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The Effect of Corporate Social Responsibility on Firm Value and the Role of Firm Reputation. Evidence from Europe

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Abstract

The objective of this study is to analyze the relationship between corporate social responsibility (CSR) and firm value and the moderating effect of firm reputation on this relationship. Existing research has found a modest positive relationship between CSR and firm value, but few studies in the literature have examined the influence of firm reputation on the relationship between CSR and firm value; while this study fills this research gap. This study uses a sample of 764 European firms from 2014 to 2018 and an RE model was used in the study to analyze this panel data. This study confirms the general results of previous studies regarding the effect of CSR on firm value and finds a significant moderating effect of firm reputation on the relationship between CSR and firm value in the technology sector. As well as being the first to use the firm's reputation in this context, this study is also an important addition to the literature on stakeholder theory. Furthermore, an emphasis on the moderating effect of a firm's reputation in the technology sector unveiled new findings of the moderating variables on the relationship between CSR and firm value for listed firms in European countries.

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1. Introduction

"Corporate social responsibility is a hard-edged business decision. Not because it is a nice thing to do or because people are forcing us to do it... because it is good for our business".

With these words, Niall Fitzgerald, former CEO of Unilever, emphasized the importance of doing business by taking corporate social responsibility (CSR) into account. Like Fitzgerald, the vast majority of people in the business world agree that CSR is more than just a business trend or fad (Ajina et al., 2019). In addition to Fitzgerald, Alizadeh and Soltanisehat (2020) argue that, currently, firms must meet the expectations of multiple stakeholders and compete to have a positive reputation to be successful. In this context, a firm's reputation is important because stakeholders make their decisions based on the firm's reputation.

While firms that embrace CSR may benefit by staying relevant to new generations and contributing to those in need (Daudisa and Vevere, 2020), the relationship between CSR and firm value is not straightforward. On the one hand, existing research has found a modest positive relationship between CSR and firm value (e.g., Chung et al., 2018; Hu et al., 2018; Sciarelli et al., 2020). On the other hand, several studies have found a negative relationship between CSR and firm value (e.g., Brekke & Nyborg, 2005; Crisóstomo et al., 2011; Fanti & Buccella, 2017). Furthermore, some studies question whether there is a direct link between CSR and firm value at all (e.g., Al-Najjar & Anfimiadou, 2011; Schadewitz & Niskala, 2010). This lack of a finding of an empirical relation between CSR and firm value has been explained by arguing that these studies omitted important variables. These studies describe a situation in which the effect of CSR performance on firm value depends on the state of other causal variables (Walls et al., 2012; Alshammari, 2015). This lends some support to the notion that the relationship between CSR and firm value is likely more complex than most studies reveal and that tests on the moderating variables are required in this field.

An important factor possibly moderating the relationship between CSR and firm value is a firm's reputation. Firm reputation is defined as the perceptual representation of a firm's past actions and prospects that describes the firm's overall appeal to its key constituents (Wei et al., 2017), and it is typically positively associated with a firm's value (Sanchez & Sotorrio, 2007). Firm reputation has often been described as a factor that explains the extent to which firm's activities are visible. Firm reputation is a strategic resource that is difficult to imitate (Roberts & Dowling, 2002) because of its complexity and because the drivers for a positive reputation require a strong foundation that is present within the company (Dowling, 2001). Additionally, firm reputation is associated with

sustainability and performance (Orlitzky et al., 2003) in different ways. First, firms have a better reputation when they have positive social and environmental initiatives (Cole, 2012). Second, reputation and CSR allow firms to differentiate themselves (Hsu, 2012; Van Heerden & Puth, 1995), thus giving a competitive advantage over other firms (McWilliams & Siegel, 2001). Third, reputation and CSR are important in current public opinion (Hsu, 2012). Luo and Bhattacharya (2016) stated hereby that this more important today by: " the increasing media coverage of CSR issues and the fact that firms are taking direct and visible steps to communicate their CSR initiatives and energetically call for research efforts that directly link CSR to stock market performance."

Overall, the outcomes of firm value are partially contingent on firm reputation, and a firm is more likely to achieve better performance and thus value when it is more reputable than others. Therefore, one could expect that the impact of CSR on firm value can be explained, at least partially, by considering the contingent role of firm reputation. This moderating effect of firm reputation on the relationship between CSR and firm value will not be the same in every sector. Because firms in the technology sector are regarded as competitive and innovative, these firms can better respond to the fast and abrupt environmental changes. Therefore, the above effect can be expected to be more pronounced in in the technology sector. According to these expectations, the following research question is formulated:

"*Is there a relationship between CSR and firm value, and to what extent is this relationship influenced by firm reputation?"*.

The objective of this study is to analyze the relationship between CSR and firm value and the moderating effect of firm reputation on this relationship. This study uses a sample of 764 European firms between 2014 and 2018. A random-effects (RE) model was used in the study to analyze this panel data. Three main results have emerged. First, this research has found a $p < 0.01$ significant positive relationship between CSR and firm value. Second, no evidence is found that a positive firm reputation strengthens the positive effect of CSR on firm value in the overall RE model. Third, however, can be stated with a significance level of $p < 0.01$ that the moderating effect of firm reputation strengthens the positive relationship between CSR and firm value in the technology sector.

There are some limitations to this research and suggestions for further research. First, the contributions of this study for stakeholder theory would be more precise if this study considered the perceptions of the different stakeholder groups. Second, firm reputation has been investigated and included as a dummy variable, but the effect of firm reputation would have been even more

pronounced if it was used as a categorical variable. Finally, the research that has been carried out for the technology sector can be extended to many more sectors in order to generalize or modify the findings in the technology sector.

This study is relevant theoretically and practically. First, existing research has found a modest positive relationship between CSR and firm value, but few studies in the literature have examined the influence of firm reputation on the relationship between CSR and firm value; while this study fills this research gap. This study is also an important contribution to the literature on stakeholder theory. Furthermore, this study responds to various calls from different studies by using both an accounting-based (ROA) measure and a market-based (Tobin's Q) measure as dependent variables of firm value. An emphasis on the moderating effect of a firm reputation in the technology sector also revealed new findings on the moderators of the relationship between CSR and firm value for firms in European countries.

The next chapter is a literature review that compares existing literature on CSR, firm value, and firm reputation. Chapter 3 then discusses the data methodology, which includes the research method and research strategy. Chapter 4 describes the results of this study. Finally, Chapter 5 draws a conclusion to the results and describes limitations of the study.

2. Theoretical Framework

This chapter consists of a literature study that compares the existing literature on CSR, firm value, and firm reputation to outline the contribution of this study to the existing literature. First, based on the literature, the effect of CSR on firm value is analyzed and afterward, the potential moderating effect of firm reputation is described. This is done to eventually formulate the hypotheses.

2.1 Corporate social responsibility (CSR) and firm value

This section first discusses the concept of CSR and how it has changed in recent years. Then, it compares various studies on the effect of CSR and firm value and formulates a hypothesis.

The field of business ethics continues to expand in the areas of economic and civil responsibilities. Increasingly, issues are emerging that need to be addressed independently and not with an economic lens. Due to the changing need for civil responsibilities and the increasingly importance of business ethics, CSR has become a new variable in determining firm value (Bajic & Yurtoglu, 2018). In 2011, 20% of S&P 500 companies reported on their CSR, while in 2019 this number had increased to 86%, demonstrating the importance that firms attach to these activities. However, this study asks whether these CSR activities provide more benefits for shareholders or focus too much on other stakeholders, making the firm value decreases.

Freeman (1984) identified CSR as the responsibility of a company's stakeholders and stated that it is important that the focus is shifted away from the shareholders. From a stakeholder perspective, The World Business Council for Sustainable Development described CSR as "CSR is a company's commitment contributing to sustainable economic development, working with employees, their families, the local community and society as a whole to improve their quality of life". Furthermore, the stakeholder theory addresses the role of morals and values in managing an organization and integrates a resource-based view and a market-based view. Harrison et al. (2018) studied the effect of the stakeholder theory on firm value and described it in a single sentence: "Stakeholder theory affirms that those whose lives are touched by a firm have the right and obligation to participate in directing it." Thereby according to this view, firms are committed to contributing to CSR for their employees, their families, and the local community and to improve their quality of life. Drawing upon stakeholder theory, it can be expected that CSR positively affects firm value because it helps firms attain positive stakeholder responses.

Many scholars consider the stakeholder in their research on the effect of CSR and firm value. Based on the existing literature, the studies presented in Table 1 are used. All studies relate to the effect of CSR on firm value.

