Apart from industry characteristics, corporate sustainability researchers have recently turned their attention to firm size as a potential important moderator of the relationship between stakeholder pressures and the adoption of proactive sustainable management. Cordeiro and Tewari (2013) believe that firm size will significantly moderate the impact of investor reaction to information about sustainability status.

Larger firms are more visible to the public and stakeholders, Jiang and Bansal (2003) noted that a potential of the greater visibility that large firms possess triggers green organizational responses. Larger firms by definition have larger impacts on the environment, ceteris paribus. Given their greater visibility, it is more likely that stakeholders such as investors, regulators and customers are more aware of the environmental performance of larger firms. Thus, it is likely that larger firms are more sustainably proactive, especially in technical situations like eco-efficiency and pollution control initiatives. (Cordeiro and Tewari, 2013)
Cordeiro and Tewari, 2013 state that the larger the firm, the more likely it is to experience stakeholder activism in the face of disclosure of poor sustainable performance. Larger firms make attractive targets, since changes are likely to be on a larger scale. On the other hand, endorsement by a sustainability index is likely to quiet stakeholder activism, resulting in less drain on the large firm’s resources on fighting this activism. Based on this reasoning, shareholders of large firms are likely to react more positively to disclosure of superior sustainability performance and to react less positively to disclosure of inferior sustainability performance.
6 PREVIOUS STUDIES

The previous studies done on the relationship between corporate sustainability and market value have had varying results, some even insignificant. These studies have concentrated on event studies and used different measures for definition of sustainability. The first study presented is by Curran and Moran (2007) which all the other studies refer to, after that two articles concentrating on the DJSI family are presented, and lastly an article which has done both an event study and a regression is presented.

6.1 Curran and Moran (2007)

Curran and Moran’s (2007) article “Impact of the FTSE4 Good Index on firm price: An event study”, published in the journal of environmental management, examines whether corporate financial performance is affected by public endorsement of environmental and social performance. Inclusion in and deletion from the FTSE4Good UK Index is used as a proxy measure for good (addition to) and poor (deletion from) corporate social responsibility. The paper studies the relationship between CSR and share price, but since it uses the same method as I aim to use, I find this article relevant.

To be included in the index, companies needed to satisfy criteria based on three principles: environmental, social and stakeholder, and human rights. Companies with business interests in tobacco, nuclear weapons, whole weapon systems, nuclear power, and the extraction of uranium were automatically excluded. The addition of a company to the index was considered a signal to the market that it had reached a certain level of environmental and social performance, i.e. positive CSR. If a company was deleted from the tradeable index, this most likely was because it had been superseded in terms of its market capitalization, i.e. another company in the benchmark index had grown larger than it, and therefore pushed it down the list and it was no longer in the top 50 largest companies. Therefore, a removal from the tradeable index did not necessarily signal a deterioration in the environmental or social performance of the company. However, if a company was deleted from the benchmark index, Curran and Moran considered this to be a signal that its environmental and social status no longer met the criteria of the committee, indicating negative CSR.

To examine the relationship between inclusions to and exclusions from the FTSE4 Good UK index, Curran and Moran chose to use an event study methodology. Their timeframe was only one year, from 06/2001- 09/2002 which included the first announcement in
July 2001 and 3 reviews. Since the index only consisted of 50 stocks, the number of changes was low, only 6 additions and 4 deletions in September 2001, 6 additions and 4 deletion in March 2002, and 2 additions and 2 deletions in September 2002.

The authors chose to use the market model, and used an estimation period of \([-310 \text{ to } -10]\). The event windows varied in length, but were motivated to be as short as possible to minimize the effect of other events during the window. The authors expected to find a positive effect on the share price when a company was added to the index and a negative effect when it was deleted. The authors divided their sample into seven samples according to the event date and nature of event and tested the significance with a t-test.

The authors were interested in the reaction the day the index was launched, and found that the market reaction was positive, but not significantly different from zero. The returns where negative the days prior to the announcement, then turned positive for a short time-frame \([0 \text{ to } 2]\) and then turning negative again. Even though no results where significant, they interpreted the result as the market responding positively to the news of the announcements on day and then correcting itself.

Not only did the authors divide the reaction according to addition or deletion, they also decided to test all announcement days separately. They were not able to find any significant results for any of the days. However, their findings followed a similar pattern throughout the research; a positive insignificant reaction could be observed when a company was added and a negative reaction when a company was deleted.

### 6.2 Robinson, Kleiffner and Bertels (2011)

Robinson, Kleiffner and Bertels’ (2011) article “Signaling sustainability leadership: Empirical evidence of the value of DJSI Membership” published in the journal of business ethics explore the relationship between corporate sustainability, reputation, and firm value by questioning whether signaling sustainability leadership through membership in a recognized sustainability index is value generating. This article explores both the short-term and the intermediary impact on North American firms that are being included or removed from the Dow Jones Sustainability World Index.

To examine the value of a DJSI listing in supporting a reputation for sustainability leadership, the authors chose to use an event study methodology, which is consistent with studies done before. The authors measure the stock market reaction during a 6-month time period surrounding the announcement that North American firms were added to, or deleted from, the DJSI World Index during the period 2003–2007. Their
sample included five event dates giving an initial sample size of 62 additions to and 70 deletions from the index, but after modifications the actual sizes were 48 and 43 respectively.

The event study methodology used in the study computes the abnormal return for each added/deleted stock as the return on the stock minus the return on a major national index (the S&P 500 in the US and the S&P/TSX Composite in Canada), for every day in an event window. The authors used three event periods pre-announcement (-60 to -1), announcement (0 to 8 and 12) and effective (1 to 60). The statistical significance of the mean CAR values was computed for each day within each period using a standard t-test.

The authors tested two hypotheses by examining the mean price changes of stocks around the time of their announced addition to, or deletion from the DJSI.

**Hypothesis 1:** Stocks that are added to the DJSI experience a positive price change following the announcement of their addition to the index.

**Hypothesis 2:** Stocks that are removed from the DJSI experience a negative price change following the announcement of their removal from the index.

Positive CARs provide evidence in support of H1, while negative CARs provide evidence in support of H2. The results show an insignificant positive drift for both additions and deletions during the pre-announcement period, which is essentially reversed during the announcement period for additions. A more detailed day-by-day examination of these two periods reveals that none of the individual day’s returns, or any of the CARs, during these two event periods is significant. Thus, the authors find no statistical support for hypothesis H1 or H2.

Robinson, Kleifflner and Bertels also test two additional hypotheses by examining the mean price changes of stocks around the time of the effective dates of their addition to, or deletion from, the DJSI World Index. H3 states that stocks that were added to the DJSI experienced a positive price change following the effective date of their addition to the index. Whereas H4 states that stocks that were removed from the DJSI experienced a negative price change following the effective date of their removal from the DJSI. The results provided evidence that there is a sustainable positive stock market reaction when firms are added to the DJSI, and a temporary but not sustained loss in value to firms that are removed from the DJSI. These results provide support for H3, suggesting that being added to the DJSI is a positive event for a firm, while there is no support for H4, in suggesting that losing a DJSI listing is neutral for a firm. The authors
state that this is in line with the literature that examines the impact of reputation on value, but emphases that it is also consistent with literature that examines the impact of being added to or deleted from a major US stock index.

6.3 Oberndorfer, Schmidt, Wagner and Ziegler (2013)

The article by Oberndorfer, Schmidt, Wagner, and Ziegler (2013) “Does the stock market value the inclusion in a sustainability stock index? An event study analysis for German firms” empirically analyzes the effect of the inclusion of German corporations in sustainability stock indices on stock performance. They examine the DJSI STOXX, which comprise the European leaders in terms of sustainability performance, and the DJSI World, which comprise the respective world-wide leaders.

The authors use an event study approach and motivate this decision by stating that event studies are increasingly used to analyze the reactions of mean stock prices due to new information about corporate sustainability performance. The authors aim to study the impact of the inclusion in a sustainability stock index on stock performance in a similar manner to Curran and Moran (2007) and Cheung (2011), and state that they want to further develop their papers and implement the study to the German market.

The authors compare the effects of the inclusion in two different sustainability stock indexes with different visibility and importance on the stock markets, which allows to test for the possibility that the inclusion in a more recognized sustainability stock index has different effects on the stock performance of firms on the same stock market. Also, in order to receive robust estimation results they use an advanced event study methodology by basing their analysis not only on a simple asset pricing model (such as the market model), but also on the Fama-French three-factor model. The authors furthermore take into account GARCH effects i.e. the results are reliable even if a varying conditional variance in the daily stock returns analyze occurs.

Against a theoretical basis of costs and benefits related to sustainability, the authors formulated the following hypotheses:

**Hypothesis 1a (/b):** The inclusion in a sustainability stock index has a positive (/negative) effect on stock performance.

**Hypothesis 2a (/b):** The positive (/negative) effect of the inclusion in a sustainability stock index on stock performance is stronger for the DJSI World than for the DJSI STOXX.
Their data consisted of German corporations that were included in a sustainability stock index in the years between 1999 and 2002. After sorting through the data, their data consisted of 23 inclusions in the DJSI STOXX (for 23 corporations) and 28 inclusions in the DJSI World (for 27 corporations).

The authors have chosen to study both the announcement date and the efficient date. Their estimation window starts 200 trading days and ends 11 days prior to the respective first event day. This window has been used for the estimation of the unknown parameters $\alpha_i$, $\beta_{i1}$, $\beta_{i2}$, and $\beta_{i3}$ in the Fama-French three-factor model including or not including a GARCH (1,1) process in the conditional disturbance terms. The data contains the daily (discrete) stock returns (in %) for the event firms and for the German market portfolio, which comprises all stocks traded on the Frankfurt stock exchange.

They estimated CARs, AARs and CAARs for the time intervals $[-1, 1]$, $[-5, 5]$, $[1, 5]$ and $[-5, -1]$. Their results imply negative average cumulative abnormal returns which is mainly driven by the effect of the inclusion in the DJSI World. The inclusion in the DJSI World leads to strong negative impacts while the average cumulative abnormal returns are insignificant if a firm is included in the DJSI STOXX. For instance, for the whole sample the average negative abnormal return was around 2 % for the five days after the inclusion date, whilst DJSI World had an average decrease of the stock returns in the amount of more than 4 %.

The authors state that the estimation results point to two conclusions; (1) the German stock market obviously penalizes the inclusion of a firm in a sustainability stock index, and (2) the German stock market penalizes the inclusion in the DJSI World to a larger extent than the inclusion in the DJSI STOXX. Their results therefore suggest that a higher corporate environmental or social performance associated to possible reputation gains or cost savings are not financially rewarded.

The authors stated that inclusion in a sustainability stock index can be negatively assessed by investors, and therefore considered as a purely symbolic action. According to this argumentation, the inclusion in a sustainability stock index is only a reaction to institutional pressures, which have required corporate activities and which have therefore led to additional unproductive costs. Therefore, the results do not support voluntary corporate activities aiming at the inclusion in a sustainability stock index.
6.4 Doh, Howton, S. D., Howton, S. W. and Siegel (2010)

The paper by Doh, Howton, S. D., Howton, S. W. and Siegel (2010) “Does the market respond to an endorsement of social responsibility? The role of institutions, information, and legitimacy” examine whether the market reacts to expert endorsements of social responsibility (CSR) and what firm characteristics lead to an addition or deletion. The authors examined the Calvert social index, which is a widely followed and publicly available listing of firms that the Calvert group considers socially responsible. The Calvert group requires that the firms included pass a rigorous screening process, so an inclusion indicates an endorsement from the Calvert Group that a firm is acting in a socially responsible way. Firms are removed from the index when they fail to meet Calvert’s strict criteria, which indicated a removal of an expert endorsement.

The writers based their hypothesis on the literature on the role of institutions in conferring legitimacy since it - according to the writers- presents a deep and rich basis for the analysis of the potential market impact of inclusion in or removal from a social index. They formulated two main hypotheses:

*Hypothesis 1a (1b):* There is a positive (negative) shareholder wealth effect associated with a firm’s addition (deletion) to social index.

They studied a period of 6 years, 2000 to 2005, defining the event date as the earliest date that an index change is announced in the financial press. Their final sample consisted of announcements of 56 additions and 65 deletions over the sample period, after removing four firms (all deletions) because of concerns about confounding events. The authors claimed that they sampled a sufficiently large number of events to attain both statistical power and conceptual relevance, as well as used a short event window to ensure that the actual impact of the CSR-related event was isolated without anything influencing the share price. The authors calculated abnormal returns for the window [+1 to +2]. Their motivation was that by including the day prior to the event examines if there is any information leakage prior to the announcement, and including two days following the announcement ensures that any price change is not temporary and driven by supply/demand adjustments following the announcement. To test the significance of the stock price reaction the writers used two separate methods; (1) a t-test which is a parametric approach that tests if mean abnormal returns are significantly different from zero (2) a signed rank test which is a nonparametric statistic test that tests the hypothesis that the returns are ranked as expected.
The writers could not find abnormal return for additions that are statistically different from zero, whereas the abnormal return on for deletions is negative and significant at the 5% level. The authors repeated the analysis with the window extending as far as 10 days, with no significant abnormal returns in the days subsequent to the announcement of the index change outside of days 0 and 1. Thus, the results are consistent with Hypothesis 1b but not Hypothesis 1a.

In addition to the event study, the writers tested two more hypotheses:

**Hypothesis 2**: Firms added to a social index will have superior operating performance in the period prior to their inclusion, relative to companies that have been deleted from the index.

