

**UNIVERSITY OF VAASA**  
**DEPARTMENT OF BUSINESS STUDIES**  
**FACULTY OF ACCOUNTING AND FINANCE**

Corporate social responsibility's effect on the cost of equity capital during the financial  
crisis

Suvi Muinonen s93397

Master's Thesis in  
Accounting and finance  
Finance

**VAASA 2016**

<b>TABLE OF CONTENTS</b>	<b>page</b>
<b>ABSTRACT</b>	5
<b>TIIVISTELMÄ</b>	7
<b>1. INTRODUCTION</b>	9
1.1. Hypothesis	12
1.2. Purpose of the study	13
<b>2. LITERATURE REVIEW</b>	15
2.1. Corporate social responsibility (CSR)	15
2.2. Stakeholder theory	16
2.3. CSR's impact on firm performance and riskiness	17
2.4. Cost of equity capital	23
2.4.1. Dividend discount models	25
2.4.2. Residual income valuation models	26
2.4.3. Abnormal earnings growth models	29
2.5. CSR and cost of equity capital	31
2.6. Efficient market theory	32
<b>3. DATA AND METHODOLOGY</b>	34
3.1. Sample construction	34
3.2. Regression variables	35
3.2.1. Cost of equity capital estimates	35
3.2.2. Corporate social responsibility	41
3.2.3. Control variables	41
3.3. Descriptive statistics	42
3.4. Methods	44
<b>4. RESULTS</b>	47
4.1. Univariate analysis	47
4.2. Multivariate regression analysis	48
4.3. Robustness checks	56
4.3.1. Alternative models for estimating cost of equity capital	56



4.3.2. Noise in analyst forecasts	58
<b>5. CONCLUSIONS</b>	<b>60</b>
<b>6. REFERENCES</b>	<b>63</b>
<b>APPENDIX 1.</b>	<b>69</b>
<b>APPENDIX 2.</b>	<b>72</b>



---

**THE UNIVERSITY OF VAASA****Faculty of Business Studies**

**Author:** Suvi Muinonen  
**Topic of the thesis:** Corporate social responsibility's effect on the cost of equity capital during the financial crisis  
**Name of the Supervisor:** Timo Rothovius  
**Degree:** Master of Science in Economics and Business Administration  
**Department:** Department of Accounting and Finance  
**Major Subject:** Accounting and Finance  
**Line:** Finance  
**Year of Entering the University:** 2009  
**Year of Completing the Thesis:** 2016 **Pages:** 68

---

**ABSTRACT**

This study examines corporate social responsibility's (CSR) effect on the implied ex ante cost of equity capital with a S&P500 data during sample period 2002-2013. In addition, the relation between CSR and firm riskiness is analysed during the financial crisis period 2007-2009. The findings indicate that CSR investments have not decreased companies' financing costs, but the impact has been rather neutral. Also, companies that have invested in CSR have not benefit from it during financial crisis compared to companies with low CSR. Furthermore, the impact of controversial business areas on the cost of equity capital is scrutinized. This study shows that companies involved in controversial benefit from slightly lower financing costs. This result holds even during the financial crisis period.

The findings of this study indicate that the markets do not price the CSR activities. Thus, companies with higher CSR involvement do not benefit from lower financing costs from the capital markets. The CSR literature has not been able to fully explain CSR's effect on firm valuation, and therefore there is no solid evidence about how CSR actually impacts on valuation. However, this study claims that CSR does not have an impact on the cost of equity capital, and therefore companies do not profit from lower financing costs by investing in CSR practices.

---

**KEYWORDS:** Corporate social responsibility, Cost of equity premium, stakeholder theory



---

**VAASAN YLIOPISTO****Kauppätieteellinen tiedekunta**

<b>Tekijä:</b>	Suvi Muinonen
<b>Tutkielman nimi:</b>	Yritysvastuun vaikutus yrityksen oman pääoman hankintakustannukseen finanssikriisin aikana
<b>Ohjaaja:</b>	Timo Rothovius
<b>Tutkinto:</b>	Kauppätieteiden maisteri
<b>Yksikkö:</b>	Laskentatoimen ja rahoituksen yksikkö
<b>(koulutusohjelma):</b>	Rahoitus
<b>Aoitusvuosi:</b>	2009
<b>Valmistumisvuosi:</b>	2016

**Sivumäärä: 68**

---

**TIIVISTELMÄ**

Tutkimus tarkastelee yritysvastuun vaikutusta ennusteiden pohjalta estimoituun oman pääoman hankintakustannukseen. Tutkimuksessa käytetään S&P500 dataa ja havaintojakso on vuosilta 2002-2013. Lisäksi yritysvastuun ja yrityksen riskisyyden välinen suhde on finanssikriisin 2007-2009 on huomioitu. Tutkimustulokset osoittavat, että investoinnit yritysvastuuseen eivät suoranaisesti laske yrityksen rahoituskuluja ja yritysvastuun vaikutus oman pääoman hankintakustannukseen on neutraali. Yritykset eivät myöskään ole hyötynet vastuullisuudesta finanssikriisin aikana, verrattuna yrityksiin, jotka eivät ole investoineet yritysvastuuseen.

Tutkimus huomioi myös kiistanalaisten liiketoimien vaikutusta oman pääoman hankintakustannukseen. Tulosten perusteella markkinat ovat suosineet hieman enemmän yrityksiä, jotka toimivat kiistanalaisilla liiketoiminnan alueilla suoden näille yrityksille alemman oman pääoman hankintakustannuksen. Tämä vaikutus on pitää myös finanssikriisin aikana.

Tämä tutkimus osoittaa, että markkinat eivät ole hinnoitelleet yritysten investointeja yritysvastuuseen. Täten vastuullisemmat yritykset eivät hyödy alemmasta estimoituun oman pääoman hankintakustannuksen tasosta. Aikaisempi yritysvastuukirjallisuus ei ole kyennyt täysin selittämään, millä keinoin yritysvastuu vaikuttaa yritysten arvostamiseen. Tämän vuoksi ei ole olemassa pitäviä todisteita, kuinka yritysvastuuseen investoinnit vaikuttavat. Tämän tutkimukset kuitenkin osoittavat, ettei yritysvastuu vaikuta yrityksen oman pääoman hankintakustannukseen, eivätkä vastuullisemmat yritykset siten hyödy alemmista rahoituskuluista.

---

**AVAINSANAT:** Yritysvastuu, Oman pääoman hankintakustannus, Sidosryhmäteoria





## 1. INTRODUCTION

Economic globalization has significantly adjusted the environment in which corporations operate. Firstly, the competition has expanded as a consequence of globalization and therefore indefinite markets. Secondly, corporations have to respond to stakeholders' increased demands in value creation. Lastly, economic globalization has involved the corporations to enhance their corporate social responsibility (CSR) as a result of increasing amount of acts that encourage corporations to strengthen their practices according to numerous responsibility criteria (Bassen, Meyer & Schlange, 2006:4).

Companies are often seen as a part of the society operating alongside with the public sector. Therefore, studies state that the companies are responsible of social welfare (e.g. Carrol, 1999; Barnett, 2007; Dahlsrud, 2008). The concept of CSR is rarely described unambiguously. CSR is frequently defined as a combination of good quality corporate governance, activity in environmental and human rights protection, and interest in national economic development (Petkoski & Twose, 2003: 2)

Thus, while concentrating in value creation, companies also have to consider society's demands towards corporations' more sustainable development policies, which have increased during the latest decades by the means of legislation and norms. In recent years various companies have made sustainability and CSR statements, and adopted these practices into their company policies. Companies' increased concern in CSR and sustainability issues is an interesting topic for couple of reasons. Firstly, the classical financial theory states that the most crucial function for corporations is maximizing shareholder's value, which traditionally, and extremely simplified, means that all investments should be linear with increasing shareholder's value (e.g. by investing in profitable projects) or be profited as a dividend. And secondly, CSR and sustainability practices may be often seen as a value loss in a sense that the company will not create actual profits by investing into improvement of CSR or sustainability practices. Thus, why do companies invest on CSR if it is not profitable, and how is the social concerns balanced against the need to create value to shareholders? Due to this dilemma a question about possible benefits from CSR practices, and whether the markets have priced companies' acts to increase their CSR is raised. In addition, a question whether applying CSR and sustainability practices is only "greenwashing", where the actual efforts made to increase environmentally sound practices are remote, or do companies actually change their practic-

es. Most importantly, does the adoption matter – do companies benefit from being CSR compliant?

Researchers have not ignored the question whether companies benefit from adopting CSR and sustainability practices. Companies' involvement in CSR acts has raised questions, whether there is theoretical evidence that companies that “do good” also do better in financially. Consequently, the highly increased CSR interests and legislation have developed a field of CSR and sustainability studies. However, the perspectives of these studies vary, and there is no absolute solution for this question.

A branch of studies examines the relationship between CSR and corporate financial performance (Roman, Hayibor & Agle, 1999; Lee & Faff, 2009; López, Garcia & Rodriguez, 2007; Jiao, 2010; Kim & Statman, 2012), while other studies investigate the association between CSR and risk (e.g. El Ghoul, Guedhami, Kwok & Mishra, 2011; Dhaliwal, Tsan & Yang, 2011; Goss and Roberts, 2011), while some of the studies research study the association between CSR and stock price risk (e.g. Kim, Li & Li, 2014). The results from the studies that examine impact of CSR and sustainability on company performance fail to show explicitly by what method company benefits/disadvantages from introducing CSR practices into company policies. Also, many of these studies suggest that the CSR practices impact by lowering investment costs.

Roman et al. (1999), Jiao (2010) and Kim & Statman (2012) find supporting evidence that applying CSR practices improve company's financial performance. On the other hand, Lopez et al. (2007) find that adopting CSR practices actually increase the costs of the company and therefore decrease the company's performance during first periods. Yet, Lopez et al. (2007:296) estimate positive long-term results, and thus the negative impact persists only short-term.

In addition, the studies that examine the relationship between CSR and risk show that CSR and sustainability practices decrease company's risks to be involved in sanctioned activity or diminish the financing risks (e.g. El Ghoul et al., 2011; Kim et al., 2014). The decreased risk will create long-term value for the investors, since the risk of future value loss will decrease. Furthermore, El Ghoul et al., 2011, Dhaliwal et al., 2011 and Goss and Roberts, 2011 find that the companies CSR actions reduce the company's cost of capital, which means that companies that have adopted CSR practices benefit from lower investment costs. Kim et al. (2014) also find that introduction of CSR practices is negatively affiliated with stock price crash risk.

The benefits from adopting CSR practices seem to be linked to corporations' long-term profitability and positive value creation. Moreover, some of the studies (El Ghouli et al., 2011; Dhaliwal et al., 2011) show CSR practices decrease the investment risk. Therefore, it looks that corporations have become aware that they can obtain long-term profits and increase shareholder's value by fulfilling both economic and sustainability criteria.

However, even though the companies have become more aware of the higher demands of CSR and sustainability activities, it is hypothesized that the presentation of the connection between CSR and corporate financial performance depends highly on the rationale behind investors' choices and the influence of these choices on security markets (Hill, Ainscough, Shank & Manullang, 2007:165). This indicates that the investor proxy has also an effect on whether companies profit from investing in CSR activities. E.g. Kim & Statman (2012:115) find that companies benefit by increasing investments in sustainability when the increase will be consistent with investors' interests, and on the other hand, companies will decrease investments in sustainability when it lowers financial performance. Moreover, positive performance indicators such as strong corporate management, reputational benefits, and a forward-looking business style have been associated with CSR or sustainability policies (Derwal & Koedijk, 2009:211). Thus, the presentation of the potential impact of corporate social performance on firm financial performance follows, including investor characteristics, the rationale behind their choices, and their influence on the marketplace for securities worldwide.

It seems that CSR and sustainability activities effect on the company performance is highly complex. This study suggests that companies that have adopted CSR or sustainability practices might have advantage with respect to companies that have not applied CSR or sustainability practices into company policies. Since the studies investigating CSR's impact on the company's performance have not provided solid results, the CSR's impact on company's riskiness is examined in this study. To investigate CSR's impact on company riskiness, the cost of equity capital company is used. The cost of equity capital is the return that the markets require for their investment in a company, which therefore allows investigation of the market valuation of companies that have adopted CSR practices. In addition, CSR's effect on the firm financing seems to be dependent on the investigator proxy (Hill et al., 2007), while the cost of equity provides information whether CSR is priced on the capital markets.

### 1.1. Hypothesis

The scope for this study is to examine whether companies that have adopted CSR practices benefit from lower financing costs. The financing costs are measured with cost of equity capital, which is the return that stockholders require for their investment in a company. Since investors require higher return for riskier investments compared to more secured investments, the cost of equity capital should be lower for less risky companies. It is hypothesized in this study that companies with higher CSR involvement are less risky from market perspective. Thus, it is hypothesized that adopting CSR practices have decreasing effect on the cost of equity capital.

H<sub>0</sub>: CSR practices do not decrease the cost of equity capital.

H<sub>1</sub>: CSR practices decrease the cost of equity capital.

Since it is hypothesized that CSR practices decrease company's cost of equity, and therefore decrease company's risk level, it is further hypothesized that involvement in controversial business areas increase company's riskiness. It is emphasized that companies that operate in controversial business areas have higher risk for e.g. reputational harm, which may cause valuation losses. Thus, it is hypothesized that the markets require higher cost of equity capital (internal rate of return) from companies that operate with controversial businesses since investors bear higher risk and thus require higher return for their investment.

H<sub>0</sub>: Involvement in controversial business does not increase the cost of equity capital.

H<sub>1</sub>: Involvement in controversial business areas increases the cost of equity capital.

To expand the scope of this study, CSR's impact on the cost of equity capital is examined during the financial crisis period 2007-2009. During the latest financial crisis the overall volatility (riskiness) on the markets increased exponentially. The uncertainty increased during the financial crisis and it is hypothesized that markets have seen companies that have invested in CSR more stable and less risky investment. Thus, it is also hypothesized that CSR has decreasing effect on the cost of equity capital during the financial crisis period. Furthermore, it is hypothesized that the decreasing effect is greater during the economic downturn compared to pre-crisis and post-crisis period because investors try to seek less risky investments during increased volatility.

H<sub>0</sub>: CSR practices do not decrease company's cost of equity capital during financial crisis compared to post-crisis period and pre-crisis period.

H<sub>1</sub>: CSR practices decrease company's cost of equity capital during financial crisis compared to post-crisis period and pre-crisis period.

Also the companies with controversial business issues are examined during the financial crisis period. Since the riskiness increased during the financial crisis period, it is expected that companies that the involvement in controversial business areas have increased the cost of equity capital more during the financial crisis compared to other periods. Thus, companies involved in controversial business areas are hypothesized to have higher cost of equity capital during the financial crisis compared to pre-crisis and post-crisis period due to the increased riskiness on the markets.

H<sub>0</sub>: Involvement in controversial business does not increase company's cost of equity capital during financial crisis compared to pre-crisis and post-crisis period.

H<sub>1</sub>: Involvement in controversial business areas increases company's cost of equity capital during financial crisis compared to pre-crisis and post-crisis period.

The methodology to test the hypotheses is presented in chapter 3, and the results are provided in chapter 4.

## 1.2. Purpose of the study

The purpose of this study is to examine whether corporations' benefit from their acts to improve practices to respond responsibility criteria. The focus of this study is to examine CSR and sustainability efforts' impact on company's riskiness from market perspective. Thus, the aim of this study is to find out how capital markets price companies' responsibility attempts. The relation between CSR and company's valuation is examined with the implied *ex ante* cost of equity capital by using analyst forecasts on earnings. This way the capital markets' future expectations are controlled. The companies with higher CSR commitment are compared to companies with low CSR. In addition, this study examines whether companies with CSR activities bear the bear the crisis and higher volatility periods better compared to companies with lacks in CSR.

The CSR demands towards companies are here to stay. Although one would not want to consider CSR activities as a part of company's business, there might be consequences that damage company's reputation or valuation if CSR practices are not fulfilled. Thus, there is an increasing literature that examines CSR's impact on firm valuation, firm performance and firm riskiness. The CSR studies have not been able to solve by what means of CSR actually effects on company's valuation. Furthermore, there is a dilemma between the investments in CSR activities and companies' value creation, since CSR is often seen rather as expenditure than as investment. Yet, rapidly increasing amount of companies have their own CSR values and are allocating funds to CSR practices. Therefore, there should be a relation between CSR and firm valuation.

This study attempts to proof the findings of El Ghouli et al. (2011) that companies that have invested in CSR activities benefit from lower cost of equity capital. In addition, there is some evidence (e.g. Lackmann, Ernstberg & Stich, 2012) that companies that have invested in CSR practices perform better during economic downturn. Thus, this study extends El Ghouli et al. (2011) research by hypothesising that if CSR effects on the cost of equity capital, companies that have applied CSR should benefit from lower cost of equity capital also during the financial crisis period. To capture the effect of CSR practices on the cost of equity capital this study compares three different sub-periods: pre-crisis period, crisis period, and post-crisis period.

It is emphasized that the CSR demands most often come outside the company and from the stakeholders. Therefore, the market perspective should also be examined, and this study uses analyst forecasts on earnings to capture the market proxy.

The remainder of this paper is organized as follows. Chapter two discuss past studies and theories. In chapter three, the data and methods are processed. Chapter four and five cover results and conclusions.

## 2. LITERATURE REVIEW

This chapter analyses the previous literature behind CSR, stakeholder theory and the *ex ante* cost of equity capital. Sub-chapter 2.1 briefly discusses about how CSR has become part of the corporate culture, and in sub-chapter 2.2 the stakeholder theory is reviewed. Sub-chapter 2.3 analyses the relation between CSR and the company riskiness, while the cost of equity capital is further reviewed in sub-chapter 2.4. Finally, the models used to investigate CSR's impact on the cost of equity capital are presented, and efficient market theory is shortly reviewed in sub-chapter 2.5.

