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Does the effect of ESG score on firm value and profitability differ across industry sectors?

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This study examines the impact of Environmental, Social, and Governance (ESG) ratings on firm value and profitability, focusing on large U.S. companies across various sectors. It challenges the assumption that the positive relationship between ESG and financial performance is uniform across industries. Findings reveal significant sector-specific variations: some sectors show strong positive correlations, while others display no clear relationship. The study highlights the economic significance of ESG ratings and the varying influences of individual ESG pillars. This research underscores the need for sector-specific ESG strategies and suggests further investigation into other demographics.

Keywords: ESG, Sector, Firm value, Firm profitability

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1 Introduction

In the contemporary business landscape, Environmental, Social, and Governance (ESG) ratings have emerged as a central metric for evaluating corporate responsibility and sustainability. These ratings, reflecting a firm's commitment to environmental stewardship, social responsibility, and governance ethics, are increasingly influencing investor decisions and stakeholder perceptions. As companies try to meet sustainable development goals, ESG ratings are becoming increasingly important in leading this change.

A growing body of extant research underscores a positive association between high ESG ratings and enhanced financial performance. This correlation suggests that firms incorporating robust ESG practices not only contribute positively to societal and environmental goals but also witness benefits in terms of profitability and market valuation. Consequently, these findings imply that firms should invest in bolstering their ESG credentials.

However, the question remains: Does this positive ESG-financial performance relationship hold uniformly across different business sectors? While thoroughly exploring the ESG-financial performance core, existing literature often treats the corporate sector as an aggregate, overlooking the dynamics that different industries present. This oversight leads to a critical gap in understanding how ESG impacts firm value in diverse sectoral contexts.

This study aims to fill this gap by quantitatively assessing the impact of ESG ratings on firm value and profitability among publicly listed companies, emphasizing identifying cross-sectional differences across various business sectors. This paper contributes to the existing literature by offering a sector-specific analysis through which the relationship between ESG firm value and profitability can be understood, challenging the current generalization of the ESG impact. In a time when sustainable practices are essential, this study timely explores how ESG impacts financial performance in today's complex business environment.

2 Literature review

The relationship between environmental, social, and governance conduct and financial performance is a well-studied and researched field that can be traced back to the 1970s, preceding the introduction of generalized ESG ratings. Although the sustainability effect has been investigated in numerous studies, the findings vary significantly across academic papers. In a second-order meta-analysis, Friede et al. (Friede, Busch, and Bassen 2015) evaluate the results of more than 2200 primary empirical studies. They find that most studies show a positive relationship between ESG ratings and financial performance and make the investment case that in roughly 90% of papers, greater sustainability compliance is not connotated with weaker financial performance.

Narrowing in on firm value and profitability as financial performance indicators in particular, Aydogmus et al. (Aydoğmuş, Gülay, and Ergun 2022) find that ESG scores are positively associated with firm value in the form of Tobin's Q (except environmental pillar score) and profitability in their worldwide data set. Moreover, Kim et al. (Kim and Li 2021) find a positive and significant effect of ESG scores on credit ratings and profitability, which is enhanced with firm size.

Furthermore, there are numerous country-level studies that examine this relationship and find similar results. Velte shows that German companies have a positive relationship between ESG ratings and profitability. However, the effect on value remains insignificant (Velte 2017). Brogi and Lagasio confirm these profitability findings in the U.S. and further show significant differences between industrial companies and banks regarding the relevance of the environmental pillar (Brogi and Lagasio 2019). Yoon et al. (Yoon, Lee, and Byun 2018) find that the value of Korean firms is generally positively associated with corporate social responsibility (CSR) practices. They further find that the impact of sustainability conduct varies within specific firm characteristics, namely, CSR initiatives negatively impact the value of environment-sensitive businesses and that enhanced governance practices solely boost the value of large conglomerates. Moreover, Dalal and Thaker observe that ESG ratings positively influence Tobin's Q and ROA of Indian publicly listed firms and stress the importance of CSR performance disclosure (Dalal and Thaker 2019). Chang and Lee confirm a positive relationship between ESG and firm value and furthermore find that company environment characteristics, namely market concentration and industry growth, affect ESG impact negatively and positively, respectively (Chang and Lee 2022). In Malaysia, ESG certification by third-party providers positively affects firm value and significantly reduces the cost of capital (Wong et al. 2021).

Furthermore, researchers analyze the impact of ESG transparency as Yu et al. (Yu, Guo, and Luu 2018) who find positive links between the extent of CSR disclosure and relative firm value presented by Tobin's Q. Investigating transparency closer, Fatemi et al. (Fatemi, Glaum, and Kaiser 2018) find that the extent of disclosure mitigate negative valuation effects of ESG weaknesses.