**Hypothesis 3a (b)**: The magnitude of the positive (negative) shareholder wealth effect associated with a firm’s addition to (deletion from) a social index is tempered by the firm’s prior CSR reputation, that is, the better the prior reputation, the less positive (negative) will be the shareholder wealth effect resulting from inclusion (deletion).

To test Hypothesis 2 the authors analyzed the extent to which improving social performance is associated with financial performance by examining operating performance in the year prior to the index change. This was measured with operating income/total assets, referring to other previous studies that claim that this measure is among the most accurate and stable measures of operating performance, and is most closely correlated with social performance. In addition, since the industry has been found to effect on the measure, this was taken into account by an industry-adjusted operating performance measure, which is found by subtracting the mean or median industry measure from the corresponding measure for the individual firm. By using a Wilcoxon rank sum test to account for the potential non-normality of operating performance measures, the authors compare the operating performance of firms that were added to the Calvert social index with those that were deleted from the index and test whether those differences are statistically significant.

The findings are consistent with Hypothesis 2; the operating income/total assets measure is significantly higher for firms that are added to the index than for deleted firms. Even after adjusting the performance measures for possible industry effects, they find that performance is significantly better for firms that are added to the index than for deleted firms in the period prior to the announcement change.
To test Hypotheses 3a and 3b, the authors rely on cumulative firm-level social responsibility data provided by Kinder, Lydenberg, and Domini (KLD). KLD is a company that has evaluated the social performance of approximately 650 publicly listed U.S. firms since 1991. The KLD data was then used to calculate measures of CSR and corporate social irresponsibility (CSiR) by summing values of the strengths to represent CSR and the values of concerns to represent CSiR. The higher the value of each variable, the greater was the firm’s CSR and CSiR.

The authors used stepwise OLS regressions to explore the impact of preannouncement variables on the magnitude of announcement period returns. They computed 2-day standardized abnormal returns and used them as the dependent variable in the regressions. They motivated the use of two trading days instead of three because studies have shown that the full reaction to the announcement occurs within the first two trading days after the event. These returns are typically assumed to be normally distributed and homoscedastic, which was proven right when the sample was tested for the presence of heteroscedasticity using both the Breusch-Pagan test and White’s test.

Two control variables were included in the econometric analysis: firm size and sales growth. Firm size has shown to influence information production of the firm, i.e. size is a proxy for the overall visibility and presence of the firm in the marketplace. They were worried that information leakage is a viable risk for catching the actual effect, since better known companies get more visibility. Firm size was calculated as the natural log of the market value of equity for each variable at the end of the year prior to the addition or deletion. Sales growth was an indicator to the firm’s overall reputation and visibility in the marketplace, and was calculated as the percentage change in revenues between year \( -5 \) and year \( -1 \), allowing the analysis to use the same accounting information that would have been available to market participants at the time of the announcement.

Also, a dummy variable was included to examine the differences in impact for additions and deletions, getting the value 1 if the firm is deleted from the index and 0 if it is added. The authors also created deletion dummy interaction terms by multiplying the deletion dummy by the CSR and CSiR variables to measure the marginal impact of these variables for deletions. The authors expect different relationships under deletions versus additions; hence the interaction term is added since it allows an interpretation of this differential impact.

Their results showed a significantly negative relation between the CSR variable and the dependent variable, whereas the coefficient on the CSR deletion dummy was positive and
significant. These results imply that the market performance of firms engaged in CSR is more sensitive to changes in the social index. Firms that have a stronger reputation for CSR do not experience as much of a decline in their market value when they are deleted from the social index as do companies with a weaker reputation for CSR. In the case of additions, the magnitude of the announcement day reactions is inversely related to prior CSR reputation, meaning that the higher the prior reputation, the less positive are the announcement day returns. The coefficient on the CSiR variable is not significant.

Their study shows that the coefficient of the sales growth variable is negative and significant, and the coefficient on firm size is positive and significant. This was according to what was expected since the results of the event study showed that firms which are deleted experience poorer post announcement market performance relative to those that are added. The control variable Sales growth was inversely related to the abnormal returns, meaning that firms with faster sales growth that are deleted have poorer returns than firms with slower sales growth, and vice versa.

6.5 Summary of previous research

The presented previous studies empirically tested the prize reaction on change in corporate sustainability performance around the announcement day of inclusions to and deletion from a social index. The studies came to somewhat varying results, some statistically significant while others could not find statistical support. The results of these studies and others presented in this paper are summarized in Table 4. An asterisk (*) indicates studies presented in this chapter.

The studies chosen are from different markets, but study approximately the same time period, i.e. the first decade of the 21st century. To conclude the results, the European market overall seems to be positively related to corporate sustainability, since both in Europe and in the UK, show a positive reaction when a company is added to the index and a negative when deleted. Note that the UK not significant. However, Ziegler & Schröder (2010) found a negative relation to additions on the German market. The studies done on the North American market all showed positive reaction on the market when a company was added to the sample.

It might be argued that the article by Curran and Moran (2007) is not a suitable article to represent this type of studies, since they did not manage to find any significant results and the validity of the research can be questioned, since the sample size was so small. Even so, all of the previous studies presented in Table 4 refer to this study in some point
of their paper, and the method used and the trend they managed to find is what many scholars base their studies on.

All studies limit their analysis to the market response in the short-run to clarify the signaling effects of these announcements. The authors motivated the use of short event windows, since studies have shown that the full reaction to the announcement occurs within the first two trading days after the event. Also, this limited the possibility that other events interfere with the event of interest. Some studies also discussed possible firm characteristics that might affect the market reaction of this kind of news. The authors managed to find a positive relation with financial performance and firm size and a negative relationship with sales.
<table>
<thead>
<tr>
<th>Index</th>
<th>Market</th>
<th>Method</th>
<th>Significance test used in event study</th>
<th>Timeframe</th>
<th>Additions</th>
<th>Deletions</th>
<th>Addition</th>
<th>Stat. support</th>
<th>Deletion</th>
<th>Stat. support</th>
<th>Other Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consolandi et. al (2009)</td>
<td>DJSI STOXX European market</td>
<td>Event study</td>
<td>Student-t &amp; Signed rank test</td>
<td>2002-2006</td>
<td>113</td>
<td>113</td>
<td>+</td>
<td>yes</td>
<td>—</td>
<td>—</td>
<td>yes OLS Regression results</td>
</tr>
<tr>
<td>Ziegler &amp; Schröder (2010)</td>
<td>DJSI STOXX &amp; World European market</td>
<td>Panel probit model</td>
<td>-</td>
<td>1999-2004</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Index additions are related to ROA: + Tobin's Q: + Debt/assets: insignificant log sales: + sales/assets: -</td>
</tr>
<tr>
<td>Robinson et al (2011) *</td>
<td>DJSI World North America Event study</td>
<td>standard t-test</td>
<td>2003-2007</td>
<td>48</td>
<td>43</td>
<td>+</td>
<td>no</td>
<td>+</td>
<td>no</td>
<td>—</td>
<td>No significant result on announcement day, but on effective date: Addition: + and Deletion: —</td>
</tr>
<tr>
<td>Oberndorfer et al (2011) *</td>
<td>DJSI STOXX &amp; World Germany Event study</td>
<td>common z-test &amp; corrected z-statistic with GARCH</td>
<td>1999-2002</td>
<td>23 and 28</td>
<td>-</td>
<td>-</td>
<td>yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cheung (2011)</td>
<td>DJSI World US stocks Event study</td>
<td>Patell’s t-test, BMP t-test &amp; sign-test statistic</td>
<td>2002-2008</td>
<td>80</td>
<td>97</td>
<td>+</td>
<td>yes</td>
<td>—</td>
<td>yes</td>
<td>—</td>
<td>-</td>
</tr>
<tr>
<td>Cheung &amp; Roca (2013).</td>
<td>DJSI WORLD Asia Pacific Event study</td>
<td>adjusted BMP-test</td>
<td>2002-2010</td>
<td>103</td>
<td>75</td>
<td>—</td>
<td>yes</td>
<td>—</td>
<td>yes</td>
<td>—</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4 Summary of previous studies
7 DATA

In this chapter, the data used is presented. First, the chosen sustainability index, DJSI Europe, is presented, following a description of the stock market data investigated in the event study as well as suitable descriptive statistics. After that, the company specific data is presented; meaning the variables used in the regression model and suitable descriptive statistics.

7.1 The Dow Jones Sustainability Index

The Dow Jones Sustainability Indices (DJSI) is a globally known sustainability index family that is jointly created by S&P Dow Jones Indices and RobecoSAM. The DJSI World index was launched in 1999 as the first global sustainability benchmark to track the stock performance of the world’s leading companies in terms of economic, environmental and social criteria. Since then, several other Dow Jones Sustainability Indices and new index families have been developed to meet a range of investor specific needs.

Currently, the four main index families that RobecoSAM offer are the DJSI, the DJSI Diversified, the S&P ESG and the S&P Fossil Fuel Free index family. DJSI is different compared to most other sustainability indices since the index uses the best-in-class method in the selection of its components. DJSI does not automatically exclude all companies in fields that are considered unethical, such as the tobacco industry, the gambling industry, and the alcohol industry, or other similar industries that most other sustainability indices do. Instead, they choose the best companies in each industry for the index. However, the Dow Jones Indices also offer the DJSI Indices with exclusion criteria.

According to the RobecoSAM (2017) homepage, the DJSI applies a transparent, rule-based component selection process stemming from the RobecoSAM Corporate Sustainability Assessment (CSA), which is an annual evaluation of companies’ sustainability practices. Each year they ask over 3,400 listed companies in 60 countries around the world industry-specific questions focusing on economic, social and environmental factors that are relevant to the companies’ success, but that are under-researched in conventional financial analysis. Then, in September each year, a press release is published that presents the leading sustainable organizations in each industry.

What started out as a paper-based questionnaire in 1999 has now grown into one of the world’s most extensive corporate sustainability databases. The RobecoSAM’s CSA Guide
(2016) explains that the CSA is designed to capture both general and industry-specific criteria covering the economic, environmental and social dimensions. Each of the three dimensions consists of on average six to ten criteria, and each criterion can contain between two and ten questions depending on the industry, reaching a sum of 80-120 questions. Each criterion is worth up to 100 points, and is assigned a weight (percentage) of the total questionnaire.

For each company, a Total Sustainability Score of up to 100 points is calculated based on the predefined weights established for each question and criterion. The questions and weights differ depending on industry. Table 5 offers an overview of the general structure of the weights of the Automobiles & Components industries to give some indication of the criterions and weights. The total weights for the different dimensions do not vary almost at all.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Criterion</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Dimension</td>
<td>Codes of Business Conduct</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Corporate Governance</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Impact Measurement &amp; Valuation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Innovation Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Materiality</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Policy Influence</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Risk &amp; Crisis Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Tax Strategy</td>
<td>1</td>
</tr>
<tr>
<td>Social Dimension</td>
<td>Corporate Citizenship and Philanthropy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Human Capital Development</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Human Rights</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Labor Practice Indicators</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Occupational Health and Safety</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Social Reporting</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Talent Attraction &amp; Retention</td>
<td>6</td>
</tr>
<tr>
<td>Environmental Dimension</td>
<td>Climate Strategy</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Environmental Policy &amp; Management Systems</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Environmental Reporting</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Operational Eco-Efficiency</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Product Stewardship</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 5 Criterion Weights by RobecoSAM Industry Automobiles & Components, source RobecoSAM CSA (2017)

RobecoSAM (2016) has observed that industry leaders are most likely to make the effort to fill out the questionnaire and make sustainability information available in the public
otherwise, the questioners are filled out for them by RobecoSAM based on the information available.

The index being used in this paper is the Dow Jones Sustainability Europe Index that belongs to the DJSI index family. The index was introduced in 2010, and it comprises European sustainability leaders identified by RobecoSAM and represents the top 20% of the largest 600 European companies in the S&P Global BMI based on long-term economic, social and environmental criteria.

7.2 Data collection and filtering for the event study

The data for the event study consists of additions and deletions to and from the DJSI Europe index during the time period 2011-2016. The companies included in the study have been manually collected from published annual reports, and the total number of changes during that time period adds up to 93 additions and 84 deletions. To make sure nothing interferes with the estimation period of the event study, all companies were manually checked for confounding events one year prior to the event date, i.e. events such as mergers and acquisitions, lawsuits, tender offers and so on. After deleting all companies with a concern of confounding events, the final data consists of 76 additions and 77 deletions. Table 6 shows the final composition for each year as well as the total number of components in the index at that time.

<table>
<thead>
<tr>
<th>Announcement</th>
<th>Effective date</th>
<th>Addition</th>
<th>Deletion</th>
<th>Index total</th>
</tr>
</thead>
<tbody>
<tr>
<td>08-09-2011</td>
<td>30-09-2011</td>
<td>14</td>
<td>7</td>
<td>172</td>
</tr>
<tr>
<td>13-09-2012</td>
<td>24-09-2012</td>
<td>8</td>
<td>12</td>
<td>166</td>
</tr>
<tr>
<td>12-09-2013</td>
<td>23-09-2013</td>
<td>18</td>
<td>12</td>
<td>177</td>
</tr>
<tr>
<td>11-09-2014</td>
<td>22-09-2014</td>
<td>6</td>
<td>21</td>
<td>154</td>
</tr>
<tr>
<td>14-09-2015</td>
<td>21-09-2015</td>
<td>15</td>
<td>6</td>
<td>161</td>
</tr>
<tr>
<td>12-09-2016</td>
<td>19-09-2016</td>
<td>15</td>
<td>19</td>
<td>153</td>
</tr>
<tr>
<td><strong>Sample total</strong></td>
<td></td>
<td><strong>76</strong></td>
<td><strong>77</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 Number of additions and deletions after filtering

As can be seen from the table, the amount added and deleted each year has varied, as well as the total amount of components each year. However, a pattern can be detected in the total amount of components; it has not shrunk or grown two years in a row.

