# Radboud University

Master Thesis

Nijmegen School of Management

# THE INFLUENCE OF A SUSTAINABILITY REPORT ON THE COST OF CAPITAL

## Evidence from European countries

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# Abstract

This study investigates the influence of a sustainability report on the cost of equity and debt capital. Prior literature has discussed the relationship between a sustainability report and the cost of capital (COC). However, this study provides an additional argument for the existing debate about the influence of sustainability on the cost of debt. The effect of a sustainability report and the COC is explained through the information asymmetry, risk mitigation, and transparency. The findings exhibit a significantly negative association between a sustainability report and the cost of equity capital as well as debt capital. The sample consist of European companies and collected from Eikon ASSET4. Therefore, this study is not only fill the gap in prior research concerning the sustainability report and the COC, but it also provides useful implication for the managers, shareholders, investors, government, and other stakeholders.

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## CHAPTER 1

### Introduction

### 1.1 Introduction

Major cases of corporate financial scandals by large companies such as, Enron, WorldCom, and Lehman Brothers have resulted in a loss of stakeholders' trust in financial reporting (Duff, 2009). Additionally, business competition has become more stringent in recent years. These situations have induced many companies to implement Corporate Social Responsibility (CSR) to enhance their financial reports. KPMG International stated that almost 80 percent of approximately 250 companies in the world provide standalone sustainability reports (2008). The growing number of companies incorporating sustainability practices implies that managers of companies are eager to invest in them to get positive effects on firms (Malik, 2015).

Activities, resulting in a positive impact on the company, should be undertaken to pursue its business as a *going concern*[1]. One such activity is implementing sustainability. However, it may have unintended negative impacts on the company. For instance, in 1990, E. I. du Pont de Nemours and Company (DuPont), a chemical company, dumped 7,100 tons of Perfluorooctanoic (PFOA) or polluted waste into a dry landfill, covering up the fact that there were toxic chemicals in their product Teflon. This was noted as one of the worst impacts on the environmental surrounding area due to the chemicals and pollutants released

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[1] Going concern is an accounting concept showing an ability of a company to run the business and avoid bankruptcy (Investopedia, 2018).

into the environment (Rich, 2016). Due to instances like this one, it has become important for companies to have a hand in maintaining environmental sustainability. This concept evolved into the term called corporate social responsibility.

**1.1.1 Background of corporate social responsibility.** The World Business Council for Sustainable Development defines CSR as, *"Corporate Social Responsibility is a continuing commitment by business to contribute to economic development while improving the quality of life of the workforce and their families as well as of the community and society at large"* (Holme & Watts, 2000).

According to MVO Nederland (2015), *"Corporate Social Responsibility refers to companies taking responsibility for their impact on society".*

In general, there are many interchangeable terms for Corporate Social Responsibility (CSR) such as, sustainability, non-financial performance, and Environmental, Social and Corporate Governance Factor (ESG). All terms have a similar construct, even though there is a specific context to each term. For the purpose of this thesis, the term sustainability will be used, as it covers all the contexts of non-financial performance. Additionally, the term is used by a well-known independent international organization Global Reporting Initiative (GRI) who provides global standards for sustainability reporting. This organization helps businesses understand and communicate their impact on critical sustainability issues by providing sustainability reporting standard, which is available in public (Global Reporting Initiative, 2018). Their mission is to empower decisions, which create social, environmental, and economic benefits for everyone. GRI (2018) stated that, *"Sustainability report is a report published by a*

*company or organization about the economic, environmental and social impacts caused by its everyday activities".*

For the most part, the characteristic of a sustainability report is *voluntary* for the company. However, some companies, especially in the European Union, are *required* to include a Non-financial statement. This requirement is stated in article 19a of EU Directive 2004/95/EU, which explains that large companies with an average of 500 employees must report Non-financial information (European Union Law, 2018). Moreover, all the information issued by companies in the sustainability report should be relevant and provided in timely manner Dubbink et al. (2008).

According to Mahoney et al. (2013), the main motivation for a company to publish a sustainability report is to show its commitment to sustainability that is beneficial for stakeholders. According to Heal (2005), the implementation of sustainability is demonstrated to improve the company's strategy, mitigate future risk, and have long-term benefits for the company. Meanwhile, the adoption of sustainability report is hard to be realized due to different company interest (profit maximization) and the possibility of agency problem (Banerjee, 2008).

Furthermore, the relationship between a sustainability report and the cost of capital has received great attention by many authors and is a controversial topic among scholars (Botosan, 2006). Most of the prior researchers debated the issue whether sustainability report affects the reduction in the cost of equity and debt capital. According to Healy and Palepu (2001), producing a sustainability report provides relevant information to investors to determine the level of investment. Specifically, if the company provides higher sustainability report, it reduces the information asymmetry problem between managers and

investors and agency problem. It is the higher quality sustainability reporting, which assures investors to make informed judgements about the performance of a company and reduce the information cost incurred by them (Kim & Verrecchia, 1994). Hence, a sustainability report becomes an incentive for a company to minimize its cost of capital.

According to Bollen (2007), investors' decision to invest in socially responsible funds is a part of risk-reward optimization. Jo and Na (2012) supported it, stating that a company's engagement in sustainability activities can help it to reduce its level of risk. Renneboog et al. (2008) found that companies whose managers adopt negative sustainability performance such as, polluting firm, have fewer investment portfolios, which reduce the opportunity of risk-sharing among investors. Hence, the stock price of polluting firms increases, raising the cost of capital (expected return). This study implies that investors perceive high sustainability performance as less risky and thus have lower cost of capital compared to low sustainability performance.

In maximizing its value, a company should have support or a good image in the society. To avoid a gap in perception between stakeholders and a company, the company informs the public of its activities to meet society's expectations. For instance, from an employee's perception, he/she generally decides to work depending on how a corporation accepts and manages its responsibility (Andriof & Waddock, 2002). Hence, the publication of sustainability about a company's position regarding the "employer of choice" will enhance loyalty, reduce staff turnover, and attract and retain high quality employees (Omran, 2015).

Referring to the association between sustainability and cost of equity (COE), lot of prior literature found that sustainability report has a negative effect on COE. According to

Dhaliwal et al. (2011), standalone sustainability report leads to lower COE. Similarly, Reverte (2012) and El Ghoul et al. (2011) uncovered that higher sustainability performance leads to lower COE. Mackey et al. (2007) also provide evidence about experiencing lower COE capital for companies with good reputation.

