ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Bachelor Thesis – Economics and Business Economics

Towards sustainable valuation: integrating sustainability into the valuation of a company.

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Abstract

This study focuses on the relationship between the environmental, social and governance (ESG) score and the valuation of companies. It aims to look for a way to make the company valuation depend on the companies sustainability. Data from the Eikon Refinitiv database, for the period 2018-2022, is used to perform linear regressions. The results show a significant negative relationship between the ESG score and firm value. Furthermore, the results show a significant negative relationship between the social and governance pillar scores and the value of a company. However, a positive significant relationship between the environmental pillar score and the firm value is found. Lastly, a new method for the valuation of a company is discussed.

Keywords: Environmental, Social and Governance (ESG), firm valuation, Tobin's Q, sustainability

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1. Introduction

In recent years, there has been an increasing awareness towards sustainability. Businesses have an important role in achieving various sustainability goals. Increasingly more firms started disclosing on their environmental, social and governance (ESG) practices. In 2021, 95% of companies globally have reported something about ESG matters (IFAC, 2023). Up until this point, the sustainability disclosures have been mostly voluntary for companies. In Europe, however, there has been more regulation about the reporting of companies on environmental, social and governance subjects, for example through the implementation of the Corporate Sustainability Reporting Directive (CSRD) by the European Union. As of the financial year 2024, over 50,000 companies will be required to disclose on their sustainability practices (PricewaterhouseCoopers, n.d.). However, there has also grown more resistance against this movement, especially in the United States (Bresson & Couwenbergh, 2024; Winston, 2023). And despite the regulatory frameworks, an increasing number of companies greenwash (RepRisk, 2023). They portray themselves to be more environmentally friendly than they actually are. Furthermore, RepRisk (2023) shows that one in three companies that greenwash are also linked to social washing. This thesis aims to understand how we can give companies more incentives to make real changes regarding sustainable practices, to reduce greenwashing and social washing. The objective is to identify mechanisms that can ensure that ESG efforts translate into real value creation, benefiting both businesses and society at large. Specifically, this thesis investigates the relation between the ESG rating of companies and their valuation.

1.1 Research question

Financial, social and sustainable subjects still seem to be separate chapters in the annual report. But if we could integrate the three subjects, it might give companies more (financial) incentives to make sustainable changes. The following research question is answered in this bachelor thesis:

'How can you make the valuation of a company (partly) depend on sustainable goals?'

To answer the research question, the following sub-question is formulated: *'Is there a significant relationship between the ESG rating of companies and their valuation?'*

To address this question, a linear regression is done. Furthermore, in order to understand more about sustainability and the reporting of firms, the following questions are answered in the theoretical framework: '*Which methods are used to measure the sustainability of a company?*' and '*What are the methods of integrated reporting firms use?*' These two questions help gaining a better understanding of current practices, before answering the sub-question and ultimately the research question.

1.2 Social and scientific relevance

This research has a social relevance because it contributes to the ongoing debate about sustainability. In the last decades, it has become increasingly more important to address social issues related to the stakeholders of companies, have good corporate governance and engage in environmentally friendly business practices. Companies have a crucial role in climate change. For example, research has pointed out that just 100 companies are responsible for about 70% of all greenhouse emissions (Riley, 2021). In order to make Europe climate-neutral by 2050, as is agreed in the Paris Agreement, companies have to make a change. If companies get incentives to engage in sustainable practices, they can make a crucial impact.

This bachelor thesis aims to expand the understanding of the impact of ESG reporting and Integrated Reporting on corporate value creation. In the last decades there has been more research on ESG reporting and mostly in the context of ESG investing. However, there has not been a lot of research on how companies can be given a financial incentive to invest more in sustainability, without the value of the company decreasing. This bachelor thesis will look at the relationship between the ESG score and the value of companies to address this gap. It will therefore contribute to existing scientific literature and is scientifically relevant.

1.3 Overview of thesis results

This thesis uses a sample of international firm's valuation and ESG scores and finds that there is a significant negative relationship between the overall ESG score and the firm value. When looked at the pillar scores individually, it finds a significant positive relationship between the environmental pillar score and the company value, but a significant negative relationship between the social and governance pillar scores and the firm value. Lastly, it is hard to find another method for company valuation. However, a few possible solutions are discussed.

1.4 Thesis outline

This thesis consists of 5 chapters. In the following chapter, the existing literature on the topic will be discussed, answering the two questions mentioned above. In Chapter 2, the hypotheses that are tested in this research are proposed as well. In Chapter 3, the methodology for this research is explained and the data and variables used in the regression analysis will be discussed. Thereafter, the results from the regression analysis will be displayed and discussed. Lastly, in Chapter 5, a conclusion will be formulated and the research question will be answered.