Although most papers find a positive interrelation between ESG score and firm value and profitability, some studies indicate a negative connotation. The stakeholder expense theory states that ESG initiatives do not necessarily yield higher financial performance, particularly not in the short-term, but rather bare high investment expenses. For example, Brammer et al. find that U.K. firms with lower social scores are associated with higher equity returns (Brammer, Brooks, and Pavelin 2006), whereas Marsat and Williams obtain a negative relationship between firm value and MSCI ESG scores in their worldwide dataset (Marsat and Williams 2011). Duque-Grisales and Aguilera-Caracue's analysis of Latin American businesses present a negative impact of sustainability ratings on return on assets. However, they find a positive moderating effect when interacting ESG score with financial slack and geographic international diversification (Duque-Grisales and Aguilera-Caracuel 2021).

Apart from studies with clear positive or negative results, a few papers find mixed outcomes. In their 2022 report on Norwegian listed companies, Giannopoulos et al. observe a significant positive interrelation between ESG initiatives and Tobin's Q while simultaneously finding a negative connection with profitability (Giannopoulos et al. 2022). Also, In their study on Malaysian publicly listed businesses, Atan et al. do not discover any significant sustainability rating effects on profitability or firm value (Atan et al. 2018). Table A1 summarizes the studies discussed, along with their corresponding data points.

3 Data

The study's sample comprises S&P 500 constituents from 2003 until 2022. Over this particular timespan, there were 907 unique companies listed on the index. Only firms listed on the S&P 500 at the given time are included in the analysis. In contrast to just regarding current index constituents, this approach aims to limit possible survivorship bias and increases the number of observations compared to limiting the data to index firms as of 2023. Furthermore, the geographic restriction aims to mitigate omitted variable bias through differing country ESG standards and regulations (time-variant). The sample frequency is yearly since ESG scores are disclosed annually, typically at the end of the firm's fiscal year. After merging, preparing, and cleaning the data of dependent, independent, and control variables and disregarding incomplete rows, 5786 observations from 555 unique companies remain in the sample. Limiting factors for the small number of remaining data points are the availability of ESG scores combined with the large set of control variables and their respective availability.

3.1 Dependent variables

Tobin's Q (Q) is used as a relative measure of firm value. Developed by Nobel Prize-winning economist James Tobin in the late 1960s, it compares the market value of a firm (equity and debt) with its asset replacement costs. Therefore, it indicates how much the market value deviates from the value of assets. A greater than one Q ratio - the market value exceeds the replacement costs - might indicate that a firm has potential growth opportunities or possesses intangible assets such as brand recognition or intellectual property. On the other hand, a Q ratio of less than one might indicate undervaluation or company inefficiencies. This concept is also applicable to markets. Tobin's Q is a popular measure frequently used in academic research, e.g., Ofek (Berger and Ofek 1995), Mak (Mak and Kusnadi 2005), and Lehn (Lehn, Patro, and Zhao 2007).

This paper follows the computational approach of Chung and Pruitt (Chung and Pruitt 1994), which comes with advantages in terms of computational costs and data availability as well as high empirical correlation with other more complex approaches (Perfect and Wiles 1994):

$$\begin{aligned} Tobin's\ Q = [&Market\ Value\ of\ Equity + Liquidation\ Value\ of\ Preferred\ Stock \\ &+ (Book\ Value\ of\ LT\ Debt + \ Current\ Liabilities \\ &- Current\ Assets)]\ /\ Book\ Value\ of\ Total\ Assets \end{aligned}$$

Moreover, this approach is frequently used by other researchers, e.g., Carter (Carter, Rogers, and Simkins 2006). The fundamental and stock price data from this equation is retrieved from the COMPUSTAT database in annual format (end of fiscal year).

As the second dependent variable, return on assets (ROA) is used as a proxy for company profitability. More specifically, this study uses the operational efficiency defined as:

$$Return\ on\ Assets = \frac{EBIT}{Total\ Assets}$$

Again, the fundamental data to compute ROA is retrieved in annual format from the COMPUSTAT database. ROA is multiplied by 100 in the sample, as control ratios are also in the same format. Table 1 displays the summary statistics of the sample dependent variables. The mean Q at roughly 2 tells that sample firms, on average, have a market value twice their asset replacement costs. With a median of 1.57, the sample seems right-skewed, with several high values that draw the mean to the right. The average operational profitability defined as EBIT over Total Assets in the data is 12%, with a median slightly lower at 11%.