Meanwhile, relatively few historical studies discuss the relationship between sustainability and cost of debt (COD); part of them found the result insignificant. This result is debatable, since Cheng et al. (2014) found that more transparent information increases the reliability as well as compliance of a sustainability report, thus reducing the company's COD. Ye and Zhang (2011) supported it, stating that improving sustainability performance leads to lower debt financing cost. Moreover, McGuire et al. (1988) identified sustainability as a risk factor for banks in making investment decision.

Based on mixed results of prior studies, this thesis aims to provide supporting evidence and clarification for the current debate about the influence of a sustainability report on the cost of equity and debt capital. Therefore, the research question for this thesis is formulated as follows: **"What is the influence of a sustainability report on the cost of capital?"**

## 1.2 Scientific Contribution

This research differs from previous studies and contributes to the literature concerning the relationship between sustainability disclosure and cost of capital in three respects. First, it not only focuses on the influence of a sustainability report on COE capital like the study of Dhaliwal (2011), but also presents the influence of the report on COD capital. Since there is a lack of focus on COD in prior literature, additional examination of

COD in this research will fill the gap in the relationship between sustainability and COD capital. Hence, this research provides an additional argument for the existing debate about the influence of sustainability on COD.

Second, this research compares companies, which do and do not disclose a sustainability report in the European zone. Dhaliwal et al. (2011) found that companies with higher performance in sustainability activities tend to have lower COE when they voluntarily publish their sustainability disclosure, than non-initiator companies. Nevertheless, evidence from European companies gives additional value to this research compared to American companies used by prior literature.

Third, this research uses the Thomson Reuters ASSET4 database, different than prior research. The common database used by prior researchers (Goss & Roberts, 2011; Oikonomou et al, 2014; Cooper & Uzun, 2015) is Kinder, Lydenberg, Domini and Co. (KLD) database. Other researchers use Dow Jones Sustainability World Index (DJSI World) (Menz, 2010; Magnanelli & Izzo, 2017). Hence, this research contrasts the prior literature with the updated database.

## 1.3 Theoretical and Practical Relevance

This thesis provides an insight, useful in practice, by representing some advantages of reporting sustainability activities, specifically the reduction of cost of capital. Findings of this research can help encourage managers to be more involved in sustainability practices. It provides an insight for managers and shareholders on the relationship between sustainability and cost of capital. Subsequently, business sustainability or entity, implementing sustainability practices, will improve the company's value by being more

responsible in its business operations, especially its responsibility towards the environment, society, economy, and corporate governance.

Further, this research provides evidence to shareholders that implementing sustainability practices outweighs incurred expenses, thus maximizing their value. Additionally, it gives important information about the influence of a sustainability report on cost of capital to investors and creditors. It provides them with points of consideration that assist in the decision-making process. On the other hand, it helps to develop the applicable standards to achieve efficient capital markets and the necessity of the information disclosed in the financial statements.

**1.4 Structure**

This thesis is divided into five main chapters. The introduction is the first chapter. The second chapter presents the literature overview as well as hypotheses development. The methodology is discussed in chapter three. Chapter four explains the results of the research. The last chapter is the discussion and conclusion.

**CHAPTER 2**

**Literature Review**

This chapter provides a theoretical background and review of prior literatures related to the association between a sustainability report and cost of capital. Section 2.1 explains the important theoretical background used in this study: related theories between sustainability and COE, COD, information asymmetry, risk mitigation, and transparency. It is followed by the discussion on literature review about sustainability report and cost of capital in Section 2.2. Furthermore, Section 2.3 presents the hypotheses developments based on the explanation of literature review and discussion of theories.

**2.1 Theoretical Background**

**2.1.1 Sustainability and cost of capital.** According to Pratt and Grabowski (2008), "the cost of capital is the expected rate or return that the market participants require in order to attract funds to a particular investment". The components of its capital are equity and debt.

The concept of COE is the return rate investors require on the equity invested in a company (Damodaran, 2002). According to Botosan (1997), COE is affected by the risk and sustainability report. It is affected by the risk investors have to deal with for investing in the company's shares compared to other investment. In theory, investors require a higher reward due to the higher risk taken; it then leads to increase the COE. In contrast, when investors encounter low risk, COE decreases. Hence, the issuance of a sustainability report will increase the liquidity in the market share, leading to lower COE through reduction in

the transaction cost. Additionally, Lambert et al. (2007) stated that higher quality of sustainability report affects the covariance assessment of one company to the other company's cash flow.

From the perspective of managers, COE is used as an input to assess capital budgeting and also to calculate the present value of a company. As a result, the company's behavior depends on COE. In general, managers would only invest if the return of marginal project exceeds COE. It is due to the higher cost carried by the company from higher COE. Furthermore, the market value of a company would be higher if COE is lower.

Meanwhile, COD is the rate of return (yield rate) required by creditors when financing a company (Fabozzi et al., 2007). It consists of interest to be paid by the company when taking a loan (the interest is expense incurred from debt financing). The COD is calculated from the weighted average interest expenses based on the value of each instrument (bank loan, bonds, notes, leases, mortgage, and other agreements). The COD is affected by the loan element, loan size, firm size, and characteristics of the firm (Francis et al., 2005). Hence, debt holders encounter two types of risks. First type of risk is the incapability to fulfil the obligation for coupon payments. Second, in case a company defaults, bondholders may only receive half of its investment. Therefore, COD reflects the estimation of loss and default of a company. Investors have to gain company's information to avoid these risks. William (2012) stated that a sustainability report brings a positive impact on the value of a company. When the company's value increases, the risk of a company decreases and therefore, creditors give a lower COD.

**2.1.2 Sustainability and shareholder and stakeholder theory.** The concept of sustainability performance encourages companies to maximize shareholders' value by

having concern for the impact of business operation that benefits all stakeholders. This underlying statement emerged from the shareholder and stakeholder theory. According to Ng and Rezaee (as cited in Eldar, 2014), the Shareholder theory suggests that management of a company engages in positive net present value (NPV) to maximize the wealth of shareholders. The stakeholder is "any group of individuals who can affect or is affected by the achievement of the firm's objective" (Freeman, 1984). Thus, the stakeholders have claim, ownership, right, and interest in the company. Sustainability activities are interconnected with stakeholders through the annual statement of a company (Mustapha & Che Ahmad, 2011). According to Malik (2015), publishing a sustainability report is one of the strategic tools to maintain and maximize the value of companies and stakeholders, since it accommodates the interest and need of stakeholders. The claim of this theory suggests that sustainability performance will enhance long-term benefits of companies by being responsible towards the society, complying with the environmental obligation, and enhancing their reputation. The determination of sustainability requires a resources allocation consideration that might become a problem for maximizing the shareholder's value. However, the better implementation of a sustainability report might optimize the positive effect of a company and reduce the negative effect through balancing the sustainability cost and benefit (Brockett & Rezaee, 2012).