2. Theoretical framework

In this chapter the theoretical framework is presented. It first provides more information about the agency and stakeholder theory. Then, the current practice of reporting on sustainability, with a focus on Integrated Reporting, is discussed. Next, research on the relationship with firm valuation is considered. Lastly, this chapter concludes with the hypotheses resulting from the theory.

2.1 Agency vs. stakeholder theory

Two main theories within accounting are the agency theory and the stakeholder theory. The agency theory covers the problem that there is information asymmetry between the shareholders of a company (principals) and the managers of the company (agents) (Jensen & Meckling, 1976; Panda & Leepsa, 2017). Within this theory, the main idea is that a company should create value for its owners, that is, the shareholders of public companies. But, in the last decades, there has been a shift, where just making profit is not the only important objective of the firm. In this regard, the stakeholder theory was developed. The stakeholder theory shifts its focus to the relationship between businesses and all other stakeholders. Stakeholders are all individuals that can affect or are affected by the business (Freeman, 1984). Those stakeholders still include the shareholders, but also customers, suppliers, employees, governments, etc.

2.2 Sustainability in (financial) reporting

The stakeholder theory relates closely to sustainability, ESG and Corporate Social Responsibility (CSR). Sustainability has become increasingly more important in the last decades. It is one of the main topics in many fields. Companies cannot stay behind and have to focus more on sustainability. The United Nations Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 27). Sustainability in a business context usually refers to the impact of business practices regarding the environment, ecosystems, and humans. However, it should be noted that sustainability is a broad concept and is open for interpretation (Di Simone, Petracci & Piva, 2022).

2.2.1 ESG factors

ESG factors are well known measures, used to assess a company's sustainability. ESG factors are non-financial measures. Examples are greenhouse gas emission, board diversity or employee turnover rates. However, there are not a lot of standardized rules for companies regarding providing information about their sustainability. In Directive 2014/95/EU of the European Parliament and Council, it was decided that certain undertakings do need to provide a non-financial statement that contains certain environmental, social, and employee-related matters. However, it is still very subjective. Companies can usually choose what they want to report on, and it is hard to compare the non-financial information of companies (Suttipun, 2017). The ESG ratings are determined by individual agencies. There are multiple agencies that provide ESG ratings, but they all have different techniques and different areas of focus. The ESG rating agencies plug the relevant data into their own evaluation models (Zumente & Lāce, 2021). It is therefore necessary to consider that research has shown that there is a substantial difference between the ESG scores from different agencies (Berg, Kölbol & Rigobon, 2022; Chatterji, Durand, Levine & Touboul, 2016; Zumente & Lāce, 2021).

2.2.2 Integrated reporting

Integrated reporting (IR) is a way for companies to link financial statements to information about their sustainability (NBA, n.d.). Companies state what they do in respect to sustainability and how their strategy, governance, performances, and prospects will add value to the company on the short and long term. The IIRC (International Integrated Reporting Council) developed the first IR framework in 2013. The framework was revised in 2021. The IR framework consists of eight elements: organizational overview & external environment, governance, business model, risk & opportunities, strategy & resource allocation, performance, outlook, and basis of presentation (IIRC, 2021). Financial and non-financial information are integrated into one report (Vitolla, Raimo & Rubino, 2019). Integrated reports are primarily intended for the use of shareholders, but other stakeholders can also benefit from the information in the reports (Quattrone, Busco, Frigo & Riccaboni, 2013). The idea behind IR is the fact that "value creation is influenced by the external environment, created through relationships with others, and dependent on the availability, affordability, quality, and management of various resources"

(Quattrone et al., 2013, p. 36). However, IR still faces a lot of criticism and challenges (Hoang, 2018).

2.3 Integrating firm valuation and sustainability

Research has also looked at other ways how the valuation and/or performance of firms are related to sustainability. Empirical research has shown that there is a significant effect of sustainability variables on the relationship between disclosure, transparency, and performance (Băndoi et al., 2021). This implies that including sustainable variables in the management report, through integration, has a positive impact on the economic performance. Băndoi et al. (2021) used an integration model proposed by Gond, Grubnic, Herzig and Moon (2012) to integrate traditional management reports and sustainability reports. Faccia, Manni and Capitanio (2021) proposed a further developed 'Value-Added Income Statement' that is a structured, regulated and quantitative ESG-based income statement. A study of Mervelskemper and Streit (2016) shows that it matters, for investors, if a company reports on ESG, but that it does not matter what type of report is chosen. Marvelskemper and Streit (2016) also find that publishing "an integrated report can further enhance market valuation of a firm's composite ESG and corporate governance performance to an economically and statistically significant extent at no additional cost" (p. 546). Cornell and Shapiro (2020) emphasize that investors are important stakeholders as they supply the capital of a company. When looking at ESG reporting, the incentive to create value should be retained. Research of Giese, Lee, Melas, Nagy and Nishikawa (2019) suggests that ESG characteristics have a positive impact on the valuation of a company. Gregory, Tharyan and Whittaker (2014) showed that a positive CSR leads to an increase in valuation. ESG characteristics can impact the value of a company through systematic risk. A change in those characteristics can thus be a predictor for a change in valuation. So, overall, the existing research has showed positive effects of ESG on the valuation of a company.