The share price data was then collected from the database FactSet, and was controlled for dividends, stock splits and emissions. The daily data for the market portfolio used in
the event study, MSCI Europe Index, was retrieved from the same database. The MSCI Europe Index captures large and mid-cap representation across 15 Developed Markets (DM) countries in Europe. According to the MSCI Inc. (2017), with its 445 constituents, the index covers approximately 85% of the free float-adjusted market capitalization across the European Developed Markets equity universe.

The share data was retrieved in Euros (€), and the return for every individual share and market index is calculated as:

\[ R_{it} = \ln \left( \frac{P_{t+1}}{P_t} \right) \]

where \( P_t \) is the share price for day \( t \) and \( P_{t+1} \) is the share price for day \( t + 1 \). The use of logarithmic returns has several advantages since it eliminates the problem with negative price observations in addition to improving the normality of the distribution (Henderson, 1990).

### 7.2.1 Sample descriptive statistics

The study is based on the European market and 15 European countries are represented, defined by the location of their headquarters. All other countries except for Norway, Switzerland and Turkey are part of the European Union. Hence, all countries are expected to follow the same regulations and encouragements about corporate sustainability. The country division is presented in Figure 3. France represents the majority of inclusions in the added sample, while the United Kingdom represents the majority in the deleted sample. Retail investors in France, among other southern European countries, are known to be more skeptical towards corporate sustainability activities. Cormier and Magnan (2007) findings implies that French firms operate in an institutional setting where the decision to be sustainable is not necessarily well regarded by investors. Nevertheless, a growing trend of SRI investments has been found on the French market during the last few years, mostly driven by institutional investors (Eursif, 2016). As it is not yet shown that the retail sector in France has the same preferences, a negative reaction to this kind of news might still be expected. The United Kingdom again is the leading SRI market in Europe (Cheung & Roca, 2013); the UK’s SRI investments continue to grow significantly with assets growing faster in the UK than globally (Eursfi, 2016). As investors are shown to have a home country bias, meaning that investors' natural tendency is to be most attracted to investments in domestic markets (Lipsey,
2004), these differing opinions about corporate sustainability might have an impact on the findings in the event study.

![Figure 3](image-url) **Country represented in the study**

The data for the event study consists of share data for 72 added and 73 deleted companies, this due to the fact that some companies were added and some deleted from the index more than once during the time period. The companies in the samples are from a range of industrial sectors. Table 7 shows the total amount of representatives in each industry, and Figure 4 the percentage amount classified according to GICS (Global Industry Classification Standard). The largest sector in both categories is the Industrials sector, as it represents 27% respective 25% of the sample firms. The second and third largest industries among the added firms are the Consumer Discretionary and the Financials, whilst in deleted it is Financials and Utilities.

Furthermore, a distinction between clean and dirty industries has been made based on definitions and classification by previous studies (Levy 1995; Jänicke, Binder & Mönch 1997; Etzion (2007); Muller, Abfalter, Hautz, Hutter, Matzler & Raich 2011). Dirty industries are defined as forms of production which cause above-average environmental stress, while clean industries do not have much impact on the environment.
<table>
<thead>
<tr>
<th>Industry Classification</th>
<th>Additions</th>
<th>Deletions</th>
<th>Total</th>
<th>Clean Indus.</th>
<th>Dirty Indus.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>7</td>
<td>5</td>
<td>12</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Industrials</td>
<td>21</td>
<td>19</td>
<td>40</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Consumer Discretionary</td>
<td>12</td>
<td>9</td>
<td>21</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>7</td>
<td>4</td>
<td>11</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Health Care</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Financials</td>
<td>8</td>
<td>13</td>
<td>21</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Telecommunication Services</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>8</td>
<td>12</td>
<td>20</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>76</td>
<td>77</td>
<td>153</td>
<td>40</td>
<td>113</td>
</tr>
</tbody>
</table>

Table 7 Industry classification according to GICS

Figure 4 Percent division of industry in samples for additions and deletions

From collected share price data, daily logarithmic returns were calculated to normalize the data. Financial data is known for being non-normally distributed, which is why the extreme values in the statistical data were limited to reduce the effect of possibly false outliers, especially now when the estimation period was so short. This was done by winsorizing, i.e. by replacing the value of the extreme value with the value of the next highest acceptable.

Below in table 8 and table 9 the descriptive statistics for the estimation period [-190, -11] for the event study is presented, broken down by event period. Normalized data has a tail, skewness, around 0 and a peak, kurtosis, around 3 (Brooks 2008, p. 161). A Jarque-
Bera test is performed to statistically determine if the sample is normally distributed, with a null hypothesis of a normal distribution. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution (Brooks 2008, p. 163). The p-values of the test results are presented in the tables, and the significance of the results is presented in the following manner: *** 1 % significance, ** 5 % significance and * 10 % significance.

After taking the logarithm and winsorizing, the data shows very little negative tail with a skew around zero and some years show a small peak with a kurtosis above three in some events. However, the result from the Jarque-Bera test indicates that the sample is not normally distributed as the result for every year is significant on a 1 % level.

<table>
<thead>
<tr>
<th>No.</th>
<th>Mean</th>
<th>Median</th>
<th>Min.</th>
<th>Max.</th>
<th>Std. Dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>14</td>
<td>-0.14 %</td>
<td>-0.12 %</td>
<td>-5.98 %</td>
<td>5.96 %</td>
<td>2.08 %</td>
<td>-0.109</td>
<td>3.651</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>0.09 %</td>
<td>0.09 %</td>
<td>-6.80 %</td>
<td>6.55 %</td>
<td>1.93 %</td>
<td>0.033</td>
<td>3.994</td>
</tr>
<tr>
<td>2013</td>
<td>18</td>
<td>0.03 %</td>
<td>0.02 %</td>
<td>-5.32 %</td>
<td>5.94 %</td>
<td>1.48 %</td>
<td>-0.056</td>
<td>4.084</td>
</tr>
<tr>
<td>2014</td>
<td>15</td>
<td>-0.01 %</td>
<td>0.02 %</td>
<td>-4.87 %</td>
<td>7.58 %</td>
<td>1.36 %</td>
<td>0.04</td>
<td>5.502</td>
</tr>
<tr>
<td>2015</td>
<td>15</td>
<td>0.06 %</td>
<td>0.07 %</td>
<td>-5.98 %</td>
<td>5.00 %</td>
<td>1.66 %</td>
<td>-0.103</td>
<td>3.592</td>
</tr>
<tr>
<td>2016</td>
<td>15</td>
<td>-0.03 %</td>
<td>0.02 %</td>
<td>-5.74 %</td>
<td>5.75 %</td>
<td>1.78 %</td>
<td>-0.156</td>
<td>3.589</td>
</tr>
<tr>
<td>Sample</td>
<td>76</td>
<td>-0.02 %</td>
<td>-0.01 %</td>
<td>-6.80 %</td>
<td>7.58 %</td>
<td>1.75 %</td>
<td>-0.089</td>
<td>4.325</td>
</tr>
</tbody>
</table>

Table 8 Descriptive statistics of added sample

<table>
<thead>
<tr>
<th>No.</th>
<th>Mean</th>
<th>Median</th>
<th>Min.</th>
<th>Max.</th>
<th>Std. Dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>7</td>
<td>-0.18 %</td>
<td>-0.14 %</td>
<td>-7.53 %</td>
<td>5.78 %</td>
<td>2.23 %</td>
<td>-0.327</td>
<td>3.710</td>
</tr>
<tr>
<td>2012</td>
<td>12</td>
<td>0.08 %</td>
<td>0.12 %</td>
<td>-8.98 %</td>
<td>7.67 %</td>
<td>1.92 %</td>
<td>-0.267</td>
<td>5.538</td>
</tr>
<tr>
<td>2013</td>
<td>12</td>
<td>0.10 %</td>
<td>0.09 %</td>
<td>-5.48 %</td>
<td>5.72 %</td>
<td>1.44 %</td>
<td>0.136</td>
<td>4.425</td>
</tr>
<tr>
<td>2014</td>
<td>21</td>
<td>0.04 %</td>
<td>0.05 %</td>
<td>-5.86 %</td>
<td>7.28 %</td>
<td>1.54 %</td>
<td>0.149</td>
<td>5.505</td>
</tr>
<tr>
<td>2015</td>
<td>6</td>
<td>0.05 %</td>
<td>0.09 %</td>
<td>-5.77 %</td>
<td>4.94 %</td>
<td>1.83 %</td>
<td>-0.183</td>
<td>3.531</td>
</tr>
<tr>
<td>2016</td>
<td>19</td>
<td>-0.03 %</td>
<td>0.07 %</td>
<td>-8.92 %</td>
<td>8.84 %</td>
<td>2.36 %</td>
<td>-0.227</td>
<td>4.355</td>
</tr>
<tr>
<td>Sample</td>
<td>77</td>
<td>0.04 %</td>
<td>0.07 %</td>
<td>-8.92 %</td>
<td>8.84 %</td>
<td>1.88 %</td>
<td>-0.177</td>
<td>5.308</td>
</tr>
</tbody>
</table>

Table 9 Descriptive statistics of deleted sample

Below in Table 10 the descriptive statistics for the market index MCSI Europe are presented, broken down by the event period starting -190 days prior and ending -11 prior to the event. When looking at the data you can see that it is normally distributed with a small standard deviation.
### Table 10  Descriptive statistics of the market index

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean</th>
<th>Median</th>
<th>Mini</th>
<th>Max</th>
<th>Std. Deviation</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>-0.08%</td>
<td>0.10%</td>
<td>-3.84%</td>
<td>3.60%</td>
<td>1.12%</td>
<td>-0.573</td>
<td>4.834</td>
<td>0.101</td>
</tr>
<tr>
<td>2012</td>
<td>0.07%</td>
<td>0.06%</td>
<td>-3.25%</td>
<td>3.64%</td>
<td>1.16%</td>
<td>0.053</td>
<td>3.471</td>
<td>0.487</td>
</tr>
<tr>
<td>2013</td>
<td>0.05%</td>
<td>0.06%</td>
<td>-2.14%</td>
<td>2.27%</td>
<td>0.78%</td>
<td>0.018</td>
<td>3.801</td>
<td>0.124</td>
</tr>
<tr>
<td>2014</td>
<td>0.03%</td>
<td>0.04%</td>
<td>-2.40%</td>
<td>2.02%</td>
<td>0.74%</td>
<td>-0.280</td>
<td>3.438</td>
<td>0.179</td>
</tr>
<tr>
<td>2015</td>
<td>-0.03%</td>
<td>0.11%</td>
<td>-2.74%</td>
<td>2.89%</td>
<td>1.18%</td>
<td>-0.214</td>
<td>3.193</td>
<td>0.465</td>
</tr>
<tr>
<td>2016</td>
<td>-0.04%</td>
<td>0.05%</td>
<td>-3.96%</td>
<td>3.54%</td>
<td>1.41%</td>
<td>-0.177</td>
<td>3.316</td>
<td>0.474</td>
</tr>
<tr>
<td>Sample</td>
<td>0.00%</td>
<td>0.07%</td>
<td>-3.96%</td>
<td>3.64%</td>
<td>1.09%</td>
<td>-0.243</td>
<td>3.191</td>
<td>0.122</td>
</tr>
</tbody>
</table>

As previous studies have shown concern about a deletion from an index as a proper measure for decreased corporate sustainability, the ESG factor change is factored into the event study as a subsample. The ESG data is manually gathered for each company from the database Thomson Reuters Eikon. The value used is the ESG Combined Score, which is an overall score of a company based on the reported information in the environmental, social and corporate governance (economic) pillars with an ESG controversies overlay. This means that the ESG Combined value considers a company’s exposure to environmental, social and economic controversies and negative events reflected in global media. This value will give the most accurate estimate of a corporation’s sustainability valuation. Table 11 presents the change in each category.

<table>
<thead>
<tr>
<th>Added</th>
<th>Deleted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Δ</td>
<td>27</td>
<td>21</td>
</tr>
<tr>
<td>Negative Δ</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>No Δ</td>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

**Table 11  Change in ESG score**

### 7.3 The regression analysis

A regression analysis is conducted to get a more in-depth analysis of the investor sensitivity to corporate sustainability. All company specific data is gathered with a one-year lag, since this is the information available to the investors at the time of the event. The data is mainly collected from the data base FactSet, missing data has been manually added from the Thomson Reuters Eikon database.
7.3.1 Company specific variables

The variables chosen to portray the characteristics of the investigated companies are based on previous research and theory. The first explanatory variables regarding financial performance are in line with previous research (Waddock & Graves 1997; Ziegler & Schröder, 2010), whilst the industry specific dummies are in line with corporate sustainability theory. In addition, control variables are added which are common in analyses of the determinants of sustainable performance.

Financial performance. The main explanatory variable is corporate financial performance, which is indication of firm legitimacy. In line with Ziegler and Schröder (2010) two variables are used to define financial performance; return on assets (ROA*10) and Tobin’s Q. ROA is an accounting-based measure that measures the profitability of a corporation after tax and interest, defined as the ratio between operating income and total assets, where operating income is equal to the after-tax profit plus net financial expenses. Tobin’s Q is a market-based measure and is defined as the sum of market value and total debt divided by total assets. These measures may seem similar, but ROA is based on contemporaneous incomes, whereas Tobin’s Q is a forward-looking measure. According to previous findings and the slack resource theory, I expect positive parameter estimates for these corporate financial performance variables.