**2.1.3 Information asymmetry and risk management.** Any information about a company is very useful for investors to help determine their investment decisions regarding the company. The influence of a sustainability report on the cost of capital can be driven by information asymmetry among investors and managers. Information asymmetry is the condition where one party has more information than other parties or the firm information is not equally available to managers, as well as shareholders (DePamphilis, 2015).

Information asymmetry sources are primarily related to information about quality or intent (Stiglitz, 2000). The quality of information is important to gain premium from other parties such as, investors and the intensity of information will avoid any *moral hazard*[2] from the behavior of another party (King et al., 2005; Sanders & Boivie, 2004). Additionally, Clarkson et al. (2011) point out that companies publish sustainability reports to avoid *adverse selection*[3]. Subsequently, a company should provide any relevant and valuable information for investors to reduce information asymmetry. This implies that information asymmetry is important in explaining the relationship between a sustainability report and cost of capital, as the information risk affects investors as well as return of shareholders and stakeholders.

As stated in the introduction, a sustainability report is important to assess the risk and return of investors. It has cost and benefit that affect the shareholders and thus cost of capital. For instance, an initiation of a company to reduce pollution in its business operation requires a lot of capital expenditure, but the company will gain benefit in the long-term through the reduction of environmental liabilities. Godfrey et al. (2009) stated that sustainability activities create positive moral capital by providing protection to shareholders through a relationship-based intangible asset. This asset will not only mitigate the financial loss of a firm if some negative event occurs, but also open an opportunity with

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[2] *Moral hazard* is a situation in which one party gets involved in a risky event knowing that it is protected against the risk and the other party will incur the cost. It is due to both parties having incomplete information about each other (The Economic Times, 2018).

[3] *Adverse selection* (or hidden information) occurs when borrowers generally know more about their investment project than lenders. Thus, it can produce an undesirable outcome (de Haan, Oosterloo, & Schoenmaker, 2015).

the customer and suppliers. Therefore, sustainability report becomes a tool to communicate relevant available information to investors, thus reducing the risk.

In the risk mitigation perspective, investors perceive higher performance of sustainability company as less risky. Thus, they require lower return on the capital they invest in the higher sustainability performance company than a lower performance sustainability company. The separation of market makes risk-sharing limited and thus there is idiosyncratic risk[4] (or unsystematic risk). Higher sustainability of a company has lower idiosyncratic risk and lower returns (Lee & Faff, 2009; Boutin-Defresne et al., 2004) together with the high market-to-book (MB) ratio (Galema et al., 2008). For instance, publishing firm-specific information leads investors to demand higher return on investment. This strategy will reduce credit risk, thus lowering COE capital. Moreover, the financial risk affects the company to repay its liabilities. Thus, when a company implements sustainability, which leads to low risk and enhances its financial performance, the bank will provide better loan terms to the sustainable company. Thereafter, the COD capital for the company decreases.

Therefore, many companies use a sustainability report to provide information to investors. The increasing information availability improves transparency between companies and other stakeholders, enhancing information asymmetry, where investors perceive lower risk to the company, and thus lower cost of capital.

**2.1.4 Other theories relevant to sustainability.** Signaling theory is one of the prominent theories that explain the potential benefits for companies in disclosing a

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[4] *Idiosyncratic risk* is the risk that is attributable to firm-specific risk, or non-market risk.

sustainability report. As an illustration, obtaining a private management standard certification such as the ISO 14001 environmental management system certification will send a signal about the unobservable characteristic of a company. Hence, it will reduce the asymmetric information between parties by offering reliable information (sustainability report) to the buyer or supplier (King et al., 2005).

This theory proposes that companies who are superior[5] or better engage in the sustainability performance publish their sustainability report to reveal their actual performance and potentially increase their market value (Thorne et al., 2014). Furthermore, taking initiative to disclose sustainability activities is to attract many investors (Hummel & Schlick, 2016). It is in line with the prior research of Dhaliwal et al. (2011) that voluntary sustainability disclosure leads the company to raise capital easily and get equity with lower cost. Based on this underlying assumption, the issuance of sustainability disclosure will enhance the reputation of the companies due to the increasing level of stakeholder's confidence regarding the sustainability performance of the companies (Casey & Grenier, 2014).

The other prominent theory, regarding why companies issue sustainability report, is Legitimacy Theory. It indicates that in the event of discrepancy between a company and social expectations, the management of a company engages in disclosing sustainability in the annual statement to help alleviate the community's concerns (Gray et al., 1995). Thus, the additional information about sustainability is added in the report to lighten the public

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[5] Superior environmental performance is when a firm met or exceeded the expected standards (this definition is recognized by a regulator or other government authority) (Heal G. M., 2008).

concern and also show similar expectations between corporation, community, and society (Deegan, 2002).

Therefore, the company can use a legitimate act (or company's behavior with an intention to influence the perception of stakeholders and society) by publishing the sustainability activities, even though it may still not give a superior performance. This manipulation persuades the society to believe that the company has an intention to perform sustainably. Hence, this theory suggests that inferior company[6] on sustainability performance is more willing to issue sustainability disclosure as a legitimate act in order to influence the public perception of their sustainability performance (Hummel & Schlick, 2016; Schaltegger et al., 2006).

## 2.2 Literature Review and Hypotheses Development

According to Ameer and Othman (2012), based on the top 100 sustainable global companies in 2008, there is a significant higher means of sales growth, return on assets, profit before taxation, and cash flow in some sectors of companies engaged in sustainable performance than those not engaged. Furthermore, Berthelot et al. (2012) found that issuing sustainability report has a positive effect on a company's value. This positivity in sustainability comes from investors, who foretell the future cash flow and thus, reduce cost of capital (Berthelot et al., 2012; Hou et al., 2012; Lambert et al., 2007).