Table 1: Dependent variable summary statistics

Statistic	N	Mean	St. Dev.	Min	Median	Max
Q	5,786	2.02	1.55	0.10	1.57	18.91
ROA	5,786	12.07	8.58	−137.53	11.20	73.37

3.2 ESG scores

This paper uses ESG scores from the Refinitiv database, recently acquired by the LSEG group. The database contains information across over 630 different ESG metrics on more than 15,000 firms globally dating back to 2002. Their ESG scores aim to objectively and transparently reflect a firm's relative environmental, social, and governance performance. ESG scores are a relative measure in the form of percentiles. They are benchmarked against the firm's respective industry group (TRBC – The Refinitiv Business Classification) for all environmental and social measures and against the country of incorporation for all governance scores. The three pillar scores (E, S, G) can further be broken down into a company's resource use, emission reduction, environmental innovation, workforce treatment, human rights conformity, community impact, product responsibility, commitment to corporate governance principles, equal treatment of shareholders, and integration of CSR into the company's strategy. A score below the .25 percentile indicates poor relative ESG performance and insufficient transparency. In contrast, a score higher than the .75 percentile indicates excellent relative ESG performance and a high degree of disclosure (LSEG 2022). Scores in the data set are scaled by 100 and range from 0 (worst) to 100 (best). As shown in Table 2, the average sample ESG score is 50.6, which places the sustainability efforts of the average S&P 500 company in the middle of their industry peer group. Sample companies, on average, score severely better on the government pillar with a mean of 55.5, whereas environmental scores tend to be lower at 41.6 and fluctuate the most among the three pillars at a standard deviation of 29.6.

Table 2: ESG score summary statistics

Statistic	N	Mean	St. Dev.	Min	Median	Max
ESG_Score	5,786	50.61	20.67	2.20	51.74	95.16
E_Score	5,786	41.60	29.60	0	44.4	99
S_Score	5,786	52.31	23.28	2.10	52.97	98.01
G_Score	5,786	55.45	21.68	1.05	57.14	99.44

3.3 Control variables

The model incorporates several control variables to mitigate the risk of omitted variable bias. The firm's logarithmized total assets are included to control for differences in size. The company's financial leverage is calculated as total debt over total assets and accounts for differences in capital structure. The geometric revenue growth rate over the past three years approximates the firm's recent growth. Earnings-per-share (EPS) control for differences in a company's profitability on a per-share basis.

Table 3: Control variables summary statistics

Statistic	N	Mean	St. Dev.	Min	Median	Max
Log_Assets	5,786	9.41	1.17	6.23	9.30	13.22
Leverage	5,786	25.43	17.60	0.00	23.47	184.60
Revenue_3y	5,786	43.03	19.33	3.25	39.70	510.27
EPS	5,786	3.34	6.43	−121.79	2.50	140.56
Interest	5,786	2.85	1.09	0.54	2.67	5.14
GDP	5,786	4.01	2.51	−1.98	4.19	10.65
Inflation	5,786	2.20	1.36	−0.32	2.13	7.99
Unemployment	5,786	6.15	1.88	4	5.5	10

Furthermore, interest rate, GDP growth (calculated as year-on-year change), inflation, and unemployment rate serve as a control for the general macroeconomic condition at the given time in the panel data setting. The interest rate is approximated by the CBOE 10-Year Treasury

Note Index extracted from Yahoo Finance, whereas information on the remaining macroeconomic variables is obtained from FRED. The firm-level data above is retrieved from COMPUSTAT. Leverage, revenue growth, and interest are each multiplied by 100. Table 3 shows summary statistics on the control variables.

3.4 Sector and Subsector Classifications

This paper uses the North American Industry Classification System (NAICS) to categorize sample firms. It is a standardized classification system used in the United States of America, Canada, and Mexico to categorize businesses and industries based on their economic activity. It assigns a six-digit code to each company, of which the first two digits identify the firm's business sector, and the first three represent the subsector, respectively. The classification system allows researchers to analyze different industries with less effort. NAICS information is obtained through the Refinitiv database. As can be seen in Table A2, the index sample is dominated by manufacturing companies, which make up almost half of the unique firms in the data. Since these companies vary in production focus, manufacturing firms are further categorized into subsectors, as displayed in Table A3. The information and retail trade sectors account for the second and third most sample companies, respectively. The manufacturing companies in the dataset primarily operate in computer and electronic product manufacturing, followed by chemical and machinery production (Table A3).

3.5 Correlation

Table A4 shows the correlation between the variables of the model. Unsurprisingly, the combined ESG score is highly positively correlated with its single pillar components. Furthermore, Table A4 reveals that larger sample firms tend to have higher ESG scores, combined scores, and single pillars. More extensive resources, capacity, and access to capital might explain this. However, it could also be motivated by the visibility and scrutiny of large publicly listed firms.