### 2.1. Corporate social responsibility (CSR)

The concept of CSR has come a long way from its early origins. The modern theory of CSR begins from the 1950s as a scholarship that demanded companies' to strengthen their sense of responsibility about social issues (e.g. the welfare of the labour and society). CSR literature expanded rapidly during the 1960s and escalated during the 1970s leading to acceleration of concepts and methods. In the 1980s the CSR studies concentrated on decreasing the definitions and increasing the empirical research, which produced alternative themes such as corporate social performance (CSP), stakeholder theory and business ethics theory in the 1980s. During the 1990s CSP, business ethics and stakeholder theory achieved positions as the most fundamental themes related to CSR. (Carrol, 1999.)

During the past three decades the concerns about CSR have risen significantly. CSR has become a common part of legislation and corporations' business. Despite the continuous research and the recent activation of the CSR research, there is still an abundance of CSR definitions. Since companies are often seen as a part of the society, they are therefore also often thought to be responsible to improve social welfare. Thus, the common description of CSR is, that it is an activity, which intends to improve social welfare (Barnett, 2007: 795). However, attempts to develop unbiased definition, which would define CSR activities more fundamentally and practically are challenging, since unbiased interests will create definitions that might exclude problems (Dahlsrud, 2008:1).

However, World Bank's International Finance Corporation (IFC) (Petkoski & Twose, 2003:2) has succeeded to define CSR undisputedly as a hybrid that "covers a wide range of issues relating to business conduct, from corporate governance and environmental



protection, to issues of social inclusion, human rights and national economic development.” Moreover, United Nations’ World Commission defines sustainability as a “development that meets the ability of future generations to meet their own needs” (United Nations, 1987:37) and it is the most common definition of sustainability. Therefore, companies implementing CSR and/or sustainability principles into their company policies have to consider both environmental and social aspects.

The concept of sustainability has ascended as a one of the most observable trend of CSR. The recent interest towards sustainability results from the establishment of sustainability indexes such as Dow Jones Sustainability Index family (DJSI), FTSE4Good Index and Domini 400 Social Index. The foundation of these indexes is consequence from progressive growth of Socially Responsible Investment (SRI). Thus, CSR has developed from including mainly social issues, to cover sustainable features such as resource and emission reduction.

The establishment of the sustainability indexes and investor proxy may offer a new, interesting insight on ethical investing and has motivated the most recent and more theoretically oriented studies to examine CSR’s influence on firm performance (e.g. Derwal & Koedijk, 2009; McWilliams & Siegel, 2000; Nelling & Webb, 2008; Orlitzky, Schmidt & Rynes, 2003; Pätäri, Arminen, Tuppura & Jantunen, 2014; Van de Velde, Vermeir & Corten, 2005). In these studies the impact of adoption of CSR practices on the firm performance and valuation is emphasized. This approach is the motivation of this study and the relationship between CSR and firm valuation (the implied cost of equity capital) will be elaborated subsequently.

## 2.2. Stakeholder theory

The most important objective for a company is generally identified to maximize shareholders’ value by increasing company’s stock value in the long-term. The studies have not been able to fully explain whether companies actually benefit from investing in CSR activities, and therefore a question remains: why should companies invest in CSR if this does not increase shareholders’ value? Stakeholder theory challenges the perspective, that company’s only goal is to maximize the value of the company by arguing that other parties including such as employees, customers, suppliers, financiers, communities, governmental bodies, political groups, and trade unions should be also considered (e.g. Freeman, Wicks & Parmar, 2004).

The reason behind companies' investments in CSR activities might be explained with stakeholder theory, which suggests that also other groups than stakeholders also review companies' activities (Freeman et al., 2004). Therefore, to outperform the competitors companies need to consider other factors than the maximization of firm value. However, the classification of what groups are considered to be stakeholders are highly contested (Miles, 2012), and therefore, there is no explicit allocation for the stakeholders.

Even though the previous literature is not able to explicitly show which of the groups are companies' most important stakeholders, many of these stakeholders (e.g. politicians, communities, customers and governmental) demand companies to be CSR compliant. Therefore, it is hypothesized in this study that CSR policies and demands effect on companies through various stakeholders, which might be one reason for companies to increase their involvement in CSR. However, even if stakeholders impact on the amount how much companies invest in CSR activities, the question whether CSR is priced by the markets remains open.

### 2.3. CSR's impact on firm performance and riskiness

As emphasized before, during recent years relationship between application of CSR/sustainability practices and firm performance has become a current topic in financial literature. The demand for higher sustainability is resulted from both social and regulatory pressure, which companies are exposed to. Moreover, the actions of a company are constantly under shareholders' and other stakeholders' evaluation. Therefore, there might be critical influences on firm's value if it is revealed that sustainability practices are not fully applied.

Several studies (e.g. Carrol, 1999; De Bakker, Groenewegen & De Hond, 2005; Michelson, Wailes, Laan & Frost, 2004) have focused on forming theoretical proxy for the relationship between CSR and firm performance. These approaches illustrate theoretical and methodological problems that obtain, when the relationship between CSR and firm performance is under examination. The main problems in the CSR literature are vague clarification of the relationship between CSR and firm performance, variant views on CSR measurements and lack of essential progress (De Bakker et al., 2005:284). Therefore, these deficiencies will be carefully considered in this study.

Many of the previous studies have concentrated on the association between CSR and company's financial performance (e.g. Roman et al., 1999; López, Garcia & Rodriguez; 2007; Morgolis & Walsh, 2001; Jiao, 2010; Kim & Statman, 2012). However, the results of these studies vary extensively. Roman et al. (1999) make an introductory research to compare the results of the previous studies to observe the relationship between CSR and firm performance. They suggest that the correlation between CSR and firm performance is neutral or slightly positive, and disclose with a claim that good CSR does not lead to poor firm performance (Roman et al., 1999:121).

López et al. (2007) examine the impact of CSR on firm performance by comparing accounting indicators of companies included in Dow Jones Sustainability Index (DJSI) to companies that are only listed in Dow Jones Global Index (DJGI), but not on DJSI. They find that applying CSR practices into company policy may increase costs and harm company's current asset allocation placing responsible companies into disadvantage with respect to others (López et al., 2007:296). This disadvantage is shown as a negative short-term influence on firm performance compared to the companies that have not applied CSR practices (López et al., 2007:296). However, López et al. (2007: 296) find that CSR's negative impact on firm performance will diminish during time.

Also Consolandi, Jaiswal-Dale, Poggiani & Vercelli (2008:195) compare companies included in DJSI to companies that are only included in DJGI finding that DJSI hardly outperforms DJGI. However, they find that the inclusion (good news) in DJSI has a positive impact on firm performance, while the deletion (bad news) from DJSI has a negative impact on firm performance. Moreover, the negative impact of the deletion from the ethical index is more substantial compared to the positive impact from inclusion into DJSI (Consolandi et al., 2008:195).

Lackmann et al. (2012:136) find that stocks have abnormal returns if additional reliability of sustainability information, concerning the stocks in question, has been revealed. Moreover, they find that the benefits from the additional reliability of sustainability information is specially greater at companies with higher systematic stock return risk with respect to companies with lower investment risk. Also companies with less predictable future stock performance have greater benefits from additional reliability information (Lackmann et al., 2012:136).

In additional, Lackmann et al. (2012:136) make an interesting observation about the relationship between reliability of sustainability information and overall economic envi-

ronmental. They find that during economic downturns and times of uncertainty the benefits of the reliability of sustainability information are greater. Thus, it is hypothesized in this study that companies with higher CSR involvement benefit from lower cost of equity capital.

The changes in CSR concerns seem to have similar negative impact on financial performance and profitability than deletion from DJSI. The changes in CSR strengths do not however appear to have any significant impact on firm performance nor profitability. Yet, changes in CSR strengths and CSR concerns both have Granger cause changes in market value, while the impact of changes in CSR strengths seems to have a shorter lag than the lag of CSR concerns. However, the lag in CSR strengths starts from one year implicating that adoption of CSR practices has a long-term impact on firm performance. (Pätäri et al., 2014:147.)

The results show that there is Granger causality between the CSR strengths/concerns and company performance (Pätäri, Arminen, Tuppurä & Jantunen, 2014:142). CSR strengths involve companies' actions that might have a positive social impact, while CSR concerns are afflicted with companies actions that might harm society (Pätäri et al., 2014:146). Both Consolandi et al. (2008) and Pätäri et al. (2014) find that the impact of bad news is greater on firm performance in respect with good news. These results are consistent with the previous results from behavioural finance stating that behavioural response to bad news is typically more powerful than the reaction to good news (e.g. Kahneman & Tversky, 1979).

In addition to the results indicating that adopting CSR practices into company policies has a positive impact on firm performance, CSR also seems to have a positive impact on Tobin's Q. Jiao (2010:2560) find that an increase of one unit in welfare (CSR) score leads to a 0.587 gain in Tobin's Q. This finding supports the hypothesis that applying CSR practices into company policy will increase company valuation.

Kim & Statman (2012:128) examine the association between changes in corporate environmental responsibility (CER) and changes in firm performance. The examination is conducted with Tobin's Q and ROA. When the changes in CER and firm performance are measured, the results suggest that investments in CER are increased or decreased to enhance firm performance (Kim & Statman, 2012:128).

Moreover, Kim & Statman (2012) suggest that companies that changed (increased/decreased) their levels of investments in CER practices enjoyed increases in firm performance compared to companies that did not change the levels of investments in CER. This finding is contradictory with the results of Consolandi et al. (2008) and Pätäri et al. (2014), who find that decreasing CSR activity will also decrease the level of firm performance.

It can be easily noted that studies about the impact of applying CSR practices into company policies has increased rapidly in recent years. However, studies that examine the relation between CSR and firm performance fail to offer an absolute answer by which channel CSR actually impacts. Many of the studies show that there is a relation between CSR and firm performance in some level (Lopez et al., 2007; Consolandi et al., 2008; Lackman et al., 2012; Pätäri et al. 2014) and there seems to be evidences that companies benefit from applying CSR practices, while CSR concerns harm the company.

Kim et al. (2014) have a different approach to study the CSR's influence on company's financial figure. They study whether there can be found a relation between adopting CSR practices and stock price crash risk. Kim et al. (2014:11) show that there is significant negative relationship between CSR performance and one-year-ahead stock price risk. Interestingly, they find evidence that the mitigating impact of CSR on future stock price crash risk is associated with weak corporate governance (Kim et al., 2014:7). This finding suggests that companies with poor corporate governance benefit more from adopting CSR practices, since companies the impact of high CSR performance is not that significant on companies that have good corporate governance compared to companies with companies that do not have as strong corporate governance (Kim et al., 2014:11).

The latter finding is interesting, since it implies that the association between CSR activities and firm performance is more comprehensive. It seems that CSR has an indirect relationship on company performance by better corporate governance. This is emphasized by the studies that show that only specific corporate governance related CSR factors lower the cost of equity (El Ghoul et al., 2011; Kim et al., 2014) and that exclusion from DJSI index will lower firm performance (Consolandi et al., 2008:195), which can be seen as an implication as a decreased corporate governance level. Also the finding of Lackman et al. (2012:136) that increased reliability of sustainability information will enhance company's performance is consistent with the benefits of good corporate governance.

In addition to above discussed performance based studies, many studies examine the influence of CSR and corporate sustainability on company's riskiness, and also thereby investigate the indirect impact on company's internal performance. Also Lackmann et al. (2012), suggest that the impact of CSR might have an impact on company's riskiness rather than it's performance. In addition, Orlitzky et al. (2003:403) suggest that while companies benefit from adopting CSR and sustainability activities, the association between applying CSR practices into company policies and accounting-based measures is more significant than relationship between CSR and market-based indicators.

E.g. El Ghoul (2011), Kempf & Osthoff (2007) and Sharfman & Fernando (2008) examine CSR's impact on company's riskiness. The results suggest that there is a relation between CSR and the cost of equity. Sharfman & Fernando (2008:582-586) examine how complying CSR affects on company's weighted cost of capital (WACC). This approach is emphasized by the hypotheses that companies with higher CSR rates benefit from lower financing cost. Since companies are generally financed with both debt and equity, Shafman & Fernando use WACC as a measurement for risk.

Shafman & Fernando (2008:582-586) find that environmental risk management leads to a lower cost of equity and is associated with decreased WACC. However, Shafman & Fernando (2008) fail to control the cost of debt-leverage ratio resulting biased results. Moreover, the variance of their data is remarkably high.

Lee & Faff (2009) compare sustainability portfolio to the market portfolio finding supporting evidence that companies that have adopted CSR and sustainability practices do not underperform the market portfolio. Furthermore, they state that companies with better CSR performance benefit from significantly lower idiosyncratic risk that might be priced by global equity market. This indicates that CSR has an impact on company's riskiness.

Goss & Roberts (2009) have a quasi-insider approach to examine the impact of CSR on company's riskiness. They use bank loans to compare the cost of debt between companies with poor CSR performance and companies with high CSR performance. The results of Goss & Roberts (2009) are similar to Lee & Faff's (2009), and they find that most responsible companies have slightly lower cost of debt. Though the results of Goss & Robert (2009:2002) are statistically significant, they are economically moderate. However, Goss & Robert (2009) emphasize that further research is needed to determine the aspects how CSR adds value.

El Ghoul et al. (2011:2389) study the impact of CSR on the cost of equity capital by hypothesizing that if CSR or sustainability actions impact company's riskiness, the company should have lower equity financing costs compared to companies without CSR or sustainability practices since the cost of capital is risk driven. This causality rests on a theory where market determines company's future cash flows with discount rate on market perception of a company's riskiness (Pratt & Niculita, 2008).

El Ghoul et al. (2011:2400) find that introducing CSR practices will lower significantly companies' cost of equity. Moreover, they find that the impacts of different dimensions of CSR on the cost of equity differ from each other. Investments in employee relations, environmental policies, and product strategies appear to lower the cost of equity, while community relations, diversity, and human rights do not yield similar results (El Ghoul et al., 2011:2401). Also Dhaliwal et al. (2011) find supporting evidence that companies with higher CSR benefit from lower cost of equity capital.

As listed before, various studies have attempted to find an answer, whether CSR activities has an impact on firm performance or riskiness. Yet, it seems that CSR influences through information channels, which can be seen from the results that increasing CSR activities increases firm performance, while decreasing investments in CSR decreases the performance (e.g. Kim & Statman, 2012). In addition, bad CSR news has greater impact on firm performance than good CSR news (Pătări et al. 2014). Thus, it seems that the market information prices the CSR.

Even though there are many studies (e.g. Roman et al., 1999; Lopéz, Garcia & Rodriguez, 2007; Morgolis & Walsh, 2001; Jiao, 2010; Kim & Statman, 2012) that examine the relation between CSR and firm performance, the results of these studies remain inadequate. Thus, it is emphasized in this study that since CSR activities are demanded through various stakeholders, the capital markets have the power to determine the level of influence that CSR has on the company's business. Furthermore, the capital markets prices the companies through risk premium, which is added to the risk free rate. The amount of premium depends on the riskiness of the company, and therefore companies with higher CSR activities should have lower risk level if CSR is seen as a positive investment by the markets.

This study investigates CSR's impact on company's riskiness rather than its performance. This way the markets' perspective and expectations are included into the exami-

nation. In addition, the previous studies show that bad or negative CSR news impact negatively on company's valuation. Therefore, the companies involved in controversial business issues are also investigated, and the cost of equity capital of the "good" and "bad" companies is compared. The theoretical background of the cost of equity capital is discussed in the following sub-chapter.

#### 2.4. Cost of equity capital

The studies that examine the relationship between CSR and firm performance suggest that CSR affects firm's account based risk factors such as cost of equity capital (e.g. Dhaliwal et al., 2011; El Ghoul et al, 2011; Lackmann et al., 2012; Orlitzky et al. 2003) rather than firm's external performance. This study uses the implied cost of equity capital (ICC) to determine whether CSR impacts on the riskiness of a company. To examine whether companies that have adopted CSR practices outperform companies that have not invested in CSR, the cost of equity capital is compared between these companies.

Cost of equity capital is the internal rate of return (discount rate) that is applied to company's future cash flows to determine its current market value. Therefore, cost of equity represents the required rate of return from the market's perspective and thus, equals to the investigators' experience of company's riskiness. Being equal to the compensation that the market demands in exchange for owning the asset and bearing the risk, cost of equity represents market's expectation of stock's valuation. If CSR and sustainability practices have an impact on the perceived riskiness of the company, then socially responsible companies should benefit from lower equity financing costs. Moreover, studies (e.g. Hail and Leuz, 2006; Chen, Chen & Chen, 2009) show that companies with competent corporate governance and stricter disclosure standards benefit from lower company's cost of equity capital and information asymmetry problems.

The cost of capital is used as a depending factor in this study because the empirical results of applying CAPM when estimating cost of equity have failed to show accurate results. Furthermore, CAPM is rather a fundamental model that should be improved with more complicated models (Fama & French, 2004:44). In addition, single-factor model and the Fama & French (1993) three-factor model offer poor proxies for the cost of equity capital (Fama & French, 1997). Moreover, Elton (1999) states that realized returns offer biased estimates to expected returns and neglect significant future information events. Thus, there is a need for alternative methods.



Recent studies show that ICC separates the cost of capital effects from cash flow effects and growth effects (Heil & Leuz, 2006, 2009; Chen et al., 2009), and therefore ICC provides more accurate predictions than estimations based on realized returns. In addition, Pástor, Sinha & Swaminathan (2008) find that ICC outperforms the methods that use realized returns in determining the nexus between increase in return and increase in risk (risk-return trade-off).