Kocmanová and Dočekalová (2012) use Key Performance Indicators (KPI) in order to measure the performance in relation to ESG indicators. There are financial KPI's that are related to the economic performance and non-financial KPI's that are related to ESG indicators. Managers can use KPI's to set the company's business strategy or operational

plans, including performance targets. Therefore, the process of identifying and selecting non-financial KPI's enhances the company's value by offering a more comprehensive understanding of its economic performance (Kocmanová & Dočekalová, 2012).

Yu and Zhao (2015) find a positive relationship between sustainability performance and firm value. They use the Dow Jones Sustainability Index (DJSI) as an integrated measure of sustainability performance. Their findings show that the market is willing to pay a premium for companies that are more ESG-conscientious. But this premium is higher in countries with stronger investor protection. Research does not only show a positive relationship. Other research showed that the focus group did not consider integrated reporting, nor information about natural nor social capital to be relevant to their investment decision (De Melo De Albuquerque Ribeiro, Ezequiel, Zotes & Neto, 2022).

2.4 Hypotheses

Overall, there seems to be a consensus in the literature that there is a positive relationship between the financials of a firm and the sustainability. Friede, Busch and Bassen (2015) give an extensive overview of over 2,000 studies done on the relationship between ESG criteria and corporate financial performance. They show that the weighted share of companies that found a positive relationship is 48.2%. Only 10.7% found a negative relationship. The rest of the studies found a neutral or mixed relationship. Specifically Di Simone et al. (2022), Srivastava and Anand (2023) and Yu and Zhoa (2015) found a positive relationship between the value of a company and its sustainability. Therefore, the first hypothesis proposes that the ESG score positively affects the firm value:

H1: There is a positive relationship between firm valuation and its ESG rating.

The following three hypotheses are related to the first hypothesis, but they are focused on the three pillars of ESG individually. This will show which element of the ESG score has more influence on firm valuation. Di Simone et al. (2022) looked at the three pillars separately. They found a positive and significant relationship with the firm economic sustainability for all three scores. Srivastava and Anand (2023) also find a positive and significant relationship between the pillar scores and the value of a firm. Therefore, it is

expected that all scores have a positive relationship with firm valuation. This gives the following three hypotheses:

H2a: There is a positive relationship between firm valuation and the environmental score.

H2b: There is a positive relationship between firm valuation and the social score.

H2c: There is a positive relationship between firm valuation and the governance score.

3. Methodology

This chapter will discuss the data and method used for this research. First the database, datasets and the independent and dependent variables will be discussed. Then, the regression models are presented. Lastly, the control variables will be discussed and some descriptive statistics will be shown.

3.1 Data

Specifics about the sustainability of a company is hard to define. Therefore the ESG scores are used. This is usually done with research on the sustainability. To study the relationship between the aspects of interest, a secondary quantative dataset is used. The ESG dataset is obtained from the Refinitiv Eikon database. LSEG (formerly: Refinitiv) is one of the largest providers of financial markets data worldwide. The Refinitiv dataset contains information about the ESG score and the environmental, social, and governance pillar scores of 16,000 firms from all over the world and covers over 90% of the global market cap (Refinitiv, n.d.). In this thesis, data from countries in Europe, North-America and Asia and the Pacific are used over a time period of 5 years. Table A 1, in the Appendix, shows the geographic dispersion of the sample firms. The period of interest is 2018-2022.

The ESG scores are based on publicly-reported data (Refinitiv, n.d.). The ESG score is the weighted average of three pillar scores, namely the environmental, social and governance pillar score (Refinitiv, 2022). The weight of the economic pillar score and the social pillar score vary per industry. The weight of the governance pillar score remains constant. The pillar scores are calculated by 10 categories in total consisting of a subset of 186 factors. The environmental pillar depends on various company-level ESG measures that are grouped in the categories: resource use, emissions and innovation. The social pillar consists of the categories: workforce, human rights, community and product responsibility. Lastly, the governance pillar contains the categories: management, shareholders and CSR strategy. The goal is a good reflection of ESG performance, commitment and effectiveness. Furthermore, not reporting on ‘highly material’ data points negatively affects the score. There are also industry and country

benchmarks included to facilitate a comparable analysis. The ESG score and the pillar scores are scores that range from 0 to 100. A higher score means that the company does better with regard to ESG.

The financial variables are also obtained from the Refinitiv Eikon database. It contains yearly information about the accounting variables of interest. The independent variable is the Tobin's Q. The Tobin's Q is a commonly used ratio for the long-term market value of a firm (Ishaq, Islam & Ghouse, 2021; Zhou, Liu & Luo, 2022). It is the sum of the market value of capital, long-term debt and short-term debt divided by the total assets. The Refinitiv Eikon database itself does not contain the value of the Tobin's Q, but the variables needed to calculate the ratio are available.