The high correlation between the different ESG scores is confirmed by a variance inflation test (VIF) performed on the independent variables. Test values over 5 pose potential multicollinearity problems, which could lead to inflated standard errors, difficulties in determining individual effects of regressors, and overall misleading regression results. Column "All" of Table 4 shows multicollinearity risk if all ESG scores were included in the same regression model simultaneously. Therefore, this paper does not feature models of multiple ESG factors being used simultaneously in a single regression since the concern for multicollinearity would be high. However, if models are run separately, no multicollinearity risk is present, as indicated by the low VIF test results in Table 4.

Table 4: VIF test results

Variables	All	ESG-Model	E-Model	S-Model	G-Model
ESG_Score	79.862	1.641			
E_Score	12.641		1.624		
S_Score	22.830			1.509	
G_Score	9.557				1.159
Log_Assets	1.416	1.361	1.379	1.306	1.142
Leverage	1.126	1.125	1.125	1.125	1.125
Revenue_3y	1.094	1.085	1.083	1.065	1.070
EPS	1.049	1.049	1.049	1.049	1.049
Interest	1.483	1.472	1.438	1.440	1.320
GDP	2.277	2.269	2.267	2.275	2.258
Inflation	1.875	1.873	1.867	1.873	1.863
Unemployment	1.469	1.462	1.457	1.462	1.462

4 Methodology

This study uses separate multivariate regression models to determine the effect of ESG score on Tobin's Q and return on assets. Further, it uses separate regression models for different measures of ESG: combined and single pillar scores. This leads to the following regression equations:

(1) $Q_{i,t} = \beta_0 + \beta_1 ESG\_Metric_{i,t} + \beta_2 Log\_Assets_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Rev\_3y_{i,t} + \beta_5 EPS_{i,t} + \beta_6 Interest_{i,t} + \beta_7 GDP_{i,t} + \beta_8 Inflation_{i,t} + \beta_9 Unemployment_{i,t} + \theta_i + \epsilon_{i,t}$

(2) $ROA_{i,t} = \beta_0 + \beta_1 ESG\_Metric_{i,t} + \beta_2 Log\_Assets_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Rev\_3y_{i,t} + \beta_5 EPS_{i,t} + \beta_6 Interest_{i,t} + \beta_7 GDP_{i,t} + \beta_8 Inflation_{i,t} + \beta_9 Unemployment_{i,t} + \theta_i + \epsilon_{i,t}$

where,

θ_i: Firm fixed effects of company i.

$ESG\_Metric_{i,t}$: Either combined or single pillar score of company i at time t

Even though the model includes several control variables, it is plausible that differences in firm characteristics that are not picked up by the independent variables still exist. This might result in biased estimators, leading to deceptive results. To account for time-invariant heterogeneity across cross-sections and, therefore, mitigate the risk of omitted variable bias (time-invariant), the model incorporates firm-level fixed effects.

Table 5: Hausman test results

Test	Tobin's Q Model	ROA Model
Chi-Squared	909.17	224.21
Degrees of Freedom	9	9
P-Value	$< 2.2e\text{-}16$	$< 2.2e\text{-}16$
Conclusion	Fixed over random effects	Fixed over random effects

The choice of the particular panel data model is not solely motivated by the theoretical framework of the analysis purpose but is additionally backed up by statistical model fit tests. First, the results of an F-Test (Table A5) and a Breusch-Pagan Test (Table A6) for Tobin's Q and ROA models reject using pooled OLS models and suggest using fixed and random effects, respectively. Second, a performed Hausman Test strongly suggests that a fixed effects model should be preferred over a random effects setting (Table 5). While this study strives to address and eliminate omitted variable bias, it is essential to recognize that there may still be limitations regarding excluding unknown time-variant variables.

Further, since the data includes recurring observations of identical cross-sections over different periods, observations within groups (firms) might be correlated. Also, there might be autocorrelation of the residuals within groups, potentially leading to the underestimation of standard errors and, therefore, falsely significant results. To account for and mitigate those risks mentioned above, standard errors are clustered on the cross-section (firm) level. This is common research practice and generally a more cautious approach for assessing statistical inference when dealing with panel data format (Zeileis, Köll, and Graham 2020).