Studies shows that traditional models (i.e. CAPM, three factor model, four factor model) that rely on realized estimates provide unavoidably imprecise results, and the empirical problems involved in these models might invalidate their use in applications (e.g. Fama & French, 1997, 2004). E.g. Fama & French (1997) test extensively CAPM and three-factor based industry cost of capital, concluding that the use of realized returns yields inaccurate cost of capital estimates. The obstacles with models based on realized returns have awakened the researchers to study alternative methods for computing the required rate of return. The *ex ante* ICC has become to an attractive method to compute the cost of equity capital disposing the problems related to the use of realized returns (e.g. Claus & Thomas, 2001; Gebhardt, Lee, & Swaminathan, 2001).

To estimate company's ICC, this study follows recent branch of studies (e.g. Claus & Thomas, 2001; Hail & Leuz, 2006; Chen et al., 2009) and adopt *ex ante* cost of capital implied in analyst earnings forecasts and stock prices. Using ICC, and thus having an internal rate of return based approach can avoid two major problems. Firstly, since the *ex ante* analysts earnings forecasts is used, growth rates and expected cash flows can be controlled when estimating company's cost of equity unlike with traditional measures of firm value (e.g. Tobin's Q) (Hail & Leuz, 2006:524-525). Secondly, as emphasized previously, various studies have shown that realized returns provide noisy results (e.g. Fama & French, 2004; Elton, 1999; Pástor, et al., 2008) and traditional capital asset pricing models fail to deliver accurate estimates of firm level (e.g. Pástor, 2008:2860). However, the use of ICC can prevent these problems. Since ICC does not rely on realized returns, but uses analyst earnings forecast and stock prices, the noisy proxy can be avoided.

The idea behind ICC is to calculate the cost of capital as the internal rate of return with a valuation model that equates the present value of future dividends or income streams with the current market price. The greatest difference between ICC methods and CAPM is that instead of using *ex post* returns for *ex ante* valuation to compute empirical im-

plementations, ICC methods rely on forecasted, forward looking data. Furthermore, ICC literature assumes that the efficient market theory is applied, and the equity value of a company is set equal to the quoted share price. Moreover, expected dividends, earnings, book values (numerator), and growth expectations are inserted into an accounting-based valuation formula that determines the discount factor, which is equal to market's expected rate of return. (Echterling, Eierle & Ketterer, 2015:236.)

The ICC literature has expanded during the recent decade, but there is no consensus among researchers, which of the approaches performs best, how shortcomings can be mitigated, or how methods can be evaluated adequately (Echterling, et al., 2015). Consequently, even though the use of ICC provides an attractive alternative method to stock price valuation, it has its problems in the heterogeneous methods of computing ICC. The most common approaches are – in no specific order – (1) the dividend discount model (Gordon & Gordon, 1997; Botosan & Plumblee, 2002), (2) the residual income valuation model (Claus & Thomas, 2001; Gebhardt et al., 2001, Daske, Gebhardt & Klein, 2006), and (3) the abnormal earnings growth model (Easton, 2004; Ohlson & Juettner-Nauroth, 2005). These three models are examined more thoroughly in the following sub-chapters, and the advantages and obstacles concerning the models are discussed.

#### 2.4.1. Dividend discount models

In the dividend discount models the share price is valued by using predicted dividends that are discounted back to present value. Gordon & Gordon (1997) use a finite horizon expected return model that is a basic dividend discount model assuming that firms do not earn excess returns beyond a finite forecast horizon. Moreover, they assume that beyond this finite horizon a return on equity investment equals to the cost of equity capital and the price is no longer dependent on the dividend policy. In addition, Gordon & Gordon (1997:54) hypothesise that when the retention rate (the percentage of the net income that is retained to grow the business) is zero or equivalent, a full distribution of earnings takes place.

$$(1) \quad P_t = \sum_{t=1}^T \frac{D_t(1+g)^t}{(1+k_{GG})^t} + \frac{E_t(1+g)^T}{r_{GG}(1+k_{GG})^T}$$

Gordon & Gordon (1997).

where,

$P_t$  = current price of the share

$D_t$  = expected dividend yield in period t

$g$  = expected growth rate of the dividend

$E_t$  = expected normalized earnings per share in period t

$k_{GG}$  = the return on equity investment = cost of equity capital

Botosan & Plumplee (2002) use target price ( $P$ ) method and combine the forecasted dividends for the first four periods to compute the cost of equity capital that is, similarly to Gordon & Gordon's (1997) model, equal to return on equity investment. The target price is the mean of the minimum and maximum long-run price forecasts and it operates as a substitute for terminal value estimations.

$$(2) \quad P_t = \sum_{t=1}^4 \frac{D_t}{(1+k_{BP})^t} + \frac{P_4}{(1+k_{BP})^4}$$

Botosan & Plumplee (2002).

where,

$P_t$  = price at date t

$D_t$  = dividends per share for year t

$P_4$  = mean of the minimum and maximum long-run price forecasts

$k_{BP}$  = expected cost of equity capital

The problem with the dividend discount models is that they recognise less value during the forecasting period and more value within the terminal value. Therefore, they exhibit higher sensitivity to assumed growth rate in perpetuity and thus, they are more vulnerable to uncertainty (Echterling, et al., 2015). Moreover, e.g. Croteau, Kao, & Richardson (2001) and Francis, Olsson & Oswald (2000) show that the residual income valuation models' valuation errors are minor than the errors in the dividend discount models.

#### 2.4.2. Residual income valuation models

Claus & Thomas (2001) and Gebhardt et al. (2001) both use the residual income valuation models to estimate the ICC. The strength in residual income valuation model lies in its ability to count the true cost of capital by measured as book value of the sharehold-

er's equity and the income that a company generates after accounting. Thus, residual income model attempts to provide more accurate value for the firm by adjusting the future earnings estimates, and by compensating for the equity cost.

To determine the ICC with the residual income valuation model, Claus & Thomas (2001:1642) use a five-year detailed plan horizon ( $T = 5$ ) and consensus analysts' forecasts of earnings. Moreover, they assume the long-term growth rate to be equal to the expected inflation rate, which is proxied by the risk free rate minus 3%. In addition, Glaus & Thomas (2001) require clean surplus accounting according to which book values are calculated, and that firms have positive earnings forecasts for at least two years in the I/B/E/S database. The missing earnings forecasts for the remaining years are computed by the long-term growth rate from I/B/E/S ( $FEPS_{t+\tau} = FEPS_{t+\tau}(1 + LTG)$ ). The dividend pay-out ratio is assumed to be constant 50%. Claus & Thomas (2001) use the abnormal earnings model to subtract biased results, such as systematically optimistic expected dividend growth rate ( $g$ ) relative to realized earnings.

$$(3) \quad P_t = B_t + \sum_{\tau=1}^5 \frac{ae_{t+\tau}}{(1+k_{c\tau})^\tau} + \frac{ae_{t+5}(1+g)}{(k_{c\tau}-g)(1+k_{c\tau})^5}$$

Claus & Thomas (2001:1642)

where,

$$\begin{aligned} ae_{t+\tau} &= FEPS_{t+\tau} - k_{c\tau}B_{t+\tau+1} \\ B_{t+\tau} &= B_{t+\tau+1} + FEPS_{t+\tau}(1 - DPR_{t+\tau}) \\ DPR_{\tau+t} &= 0,5 \\ g &= r_f - 0,3 \\ k_{c\tau} &= \text{cost of equity capital} \end{aligned}$$

Gebhardt et al. (2001) use similar approach than Claus & Thomas (2001) to estimate the ICC. In Gebhardt et al. (2001) residual income valuation model the detailed plan horizon is set to three years, and the earnings for the first two periods are collected from I/B/E/S, while the third period's earnings are calculated with the long-term growth rate from I/B/E/S ( $FEPS_{t+\tau} = FEPS_{t+\tau-1}(1 + LTG)$ ). Beyond the third period the return on equity linearly fades into the median industry return on equity by the twelfth year and remains constant thereafter. Gebhardt et al. (2001:142) emphasize that this method captures the long-term erosion of excess ROEs over the period and that individual firms tend to move towards their industry peers. Book values are calculated in accordance

with clean surplus accounting also in Gebhardt et al. (2001) model and the expected dividend pay-out ratio is assumed to be equal to  $DPS_0/EPS_0$ .

$$(4) \quad P_t = B_t + \sum_{\tau=T}^{T-1} \frac{FROE_{t+\tau} - k_{GLS}}{(1+k_{GLS})} B_{t+\tau-1} + \frac{FROE_{t+T} - k_{GLS}}{k_{GLS}(1+r_{GLS})^{T-1}} B_{t+T-1}$$

Gebhardt et al. (2001:142)

where,

$FROE_{\tau+t}$  = forecasted return on equity year  $t + \tau$ ,

$B_{t+\tau} = B_{t+\tau-1} + FEPS(1 - DPR_{\tau+t})$ ,

$DPR_{\tau+t} = DPS_0/EPS_0$ , if  $EPS_0 < 0 \rightarrow EPS_0 = LTG$

$k_{GLS}$  = cost of equity capital

Daske et al. (2006) extend Gebhardt et al. (2001) residual income valuation model by explicitly allowing daily estimates. In addition, Daske et al. (2006) use only publicly available information at the estimation date ( $s$ ). Also Daske et al. (2006) use the I/B/E/S analyst forecasts to estimate the missing forecasts up to five years, and interpolate the return on equity to the median industry average between the years six and twelve. Both Gebhardt et al. (2001:166) and Daske et al. (2006:28) find evidence that the lagged industry risk premium has an explanatory power over variation of expected risk premium.

$$(5) \quad P_s = E(bvps_s) + \frac{FEPS_s - \left[ (1+k_{DBK})^{\frac{d_1}{365}} - 1 \right] bvps_s}{(1+k_D)^{\frac{d_1}{365}}} + \sum_{t=2}^5 \frac{FEPS_{s,t} - k_{DBK} * bvps_{s,t-1}}{(1+k_{DBK})^{\frac{d_1}{365}}} \\ + \sum_{t=6}^{11} \frac{FROE_{s,t} - k_{DBK} bvps_{s,t-1}}{(1+k_{DBK})^{\frac{d_1}{365}}} + \frac{(FROE_{s,12} - k_{DBK}) bvps_{s,11}}{k_{DBK} (1+k_{DBK})^{\frac{d_{11}}{365}}}$$

Daske et al. (2006:6)

where,

$E(-)$  = expectation based on information available at time  $s$ ,

$P_s$  = price per share at estimation date  $s$ ,

$bvps_s$  = adjusted book value per share at estimation date  $s$ ,

$bvps_{s,t}$  = expected book value per share for the  $t$ -th full fiscal year after  $t$  at estimation date  $s$ ,

$FEPS_s$  = adjusted forecasted earnings per share for current fiscal year at estimation date  $s$ ,

$FEPS_{s,t}$  = forecasted earnings per share for current fiscal year at estimation date  $t$ ,

$FROE_{s,t}$  = forecasted (book-) return on equity for the  $t$ -th full fiscal year at estimation date  $s$ ,

$k_{DBK}$  = cost of equity capital,

$d$  = number of days between estimation date  $s$  and  $t$ -th full fiscal year's end.

The outcomes of all of the previously listed studies that have used the residual income valuation model (Claus & Thomas, 2001; Gebhardt et al., 2001; Daske et al., 2006) are constant – it has potential to complement or even replace the traditional methods using realized returns. Moreover, Gebhardt et al.'s (2001) findings indicate that there could be a cross-sectional relation between estimated equity risk premium and firm/industry characteristic, such as B/M, forecasted long-term growth rate, and the dispersion in analyst earnings forecast. However, there is a concern that B/M and long-term analyst forecasted growth rate might rather represent market mispricing than market riskiness. Yet, the use of these variables is emphasized by the fact that even though the markets are not completely rational, the eventual market correction will occur over relatively long period (Gebhardt et al. 2001:171). In addition, Claus & Thomas (2001:1657) state that the I/B/E/S forecasts might be biased. Therefore, the forecasted earnings estimates should be computed from the I/B/E/S median consensus earnings.

#### 2.4.3. Abnormal earnings growth models

The third approach to estimate ICC is abnormal earnings growth models, which provide different insight to firm valuation than residual income models by concentrating on earnings rather than book values. In addition, abnormal growth models do not require clean surplus as residual income models do. Since the clean surplus will not always literally hold on empirical environment, abnormal growth estimates are not exposed to multiple estimates in intrinsic values.

Several studies have applied abnormal earnings growth model, which is generally based on a two-year time horizon, and differing assumptions regarding cost of equity capital, dividend payout, and abnormal earnings. Easton (2004:73-74) uses simple price-to-earnings ratio ( $P/E$ -ratio) as a proxy and expands it to price-to-earnings to growth ratio ( $PEG$ -ratio). While  $P/E$ -ratio assumes that there are no abnormal returns earned during the measuring period, or growth in abnormal earnings,  $PEG$ -ratio allows abnormal returns to be earned during period two yet keeping the growth in abnormal earnings and the growth in dividend payout zero during the period one.

$$(6) \quad P_t = \frac{FEPS_{t+2} + k_{ES} DPS_{t+1} - EPS_{t+1}}{k_{ES}^2}$$

Easton (2004:80)

where,

$DPS_{t+1} = DPS_0$  = dividend during period 0,

$EPS_{t+1}$  = actual earnings per share during in year  $t + 1$ ,

$FEPS_{t+2}$  = forecasted earnings per share for year

$k_{ES}$  = cost of equity capital

Ohlson & Juettner-Nauroth (2005:349-350) abandon the restriction regarding the zero growth in abnormal earnings and allow long-term growth in perpetuity, without general assumptions on earnings and dividend growth. The model assumes that share price is determined by the present value of dividend per share, and that there are no restrictions how the dividends should evolve during time. Thus, the short-term dividend adjusted growth in earnings is defined as a separate parameter in the valuation function (Ohlson & Juettner-Nauroth, 2005:353).

$$(7) \quad K_{0J} = A + \sqrt{A^2 + \frac{FEPS_{t+1}}{P_t} (g_2 - (\gamma - 1))}$$

Ohlson & Juettner-Nauroth (2005:359)

where,

$$A = \frac{1}{2}((\gamma - 1) + \frac{DPS_{t+1}}{P_{t0}}),$$

$$DPS_{t+1} = DPS_0,$$

$$g_2 = \frac{STG+LTG}{2},$$

$$STG = \frac{FEPS_{t+2}-FEPS_{t+1}}{FEPS_{t+1}},$$

$$(\gamma - 1) = r_f - 0,03,$$

$r_f$  = risk free rate.

Even though abnormal earnings growth models concentrate explicitly on earnings rather than book values, there are some evident biases in the estimations. Easton (2004:92-93) finds that *PEG*-ratio is useful in specific means of valuating firms, but the model provides biased results from for firms that have higher *PE*, higher *PEG*-ratios, lower book-to-price ratios, lower standard deviation of past returns, and higher market capitalization. The model of Ohlson & Juettner-Nauroth (2005) prevents some of the problems that appear in Easton's (2004) model. Yet they find that there are some circumstances where the assumptions for  $\gamma$ , (which is assumed to be the difference between previous years' earnings per share compared to current year's earnings per share) is violated.

## 2.5. CSR and cost of equity capital

The theoretical approach to determine the ICC as the internal rate of return is basically the same in each of the above models. However, there are almost as many models to calculate to the ICC than there are studies related to it. To determine how to examine the CSR's impact on ICC, some of the models need to be excluded.

The studies show that the residual income models and abnormal earnings growth models outperform the dividend discount model in explaining the relation between value estimates and observable stock prices (e.g. Corteau et al., 2001; Francis et al., 2000). Moreover, since this study observes the CSR's impact on ICC also during the financial crisis period, dividend discount model's vulnerability to uncertainty is not preferred.

The evidence whether residual income model performs better in empirical implementation than abnormal earnings growth model or opposite. Although, Lai (2015) investigate the Ohlson & Juettner-Nauroth's (2005) model and is able to theoretically show that



abnormal earnings growth models provide better proxy for the growth patterns and therefore outperform residual income models. Since the evidence about which of the models perform better remains yet modest, this study applies both residual income models and abnormal earnings growth models to determine the ICC.

Thus, four models are selected to determine the ICC and to further study, whether companies with higher CSR values have lower financing costs i.e. lower cost of equity capital. The use of four different models is emphasized with an assumption that various models will provide better proxy to reveal the ICC due to the fact that the researches have not been able to determine which of the models operates the best. Moreover, by using four different models the biases and shortcomings among different approaches can be mitigated.

The studies have found that sustainability has long period impact (e.g. Lopez et al., 2007; Pătări et al., 2014) on stock prices. Since the model of Daske et al. (2006) uses daily estimates, and CSR is assumed to have long-term impact on firm's cost of equity, models that use yearly data are preferred over models using daily data in this study. The models that have been left after excluding dividend discount model and use of daily estimates are two residual income models (Claus & Thomas, 2001; Gebhardt et al., 2001), and two abnormal earnings growth models (Eston, 2004; Ohlson & Juettner-Nauroth, 2005). Thus, this study follows Hail & Leuz (2006) and El Ghouli et al. (2011) studies to compute the ICC from the mean of four different models.

Since the residual income models require clean surplus relation it is assumed later in this study that clean-surplus accounting holds. This means that the value of a stock can be expressed in terms of book value of equity plus the present value of residual earnings in the models that require clean surplus accounting. Moreover, all items that have influence on the book value of equity (excluding transactions with shareholders, e.g. dividends and share repurchases/issues) have to be included in earnings. (e.g. Claus & Thomas, 2001:1635.)

## 2.6. Efficient market theory

To examine the impact of applying CSR/sustainability practices on the cost of equity capital it is assumed that the efficient market theory holds. The weak form of the efficient market theory suggests that markets are purely random and any future change in

security can't be predicted with past prices. Under the semi-strong efficiency asset prices fully reflect all publicly available market information, and anomalies are instantly adjusted away by the markets. Finally, the strong-form efficiency applies when all available public and inside information are fully reflected into stock prices and therefore, there is no additional information available that would benefit any investor. (Fama, 1970.)