Table 1 contains an overview of all steps taken to get the full sample. First, companies that were double in the two separate datasets were removed. Also, companies with missing values were removed from the dataset. Thereafter, the sustainability and the financial dataset are merged together. The final sample includes 10,235 companies across 54 countries. Table A 1, in the Appendix, displays the descriptive statistics of the variables broken down per year, country and industry.

Table 1: Overview of adjustments to dataset

Step	**Description**	**Obs. excluded**	**Obs. remaining**
Initial dataset ESG scores	Raw data collected from a premade set consisted of data from EIKON	-	65,142
Remove duplicates	Duplicate records based on Name	252	64,890
Reshape dataset	Reshape dataset from wide to long for Year, and then from long to wide for datatype (the scores)		54,075
Remove duplicates	Duplicate records based on ID	10	54,065
Merge datasets	Merge	1145	52,920
Initial financial dataset	Raw data collected from EIKON database, based on ID's from the ESG-dataset	-	76,128
Drop duplicates	Duplicate records based on Name	1360	74,768

Reshape dataset	Reshape dataset from wide to long for Year, and then from long to wide for the datatype (the scores)		54,375
Merge datasets	Merge	1455	52,920
Merged dataset	Raw dataset		52,920
Remove missing values	All missing values for all variables are dropped	14,412	38,508

Note: This table gives an overview of all adjustments made to the datasets to get the full sample.

3.2 Method

To analyze the relationship between the ESG score and the valuation of a firm, an Ordinary Least Square (OLS) regression is performed. The model used for this study follows a combination of Yu and Zhao (2014) and Di Simone et al. (2022). Hypothesis 1 will be tested using Model (1):

(1) $$Q_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 DTOA_{it} + \beta_4 Leverage_{it} + \beta_5 Profitability_{it} + country\ control_{it} + industry\ control_{it} + year\ control_{it} + \varepsilon_{it}$$

Here, $Q_{i,t}$ is the independent variable and represents the Tobin's Q. $ESG_{i,t}$ represents the ESG score. $Size_{i,t}$ represents the firm size, $DTOA_{i,t}$ represents the total liabilities to total assets. $Leverage_{i,t}$ is the ratio of long-term debt and the total assets. $Profitability_{i,t}$ is the profitability of a firm represented by the earnings before interest and taxes divided by total assets. Furthermore, there will be controlled for the country, industry and year as is represented by country $control_{i,t}$, industry $control_{i,t}$ and year $control_{i,t}$, respectively. Lastly, $\varepsilon_{i,t}$ is the error term. For all variables, i represents firm i and t represents year t. A more detailed description of all the variables can be found in Table 2.

For the last three hypotheses the ESG score is broken down into the three pillar scores: the environmental, social and governance pillar scores. Therefore, Hypotheses 2a, b and c will be tested using Model (2):

(2) $$Q_{it} = \beta_0 + \beta_1 ENV_{it} + \beta_2 SOC_{it} + \beta_3 GOV_{it} + \beta_4 Size_{it} + \beta_5 DTOA_{it} + \beta_6 Leverage_{it} + \beta_7 Profitability_{it} + country\ control_{it} + industry\ control_{it} + year\ control_{it} + \varepsilon_{it}$$

In this model, $ENV_{i,t}$ represents the environmental pillar score, $SOC_{i,t}$ represents the social pillar score and $GOV_{i,t}$ represents the governance pillar score. Here, i represents again firm i and t represents year t.

In the analysis, four control variables are used to prevent ommitted variable bias. The first control variable is the firm size, calculated as the natural logarithm of the total assets. Since the valuation of a firm can also be influenced by its financial performance, that has to be accounted for. Therefore, the other control variables are profitability, leverage, and the ratio of total liabilities to total assets. There will also be controlled for the fixed effects of the year, country and industry. The choice for including fixed effects in the regression is justified by the Hausman Test. According to this test the H0 of preferring a random effects estimator is rejected. The results can be found in Table A 2 and Table A 3 in the Appendix. The industries are defined according to the Industry Classification Benchmark (ICB).

Table 2: Overview of variables

Variables	Abbreviation	Definition
Tobin's Q	Q	Represents the value of the company, calculated by the sum of market value of capital, long-term debt and short-term debt divided by total assets and multiplied with 100.
ESG score	ESG	An overall company score based on the self-reported information in the environmental, social and corporate governance pillars.
Environmental pillar score	ENV	The weighted average rating of a company based on the reported environmental information and the three environmental category scores.
Social pillar score	SOC	The weighted average rating of a company based on the reported social information and four social category scores.
Governance pillar score	GOV	The weighted average rating of a company based on the reported governance information and the resulting three governance category scores.
Firm size	Size	The natural logarithm of the total assets.
Liabilities to assets	DTOA	The ratio of total liabilities and total assets, multiplied by 100.
Leverage	Leverage	The ratio of long-term debt and total assets, multiplied by 100.