According to Jo and Na (2012), a company's engagement in CSR activities can help it to reduce its level of risk. Godfrey et al. (2009) support this idea, stating that

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[6] Inferior performance in this context comprises companies reporting less about sustainability performance; or filing of a complaint against a firm, by a regulator or a member of the public (Heal G. M., 2008).

initiating CSR creates moral capital or goodwill, which gives protection to the company like insurance, which can preserve financial performance. Stakeholders assess risk based on information, which goes beyond financial information. A sustainability report provides stakeholders with additional information pertaining to the well-being of society. Although the main concern in implementing sustainability initiatives is the high cost, the benefit gained from the implementation of sustainability activities is more than the cost incurred.

**2.2.1 The benefit of sustainability report and hypotheses development**. The implementation of a sustainability report is expected to bring more benefit for the company and stakeholders. Several benefits gained from sustainability are cost-saving; reduce litigation cost; improved product quality, customer satisfaction, risk management, productivity, loyalty from employee and enhanced reputation of a company (Toronto Stock Exchange, 2014). The cost for sustainability reports consists of producing and obtaining assurance for the report, managerial time in providing the report, disclosing valuable information (trade information, profitable markets, and other exposures), and litigation cost (Harris, 1998; Leuz, 2004).

Based on prior literatures and related theories mentioned above, this thesis hypothesizes that there is an influence of a sustainability report on cost of capital. Superior companies will signal their higher sustainability performance to the market, while inferior companies should put in more effort to disclose their sustainability reports. Moreover, investors are aware of the sustainability information, leading to risk-sharing and then lowering cost of capital. Information possesses risk, which can affect cost of capital. When the benefit of sustainability disclosure exceeds the cost of providing the disclosure, the value of the company is expected to increase. Furthermore, the more transparently a

company discloses its information (specifically sustainability report), the investor would demand lower return on its investment.

Additionally, higher implementation of sustainability also leads to lower COD. Goss and Roberts (2011) provide evidence that higher quality borrowers who invest in sustainability performance do not encounter higher yield spreads. Additionally, Ge and Liu (2015) found that better sustainability performance has lower yield and higher bond ratings. The increasing use of debt reflects the higher risk faced by the company. This research assumes that creditors are neutral parties, interested in the company's ability to repay its loan obligation by evaluating its annual report and sustainability activities. When company engages in sustainability activities and is low-risk with improved financial performance, creditors will offer a good deal in determining the loan spread. Therefore, providing a sustainability report helps the company operate according to the interest of stakeholders. As a result, this study examines the influence of sustainability report on cost of equity and debt capital with the following hypotheses:

*Hypothesis 1:* The sustainability report has a negative effect on the cost of equity capital.

*Hypothesis 2:* The sustainability report has a negative effect on the cost of debt capital.

Figure 1 shows the influence of a sustainability report on COE and COD. It is consistent with studies by Dhaliwal et al. (2011), Reverte (2012), and El Ghoul et al. (2011) that publishing a sustainability report will have a negative effect on COE capital.

Additionally, the effect of issuing a sustainability report also has a negative effect on COD capital (Goss & Roberts, 2011).
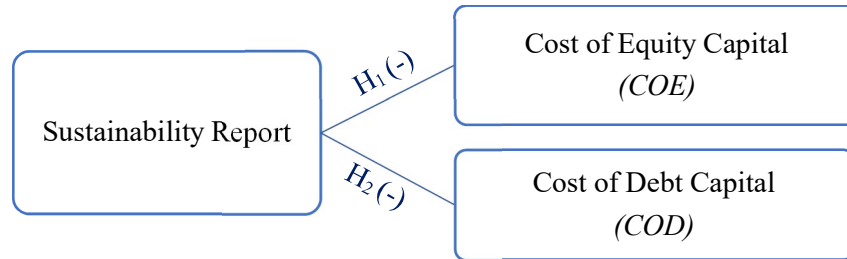


Figure 1. The influence of a sustainability report on the cost of capital

# CHAPTER 3

## Research Method

This chapter focuses on data collection and methodology used for this thesis. Data collection and sample are explained in the first part. The second part discusses the variables and econometric model used in this research.

### 3.1 Data Collection and Samples

Data in this thesis is collected from Thomson Reuters DataStream and Eikon, provided by Radboud University. All the sustainability data can be retrieved from a package named ASSET4. Nevertheless, Thomson Reuters database is considered as one of the most updated datasets. In prior literature, most of the researchers used Kinder, Lydenberg, Domini, and Co. (KLD) dataset and focused on the American companies (Cooper & Uzun, 2015; Goss & Roberts, 2010; Oikonomou et al., 2014). Meanwhile, this research measures sustainability performance based on Thomson Reuters (ASSET4 ESG dataset), which uses over 250 key performance indicators (KPIs). The KPI scores are gathered into 18 categories grouped within four sustainability dimensions (social, corporate governance, economic, and environmental performance). Further, the time frame of this research starts from 2002 until 2016 that is the most complete data available until the recent period.

The sample contains companies located in European countries, except UK and Ireland, with 683 companies in 18 countries (Appendix A). The reason for choosing European countries is because Europe is the most active area regarding sustainability

reporting (more than 50% of sustainability reports in the world come from Europe) (European Union, 2011). It is also supported by RobecoSAM as one of the specialists in Sustainability Investing who presents an annual evaluation of companies' sustainability practices (RobecoSAM, 2018). Besides, European companies can be used to compare with prior studies, mainly focused on United States area.

## 3.2 Research Methodology

In order to examine the influence between a sustainability report and cost of capital, this research uses regression model with panel data analysis. The first hypothesis examines that the sustainability report will have negative effect on the COE capital. The following regression model is formulated based on Dhaliwal et al. (2011):

$$\log COE_{i,t} = \beta_0 + \beta_1 Sreport_{i,t} + \beta_2 \log SIZE_{i,t} + \beta_3 \log BETA_{i,t} + \beta_4 \log MB_{i,t} +$$

$$\beta_5 \log LEV_{i,t} + \sum EuropeRegion + \varepsilon_{i,t} \qquad (1)$$

where *COE* is the log cost of equity capital for company *i* at year *t*.

Hypothesis 2 expects that the sustainability report will have negative effect on COD. Therefore, the following regression model is formulated:

$$\log COD_{i,t} = \beta_0 + \beta_1 Sreport_{i,t} + \beta_2 \log SIZE_{i,t} + \beta_3 \Delta \log BETA_{i,t} + \beta_4 \log LEV_{i,t} +$$

$$\beta_5 \log ROA_{i,t} + \sum EuropeRegion + \varepsilon_{i,t} \qquad (2)$$

where *COD* is the log cost of debt capital for company *i* at year *t*.