The above described efficient market theory suggests that all information available will be immediately absorbed into stock value, and the stock price follows random walk. Therefore investors do not have the possibility to make abnormal profits on the market. It is hypothesized in this study, that efficient market theory holds and therefore markets will price companies that have applied CSR practices less risky, while companies with poor CSR performance are priced with higher cost of equity capital. This assumption is conducted with logic that markets will reward companies that do “good”, and punish the “bad” companies.

However, empirical research have found anomalies, where the efficient market theory does not fully apply e.g. (1) momentum, where price keeps moving to the same direction rather than changing its direction (e.g. Jegadeesh & Titman, 1993; Jegadeesh & Titman, 2001; Fama & French, 2008); (2) overreacting/underreacting, where the market does not react to new information available (e.g. Fama, 1998; Hong & Stein, 1999; Frazzini, 2006); (3) small firms (smaller capitalization) outperforming the larger companies (Fama & French, 1993; Moeller, Schlingemann & Stulz, 2004) and (4) low book to value -anomaly, where below average price-to-book ratio stocks tend to outperform the market (Fama & French, 1993; Zhang, 2005).

The results of the studies CSR and sustainability practices' impact on stock price are controversial. E.g. López et al. (2007:292 – 295) find that application of CSR practices has a negative short-term impact on firm performance. In addition, Pätäri et al. (2014) results suggest that the CSR's impact on the firm performance does not start immediately after the CSR announcements. The market anomalies (e.g. overreacting/underreacting) might be one of the factors that cause these results, and complicate also the examination of the relation between CSR and company's riskiness.

The data and methodology are presented in next chapter 4. Thereafter the results are reviewed in chapter 5, and the conclusions are listed in chapter 6.

### 3. DATA AND METHODOLOGY

This chapter presents the data and methodology that are used to conduct this study. In sub-chapter 3.1 the sample construction is reviewed. Furthermore, the regression variables are presented in sub-chapter 3.2, and descriptive statistics for the regression variables are reported in sub-chapter 3.3. Finally, the methodologies to run the regressions are viewed in sub-chapter 3.4.

#### 3.1. Sample construction

This study examines the association between CSR and the cost of equity financing. The data is obtained from Thomson Reuters Datastream. Datastream on Institutional Brokers Earnings Services (I/B/E/S) provides analyst forecast data, while Datastream on ASSET4 provides the CSR data. The industry affiliation and financial data and financial data are also obtained from Thomson Reuters Datastream.

The methodology follows Gerdhardt et al. (2001), Dhaliwal et al. (2011) and El Ghouli et al. (2011) studies to produce the cost of equity capital, which itself is obtained from four different models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Easton (2004), and Ohlson & Juettner-Nauroth (2005). To produce the estimate, the forecast data for all firms that have positive 1- and 2-year-ahead consensus earnings forecasts and a positive long-term growth forecast is extracted from the I/B/E/S summary file. Furthermore, it is required that each of the samples have positive I/B/E/S share price, positive book value per share, and that the firm belongs to one of the Fama & French (1997) 48 industries (El Ghouli et al., 2011:2390). Moreover, firms with invalid cost of equity estimates under any of the four models or insufficient CSR and control variables are excluded.

The above constrictions yield a sample of 4085 firm-year observations that represent 404 unique companies between 2002 and 2013. The companies are divided by industries according to Fama & French (1997) 48 industry groups, and the division between industry and year is presented in Table 1. Business services, utilities, petroleum and natural gas, retail, electronic equipment, and insurance are the dominating industries as each of these industries are accounting for over 5% of the observations. It can be seen from the table that the coverage of CSR data increases linearly over the sample period,

and on 2012 the data is available for all firms in the sample. This indicates that the CSR activity has increased during recent years.

**Table 1.**

Sample breakdown by industry and year.

Industry	N	%	Industry	N	%
Agriculture	0	0,00	Personal services	1	0,25
Food products	12	2,97	Business services	33	8,17
Candy and soda	5	1,24	Computers	12	2,97
Beer and liquor	3	0,74	Electronic Equipment	24	5,94
Tobacco products	1	0,25	Measuring and control equipment	10	2,48
Recreation	2	0,50	Business supplies	5	1,24
Entertainment	2	0,50	Shipping containers	1	0,25
Printing and publishing	2	0,50	Transportation	13	3,22
Consumer goods	9	2,23	Wholesale	14	3,47
Apparel	3	0,74	Retail	29	7,18
Healthcare	5	1,24	Restaurants, hotels and motels	8	1,98
Medical equipment	13	3,22	Banking	13	3,22
Pharmaceutical products	16	3,96	Insurance	21	5,20
Chemicals	13	3,22	Real Estate	2	0,50
Rubber and plastic products	1	0,25	Trading	20	4,95
Textiles	1	0,25	Almost Nothing	3	0,74
Construction materials	5	1,24	Total	404	100,00
Construction	3	0,74			
Steel works etc.	2	0,50	Year	N	%
Fabricated products	0	0,00	2002	220	5,39
Machinery	14	3,47	2003	220	5,39
Electrical equipment	0	0,00	2004	283	6,93
Automobiles and trucks	6	1,49	2005	330	8,08
Aircraft	3	0,74	2006	335	8,20
Shipbuilding and railroad equipment	0	0,00	2007	358	8,76
Defense	0	0,00	2008	381	9,33
Precious metals	1	0,25	2009	389	9,52
Non-metallic and industrial metal mining	1	0,25	2010	395	9,67
Coal	1	0,25	2011	401	9,82
Petroleum and natural gas	29	7,18	2012	404	9,89
Utilities	33	8,17	2013	369	9,03
Communication	9	2,23		4085	100,00

The table presents sample composition by industry and year of the 4085 observations during 2002 – 2012. The industries are divided into Fama & French (1997) industry groups.

### 3.2. Regression variables

To examine CSR's impact on cost of equity, the implied cost of equity and CSR variables need to be yielded from the data available. This subchapter presents the methods how to produce the cost of equity capital estimates. Also the methods to produce the CSR variables are reported, and the firm specific control variables are reviewed.

#### 3.2.1. Cost of equity capital estimates

As discussed in Chapter 2, the previous studies (Fama & French, 1997, 2004; Elton, 1999; Claus & Thomas, 2001) do not tempt to use realized returns as a proxy for estimating cost of equity capital. Thus, this research follows Hail & Leuz (2006), Dhaliwal et al. (2011) El Ghouli et al. (2011) studies which estimate the cost of equity capital, and

further equity premium, by using four different models based on *ex ante* cost of equity implied in current stock prices and forecast analysis.

Recent studies show that implied cost of equity (ICC) separates the cost of capital effects from cash flow effects and growth effects (Heil & Leuz, 2006, 2009; Chen et al., 2009), and therefore ICC provides more accurate predictions than estimations based on realized returns. In addition, Pástor et al. (2008) find that ICC outperforms the methods that use realized returns in determining the nexus between increase in return and increase in risk (risk-return trade-off). Yet, the recent literature has not been able to detect the most efficient model(s), and therefore, the use of four different models is emphasized. Moreover, the use of different models will eliminate any deficiencies in individual models.

The four models used in this study are (1) the Claus & Thomas (2001) model (CT), (2) the Gebhardt et al. (2005) model (GLS), (3) the Ohlson & Juettner-Nauroth (2005) model (OJ), and (4) the Easton (2004) model (ES). After computing the cost of equity capital with each of the models, the 10-year US Treasury bond yield is deducted from it to yield the cost of equity premium. These cost of equity premiums computed from the four models are denoted as  $r_{CT}$ ,  $r_{GLS}$ ,  $r_{OJ}$ , and  $r_{ES}$  respectively. The four equations for computing cost of equity capital are presented below.

Since all of the four models use somewhat similar variables, the most commonly used variables are listed:

$P_t$  = stock price in year  $t$

$DPS_0$  = actual dividend per share in year  $t - 1$

$EPS_0$  = actual earnings per share in year  $t - 1$

$LTG$  = long-term growth forecast in year  $t$

$FEPS_{t+\tau}$  = forecasted earnings per share for year  $t+\tau$  recorded in year  $t$

$B_t$  = book value per share at the beginning of the year  $t$

$r_f$  = yield on a 10-year Treasury note in year  $t$

In addition, two of the models require the over two-year-earning forecast. Since over two-year-earning forecast is not available for all firms in I/B/E/S, the forecast is yielded from the previous year's forecast and the long-term growth forecast:

$$(8) \quad FEPS_{t+\tau} = FEPS_{t+\tau}(1 + LTG)$$

El Ghoul et al. (2011:2401).

Model 1: Claus & Thomas (2001)

In Claus & Thomas (2001) model the share price is expressed in forecasted residual earnings and book values. To allow this assumption, clean surplus accounting is required. As seen from the below equation, the explicit forecast window is set to 5 years. After this, the forecasted residual earnings growth is equal to expected inflation rate and dividend pay-out ratio is a constant 50%. The cost of equity capital is obtained by searching for the right value for  $k_{c\tau}$  that balances the right-hand-side and the left-hand side of the equation. The valuation equation is given by:

$$(9) \quad P_t = B_t + \sum_{\tau=1}^5 \frac{ae_{t+\tau}}{(1+k_{c\tau})^\tau} + \frac{ae_{t+5}(1+g)}{(k_{c\tau}-g)(1+k_{c\tau})^5}$$

Claus & Thomas (2001:1642)

where

$$\begin{aligned} ae_{t+\tau} &= FEPS_{t+\tau} - k_{c\tau}B_{t+\tau+1} \\ B_{t+\tau} &= B_{t+\tau+1} + FEPS_{t+\tau}(1 - DPR_{t+\tau}) \\ DPR_{\tau+t} &= 0,5 \\ g &= r_f - 0,3 \end{aligned}$$

Model 2: Gebhardt et al. (2001)

Also in the Gebhardt et al. (2001) model the clean surplus accounting is assumed to be valid, to allow share price to be expressed in terms of forecasted returns on equity (ROE) and book values. Again, the equation is balanced by finding the right value for  $k_{GLS}$ . The valuation equation is given by:

$$(10) \quad P_t = B_t + \sum_{\tau=T}^{T-1} \frac{FROE_{t+\tau}-k_{GLS}}{(1+k_{GLS})} B_{t+\tau-1} + \frac{FROE_{t+T}-k_{GLS}}{k_{GLS}(1+k_{GLS})^{T-1}} B_{t+T-1}$$

Gebhardt et al. (2001)

where

$FROE_{\tau+t}$  = forecasted return on equity year  $t + \tau$

$B_{t+\tau} = B_{t+\tau-1} + FEPS(1 - DPR_{\tau+t})$

$DPR_{\tau+t} = \frac{DPS_0}{EPS_0}$ , if  $EPS_0 < 0$ ,  $EPS_0 = LTG$

For the first 3 years,  $FROE_{t+\tau}$  is set equal to  $FEPS_{t+\tau}/B_{t+\tau-1}$ , where  $FEPS_{t+\tau}$  is the I/B/E/S mean forecasted EPS for the year  $t + \tau$  and  $B_{t+\tau-1}$  is the book value per share for the year  $t + \tau - 1$ . After the third year  $FROE$  is forecasted using the linear interpolation and it fades linearly to the industry median  $ROE$  by the 12th year. The industry allocation follows Fama & French (1997) industry classification and the median industry  $ROE$  is calculated over the past 12 years excluding loss firms. The expected dividend payout ratio  $DPR_{t+\tau}$  is set equal to  $DPS_0/EPS_0$ . The highest extreme values are winsorized at 20 percent rate.

Model 3: Ohlson & Juettner-Nauroth (2005):

Ohlson & Juettner-Nauroth (2005) apply constant growth model to estimate the ICC. It is a generalization of Gordon (1962) dividend growth that implies that the expected rate of return on the stock market ( $k^*$ ) equals the forward dividend yield ( $d_1/p_0$ ) plus the expected dividend growth rate in perpetuity ( $g$ ). Ohlson & Juettner-Nauroth (2005) expand Gordon's (1962) model by introducing short-term and long-term growth and cost of capital in to the estimation. The equation assumes that dividend per share (DPS) determines the share price but it does not restrict how it should evolve. Thus, the equation expresses ICC as a function of the estimated earnings per share to price, and as two measures of growth. The valuation equation is given by:

$$(11) \quad K_{0J} = A + \sqrt{A^2 + \frac{FEPS_{t+1}}{P_t} (g_2 - (\gamma - 1))}$$

Ohlson & Juettner-Nauroth (2005:359)

where,

$$A = \frac{1}{2} \left( (\gamma - 1) + \frac{DPS_{t+1}}{P_t 0} \right)$$

$$DPS_{t+1} = DPS_0$$

$$g_2 = \frac{STG + LTG}{2}$$

$$STG = \frac{FEPS_{t+2} - FEPS_{t+1}}{FEPS_{t+1}}$$

$$(\gamma - 1) = r_f - 0,03.$$

Model 4: Easton (2004)

Easton (2004) uses a generalization of Price-Earnings-Growth (PEG) model, where the earnings growth of a company is also controlled in addition to price and earnings. In this model share price is expressed in terms of 1-year-ahead and 2-year-ahead earnings forecasts. The explicit forecast horizon is set to 2-years, and after this forecasted abnormal returns are assumed to grow in perpetuity at constant rate. In addition to positive 1-year-ahead and 2-year-ahead earnings forecasts, Easton's (2004) model also requires positive change in earnings forecast. The valuation equation is given by:

$$(12) \quad P_t = \frac{FEPS_{t+2} + r_{ES} DPS_{t+1} - EPS_{t+1}}{k_{ES}^2}$$

Easton (2004:80)

where

$$DPS_{t+1} = DPS_0.$$



**Table 2.**  
Descriptive statistics and correlation coefficients for implied equity premium estimates.

Variable	Mean	Q1	Median	Q3	St.dev.
Panel A. Descriptive statistics for implied equity premium estimates.					
$r_{CT}$	3,06	1,42	2,68	4,26	2,68
$r_{GLS}$	6,34	4,05	6,00	8,22	3,39
$r_{OJ}$	4,20	2,14	3,67	5,46	3,26
$r_{ES}$	6,77	4,38	6,05	8,22	3,96
$r_{AVG}$	5,07	3,30	4,65	6,30	2,63
2002	4,76	3,21	4,27	5,73	2,51
2003	3,87	2,59	3,64	4,67	2,05
2004	3,55	2,40	3,21	4,41	1,92
2005	3,64	2,49	3,30	4,21	2,12
2006	3,36	2,27	3,05	3,82	2,01
2007	4,10	2,98	3,88	4,88	1,82
2008	7,65	5,55	6,95	8,81	3,21
2009	5,09	3,66	4,63	6,09	2,25
2010	5,25	4,01	5,03	6,27	2,02
2011	7,08	5,39	6,72	8,24	2,55
2012	6,63	5,33	6,32	7,38	2,18
2013	4,66	3,65	4,42	5,46	1,74
	$r_{CT}$	$r_{GLS}$	$r_{OJ}$	$r_{ES}$	
$r_{GLS}$	0,563				
$r_{OJ}$	0,314	0,465			
$r_{ES}$	0,344	0,451	0,724		
$r_{AVG}$	0,682	0,786	0,812	0,834	

The table demonstrates the implied cost of equity premium estimations distribution statistics and Pearson's correlation coefficients for the 4085 companies during 2002-2013. Mean, first quartile, median, third quartile, and standard deviation are presented in the Panel A, while Panel B shows the Pearson pairwise correlations.  $r_{AVG}$  is the average implied cost of equity premium, and it is calculated as average of four models produced by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004) ( $r_{CT}$ ,  $r_{GLS}$ ,  $r_{OJ}$ , and  $r_{ES}$  respectively).

Table 2 presents descriptive statistics and correlation coefficients for the implied cost of equity premium. In Panel A. the equity premium estimates are first presented based on the four models, and secondly the average implied cost of equity premium is presented by observation years. Gebhardt et al. (2001) and Easton (2004) models produce higher average equity premiums (6,34% and 6,77% respectively) compared to Claus & Thomas (2001) and Ohlson & Juettner-Nauroth (2005) models (3,06% and 4,20% respectively). The Pearson correlation coefficients between the cost of equity estimates yielded from the four different models and the final averaged measure of the cost of equity capital ( $r_{AVG}$ ) are presented in the Panel B. The results are similar with Dhaliwal et al. (2011) and El Ghouli et al. (2011) findings showing  $r_{OJ}$  and  $r_{ES}$  have higher correlations with  $r_{AVG}$ , while  $r_{CT}$  and  $r_{GLS}$  exhibit lower correlation with  $r_{AVG}$ . In addition, the implied cost of equity premium peaks during years 2007, 2011, and 2012.

### 3.2.2. Corporate social responsibility

To specify the proxy for CSR this study uses corporate governance, environmental, economic and social variables provided by Datastream. The variables are divided into two major categories: qualitative issue areas and controversial business issues. The qualitative issue areas include companies CSR activities, while controversial business issues category preserve the “sin” stocks.

Qualitative issue areas cover corporate governance, emission reduction, resource reduction, community, human rights, diversity and opportunity, and employee issues characteristics. All these seven issue areas include different sub-variables (illustrated in the Appendix 1). Datastream provides either “YES” or “NO” value for each of the CSR variable. “YES” means that the company practices the specific CSR policy, while “NO” means that the company has not applied the specific CSR practices. Based on these a binary (0/1) score is given for each qualitative issue areas from deducting the amount of cells containing “NO” from the amount of cells containing “YES”. If a company has applied more CSR practices than it has lacks in the variables, company will get the value of 1 for that specific issue area. Vice versa, if the company fails to apply any CSR practices or the amount of “YES” and “NO” are equal, the value of 0 will be assigned for the issue area. Furthermore, an ultimate CSR score is calculated by adding the sub-variable scores together.