Table 1: A list of empirical studies on the relationship between CSR and firm value

Author(s) (Year)	**Sample**	**Measures**	**CSR → Firm value**
Jo & Harjoto (2011)	3000 listed companies on the Russell 2000, S&P 500 or Domini 400	CSR: KLD Scores Firm value: industry-adjusted Tobin's Q	After correcting for endogeneity of CSR engagement, shows that CSR engagement positively influences firm value
Hu et. al. (2018)	Listed firms in China (2010-2015)	CSR: environmental responsibility score by Hexun infoTech Firm value: Tobin's Q and ROA	Found a positive effect of CER (CSR) on firm performance. The positive effect is more pronounced for firms in highly polluting industries, with high asset tangibility and with low state ownership
Fatemi et al. (2018)	403 U.S. listed companies	CSR: KLD Scores Firm value: Tobin's' Q	Conclude that ESG strengths increase firm value and that weaknesses decrease it. Also found that disclosure plays a crucial moderating role
Schadewitz & Niskala (2010)	All listed Finnish firms that adopted GRI.	CSR: GRI firm's quality Firm value: book value and market value	Supported the conclusion that GRI responsibility is an important factor for a firm's market value.
Garg (2016)	All listed companies in India	CSR: corporate reporting on expense related to other social and environmental expenses Firm value: ROA, EPS, EV	Indicate that CSR performance impacts firm value positive not only for current year, but also for the following years. Results differs significantly across industries.
Mishra (2017)	13,917 US firms	CSR: KLD Scores Firm value: Tobin's Q	Conclude that innovative firms demonstrate high (CSR) performance subsequent to a successful innovation. Higher valuation in relation with higher CSR post innovation.
Crisóstomo et al. (2011)	296 listed Brazilian firms (2001-2006)	CSR: IBase's scores Firm value: stock returns	Negative correlation between CSR and firm value. CSR is value destroying in Brazil.
Bing & Meng (2019)	1028 Chinese firms	CSR: Bloomberg ESG Scores Firm value: Tobin's Q	CSR significantly reduces firm value. No differences between industries in China

With the exception of Crisóstomo et al. (2011), Bing and Meng (2019), and Schadewitz and Niskala (2010), who found that CSR had a negative or no impact on firm value, overall the research has found a modest positive relationship between CSR and firm value. These studies indicate that CSR engagement positively influences firm value (Jo & Harjoto, 2011; Hu et al., 2018; Fatemi et al., 2018; Garg, 2016; Mishra, 2017). Based on these studies and the stakeholder theory, this study predicts that better CSR performance will lead to a higher firm value. The following hypothesis is formulated:

Hypothesis 1: CSR performance have a positive effect on firm value.

2.2 Firm Reputation

This section describes the moderating effect of firm reputation on the relationship between CSR and firm value. First, it defines the concept of firm reputation and discusses its current interpretation. Then, it explains why a firm's reputation can have a moderating effect and why this study is a contribution to the existing literature. Finally, it formulates a hypothesis.

Wei et al. (2017) defined a firm reputation as: "a perceptual representation of a firm's past actions and prospects that describes the firm's overall appeal to its key constituents." Currently, this is reinforced by the increased sensitivity to social and environmental issues and demands from various stakeholders who expect businesses to contribute more to society (Eweje & Sakaki, 2015). The impact of firm reputation on the relationship between CSR and firm value has become more important. Luo and Bhattacharya (2016) stated hereby that this more important today by: " the increasing media coverage of CSR issues and the fact that firms are taking direct and visible steps to communicate their CSR initiatives and energetically call for research efforts that directly link CSR to stock market performance.". Walls et al.'s (2012) and Alshammari's (2015) studies argue that the effect of CSR performance on firm value depends on the state of other causal variables that plays an important role. This lends some support to the idea that the relationship between CSR and firm value is likely more complex than most studies reveal and that tests of moderation variables are required in this field.

The first reason that a firm's reputation would strengthen the relationship between CSR and firm value is that firm reputation increases the visibility of the firm's activities. As firms with a good reputation have greater visibility, the CSR activities will be more visible and this will impact firm value (Alshammari, 2015).

The second reason is that stakeholders currently demand more from firms in the field of CSR (Nguyen & Sarker, 2018). Because stakeholders demand more from this area of CSR, firms can distinguish themselves more from others by engaging in CSR activities and bolstering their reputation. If a firm's CSR goes beyond the requirements stipulated in government regulations, it can be considered as a high-performance firm, and, therefore, a positive firm reputation would ensure that the CSR activities translate even more strongly into firm value. Therefore, the perception of stakeholders is important a firm's reputation (Miller et al., 2018).

The moderating effect of firm reputation should be examined because it strengthens the effect of CSR on firm value for two main reasons. First, firm reputation ensures higher visibility of CSR activities; second, firms can distinguish themselves more and be perceived highly by stakeholders if they have a high firm reputation. Furthermore, research into the effect of firm reputation on the relationship between CSR and firm value will add to the literature because previous studies have indicated that the relationship of CSR and firm value is complex and firm reputation can further explain this effect. These predictions lead to the following hypothesis:

Hypothesis 2: *A positive firm reputation strengthen the positive effect of CSR performance on firm value.*

The moderating effect of firm reputation on the relationship between CSR and firm value will not be the same for every sector. Brammer and Pavelin (2006) emphasize this difference between sectors by stating that "The effect of a firm's CSR performance on its reputation is importantly determined by the fit between sector-specific characteristics of the firm's business environment." Marin et al. (2012) add that the effect of CSR on firm value is greater in sectors with high competitiveness and a proactive vision. Therefore, the result of a good CSR performance is greater in competitive industries and firms with an innovative vision. This is because a firm's capability to innovate and the need to compete helps the firm better respond to the fast and abrupt environmental changes. Elaborating on this idea, Enjorals et al. (2019) argue that firms with high technological intensity would be more competitive than other firms due to their rapidly changing environment and activities. For several years, large firms in the high-tech sector have dominated different global rankings of innovation. These innovative firms have proactive visions due to their significant research and development investments.

Based on these two characteristics, the technology sector is the sector that is the most competitive and innovative. The technology sector includes firms that manufacture electronics and create software, computers, or information technology products and services (Investopedia, 2020). However, no studies have been found that analyze the moderating effect of firm reputation on the effect of CSR performance on firm value in the technology sector. Therefore, there are not enough studies on the technology sector.

Based on the above arguments, this study hypothesizes that there is a moderating effect of firm reputation on the relationship between CSR and firm value in the technology sector. The following hypothesis is formulated:

Hypothesis 3: A *positive firm reputation that strengthen the positive effect of CSR performance on firm value is more pronounced in the technology sector.*

3. Data and Methodology

This chapter describes how the proposed hypotheses are tested. First, the data is explained. Then the dependent and independent variables are introduced. Last, the research method and the research strategy are presented.

3.1 Dataset and data sample

This paragraph describes the data that is suitable for the study and the database used for collecting the data. First, a distinction must be made between different types of data that can be used for the research. To do this, the type of data analysis used in this study is considered. This research uses data analysis that has a multidimensional character and consists of measurements over time. This combination of time series and cross-sectional data is called panel data (Studenmund & Johnson, 2017). Furthermore, based on the nature of the data, panel data is most suitable as comparable studies by Schadewitz and Niskala (2010) and Garg (2016) into the effects of CSR on firm value have also used panel data analysis.

Two databases were used to collect the data from public firms. The first database that is used is the Thomson Reuters database for collecting financial data. The Thomson Reuters database combines economic, financial, and business information from multiple sources globally, such as the Organization for Economic Cooperation and Development, the International Monetary Fund, and Worldscope. The database consists of firms spread over nearly 200 countries globally. These firms are divided over 10 economic sectors, 28 business sectors, and 54 industry groups (Thomson Reuters, 2020). The CSR data is retrieved from the Asset4 database of Thomson Reuters. The Asset4 database offers one of the most comprehensive CSR databases; it uses 450 different CSR metrics and consists of more than 1,400 firms in Europe. The second database is the Fortune World's Most Admired Companies list. This database has been used to collect data on firm reputation. To determine the most reputable firms, the database consists of a survey including top managers, directors of eligible companies, and financial analysts that identify the firms that have the strongest reputations. This list has been compiled using different reputation criteria, including innovativeness, quality of management, ability to attract and retain talented people, and effectiveness in doing business globally.

Furthermore, the panel data consists of European firms over the 2014-2018 period. The reason for including only European firms in the data sample is to control for institutional differences, as discussed in previous studies of Yo-Jud Cheng and Groysberg (2020) and Hu et. al. (2018, in which the

selection is based on institutional differences. The time frame chosen was determined because firm reputation as determined by the Fortune World's Most Admired Companies list was measurable from 2014 and the CSR data for 2019 had not yet been published by the time of writing for all the firms in the sample. Table 2 below summarizes the frequency of firms from Fortune's Worlds Most Admired Companies. In total, 107 different firms are included on the Fortune list, including 288 observations throughout 2014 and 2018 in 15 European countries.

Table 2: Number of firms and observations per country on the Fortune's list

Country	Freq. firms	Freq. Observations	Percent	Cum.
United Kingdom	19	44	15.07	15.07
The Netherlands	10	24	8.22	23.29
Germany	26	85	29.11	52.40
Switzerland	14	37	12.67	65.07
Spain	2	6	2.05	67.12
France	16	46	15.75	82.88
Italy	1	1	0.34	83.22
Belgium	2	6	2.05	85.27
Norway	2	2	0.68	85.96
Luxembourg	1	5	1.71	87.67
Sweden	3	10	3.42	91.10
Denmark	1	1	0.34	91.44
Finland	3	6	2.05	93.49
Austria	1	1	0.34	93.84
Ireland	6	18	6.16	100.00
Total	107	288	100.00	100.00

Table 2 shows that Germany, France, and the United Kingdom are the three countries with the highest number of firms on Fortune's World's Most Admired Companies list. This can largely be explained by the fact these countries are also the three largest economies in Europe (Ochel & Wegner, 2019). Furthermore, Table 2 shows that Switzerland has a relatively high concentration of reputable firms compared to the size of its economy. Plüss (2018) explains this high concentration by analyzing the economic landscape in Switzerland, and he states that "low taxes, a skilled labor force, and economic stability have helped Switzerland attract and build some of the largest multinational companies." The frequency of firms and observations has also been computed for the industry, and the results are shown in Table 3 below.