Country specific dummy. Two country specific dummies are included, one for France and one for Great Britain as these countries have shown to have different views about sustainability. The France dummy is added to the regression on added companies, since it is a dominating area, while the Great Britain dummy is added to the deleted sample for the same reason. I expect the dummy for France to be negatively related to the dependent variable in the added sample, and the dummy for Great Britain to be positively related to the dependent variable in the deleted sample.

Industry dummy. An industry dummy is added since investors in different industries have been shown to react differently to announcements of sustainability activities. The grouping in industries follows the GICS classification, which was found in the Thomson Reuters Eikon database. After that they were separated into dirty and clean, giving dirty a value of 1 and clean a value of 0. Based on theory, I expect to find a positive parameter estimate in the dirty industry addition sample.

Firm size. A control variable for firm size is added because size has been shown to influence information production of the firm. In other words, size is a proxy for the overall visibility and presence of the firm in the marketplace. Firms with larger market
capitalization are more likely to receive coverage from financial analysis (Doh et al., 2010). In an event study, there is concern about potential information leakage prior to the event announcement, which is more likely in visible firms. Also, Ziegler and Schröder (2010) argue that size is an indicator of the capacity of a firm to perform environmental and social activities, which lead to fixed costs that are less important for larger corporations. The size variable is calculated as the natural log of the market value of equity and is calculated at the end of the year prior to the addition or deletion, as it is the newest information available for the investors at the event time. Based on theory I expect, similarly to Doh et al. (2010) and Ziegler and Schröder (2010), positive parameter estimates for this variable.

**Sales/assets.** Another economic control variable is incorporated, as it is common in analyses of the determinants of sustainability and especially environmental performance. The ratio between sales and total assets is also considered in the study by Ziegler and Schröder (2010) who argue based on other previous studies that a low ratio between sales and total assets of corporations is an indicator of stronger dependence on capital markets as well as poorer financial health and of idle capacity. Also, due to companies’ higher vulnerability to investor sentiment, it can be hypothesized that these corporations increase their sustainability activities in order to appear less risky to investors and to improve their environmental and social image. Therefore, I expect negative parameter estimates for this variable in the econometric analyses.

**Debt/assets.** The last control variable, the ratio between total debt and total assets, is also commonly used in studies on sustainable performance. Waddock and Graves (1997) argue that this variable is as an indicator of the risk tolerance of the management, while Ziegler and Schröder (2010), argue that firms with low debt can have more flexibility to finance environmental and social activities. As a consequence, I expect negative parameter estimates for this variable.

It should be mentioned that I do not include an ESG rapport dummy, since all companies except for one published an ESG rapport the year prior to the inclusion or deletion. There is no reason to believe that there may be an imbalance in information available regarding the evaluation of added and deleted firms prior to the announcement of the additions and deletions. This means that all investors had sufficient sustainability information available to base their valuation before the news about increased and decreased corporate sustainability activities.
7.3.2 Descriptive statistics

Statistics for the company specific variables are summarized in Table 12 and Table 13 for additions and deletions respectively. As can be seen, the variables for financial performance and company size suffer from high kurtosis, and the Jarque-Bera test is significant on a 1 % level for all variables except Debt/Assets in the deleted sample, indicating non-normal distributions. In order to obtain a more symmetrical distribution of data, logarithmic transformation is performed for the variable Market Cap.

<table>
<thead>
<tr>
<th>No.</th>
<th>ROA</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Std. Dev</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>5.18</td>
<td>4.15</td>
<td>-5.62</td>
<td>41.29</td>
<td>6.33</td>
<td>-1.67</td>
<td>-1.67</td>
<td>-1.67</td>
<td>0.000***</td>
</tr>
<tr>
<td>76</td>
<td>1.00</td>
<td>0.66</td>
<td>0.02</td>
<td>8.99</td>
<td>1.34</td>
<td>3.34</td>
<td>18.58</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>0.81</td>
<td>0.62</td>
<td>0.03</td>
<td>2.45</td>
<td>0.62</td>
<td>3.94</td>
<td>21.99</td>
<td>0.006***</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>0.26</td>
<td>0.24</td>
<td>0</td>
<td>0.78</td>
<td>0.16</td>
<td>0.92</td>
<td>3.08</td>
<td>0.010***</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>20942.77</td>
<td>9940.05</td>
<td>60.92</td>
<td>218593.18</td>
<td>31897.50</td>
<td>0.81</td>
<td>3.78</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>-0.02%</td>
<td>-0.01%</td>
<td>-6.8%</td>
<td>7.58%</td>
<td>1.75%</td>
<td>-0.09</td>
<td>4.33</td>
<td>0.000***</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Sales/Assets</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Std. Dev</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>2.95</td>
<td>2.05</td>
<td>-15.1</td>
<td>31.62</td>
<td>5.55</td>
<td>-1.05</td>
<td>5.88</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>0.76</td>
<td>0.47</td>
<td>0.01</td>
<td>7.74</td>
<td>1.03</td>
<td>1.59</td>
<td>12.58</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>0.71</td>
<td>0.66</td>
<td>0.02</td>
<td>2.4</td>
<td>0.54</td>
<td>4.43</td>
<td>30.24</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>0.25</td>
<td>0.22</td>
<td>0.01</td>
<td>0.63</td>
<td>0.15</td>
<td>1.23</td>
<td>4.63</td>
<td>0.116</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>17313.64</td>
<td>10020.50</td>
<td>22.65</td>
<td>69571.26</td>
<td>16272.58</td>
<td>0.59</td>
<td>2.95</td>
<td>0.000***</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Debt/Assets</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Std. Dev</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>0.69</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>-0.83</td>
<td>1.36</td>
<td>4.31</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>53</td>
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<td>0</td>
<td>1</td>
<td>0.40</td>
<td>-1.35</td>
<td>0.69</td>
<td>0.000***</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Market Cap</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Std. Dev</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Jarque-Bera</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>2.95</td>
<td>2.05</td>
<td>-15.1</td>
<td>31.62</td>
<td>5.55</td>
<td>-1.05</td>
<td>5.88</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>0.76</td>
<td>0.47</td>
<td>0.01</td>
<td>7.74</td>
<td>1.03</td>
<td>1.59</td>
<td>12.58</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>0.71</td>
<td>0.66</td>
<td>0.02</td>
<td>2.4</td>
<td>0.54</td>
<td>4.43</td>
<td>30.24</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>0.25</td>
<td>0.22</td>
<td>0.01</td>
<td>0.63</td>
<td>0.15</td>
<td>1.23</td>
<td>4.63</td>
<td>0.116</td>
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</tr>
<tr>
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<td>22.65</td>
<td>69571.26</td>
<td>16272.58</td>
<td>0.59</td>
<td>2.95</td>
<td>0.000***</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.19</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.40</td>
<td>-1.35</td>
<td>0.69</td>
<td>0.000***</td>
<td></td>
</tr>
</tbody>
</table>

Table 12 Descriptive statistics added sample

Further model diagnostics are discussed in chapter 9.2.1. Model diagnostics.
8 METHODOLOGY

The empirical study consists of two parts; an event study and a regression analysis. In order to empirically test whether there is a relationship between corporate sustainability and change in share price, an event study is conducted. After this, factors related to the company characteristics are factored in by a OLS regression to get a deeper understanding of the possible change in market value due to sustainability activities in corporations.

The event study used in this paper is based on the one MacKinlay modelled in his paper in 1997. This method represents the dominant approach for measuring short-term valuation effects of additions and deletions from an index (Robinson, Kleifflner & Bertels 2011; Curran & Moran 2007; Oberndorfer et al. 2013; Roca 2013 etc.). The variables in the regression are influenced by theory and research done by Waddock and Graves (1997), Ziegler and Schröder (2010) and Doh et al. (2010).

8.1 Hypothesis reasoning

The hypotheses and reasoning behind them for the event study and regression study are presented in this part.

8.1.1 Event study hypothesis

The different theories give basis for two different hypotheses regarding the corporate share price reaction. Those arguing for a negative relationship between social performance and share price believe that firms that perform responsibly suffer a competitive disadvantage because they are adding costs to the company that might otherwise be avoided or that should be carried by others (e.g. individuals or the government), and therefore are punished on the share market. An example of this kind of action would be the decision to invest in pollution control equipment when other competitors do not (Waddock & Graves, 1997). According to this line of thinking, which is fundamental to Friedman’s (1970) arguments, there are few economic benefits to corporate sustainability actions while there are numerous costs. The costs, by this argument, reduce profits and thus shareholder wealth. When a company is no longer putting its resources on social work, they can concentrate on their fundamental operations and thus value maximization. This theory expects the relationship between corporate sustainability and market reaction to be negative, giving:

Hypothesis 1: There is an observable negative abnormal return on a company share when added to the DJSI index.
Hypothesis 1b: There is an observable positive abnormal return on a company share when deleted from the DJSI index.

The three other theories, however, suggest that there are potentially great benefits from acting sustainably, while the related costs are minimal. Firstly, according to the stakeholder theory, there exists a tension between the firm’s explicit costs and its implicit costs to other stakeholders, which can be reduced as a result of sustainable performance. This theory predicts that a firm that attempts to lower its implicit costs by being socially irresponsible will, as a result, suffer higher explicit costs, resulting in competitive disadvantage (Waddock & Graves, 1997). Secondly, according to the legitimacy theory, corporate sustainability aims to guarantee the company’s long-term survival, meaning long-term value creation to the investors. According to these arguments, there is a positive relationship between corporate sustainability and share price, giving:

Hypothesis 2a: There is an observable positive abnormal return on a company share when added to the DJSI index.

Hypothesis 2b: There is an observable negative abnormal return on a company share when deleted from the DJSI index.

8.1.2 Regression analysis hypotheses

In the regression analysis, the interest lies in finding what company specific characteristics may have a relation to the market reaction of disclosure of company sustainability performance. The main explanatory variables are financial performance, country of origin and industry. Also, some control variables are added to strengthen the regression. The hypotheses are formulated to the main explanatory variables.

According to the slack resource theory, companies that are in better financial health are more engaged in sustainability performance. Also, Ziegler and Schröder (2010) argue that firms with a better financial performance find it easier to pay attention to stakeholder groups and to obey moral standards, by investing more capital in corporate sustainability performance attributes. The authors found evidence to this by showing a positive reaction between financial performance and corporate sustainability. Hence, one could expect that investors react more positively to sustainability activities by corporations which financials are in good shape, and more skeptically if a company is in distress, giving the first hypothesis:

Hypothesis 3: The investor reaction to announcement of sustainability endorsement will be positively related to firm financial performance.
As there has been some differences in how investors in different European countries evaluate corporate sustainability efforts, it is interesting to see if a home-country bias can be detected in the two samples. The UK is known to be a leading investor in sustainability, why investors can be expected to react negatively to announcement of loss of endorsement. On contrary, French investors are known to have a negative attitude towards corporate sustainability activities. Hence the hypotheses are presented as follow:

**Hypothesis 4a:** The investor reaction to disclosure of sustainability performance in the added sample will be negatively moderated if the country of origin is France.

**Hypothesis 4b:** The investor reaction to disclosure of sustainability performance in the deleted sample will be positively moderated if the country of origin is the UK.

A final hypothesis is formulated to test whether there is a reaction when a company that is considered to be from a dirty industry is added or deleted from the index. Studies have shown that there is a positive reaction to be found when a company is added, while no noteworthy reaction when it is deleted. Hence the hypothesis is formulated as:

**Hypothesis 5:** The investor reaction to disclosure of sustainability performance will be positively moderated to dirty industry.

### 8.2 The event study

Event studies are used to measure the effect of a particular event (in this case publication of DJSI index components) on the stock value, by comparing expected and actual returns regarding the announcement of the event in question. The method is based on the assumption that the publication of the components of an index provides new information to the market- such as updated expectations of future company value - which is then reflected in stock prices. It is worth noting that the focus lies only on short-term market reactions, which do not necessarily correlate with long-term success.

The first step in conducting an event study is to specify the event, event windows and the estimation period (MacKinlay, 1997). In this thesis, I am going to study two different events; the announcement of (1) an inclusion to and (2) an exclusion from the Dow Jones Sustainability Europe Index. The inclusion into the index is going to represent an increase in corporate sustainability activities since the company has earned a place in the sustainability index. On the contrary, exclusion from the index signals that a company’s sustainability program has deteriorated so they no longer fulfil the criteria of the index.
Hence, this is going to be used as a signal of decrease in corporate sustainability activities.

Identifying the actual time when new information reaches the market for the first time is crucial for the validity of an event study. In this study, the event day is going to be the day DJSI announces the components of the DJSI Europe index with a press release, usually published during the first week of September each year. However, the inclusion and exclusion of the components will not take place before the third week of September. Contrary to previous studies, I am not going to use the date the company actually is included in the index, because studies have shown that inclusion to an index has an impact on the share price. Since I am interested in knowing the impact of the endorsement a company gets through this announcement, the use of the inclusion date can lead to falsely significant results.