Controversial business issues include alcohol, gambling, tobacco, armaments and nuclear. Since qualitative issue areas and controversial business issues are critically different, they are examined separately. Consistent with the calculation process of CSR score, the involvement in controversial business issues is calculated with a variable that takes the value of 0/1 if a company is involved in any of the five controversial business areas (*CSR\_CONTR*). Thus, a dummy value (1) is denoted for companies that are involved in any of the controversial business areas. Controversial business issues are listed in the Appendix 2.

### 3.2.3. Control variables

The implied cost of equity premium is regressed on also other variables than CSR to examine firm-specific effects. Factors that are shown to have an impact on the cost of equity capital are selected for control variables for multivariate analysis. Prior studies (e.g. Gebhardt et al., 2001; Hail & Leuz, 2006; Dhaliwal et al., 2011; El Ghouli et al.,

2011) show that beta (*BETA*); size (*SIZE*), measured as the natural logarithm of total assets; the book-to-market ratio (*BTM*); and leverage (*LEV*), computed as the ratio of total debt to the market value of equity, affect the cost of equity capital, and are therefore controlled in this study. Since the *implied* cost of equity capital is used as a dependent variable, also analyst forecast attributes are controlled. Forecast dispersion (*DISP*), measured as the coefficient of variation of 1-year-ahead earnings forecasts, and the consensus long-term growth forecast (*LTG*) are used to control the analyst forecast features. Lastly, the industry effects are controlled by using Fama & French (1997) 48-industry groups classification.

### 3.3. Descriptive statistics

Table 3 provides descriptive statistics for the CSR variables. The overall CSR score over the study period is stated in panel A. The maximum variation of the score is from 0 to 7. The descriptive statistics show that the median increases over time, which means that companies' awareness towards CSR practices has increased steadily over time. Even though the amount of companies applying CSR practices increases in the sample data, the amount of companies with lower CSR score exceed the companies that have high CSR scores during all years except years 2012 and 2013. This can be seen from the median that remains below the middle level of minimum and maximum value, and from all years' average value 2,63.

Panel B reports the frequency distribution of the controversial business issues. The percentage of companies involved in controversial businesses is expressed with *CSR\_CONTR(%)* both at the year level and for the whole sample period. The percentages for all five controversial business industries with respect to total sample size are presented in the panel B. The overall percentage for controversial business issues is 14,10%, and from the percentages over the whole sample period, it can be clearly observed that the fields of nuclear and armament dominate the controversial business issues. The frequency distribution suggests that the involvement in the five controversial business issues has remained almost the same during the whole sample period. The amount of companies involved in alcohol and tobacco products has decreased during the sample period. However, the companies involved in armament products have more than doubled during the period and thus the decreasing impact is deleted. The involvement in gambling and nuclear has remained somewhat same during the sample period.

**Table 3.**  
Descriptive statistics for corporate social responsibility data.

	Mean	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	St.dev.
<i>Panel A. Descriptive statistics for the corporate social responsibility score</i>							
2002	0,48	0	0	0	1	4	0,78
2003	0,82	0	0	1	1	5	0,84
2004	0,85	0	0	1	1	5	0,82
2005	1,06	0	0	1	1	7	0,99
2006	1,41	0	1	1	2	7	1,13
2007	2,28	0	1	2	3	7	1,39
2008	2,91	0	2	3	4	7	1,59
2009	3,17	0	2	3	4	7	1,73
2010	3,37	1	2	3	5	7	1,70
2011	3,63	1	2	3	5	7	1,74
2012	3,80	1	2	4	5	7	1,73
2013	3,84	1	2	4	5	7	1,76
All years	2,63	0	1	2	4	7	1,86
Year		<i>CSR_CONTR(%)</i>	<i>CSR_ALC(%)</i>	<i>CSR_GAM(%)</i>	<i>CSR_TOB(%)</i>	<i>CSR_ARM(%)</i>	<i>CSR_NUC(%)</i>
<i>Panel B. Frequency distribution for controversial business areas</i>							
2002		14,50	2,30	0,50	0,90	3,60	7,70
2003		13,60	2,30	-	0,90	3,60	7,30
2004		9,90	1,40	-	0,40	2,80	6,00
2005		11,20	1,50	-	0,60	3,30	6,70
2006		13,70	0,90	1,20	0,30	5,10	7,20
2007		14,20	0,80	0,80	0,60	5,90	7,80
2008		15,20	0,80	1,00	0,30	7,10	7,60
2009		14,90	0,80	1,00	0,30	7,20	7,50
2010		15,20	0,80	1,00	0,30	7,30	7,60
2011		15,20	0,70	1,00	0,20	7,50	8,00
2012		14,60	0,70	1,00	0,20	7,40	7,40
2013		14,60	0,80	0,50	0,30	7,90	7,60
All years		14,10	1,10	0,70	0,40	6,00	7,40

This table shows descriptive statistics of the CSR data for the 404 firms in the sample. Mean, minimum, first quartile, median, third quartile, maximum, and standard deviation of the overall CSR score are provided in the Panel A. The yearly frequency distribution of the controversial business issues is presented in panel B. Appendix 1 and 2 provide further details of the construction of the CSR variables.

The other explanatory variables (Panel A) and the pair-wise correlations (Panel B) between the implied cost of equity estimates and the regression variables are presented in Table 4. The Pearson correlation coefficient shows that CSR score is actually associated with higher implied cost of equity premium. Contradictory to the hypotheses, the Pearson correlation coefficient indicates that market prices companies that have adopted CSR practices riskier than companies with low CSR score.

In addition, beta, book-to-market ratio, size and leverage seem to have significant increasing effect on cost of equity capital. Beta measures the systematic risk of a security, while leverage represents the amount of debt used to finance company's assets. Therefore, it is consistent that market sees companies with higher beta coefficients and leverage ratios riskier and requires higher cost of equity capital from them. Above one book-to-market ratio indicates that the stock is undervalued, and it seems that companies with higher book value related to the market value also have higher cost of equity capital costs. Moreover, it seems that the company size impacts increasingly to the cost of equity capital. The only control variable that seems to have decreasing impact to cost of eq-

uity capital is long-term growth. Therefore it seems that markets require lower cost of equity capital from companies with expected growth in the future.

**Table 4.**  
Descriptive data for regression variables.

Variable	Mean	Min	Q1	Median	Q3	Max	St.dev.
<i>Panel A. Descriptive statistics for control variables</i>							
BETA	1,01	-0,23	0,71	0,98	1,31	3,89	0,51
SIZE	16,41	12,12	15,39	16,32	17,26	21,61	1,35
BTM	0,45	0,00	0,24	0,37	0,58	4,64	0,31
LEV	0,38	0,00	0,08	0,19	0,47	11,22	0,63
LTG	11,82	-41,00	8,50	11,44	14,45	75,99	6,64
DISP	0,03	-0,30	0,01	0,01	0,03	9,00	0,19
	$r_{AVG}$	CSR_S	BETA	SIZE	BTM	LEV	LTG
<i>Panel B. Pearson correlation coefficients between regresson variables</i>							
CSR_S	0,27***						
BETA	0,19***	-0,03					
SIZE	0,22***	0,38***	-0,02				
BTM	0,51***	0,08***	0,05***	0,40***			
LEV	0,24***	0,06***	-0,04***	0,39***	0,41***		
LTG	-0,09***	-0,24***	0,22***	-0,30***	-0,24***	-0,18***	
DISP	0,11***	-0,02	0,04**	-0,01	0,06***	0,05***	0,05***

The descriptive statistics for the regression variables for the 4045 firm-year observations during sample period 2002-2013 is presented in this table. The mean, minimum, first quartile, median, third quartile, maximum, and standard deviation for the control variables are demonstrated in the Panel A., while Panel B. shows the Pearson pair-wise correlations between the regression variables and implied cost of equity premium obtained from four models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004).

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

### 3.4. Methods

The empirical part of this study follows El Ghouli et al. (2011) study and uses pooled time-series cross-sectional (TSCS) regression, which allows the data be organized under the dimension of space and dimension of time. The dependent variable is set to be the average implied cost of equity premium ( $r_{AVG}$ ) that is calculated from the four models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004).

The cost of equity premium is regressed on various CSR proxies and control variables, and the standard errors are clustered at the firm level. The regressions used in this study are executed with STATA. The regressions are run with xtreg command, and the resulting standard errors are completely robust to any kind of serial correlation and/or heteroskedasticity.

Equation 13 explains the basic methodology used in this study.  $y_{it}$  and  $x_{it}$  are respectively the dependent and independent variables for unit I and time t, while  $\varepsilon_{it}$  is a random error.  $\beta_0$  is the constant intercept and  $\beta_k$  represent the coefficient of an independent variable. In addition,  $u_i$  represents the individual-level fixed effects or in this case the industry effects.

$$(13) \quad y_{it} = \beta_0 + \beta_k x_{it} + u_i + \varepsilon_{it}$$

Linear regression assumptions define whether to use random effects or fixed effects model. The assumptions for random effects model are significantly stricter than the assumptions for fixed effects model. To test which model can be used in this study, Hausman and the Breusch and Pagan Lagrange- multiplier tests are run. Hausman test results show that  $\text{Chi}^2$  is significant, which indicates that fixed effects model should be used rather than random effect model. The Breusch and Pagan Lagrange -multiplier test shows consistent results. The primary assumptions of random effects are violated, since  $\text{Var}(v)$  does not add to zero. Due to the fact that both of the tests reject null hypothesis, the fixed effect model is adopted to run the tests.

The basic regression used in this study is the Equation 14, where the cost of equity premium ( $r_{AVG}$ ) is regressed on CSR score ( $CSR\_S$ ) and year and industry effects are controlled. Equation 15 represents the regressions where the firm-specific variables are controlled.

$$(14) \quad r_{AVG} = \beta_0 + \beta_1 CSR\_S_{it} + u_i + \varepsilon_{it}$$

$$(15) \quad EQR = \beta_0 + \beta_1 CSR\_S_{it} + \beta_2 BETA_{it} + \beta_3 SIZE_{it} + \beta_4 BTM_{it} + \beta_5 LEV_{it} + \beta_6 LTG_{it} + \beta_7 DISP_{it} + u_i + \varepsilon_{it}$$

To control the year change effects the sample period is divided into three-year periods, but otherwise the regressions remain similar than demonstrated in equations X & Y. In addition, individual CSR components' effect on the cost of equity capital is examined in this study. To control for individual CSR attributes, the cost of equity premium ( $r_{AVG}$ ) is regressed on individual CSR variable, and CSR score ( $CSR\_S$ ) is dropped from the regression.

Since the controversial issue areas are analyzed separately from qualitative issue areas, the CSR score ( $CSR\_S$ ) is replaced by controversial issue dummy ( $CSR\_CONTR$ ) in the

regressions examining controversial issue areas' impact on the cost of equity capital. In regressions for individual controversial business areas controversial issue dummy (*CSR\_CONTR*) is replaced with individual controversial attribute. The results are presented in the next Chapter 4.

## 4. RESULTS

As discussed in the literature review the recent literature provides controversial results about how exactly CSR affects to firm valuation. This chapter reviews the results obtained from the models used to investigate the relation between CSR and cost of equity capital. The chapter is organized as follows. Firstly, univariate tests are implemented in sub-chapter 4.1 to compare the cost of equity premium of firms with an above median CSR score against companies with below median CSR score. Secondly, multivariate regression analysis is executed in sub-chapter 4.2, and the cost of equity capital is regressed on a number of CSR proxies and control variables. Lastly, the robustness checks are reported in sub-chapter 4.3.

### 4.1. Univariate analysis

The univariate analysis is conducted by comparing the mean (Table 5, Panel A) and median (Table 5, Panel B) cost of equity premiums between companies that have above median CSR score to companies with below median CSR score. The comparison is made with using the average cost of equity premium ( $r_{AVG}$ ) and all four individual cost of equity estimates ( $r_{CT}$ ,  $r_{GLS}$ ,  $r_{OJ}$ , and  $r_{ES}$ ).

The results comparing the average cost of equity premium show that the mean (median) cost of equity premium for companies with a high CSR score is 5,68% (5,22%), while companies with lower CSR score it is 4,10% (3,65%). Thus, the univariate test results support the preliminary results obtained from the Pearson correlation coefficient test that companies with lower CSR score actually benefit from 1,58 (1,57) basis points lower cost of equity premium and therefore lower financing costs. The T-test (Wilcoxon signed-rank test) is used to calculate the significance of the differences between the means, and all these differences are significant at the 1% level. Equally, the Wilcoxon signed-rank test is used to test the significance of the differences between the median scores. Also all these differences are significant at the 1% level.

The differences between mean and median scores are calculated also by using the four individual cost of equity premiums. Even if the individual estimates are used to examine the direction of the differences, it seems that companies with higher CSR score have also greater cost of equity costs. Thus, the univariate analysis suggests that adopting



CSR practices actually increases companies' cost of equity premium rather than decreases it.

**Table 5.**  
Univariate test.

		<i>N</i>	$r_{CT}$	$r_{GLS}$	$r_{OI}$	$r_{ES}$	$r_{AVG}$
<i>Panel A. Means</i>							
CSR_S $\geq$ median	(1)	2513	3,63	7,19	4,70	7,41	5,68
CSR_S < median	(2)	1572	2,16	4,99	3,40	5,75	4,10
Difference	(1)-(2)		1,47	2,20	1,30	1,66	1,58
t-stat.			-22,99***	-28,72***	-17,87***	-19,66***	-27,82***
<i>Panel B. Medians</i>							
CSR_S $\geq$ median	(1)	2513	3,19	6,82	4,16	6,72	5,22
CSR_S < median	(2)	1572	1,87	4,56	2,75	5,09	3,65
Difference	(1)-(2)		1,32	2,26	1,41	1,63	1,57
Z-stat.			-19,14***	-23,38***	-15,27***	-15,76***	-20,72***

The table shows the results of mean (Panel A) and median (Panel B) comparison tests for individual and average cost of equity estimates. The test is made by comparing companies with high (above median) and low (below median) CSR score (*CSR\_S*). The sample contains 4085 observations during the sample period 2002-2013.  $r_{CT}$ ,  $r_{GLS}$ ,  $r_{OI}$ , and  $r_{ES}$  are implied cost of equity estimates obtained from the models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004) respectively.  $r_{AVG}$  is the average cost of equity premium determined from the previously listed four models.

\*\*\* Statistical significance at the 1% level.

#### 4.2. Multivariate regression analysis

Multivariate regression analysis is used to further examine the CSR's impact on cost of equity capital, and the averaged implied cost of equity premium ( $r_{AVG}$ ) is regressed on various CSR proxies and control variables. The multivariate analysis is conducted by using pooled time-series cross-sectional regression (TSCS), which is a powerful explanatory tool organizing the data under the dimension of space and dimension of time. The results are presented in Table 6. In all models, the average cost of equity premium is the dependent variable, while explanatory variables include, in addition to different CSR proxies, many firm-specific control variables and also year and industry fixed effects.

In Models 1 – 6 the overall CSR score's (*CSR\_S*) impact on the cost of equity capital is tested, while controlling both year and industry effects. Model 1 is the basic regression and only the effect of CSR is scrutinized with year and industry effects. The control variables (*BETA*, *SIZE*, *BTM*, *LEV*, *LTG*, *DISP*) are included in Model 2 to allow examination of different firm-specific controls' impact on the cost of equity capital. The results from both Model 1 and Model 2 are similar, and the impact of CSR on the cost of equity is neutral. However, it seems that leverage (*LEV*) and dispersion (*DISP*) have significant and increasing effect on the cost of equity capital.

To examine the changes in the relation between CSR and the cost of equity capital the sample is divided into four sub-periods: 2002-2004 (Model 3), 2005-2007 (Model 4), 2008-2010 (Model 5), and 2011-2013 (Model 6). As seen from Table 1, the amount of companies that have adopted CSR practices has increased over the time. Therefore, the relation between CSR and the cost of equity capital is expected to change over time. Only during financial crises period 2008-2010 in Model 5 the impact of CSR on the cost of equity capital is significant and positive. However, the impact is insignificant.

Finally, in Models 8 – 13 the examination of the relation between CSR and the cost of equity capital is extended to cover the individual CSR proxies' effect on the cost of equity capital. The impact of corporate governance (*CSR\_GOV\_S*), emission reduction (*CSR\_EMI\_S*), resource reduction (*CSR\_RES\_S*), community (*CSR\_COM\_S*), human rights (*CSR\_HUM\_S*), employee relations (*CSR\_EMP\_S*), and diversity and opportunity (*CSR\_DIV\_S*) on the cost of equity capital is individually investigated. Similarly to CSR score a yearly binary score (1/0) is calculated for all individual CSR attributes depending whether companies have adopted the specific CSR practices (1) or not (0). The objective of examining the specific CSR practices' effect on the cost of equity capital is to find out whether certain attributes have greater impact on the cost of equity capital than others.

Model 7 tests the impact of corporate governance on the cost of equity capital. The coefficient for *CSR\_GOV\_S* is only negative coefficient in Models 7 – 13. However, the result is insignificant. The impact of emission reduction tested in Model 8 is neutral and insignificant. Resource reduction (Model 9), community (Model 10), human rights (Model 11), employee relations (12) and diversity and opportunity (Model 13) seem to have slight but significant impact on the cost of equity capital. All these attributes have increasing impact on the cost of equity capital, which indicates that companies that have adopted these any of these five CSR practices suffer from higher cost of equity capital.