Table 3: Number of firms and observations per industry on the Fortune's list

Industry	Freq. firms	Freq. Observations	Percent	Cum.
Consumer Non-Cyclicals	15	50	17.12	17.12
Industrials	18	48	16.44	33.56
Financials	13	24	8.22	41.78
Basic Materials	10	21	7.19	48.97
Consumer Cyclicals	20	63	21.58	70.55
Utilities	5	5	1.71	72.26
Healthcare	7	25	8.56	80.82
Technology	8	27	9.25	90.07
Energy	5	11	3.77	93.84
Telecommunication	6	18	6.16	100.00
Total	107	288	100.00	100.00

Table 3 indicates that the consumer cyclicals and consumer non-cyclicals sectors are the most represented in Fortune's World's Most Admired Companies list for European firms. This can be explained by the fact that the visibility of the products and activities of these sectors is significant, and this can result in high volatility of firm reputation (Valet, 2019). Furthermore, Blanchard (2010) states that firms in this sector enjoy a stronger emotional connection with consumers.

In addition to these firms, all firms that have an CSR score available from 2014 to 2018 are selected in the data sample to prevent selection bias. This is done to avoid association distortion caused by sample selection and to ensure that the target population is accurately represented. Furthermore, companies that do not have sufficient data or that have incomplete data are excluded. The data that is collected is used to test the proposed hypotheses. Later in this chapter, the data sample is used to determine an empirical strategy.

3.2 Dependent variables

The first dependent variable used in this study is Tobin's Q. Previous studies such as Hoang et al. (2020), Bose and Majumdar (2019), Nam and Uchida (2019), Benson et al. (2019), and Horn et al. (2018) have used Tobin's Q as a dependent variable for firm value. As with the above studies, Tobin's Q is measured by dividing the total market value of the firm by the total asset value. Using this method, the Tobin's Q ratio can be equated with the market value of a firm divided by its asset's replacement costs. An advantage of using Tobin's Q as a measure of firm value is that this variable considers the market value of a firm into account. This is described by Jiao (2010), among others, as an important determining factor in the valuation of a firm.

In addition to Tobin's Q, the return on assets (ROA) is also used as a variable to measure firm value. The ROA has been used to not depend on a single variable. Studies such as Selvam et al. (2016), and

Jiang (2014) endorse the use of multiple variables when researching into firm value. They argue that such a robustness check should be carried out in case one of the variables does have a significant relationship. The ROA is calculated by dividing the net income with the total assets of a firm. Previous studies such as Xu et al. (2016) and Naik et al. (2020) that used the ROA in addition to Tobin's Q have found that these two variables should be used. This is because the ROA is concerned with previous accounting data, while Tobin's Q is related to prospects of the firm as viewed by the stock market. Firm value is, therefore, measured using both the ROA and Tobin's Q, hence, reference is made to both variables when firm value is mentioned.

3.3 Independent variables

To measure CSR performance, a CSR score from the Asset4 database of Thomson Reuters is used. This CSR score is recognized as providing the most complete CSR ratings (Zolin et al. 2016). The CSR score classifies data into three major pillars. The first of the three different pillars is the environmental one, which includes resource use, emissions, and innovation. The second pillar is that of governance, which consists of the measurements in the field of management, shareholders, and CSR ratings. The third is the social pillar, which is used to arrive at a total corporate responsibility rating. The social pillar consists of measurements in the areas of workforces, human rights, community, and product responsibility. In this study, CSR performance is based on the overall score from these three above pillars. This score reflects a firm's practices in integrating CSR in their daily decision-making processes.

No generally accepted method in the literature indicates how firm reputation should be measured. To measure firm reputation, this study uses the Fortune's World's Most Admired Companies. A dummy variable was used to quantify firm reputation. Companies on the Fortune list have been marked as highly reputable. This dummy variable is used to measure the possible interaction effect on firm reputation on the relationship between CSR and firm value. In Figure 1, a visualization of this moderating effect is presented.

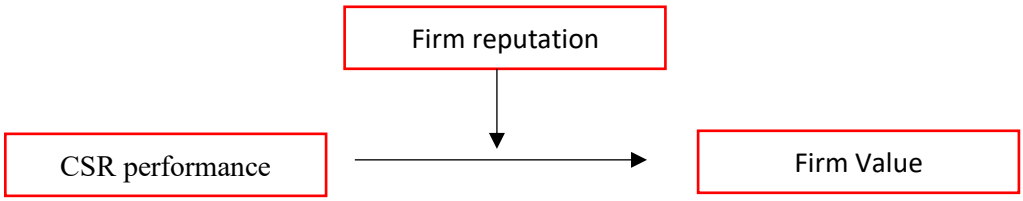

Figure 1: model of the moderating effect

3.4 Control variables

In this study six control variables were used to control for possible effects of other factors on firm value, but they are not of primary interest in this study. This section explains why these control variables can affect firm value.

The first control variable is firm size. Firm size is calculated as a natural logarithm of the total assets of a particular firm. Firm size is controlled for because larger firms may attract more attention from investors, and, therefore, the effect of CSR on firm value is more significant if the firm is larger.

The second control variable is leverage. Leverage is the ratio of total debt divided by the equity of a firm. Hillier et al. (2011) argue that capital structure can affect a firm's value and should, thus, be addressed. When analyzing the financial distress and increase leverage, it can be expected that leverage will harm firm value.

In addition to the above control variables, firm growth is included as the third control variable in this study. Firm growth is determined by subtracting the firm's previous year's sales from the current year's sales and dividing by the previous year's sales. Firm growth is the firm's ability to increase its annual income per year. In prior research, this has been significantly linked with firm value because a high growth rate contributes to substantially better firm value.

Industry, country, and year are included as control variables based on prior research. These industry and country control variables are set up as dummy variables. By adding these control variables, this study controls for industrial, country, and year differences. Table 4 below shows all variables schematically with their respective measurements.

Table 4: Overview variables and their measurement

Dependent variables (Firm value)	**Measurement**
Return on assets (ROA) Tobins'Q (TOBINSQ)	Net income / total assets (Market capitalization + total liabilities) / (Book value equity + total liabilities)
Independent variables	
CSR performance (CSR) Firm reputation (FR)	CSR score 1 is a high firm reputation and 0 is not
Interaction effect	
CSR and FR (CSR*FR)	CSR*FR
Control variables	
Firm size (SIZE) Leverage (LEVER) Firm growth (GROWTH) Country (COUNTRY) Industry (INDUSTRY) Year (YEAR)	Natural logarithm of total assets Ratio total debt / total assets (Sales – Salest-1) / Salest-1 Set of 20 dummy variables corresponding to each country Set of 10 dummy variables corresponding to each industry Set of 5 dummy variables corresponding to each year

3.5 Empirical Strategy

This section examines various models. Panel data comes in three forms: the pooled ordinary least squares (OLS) model, random effects (RE), and fixed effects (FE) model. To determine which model best suits this study, they are compared below.

First, the pooled OLS regression model is examined. To arrive at the functional form, all observations from the European firms over time are combined without any difference can be made between firms and over time. This leads to the following equation:

$$\text{TOBIN'S } Q_{i,t} \text{ or } ROA_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 L.FR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEVER_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 INDUSTRY_i + \beta_7 COUNTRY_i + \beta_8 YEAR_i + \beta_6 CSR_{i,t} * \beta_2 FR_{i,t} + \varepsilon_{i,t}$$

The above equation includes industry and country as categorical variables and firm reputation (FR) as a dummy variable. Furthermore, the ε in the above equation stands for the normally distributed error, subscript i denotes the particular firm, and subscript t denotes the year to which the value relates. Before the pooled regression analysis can be performed, various assumptions must first be tested. These assumptions are described by Studenmund and Johnson (2017) and are divided into four classical assumptions for OLS estimators. Chapter 4 further examines these assumptions, testing for no multicollinearity, no heteroscedasticity, no autocorrelation, and normality. As well as these

assumptions, Studenmund and Johnson (2017) state that it must also be assumed that there is no difference in the intercept across entities and that the variances across entities are zero. Although all entities, the European firms, have specific and different characteristics, this assumption must be tested. For this, the Breusch-Pagan Lagrange Multiplier (LM) test is used to determine whether the pooled OLS model or the RE model should be chosen.

Second, the FE model and RE model can be used in case the pooled regression does not fit perfectly. The FE model focuses on the change within the subject, while the RE model is influenced by both within and between patterns of the subject, both of which have potential benefits and limitations (Gayle and Lamber, 2018). Following the argument in mainstream econometrics on the key differences between the FE and RE models, a common way to choose between them is to use the Hausman test (Wooldridge, 2010). The idea underlying this approach is that the test compares an estimator that is known to be consistent with another estimator that is efficient. In econometrics, a null hypothesis is proposed that the estimator β RE is an efficient estimate of the true parameters and that this is consistent. If this is the case, there will be no systematic differences in the estimates exist, and there is reason to doubt the assumption that there is no correlation between the observed variables and the unobserved effects. Therefore, the RE model is appropriate. However, if the null hypothesis is rejected, the FE model is the most appropriate. The following equation can be set up for an FE model:

$$\text{TOBIN'S } Q_{i,t} \text{ or } ROA_{i,t} = \beta_0 + \beta_1 CSR_{i,j,t} + \beta_2 L.FR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEVER_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 INDUSTRY_i + \beta_7 COUNTRY_i + \beta_8 YEAR_i + \beta_6 CSR_{i,j,t} * \beta_2 FR_{i,j,t} + \varepsilon_{i,t} + \mu_{i,t}$$

Where $\varepsilon_{i,t}$ stands for the normally distributed error and $\mu_{i,t}$ captures everything else. Hereby, the FE model controls for, fully or partially, the effects of time-invariant variables on time-invariant effects. However, the effects of the time-invariant variables that are measured cannot be estimated. Therefore, the RE model is desirable because it allows the researcher to estimate the effects of time-invariant variables. In addition to conducting the Hausman test, an overview of the different models is also conducted. The analysis in Chapter 4 shows whether the coefficients of an RE and FE model match; if they do so, an RE model fits the needs of the study best because an RE model includes the effects of the time-invariant variables. The following equation can be set up for an RE model:

$$\text{TOBIN'S } Q_{i,t} \text{ or } ROA_{i,t} = \beta_0 + \beta_1 CSR_{i,j,t} + \beta_2 L.FR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEVER_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 INDUSTRY_i + \beta_7 COUNTRY_i + \beta_8 YEAR_i + \beta_6 CSR_{i,j,t} * \beta_2 FR_{i,j,t} + \varepsilon_{i,t} + \alpha_{i,t} + \mu_{i,t}$$

Where $\varepsilon_{i,t}$ stands for the normally distributed error, $\alpha_{i,t}$ for the specific variation per entity and $\mu_{i,t}$ captures everything else. Furthermore, the ε in the above functional form stands for the normally distributed error, subscript *i* denotes the firm, and subscript *t* denotes the year to which the value relates.