Profitability	Profitability	The ratio of EBIT and total assets, multiplied by 100.

Note: This table contains the variables used in Model (1) and Model (2). The first Column contains the full name of the variable, the second Column contains the abbreviation used in the regression of the variables and the third Column contains a description of the variables.

To address the issue of outliers in the dataset, some of the variables are winsorized. The extreme values of the variables Q, DTOA, Leverage and Profitability are adjusted by setting the lower and upper 1% observations to the 1st and 99th percentile values, respectively. Table 3 shows the descriptive statistics of the variables. It is noticeable that there is a big difference between the first and 99th percentile values for all variables. Furthermore, the standard deviation is for all variables, except Size, very large. Regarding Profitability, it is noticeable that the mean is very low and that it thus contains a large number of negative values. Lastly, it should be noted that some firms get a score of 0.000 for the environmental pillar. Table A 5, in the Appendix, shows the correlation between each variable. Table A 1, in the Appendix, gives a more detailed overview of the independent variable and the dependent variables. It shows the mean and number of observations broken down per year, country and industry.

Table 3: Descriptive statistics

Variables	**Obs.**	**Mean**	**St. Dev.**	**1%**	**99%**
Q	38,508	25.168	20.170	0.077	88.417
ESG	38,508	44.787	20.496	6.750	87.570
ENV	38,508	35.674	28.535	0.000	93.120
SOC	38,508	46.243	23.426	3.340	93.470
GOV	38,508	49.335	22.675	4.730	92.150
Size	38,508	15.950	2.950	10.488	24.235
DTOA	38,508	55.038	25.403	3.906	126.723
Leverage	38,508	18.872	18.208	0.000	81.029
Profitability	38,508	3.245	15.904	-78.724	37.041

Note: This table contains descriptive statistics of the variables used in Model (1) and Model (2). The first Column shows the name of the variables used. The second Column contains the number of observations. Column 3 shows the mean of the variables. Column 4 shows the standard deviation and Columns 5 and 6 show the first and 99th percentile value, respectively.

4. Results

In this chapter the results of the regression analyses will be discussed. This will be done by looking at the hypotheses. First, the results of Model 1 are analyzed and then the results of Model 2. This chapter concludes with a discussion about the findings.

4.1 Regression results of Model 1

First, Hypothesis 1 is tested. Hypothesis 1 states that there is a positive relationship between the valuation of a company and its ESG score. The results from the regression analysis in Table 4, however, show that there is a significant negative relationship between the valuation and the ESG score. Hence, Hypothesis 1 has to be rejected. The magnitude of the estimated effect suggests that if the ESG score of a company increases with 1 point, the Tobin's Q of that company will decrease with 0.034 percent point. This result is contradictory to the literature, for example the results by Yu and Zhao (2015), Li, Gong, Zhang and Koy (2018), and Zhou et al. (2022). A possible explanation for the negative relationship could be that managers overinvest in ESG and CSR to increase their reputation (Buchanan, Cao & Chen, 2018). This relates to the agency theory as discussed in Chapter 2.1. An agency problem arises if the objective of the managers of the firm and the shareholders don't align. If firms invest more in sustainability to comply with the interests of all stakeholders, this might hurt the interests of shareholders. Furthermore, Barnea and Rubin (2010) argue that managers tend to spend more than optimal on CSR and ESG.

As for the control variables, the results show that DTOA and Leverage are positively and significantly associated with the Tobin's Q. That means that relatively more liabilities and long-term debt are related to a higher firm value. This makes sense because if a company has relatively more long-term debt, it probably uses that to fund development which attributes to more value. The firm size and Profitability are significant but negatively associated with the Tobin's Q. This is, for the firm size, consistent with the literature. However, it is not for profitability. It would have made sense that a higher profit relates to a higher value. The R-squared value of 0.852 means that the model can explain 85.2% of variability in the dependent variable.

4.2 Regression results of Model 2

When looked at the regression results of Model 2, it shows that the social and governance pillar scores have a significant negative effect on the Tobin's Q, while the environmental pillar score has a significant positive effect. Hypothesis 2a, that states that the environmental pillar score has a positive relationship with the valuation of a company, should not be rejected at a 5% significance level. Hypothesis 2b and 2c, that stated that the social and governance pillar score, respectively, have a positive relationship with the value of a company, should both be rejected. This means that a higher social or governance pillar score, results in a lower firm value. A possible explanation could be that implementing sustainable practices requires an investment. However, long-term investment on environmental practices requires a cost-benefit analysis, where the necessary costs are compared with the future benefits. The future benefits will become clearer. The reason that the effect of social and governance pillar score differs from the environmental, could be that such analysis is less prominent for those two. The costs made to incorporate better work conditions could maybe be seen more as a cost than as an investment, which would explain the negative relationship with firm value. It leads to a structural increase in costs, while investment in more environmentally friendly practices does not necessarily do that.