**Table 6.**  
Corporate social responsibility and the cost of equity capital.

	<i>CSR_S</i>	<i>CSR_S</i>	2002- 2004	2005- 2007	2008- 2010	2011- 2013	<i>CSR_GOV_S</i>	<i>CSR_EMP_S</i>	<i>CSR_RES_S</i>	<i>CSR_COM_S</i>	<i>CSR_HUM_S</i>	<i>CSR_EMP_S</i>	<i>CSR_DIV_S</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>CSR</i>	0.001*** (4.21)	0.001*** (2.74)	0.00 (0.51)	0.000 (0.78)	0.001*** (2.83)	-0.000 (-0.21)	-0.001 (0.83)	0.000 (0.72)	0.003*** (3.32)	0.001* (1.88)	0.004** (2.43)	0.003*** (4.18)	0.008*** (9.88)
<i>BETA</i>		0.003*** (4.68)	0.000 (-0.00)	0.000 (0.04)	0.006*** (4.58)	0.004*** (3.68)	0.003*** (4.73)	0.003*** (4.73)	0.003*** (4.60)	0.003*** (4.60)	0.003*** (4.66)	0.003*** (4.83)	0.003*** (3.95)
<i>SIZE</i>		0.001* (1.82)	0.000 (0.03)	0.001** (1.98)	0.000 (0.26)	0.001** (2.24)	0.001*** (3.71)	0.001*** (31.46)	0.001** (2.37)	0.001*** (2.88)	0.001*** (3.09)	0.001** (2.25)	-0.000 (-0.32)
<i>BTM</i>		0.037*** (31.59)	0.038*** (12.82)	0.040*** (15.71)	0.035*** (15.88)	0.034*** (15.67)	0.036*** (31.43)	0.036*** (31.46)	0.037*** (31.69)	0.036*** (31.54)	0.036*** (31.57)	0.037*** (31.81)	0.043*** (32.94)
<i>LEV</i>		0.458*** (8.27)	0.480*** (3.58)	0.042 (0.36)	0.410*** (4.49)	0.604*** (5.32)	0.004*** (8.11)	0.005*** (8.14)	0.005*** (8.25)	0.005*** (8.16)	0.005*** (8.19)	0.005*** (8.33)	0.006*** (8.55)
<i>LTG</i>		0.012** (2.47)	0.007 (0.57)	0.035*** (3.53)	-0.028*** (-2.98)	0.024*** (3.09)	0.000*** (2.21)	0.000** (2.26)	0.000** (2.48)	0.000** (2.29)	0.000** (2.24)	0.000** (2.56)	-0.000 (-1.47)
<i>DISP</i>		0.852** (5.68)	0.946*** (4.07)	4.455*** (2.91)	5.087*** (8.14)	0.579** (2.49)	0.009*** (5.67)	0.009*** (5.67)	0.009*** (5.60)	0.009*** (5.70)	0.009*** (5.68)	0.009*** (5.71)	0.009*** (4.91)
INTERCEPT	0.048*** (12.56)	0.025*** (4.24)	0.0342*** (2.89)	0.002 (0.19)	0.054*** (-14.06)	0.036*** (3.16)	0.019*** (3.43)	0.020*** (3.58)	0.024*** (4.13)	0.022*** (3.86)	0.022*** (3.86)	0.024*** (4.22)	0.042*** (6.26)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4084	4083	723	1023	1165	1174	4083	4083	4083	4038	4038	4083	4083
Adj. R <sup>2</sup>	0.3906	0.5717	0.4954	0.4055	0.5605	0.4952	0.5646	0.5646	0.5657	0.5649	0.551	0.5728	0.4073

The results from regressing the average cost of equity premium ( $r_{AVG}$ ) on CSR scores and control variables over the sample period 2002-2013 are presented in this table.  $r_{AVG}$  is the cost of equity estimate obtained from the models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004). In Models 1 and 2 the overall CSR score is used to examine CSR's impact on the cost of equity capital. Models 3 – 6 replicate the Model 2 dividing the total sample period into sub-periods. Models 7 – 13 examine individual CSR component's effect on the cost of equity capital. The individual components examined are: corporate governance (*CSR\_GOV\_S*), emission reduction (*CSR\_EMP\_S*), resource reduction (*CSR\_RES\_S*), community (*CSR\_COM\_S*), human rights (*CSR\_HUM\_S*), employee relations (*CSR\_EMP\_S*), and diversity and opportunity (*CSR\_DIV\_S*). T-statistics are listed inside the parentheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

Riskiness, size, book-to-market, and leverage are included in all regressions in Table 6 (excluding Model 1) to examine the impact of firm-specific characteristics on the cost of equity capital. The results show that during the sample period company's riskiness (*BETA*) and book-to-market (*BTM*) have positive and significant effects on the cost of equity capital, though the impact remains relatively small. Similarly to Dhaliwal et al. (2011) and El Ghouli et al. (2011) findings the impact of company leverage (*LEV*) has generally positive and significant coefficient (except in Model 4 where leverage is insignificant) indicating that the debt-asset ratio has significant impact on company's cost of equity capital and financing costs. Also the forecast variables forecast dispersion (*DISP*) and long-term growth forecast (*LTG*) seem to have positive and significant impacts on the cost of equity capital. Forecast dispersion's impact on the cost of equity capital increases significantly during pre-financial crises period (Model 4) and during financial crises period (Model 5) diminishing after the crisis period (Model 6). In addition, long-term growth (*LTG*) increases the cost of equity capital in Models 2 – 6 except during the financial crises period (Model 5) when long-term growth seems to have a decreasing impact on the company's cost of equity capital. The impact is low but signifi-

cant. Also, when the individual CSR components are used in the regression (Models 7 – 13) the impact of long-term growth forecast is neutral.

Next the impact of involvement in controversial business issues on the cost of equity capital is scrutinized. It is usually emphasized that companies operating with “sin” industries (e.g. alcohol, tobacco, and nuclear) are seen riskier and therefore have higher expected returns (e.g. El Ghouli et al., 2011). The effects of five controversial business areas, namely, alcohol, gambling, tobacco, armaments, and nuclear, are analyzed in the Table 7. In addition, the overall controversial dummy variable CSR score (*CSR\_CONTR*) is assigned for companies involved in any of the five controversial business industries.

The overall impact of controversial business areas is investigated in Model 1. The results show that markets see the involvement in controversial business issues as a positive sign and the coefficient estimate on *CSR\_CONTR* is actually negative and significant. In Models 2 – 6 the impacts of individual controversial business areas on the cost of equity capital are examined. The results show that all controversial business coefficients are negative except alcohol (*CSR\_ALC*). However, the statistical significance varies across the variables. As mentioned, the impact of alcohol (Model 2) on the cost of equity capital is the only positive coefficient, but the impact is statistically insignificant. The impacts of gambling and tobacco are examined in Models 3 and 4 respectively, and the results show that both gambling and tobacco have negative but insignificant effects on the cost of equity capital. The coefficients for armaments and nuclear are negative and significant, which indicates that companies that are involved in these two industries benefit from lower cost of equity capital. However, the coefficients of all of the controversial business areas are relatively low.

**Table 7.**  
Controversial business areas and the cost of equity capital.

	<i>CSR_CONTR</i> (1)	<i>CSR_ALC</i> (2)	<i>CSR_GAM</i> (3)	<i>CSR_TOB</i> (4)	<i>CSR_ARM</i> (5)	<i>CSR_NUC</i> (6)
<i>CSR</i>	-0.004*** (-3.92)	0.009 (1.54)	-0.003 (-0.99)	-0.007 (-0.83)	-0.007*** (-4.99)	-0.005*** (-3.99)
<i>BETA</i>	0.003*** (4.37)	0.003*** (4.77)	0.003*** (4.76)	0.003*** (4.74)	0.003*** (4.22)	0.003*** (4.43)
<i>SIZE</i>	0.001*** (4.04)	0.001*** (3.58)	0.001*** (3.61)	0.001*** (3.63)	0.001*** (4.02)	0.001*** (4.03)
<i>BTM</i>	0.036*** (31.52)	0.036*** (31.47)	0.036*** (31.46)	0.036*** (31.47)	0.036*** (31.27)	0.036*** (31.56)
<i>LEV</i>	0.004*** (8.14)	0.004*** (8.13)	0.005*** (8.15)	0.004*** (8.10)	0.005*** (8.41)	0.004*** (7.97)
<i>LTG</i>	0.000** (2.13)	0.000** (2.21)	0.000** (2.21)	0.000** (2.21)	0.000** (2.29)	0.000** (2.03)
<i>DISP</i>	0.008*** (5.62)	0.009*** (5.70)	0.009*** (5.69)	0.009*** (5.70)	0.008*** (5.62)	0.008*** (5.64)
INTERCEPT	0.022*** (3.89)	0.20*** (3.52)	0.020*** (3.50)	0.20*** (3.50)	0.025*** (4.39)	0.20*** (3.50)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes
N	4083	4083	4083	4083	4083	4083
Adj. R <sup>2</sup>	0.5662	0.5648	0.5646	0.5646	0.5672	0.5662

The results from regressing the cost of equity premium ( $r_{AVG}$ ) on indicators for controversial business areas and control variables during the sample period 2002-2013 are presented in this table.  $r_{AVG}$  is the cost of equity estimate obtained from the models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004). The controversial business areas are alcohol (*CSR\_ALC* in Model 2), gambling (*CSR\_GAM* in Model 3), tobacco (*CSR\_TOB* in Model 4), armaments (*CSR\_ARM* in Model 5), and nuclear (*CSR\_NUC* in Model 6). In Model 1 dummy variable *CSR\_CONTR* that takes a value of 1 for companies involved in any of the five controversial business areas. The definitions for controversial business areas are listed in Appendix 2 and unreported industry controls are based on Fama & French (1997) industry classifications. T-statistics are listed inside the parentheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

Finally, the CSR's impact on the cost of equity capital is examined during the pre-crisis period (2002-2006), during crisis period (2007-2009), and post-crisis period (2010-2013). The crisis period is adjusted to include years 2007, 2008, and 2009, since during these years the markets were most volatile. Table 8 reports the results from regressing the cost of equity premium ( $r_{AVG}$ ) on *CSR\_S* during the pre-crisis period (2002-2006), during crisis period (2007-2009), and post-crisis period (2010-2013). Table 9 presents the results from regressing the cost of equity premium on individual CSR components during the pre-crisis period (2002-2006), during crisis period (2007-2009), and post-crisis period (2010-2013), and Table 10 shows the results from regressing the cost of equity on individual controversial business areas during the pre-crisis period (2002-2006), during crisis period (2007-2009), and post-crisis period (2010-2013).

In Table 8, in Models 1 – 3 the average cost of equity premium ( $r_{AVG}$ ) is regressed to CSR score ( $CSR\_S$ ), while in Models 5 – 8 the controversial dummy score ( $CSR\_CONTR$ ) is the regression variable. Model 1 presents the CSR's effect on the cost of equity capital before the financial crisis. The impact is negative but low and statistically insignificant. However, during the financial crisis (Model 2), and during post-crisis period CSR seems to have positive effect on the cost of equity capital. This finding indicates that CSR has not decreased the financing costs during more uncertain times and the results remain constant with earlier findings in Table 6.

Models 4 – 6 follow same logic than Models 1 – 3 but the CSR score ( $CSR\_S$ ) is replaced with controversial dummy variable ( $CSR\_CONTR$ ) to examine whether the effect of involvement in controversial business areas have changed during the pre-crisis period (2002-2006), crisis period (2007-2009), and post-crisis period (2010-2013). The results are similar for all periods, and it seems that companies that are involved in controversial business issues benefit from lower financing cost during every sub-period.

**Table 8.**

Corporate social responsibility, controversial business areas and the cost of equity capital during financial crisis.

	$CSR\_S$ 2002-2006 (1)	$CSR\_S$ 2007-2009 (2)	$CSR\_S$ 2010-2013 (3)	$CSR\_CONTR\_S$ 2002-2006 (4)	$CSR\_CONTR\_S$ 2007-2009 (5)	$CSR\_CONTR\_S$ 2010-2013 (6)
<i>CSR</i>	-0.000 (-0.01)	0.001*** (2.86)	0.001*** (2.83)	-0.003* (-1.80)	-0.004** (-2.04)	-0.003** (-2.00)
<i>BETA</i>	0.000 (0.06)	0.005*** (3.40)	0.006*** (4.58)	-0.000 (-0.14)	0.004*** (3.32)	0.004*** (4.04)
<i>SIZE</i>	0.001** (2.11)	-0.001 (-1.27)	0.000 (0.26)	0.001*** (2.57)	0.000 (0.63)	0.002*** (4.12)
<i>BTM</i>	0.038*** (17.75)	0.37*** (16.69)	0.035*** (15.88)	0.038*** (17.85)	0.036*** (16.49)	0.034*** (16.61)
<i>LEV</i>	0.003*** (2.72)	0.003*** (3.86)	0.410*** (4.49)	0.003*** (2.70)	0.003*** (3.58)	0.006*** (6.07)
<i>LTG</i>	0.000 (3.72)	-0.000*** (-3.39)	-0.028*** (-2.98)	0.000*** (3.77)	-0.000*** (-3.66)	0.000*** (2.79)
<i>DISP</i>	0.009*** (3.89)	0.055*** (8.68)	5.087*** (8.14)	0.009*** (3.84)	0.055*** (8.65)	0.005** (2.30)
INTERCEPT	0.014 (1.61)	0.045*** (3.72)	0.054*** (-14.06)	0.016* (81.85)	0.035*** (3.07)	0.015* (1.66)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	No	No	Yes	No	Yes	Yes
N	1388	1128	1165	1388	1128	1567
Adj. R <sup>2</sup>	0,4591	0,5864	0,5605	0,4605	0,5849	0,5237

This table reports the results from regressing the cost of equity premium ( $r_{AVG}$ ) on CSR/controversial business areas dummy variable and control variables during the pre-crisis period 2002-2006, crisis period 2007-2009 and past-crisis period 2010-2013. Model 1, 2, and 3 use the overall CSR score ( $CSR\_S$ ) and the time periods are set to 2002-2006, 2007-2009, and 2010-2013 respectively. Models 3, 4, and 5 use the controversial business areas dummy variable ( $CSR\_CONTR$ ) and the time periods are set to 2002-2006, 2007-2009, and 2010-2013 respectively. The t-statistics are reported inside the parantheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

Next the individual CSR component's effect is examined closer in Table 9. The results show that only diversity and opportunity (*CSR\_DIV\_S*) has had a negative and statistically significant effect on cost of equity capital during the post-crisis period (2010-2013). During the financial crisis period (2007-2009) especially investments in emission reduction (*CSR\_EMI\_S*), resource reduction (*CSR\_RES\_S*), and employee issues (*CSR\_EMP\_S*) have increased companies financing costs through the cost of equity capital. Corporate governance (*CSR\_S\_GOV*) has negative effect on the cost of equity capital during pre-crisis period and crisis period but the effect is low and statistically insignificant. Also, at post-crisis period corporate governance increases the cost of equity capital by almost 3 percentage points and the effect is statistically significant.

The impact of individual controversial business areas on the cost of equity capital is reviewed in Table 10. The results show that during crisis period markets have required lower cost of equity capital from companies involved in alcohol (*CSR\_ALC*), armaments (*CSR\_ARM*) or nuclear (*CSR\_NUC*) industry. However, involvement in alcohol business has increased companies' cost of equity during the pre-crisis period, but after that the effect turns into negative and statistically significant during the financial crisis as well as during the past-crisis period. For armament industry the negative and statistically significant effect lingers during all three sub-periods, but the decreasing effect also diminishes during the time. The results from regressing nuclear on the cost of equity premium are similar to results obtained from armament industry. However, during the post-crisis period the effect is statistically insignificant even though it is negative.

To summarize the main results from regressing the different CSR proxies and firm-specific control variables on the cost equity variables there are three main findings. Firstly, CSR's impact on the cost of equity capital seems to be neutral or slightly positive. Only efforts in diversity and opportunity have a negative effect on the cost of equity capital. Second, company's involvement in controversial business areas appear to have decreasing effect on the cost of equity premium. This means that companies benefit from controversial businesses rather than are required to have higher financing costs. Thirdly, the CSR's and controversial business areas' impact on the cost of equity capital varies across the CSR and controversial attributes suggesting that other CSR/controversial attributes have higher impact on the cost of equity capital than other. Specially alcohol, armaments, and nuclear seem to have lowered company's cost of equity capital.