Moderated hierarchical multiple regression (MHMR) is used to test the interaction effect, which emerges in Hypotheses 2 and 3 on the relationship between CSR and FR. This approach is based on a step-by-step testing of the independent variables on firm value. The purpose of testing the independent variables in steps, also known as blocks, is to reduce the reliance of multiple testing and to test for differences in each step. The individual effect of a predictor can be determined because the predictors are tested individually, rather than being tested together with a shared variance with other predictors when they are tested together. First of all, a block is formed of the control variables to test the effect on firm value.

Then, whether and to what extent the independent variable of CSR affects firm value is tested. This is done to test the first hypothesis and because, if there is no significant effect between CSR and firm value, the study can continue with the original model. This is because, as described in the theoretical framework, there are indications that there is an effect of these two variables when there is an interaction with FR. After these two steps, the third regression is tested, which includes only the predictor of FR. This is done to see the differences in correlation with the original model and the model that includes the variable as an interaction with CSR. The last step is the fourth regression, which consists of the complete model with all the independent variables included, in which Hypotheses 2 and 3 can be tested.

This study conducts an empirical analysis, and the results are displayed in the next chapter.

4. Empirical Results

This chapter outlines the results of the study. First, the descriptive statistics are discussed, followed by a correlation analysis. Then, the models are compared before a choice is made between them. Thereafter, the three hypotheses are answered analytically and can be used to draw a conclusion and discus the results in Chapter 5.

4.1 Descriptive Statistics

This section presents the descriptive statistics used in this research. It discusses the composition of the dataset, including the number of observations, the standard deviation, the mean, and the extreme values of each variable.

Table 5 below shows the descriptive statistics of all variables after they have been corrected for outliers. An outlier can be described as a minimum or maximum observation that can change the estimation of a regression. Outliers can be identified by data points that diverge significantly from the overall pattern. Furthermore, the existence of outliers in the dataset can cause inaccurate estimations. The outliers identified in this study are shown in Appendix 7.2, which shows the descriptive statistics before they were corrected by removing the outliers. When using the Winsor method to remove the outliers, values below the 1st percentile are set to equal those of 1st percentile and values above the 99th percentile are set to equal those of the 99th percentile. Before this can be done, a test is first conducted to check whether the data is balanced; Appendix 7.4 shows that the panel data is balanced. By correcting the outliers in this way, the panel data remains balanced because no observations are removed. The table below shows the number of observations for all variables. In addition to the number of observations, Table 5 also shows the mean, standard deviation, minimum, and maximum per variable.

Table 5: Descriptive Statistics after correcting for outliers

Variable	Obs	Mean	Std.Dev.	Min	Max
TOBINSQ	3820	1.626	.99	.63	7.183
ROA	3820	5.298	6.913	-24.79	37.93
CSR	3820	56.695	19.849	.33	95.03
FR	3820	0.053	0.223	0	1
SIZE	3820	15.809	1.713	12.445	20.622
LEVER	3820	.252	.167	0	.869
GROWTH	3820	.035	.176	-.684	.931

When analyzing Table 6, Tobin's Q has an average of 1.626. This average shows that the market value of European firms is 1.626 times higher than the book value. This is comparable to the results of a study by Martynova and Renneboog (2011) that also included Tobin's Q for European-listed firms. In this study, they found a value of 1.74. Furthermore, there is a standard deviation of 0.99 and the observation varies between 0.63 and 7.183 after correcting the outliers. The average of the ROA is 5.298, and, therefore, the net income divided by the total assets for the European firms is 5.3%. This corresponds to a study by Beracha et al. (2019) who also measured firm value using the ROA and arrived at an ROA of 6.03% with almost the same number of observations from listed firms. The values vary between a minimum of -24.8% and 37.9% with a standard deviation of 6.913.

The sample average for the CSR is 56.695. The CSR scores vary between a minimum of 0.33 and a maximum of 95.03. The CSR scores are generated in the same way for all observations and can, therefore, be compared with other firms in the dataset or with previous years.

Table 5 also shows how the observations are distributed. For all 3,820 observations, a value of 1 is assigned when there is a high reputation and a value of 0 is assigned if this not the case. A large proportion of the observations, namely 3,619 of them, have a value of 0 and 201 have a value of 1.

In addition to the dependent and independent variables, Table 6 also shows the control variables. The average firm size (SIZE) is 15.809, calculated as a natural logarithm of the total assets. There is a standard deviation of 1.713 with a minimum of 12.445 and a maximum of 20.622. When compared to other studies, this can be interpreted as relatively high. Studies such as Lemmon et al.'s (2008) and Mehran's (2008), which include listed firms in their studies and defined them as a natural logarithm of total assets, have lower values of 7.8 and 11.2, respectively. Furthermore, leverage (LEVER) is included as a control variable and has an average of 0.252 emerging. This 0.252 is a ratio of total debt divided by total assets. This ratio varies for the firms in the dataset, from a minimum of 0 to a maximum of 0.869. This is comparable to Fatemi (2018), who investigated listed firms in the same time period.

The factor variables of country and industry were also included as control variables in this study. As with FR, the mean and standard deviation are irrelevant because it is a dummy variable. The country variable is divided into 20 European countries and the industry control variable is divided into 10 sectors. Tables 8 and 9 show the distribution between the various countries and sectors respectively.

TABLE 6: TABULATION OF COUNTRY

Country	Freq.	Percent	Cum.
United Kingdom	1150	30.10	30.10
The Netherlands	145	3.80	33.90
Germany	375	9.82	43.72
Switzerland	250	6.54	50.26
Spain	205	5.37	55.63
France	420	10.99	66.62
Italy	185	4.84	71.47
Belgium	120	3.14	74.61
Norway	90	2.36	76.96
Turkey	105	2.75	79.71
Sweden	205	5.37	85.08
Poland	120	3.14	88.22
Greece	60	1.57	89.79
Denmark	110	2.88	92.67
Finland	115	3.01	95.68
Austria	60	1.57	97.25
Portugal	30	0.79	98.04
Ireland	35	0.92	98.95
Czech Republic	20	0.52	99.48
Hungary	20	0.52	100.00

Table 6 shows that the UK is the country with the highest number of listed firms that have been awarded a CSR score. One of the reasons for this is the various initiatives that began in the UK to disseminate and develop activities that link business development to social and environmental issues. Examples of these initiatives are the promotion of transparent and complete firm reporting and the introduction of indicators to rank the firms' sustainability. Furthermore, Germany and France are also relatively frequent on the list, which can be significantly explained by the size of these countries' economies.

Table 7: Tabulation of Industry

Industry	Freq.	Percent	Cum.
Consumer Non-Cyclicals	270	7.07	7.07
Industrials	750	19.63	26.70
Financials	825	21.60	48.30
Basic Materials	415	10.86	59.16
Consumer Cyclicals	625	16.36	75.52
Utilities	150	3.93	79.45
Healthcare	200	5.24	84.69
Technology	180	4.71	89.40
Energy	255	6.68	96.07
Telecommunication	150	3.93	100.00

Table 7 shows that the most frequent sector in the dataset is the financials sector. Krasodomska (2015) explains that this high number of CSR scores in the financial sector is caused by the high degree of disclosure.

4.2 Correlation matrix

The correlation matrix presents an analysis of the strength of the relationship between all variables. The values vary from 0 to 1, where a correlation of 0 indicates that variables do not correlate with each other, and 1 means that variables can be strongly related to each other. The correlation matrix shown in Table 10 below is used to summarize the dataset and visualize patterns in the data.

Table 8: Matrix of correlations

Variables	TOBINSQ	ROA	CSR	FR	SIZE	LEVER	GROWTH
TOBINSQ	1.000						
ROA	0.575	1.000					
CSR	-0.035	-0.011	1.000				
FR	-0.009	0.002	0.283	1.000			
SIZE	-0.337	-0.226	0.488	0.278	1.000		
LEVER	-0.120	-0.119	0.045	-0.002	0.012	1.000	
GROWTH	0.149	0.221	-0.075	-0.024	-0.073	-0.019	1.000

First, Tobin's Q and the ROA are relatively strongly correlated. This corresponds to the expectation because they are both dependent variables of firm value and are therefore similar. Table 10 also shows that FR and CSR are related. This corresponds to the expectations of the literature review; later in this chapter, an analysis of this correlation with respect to firm value is presented. Table 10 also shows that CSR and firm size (SIZE) are reasonably correlated with each other. This effect is also described by Udayasankar (2008) and Børing (2019). These studies argue that, because of their larger scale, larger firms have more access to resources and visibility and are therefore are more likely to participate in CSR initiatives.