The above-mentioned variables will reveal their effect on the dependent variables in the regression model. The adoption of panel data analysis is used as the sample contains panel data set (multiple companies involved in the 15 years). It helps this research to resolve the issue of omitted variables, generating more accurate predictions and, therefore, to have an ideal experimental design (Wooldridge, 2013). The analysis in this thesis uses Random effect model due to the existence of invariant variable (*Industries*). Besides, the Hausman-test will be conducted to test the validity of random effect model. In order to meet the classical assumption, the variable, which is not normally distributed, is transformed by using natural logarithm (Studenmund, 2014). Thus, all these variables are measured by using *natural* logarithm to have normally distributed variable. Thus, the result of the regression will lead to answer the research questions.

## 3.3 Variables

**3.3.1 Dependent variables.** As can be seen in the regression model, this thesis uses two dependent variables to analyze the influence of a sustainability report on the cost of equity and debt capital. The first dependent variable is the cost of equity (COE). The Price per Earning to Growth (PEG) ratio is the most suitable model to be used in measuring the COE capital (Botosan & Plumlee, 2005; Botosan et al., 2011). This PEG model was proposed by Easton (2004), stating that this proxy may be used by a researcher to determine the effect of various factors (disclosure quality) on the COE capital. It can be calculated as follows:

$$r = \sqrt{(EPS_2 - EPS_1)/P_0}$$

Where $EPS_2$ is the mean for a two-year analysis forecast of the Earning per Share (EPS) and $EPS_1$ is the mean for one year of EPS. The $P_0$ is the current or the base year of market price (Francis et al., 2005).

The second dependent variable is the cost of debt capital (COD). According to Magnanelli and Izzo (2017) and Ye and Zhang (2011), the measurement of the COD capital is the interest expenses on total debt ratio of a company. The expense of interest represents all the charge on the use of cost of capital before the reduction for interest is capitalized, while total debt represents the short- and long-term debt.

**3.3.2 Independent variables.** The independent variable in this research is sustainability reporting (Sreport). In conducting the test, a dummy variable is created for Sreport. The indicator variable would be represented by a value of 1 if company i publishes its sustainability section in its annual report. Where there is no issuance of a sustainability report or no data is available, the value would be represented as 0.

**3.3.3 Control variables.** Following prior studies, several control variables are used to examine the influence of a sustainability report on cost of capital and also to avoid statistical bias in research. Control variables in this research are firm size (SIZE), market-to-book ratio (MB), beta (BETA), leverage (LEV), return on asset (ROA), and Industry (Industries).

First, the firm size (SIZE) is expected to be negatively correlated to cost of capital. Based on Lang and Lundholm's study (1996), the size of a company captures numerous factors like financial resources that motivate a company to publish a sustainability report. The bigger company is assumed to have more financial resources to perform sustainability

activities and is also perceived as less risky (Di Giulio et al., 2007; Cooper & Uzun, 2015).

These companies provide a greater disclosure that lowers information asymmetry (Botosan

C. A., 1997). Also, a larger firm is assumed to have a better experience in encountering

shock conditions on its cash flow, leading to less possibility to default (Goss & Roberts,

2011). On the other hand, when a company need higher amount of financing, this request

of larger amount of capital increase the cost of capital.

Second, beta (*BETA*) is used to control the systematic risk along different

dimensions. It measures the market risk showing a relationship between stock volatility

and market volatility. *BETA* is positively associated with COD (El Ghoul et al., 2011; Izzo

& Magnanelli, 2012), as well as COE (Dhaliwal, Li, Tsang, & Yang, 2011). Meanwhile,

Hou et al. (2012) found that beta is significantly negatively related to *COE* because of risk

explanation.

Third control variable is market-to-book ratio (*MB*). The *COE* is expected to be

positively associated with MB (Fama & French, 1992). In general, a superior company

usually has higher MB ratios (Goss & Roberts, 2011), which is the ratio of the company's

market capitalization to the total book value. This variable is used as a control for risk,

growth opportunities, and mispricing in the market (Goss & Roberts, 2011).

Fourth control variable is leverage (*LEV*). It is included due to the assumption of

Fama and French (1992) that *COE* will increase when leverage increases. The company

has to pay higher spreads when they face higher LEV. Additionally, based on Magnanelli

and Izzo's study (2017), the higher LEV of a company is expected to pay more spreads.

Thus, it is expected to be positively correlated with the cost of equity and debt. Moreover,

the leverage proxy in this research is the ratio of total debt to the total asset. This ratio shows the amount of debt used by the company in operating their activities.

Next, the control variable for COE is return on asset (*ROA*), which measures a company's profitability. It is calculated by dividing a company's annual net income by total assets at the end of the year. Based on the study by Dhaliwal et al. (2012), the better financial performance of a company (measured by its ROA) is likely to have more resources to perform sustainability activities, also producing sustainability disclosure.

Last, the country of the company (Country) is considered as a control variable since the level of pressure in countries is different and impacts the quality of sustainability implementation and disclosure differently (Carnevale & Mazzuca, 2014). Furthermore, Table 1 below shows the definition of the variable and expected sign of this research.

Table 1. Definition of variable and the expected sign

| Variable | Proxy | Measurement | Source | Expected Sign |
|---|---|---|---|---|
| **Dependent Variables** | | | | |
| **Cost of Equity** | *COE* | Price per Earning to Growth ratio (PEG ratio) | DataStream | |
| **Cost of Debt** | *COD* | The ratio of interest expense on the total debt | DataStream | |
| **Independent Variables** | | | | |
| **Sustainability Report** | *Sreport* | Sustainability report is dummy variable and equals to 1 if a company issue sustainability report and 0 otherwise | Eikon | - |
| **Firm Control Variable** | | | | |
| **Firm Size** | *SIZE* | The company's total assets | DataStream | - |
| **Beta** | *BETA* | Systematic risk of the market | DataStream | -/+ |
| **Market to Book Ratio** | *MB* | The ratio of the company's market value to total book value | DataStream | + |
| **Leverage** | *LEV* | The ratio of total debt on the total assets | DataStream | -/+ |
| **Return on Asset** | *ROA* | Return on Asset is calculated by dividing a company's annual net income by the total asset at the end of the year | DataStream | + |
| **Industry** | *Industry* | Six categories of Industries | Eikon | |

# CHAPTER 4

## Results

The fourth chapter presents the results of the research, focusing on the influence of sustainability on cost of equity and debt capital. The first brief overview is the sample distribution and descriptive statistic obtained from the data. Moreover, the result will be analyzed to answer the research question.