Table 4: Linear regression results for the relationship between ESG-score(s) and the Tobin's Q of a firm.

	Model 1	**Model 2**
Variables	$Q_{i,t}$	$Q_{i,t}$
ESG	-0.034***	
	(0.003)	
ENV		0.006**
		(0.003)
SOC		-0.024***
		(0.003)
GOV		-0.013***
		(0.002)
Size	-0.076**	-0.129***
	(0.030)	(0.031)
DTOA	0.160***	0.160***
	(0.002)	(0.002)

Leverage	0.916***	0.916***
	(0.003)	(0.003)
Profitability	-0.017***	-0.017***
	(0.003)	(0.003)
Constant	2.798***	3.643***
	(0.425)	(0.444)
Year fixed effect	Yes	Yes
Country fixed effect	Yes	Yes
Industry fixed effect	Yes	Yes
Observations	38,508	38,508
R-squared	0.852	0.852

Note: This table shows the results of a linear regression on the relationship between the ESG score of a firm and its Tobin's Q. All missing values have been removed from the dataset. Size, DTOA, Leverage and Profitability are added as control variables. The regression accounts for the fixed effects of country, year and industry. The sample consists of 38,508 observations. Standard errors are in parentheses; *p<0.10; **p<0.05; and *** p<0.01.

Since it is understandable that there is a delay in the effect of the ESG score on the value of a company, this could be taken into account. These results are given in Table A 4, in the Appendix. There seems to be a less negative relationship between the ESG score and the Tobin's Q when there is more delay between the two variables. However, the relationship is also not significant.

4.3 Discussion

The Tobin's Q is calculated by the sum of the market value of capital and long- and short-term debt divided by total assets. Therefore, this measure of firm value solely depends on financial performance and market perception. It does not account for non-financial dimensions, such as ESG factors. This is further supported by the low correlation between the Tobin's Q and the various ESG scores, as displayed in Table A 5 in the Appendix. This suggests that traditional financial measures may not fully capture the value of companies, by not including the direct effect of sustainable practices. In my opinion, the Tobin's Q is a measurement that is only focused on the value of a company and not on the valuation of a company. Until now, these terms are used interchangeably, but it could be argued that there should be a clear distinction between the two terms. Furthermore, it could be argued that the Tobin's Q should be adjusted or that another measure should be used. I propose an adjustment to the Tobin's Q in which the Tobin's Q

also accounts for long-term investments in sustainability, so that these don't contribute to a lower firm value.

Maybe instead of just reporting on the sustainability, there should be a measure for firm value that integrates components of the ESG score as well. This could be done by introducing sustainability KPI's, as Kocmanová & Dočekalová (2012) proposed. "These KPI's should enable companies to measure economic performance and the added value towards sustainability." But there is still a lot of progress to be made. A possible solution could also be using the cost of capital. If the more sustainable companies get a loan at a better interest rate, this will show in their economic performance and value. In my opinion, the goal should be that there is shift in focus on short-term performance to long-term value creation. Reporting on sustainability plays a role in this, but ultimately the goal should be to change the attitude of shareholders.

5. Conclusion

In this thesis, the relationship between the ESG-score and the value of a firm is analyzed in order to look at ways to reflect the sustainability of a company in its firm valuation. The central research question is: *'How can you make the valuation of a company (partly) depend on sustainable goals?'*
To answer this question, a linear regression was performed on a sample of 10,235 companies from 54 countries all over the world and over a period of 5 years, to see if there is a relationship between ESG performance and the valuation of a company. The results showed a significant negative relationship between the ESG score and the value of a firm. When the separate ESG pillars are studied, the social and governance pillar score also showed a significant and negative effect on firm value. Only the environmental pillar score has a significant positive effect on firm value.

The valuation of a company is represented by the Tobin's Q. This solely depends on financial measures, so a small relationship is not surprisingly. This finding suggests that there should be other measures for firm valuation. Those other measures should also depend on sustainability. This could be done by using a different method for company valuation, an integrated report, using non-financials KPI's or by integrating the value of the ESG score in a measure for valuation. But there is still a lot of progress to be made and research to be done, to find a good solution.

The results of this research imply that a higher ESG score will lower the value of a firm. However, this finding contradicts to a lot of existing research. Therefore, the possible limitations of this research should be considered. Firstly, there is a possibility of selection bias. The data used is from firms that voluntarily report on ESG and that have been included in the Refinitiv Eikon dataset. This could have led to the exclusion of firms that show the opposite relationship. Furthermore, the dataset only includes data from 2018 until 2022. Therefore, conclusions about long-term effects cannot be made, while this might be more relevant than the short-term effects. Future research could also investigate the effect of mandatory regulation on the reporting of sustainability or could look at country-specific differences.