Moreover, since the number of observations and clusters can get small, depending on the sector, and therefore, potentially induce misleading results, this paper incorporates small sample adjustments for the variance-covariance matrix following the approach of the esteemed "fixest" R package ("On Standard-Errors" 2023):

$$\hat{V} = M * \frac{G}{G-1} * \frac{n-1}{n-K}$$

Where *M* represents the sandwich estimator (heteroskedasticity-consistent), initially introduced by Halbert White (White 1980), of the variance-covariance matrix without adjustment, *G* denotes the number of clusters, n is the number of observations, and K equals the number of regressors. This adjustment counters the potential downward bias of standard errors in small samples, increasing the threshold for significant statistical inference. Also, this study uses the number of clusters minus one as degrees of freedom when computing the critical t-statistic values, as suggested by researchers when dealing with small sample sizes and clustered standard errors. This modification represents a cautious approach when determining inference as it increases thresholds for significance levels when dealing with small samples and delivers satisfactory results in Monte Carlo simulations (Colin Cameron and Miller 2015, p. 346).

5 Results

This section compares the regression results for the statistical models described beforehand. It commences with analyzing the whole sample to obtain general sample effects for comparison purposes and further investigates statistical inference in the respective industry sectors.

5.1 Cross-sector analysis

Table 6: Comparing regression models with different control variables

Dependent Variables:		Q			ROA	
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
ESG_Score	0.0009	0.0052**	0.0062***	-0.0348**	0.0376***	0.0430***
	(0.0019)	(0.0017)	(0.0018)	(0.0110)	(0.0101)	(0.0101)
Log_Assets		-0.4290***	-0.5941***		-3.250***	-4.647***
		(0.0974)	(0.0994)		(0.6197)	(0.6305)
Leverage		0.0105*	0.0092·		-0.0717*	-0.0516·
		(0.0050)	(0.0050)		(0.0334)	(0.0293)
Revenue_3y			0.0083***			0.0627***
			(0.0018)			(0.0123)
EPS			0.0133*			0.3822**
			(0.0052)			(0.1474)
Interest			-0.1125***			-0.3356*
			(0.0247)			(0.1323)
GDP			0.0469***			0.0084
			(0.0072)			(0.0447)
Inflation			-0.0597***			0.3266***
			(0.0135)			(0.0964)
Unemployment			-0.0733***			-0.0735
			(0.0105)			(0.0641)
Fixed-effects						
Cusip	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
Observations	5,786	5,786	5,786	5,786	5,786	5,786
Adjusted R^2	0.66529	0.67654	0.70102	0.54381	0.57250	0.64790

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table 6 displays six different regression models, two different dependent variables, and three sets of control variables across all sectors in the sample. Models 1 and 4 do not feature any control variables. Interestingly, the effect of the ESG score on Tobin's Q is not statistically significant and is even negative and significant for ROA. However, these models likely do not capture the actual effect of ESG since variation in the dependent variables is solely explained through one variable, which might be prone to endogeneity.

Models 2 and 5 of Table 6 replicate a common identification strategy in research of ESG effects on firm value and profitability used by Giannopoulos et al. (Giannopoulos et al. 2022), Aydogmus et al. (Aydoğmuş, Gülay, and Ergun 2022), and Dalal and Thaker (Dalal and Thaker 2019) amongst others, which solely control for firm size and financial leverage. Both models find positive and statistically highly significant relationships between ESG scores and the dependent variables. These results are similar to the results of the papers mentioned above.

This study additionally controls for more characteristics, namely revenue growth, EPS, and a set of macroeconomic measures (Models 3 and 6 in Table 6). In direct comparison, the adjusted R2 in both cases indicates that including these additional control variables adds explanatory power rather than hurts the analysis by losing degrees of freedom. When incorporating those further controls in models 3 and 6, ESG coefficients are positive and significant at the 99.9% confidence level. In the Tobin's Q regression, a one unit increase in ESG score, hence a one percentile higher ESG performance ranking compared to peers, is associated with an increase of 0.0062 in relative firm value (market value / assets replacement costs). The regression coefficient of ESG in model 6 indicates that a one percentile increase, on average, connotes a 0.043 percentage point increase in operational firm profitability.

Across all four models displayed in Table 6, which include firm size, the logarithm of assets is negatively associated with firm value and profitability at the 99% confidence level. When incorporating the complete set of controls, financial leverage has no significant relationship with either Tobin's Q or ROA at typical statistical confidence levels. Unsurprisingly, revenue growth and EPS coefficients are both statistically significantly positive for company value and profitability since EPS and ROA are both measures of profitability, whereas growth is part of standard market valuation approaches such as the discounted cash flow model.