## 4.1 Sample Distribution

In Figure 2, the empirical data shows that number of companies that issue a sustainability report increases every year, while the number of companies that do not issue sustainability report decreases. Based on the total of 7,422 data observations, the difference of number between companies who publish and do not publish a sustainability report is 2,751.

Figure 2. Graph of sustainability reports
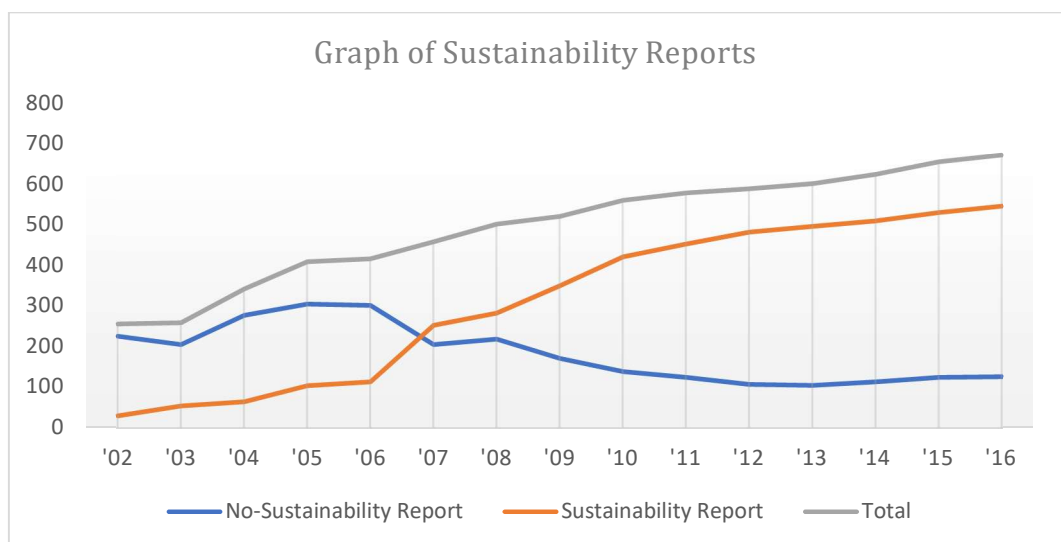
**4.2 Descriptive Statistic**

Table 2 presents the descriptive statistic of two dependent, one independent, and control variables. As can be seen from the data in the table, the total number of observations is 10,245 from companies in European countries (except UK and Ireland). However, the number of observation varies in some variable (COE, COD, Sreport, and other variables) due to missing data in the database. Thus, it does not completely provide all the information (or data is not available) for the variables. Moreover, the panel dataset in this research strongly balances with 683 total companies (ISINCODE) within 18 countries (CountryCode) in Europe between 2002–2016. Moreover, there are 6 categories of industries and the region of Europe is categorized into four regions (Appendix A).

Furthermore, the average number of COE from 10,020 observations is 1.234406 with minimum value of COE being -6.214608, maximum value of COE 10.10418, and standard deviation of 1.777842. Meanwhile, the average number of COD is 11.4352 with minimum value of COD being 0, maximum value of COD 18.381, and standard deviation of 2.25323.

In the sustainability report (Sreport), values of 0 and 1 indicate "no-sustainability report" and "sustainability report," respectively. Its average of 0.6303413 indicates that approximately 63% of European companies publish sustainability report.

The maximum value of SIZE is 23.14875, minimum value 7.399398, and average value 16.27116 with standard deviation of 2.002906. The average of BETA is 3.278384, standard deviation value 0.3013827, minimum value 1.680828, and maximum 4.320949. The average of MB ratio is 0.6441059, average of LEV is 3.477604 and average ROA is

1.53139. The average of LEV implies that the composition of debt financing from 683 companies is around 34.8%.

Table 2. Descriptive statistic

| Descriptive Statistic | | | | | |
|---|---|---|---|---|---|
| **Variable** | **N** | **Mean** | **Std.Dev.** | **Min** | **Max** |
| *Dependent variables* | | | | | |
| logCOE | 10,020 | 1.234406 | 1.777842 | -6.214608 | 10.10418 |
| logCOD | 10,168 | 11.4352 | 2.25323 | 0 | 18.381 |
| *Independent variable* | | | | | |
| Sreport | 7,442 | .6303413 | .4827447 | 0 | 1 |
| *Control variables* | | | | | |
| logSIZE | 10,245 | 16.27116 | 2.002906 | 7.399398 | 23.14875 |
| logBETA | 10,245 | 3.278384 | .3013827 | 1.680828 | 4.320949 |
| logMB | 10,148 | .6441059 | .7272876 | -4.60517 | 5.657075 |
| logLEV | 9,979 | 3.477604 | 1.076687 | -4.60517 | 8.970141 |
| logROA | 9,386 | 1.531399 | .9926045 | -4.60517 | 5.383393 |
| Industries | 10,245 | 1.980966 | 1.62382 | 1 | 6 |
| ISINCODE | 10,245 | 342 | 197.1745 | 1 | 683 |
| CountryCode | 10,245 | 10.20644 | 4.927811 | 1 | 18 |
| Years | 10,245 | 2009 | 4.320705 | 2002 | 2016 |

Table 3. Pearson correlation

| Pearson Correlations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **logCOE** | **logCOD** | **Sreport** | **logSIZE** | **logBETA** | **logMB** | **logLEV** | **logROA** |
| **logCOE** | 1.0000 | | | | | | | |
| **logCOD** | 0.1524*** | 1.0000 | | | | | | |
| **Sreport** | -0.0126 | 0.1773*** | 1.0000 | | | | | |
| **logSIZE** | 0.2100*** | 0.8396*** | 0.2127*** | 1.0000 | | | | |
| **logBETA** | -0.0835*** | -0.0874*** | -0.1254*** | -0.1296*** | 1.0000 | | | |
| **logMB** | 0.1134*** | -0.2525*** | -0.0431*** | -0.2614*** | -0.0917*** | 1.0000 | | |
| **logLEV** | -0.0131 | 0.5219*** | 0.0602*** | 0.2917*** | -0.0096 | -0.1556*** | 1.0000 | |
| **logROA** | 0.0563*** | -0.3277*** | -0.0541*** | -0.4100*** | -0.0472*** | 0.4883*** | -0.3203*** | 1.0000 |

p-value in parentheses: *p<0.1, **p<0.05, ***p<0.01

**4.3 Pearson Correlation**

Pearson correlation is used to test multicollinearity[7] between variables. The result of the Pearson correlation analysis is summarized in Table 3. The high correlation between variables will show whether the correlation is close to -1 or 1. The relationship between variables will be a problem (an indication of multicollinearity) if the correlation between variables is more than 0.6.