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7. Appendix

Table A 1: Sample breakdown per year, country and industry

Panel A						
Year	**N**	**Mean**				
		Q	**ESG**	**ENV**	**SOC**	**GOV**
2018	5,854	25.010	43.462	32.933	45.148	48.689
2019	6,893	25.511	44.136	34.538	45.501	49.161
2020	8,108	26.021	44.714	35.406	46.130	49.387
2021	9,023	24.818	45.561	37.049	47.085	49.611
2022	8,630	24.565	45.466	37.254	46.805	49.576
Panel B						
Country	**N**	**Mean**				
		Q	**ESG**	**ENV**	**SOC**	**GOV**
Australia	1,594	21.326	40.791	26.961	43.197	48.966
Austria	150	28.900	58.973	58.135	65.258	50.001
Belgium	233	27.821	54.062	50.569	57.979	51.782
Bermuda	10	11.795	43.449	15.204	28.588	85.106
Bulgaria	1	19.870	37.990	0.000	37.270	50.000
Canada	1,753	27.454	42.059	32.818	43.160	49.799
Cayman Islands	6	10.475	60.943	69.263	42.937	79.048
Channel Islands	12	43.889	41.608	42.385	33.997	48.348
China	3,750	24.542	35.999	30.119	29.859	48.410
Cyprus	12	20.794	38.582	27.575	43.265	37.819
Czech Republic	13	12.334	58.803	51.140	56.524	59.359
Denmark	266	23.976	50.138	43.922	54.271	49.244
Finland	287	26.641	55.084	53.332	59.321	50.492
France	794	30.259	59.906	60.717	65.746	51.006
Germany	1,117	24.489	51.000	44.653	55.667	49.872
Greece	111	28.371	54.360	46.591	58.149	53.323
Hong Kong	1,181	24.561	52.688	54.628	51.135	52.628
Hungary	27	17.983	53.250	52.755	56.802	47.143

Iceland	24	38.034	43.720	38.195	41.876	50.524
India	1,315	23.047	45.748	36.796	47.731	49.733
Indonesia	278	23.399	50.264	39.254	55.415	50.408
Ireland	92	22.673	54.906	48.290	56.854	59.155
Israel	20	4.503	32.323	11.327	41.635	34.119
Italy	518	30.695	57.050	52.334	63.894	50.797
Japan	2,147	21.930	50.347	52.889	47.259	49.037
Jersey	3	23.520	72.320	67.680	77.710	70.067
Kazakhstan	2	11.234	45.760	21.275	60.975	34.580
Luxembourg	37	19.408	54.496	54.867	62.997	40.715
Malaysia	817	23.409	43.848	32.879	47.093	50.151
Malta	3	41.935	28.993	24.300	27.793	31.437
Netherlands	248	29.178	59.991	56.109	65.548	55.069
New Zealand	251	26.746	40.086	28.625	39.395	49.999
Norway	369	31.367	50.005	46.039	53.029	49.573
Pakistan	36	19.702	35.733	19.835	33.604	47.879
Philippines	139	32.227	47.791	42.463	52.192	46.692
Poland	179	20.261	50.709	45.188	52.303	51.610
Portugal	64	37.919	66.417	68.296	74.523	51.030
Romania	22	17.296	47.953	38.895	53.357	46.921
Russian Federation	154	36.329	52.668	48.876	55.250	52.494
Singapore	361	28.244	48.228	47.035	48.957	47.995
Slovakia	4	24.372	38.043	44.043	30.040	46.670
Slovenia	9	9.241	58.341	56.230	65.321	49.999
South Africa	5	3.792	72.884	66.926	60.122	89.760
South Korea	624	23.890	50.085	48.759	49.770	49.829
Spain	315	33.051	65.457	64.477	75.186	52.012
Sweden	1,158	24.366	44.270	35.159	45.983	48.511
Switzerland	713	23.197	45.481	37.756	47.581	49.501
Taiwan	787	21.010	57.823	57.464	62.920	49.810
Thailand	566	32.928	51.170	42.848	57.687	49.792
Turkey	370	29.792	60.629	60.189	67.789	51.362
Ukraine	2	48.484	53.180	40.670	46.075	79.210

United Kingdom	2,418	21.569	46.924	38.851	47.952	51.183
United States	13,088	25.890	40.238	24.308	42.810	48.218
Vietnam	53	29.342	30.294	17.315	23.800	51.651