When choosing the event window, it is important to isolate the event and the possible effect. The length of the event windows in previous studies have differed, but have usually been between -10 and +10 days around the event date. According to Oberndorfer et al. (2013) the strongest reaction to the price can usually be detected on the event date and the days following it. Since information moves quickly in today’s society, the market is likely to quickly absorb the news and the share price will fast return to normal. Due to a miss in estimation of the event date or information leakage, the reaction can be noticed already before the actual event. Since the event and an approximate date is known in advance- and since there might be some anticipation about the components of the index- it is motivated to search for the effect even before the announcement with a longer event window. Since the effective date of the announcement is close to the announcement day, the biggest window possible is [-10 to 5], which will then be narrowed down to see when or if there is a reaction to be found.

To estimate the expected return of the share, an estimation period has to be chosen. This estimation period is then going to be used when calculating the components for abnormal return (AR). MacKinley (1997) recommends a period of 120 days, whilst Oberndorfer et al. (2013) recommend an estimation window that starts 200 trading days before and ends 11 days prior to the event, and Curran and Moran (2007) used a window of 300 days. Since there are companies that have been added and deleted in consecutive years, the possible effect of this cannot interfere with the estimation period. That is why I have chosen to use an estimation period of approximately 8 months, giving a window of [-190 to -11].
8.2.1 Estimating abnormal return

By using financial return data, an event study can measure the impact of a specific event on the corporate value. This is possible when assuming that the market is rational and effective, because the impact of the event will almost immediately be reflected in the share price. The economic impact of an event is measured with abnormal returns which can be defined as the actual return during the event window minus the normal return. This can be presented as:

\[ AR_{i\tau} = R_{i\tau} - R_{n_{i\tau}} \]

Where \( AR_{i\tau} \) is the abnormal return, \( R_{i\tau} \) is the actual return and \( R_{n_{i\tau}} \) is the normal return for company \( i \) at time \( \tau \).

The normal return is the return one would expect to get if the event had not happened (MacKinley, 1997). The next step in setting up an event study is to choose the model for calculating the normal (or expected) return. There are different estimation methods and the most popular models are originally presented by Brown and Warner (1985), namely the constant mean return model, the market-adjusted model and the market model. The two first non-regression based models ignore risks when calculating normal returns. The third model, a regression based market model, takes into account both the systematic and the non-systematic risk when estimating the normal return.

In accordance with the recommendations by MacKinlay (1997), as well as the majority of previous studies, the market model is applied in this empirical study. The model takes into account the company’s correlation with the market, and is based on the assumption of a constant and linear relationship between individual stock returns and the market index. By including a company-specific beta the model increases the ability to detect what is explicitly caused by the publication of the index composition. MacKinley (1997) notes that the difference in results among the market model and more advanced models, such as Fama-French three-factor model are minor, hence making this a suitable method.

According to MacKinley (1997) the market model describes the abnormal return as:

\[ AR_{i\tau} = R_{i\tau} - (\hat{\alpha}_i + \hat{\beta}_i R_{m\tau}) + \epsilon_{i\tau} \]

\[ E(\epsilon_{i\tau}) = 0, \quad Var(\epsilon_{i\tau}) = \sigma_{\epsilon_i}^2 \]

Where \( R_{i\tau} \) and \( R_{m\tau} \) are returns during time \( \tau \) for share \( i = 1, 2, ... n \), respectively the market \( m \). The error term \( \epsilon_{i\tau} \) measures the estimation errors the model cannot explain,
and is assumed to be iid\(^2\), meaning that the error terms are not correlated. The market return is represented by the MCSI Europe index. The parameters \(\alpha_i\), \(\beta_i\) and \(\sigma_{\varepsilon_i}^2\) are estimated as follows:

\[
\hat{\alpha}_i = \mu_i - \hat{\beta}_i \hat{\mu}_m
\]

where,

\[
\hat{\mu}_i = \frac{1}{L_1} \sum_{\tau = T_0 + 1}^{T_1} R_{i\tau}
\]

and

\[
\hat{\mu}_m = \frac{1}{L_1} \sum_{\tau = T_0 + 1}^{T_1} R_{m\tau}
\]

\[
\hat{\beta}_i = \frac{\sum_{\tau = T_0 + 1}^{T_1} (R_{i\tau} - \hat{\mu}_i) (R_{m\tau} - \hat{\mu}_m)}{\sum_{\tau = T_0 + 1}^{T_1} (R_{m\tau} - \hat{\mu}_m)^2}
\]

\[
\hat{\sigma}_{\varepsilon_i}^2 = \frac{1}{L_1 - 2} \sum_{\tau = T_0 + 1}^{T_1} (R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau})^2
\]

Returns will be indexed in event time using \(\tau\), defining \(\tau = 0\) as the event date, while \(\tau = T_1 + 1\) to \(\tau = T_2\) represents the event window, and \(\tau = T_0 + 1\) to \(T_1\) represents the estimation period. This gives \(L_1 = T_1 - T_0\) as the length of the estimation period and \(L_2 = T_2 - T_1\) as the length of the event window. The timeline of the event study can be visualized in Figure 5.

---

\(^2\) independent and identically distributed
The abnormal return must then be aggregated to allow the overall effect of the event to be statistically interpreted. This aggregation is made in two dimensions; over time and across securities. First, the observations are aggregated over time throughout the event window to get the full effect of the event on that asset. To do so, the cumulative abnormal return (CAR) is calculated with the following formula:

\[ CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \]

The \( CAR_i(\tau_1, \tau_2) \) is the sum of the included abnormal returns, where \( \tau_1 \) and \( \tau_2 \) are the beginning and end of the event window with the following characteristics \( T_1 < \tau_1 < \tau_2 < T_2 \). In order to aggregate the effects of the event, it is assumed that the event windows do not overlap. Since the tested sample has clustering and thus does not meet the requirements for independent event windows, the significance test must take this into consideration.

After that, the assets are aggregated across securities to get the effect on the sample. The average cumulative abnormal return (\( \overline{CAR} \)) measures the abnormal response on average throughout assets and event windows and is calculated as follows:

\[ \overline{CAR}(\tau_1, \tau_2) = \frac{1}{N} \sum_{i=1}^{N} CAR_i(\tau_1, \tau_2) \]

Where \( CAR_i(\tau_1, \tau_2) \) is the cumulative abnormal return for share \( i \) and \( N \) is the number of observations.

### 8.2.2 Significance tests

The significance of the stock price reaction is tested by using two separate methods. First, a parametric approach is used to test if mean abnormal returns are significantly different from 0 using a standard t-test in accordance with previous studies (Curran & Moran 2007; Consolandi et al. 2009; Doh et al. 2010; Robinson et al. 2011, etc.). Since t-tests assume that the sample is normally distributed, an additional nonparametric statistic test is used to improve the validity and credibility of the study in a similar manner to Doh et al. (2010) and Consolandi et al. (2009). I use a Wilcoxon signed rank test as it can be regarded as an extension of the t-test, since it considers both the sign and the magnitude of abnormal returns. This test assumes that none of the absolute values are equal and are non-zero. Doh et al. (2010) states that previous studies find this approach the most appropriate for event studies.
As there are differing views about the sign of the relationship between corporate sustainability activities and price reaction, the significance tests are going to be two sided, giving the following hypotheses:

**T-test:**

\[ H_1: \overline{CAR} = 0 \]
\[ H_2: \overline{CAR} \neq 0 \]

**Wilcoxon signed rank test:**

\[ H_1: \overline{CAR} = 0 \]
\[ H_2: \overline{CAR} \neq 0 \]

Some studies argue that a standard t-test is not the optimal way to define significance in a study where all events for each year happen on the same date (Cheung, 2011; Cheung & Roca, 2013). Event studies that use the same date for several different companies suffer from clustering, meaning cross-sectional correlation of the abnormal return. Because of this, test statistics cannot assume that abnormal returns are independent. Kolari and Pynnönen (2010) show that even if cross-sectional correlation is relatively low, clustering causes the null-hypothesis (no abnormal return) to be rejected too often when it is true. They suggest that one uses more advanced t-tests such as the BMP-test or adjusted BMP-test. However, since the t-test is strengthened with a sign rank test, the significance tests chosen for this thesis are considered to be reliable enough.

### 8.3 The regression model

By using an event study, it is possible to detect the direction and size of the reaction on the share market, but not much more than that. By combining the abnormal returns with company-specific characteristics, it may be possible to distinguish in more depth what causes the heterogeneity of the reactions.

In this study, the factors that influence abnormal returns are examined using OLS regression analysis. Cumulative abnormal returns are used as dependent variables in all regressions, and each regression model is tested for different statistically significant event windows.

A set of explanatory and control variables are chosen based on previous research and the following original model is specified:
\[ CAR_i = \alpha + \beta_1 ROA_i + \beta_2 Tobin's_{q_i} + \beta_3 Log\_Market\_cap_i + \beta_4 Sales/Asset_i + \beta_5 Debt/Assets_i + \beta_6 Dirty\_industry_i + \beta_7 Country_i + \epsilon_i \]

Where,

\( CAR_i \) = The proper event window of estimated abnormal return for companies in the event study.

\( \alpha \) = intercept.

\( ROA_i \) = Company specific return on asset the fiscal year prior to the event.

\( Tobin's_{q_i} \) = Company specific Tobin’s Q value the fiscal year prior to the event.

\( Log\_Market\_cap_i \) = Logarithm of company size the fiscal year prior to the event.

\( Sales/Asset_i \) = Ratio between company sales and assets the fiscal year prior to the event.

\( Debt/Assets_i \) = Ratio between company debt and assets the fiscal year prior to the event.

\( Dirty\_industry_i \) = Industry dummy giving value 1= dirty industries and 0= clean industries.

\( Country_i \) = Country dummy giving value 1=France and 0=Other in added sample, and 1=the UK and 0=Other in deleted sample.

\( \epsilon_i \) = Error term.
9 RESULTS

In this chapter, the results of the empirical study are presented. The chapter begins with a presentation of the event study outcome and then the results from the regression models are presented. A deeper discussion about finding possible links and contradictions between the results obtained and existing theories and previous research are presented in the next chapter. The significance of the results is presented in the following manner: *** 1 % significance, ** 5 % significance and * 10 % significance. A significance level under 5 % is said to be highly statistically significant, while a level above five indicates weak evidence against the null hypothesis (Brooks 2008, p. 110).

9.1 Event study results

The aim of the event study is to find whether there is an observable significant market reaction to news about endorsement or loss of endorsement measured by inclusions to and exclusions from the DJSI Europe sustainability index. The study was executed in the statistical program R. There was no market reaction to be found before day five prior to the event, hence the result is presented from that day forward. Table 14 presents the daily abnormal returns around the event day, rounded to two decimals.

The overall result shows that the stock market experienced a negative market reaction in conjunction with addition to and deletion from the DJSI Europe index. The observed abnormal returns are statistically significant primarily a few days before, and a few days after the event. Interestingly there was not a significant reaction on the event date for the added sample. The results do indicate some information leakage during the days prior to the announcement of the index components, since significant negative reaction can be found already from day 2 prior to the event. Furthermore, the results indicate that the companies' market value tends to adapt to the new information in just a few days.

<table>
<thead>
<tr>
<th>Day</th>
<th>Additions</th>
<th>Deletions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily $\bar{AR}$</td>
<td>Std.Dev.</td>
</tr>
<tr>
<td>-5</td>
<td>1.14 %</td>
<td>2.5 %</td>
</tr>
<tr>
<td>-4</td>
<td>0.33 %</td>
<td>1.1 %</td>
</tr>
<tr>
<td>-3</td>
<td>-0.09 %</td>
<td>2.06 %</td>
</tr>
<tr>
<td>-2</td>
<td>-0.9 %</td>
<td>1.82 %</td>
</tr>
<tr>
<td>-1</td>
<td>0.79 %</td>
<td>2.06 %</td>
</tr>
<tr>
<td>0</td>
<td>-0.21 %</td>
<td>1.41 %</td>
</tr>
<tr>
<td>1</td>
<td>-0.64 %</td>
<td>2.35 %</td>
</tr>
<tr>
<td>2</td>
<td>-0.7 %</td>
<td>2.49 %</td>
</tr>
<tr>
<td>3</td>
<td>0.49 %</td>
<td>2.12 %</td>
</tr>
<tr>
<td>4</td>
<td>0.06 %</td>
<td>2.2 %</td>
</tr>
<tr>
<td>5</td>
<td>0.94 %</td>
<td>1.79 %</td>
</tr>
</tbody>
</table>

Table 14 Daily abnormal returns
By placing the abnormal returns from the previous table into a graph, you get a quick overview of the impact of the event on the company shares. Figure 6 shows the daily $\bar{AR}$ values visualized, and it is interesting to see that there has been a rise in the market value for both added and deleted samples one day prior to the event followed by an immediate dip on the event date.

Figure 6  Average abnormal returns visualized

Table 15 below presents the results for the events with various event windows chosen in accordance with previous studies. The aim of the windows is to capture both a possible pre-reaction and a drift. When looking at the event windows, you can see that there are more significant results to be obtained from the deleted sample, which is in accordance with many of the previous studies.