Based on Table 3, there is high correlation (0.8396) between SIZE and COD. This correlation is not a problem since bigger companies are likely to have more debt compared to smaller firms. In order to test the validity about this correlation, another alternative to test multicollinearity is by conducting the Variance Inflation Factor (VIF) test. The result can be seen in Appendix B. If the result of VIF is lower than 10, it means that there is no multicollinearity in this dataset (Wooldridge, 2013). The result of VIF in this research shows that it's mostly around one and the highest number of VIF is 1.50. Therefore, there is no multicollinearity problem within these variables.

There is negative correlation between Sreport and COE, but positive correlation with COD. It implies that published Sreport is associated or related to decrease COE, while it increases for COD. This positive coefficient for COD means that third parties do not base the sustainability information as a factor in lending their money. Since the number of observations for Sreport decreases because of some missing values or companies do not report their information in the database, the level of significance might be affected.

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[7] Multicollinearity indicates more than two independent variables are involved (Studenmund, 2014)

Overall, all variables are lower than 0.6, except the relationship between SIZE and COD. However, the correlation can be explained and therefore, there is no multicollinearity problem within each variable.

**4.4 Panel Regression**

Since the dataset consists of panel data and invariable data (*Industries*), a random effect regression (panel data analysis) is conducted. This research employs the Hausman test to check which model between fixed and random effect model is best suited for this research. Moreover, Breusch-Pagan Lagrange multiplier is tested to check the reliability of the Random Effect Model.

Hypothesis 1 predicts that a sustainability report has negative effect on the COE. Meanwhile, the second hypothesis aims to test the influence of a sustainability report (Sreport) and the COD. Based on the Hausman result, the significant systematic difference in coefficient is 1.0000 for both hypotheses. This means that the random effect regression model is suitable for testing each equation rather than the fixed effect model. After the Breusch-Pagan Lagrange multiplier is applied, the results suggest that Random effect model is appropriate for this study.

Table 4 exhibits a significantly negative association between Sreport (-0.223, p-value < 0.05) and the COE. This subsequently implies that the publication of the sustainability report leads to a 0.223 (or 22.3 percent) decrease in the company's COE. Meanwhile, the result is slightly lower for COD. The issuance of a sustainability report (Sreport) is significantly negative impacts (-0.0827, p-value < 0.05) to the COD. Thus,

when a company publishes their sustainability report, it leads to a 0.0827 (or 8.27 percent) decrease in COD.

Table 4. Random effect for cost of equity and cost of debt

| Variable | I Cost of Equity | | II Cost of Debt | |
|---|---|---|---|---|
| | Coeff. | t-stat. | Coeff. | t-stat. |
| Sreport | -0.223*** | -5.69 | -0.0827*** | -3.70 |
| Log of Size | 0.283*** | 21.90 | 0.949*** | 129.20 |
| Log of Beta | -0.537*** | -8.49 | 0.146*** | 4.08 |
| Log of Market-Book | 0.240*** | 9.14 | - | - |
| Log of Leverage | -0.149*** | -7.82 | 0.641*** | 58.81 |
| Log of ROA | - | - | 0.0762*** | 6.01 |
| Industries | | | | |
|    Utility | -0.934*** | -14.29 | 0.283*** | 7.61 |
|    Transportation | -0.237* | -2.10 | 0.0999 | 1.57 |
|    Bank/Saving & Loan | -0.252*** | -3.44 | -1.030*** | -23.76 |
|    Insurance | -0.124 | -1.35 | -1.261*** | -21.99 |
|    Other Financial | 0.140 | 1.80 | -0.137** | -3.11 |
| Constant | -1.374*** | -4.42 | -6.653*** | 0.00 |
| Observation (n) | 7,068 | | 6645 | |

Dependent variable: Sustainability report
t statistics in parentheses: *$p<0.05$, **$p<0.01$, ***$p<0.001$

In random effect, the *Industrial* becomes the reference category relative to five other industries because of the dummies variable. In column 1 (Table 4), the industry of utility, transportation, bank/saving & loan, and insurance negatively influence the COE. All of these variables are significant except for the insurance industry. On the other hand, all of the industries significantly influence the COD, except for transportation.

Moreover, all the control variables also have significant results (p-value < 0.05). There is significantly negative association between BETA (-0.537) and LEV (-0.149) with the COE, while there is significantly positive association between SIZE (0.283) and MB (0.240) to COE. Similar to the result of the first hypothesis, all the variables show significant results, but the association between all of the control variables and COD are significantly positive. The association between LEV and COD also exhibits the same result as BETA.

Both results in Table 4 display a significantly positive association between SIZE and COE as well as COD. The BETA has different effect on the component of the cost of capital. There is negative association between BETA (-0.537) and the COE, but positive association between BETA (0.146) and the COD. The result of market-to-book (MB) value implies that there is positive relationship between MB (0.240) and COE. Moreover, the relationship between return on asset (ROA) and COD is also positive (0.0762).

## CHAPTER 5

## Discussion and Conclusion

### 5.1 Discussion

This section provides the findings of the analysis based on the regression result in the previous chapter. The random regression model that is used in this study is suitable to deduce that a sustainability report has a significantly negative effect on the cost of equity ($COE$) and the cost of debt ($COD$).

This result is supported by the probability of 22 percent reduction for the relationship between a sustainability report and $COE$. The result of this study is in line with Dhaliwal et al. (2011) and El Ghoul (2010) who found that higher sustainability disclosure leads to lower COE Meanwhile, there is only 8.27 percent for the $COD$. It implies that when a company publishes a sustainability report, they will experience a reduction of cost of equity and debt capital. This result is in accordance with Goss & Robert (2011) who stated that there is a negative relationship between sustainability and COD. This proves the first hypothesis which states that a sustainability report leads to lower cost of equity capital and also proves the second hypothesis which states that a sustainability report leads to lower cost of debt capital.