Additionally, the macroeconomic coefficients in Model 3 align with expectations, indicating a positive correlation between an improved economic climate and increased firm value. Similarly, Model 6 demonstrates comparable outcomes, albeit with an exception: higher inflation correlates with enhanced profitability. This might initially appear counterintuitive, however, it could be attributed to the ability of S&P 500 companies to transfer rising costs to consumers, thereby boosting their profits. It is crucial to acknowledge that this analysis employs nominal ROA, which may not fully capture the true impact of inflation on real ROA.

To obtain a scale-free measure of the relationship between ESG measures and firm value and profitability and get a feel for the relative magnitude of the coefficients, the economic significance is computed as how many standard deviations the dependent variable changes for one standard deviation increase in the predictor.

$$\Delta Q_{STDs} = \frac{\beta_{ESG} * \sigma_{ESG}}{\sigma_Q}$$

Using the formula provided above (equivalent for ROA), a one standard deviation increase in ESG combined score is associated with an 8% standard deviation increase in firm value and a 10% standard deviation increase in firm profitability. Therefore, the relationship is not just statistically highly significant but also features significant economic magnitude.

As a model comparison, Table A7 shows the same regressions as Table 6 but as pooled OLS instead of fixed effects models. The estimate coefficients show the same positive statistically significant relationship as the ones from the fixed effects model, although the pooled model shows a substantially higher parameter magnitude than the fixed effects estimates. However, in terms of explanatory power described by the adjusted R2, the pooled models do not manage to explain the variation in the dependent variables as well as the fixed effects models. In the subsequent single pillar and sector group analysis, this study will focus on the fixed effects models introduced in the methodology section of the paper.

Table 7: Single pillar regression models

Dependent Variables:			Q			ROA		
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0062***				0.0430***			
	(0.0018)				(0.0101)			
E_Score		0.0030**				0.0303***		
		(0.0011)				(0.0073)		
S_Score			0.0060***				0.0426***	
			(0.0016)				(0.0090)	
G_Score				0.0008				0.0050
				(0.0010)				(0.0056)
Log_Assets	-0.5941***	-0.5756***	-0.5971***	-0.5330***	-4.647***	-4.661***	-4.679***	-4.219***
	(0.0994)	(0.0963)	(0.0993)	(0.0964)	(0.6305)	(0.6210)	(0.6336)	(0.6145)
Leverage	0.0092·	0.0094·	0.0092·	0.0097·	-0.0516·	-0.0509·	-0.0515·	-0.0476
	(0.0050)	(0.0051)	(0.0051)	(0.0051)	(0.0293)	(0.0294)	(0.0295)	(0.0295)
Revenue_3y	0.0083***	0.0082***	0.0081***	0.0079***	0.0627***	0.0631***	0.0615***	0.0596***
	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0123)	(0.0123)	(0.0123)	(0.0122)
EPS	0.0133*	0.0134*	0.0133*	0.0137*	0.3822**	0.3818**	0.3821**	0.3853**
	(0.0052)	(0.0053)	(0.0052)	(0.0054)	(0.1474)	(0.1473)	(0.1473)	(0.1483)
Interest	-0.1125***	-0.1231***	-0.1137***	-0.1440***	-0.3356*	-0.3377*	-0.3382**	-0.5564***
	(0.0247)	(0.0255)	(0.0240)	(0.0249)	(0.1323)	(0.1361)	(0.1262)	(0.1395)
GDP	0.0469***	0.0454***	0.0487***	0.0435***	0.0084	0.0045	0.0220	-0.0154
	(0.0072)	(0.0071)	(0.0072)	(0.0071)	(0.0447)	(0.0446)	(0.0454)	(0.0441)
Inflation	-0.0597***	-0.0570***	-0.0611***	-0.0544***	0.3266***	0.3358***	0.3157**	0.3634***
	(0.0135)	(0.0137)	(0.0135)	(0.0137)	(0.0964)	(0.0970)	(0.0960)	(0.0973)
Unemployment	-0.0733***	-0.0757***	-0.0732***	-0.0748***	-0.0735	-0.0916	-0.0720	-0.0835
	(0.0105)	(0.0106)	(0.0104)	(0.0106)	(0.0641)	(0.0652)	(0.0638)	(0.0650)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	5,786	5,786	5,786	5,786	5,786	5,786	5,786	5,786
Adjusted R^2	0.70102	0.70012	0.70148	0.69932	0.64790	0.64793	0.64880	0.64520

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table 7 investigates the firm value and profitability relationship with the single ESG pillars. In general, the environmental score is statistically significant at the 99% confidence level and positive in the Tobin's Q model, even though the coefficient magnitude is lower than for the combined ESG score. Regarding profitability, the environmental score is highly statistically significant at the 99.9% confidence level, although the effect is also smaller than in the combined ROA model. Models 3 and 7 of Table 7 suggest that the main effect of the combined score is driven by the social pillar. Both display a highly statistical connotation between predictor and dependent variables with similar parameter magnitudes. Conversely, the governance score does not seem to influence value and profitability at standard statistical confidence levels. However, that may change when focusing on single industry sectors.