Panel C

Industry	**N**	**Mean**				
		Q	**ESG**	**ENV**	**SOC**	**GOV**
Basic Materials	3,037	23.909	45.689	42.285	44.808	51.974
Consumer Discret	5,996	28.428	44.430	35.981	45.445	48.501
Consumer Staples	2,276	24.759	46.886	43.157	46.783	50.857
Energy	1,941	27.144	45.451	40.965	45.802	51.215
Financials	5,582	19.579	44.714	28.126	45.994	50.226
Health care	4,244	18.893	39.100	21.445	44.807	44.125
Industrials	6,921	26.093	45.657	40.056	46.352	50.180
Real estate	2,557	37.851	47.833	43.458	50.148	49.830
Technology	3,600	18.597	43.412	31.226	46.716	46.219
Telecomm-unication	1,005	31.036	47.876	39.307	48.304	53.338
Utilities	1,349	38.597	49.177	47.102	47.538	54.594

Note: This table provides the descriptive statistics of the sample broken down per year, country and industry. Column 1 shows the years, countries and industries. Column 2 shows the number of observations. Column 3 shows the mean value of the independent variable, Tobin's Q, and the dependent variables, ESG-score, environmental, social and governance pillar score.

Table A 2: Hausman test – Model 1

	Coefficients			
	FE	**RE**	**Difference (FE – RE)**	**Std. Errors**
ESG	-0.013	-0.025	0.118	0.002
size	0.637	0.342	0.295	0.077
DTOA	0.327	0.242	0.086	0.002
Leverage	0.622	0.730	-0.109	0.002
Profitability	-0.023	-0.019	-0.004	0.001

FE = consistent under H0 and Ha; obtained from xtreg

RE = inconsistent under Ha, efficient under H0; obtained from xtreg

Test: H0: Difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 3045.450

Prob > chi2 = 0.000

Note: The test result displays a p-value of 0.000, suggesting that a fixed-effects approach is appropriate for Model 1.

Table A 3: Hausman test – Model 2

	Coefficients			
	FE	**RE**	**Difference (FE – RE)**	**Std. Errors**
ENV	-0.008	0.012	-0.020	0.001
SOC	-0.008	-0.032	0.024	0.002
GOV	0.003	-0.003	0.006	0.001
size	0.671	0.302	0.369	0.077
DTOA	0.328	0.241	0.087	0.002
Leverage	0.622	0.731	-0.110	0.002
Profitability	-0.024	-0.020	-0.004	0.001

FE = consistent under H0 and Ha; obtained from xtreg

RE = inconsistent under Ha, efficient under H0; obtained from xtreg

Test: H0: Difference in coefficients not systematic

chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 3193.940

Prob > chi2 = 0.000

Note: The test result displays a p-value of 0.000, suggesting that a fixed-effects approach is appropriate for Model 2.

Table A 4: Results regression analysis over time

	Model 3	**Model 4**	**Model 5**	**Model 6**
Variables	$Q_{i,t+1}$	$Q_{i,t+2}$	$Q_{i,t+3}$	$Q_{i,t+4}$
ESG	-0.032***	-0.026***	-0.027***	-0.016
	(0.004)	(0.006)	(0.008)	(0.014)
Size	0.098**	0.212***	0.308***	0.123
	(0.048)	(0.068)	(0.098)	(0.164)
DTOA	0.127***	0.108***	0.094***	0.081***
	(0.003)	(0.005)	(0.007)	(0.012)
Leverage	0.861***	0.795***	0.748***	0.711***
	(0.004)	(0.006)	(0.009)	(0.015)
Profitability	-0.030***	-0.025***	-0.042***	-0.068***
	(0.005)	(0.007)	(0.010)	(0.016)
Constant	3.023***	3.734***	2.401*	6.013***
	(0.657)	(0.932)	(1.307)	(2.154)
Year fixed effect	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Observations	28,152	19,193	11,360	4,787
R-squared	0.738	0.637	0.565	0.504

Note: For efficiency, the dependent variables are shown with a variable t, but it is considered that that is not the correct way of showing. All missing values have been removed from the dataset. Size, DTOA, Leverage and Profitability are added as control variables. The regression accounts for the fixed effects of country, year and industry. Standard errors are in parentheses; *p<0.1, **p<0.05 and ***p<0.01.

Table A 5: Correlation table

Variable		1	2	3	4	5	6	7	8	9
1	Q	1.000								
2	ESG	0.099*	1.000							
3	ENV	0.132*	0.854*	1.000						
4	SOC	0.089*	0.894*	0.730*	1.000					
5	GOV	0.052*	0.705*	0.418*	0.423*	1.000				
6	Size	0.107*	0.415*	0.475*	0.318*	0.232*	1.000			
7	DTOA	0.563*	0.173*	0.123*	0.145*	0.128*	0.423*	1.000		
8	Leverage	0.892*	0.116*	0.120*	0.123*	0.064*	0.318*	0.486*	1.000	
9	Profitability	-0.004	0.207*	0.238*	0.138*	0.158*	0.145*	-0.056*	-0.003	1.000

Note: This table shows the correlation between the variables; * $p < 0.01$.