4.3 Assessment of estimation model

In this section, the assessment of the estimation models takes place. First, an overview of all possible models is presented. Second the OLS assumptions are tested and the Breusch-Pagan LM test and Hausman test are conducted, and a choice is made between the three models.

Table 9: Overview OLS, FE, and RE models

	(1) OLS ROA	(2) OLS TOBINSQ	(3) FE ROA	(4) FE TOBINSQ	(5) RE ROA	(6) RE TOBINSQ
CSR	0.039***	0.005***	-0.011	-0.001	0.004***	0.001***
	(0.007)	(0.001)	(0.022)	(0.001)	(0.002)	(0.001)
FR	0.1327	-0.0262	-1.194	0.027	0.086	-0.013
	(0.921)	(0.881)	(0.922)	(0.084)	(0.150)	(0.045)
FR*CSR	0.0453	0.002	0.038	-0.001	0.005	0.001
	(0.390)	(0.775)	(0.033)	(0.003)	(0.006)	(0.002)
SIZE	-0.945***	-0.160***	-0.000	-0.348***	-0.294***	-0.091***
	(0.089)	(0.012)	(0.800)	(0.063)	(0.025)	(0.012)
LEVER	-4.221***	-0.543***	-27.345***	-0.546**	-0.315**	-0.215***
	(0.638)	(0.084)	(3.201)	(0.237)	(0.160)	(0.074)
GROWTH	7.678***	0.536***	5.032***	0.186***	0.423***	0.094***
	(0.595)	(0.078)	(1.099)	(0.037)	(0.139)	(0.018)
Observations	3820	3820	3056	3056	2742	3056
R-squared	.1827	.3087	.1242	.1223	.3954	.3593
F-statistic	22.243	44.435	12.357	28.106	.z	.z
Year Dummy	yes	yes	yes	yes	yes	yes
Country Dummy	yes	yes	no	no	yes	yes
Industry Dummy	yes	yes	no	no	yes	yes

Standard errors are in parenthesis
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9 shows an overview of all possible models. The first two columns are an OLS model, Columns 3 and 4 give an overview of the two FE models and the last two columns are based on an RE model. For the above three models, 2014, the United Kingdom and consumer non-cyclicals were used as a basis. Only the OLS and RE models show a significant relationship of $p < 0.01$ between CSR and firm value. When examining the control variables, there is a significant relationship of $p < 0.01$ for each model between the predictors and firm value except for firm size in the FE model. Furthermore, firm size correlates negatively with firm value in all models. Previous studies from Hirdinis (2019) and Niesh and Velnapy (2014) also found a negative relationship between firm size and firm value. Both studies explain this by reasoning that firms with large assets and inventories may not be able to pay dividends (retained earnings) due to asset accumulation on, for example, inventories. This corresponds to the results of this study because firm size is defined as a natural logarithm of total assets.

4.4 Testing OLS assumptions

This paragraph describes four assumptions of OLS regression that possibly affect the data sample. While OLS is feasible and can be used in this study, the underlying assumptions must be tested. A lack of knowledge of OLS assumptions would possibly lead to misuse and produce erroneous results.

Multicollinearity

Multicollinearity is the presence of (high) intercorrelations between independent variables. When predicting the ROA and Tobin's Q, multicollinearity of the independent variables can lead to unreliable and unstable estimates of regression coefficients. In this study the variance inflation factor (VIF) is used as a diagnostic for multicollinearity. The VIF test determines to what extent the variance of an estimated regression coefficient has increased because of multicollinearity. Appendix 7.5.1 shows the results of the VIF test; all values of collinearity are below 2.5. A value of 5 indicates that there is high collinearity (O'Brien, 2007). Therefore, there is not high multicollinearity in the regression models.

Autocorrelation

Autocorrelation occurs when one observation of the error term predicts the next observation in a certain way (Belotti et al., 2017). Because autocorrelation in the linear panel data models distorts standard errors and makes results less reliable, this study identifies autocorrelation in the idiosyncratic error with the Woolridge test. Appendix 7.5.2 shows the results of this test for the ROA and Tobin's Q. The results of the test show that the null hypothesis can be rejected for both variables. For the ROA, this can be done at a 10% level of significance, while the probability for Tobin's Q is 0.000. These results indicate that autocorrelation may be present in the data. To counter this, clustered standard errors were used in the analysis of the model (Peterson, 2009).

Heteroscedasticity

Heteroscedasticity occurs when the error term does not have a constant variance; when heteroscedasticity is present, the error terms are biased. This leads to a bias in the test statistics and confidence intervals. To detect any linear form of heteroscedasticity, the Breusch-Pagan / Cook-Weisberg test was performed. Appendix 7.5.3 shows that the null hypothesis is rejected for both the ROA and Tobin's Q and that heteroscedasticity is present. One reason for the presence of heteroscedasticity is that there is a large range between the largest and smallest observed values. Appendix 7.5.3 shows a scatterplot of the distribution of the residuals. As with autocorrelation, clustered standard errors are used to counter the problem of heteroscedasticity when analyzing the model.

Normality

To test for normality, hypothesis testing must be done and reliable confidence and prediction intervals must be generated. The OLS does not require the error term to follow a normal distribution to produce unbiased estimates. To test for normality, a skewness and kurtosis test were performed. Skewness is a measure of the asymmetry of the probability distribution of a variable over its average. It shows the direction and amount of skew. Kurtosis is the height and sharpness of the peak relative to the standard normal. Appendix 7.5.4 shows the results of this test. The skewness is 0.2234, which implies that the skewness is normally is distributed. However, the null hypothesis is rejected at a 0% significance level, which indicates that the residuals are not normally distributed. Appendix 7.5.4 also contains a plot that shows that the normality assumption is weak because the asymptotic line does not deviate significantly.

4.5 Breusch-Pagan LM test and choice between Pooled OLS and RE model

Based on the above tests, in which it could not be excluded that heteroscedasticity, autocorrelation, and normality existed for the pooled OLS regression, this section additionally describes a test to choose between the RE model and the pooled OLS model.

To do this, the Breusch-Pagan LM test was performed. When performing the Breusch-Pagan LM test, a null hypothesis was tested for whether the variances across entities equals zero; in other words, for whether there were significant differences across units. Appendix 7.6 shows the results of this test, and, based on this, the null hypothesis that the pooled OLS model is appropriate for the study was rejected for both the ROA and Tobin's Q. Therefore, it can be concluded that the RE model is more suitable for this study because the panel data effects are present.

4.6 Hausman test and choice between FE and RE model

Because the Breusch-Pagan LM test determined that the panel data effects are present, this section tests whether an FE model or an RE model is more appropriate for this study.

First, a Hausman test was carried out to choose between both models. A Hausman test was performed to determine whether there is a correlation between the individual effects and the regressors. The null hypothesis tested that there is no correlation between these individual effects and the regressors. The results of the Hausman test are shown in Appendix 7.1.1; the null hypothesis is rejected. Therefore, the Hausman test indicates that the FE model is more suitable for this study.

However, this FE model is not appropriate for this study because time-invariant variables cannot be estimated with FE regressions. This is because the time-invariant variables would be absorbed by the FE model. In addition to the objectives and data characteristics of this study, which explain why the RE model would be preferred, Appendix 7.7.2 provides an overview of the coefficients of both models to compare them. By analyzing the coefficients, it is shown that there is no statistically significant difference between the coefficients of an FE model and an RE model.

Based on the tests of the OLS assumptions, the Breusch-Pagan LM test, the Hausman test, and the analysis of the coefficients between the models, a RE model was chosen to test the hypotheses.

4.7 Results of Random effects model

This section first presents the overall RE model. Then, the fit of the model is discussed, and the effects and the coefficients are discussed.

Before the overall RE model can be analyzed, the interaction effects between CSR and FR, which are hypothesized in Hypotheses 2 and 3, are tested based on the MHMR. This approach is based on a step-by-step testing of the independent variables of firm value. The regression models that have emerged from these steps are shown in Appendix 7.9.

Table 10 shows the results of the RE model. To control for simultaneity, the FR is lagged by one year. The one-year delay of the firm's reputation variable is included in the model because the effect of FR is more visible after a year than on the same year of the CSR score. Therefore, 2015 is the basis of the model. The full model, including coefficients for all years, countries, and industries, is included in Appendix 7.10. The significance test of the model is denoted as *, **, *** which represents the 10%, 5%, and 1% levels, respectively.

Table 10: Overall random effects model

	(1) ROA	(2) TOBINSQ
CSR	0.004***	0.001
	(0.002)	(0.001)
FR	0.086	-0.013
	(0.150)	(0.045)
CSR*FR	0.005	0.001
	(0.006)	(0.002)
FZ	-0.294***	-0.091***
	(0.025)	(0.012)
LEVER	-0.315**	-0.215***
	(0.160)	(0.074)
GROWTH	0.423***	0.094***
	(0.139)	(0.018)
Year Dummy	yes	yes
Country Dummy	yes	yes
Industry Dummy	yes	yes
Obs.	3056	3056
R-squared overall	0.395	0.359
Sigma_u	0.667	0.339
Sigma_e	0.538	0.124
Rho	0.606	0.883
Prob > Chi2	0.000	0.000

Standard errors are in parenthesis
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10 shows that for both dependent variables of firm value, there is a Prob > Chi2 of 0.000. The Prob > Chi2 represents the probability using a chi-square statistic that the null hypothesis is true. In other words, the probability that there is an effect of the independent variables, taken together, on the dependent variables is statistically significant because the value of no effects is 0%. From the overall R-squared, it can be concluded that for the ROA, 0.395 of the variance is explained by the model and that this value for Tobin's Q is 0.359. Hair et al. (2013) indicate that values of around 0.5 are moderate. Furthermore, an analysis of Rho shows that the proportion of variation explained by the individual-specific term is relatively high for both the ROA and Tobin's Q.