**Table 9.**  
Individual CSR components and the cost of equity capital during financial crisis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	CSR_GOV_S	
	2010-2013	2007-2009	2010-2013	2002-2006	2007-2009	2010-2013	2002-2006	2007-2009	2010-2013	2002-2006	2007-2009	2010-2013	2002-2006	2007-2009	2010-2013	2002-2006	2007-2009	2010-2013	2002-2006	2007-2009	2010-2013	
CSR	-0.001 (-1.07)	-0.001 (-0.18)	0.028** (2.34)	-0.000 (-0.19)	0.004** (2.08)	-0.001 (-1.24)	0.000 (0.15)	0.004*** (2.71)	0.001 (1.16)	0.001 (0.79)	0.001 (0.56)	0.02 (1.28)	0.002 (0.41)	0.003 (1.14)	0.001 (0.71)	0.001 (0.78)	0.004*** (3.09)	0.003** (2.74)	0.000 (0.11)	0.001 (0.50)	-0.003*** (-2.96)	
BETA	0.000 (0.05)	0.005*** (3.51)	0.004*** (4.25)	0.000 (0.06)	0.005*** (3.59)	0.004*** (4.16)	0.000 (0.06)	0.005*** (3.43)	0.004*** (4.14)	0.000 (0.05)	0.005*** (3.41)	0.004*** (4.14)	0.000 (0.05)	0.005*** (3.34)	0.004*** (4.91)	0.000 (0.06)	0.005*** (3.66)	0.004*** (4.29)	0.000 (0.06)	0.005*** (3.52)	0.004*** (4.22)	
SIZE	0.001** (2.54)	0.000 (0.42)	0.002*** (4.01)	0.001** (2.32)	-0.000 (-0.37)	0.002*** (4.09)	0.001** (2.27)	-0.000 (-0.81)	0.002*** (3.22)	0.001** (1.98)	0.000 (0.20)	0.002*** (3.38)	0.001** (2.25)	0.001** (2.13)	0.002*** (3.65)	0.001** (2.13)	-0.000 (-0.76)	0.001** (2.79)	0.001** (2.24)	0.000 (0.17)	0.000 (0.17)	0.002*** (4.80)
BTM	0.038*** (17.75)	0.036*** (16.39)	0.034*** (18.43)	0.038*** (17.81)	0.036*** (16.50)	0.034*** (18.39)	0.038*** (17.83)	0.037*** (16.67)	0.034*** (18.59)	0.038*** (17.87)	0.036*** (16.40)	0.034*** (18.61)	0.038*** (17.86)	0.038*** (17.86)	0.034*** (18.57)	0.038*** (17.86)	0.037*** (16.73)	0.034*** (18.80)	0.038*** (17.80)	0.036*** (16.38)	0.034*** (18.27)	
LEV	0.003*** (2.70)	0.003*** (3.57)	0.006*** (6.02)	0.003*** (2.70)	0.003*** (3.73)	0.006*** (2.74)	0.003*** (2.73)	0.003*** (3.81)	0.006*** (6.07)	0.003*** (2.75)	0.003*** (3.59)	0.006*** (6.06)	0.003*** (2.74)	0.003*** (2.74)	0.006*** (6.09)	0.003*** (2.77)	0.003*** (3.78)	0.006*** (6.21)	0.003*** (2.72)	0.003*** (3.59)	0.005*** (5.96)	
LTV	0.000*** (3.74)	-0.000*** (-3.73)	0.000*** (3.02)	0.000*** (3.71)	-0.000*** (-3.58)	0.000*** (2.74)	0.000*** (3.72)	-0.000*** (-3.49)	0.000*** (3.03)	0.000*** (3.75)	-0.000*** (-3.64)	0.000*** (2.95)	0.000*** (3.73)	0.000*** (3.73)	0.000*** (2.91)	0.000*** (3.76)	-0.000*** (-3.56)	-0.000*** (-3.26)	0.000*** (3.72)	-0.000*** (-3.72)	0.000*** (2.72)	
DISP	0.009*** (3.38)	0.056*** (8.74)	0.005*** (2.34)	0.009*** (3.89)	0.055*** (8.68)	0.005*** (2.38)	0.009*** (3.89)	0.056*** (8.72)	0.005*** (2.27)	0.009*** (3.89)	0.056*** (8.75)	0.005*** (2.33)	0.009*** (3.89)	0.056*** (8.69)	0.005*** (2.32)	0.009*** (3.90)	0.054*** (8.52)	0.005*** (2.36)	0.009*** (3.89)	0.056*** (8.75)	0.005*** (2.29)	
INTERCEPT	0.013 (1.44)	0.032*** (2.82)	-0.015 (-1.01)	0.014* (1.65)	0.038*** (3.27)	0.010 (1.06)	0.015* (1.70)	0.041*** (3.50)	0.015* (1.66)	0.016* (1.84)	0.034*** (2.93)	0.014 (1.59)	0.015* (1.73)	0.015* (1.77)	0.014 (1.57)	0.015* (1.77)	0.040*** (3.55)	0.017* (1.92)	0.015* (1.69)	0.034*** (2.90)	0.034*** (2.90)	0.007 (0.72)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Industry effect	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	
N	1388	1128	1567	1388	1128	1567	1388	1128	1567	1388	1128	1567	1388	1128	1567	1388	1128	1567	1388	1128	1567	
Adj. R <sup>2</sup>	0.4596	0.5833	0.5243	0.4592	0.5850	0.5231	0.4592	0.5861	0.5230	0.4594	0.5834	0.5231	0.4592	0.5838	0.5227	0.4594	0.5870	0.5249	0.4592	0.5834	0.5253	

This table reports the results from regressing the cost of equity premium (rAVG) on individual CSR components during different time periods - before crisis, during crisis and after crisis. The sample period is divided into three sub-periods: 2002-2006, 2007-2009 (representing the financial crisis period), and 2010-2013. Models 1, 4, 7, 10, 13, 16, and 19 use each individual CSR components time period being set to 2002-2006. Models 2, 5, 11, 14, 17, and 20 use each individual CSR components time period being set to 2007-2009. Models 3, 6, 12, 15, 18, and 21 use each individual CSR component time period being set to 2010-2013. The t-statistics are reported inside the parentheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.



**Table 10.**

Individual controversial business areas and the cost of equity capital during financial.

	<i>CSR_ALC</i> 2002-2006 (1)	<i>CSR_ALC</i> 2007-2009 (2)	<i>CSR_ALC</i> 2010-2013 (3)	<i>CSR_GAM</i> 2002-2006 (4)	<i>CSR_GAM</i> 2007-2009 (5)	<i>CSR_GAM</i> 2010-2013 (6)	<i>CSR_TOB</i> 2002-2006 (7)	<i>CSR_TOB</i> 2007-2009 (8)	<i>CSR_TOB</i> 2010-2013 (9)	<i>CSR_ARM</i> 2002-2006 (10)	<i>CSR_ARM</i> 2007-2009 (11)	<i>CSR_ARM</i> 2010-2013 (12)	<i>CSR_NUC</i> (13)	<i>CSR_NUC</i> (14)	<i>CSR_NUC</i> (15)
<i>CSR</i>	0.010* (1.89)	-0.017** (-1.99)	-0.030*** (-4.42)	-0.010 (-1.38)	-0.001 (-0.15)	-0.004 (-0.81)	-0.009 (-0.99)	0.002 (0.12)	-0.014 (-1.47)	-0.010*** (-3.66)	-0.007** (-2.51)	-0.004** (-1.98)	-0.004 (-1.62)	-0.005*** (-1.96)	-0.005*** (-2.69)
<i>BETA</i>	0.000 (0.16)	0.005*** (3.51)	0.004*** (4.23)	0.000 (0.07)	0.005*** (3.51)	0.004*** (4.25)	0.000 (0.09)	0.005*** (3.51)	0.004*** (4.23)	-0.000 (-0.27)	0.004*** (3.16)	0.004*** (4.01)	-0.000 (-0.06)	0.005*** (3.38)	0.004*** (4.02)
<i>SIZE</i>	0.001** (2.26)	0.000 (0.41)	0.002*** (3.94)	0.001** (2.31)	0.000 (0.41)	0.002*** (3.94)	0.001** (2.36)	0.000 (0.41)	0.002*** (3.94)	0.001*** (2.80)	0.000 (0.63)	0.002*** (4.03)	0.001** (2.49)	0.000 (0.60)	0.002*** (4.23)
<i>BTM</i>	0.038*** (17.87)	0.036*** (16.40)	0.034*** (18.57)	0.039*** (17.89)	0.036*** (16.27)	0.034*** (18.57)	0.038*** (17.84)	0.036*** (16.39)	0.034*** (18.57)	0.038*** (17.91)	0.036*** (16.32)	0.034*** (18.47)	0.038*** (17.87)	0.036*** (16.50)	0.034*** (18.66)
<i>LEV</i>	0.003*** (2.76)	0.003*** (3.57)	0.006*** (6.05)	0.003*** (2.74)	0.003*** (3.57)	0.006*** (6.07)	0.003*** (2.70)	0.003*** (3.57)	0.06*** (6.05)	0.003*** (2.83)	0.003*** (3.76)	0.006*** (6.17)	0.003*** (2.71)	0.003*** (3.45)	0.006*** (5.91)
<i>LTG</i>	0.000*** (3.73)	-0.000*** (-3.72)	0.000*** (2.91)	0.000*** (3.71)	-0.000*** (-3.72)	0.000*** (2.91)	0.000*** (3.72)	-0.000*** (-3.72)	0.000*** (2.91)	0.000*** (3.88)	-0.000*** (-3.52)	0.000*** (2.91)	0.000*** (3.69)	-0.000*** (-3.80)	0.000*** (2.75)
<i>DISP</i>	0.009*** (3.89)	0.056*** (8.74)	0.005** (2.33)	0.009*** (3.89)	0.022*** (15.55)	0.005** (2.33)	0.000*** (3.89)	0.056*** (8.74)	0.005** (2.33)	0.009*** (3.79)	0.055*** (8.68)	0.005** (2.31)	0.009*** (3.69)	0.055*** (8.65)	0.005** (2.29)
INTERCEPT	0.015* (1.74)	0.032*** (2.88)	0.013 (1.45)	0.015* (1.71)	0.032*** (2.88)	0.013 (1.44)	0.014* (1.67)	0.032*** (2.88)	0.013 (1.45)	0.021** (2.39)	0.037*** (3.28)	0.017* (1.81)	0.014* (1.68)	0.032*** (2.89)	0.013 (1.43)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	No	No	Yes	No	No	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes
N	1388	1128	1567	1388	1128	1567	1388	1128	1567	1388	1128	1567	1388	1128	1567
Adj. R <sup>2</sup>	0.4606	0.5837	0.5227	0.4599	0.5833	0.5226	0.4595	0.5833	0.5227	0.4645	0.5857	0.5236	0.4602	0.5848	0.5247

This table presents the results from regressing the cost of equity capital on individual controversial business areas. The cost of equity capital is regressed on alcohol (*CSR\_ALC*) in Models 1 – 3, on gaming (*CSR\_GAM*) on Models 4 – 6, on tobacco (*CSR\_TOB*) on Models 7 – 9, on armaments (*CSR\_ARM*) on Models 10 – 12, and on nuclear (*CSR\_NUC*) on Models 13 – 15. The t-statistics are reported inside the parentheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

### 4.3. Robustness checks

To test the accuracy of the results obtained from the univariate and multivariate analysis, some sensitivity test are controlled. This study uses alternative models to test the robustness of the four models used to calculate the  $r_{AVG}$ . Furthermore, the noise in analyst forecasts is being controlled.

#### 4.3.1. Alternative models for estimating cost of equity capital

In this study, the dependent variable has been specified as the average cost of equity premium ( $r_{AVG}$ ) estimated with four different models to avoid biased results arising from the use of single model. However, the results are also tested with individual cost of equity premiums to test whether the  $r_{AVG}$  is driven by some of the cost of equity premiums. In Table 11 the regression from Model 2 in Table 6 is replicated, but instead of using the  $r_{AVG}$  as a dependent variable the individual risk premiums,  $r_{CT}$ ,  $r_{GLS}$ ,  $r_{OJ}$ , and  $r_{ES}$ , are used. The results remain similar, indicating that CSR has no impact on lowering or increasing cost of equity capital.

In addition, three alternative models are used to calculate the cost of equity capital to mitigate the concerns that the four models used in this study are providing biased results. The following two PEG-ratios are special cases of Easton (2004) model and the models assume zero dividend payments. The first version (model 5) of the model is based on short-term earnings forecasts, while the second model (model 6) is based on long-term earnings forecasts. The valuation equations are given by:

$$(16) \quad P_t = \frac{FEPS_{t+2} + FEPS_{t+1}}{k_{PEG2}^2}$$

Easton (2004)

$$(17) \quad P_t = \frac{FEPS_{t+2} + FEPS_{t+1}}{k_{PEG5}^2}$$

Easton (2004)

The third alternative model (model 7) is obtained from simplified earnings-price ratio and it is a special case of Francis, Olsson & Schipper (2005) model assuming that there is no abnormal earnings growth. The EP ratio is given by:

$$(18) \quad EPR = \frac{FEPS_{t+1}}{P_t}$$

Francis et al. (2005).

Consistent with the individual cost of equity estimates, the results from using alternative cost of equity estimates show that CSR has no impact on cost of equity premium. However, the model 5 show that CSR affects decreasingly to short-term cost of equity capital. Yet, the result is both statistically and quantitatively insignificant.

**Table 11.**

Corporate social responsibility and individual and alternative cost of equity capital estimates.

	Individual cost of equity estimates				Alternative cost of equity estimates		
	$\Gamma_{CT}$ (1)	$\Gamma_{GLS}$ (2)	$\Gamma_{OI}$ (3)	$\Gamma_{ES}$ (4)	$\Gamma_{PEG2}$ (5)	$\Gamma_{PEG5}$ (6)	EPR (7)
<i>CSR</i>	0.001*** (3.54)	0.000 (0.40)	0.001** (2.07)	0.000 (1.01)	-0.001 (-0.27)	0.001** (2.32)	0.001*** (2.81)
<i>BETA</i>	0.006*** (7.10)	0.004*** (5.69)	0.002 (1.55)	0.002* (1.94)	0.006*** (5.02)	0.013*** (6.35)	0.005*** (4.65)
<i>SIZE</i>	0.001*** (2.74)	0.001** (2.25)	0.000 (0.06)	0.001 (1.53)	-0.000 (-0.12)	-0.003*** (-3.51)	0.001*** (2.74)
<i>BTM</i>	0.008*** (5.09)	0.062*** (56.95)	0.027*** (14.88)	0.038*** (17.23)	0.034*** (17.03)	0.042*** (11.91)	0.045*** (26.78)
<i>LEV</i>	0.005*** (6.84)	0.005*** (8.79)	0.007*** (7.64)	0.004*** (3.57)	0.005*** (4.82)	0.012*** (7.34)	0.006*** (6.85)
<i>LTG</i>	0.000** (2.11)	-0.000*** (-10.27)	0.000*** (3.39)	0.001*** (6.20)	0.001** (11.17)	0.001*** (8.73)	-0.001*** (-19.40)
<i>DISP</i>	-0.002 (-1.30)	-0.002* (-1.67)	0.015*** (6.63)	0.019*** (6.73)	0.022*** (8.39)	0.006 (1.40)	-0.017*** (-7.79)
INTERCEPT	0.006 (0.79)	0.006*** (9.47)	0.017* (1.87)	0.016 (1.41)	0.018* (1.73)	0.080*** (4.46)	0.005 (0.60)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	No	Yes	No	No	No	No	Yes
N	4083	4083	4083	4083	4083	4083	4083
Adj. R <sup>2</sup>	0.3172	0.7676	0.3254	0.2926	0.3364	0.2501	0.5897

The results from regression individual cost of equity models (Models 1 – 4) and alternative cost of equity estimates (Models 5 – 7) on the overall CSR score are presented in this table. The results cover the sample period 2002-2012). In Models 1, 2, 3, and 4 the cost of equity is estimated with models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005) respectively. Model 5 uses the Price-Earnings-Growth (*PEG*) ratio that is based on 1- and 2- year-ahead earnings forecasts to estimate the implied risk premium, while Model 6 is estimated with *PEG*-ratio based on 4- and 5- year-ahead earnings forecasts. Model 7 is earnings-to-price ratio. The t-statistics are reported inside the parentheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

#### 4.3.2. Noise in analyst forecasts

The noise in analyst forecasts is often associated with analysts' sluggishness and their tendency to react slowly to available public information (e.g. Ali, Klein & Rosenfield, 1992). To confront the possible slow reaction to public information the price momentum computed as the compound stock returns over the past 3, 6, and 12 months is included in the regression as one regression variable. The additional explanatory variable that controls past stock returns will decrease the possibility that the analysts' forecasts are sluggish with respect to information in past returns (e.g. Chen et al., 2009:288). The equation for compounded stock returns is given by:

$$(19) \quad CR_t = \left( \frac{P_{t+1}}{P_t} \right)^{\frac{\tau}{365}} - 1$$

The robustness checks by using alternative models and compounded stock returns are presented in Table 12. The results show that the regression is robust for analyst forecast sluggishness, and the outcome

**Table 12.**  
Robustness to analyst forecast sluggishness.

	(1)	(2)	(3)
<i>CSR_S</i>	0.001** (2.40)	0.001** (2.43)	0.001** (2.47)
<i>BETA</i>	0.003*** (4.91)	0.003*** (4.97)	0.003*** (5.03)
<i>SIZE</i>	0.001* (1.75)	0.001* (1.66)	0.000 (1.59)
<i>BTM</i>	0.035*** (29.38)	0.035*** (29.73)	0.036*** (30.42)
<i>LEV</i>	0.004*** (7.92)	0.004*** (8.07)	0.005*** (8.26)
<i>LTG</i>	0.000*** (3.84)	0.000*** (3.72)	0.000*** (3.45)
<i>DISP</i>	0.008*** (5.59)	0.008*** (5.60)	0.008*** (5.63)
<i>MOM3</i>	-0.040*** (-9.00)		
<i>MOM6</i>		-0.017*** (-8.03)	
<i>MOM12</i>			-0.006*** (-6.27)
INTERCEPT	0.024*** (4.04)	0.24*** (4.13)	0.025*** (4.23)
Year effects	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
N	4084	4083	4083
Adj. R <sup>2</sup>	0.5759	0.5742	0.5715

This table presents the robustness results for Model 2 from Table 6 controlling analyst forecast sluggishness. An additional variable is added to Models 1 – 3 to control for price momentum estimated as compounded returns over the past 3, 6, and 12 months respectively.  $r_{AVG}$  is the regression variable and it is the average implied cost of equity premium computed from four models developed by Claus & Thomas (2001), Gebhardt et al. (2001), Ohlson & Juettner-Nauroth (2005), and Easton (2004). The t-statistics are reported inside the parentheses.

\* Statistical significance at the 10%.

\*\* Statistical significance at the 5%.

\*\*\* Statistical significance at the 1%.