<table>
<thead>
<tr>
<th>Event window</th>
<th>Additions</th>
<th>Deletions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$[-5, 5]$</td>
<td>$1.19%$</td>
<td>$0.030^{**}$</td>
</tr>
<tr>
<td>$[-1, 2]$</td>
<td>$0.19%$</td>
<td>$0.097^{*}$</td>
</tr>
<tr>
<td>$[-3, 3]$</td>
<td>$-0.12%$</td>
<td>$0.051^{*}$</td>
</tr>
<tr>
<td>$[-5, 0]$</td>
<td>$1.05%$</td>
<td>$0.032^{**}$</td>
</tr>
<tr>
<td>$[-4, 0]$</td>
<td>$0.90%$</td>
<td>$0.814$</td>
</tr>
<tr>
<td>$[-3, 0]$</td>
<td>$-0.42%$</td>
<td>$0.277$</td>
</tr>
<tr>
<td>$[1, 3]$</td>
<td>$-0.85%$</td>
<td>$0.044^{**}$</td>
</tr>
<tr>
<td>$[1, 4]$</td>
<td>$-0.79%$</td>
<td>$0.047^{**}$</td>
</tr>
<tr>
<td>$[1, 5]$</td>
<td>$0.15%$</td>
<td>$0.659$</td>
</tr>
</tbody>
</table>

Table 15  Cumulative abnormal returns for different event windows
When looking at the results in Table 15, negative result significant on a 1 % level can be found in the deleted sample for windows [-1, 2] and [-3, 3], which shows that the market has had a negative reaction to the news of exclusion from a sustainability index. The added sample shows a similar reaction in those event windows, but the result is significant only on a 10 % level. As can be seen from event window [-3, 0] there was a significant (1 %) pre-reaction among the deleted sample, however, a similar significant pre-reaction could not be found in the added sample. On contrary, the negative reaction on the added sample had a longer drift, which can be seen in windows [1, 3] and [1, 4], while the shares in the deleted sample seed to incorporate the information faster, since the reaction was no longer significant after window [1, 3].

As can be seen from the presented results, some reaction to the event has occurred already a few days prior to the event. However, previous studies have shown that the full reaction to the announcement occurs within the first two trading days after the event. Starting the event window two days prior to the event might give a false result, since it will risk that the market reacted to some other information. Based on this motivation, I have chosen to further analyze a short event window of only four days around the event [-1, 2]; the day prior to the event to capture any information leakage on the day prior to the announcement, the announcement day and 2 days following the announcement to ensure that any price change is not temporary and driven by supply/demand adjustments following the announcement. The result for this window is bolded in Table 15. This event window is also used as the dependent variable in the regression analysis.

To further analyze the data, two subsamples were created. The added and deleted companies where divided into samples according to (1) change in ESG score the year prior to the event and (2) event year. The separation according to change in ESG score is performed since previous studies have been worried that a deletion from a social index does not necessarily indicate weakened corporate sustainability. Hence, the company data is divided into two categories; (a) no or positive change in corporate ESG score, and (b) negative change in corporate ESG score. The interest in the test lies mainly on the deleted sample.

The interest in the second sample, division according to year, lays in finding a possible similar trend as is found in the European during the years 2009-2013, as that time was characterized with a big rise in the sustainability investments. The data is separated into to samples; (a) years 2011-2013 and (b) years 2014-2016. The result is presented in Table 16.
The result for subsample one, the division according to change in ESG score, only shows a significant result for the deletes sample when there has been no or a positive change in corporate ESG score the year prior to the event. The result shows a cumulative average drop of 1.56 %, and is significant on a 1 % level. In the sample for year division, there was significant result for both added and deleted sample during the time period 2014-2016.

### 9.2 Result of regression analysis

The first part of this empirical study examined the stock market reaction regarding news about inclusions and exclusions to the DJSI Europe index. In the second part, the focus is on the heterogeneity in the reactions and more specifically the company specific aspects that lay behind the abnormal returns. This is done with an OLS regression in EViews, and the dependent variable is the estimated cumulative abnormal returns from the event window [-1, 2]. The independent variables in the regressions are company-specific characteristics chosen based on theory and previous research. The regressions where done with robust standard errors, meaning that they were corrected for heteroscedasticity and autocorrelation when needed.

Based on previous studies, seven regression models where formulated for both the addition sample and the deletion sample, so all included 14 regressions are performed. Regression 1-7 have the CAR [-1, 2] from the added sample as dependent variable, while Regression 8-14 have the CAR [-1, 2] from the deleted sample as dependent variable. Regression (1) and Regression (8) includes all explanatory and control variables. Regression (2) and Regression (9) includes all variables except for Tobin’s Q, while Regressions (3) and Regressions (10) includes all variables except ROA due to worry about multicollinearity between the financial performance variables.
Regression (4) and Regression (11) are in accordance with the study done by Doh et al. (2010), and includes the variables sales/assets, the size variable and the dummy variables. Regression (5) and Regression (12) on the other hand are in accordance with the study performed by Ziegler & Schröder (2010), and includes the financial performance variables, sales/assets, debt/assets and the company size variable. Due to worry about multicollinearity between the financial performance variables, the regressions inspired by Ziegler & Schröder (2010) are also performed with those variables separately, giving Regression (6) and Regression (13) including ROA and Regression (7) and Regression (14) including Tobin’s Q. The results can be seen in Table 17 and Table 18.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.002</td>
<td>-0.007</td>
<td>-0.012</td>
<td>-0.009</td>
<td>-0.002</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.958)</td>
<td>(0.864)</td>
<td>(0.772)</td>
<td>(0.817)</td>
<td>(0.968)</td>
<td>(0.975)</td>
<td>(0.862)</td>
</tr>
<tr>
<td>ROA*10</td>
<td>0.001**</td>
<td>0.218*</td>
<td>0.001**</td>
<td>0.255**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.093)</td>
<td>(0.014)</td>
<td>(0.045)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobin’s Q</td>
<td>0.013*</td>
<td></td>
<td>0.012</td>
<td>0.186</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.083)</td>
<td></td>
<td>(0.110)</td>
<td>(0.148)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales/Assets</td>
<td>0.001</td>
<td>0.022</td>
<td>0.042</td>
<td>0.003</td>
<td>0.006</td>
<td>0.104</td>
<td>0.128</td>
</tr>
<tr>
<td></td>
<td>(0.825)</td>
<td>(0.874)</td>
<td>(0.766)</td>
<td>(0.727)</td>
<td>(0.393)</td>
<td>(0.425)</td>
<td>(0.329)</td>
</tr>
<tr>
<td>Debt/Assets</td>
<td>0.018</td>
<td>0.109</td>
<td>0.104</td>
<td>0.039</td>
<td>0.189</td>
<td>0.192</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.493)</td>
<td>(0.409)</td>
<td>(0.443)</td>
<td>(0.193)</td>
<td>(0.132)</td>
<td>(0.137)</td>
<td></td>
</tr>
<tr>
<td>Log Market Cap</td>
<td>-0.005</td>
<td>-0.064</td>
<td>-0.040</td>
<td>-0.001</td>
<td>-0.008</td>
<td>-0.105</td>
<td>-0.082</td>
</tr>
<tr>
<td></td>
<td>(0.626)</td>
<td>(0.600)</td>
<td>(0.745)</td>
<td>(0.935)</td>
<td>(0.399)</td>
<td>(0.387)</td>
<td>(0.503)</td>
</tr>
<tr>
<td>Dirty industry</td>
<td>0.009</td>
<td>0.107</td>
<td>0.107</td>
<td>0.010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.575)</td>
<td>(0.392)</td>
<td>(0.398)</td>
<td>(0.411)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>-0.019</td>
<td>-0.189</td>
<td>-0.203</td>
<td>-0.024**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.139)</td>
<td>(0.130)</td>
<td>(0.109)</td>
<td>(0.031)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no. observations</td>
<td>76</td>
<td>76</td>
<td>76</td>
<td>76</td>
<td>76</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>F-value</td>
<td>1.703</td>
<td>1.719</td>
<td>1.411</td>
<td>1.759</td>
<td>1.712</td>
<td>1.788</td>
<td>1.257</td>
</tr>
<tr>
<td>R2</td>
<td>0.149</td>
<td>0.130</td>
<td>0.109</td>
<td>0.090</td>
<td>0.109</td>
<td>0.092</td>
<td>0.066</td>
</tr>
</tbody>
</table>

Table 17 Regression with dependent variable CAR [-1, 2] from added sample

As can be seen from table 17, the financial performance has a positive relation to investor reaction on the information published by RobecoSAM. The variable ROA has a significant positive relation in all regressions it is included in, while Tobin’s Q shows a significant reaction in Regression 1. Also, the dummy variable for France has a significant (5 %) negative relation to the dependent variable in Regression 4. There are no significant results for any of the control variables.
Table 18  Regression with dependent variable CAR [-1, 2] from deleted sample

The results presented in table 18 show no significant results for any of the main explanatory variables. However, the control variable sales/assets has a significant positive relation to investor reaction on the information published by DJSI in all regressions.

9.2.1 Model diagnostics

Linear regression models are based on Gauss-Markov’s assumptions, which should be met in order for the models to be considered justifiable. In particular, it is important that potential problems are taken into account, as well as remedied if necessary to minimize unwanted side effects. The following analysis looks for answers to the following questions:

1. Are the explanatory variables linearly independent?
2. Are the residuals following a normal distribution?
3. Is the variance of the error terms constant throughout the population?

9.2.1.1 Multicollinearity

Multicollinearity occurs when two or more explanatory variables have a high correlation. The impact of multicollinearity is that the standard errors tend to grow, and small changes in the actual data can have a big effect on estimated coefficients. Causes of multicollinearity can vary from sampling over a limited range of potential values for the regressors to a model with more explanatory variables than observations. Perhaps the
The most vital reason for multicollinearity is so-called dummy variable-trap, which means perfect collinearity to too many dummy variables. (Brooks 2008, p. 171-173)

In order to test for multicollinearity, a two-part test is performed. First, pairs of correlation coefficients are calculated between all variables which significance is tested with a Pearson correlation test. The results are presented in Table 19 and Table 20 for added and deleted regressions respectively. As is the case with many statistics, there is no definitive agreed upon value when interpreting correlation what is equal to multicollinearity and what is not, popular are 0.8 or 0.9 (Djurfeldt, Larsson & Stjärnhagen 2006, p. 389). As can be seen from Table 19 and Table 20, only the correlation between ROA and Tobin’s Q wake concern.

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>Tobin’s Q</th>
<th>Sales/ Assets</th>
<th>Debt/ Assets</th>
<th>Log Market Cap</th>
<th>Dirty industry</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobin’s Q</td>
<td>0.943</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales/Assets</td>
<td>0.283</td>
<td>0.284</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt/Assets</td>
<td>-0.263</td>
<td>-0.319</td>
<td>-0.37</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Market Cap</td>
<td>0.233</td>
<td>0.216</td>
<td>-0.163</td>
<td>-0.07</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dirty industry</td>
<td>-0.024</td>
<td>-0.057</td>
<td>0.354</td>
<td>0.014</td>
<td>-0.227</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>-0.173</td>
<td>-0.169</td>
<td>-0.166</td>
<td>-0.218</td>
<td>0.141</td>
<td>-0.092</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 19  Multicollinearity table, added sample

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>Tobin’s Q</th>
<th>Sales/ Assets</th>
<th>Debt/ Assets</th>
<th>Log Market Cap</th>
<th>Dirty industry</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobin’s Q</td>
<td>0.732</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales/Assets</td>
<td>0.179</td>
<td>0.305</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt/Assets</td>
<td>-0.242</td>
<td>-0.203</td>
<td>-0.231</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Market Cap</td>
<td>0.179</td>
<td>-0.103</td>
<td>-0.151</td>
<td>-0.018</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dirty industry</td>
<td>0.008</td>
<td>-0.101</td>
<td>0.355</td>
<td>0.231</td>
<td>0.014</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>The UK</td>
<td>0.001</td>
<td>0.032</td>
<td>-0.01</td>
<td>-0.059</td>
<td>-0.292</td>
<td>-0.023</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 20  Multicollinearity table, deleted sample

As a further test to identify multicollinearity, a VIF test is performed. Just like there is no agreed upon cutoff for correlation values, there is no one agreed set of cut of values for VIF, but it is usually 2.5 (Djurfeldt, Larsson & Stjärnhagen 2006, p. 389). After performing the test for the added sample, the VIF values for ROA and Tobin’s Q where

---

3 Variance Inflation Factor
9.334 and 9.597 respectively, meaning there was high risk for multicollinearity. After testing for the variables in different regressions, the VIF values extend from 1.55-1.18 in the regression with ROA and 1.54-1.16 with Tobin’s Q. Hence, performing regressions (2) and (3) that took multicollinearity into account was motivated in the added sample.

However, when testing for multicollinearity for the deleted sample, the VIF values extend from 1.11-2.79, meaning no multicollinearity is detected, thus no distinction between variables would have been necessary.

9.2.1.2 Normality

An additional Gauss-Markov assumption is that the residuals are normalized, meaning $e_i \sim N(0, \sigma^2)$. If the distribution of the original data does not follow a normal distribution, it is very likely that even the residues show the same characteristics. A general practice for correcting the skew in size variables is taking the logarithm. In practice, non-normality in residues implies that the model’s significance varies over the scale of the dependent variable. This can distort results, especially in the case of small samples. (Brooks 2008, p. 161-4)

The residuals are reviewed for normality by using Shapiro-Wilk test. The hypotheses states:

$H_0$: Normality in the residuals

$H_1$: Non-normality in the residuals

The result is presented in Table 21, two asterisks indicate significance of 5 % and three 1 %. The result show that the zero hypothesis is rejected for all models. In other words, the residuals are not normally distributed.