Table 10 shows that the independent variable of CSR has a positive effect on both the ROA and Tobin's Q. The coefficients of 0.004 and 0.001 are similar. However, no significant relationship can be established for Tobin's Q, and, therefore, Hypothesis 1 is not supported based on the dependent variable of Tobin's Q. For the ROA, when the CSR score increases by 1%, the ROA increases by 0.004%. This relationship is significant with $p < 0.01$. Based on this, Hypothesis 1 (There is a positive relationship between CSR performance and firm value) can be supported with met $p < 0.01$. This result agrees with studies by Jo and Harjoto (2011), Hu et al. (2018), Fatemi et al. (2018), Garg (2016), and Mishra (2017).

When examining the interaction variable of CSR and FR in Table 10, it appears that, in both models, the effect of CSR is positively strengthened by firm reputation. Table 10 shows that CSR and FR have a positive effect of 0.005 on the ROA and a positive effect of 0.001 on Tobin's Q. However, there is no significant relationship for either model because both coefficients do not have a significant relationship of at least $p < 0.1$. Therefore, Hypothesis 2 (A positive firm reputation strengthens the positive effect of CSR performance on firm value) cannot be supported, and there is no direct moderating effect of FR on the relationship between CSR and firm has not been found in the overall model.

4.8 Results in Technology Sector

This section presents two RE models; one model uses firms that are active in the technology sector and one uses firms that are not active in the technology sector. Hypothesis 3 is tested using the results shown in Table 11.

Table 11: Regression results Technology Sector

	Only Technology Sector		Without Technology Sector	
	(1) ROA	(2) TOBINSQ	(3) ROA	(4) TOBINSQ
CSR	-0.021	0.001	0.027**	0.001
	(0.073)	(0.003)	(0.012)	(0.001)
FR	-45.254	-1.506	-0.057	-0.006
	(7.927)	(0.459)	(0.754)	(0.044)
FR*CSR	0.947***	0.046***	0.043	0.001
	(0.004)	(0.001)	(0.140)	(0.465)
SIZE	0.346	-0.220**	-0.841***	-0.089***
	(1.359)	(0.086)	(0.162)	(0.012)
LEVER	-19.707**	-0.376	-8.532***	-0.198***
	(7.974)	(0.389)	(1.279)	(0.076)
GROWTH	3.696	0.167	6.171***	0.101***
	(2.992)	(0.181)	(1.157)	(0.017)
Obs.	144	144	2912	2912
R-squared	.1120	.2026	.1824	.3656

Standard errors are in parenthesis
**** p<0.01, ** p<0.05, * p<0.1*

Table 11 shows that the independent variable of CSR has a negative effect on the ROA and a positive effect on Tobin's Q for firms that are active in the technology sector. However, there is no significant relationship for both the ROA and Tobin's Q, and, therefore no conclusion can be drawn from this.

However, when examining the interaction variable of CSR and FR in Table 11, for both dependent variables of the ROA and Tobin's Q, the effect of CSR is positively strengthened by firm reputation. Table 11 shows that CSR and FR have a positive effect of 0.947 on the ROA and a positive effect of 0.046 on Tobin's Q. There is also a significant relationship of $p < 0.01$ for both dependent variables of firm value. Therefore, it can be stated that when CSR and FR increase by 1%, the ROA will increase by 0.947% and Tobin's Q increases by 0.046%. In conclusion, Hypothesis 3 (A positive firm reputation that strengthens the positive effect of CSR performance on firm value is more pronounced in the technology sector) can be supported with a significance level of $p < 0.01$.

5. Conclusion

This chapter answers the research questions using the results of the previous chapter. It then discusses the limitations of the study and the limits to the generalizations that can be made. Finally, the theoretical contribution of this study is elaborated upon, and the implications of this study for other researchers and policymakers in the field are described.

This study has focused on analyzing the relationship between CSR and firm value and the moderating effect of FR on this relationship. This study examines this relationship using a sample of 764 European firms from 2014 to 2018. An RE model was used in the study to analyze this panel data. First, this research has found a significant positive relationship between CSR and firm value. Hypothesis 1 is hereby supported with significance level $p < 0.01$, which accords with previous research by Jo and Harjoto (2011), Hu et al. (2018), Fatemi et al. (2018), Garg (2016), and Mishra (2017). In contrast to the significant relationship in Hypothesis 1, Hypothesis 2, which tested whether a positive FR strengthens the positive effect of CSR on firm value, is rejected based on the overall RE model. Finally, Hypothesis 3 was tested to investigate whether the moderating effect of FR on the relationship between CSR and firm value is more pronounced in the technology sector. This hypothesis is supported with a significance level of $p < 0.01$, so it can be stated that the moderating effect of FR strengthens the positive relationship between CSR and firm value in the technology sector.

There have been several limitations of the research and there are ways that this research could be further improved. First, the stakeholder theory has been used to study the moderating effect of FR on the relationship between CSR and firm value, but no distinction has been made between different stakeholder groups. The contributions of this study relating to the stakeholder theory would be more precise if the difference in the perception of different stakeholder groups were considered. This could also include adding private firms to the study that pursue other objectives and also deal with other stakeholder groups. Second, in this study, FR has been investigated and included as a dummy variable based on Fortune's World's Most Admired Companies list. If FR is used as a moderator, the research could be extended to include FR as a categorical variable. A FR score could be made for this based on a score from surveys, for example. Finally, the research that has been carried out for the technology sector can be extended to other sectors to generalize or modify the findings in the technology sector. This can be done as a robustness check for this study. Further research should consider these limitations and suggestions to further fill the research gap.

This study has several theoretical and practical implications. First, few studies in the existing literature have examined the theoretical impact of FR in the context of CSR and firm value, while this study has explored this directly. Second, this study is an important addition to the literature on stakeholder theory. The debate within stakeholder theory about whether or not to participate in CSR has been a lengthy one (Miller et al, 2018). Third, this study responds to various calls from other studies, such as Hu et al.'s (2018) and Charlo et al.'s (2015), that argue, that along with the usual dependent variable of Tobin's Q, an accounting-based measure is required to determine firm value. This study has responded to this by using both an accounting-based (ROA) measure and a market-based (Tobin's Q) measure as a dependent variable of firm value. An emphasis on the moderating effect of a firm's reputation in the technology sector also unveiled new findings of moderating variables on the relationship between CSR and firm value for listed firms in European countries. This answered Hierro's (2017) call for more research on the results of CSR activities in the technology sector. Furthermore, this topic is particularly relevant as the technology sector is one of the fastest-growing industries in the world, and it is a cornerstone for other industries to thrive.

6. Bibliography

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7. Appendix

7.1 List of firms at the FORTUNE 500 World's most admired companies 2014-2019

Firmname	Country	Industry
Voestalpine	Austria	Basic Materials
Anheuser-Busch InBev	Belgium	Consumer Non-Cyclicals
Delhaize Group	Belgium	Industrials
Maersk Group	Denmark	Consumer Cyclicals
Nokia	Finland	Technology
Stora Enso	Finland	Basic Materials
UPM-Kymmene	Finland	Basic Materials
Air France-KLM Group	France	Industrials
Alstom	France	Industrials
Danone	France	Consumer Non-Cyclicals
GDF Suez	France	Utilities
Kering	France	Consumer Cyclicals
La Poste	France	Industrials
L'Oréal	France	Consumer Non-Cyclicals
Michelin	France	Consumer Cyclicals
Orange	France	Telecommunication Services
Pernod Ricard	France	Consumer Non-Cyclicals
Renault	France	Consumer Cyclicals
Rexel	France	Consumer Non-Cyclicals
Schneider Electric	France	Industrials
Sodexo	France	Consumer Cyclicals
Total	France	Energy
Vivendi	France	Consumer Cyclicals
BMW	Germany	Consumer Cyclicals
Adidas	Germany	Consumer Cyclicals
Allianz	Germany	Financials
BASF	Germany	Basic Materials
Bayer	Germany	Healthcare
Bertelsmann	Germany	Consumer Non-Cyclicals
Bosch Group	Germany	Consumer Cyclicals
Continental	Germany	Consumer Cyclicals
Daimler	Germany	Consumer Cyclicals
Deutsche Bank	Germany	Financials
Deutsche Post DHL Group	Germany	Industrials
Deutsche Telekom	Germany	Telecommunication Services
E.ON	Germany	Utilities
Fresenius	Germany	Healthcare
Heraeus Holding	Germany	Basic Materials
Henkel	Germany	Consumer Cyclicals
Lufthansa Group	Germany	Industrials
Marquard & Bahls	Germany	Utilities
Munich Re Group	Germany	Financials
Robert Bosch	Germany	Consumer Cyclicals
RWE	Germany	Utilities
SAP	Germany	Technology
Siemens	Germany	Industrials
ThyssenKrupp	Germany	Basic Materials
Volkswagen	Germany	Consumer Cyclicals
ZF Friedrichshafen	Germany	Consumer Cyclicals
Accenture	Ireland	Technology
Eaton	Ireland	Industrials
Ingersoll-Rand	Ireland	Consumer Cyclicals
Johnson Controls	Ireland	Consumer Cyclicals
Medtronic	Ireland	Healthcare