5.2 Manufacturing

The following section analyses the manufacturing industry sector. At 275 unique manufacturing sample firms, this is the largest subgroup in the dataset and almost makes up half the cross-sections. Therefore, after glancing at the whole manufacturing sector, this paper will further divide the manufacturing companies into the 3-digit NAICS subsectors.

Table 8: Manufacturing sector regression results

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0051**				0.0502***			
	(0.0018)				(0.0128)			
E_Score		0.0036*				0.0292**		
		(0.0015)				(0.0104)		
S_Score			0.0051**				0.0484***	
			(0.0016)				(0.0107)	
G_Score				-0.0005				0.0078
				(0.0011)				(0.0078)
Log_Assets	-0.5029***	-0.4962***	-0.5124***	-0.4449**	-4.016***	-3.863***	-4.087***	-3.513***
	(0.1465)	(0.1462)	(0.1502)	(0.1487)	(0.7268)	(0.7391)	(0.7267)	(0.7346)
Leverage	0.0019	0.0021	0.0018	0.0024	-0.0553·	-0.0527·	-0.0564·	-0.0511
	(0.0047)	(0.0047)	(0.0048)	(0.0047)	(0.0313)	(0.0308)	(0.0317)	(0.0311)
Revenue_3y	0.0053**	0.0053**	0.0051**	0.0048*	0.0618**	0.0611**	0.0597**	0.0586**
	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0203)	(0.0202)	(0.0200)	(0.0204)
EPS	0.0110·	0.0110·	0.0110·	0.0113·	0.2370	0.2379	0.2374	0.2395
	(0.0065)	(0.0065)	(0.0065)	(0.0069)	(0.1463)	(0.1469)	(0.1458)	(0.1492)
Interest	-0.1293**	-0.1296**	-0.1288***	-0.1606***	-0.3877*	-0.4427*	-0.3937*	-0.6571***
	(0.0402)	(0.0412)	(0.0382)	(0.0389)	(0.1744)	(0.1812)	(0.1638)	(0.1723)
GDP	0.0379***	0.0377***	0.0392***	0.0343***	0.0771	0.0691	0.0879·	0.0428
	(0.0101)	(0.0102)	(0.0099)	(0.0102)	(0.0527)	(0.0523)	(0.0523)	(0.0537)
Inflation	-0.0650***	-0.0643***	-0.0655***	-0.0599**	0.3127**	0.3271**	0.3096**	0.3562**
	(0.0191)	(0.0192)	(0.0191)	(0.0194)	(0.1106)	(0.1109)	(0.1093)	(0.1114)
Unemployment	-0.1053***	-0.1068***	-0.1041***	-0.1065***	-0.0762	-0.0907	-0.0654	-0.0864
	(0.0138)	(0.0138)	(0.0137)	(0.0138)	(0.0796)	(0.0805)	(0.0788)	(0.0799)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	2,909	2,909	2,909	2,909	2,909	2,909	2,909	2,909
Adjusted R^2	0.69398	0.69403	0.69450	0.69270	0.69948	0.69816	0.70080	0.69527

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Regarding the analysis approach for the models shown in Table 8, this section follows the same approach explained in the methodology chapter but applied to the manufacturing subsample. Table 8 presents results similar to the regressions on the total sample in terms of effect direction and magnitude. This is not very surprising since the manufacturing makes up a significant stake of the dataset. Again, governance remains statistically insignificant for value and profitability, while the social pillar seems to continue to be the driving force of the combined ESG measure. When reviewing economic significance, a one standard deviation increase in combined ESG score is associated with a 7% and 13% standard deviation increase in Tobin's Q and ROA, respectively. Therefore, compared to the entire sample, economic significance is lower for Tobin's Q and higher for ROA in the manufacturing subsample.