<table>
<thead>
<tr>
<th>Added sample</th>
<th>Shapiro-Wilk</th>
<th>Deleted sample</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression (1)</td>
<td>0.002***</td>
<td>Regression (8)</td>
<td>0.027**</td>
</tr>
<tr>
<td>Regression (2)</td>
<td>0.001***</td>
<td>Regression (9)</td>
<td>0.026**</td>
</tr>
<tr>
<td>Regression (3)</td>
<td>0.001***</td>
<td>Regression (10)</td>
<td>0.023**</td>
</tr>
<tr>
<td>Regression (4)</td>
<td>0.000***</td>
<td>Regression (11)</td>
<td>0.021**</td>
</tr>
<tr>
<td>Regression (5)</td>
<td>0.000***</td>
<td>Regression (12)</td>
<td>0.025**</td>
</tr>
<tr>
<td>Regression (6)</td>
<td>0.000***</td>
<td>Regression (13)</td>
<td>0.012**</td>
</tr>
<tr>
<td>Regression (7)</td>
<td>0.001***</td>
<td>Regression (14)</td>
<td>0.013**</td>
</tr>
</tbody>
</table>

Table 21: Result from Shapiro-Wilk normality test
The relatively large sample size should weaken the negative effects of non-normality, but the knowledge of non-normal residuals is good to keep in mind when interpreting the results.

9.2.1.3 Heteroscedasticity and Autocorrelation

According to one of the central assumptions on which the linear regression model is based on, the variance of the error terms should be constant, i.e. homoscedastic. If the assumptions for homoscedasticity is not met, the data is said to be heteroscedastic. Heteroscedasticity is a general phenomenon in economics and means that the error term’s variance is not kept constant in the population. This may be due to the choice of variables or use of a model that is incorrectly applied. Heteroscedasticity does not directly affect the coefficients of the regression, but can distort the standard errors of the variables and thus lead to flawed conclusions. (Brooks 2008 p. 132-53)

Linear regression analysis also requires that there is little or no autocorrelation in the data. Autocorrelation occurs when the residuals are not independent from each other. This problem typically occurs in stock prices, where the price is not independent from the previous price. (Brooks 2008 p. 139-45)

All regressions were corrected for heteroscedasticity and autocorrelation by using robust standard errors.
10 RESULT DISCUSSION

In this chapter, the results will be discussed more thoroughly. The results will be linked to the theory presented in the paper and discussed in relation to findings in previous research. In addition, criticism of the study will be discussed and a number of proposals for further research will be presented.

10.1 Result discussion regarding market reaction and endorsement announcement

The results of the event studies conducted on both data samples show a fairly steady negative trend on the market for both additions and deletions around the announcement day [-1, 2]. The results for the added sample is in line with what Obendorfer et al. (2011) found on the European market, while the negative reaction in the deleted sample is in line with what Curran and Moran (2007) found in the UK and Consolandi et al. (2009) found on the European market. The significant negative reactions that is found is short term, which is in accordance with the mentioned previous studies as well as the market hypothesis, meaning that the new information the DJSI announcement brought to the market was quickly absorbed in to the share price.

The result of the added sample suggests that there is a weakly significant (10 % level) negative link between sustainability and the share price, so Hypothesis 1a holds. This supports the traditional view of a company's tasks, i.e. value maximization theory, which believes that social responsibility is a burden to the company because resources that could be used for other value-adding activities now go to sustainability activities instead. However, as there is not a positive reaction to be seen in the deleted sample, meaning Hypothesis 1b do not hold, this conclusion cannot be made.

There are several plausible explanations for this finding. Firstly, the management might simply have chosen to invest in sustainability because of their own interest, although it is not in the best interest of the company, hence its shareholders, which has then lead to an observable negative reaction on the market. Cordeiro and Tewari (2015) point out that this kind of action can be classified as agent costs that are directly harmful to shareholders who do not share the management’s interests. Therefore, it is shown in the market valuation of the company after the announcement.

Another reason behind the negative reaction may be that increased sustainability leads to large direct-, indirect- and alternative costs that the investors factor into the company value after this type of an announcement. Even if the theory suggests that expensive investments in sustainability could pay off in the long run as corporate sustainability
might lead to early mover benefits, capital from specialized markets, as well as better reputation and relationships with the stakeholders (Cornell & Shapiro 1987; Waddock & Graves 1997; Epstein & Schneitz 2002), the associated costs on a short run may still have been considered dominating. One can expect that the benefits that arise from being sustainable do not arise immediately when investments are made, as sustainable efforts do not immediately begin to yield returns and reduce costs. Walley and Whitehead (1994) pointed out that sustainability investments usually require a large initial investment, which has a very low repayment capacity, meaning that it may take several years before the benefits outweigh the costs. This may result in a positive effect of corporate sustainability becoming apparent in the future, but is not seen in this study since it only studies a short-term reaction.

What may also be a reason behind the negative results is that the trend of sustainability seen on the European market leads to the belief that the real demand for corporate sustainability on the financial markets is greater than it really is. As Luchs et al. (2010) claims, stakeholders may consider themselves greener than is seen in real actions. This can lead to that the investments made to increase sustainability performance may not pay off because it ultimately does not lead to increased value through better sales or more equity investments. Although the trend of sustainability makes it easy for us to believe that corporate sustainability activities is the right thing and desirable in our society, it does not necessarily lead to increased financial performance and thus increased value as legitimacy theory predicts. To conclude this reasoning, a study on long term value has to be made.

One last aspect that should not be forgotten is that the majority of the added sample consisted of French companies. As Cormier and Magnan (2007) found, French retail investors are known to be more skeptical towards corporate sustainability actions, and hence it can be speculated that this majority might lie behind the negative reaction. Cheung and Roca (2013) found a negative reaction in both additions and deletions on the Asian Pacific market, and concluded that one reason for the negative reaction in the addition sample is that the number of corporate sustainable stocks from those “moralistic” countries is small. Also, as can be seen in Regression (4), the dummy variable for France had a significant negative relation to market reaction, which strengthens this argument.

The sample for deleted companies shows a highly statistically significant (1 % level) negative reaction on the market, which is in line with Hypothesis 2b. This supports the
view that investors do understand the long-term value of corporate sustainability actions, and punishes companies that don’t act according to the stakeholder interest. Hence, the result gives evidence towards stakeholder theory and legitimacy theory. However, as Hypothesis 2a did not hold, this conclusion cannot be made.

If the fact that the negative reaction on the added sample is only significant on a 10% level, while the deleted sample is significant on a 1% level is taken into account, as well as the fact that these event study results should be discussed separately since they consist of different company compositions and hence possibly different investor groups, it can be argued that the market does, in fact, value corporate sustainability activities.

In this notion, the result might be interpreted as that investors are concerned about the sustainability performance of firms they invest in. A deletion from the index has signaled the market that the management is no longer able to mediate between the interests of different stakeholders in a long-term perspective as the stakeholder theory calls for. Also, it signals that the management no longer succeeds in managing the new difficulties the changing environment is bringing and hence do not manage the company in the most effective way. These facts, and the loss of reputation as a sustainable company might have led to the significant negative result.

As the stakeholder theory, legitimacy theory and resource-based view argues, corporate sustainability is either a way to get better financial performance or is an activity that is implemented when there is extra resources due to better financial performance. Either or, the reason to implement corporate sustainability is to guarantee a corporation’s long-term survival and generate long-term value. Sustainability is expected to lead to better reputation, greater cash flows to the company, more effective processes and long-term value creation. Waddock and Graves (1997) argue that when a company no longer acts in a sustainable way, shareholders risk to lose considerable future value, and hence use their demonstrative power which is showed with a negative market reaction to the announcement of decreased sustainability.

Since Consolandi et al. (2009) were worried that the best-in-class approach adopted by RobecoSAM could lead to a deletion of the company even if it has improved its ESG score, a subsample was created to test this scenario. On contrary to what Consolandi et al. (2009) found, there was no significant reaction in the deleted sample in the group where the ESG score had actually decreased. As Doh et al. (2010) suggests, this might be explained by the fact that the information of the sustainability status was already incorporated in the share price, and the loss off endorsement did not bring any new
information as it was already anticipated. However, a strongly significant negative result was found in the deleted sample for companies whose ESG had stayed the same or increased the previous year. This finding shows evidence towards the Consolandi et al. (2009) fear, since the companies where deleted without any apparent reason other than that it was outperformed by another company. Another plausible explanation for this finding is an information asymmetry argument. Doh et al. (2010) argues that a company is often reluctant to give out negative information about their social performance in advance, resulting in a surprised market that quickly adjusts to the new information. Meaning that the companies’ sustainability performance might, in fact, have decreased since the ESG valuation the year before, but did not make a fuss of it in fear of losing reputation, moral capital and market value.

As the interest in SRI investments on the European market had a big upward shift during the years 2009 to 2013, it was interesting to see if this trend was behind the significant results. On the contrary to expectations, there was no significant reaction in the subsample for the time period 2011 to 2013. However, strongly significant negative reactions were found in the added and deleted subsamples for the time period 2014 to 2016. This finding gives evidence to the argumentation by Oberndorfer et al. (2013), stating that as an index becomes better known and acquires a reputation of subject knowledge, a larger reaction among investors can be noted. As the DJSI Europe index was only launched in 2010, it might not have gotten the needed reputation to be considered as reliable information source the first years, even if it belonged to a well-known index family.

The results in the regression analysis was insignificant for the most part. However, there could be found a significant positive relation between added companies and the main explanatory variable financial performance which is in line with the findings by previous studies (Waddock and Graves (1997); Ziegler and Schröder (2010). The variable ROA was significant in all regressions, while the variable Tobin’s Q was significant in Regression (1). These findings give support to Hypothesis 3, suggesting a positive relationship between a company’s financial performance and investor sensitivity to sustainability. Since the financial performance values used in the regressions have a one-year lag, the relation between investors and financial performance can be interpreted as that investors react more positively to corporate sustainability activities of companies with better financial performance. Hence, this study suggests some evidence for the resource-based theory, and indicates that investors have a positive attitude towards
investments in corporate sustainability activities when a corporation has better financial performance and hence possibly slack financial or other resources.

As mentioned, there is a significant negative relationship in the added sample between investor reaction and home-country France, which is in line with Hypothesis 4a. However, no significant result was found in the negative sample for the UK. Furthermore, there was no significant result to be found for the industry aspect. This might be due to the fact that RobecoSAM uses a best-in-class approach, which means that the sustainability stock indices measure consists of the most sustainable corporations of each sector, hence the industry factor does not matter in this type of study as Ziegler and Schröder (2010) argue. Interestingly, there was a significant positive relation between investor reaction and the control variable sales/assets, which is against the findings by Ziegler and Schröder (2010), and Waddock and Graves (1997), and therefore the expected relationship of the parameter. Furthermore, even if not significant, the constant in each regression was negative when controlled against these variables, initiating a negative intercept for the regressions.

10.2 Criticism to the study and proposal for further research

Although the study has been conducted in such a way that has been considered the most optimal based on the thesis’s purpose, there are still some shortcomings in the study that must be highlighted. What has to be emphasized is that this study only examines short term market value change, meaning that all discussion of investor sensitivity to sustainability is restricted to the immediate reaction to the announcement. A deeper understanding on the relationship between investor sentiment and corporate sustainability is achieved with an additional long term value study. As the value of sustainability comes on a long run, investor sentiment might change once the possible benefits of corporate sustainability kicks in. Adding a long-term value study would give depth to the discussion and give a more detailed picture of the market’s interests.

The first criticism that can be directed towards this study is the measure of corporate sustainability. As discussed in the theory chapter, the sustainability index ability to correctly represent corporate sustainability, especially decreased sustainability, has been criticized. As the result show in this study, there is a risk that companies are deleted from the index even though their ESG value has risen. Still, a deletion from the index was considered as decreased corporate sustainability. Although the result might be explained by asymmetric information, possible errors in the measure must be taken into account and the reliability of the results questioned.
Another possible shortcoming is the decision to use such a new index as the proxy for corporate sustainability. As previous studies have shown, the reputation a sustainability index has acquired strongly affects how investors react to the information they provide. As the outcomes in this study shows, there is no significant result in the beginning of the study period. It might be motivated to test this new index in a few years when more data is available and the index is better known. One way to see if this problem is present is to study the trading volume to each announcement. It would give some information whether there in fact was less trades during the first years and hence an insignificant result, but also give info whether investors react more strongly to positive or negative announcements.

An additional way would be to study if there is a difference in market reactions to announcement from more or less recognized sustainability indices. This could be done by studying the difference in market reactions for additions and deletions of companies on the same market but in different indices. Indices from the Dow Jones Sustainability Index family could be used, such as the DJSI World, DJSI STOXX and the DJSI Eurozone or other specific sustainability stock indices.

Lastly, all companies in the test where manually collected from the DJSI yearly reports and cleared from confounding events, so some human error or selection bias might be present. This cleansing also left the number of observations in the dependent variable in each regression relatively small and it was not normally distributed. As the recommended amount of observations per independent variable in cases with non-normal distribution is above 20, there might have been too many explanatory variables against observations, which lessens the predictability power of the regression. This has to be considered when evaluating the insignificant results and explanatory power of each regression.

As a proposal for further research, it would be of interest to put more emphasis on the financial performance aspect. One way is to analyze to which extent improving social performance is associated with financial performance by examining operating performance, as this measure is said to be most closely correlated with social performance (Doh et al., 2010). One possible approach could be to see if there is a difference between operative performance of added and deleted companies or if there has been a change in performance in recent years prior to the additions or deletions.
11 CONCLUSIONS

Climate change is a fact in today's world and has been strongly acclaimed in the media as well as in academic literature. The changing view and increased knowledge of the true environmental impact of the human behavior has resulted in actual actions on both the legislative and company level. In today's society, the globalization of the sustainability challenge poses reputational risks to companies identified as unwilling to adapt to this new reality. At the same time, those companies that are capable of achieving genuine first-mover status may find a stakeholder base with a significant appreciation of the value of their actions.