Firmname	Country	Industry
Seagate Technology	Ireland	Technology
Poste Italiane	Italy	Industrials
ArcelorMittal	Luxembourg	Basic Materials
Unilever	Netherlands	Consumer Non-Cyclicals
Airbus Group	Netherlands	Industrials
EADS	Netherlands	Industrials
Heineken Holding	Netherlands	Consumer Non-Cyclicals
Louis Dreyfus Company	Netherlands	Industrials
LyondellBasell Industries	Netherlands	Basic Materials
Randstad Holding	Netherlands	Industrials
Royal Ahold Delhaize	Netherlands	Consumer Non-Cyclicals
Royal Dutch Shell	Netherlands	Energy
Royal Philips	Netherlands	Healthcare
SHV Holdings	Netherlands	Financials
Statoil	Norway	Energy
Telenor	Norway	Telecommunication Services
Gas Natural Fenosa	Spain	Utilities
Telefónica	Spain	Telecommunication Services
Electrolux	Sweden	Consumer Cyclicals
Ericsson	Sweden	Technology
Volvo	Sweden	Industrials
Nestlé	Switzerland	Consumer Non-Cyclicals
ABB	Switzerland	Consumer Cyclicals
Adecco Group	Switzerland	Financials
Chubb	Switzerland	Financials
Credit Suisse	Switzerland	Financials
Glencore	Switzerland	Energy
Novartis	Switzerland	Healthcare
Roche Group	Switzerland	Healthcare
STMicroelectronics	Switzerland	Technology
Swiss Re	Switzerland	Financials
TE Connectivity	Switzerland	Technology
UBS Group	Switzerland	Financials
Wolseley	Switzerland	Consumer Non-Cyclicals
Zurich Insurance Group	Switzerland	Financials
Unilever	United Kingdom	Consumer Non-Cyclicals
Anglo American	United Kingdom	Basic Materials
BAE Systems	United Kingdom	Industrials
BP	United Kingdom	Energy
BT Group	United Kingdom	Telecommunication Services
Compass Group	United Kingdom	Financials
Diageo	United Kingdom	Consumer Non-Cyclicals
GlaxoSmithKline	United Kingdom	Healthcare
HSBC Holdings	United Kingdom	Financials
InterContinental Hotels Group	United Kingdom	Consumer Cyclicals
International Airlines Group	United Kingdom	Industrials
Liberty Global	United Kingdom	Technology
Prudential Plc (U.K.)	United Kingdom	Financials
Reckitt Benckiser Group	United Kingdom	Consumer Non-Cyclicals
Royal Mail	United Kingdom	Industrials
Rio Tinto	United Kingdom	Basic Materials
Rolls-Royce Holdings	United Kingdom	Industrials
SABMiller	United Kingdom	Consumer Non-Cyclicals
Vodafone Group	United Kingdom	Telecommunication Services

7.2 Descriptive statistics before outliers

Descriptive Statistics before correcting for outliers

Variable	Obs	Mean	Std.Dev.	Min	Max
TOBINSQ	3820	1.645	1.125	.282	14.124
ROA	3820	5.339	8.91	-70.08	217.76
CSR	3820	56.695	19.849	.33	95.03
FR	3820	.053	.223	0	1
FZ	3820	15.809	1.736	10.984	21.451
LEVER	3820	.254	.175	0	1.503
GROWTH	3820	.688	35.701	-3.187	2192.374
Country	3820	5.719	4.833	1	20
Industry	3820	4.336	2.481	1	10

7.3 Balanced panel data

```
      panel variable:  FirmID (strongly balanced)
       time variable:  Year, 2014 to 2018
               delta:  1 unit

       FirmID:  1, 2, ..., 764                              n =        764
         Year:  2014, 2015, ..., 2018                      T =          5
                Delta(Year) = 1 unit
                Span(Year)  = 5 periods
                (FirmID*Year uniquely identifies each observation)

Distribution of T_i:   min      5%      25%       50%       75%      95%      max
                         5       5        5         5         5        5        5

     Freq.  Percent    Cum.  |  Pattern
  ----------------------------+---------
       764   100.00  100.00  |  11111
  ----------------------------+---------
       764   100.00          |  XXXXX
```

7.4 Pooled OLS regression

	(1)	(2)
	ROA	TOBINSQ
CSR	.039***	.005***
	(.007)	(.001)
FR	.133	-.026
	(1.334)	(.176)
CSR*FR	.045	.002
	(.053)	(.007)
FZ	-.945***	-.16***
	(.089)	(.012)
LEVER	-4.221***	-.543***
	(.638)	(.084)
GROWTH	7.678***	.536***
	(.595)	(.078)
UK	(base)	(base)
NL	-.652	-.069
	(.567)	(.075)
DE	-1.227***	-.022
	(.392)	(.052)
CH	-.237	.362***
	(.45)	(.059)
ES	-.017	.139**
	(.489)	(.064)
FR	-1.173***	-.064
	(.379)	(.05)
IT	-2.07***	-.177***
	(.517)	(.068)
BE	-.842	-.182**
	(.613)	(.081)
NO	-1.969***	-.051
	(.717)	(.094)
TR	1.749***	-.053
	(.647)	(.085)
SE	.92*	.069
	(.481)	(.063)
PL	-1.578**	-.195**
	(.614)	(.081)
GR	-2.045**	-.372***
	(.837)	(.11)
DK	2.168***	.901***
	(.641)	(.084)
FI	-.148	-.039
	(.62)	(.082)
AT	-1.438*	-.218**
	(.84)	(.111)
PT	-2.128*	-.236
	(1.175)	(.155)
IE	.066	.078
	(1.086)	(.143)
CZ	-.268	-.033
	(1.431)	(.188)
HU	-2.034	-.59***
	(1.435)	(.189)
Consumer Non-Cyclicals	(base)	(base)
Industrials	-.883*	-.242***
	(.453)	(.06)

Financials	-1.011**	-.573***
	(.481)	(.063)
Basic Materials	-.972*	-.358***
	(.501)	(.066)
Consumer Cyclicals	.724	.06
	(.469)	(.062)
Utilities	-.76	-.444***
	(.666)	(.088)
Healthcare	1.568***	.517***
	(.607)	(.08)
Technology	-1.203*	.071
	(.62)	(.082)
Energy	-4.095***	-.639***
	(.569)	(.075)
Telecommunication	.758	-.011
	(.655)	(.086)
2014	(base)	(base)
2015	-.916***	.004
	(.324)	(.043)
2016	-.055	-.012
	(.323)	(.042)
2017	.118	.032
	(.325)	(.043)
2018	-.653**	-.143***
	(.327)	(.043)
_cons	22.332***	4.508***
	(1.434)	(.189)
Observations	3820	3820
R-squared	.183	.309

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

7.5 OLS assumptions

7.5.1 Multicollinearity

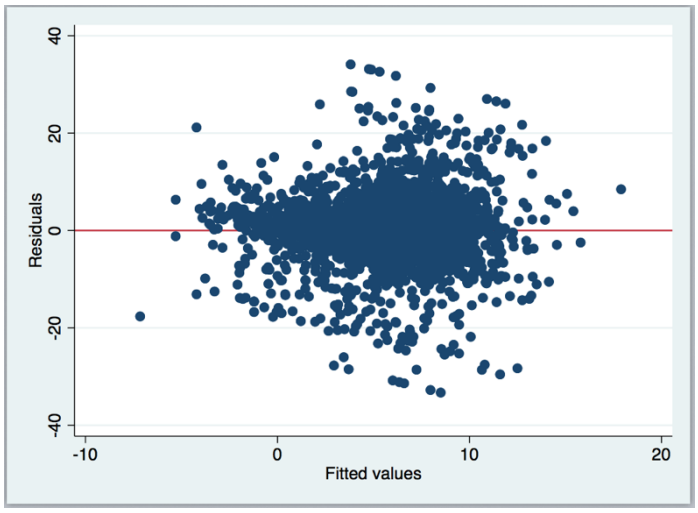
Variance inflation factor

	VIF	1/VIF
CSR	1.742	.574
FR	1.228	.815
FZ	2.26	.442
LEVER	1.095	.914
GROWTH	1.059	.944
Country	1.127	.887
Industry	2.341	.427
Year	1.630	.613
Mean VIF	1.513	.