Moreover, the result of the cost of equity and debt can also be explained by all of the control variables with significant results due to all of its p-value being lower than 0.05. Both results present positive association between SIZE and cost of cost of capital, which contrast with the expectation. Since most of the company's category is industrial (66.76%)

and higher companies with high total asset belong to polluting industry. It is line with the study of Gamerschlag et al., 2011. Thus, it might affect the increase number on the cost of capital. The relationship between BETA and COE is negative. It is in line with Dhaliwal et al. (2011) and Hou et al. (2012) who observed that there is significantly negative association between BETA and COE. Additionally, the positive relationship of BETA and COD is supported by the study of El Ghoul et al. (2011) and Bowen et al., (2008). The significant positive relation between MB and COE implies that the market price the sustainability report along with other risk factors (El Ghoul et al., 2011). The association between LEV and cost of capital is affect by the social norm to the financing decision and, therefore, affect the cost of capital. The significantly positive association between ROA and COD implies that long-term financial performance is associated with profitability in short-term (Akisik & Gel, 2014).

The amount of information disclosed in the annual report is directly proportional to the company's performance in sustainability activities. The more companies disclose their sustainability activities, it increases the transparency (Cheng et al., 2014), reduce information asymmetry and help to reduce the risk (Dhaliwal et al., 2011; El Ghoul et al., 2011; Reverte., 2012; Lee & Faff, 2009; Boutin-Dufresne & Savaria, 2004). Therefore, the sustainability information has valuable information that is relevant or useful to readers of financial statements or investors conducting company evaluation. Thus, these companies are categorized as superior companies and are of a higher quality in the creditor's perspective, which results in them paying lower cost of debt than the inferior companies. Hence, the third parties (e.g. creditors and banks) consider sustainable activities as a factor for evaluating the company and giving lower COD. Therefore, this result is consistent with the second hypothesis that a sustainability report leads to lower COD.

**5.2 Conclusion**

Major scandals, like the case of Enron, have caused a loss of trust of stakeholders about companies' financial statements. Therefore, sustainability reports have become the trend in gaining stakeholder interest and trust, especially since the benefits outweigh the costs incurred. This thesis conclusively proves that issuing a sustainability report will lead to lower cost of equity and debt capital. It fills a gap and answers the debate on the relationship between sustainability or sustainability reporting and the cost of capital (equity and debt) with data from European companies.

The first hypothesis states that the influence of sustainability report has significant negative effect on the cost of equity capital. The result indicates that most of the type of industry in European companies is industrial, which engage in sustainability activities have issued sustainability reports and have a lower cost of equity compared to companies who did not issue a sustainability report. The second hypothesis states that the influence of a sustainability report has a negative effect on the cost of debt capital. It has significant result and indicates that a company which issues a sustainability report will experience lower cost of debt compared to a company that does not issue a sustainability report.

Therefore, companies will gain benefit after disclosing their sustainability activities. This is evident from the increase of European companies to publish sustainability report from 2002 to 2015 and the statistical results proved that the influence of sustainability reports on the cost of capital is very significant.

## 5.3 Limitation and Further Research

This research is not without limitations. There is still limited data for a sustainability report and performance and data which is not available in the database could result in other findings if a different database had been used. Hence, further research would provide additional information and make the result more reliable. In addition, the effect of a sustainability report will be clearer if an interaction is added such as the level of sustainability performance or the score of the sustainability report. Moreover, the debt characteristic should be added more as explanatory variables to enhance the dependent variables.

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## APPENDIX A

## Sample Distribution by Years, Industry, and Country

| Sample Distribution by Years | | | | Sample Distribution by Country | | |
|---|---|---|---|---|---|---|
| Year | N | Percent. | | Country | N | Percent. |
| 2002 | 30 | 0.64% | | Austria | 240 | 2.34% |
| 2003 | 54 | 1.15% | | Belgium | 420 | 4.10% |
| 2004 | 65 | 1.39% | | Czech Republic | 75 | 0.73% |
| 2005 | 104 | 2.22% | | Denmark | 405 | 3.95% |
| 2006 | 114 | 2.43% | | Finland | 375 | 3.66% |
| 2007 | 253 | 5.39% | | France | 1470 | 14.35% |
| 2008 | 283 | 6.03% | | Germany | 1440 | 14.06% |
| 2009 | 350 | 7.46% | | Greece | 270 | 2.64% |
| 2010 | 421 | 8.97% | | Hungary | 60 | 0.59% |
| 2011 | 453 | 9.66% | | Italy | 750 | 7.32% |
| 2012 | 482 | 10.27% | | Netherlands | 600 | 5.86% |
| 2013 | 496 | 10.57% | | Norway | 375 | 3.66% |
| 2014 | 510 | 10.87% | | Poland | 0 | 0.00% |
| 2015 | 530 | 11.30% | | Portugal | 465 | 4.54% |
| 2016 | 546 | 11.64% | | Spain | 165 | 1.61% |
| Total | 4,691 | 100.00% | | Sweden | 705 | 6.88% |
| | | | | Switzerland | 1,065 | 10.40% |
| Sample Distribution per Industry | | | | Turkey | 975 | 9.52% |
| Industry | N | Percent | | Total | 10,245 | 100.00% |
| Industrial | 6,840 | 66.76% | | | | |
| Utility | 885 | 8.64% | | | | |
| Transportation | 300 | 2.93% | | | | |
| Bank/Saving & Loan | 1,050 | 10.25% | | | | |
| Insurance | 435 | 4.25% | | | | |
| Other Financial | 735 | 7.17% | | | | |
| Total | 10,245 | 100.00% | | | | |

# APPENDIX B

## VIF Test for First and Second Hypotheses

| VIF test for Hypothesis 1 | | | VIF test for Hypothesis 2 | | |
|---|---|---|---|---|---|
| **Variable** | **VIF** | **1/VIF** | **Variable** | **VIF** | **1/VIF** |
| logSIZE | 1.42 | 0.702542 | logSIZE | 1.50 | 0.666023 |
| Industries | 1.35 | 0.702542 | logROA | 1.47 | 0.666023 |
| logMB | 1.23 | 0.810295 | Industries | 1.37 | 0.730922 |
| logLEV | 1.13 | 0.888184 | logLEV | 1.17 | 0.851334 |
| Sreports | 1.10 | 0.908230 | Sreports | 1.10 | 0.913174 |
| logBETA | 1.07 | 0.930974 | logBETA | 1.06 | 0.944007 |
| Mean VIF | 1.22 | | Mean VIF | 1.28 | |