The company's challenge is to succeed in building a sincere reputation for corporate sustainability. Companies' desire to credibly signal economically, socially and environmentally responsible behavior and to benefit from a good reputation has contributed to the development of a whole new business area, which is responsible for reviewing and reporting on companies' sustainability activities. Against this background, the aim of this paper was to investigate whether there is a market reaction when a company is endorsed or loses endorsement for its sustainability work from a reliable, neutral entity. The interest also laid in finding what business characteristics are likely to affect investors' reaction.

This paper empirically examines the market reaction of the inclusion and exclusion of European firms in Dow Jones Sustainability European Index, during the time period 2011 to 2016. A inclusion is considered as an endorsement for a company's sustainability activities, whilst an exclusion indicated a distortion of sustainability activities. The contribution of this study is twofold, first an event study is performed to see the immediate market response to the announcement. Then a OLS regression is performed to analyze company specific factors with financial performance (ROA and Tobin's Q), industry and country of origin as the main explanatory variables.

The reaction among shareholders was expected to be either negative towards corporate sustainability as the traditional value maximization theory argues, or positive as the stakeholder theory and legitimacy theory argues. The resource based view stated that a company with superior financial performance is better able to follow up on stakeholder interests and act in a sustainable manner.

The outcome of the event study shows a significant negative response to both additions and deletions. The reaction had a short-term negative drift similar to the previous studies. If the fact that the negative reaction on the added sample was only weakly
significant and arguably driven by companies operating in an environment reluctant to
corporate sustainability, while the deleted sample showed high statistical significance, it
can be argued that the market values corporate sustainability activities. The results from
the regression analysis showed a positive relationship between corporate financial
performance and investor reaction to sustainability activities, which is in line with what
was expected.

As a concluding note, none of the presented theories could be accepted or ruled out, since
the results in the event study for added or deleted sample gave contradicting results.
However, the deleted sample showed a highly significant negative reaction on the market
when companies where deleted from the market, indicating that the investors evidently
punish companies that act in a counteractive way. Hence, my findings are consistent with
the notion that investors are concerned about the sustainability performance of firms
they invest in and that third-party endorsement is one mechanism through which
information is conveyed to investors, who then act on this information when making
their investment decisions.
SVENSK SAMMANFATTNING

1 Introduktion till ämnet

Inverkan av mänskligt beteende på naturen och vår roll i klimatförändringen har varit allmänt noterad i både media och akademiska tidskrifter. Grön finansiering och klimatrelaterade problem har blivit en integrerad del av företagens strategier, vilket visar att samhällen håller på att omvärdera sina värden för att belasta miljön så lite som möjligt. Tidigare diskuterades det främst om företagens sociala ansvar, men nu har intresset flyttats över till långsiktigt värdeskapande, med andra ord hållbarhet. Hållbarhet går ut på att man skapar och underhåller förutsättningar för att människor och natur kan finnas i produktiv harmoni för att stödja nuvarande och kommande generationer (EPA, 2017). Ur en mer ekonomisk synvinkel definierar Dow Jones Sustainability Index (DJSI, 2017) företagets hållbarhet som ett affärsinriktat tillvägagångssätt som skapar långsiktigt aktievärde genom att omfatta möjligheter och hantera risker som medförs av ekonomisk, miljömässig och social utveckling. De hävdar att ökande investeringar har gjorts åt företag som är engagerade i företagens hållbarhet och hävdar att detta främst dras av två faktorer: (1) bolagets hållbarhetsarbete är attraktivt för investerare eftersom det syftar till att öka långsiktigt värde för aktieägarna, och (2) hållbarhetsledare förväntas visa bättre prestanda och gynnsamma riskavkastningsprofiler.


Företagens utmaning blir att lyckas bygga ett uppriktigt rykte om företagshållbarhet. Företagens önskan att trovärdigt signalera socialt och miljömässigt ansvarsfullt beteende och att dra nytta av ett gott rykte har bidragit till utvecklingen av ett helt nytt näringslivsområde som har ansvar för att granska och rapportera om företagens hållbarhetsverksamhet (Fowler och Hope, 2007). Mot denna bakgrund strävar jag efter att undersöka om det finns en marknadsreaktion då ett företag stöds eller förlorar stödet.
för sitt hållbarhetsarbete från en tillförlitlig, neutral entitet. Jag är också intresserad av att se vilka företagskaraktäristiska drag som möjligen influerar investerares reaktion.

Syftet med undersökningen är således att undersöka relationen mellan företags hållbarhetsarbete och marknadsreaktion, samt vilka företagskaraktäristiska drag som ligger bakom reaktionen.

Undersökningar om investerares åsikt om hållbarhetsarbete har visat mycket varierande resultat, men intresset för socialt ansvarig investering (SRI) har påvisligt vuxit kolossalt på den europeiska marknaden under det senaste decenniet, varför denna marknad är av intresse för denna studie. Som indikator för hållbarhet används således inkludering till och exkludering från Dow Jones Sustainability Europe Index, vilket lanserades 2010. Undersökningen kommer att kontribuera med nyaste möjligst data och är en studie på ett index som jag inte lyckades finna tidigare liknande studier på.

2 Definition av företagshållbarhet

Nuförtiden omfattar nästan alla företagsbeslut sociala och miljömässiga frågor. Beslut såsom vilken teknik som ska installeras i en ny tillverkningsanläggning, i vilken utsträckning förnybar energi ska användas, förvaltningskompensation samt hur och när man lägger ner gamla anläggningar, påverkar företagets intressenter och dess naturliga miljö. Hållbarhet har sedan slutet av 1990-talet blivit det universella målet för samhällsplanering, och på grund av den växande stadsbefolkningen spelar städer och företag viktiga roller i hållbar utveckling. (Dempsey et al, 2009)

Den mest kända definitionen på företags hållbarhet definierades av Brundtland kommissionens rapport *Our Common Future* som gjordes för FN: s världskommission för miljö och utveckling och den lyder att:” Hållbarhet är utveckling som möter dagens behov utan att riskera framtidens förmåga att möta sina egna behov”. Detta tankesätt har sedan utvecklats, och nuförtiden är hållbarhet ett koncept som omfattar tre lika viktiga pelare, dvs. ekonomisk utveckling, social utveckling och miljöutveckling, som måste balanseras.

**Ekonomisk utveckling** handlar om att ge människor vad de vill ha utan att äventyra livskvaliteten, särskilt i utvecklingsländerna, samt att minska den ekonomiska bördan av att göra ”det som är rätt”. Det handlar om att ge företag och andra organisationer incitament att följa hållbarhetsriktlinjer utöver deras normala lagstiftningskrav. Den ekonomiska pelaren ger en motvikt till extrema åtgärder som företagen ibland tvingas att vidta, till exempel press för att överge fossila bränslen i en snabb takt. Goodland


**Miljöutveckling** syftar till att förbättra människors välferrningande genom att värna källorna till råmateriell på ett sådant sätt att den kan tillhandahålla de nödvändiga naturkapitalen och kunna bära avfallen. Detta innebär att (1) skördens av förnybara energikällor måste hållas inom regenereringsgraden; (2) Icke-förnybara energikällor måste användas i en fas så att deras uttömningsnivåer är lika med den takt som förnybara substitut kan skapas, och (3) håller utsläpp av avfall inom miljöns assimilera förmåga utan att försvaga den. Miljöutveckling behöver hållbar produktion och hållbar konsumtion.

Med all diskussion om klimatförändringar, minskande energiresurser och miljöpåverkan är det ingen överraskning att olika **lagstiftande enheter initierar föreskrifter för att skydda miljön**. Europeiska kommissionen har kommit ut med stora mål och riktlinjer för olika områden. Ett viktigt exempel är Europa 2020-


3 Den teoretiska länken mellan hållbarhet och företags värde


Som en motpunkt till denna kritiska teori finns intressentteorin introducerad av Edward Freeman (1984), som lyder att en organisations framgång är starkt beroende av hur väl de hanterar sina relationer med intressenter såsom kunder, anställda, leverantörer, samhälle, investerare och andra som kan påverka företagets förmåga att uppnå sitt syfte. Enligt teorin kan företag inte längre betraktas som en privat institution, utan som en social institution. Trots att företagens främsta uppgift har varit att öka


tillverkningskostnaderna, ger konkurrenskraftiga fördelar genom att öka produktionseffektiviteten och sänka ansvarskostnaderna. Detta är känt för att locka till sig investerare och en reaktion på marknaden kan förväntas.

Debatten om förhållandet mellan hållbarhet och aktiekurs handlar i grund och botten om huruvida intressenterna antar att hållbarhetsaktiviteter skapar värde som intressentteori, legitimitetsteori och resursbaserade teorin påstår, eller minskar företagets värde som det traditionella tillvägagångssättet hävdar. När företag investerar i säkrare produkter, en säkrare arbetsmiljö eller "grön" teknik, måste de identifiera den inverkan det kommer att ha på framtida intäkter och kostnader. Det är möjligt att argumentera huruvida hållbarhetsverksamhet är en konkurrenskraftig tillgång eller en skuld för bolaget.

4 Hållbarhet och marknadsreaktion


Intressenterna kräver allt mer att företagen visar sitt engagemang för hållbarhet. Även om vissa hållbarhetsegenskaper kan vara enkla att observera, kan investerare och andra intressenter ha svårt att bedöma företagets hållbara prestationsförmåga. Graden av asymmetrisk information kan minskas av företaget själv eller av mellanhänder. Frivillig hållbarhetsrapportering från företag har motiverats av det faktum att den information som dessa rapporter ger kommer att minska informationsasymmetrier som leder till mer effektiva marknader. De företag som gör grundliga hållbarhetsrapporter har visat sig ha sin hållbarhetsinsats värderad snabbare i sin aktiekurs (Guidry & Patten, 2010). Detta kräver att det inte finns några tvivel om huruvida informationen som ett företag presenterar är korrekt. Nuförtiden publicerar majoriteten av de stora företagen
någon form av årliga CSR- eller hållbarhetsrapporter, som kan ses som en form av omprövning och förbättring av rykte (Doh et al. (2010).


5  Tidigare forskning


6  Redogörelse för genomförandet av undersökningen

Undersökningen som utfördes i avhandlingen bestod av två delar, (1) en händelsestudie utfördes för att finna en möjlig marknadsreaktion efter meddelandet av DJSI Europe indexets komponenter, samt (2) en OLS regression utfördes för att se vilka företagskarakterer som kan ha haft en del i reaktionen. Företagen inkluderade i studien har blivit manuellt plockade från årsredovisningen där komponenterna för indexet...

Data för **händelsestudien** bestod av aktiedata, närmare bestämt dagliga priset för aktierna för en period på åtta månader före själva händelsen fram till fem dagar efter, och marknadsportfoliolien representerades av MSCI Europe indexet. Avkastningen för aktiedata samt indexdata logaritmerades. I undersökningen användes marknadsmodellen för att räkna ut onormala avkastningen (AR), vilket enligt MacKinley (1997) ger en mer exakt reaktion då det tar i beaktan företagsspecifik karaktär i uträkningen. Den onormala avkastningen aggregerades sedan genom tid och aktier för att få fram kumulativa onormala avkastningen (CAR) och den genomsnittliga kumulativa onormala avkastningen (\(\overline{CAR}\)). De tidigare studierna rekommenderar att man använder sig av korta händelsefönster för att analysera händelsens inverkan för att säkra att ingen annan händelse inverkar reaktionen. Därför analyseras \(\overline{CAR} [-1, 2]\) i olika delurval för att estimera marknadsreaktionen, medan \(\text{CAR} [-1, 2]\) användes som beroende variabel i regressionsanalysen. Då tidigare undersökningar visat både positiv och negativ reaktion på marknaden, testades signifikansen med ett tvåsidigt t-test och rank test.

Då tidigare forskare varit oroliga över att exkludering från ett hållbarhetsindex inte nödvändigvis indikerar försämrad hållbarhet, tillsattes delurval angående förändrad ESG poäng. Det tillsattes även ett sampel för att se ifall resultatet visar en liknande trend som trenden på den europeiska marknaden, där största tillväxten var i början av 2010-talet.

tillsattes även kontrollvariablerna försäljning/tillgång samt skuld/tillgångar i likhet med de tidigare studierna. Relationen förväntas vara negativ.

7 Resultatredovisning och konkluderande avslutning


ESG delurvalet visade ingen signifikant reaktion då värdet sjunkit och företaget excluderas. Men en signifikant negativ reaktion återfanns då företaget var exkluderat fast ingen ändring eller positiv ändring skett. Detta kan tyda på att (1) de företag som blir exkluderade från indexet inte nödvändigtvis blir exkluderade endast pga. nedsatt hållbarhet eller (2) företagen är inte villiga att publicera negativ hållbarhetsinformation pga. möjlig negativ reaktion på marknaden. Tidsperiod-delurvalet visade inga signifikanta resultat för testet för de tre första åren, vilket stöder Oberndorfer, Schmidt, Wagner and Ziegler (2011) antagande, att då ett index blir bättre känt och får till sig ett rykte av ämneskunskap, reagerar marknaden starkare till deras givna stöd.

Förutom landsdummy, visade endast ROA en positiv relation med beroendevariabeln i regressionsanalysen utförd på adderade samplet. Detta var i likhet med de tidigare studierna. I regressionerna för raderade samplet visade endast kontrollvariabeln försäljning/tillgångar ett positivt signifikant resultat som var motstridigt med de tidigare undersökningarna.

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