## 5. CONCLUSIONS

This paper examines whether corporate social responsibility has an impact on companies' *ex ante* cost of equity implied in stock prices and analysts' earnings forecasts. Furthermore, this study compares the CSR's impact on the cost of equity capital during the financial crisis and non-crisis period. This study is conducted with a sample of 4085 US firm-year observations during sample period 2002-2013 while controlling firm-specific variables as well as industry and year fixed effects. Contradictory to the hypotheses, the results show that the overall CSR score of a company has no visible impact on the cost of equity capital, and companies' with higher CSR involvement do not benefit from it during the financial crisis period. However, investments in diversity and opportunity have slightly lowered the company's cost of equity capital.

This study contributes to the debate on whether CSR's impact on company valuation is increasing, decreasing or neutral. The findings show the market reactions to companies' involvement in CSR activities have been rather neutral. Furthermore, the results show minor increase in the cost of equity capital for companies' that have adopted CSR practices. This indicates that the market reaction has been even negative for those companies. Thus, it appears that the markets might see investments in CSR practices rather as a cost-increasing factor with no additional value creation than as a risk-decreasing factor.

Moreover, the companies' that are involved in controversial business areas seem to enjoy slightly lower equity financing costs. Thus, it seems that the markets have rather rewarded companies of operating in controversial business areas. Especially involvement in businesses such as alcohol, armaments, and nuclear are seen positive from market perspective and companies involved in these business areas benefit from lower financing costs even during the financial crisis.

To further expand the study, the examination is also conducted during the pre-crisis period, the crisis period, and the post-crisis period. This comparison provides information about how CSR effects on the cost of equity capital during economic downturn compared to more stable periods. The results remain unchanged during all three sub-periods, and companies that have invested in CSR activities do not benefit from it during economic downturn or crisis period in the means of lower financing costs. Yet, companies that are involved have with controversial business areas benefit from slightly lower cost of equity capital during the crisis period.

The individual CSR and controversial business variables are also reviewed during the three sub-periods. The results show that diversity and opportunity (*CSR\_DIV\_S*) has had a negative and statistically significant effect on cost of equity capital during the post-crisis period (2010-2013). However, during the financial crisis period especially investments in emission reduction (*CSR\_EMI\_S*), resource reduction (*CSR\_RES\_S*), and employee issues (*CSR\_EMP\_S*) have increased companies financing costs through the cost of equity capital. The results for individual controversial business areas show that during crisis period companies involved in alcohol (*CSR\_ALC*), armaments (*CSR\_ARM*) or nuclear (*CSR\_NUC*) industry have benefit from lower cost of equity capital. Thus, it seems that during economic downturn companies benefit from involvement in controversial businesses rather than investing in CSR practices.

In conclusion, the findings show that companies that have invested in CSR do not have lower financing costs compared to companies with lacking CSR involvement. Thus, there is no evidence that CSR activities would improve company's risk level on the financial markets. Hence, the results invalidate the hypotheses that CSR would decrease the cost of equity capital, or that the companies with higher CSR commitment would have been less risky investments during the financial crisis. Also, the hypotheses concerning the controversial business areas are rejected, and there is even a slight indication that the markets would actually prefer companies that are involved in controversial business issues. Therefore, the question remains unsolved: why do companies invest on CSR if it is not profitable?

It seems that there is an interest conflict between shareholder's and stockholders. The markets have not valued companies' investments for "doing good", and the "sin" stock companies profit from slightly lower financing costs. However, the CSR issues have gained more attention during recent years from the policy makers, media, and stakeholders. In addition, we have seen dramatic value losses from companies' that have been noticed to lack in their CSR policies. Yet, the problem with CSR is that it is rather easy for companies to report good CSR figures even though there are actual deficiencies in the CSR practices and no real value creation appears. Even though it seems that CSR does not effect on the firm valuation via the cost of equity capital there might be other means companies profit from investing in CSR.

The CSR activities will increase in the future through legislation and demand. Therefore, it is suggested that the examination of CSR impact on company's riskiness should be investigated further to solve in which ways CSR does effect on company's valuation

and performance. Furthermore, the markets are still changing and CSR is relatively new factor in its current extensiveness, which means that the lacks in CSR processes might have even more dramatic consequences in the future. Thus, CSR will most likely have greater impact on firm valuation in the near future.

## 6. REFERENCES

- Barnett, Michael L. (2007), Stakeholder Influence Capacity and the Variability of Financial Returns to Corporate Social Responsibility, *Academy of Management Review*, 32: 794 – 816.
- Botosan, Christine A., and Marlene A. Plumlee (2002), A re-examination of disclosure level and the expected cost of equity capital, *Journal of accounting research*, 40:1: 21 – 40.
- Carrol, Archie B., (1999), Corporate Social Responsibility – Evolution of a Definition Construct, *Business and Society*, 38: 268 – 294.
- Chen, Kevin C.W., Zhihong Chen & K.C. John Wei (2009), Legal protection of investors, corporate governance, and the cost of equity capital, *Journal of Corporate Finance*, 15, 3: 273 – 289.
- Claus, James, & Jacob Thomas (2001), Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets, *The Journal of Finance*, 56, 5: 1629 – 1666.
- Consolandi, Costanza, Ameeta Jaiswal-Dale, Elisa Poggiani & Alessandro Vercelli (2008), Global Standards and Ethical Stock Indexes: The case of the Dow Jones Sustainability Stoxx Index, *Journal of Business Ethics*, 87: 185 – 197.
- Dahlsrud, Alexander (2008), How Corporate Social Responsibility is Defined: An Analysis of 37 Definitions, *Corporate Social Responsibility and Environmental Management*, 15: 1 – 13.
- Daske, Holger, Klein Stefan & Günther Gebhardt (2006), Estimating the expected cost of equity capital using analysts' consensus forecasts, Available at SSRN: <http://ssrn.com/abstract=876425>.
- De Bakker, Frank G. A., Peter Groenewegen & Frank Den Hond (2005), A Bibliometric Analysis of 30 Years of Research and Theory on Corporate Social Performance, *Business and Society*, 44: 283 – 317.



Derwall, Jeroen & Kees Koedijk (2009), Socially Responsible Fixed-Income Funds, *Journal of Business, Finance and Accounting*, 36: 210 – 229.

Dhaliwal, Dan S., Oliver Zhen Li, Albert Tsang & Yong George Yang (2011), Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting, *The Accounting Review* 86, 1: 59-100.

Easton, Peter D. (2004), PE Ratios, and Estimating the Implied Rate of Return on Equity Capital, *The Accounting Review*, 79: 73 – 95.

Echterling, Fabian, Brigitte Eierle, and Simeon Ketterer, (2015), A review of the literature on methods of computing the implied cost of capital, *International Review of Financial Analysis*, 42: 235 – 252.

El Ghouli, Sadok, Omrane Guedhami, Chuck C.Y. Kwok & Dev R. Mishra (2011), Does Corporate Social Responsibility Affect the Cost of Capital?, *Journal of Banking and Finance*, 35: 2388 – 2406.

Elton, Edwin J. (1999), Presidential address: expected return, realized return, and asset pricing tests. *The Journal of Finance*, 54, 4: 1199-1220.

Fama, Eugene F. (1970), Efficient Capital Markets: A Review of Theory and Empirical Work, *The Journal of Finance*, 25: 383 – 417.

Fama, Eugene F. & Kenneth R. French (1993), Common Risk Factors in the Returns on Stock and Bonds, *Journal of Financial Economics*, 33: 3 – 56.

Fama, Eugene F. & Kenneth R. French (1997), Industry Cost of Equity, *Journal of Financial Economics*, 43, 153 – 194.

Fama, Eugene F. & Kenneth R. French (2004), The Capital Asset Pricing Model: Theory and Evidence, *The Journal of Economic Perspectives*, 18, 3: 25 – 46.

Francis, Jennifer, Per Olsson, and Dennis R. Oswald (2000), Comparing the accuracy and explainability of dividend, free cash flow, and abnormal earnings equity value estimates (Digest Summary), *Journal of accounting research*, 38,1: 45 – 70.

Francis, Jennifer, Ryan LaFond, Per Olsson, & Katherine Schipper, (2005). The market pricing of accruals quality, *Journal of Accounting and Economics*, 39:2, 295 – 327.

Frazzini, Andrea (2006), The Disposition Effect and Underreaction to News, *The Journal of Finance*, 56, 4: 2017 – 2046.

Freeman, Edward R., Andrew C. Wicks, & Bidhan Parmar (2004), Stakeholder theory and “the corporate objective revisited,” *Organization science*, 15,3: 364 – 369.

Gebhardt, William R., Charles Lee, & Bhaskaran Swaminathan (2001), Toward an Implied Cost of Capital, *Journal of accounting research*, 39, 1: 135 – 176.

Gordon, Joseph R., and Myron J. Gordon (1997), The finite horizon expected return model, *Financial Analysts Journal* 53:3: 52 – 61.

Goss, Allen & Gordon S. Roberts (2011), The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking & Finance* 35, 7: 1794 – 1810.

Hail, Luzi, & Christian Leuz (2006), International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of accounting research*, 44, 3: 485 – 531.

Hill, Ronald Paul, Hill, Thomas Ainscough, Todd Shank & Daryl Manullang (2007), Corporate Social Responsibility and Socially Responsible Investing: A Global Perspective, *Journal of Business Ethics*, 70: 165–174.

Hong, Harrison & Jeremy Stein (1999), A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets, *The Journal of Finance*, 54, 6: 2143 – 2184.

Jiao Yawen (2010), Stakeholder welfare and firm value, *Journal of Banking and Finance*, 34: 2549 – 2561.

Jegadeesh Narasimhan & Sheridan Titman (1993), Returns to buying winners and selling losers: Implications for stock market efficiency, *The Journal of Finance*, 48: 65 – 91.

Jegadeesh Narasimhan & Sheridan Titman (2001), Profitability of Momentum Strategies: An Evaluation of Alternative Explanations, *The Journal of Finance*, 56, 2: 699 – 720.

Ohlson, James A., and Beate E. Juettner-Nauroth (2005), Expected EPS and EPS Growth as Determinants of Value, *Review of accounting studies*, 10, 2-3: 349-365.

Kahneman, Daniel & Amos Tversky (1979), Prospect Theory: An Analysis of Decision Under Risk, *Econometrica*, 47, 2: 263 – 291.

Kempf, Alexander & Peer Osthoff (2007), The effect of socially responsible investing on portfolio performance. *European Financial Management* 13, 5: 908 – 922.

Kim, Yontae, Haidan Li & Siqi Li (2014), Corporate Social Responsibility and Stock Price Risk, *Journal of Banking & Finance*, 43, 1 – 13.

Kim, Yontae & Meir Statman (2012), Do Corporations Invest Enough in Environmental Responsibility?, *Journal of Business Ethics*, 105, 1: 115 – 129.

Lackmann, Julia, Jürgen Ernstberger & Michael Stich (2012), Market Reactions to Increased Reliability of Sustainability Information, *Journal of Business Ethics*, 107: 111 – 128.

Lai, Cheng (2015), Growth in residual income, short and long term, in the OJ model, *Review of Accounting Studies*, 1 – 10.

Lee, Darren D. & Robert W. Faff, Corporate Sustainability Performance and Idiosyncratic Risk: A Global Perspective, *Financial Review*, 44, 2: 213 – 237.

López, M. Victoria, Arminda Garcia & Lazaro Rodriguez (2007), Sustainable Development and Corporate Performance: A Study Based on the Dow Jones Sustainability Index, *Journal of Business Ethics*, 75: 285 – 300.

McWilliams, Abigail & Donald Siegel (2000), Corporate Social Responsibility and Financial Performance: Correlations or Misspecification?, *Strategic Management Journal*, 21: 603 – 609.

- Michelson, Grant, Nick Wailes, Sandra van der Laan & Geoff Frost (2004), Ethical Investment Process and Outcomes, *Journal of Business Ethics*, 52: 1 – 10.
- Miles, Samantha (2012), Stakeholder: essentially contested or just confused?, *Journal of Business Ethics*, 108: 285 – 298.
- Moeller, Sara B., Frederik P. Schlingemann & René M. Stulz (2004), Firm size and Gains from Acquisition, *Journal of Financial Economics*, 73, 3: 201 – 228.
- Nelling, Edward & Elizabeth Webb (2008), Corporate Social Responsibility and Financial Performance: The “Virtuous Circle” Revisited, *Review of Quantitative Finance and Accounting*, 32: 97 – 109.
- Orlitzky, Marc, Frank L. Schmidt & Sara L. Rynes (2003), Corporate Social and Financial Performance: A Meta-Analysis, *Organization Studies*, 24: 403 – 441.
- Pástor, Ľuboš, Meenakshi Sinha & Bhaskaran Swaminathan (2008), Estimating the intertemporal risk–return tradeoff using the implied cost of capital, *The Journal of Finance* 63, 6: 2859-2897.
- Petkoski, Djordjija & Nigel Twosa (2003), Public Policy for Corporate Social Responsibility, *World Bank's International Finance Corporation*, available in internet: [http://info.worldbank.org/etools/docs/library/57434/publicpolicy\\_econference.pdf](http://info.worldbank.org/etools/docs/library/57434/publicpolicy_econference.pdf)
- Pratt, Shannon P. & Alina V. Niculita (2008), *Valuing a Business*, New York etc.: The McGraw-Hill Companies, Inc. p. 755 ISBN 0-07-150935-6.
- Pätäri, Satu, Heli Arminen, Anni Tuppurä & Ari Jantunen (2014), Competitive & Responsible? The Relationship between Corporate Social and Financial Performance in the Energy Sector, *Renewable and Sustainable Energy Reviews*, 37: 142 – 154.
- Roman, Ronald M., Sefa Hayibor & Bradley R. Agle (1999), The Relationship Between Social and Financial Performance, *Business and Society*, 38, 1: 109 – 125.
- Sharfman, Mark P. & Chitru S. Fernando (2008), Environmental risk management and the cost of capital, *Strategic management journal*, 29, 6: 569 – 592.

United Nations World Commission on Environment and Development (1987), *Our Common Future*, Oxford: Oxford University Press, p. 224.

Van de Velde, Eveline, Wim Vermeir & Filip Corten (2005), Corporate Social Responsibility and Financial Performance, *Corporate Governance*, 3: 129 – 138.

Zhang, Lu (2005), The Value Premium, *The Journal of Finance*, 60, 1: 67 – 103.

## APPENDIX 1.

Appendix 1. The list of corporate social responsible variables

Corporate governance:

- Gender
- Experience
- Independence
- Size
- Board Functioning Processes
- CEO Board Member
- CEO Compensation Link to Total Shareholder Return
- Compensation Committee
- Compensation Improvement Tools
- Extra-Financial Performance Oriented
- Executive Retention
- Corporate Governance Committee
- External Consultants
- Nomination Committee
- Shareholders Approval of Stock Based Compensation Plan
- Board Functioning Processes

Emission reduction:

- Biodiversity Impact Reduction
- Commercial Risks and/or Opportunities Due to Climate Change
- e-Waste Reduction
- Emissions
- Emissions Trading
- Environmental Investments Initiatives
- Environmental Partnerships
- Environmental Restoration Initiatives
- NOx and SOx Emissions Reduction
- Particulate Matter Emissions Reduction
- Staff Transportation Impact Reduction
- VOC Emissions Reduction
- Waste Reduction Total

#### Environmental Products:

- Animal Testing Reduction Initiative
- Clean Technology
- Eco-Design Products
- Environmental Products
- Environmental Project Financing
- Equator Principles
- Hybrid Technology
- Labeled Wood
- Noise Reduction
- Organic Products Initiatives
- Product Environmental Responsible Use
- Sustainable Building Products
- Take-back and Recycling Initiatives
- Water Technology

#### Resource reduction:

- Environment Management Team
- Environment Management Training
- Resource Efficiency Processes/Policy Water Efficiency
- Resource Efficiency Processes/Policy Energy Efficiency
- Resource Efficiency Processes/Policy Environmental Supply Chain
- Materials Sourcing Environmental Criteria
- Toxic Substances Reduction Initiatives
- Renewable Energy Use
- Green Buildings
- Environmental Supply Chain Selection Management
- Environmental Supply Chain Partnership Termination
- Land Environmental Impact Reduction

#### Community:

- Whistleblower Protection
- Community Reputation Code of Conduct/Policy Fair Competition
- Community Reputation Code of Conduct/Policy Bribery and Corruption
- Community Reputation Code of Conduct/Policy Business Ethics
- Community Reputation Improvement Tools/Business Ethics
- Whistleblower Protection

Community Reputation Processes/Policy Community Involvement  
 Community Reputation Processes/Fair Competition (inactive)  
 OECD Guidelines for Multinational Enterprises  
 EITI Extractive Industries Transparency Initiative  
 Employees Community Work  
 Bottom of Pyramid Pricing  
 Crisis Management Systems  
 Corporate Responsibility Awards

#### Human rights:

Human Rights Processes/Policy Freedom of Association  
 Human Rights Processes/Policy Child Labor  
 Human Rights Processes/Policy Forced Labor  
 Human Rights Processes/Policy Human Rights  
 Fundamental Human Rights ILO or UN  
 Human Rights Suppliers  
 Ethical Trading Initiative ETI  
 Human Rights Breaches Suppliers

#### Employee issues:

Management Departures  
 Training and Career Development Processes/Policy Skills Training  
 Training and Career Development Processes/Policy Career Development  
 Internal Promotion  
 Management Training  
 Employees Health & Safety Team  
 Employee Health & Safety Training/Health & Safety Training  
 Employee Health & Safety Processes/Policy Supply Chain Health & Safety

#### Diversity and opportunity:

Diversity and Opportunity Processes/Policy Diversity and Opportunity  
 Flexible Working Schemes  
 Day Care Services



## **APPENDIX 2.**

Appendix 2. The list of controversial business areas variables.

Controversial businesses:

Alcohol

Alcohol 5% Revenues

Gambling

Gambling 5% Revenues

Tobacco

Tobacco 5% Revenues

Armaments

Armament Revenues

Nuclear

Nuclear 5% Revenues

Nuclear Production