7.5.2 Heteroscedacity

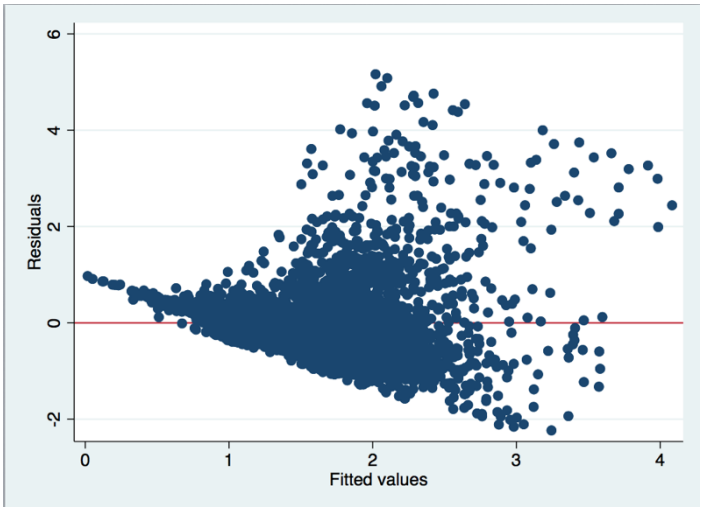
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity (ROA)
Ho: Constant variance
Variables: fitted values of ROA

chi2(1) = 232.52
Prob > chi2 = 0.0000



Breusch-Pagan / Cook-Weisberg test for heteroskedasticity (Tobin's Q)
Ho: Constant variance
Variables: fitted values of TOBINSQ

chi2(1) = 1904.60
Prob > chi2 = 0.0000



7.5.3 Autocorrelation

Wooldridge test for autocorrelation (ROA)

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 763) = 3.518
Prob > F = 0.0611

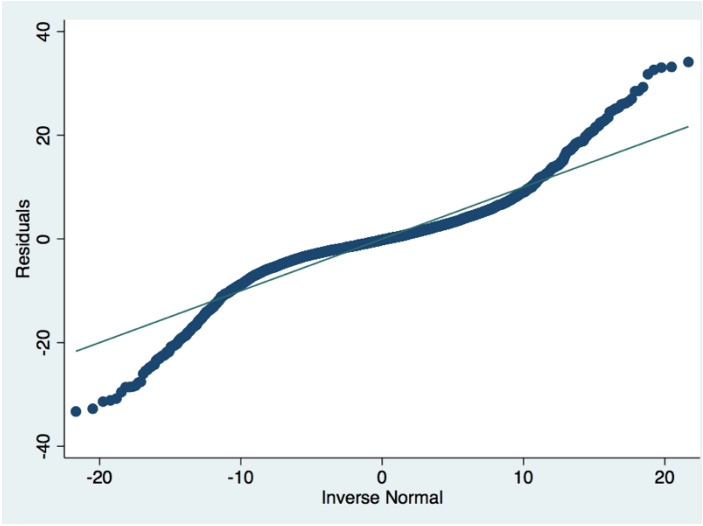
Wooldridge test for autocorrelation (Tobins'Q)

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F (1, 763) = 29.803
Prob > F = 0.0000

7.5.4 Normality

Skewness/ Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
Residuals	3,820	0.2234	0.0000	.	0.0000



7.6 Breusch-Pagan Lagrangian multiplier test for random effects

Breusch-Pagan Lagrangian Multiplier test for random effects (ROA)

```
Breusch and Pagan Lagrangian multiplier test for random effects

        ROA[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                     ROA |  47.79183       6.913163
                       e |   20.8722       4.568611
                       u |  17.90531       4.231467

        Test:   Var(u) = 0
                                 chibar2(01) =  1470.40
                              Prob > chibar2 =   0.0000
```

Breusch-Pagan Lagrangian Multiplier test for random effects (Tobin's Q)

```
    Breusch and Pagan Lagrangian multiplier test for random effects

            TOBINSQ[id,t] = Xb + u[id] + e[id,t]

            Estimated results:
                             |       Var     sd = sqrt(Var)
                    ---------+------------------------------
                      TOBINSQ |   .9799224       .9899103
                            e |   .0867895       .2946006
                            u |   .6028248        .776418

            Test:   Var(u) = 0
                                     chibar2(01) =  5680.49
                                  Prob > chibar2 =   0.0000
```

7.7 Hausman test

Hausman (1978) specification test (ROA)

	Coef.
Chi-square test value	170.274
P-value	0

Hausman (1978) specification test (Tobin's Q)

	Coef.
Chi-square test value	50.357
P-value	0

7.8 Comparison coefficients between FE and RE model

	Coefficients			
	(b) fixed_effe~s	(B) random_eff~s	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
centered_CSR	-.000499	.0007432	-.0012422	.0002203
1.FR	-.0174119	-.0130141	-.0043978	.0122372
L.FR# c. centered_CSR				
1	.0006327	.0010429	-.0004102	.0006012
FZ	-.1978023	-.0912373	-.106565	.013156
LEVER	-.1760617	-.2147872	.0387255	.0292168
GROWTH	.1114327	.0939539	.0174788	.0020877
Year				
2016	-.0065362	-.0134572	.0069209	.
2017	.0321844	.0219141	.0102703	.0003777
2018	-.0611187	-.0776199	.0165013	.0015763

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 71.83
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

7.9 Moderated hierarchical multiple regression (MHMR) steps

Step 1: Control variables

	(1) ROA	(2) TOBINSQ
FZ	-0.264***	-0.102***
	(0.021)	(0.012)
LEVER	-0.444***	-0.156**
	(0.158)	(0.068)
GROWTH	0.390***	0.113***
	(0.115)	(0.018)
Obs.	3820	3820
Year Dummy	yes	yes
Country Dummy	yes	yes
Industry Dummy	yes	yes

Standard errors are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Step 2: Only CSR

	(1) ROA	(2) TOBINSQ
CSR	0.004***	0.001
	(0.001)	(0.000)
FZ	-0.294***	-0.105***
	(0.024)	(0.013)
LEVER	-0.426***	-0.155**
	(0.156)	(0.068)
GROWTH	0.402***	0.113***
	(0.116)	(0.018)
Obs.	3820	3820
Year Dummy	yes	yes
Country Dummy	yes	yes
Industry Dummy	yes	yes

Standard errors are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Step 3: Only FR

	(1) ROA	(2) TOBINSQ
FR	0.219***	0.011
	(0.082)	(0.024)
FZ	-0.267***	-0.087***
	(0.022)	(0.011)
LEVER	-0.323**	-0.217***
	(0.161)	(0.074)
GROWTH	0.412***	0.093***
	(0.138)	(0.018)
Obs.	3056	3056
Year Dummy	yes	yes
Country Dummy	yes	yes
Industry Dummy	yes	yes

Standard errors are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Step 4: With Interaction term

	(1) ROA	(2) TOBINSQ
CSR	0.004***	0.001
	(0.002)	(0.001)
FR	0.086	-0.013
	(0.150)	(0.045)
CSR*FR	0.005	0.001
	(0.006)	(0.002)
FZ	-0.294***	-0.091***
	(0.025)	(0.012)
LEVER	-0.315**	-0.215***
	(0.160)	(0.074)
GROWTH	0.423***	0.094***
	(0.139)	(0.018)
Obs.	3056	3056
Year Dummy	yes	yes
Country Dummy	yes	yes
Industry Dummy	yes	yes

Standard errors are in parenthesis
**** p<0.01, ** p<0.05, * p<0.1*

7.10 Complete RE model

	(1) ROA	(2) TOBINSQ
CSR	0.004***	0.001
	(0.002)	(0.001)
FR	0.086	-0.013
	(0.150)	(0.045)
CSR*FR	0.005	0.001
	(0.006)	(0.002)
FZ	-0.294***	-0.091***
	(0.025)	(0.012)
LEVER	-0.315**	-0.215***
	(0.160)	(0.074)
GROWTH	0.423***	0.094***
	(0.139)	(0.018)
Year		
2015	(base)	(base)
2016	0.038	-0.013**
	(0.033)	(0.005)
2017	0.101***	0.022***
	(0.034)	(0.007)
2018	0.040	-0.078***
	(0.038)	(0.009)
Country		
UK	(base)	(base)
NL	-0.051	0.031
	(0.151)	(0.054)
DE	-0.086	0.022
	(0.107)	(0.050)
CH	0.084	0.161**
	(0.102)	(0.069)
ES	0.060	0.082
	(0.123)	(0.063)
FR	-0.076	0.026
	(0.094)	(0.044)
IT	-0.444***	-0.073
	(0.122)	(0.052)
BE	0.012	-0.093
	(0.142)	(0.066)
NO	-0.307*	-0.065
	(0.185)	(0.080)
TR	0.273	-0.049
	(0.184)	(0.062)
SE	0.315***	0.081
	(0.118)	(0.056)
PL	-0.328*	-0.172**
	(0.175)	(0.075)
GR	-0.850***	-0.253***
	(0.309)	(0.088)
DK	0.075	0.307**
	(0.180)	(0.121)
FI	0.012	0.030
	(0.158)	(0.073)
AT	-0.154	-0.115**
	(0.126)	(0.055)
PT	-0.516**	-0.074
	(0.206)	(0.143)
IE	0.082	0.071
	(0.312)	(0.167)

CZ	0.037	0.026
	(0.196)	(0.123)
HU	-0.113	-0.264*
	(0.266)	(0.141)
Industry		
Consumer Non-Cyclicals	(base)	(base)
Industrials	-0.110	-0.129**
	(0.120)	(0.058)
Financials	-0.565***	-0.368***
	(0.133)	(0.055)
Basic Materials	0.053	-0.224***
	(0.124)	(0.065)
Consumer Cyclicals	0.101	-0.035
	(0.122)	(0.063)
Utilities	0.001	-0.284***
	(0.153)	(0.068)
Healthcare	0.224	0.206**
	(0.152)	(0.080)
Technology	-0.045	-0.015
	(0.151)	(0.089)
Energy	-0.156	-0.412***
	(0.178)	(0.068)
Telecommunication	0.106	-0.016
	(0.155)	(0.067)
_cons	6.265***	2.024***
	(0.386)	(0.189)
Obs.	2742	3056
Sigma_u	0.667	0.339
Sigma_e	0.538	0.124
Rho	0.606	0.883

Standard errors are in parenthesis
*** $p<0.01$, ** $p<0.05$, * $p<0.1$