Table 9: Manufacturing subsectors regression results (Dependent variable: Tobin's Q)

Subsector	Observations	ESG_Score	E_Score	S_Score	G_Score
Computer and Electronic	884	0.0052	0.0044	0.0052	0.0001
Chemical	476	0.0057	0.0066	0.0035	0.0002
Machinery	211	0.0050	0.0000	0.0041	0.0043*
Food	231	0.0018	0.0018	0.0030	-0.0028
Transporation Equipment	194	0.0020	0.0046	0.0024	-0.0039
Beverage and Tobacco	166	0.0109.	0.0079.	0.0097.	0.0036
Paper	83	-0.0062*	-0.0035*	-0.0046	-0.0034
Petroleum and Coal	80	-0.0003	-0.0053	0.0014	0.0018

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table 9 shows the manufacturing subsector regression coefficients of the ESG combined and pillar scores after controlling for the control variables specified in the methodology section in a firm-fixed effects setting. After finding statistically significant positive relationships between ESG scores and Tobin's Q for the whole manufacturing sector, effects become mainly insignificant when looking at the single manufacturing subsectors. The only remaining significant effects are the positive effect of governance score in machinery manufacturing, the negative ESG and environmental effect in paper manufacturing, and the positive effect of combined, environmental, and social score in beverage and tobacco manufacturing (however, only significant at 10% confidence level).

Table 10 displays the same regression model results as Table 9 but with ROA as the dependent variable. In contrast to the firm value manufacturing subsector regressions, firm profitability reports results similar to those of the complete manufacturing sector. Positive and significant relationships between predictors and ROA are found in computer and electronic, chemical, machinery, transportation, and petroleum and coal manufacturing. Interestingly, these positive effects seem only to be driven by environmental and social pillars. Out of these industries, chemical, machinery, and transportation manufacturing feature a high ESG coefficient magnitude of approximately 0.08, which exceeds the 0.04 average sample effect (Table 7) and the manufacturing sample effect of 0.05 (Table 8).

Table 10: Manufacturing subsectors regression results (Dependent variable: ROA)

Subsector	Observations	ESG_Score	E_Score	S_Score	G_Score
Computer and Electronic	884	0.0593*	0.0535**	0.0532*	-0.0004
Chemical	476	0.0807**	0.0495*	0.0669*	0.0219
Machinery	211	0.0729.	0.0333	0.0739*	0.0092
Food	231	0.0029	-0.0008	0.0105	-0.0069
Transporation Equipment	194	0.0534*	0.0492*	0.0774*	-0.0328
Beverage and Tobacco	166	0.0401	0.0315	0.0401	0.0028
Paper	83	-0.0011	0.0075	-0.0011	-0.0108
Petroleum and Coal	80	0.0054	-0.0939	0.0263	0.0453

*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

5.3 Information

The information sector marks the second largest sector subgroup in the dataset, with 63 unique firms and 538 observations. The sector entails companies that engage in the distribution of information, publishing services, motion picture and sound production, broadcasting, telecommunications, and other information services.

As seen in Table 11, the ESG score appears to be driven by the social pillar, just as in the whole sample analysis. However, correlation coefficients vary distinctively in magnitude as significant positive effects in ESG and social score are more than three times larger in the information sector than in the overall sample (for Tobin's Q as the dependent variable). This also holds when comparing the information and manufacturing sector. Interestingly, the governance pillar is positively significantly associated with firm value, whereas the environmental effect becomes insignificant as opposed to the manufacturing sector.

Table 11: Information sector regression results

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0206*				0.0784***			
	(2.209)				(3.531)			
E_Score		0.0059				0.0725***		
		(0.9071)				(3.660)		
S_Score			0.0214*				0.0721***	
			(2.265)				(4.043)	
G_Score				0.0084*				0.0226
				(2.194)				(1.360)
Log_Assets	-0.6151***	-0.5336**	-0.6422***	-0.5050**	-5.853***	-6.133***	-5.876***	-5.387***
	(-3.674)	(-3.177)	(-3.986)	(-3.074)	(-7.048)	(-7.033)	(-6.626)	(-6.484)
Leverage	0.0086	0.0106	0.0087	0.0112	-0.0299	-0.0431	-0.0274	-0.0176
	(0.7182)	(0.8082)	(0.7089)	(0.9396)	(-0.6748)	(-0.9346)	(-0.6122)	(-0.3893)
Revenue_3y	0.0151**	0.0155**	0.0150**	0.0148**	0.0198	0.0264·	0.0192	0.0187
	(3.140)	(2.747)	(3.020)	(2.844)	(1.403)	(1.942)	(1.350)	(1.348)
EPS	0.0461	0.0456	0.0408	0.0472	0.3077*	0.3083*	0.2897*	0.3098*
	(1.591)	(1.551)	(1.397)	(1.583)	(2.253)	(2.374)	(2.062)	(2.222)
Interest	-0.1430	-0.2014·	-0.1247	-0.2219·	-0.8682*	-0.7080·	-0.8534*	-1.197**
	(-1.400)	(-1.753)	(-1.288)	(-1.725)	(-2.467)	(-1.983)	(-2.356)	(-3.173)
GDP	0.0388·	0.0330	0.0464*	0.0322	-0.0748	-0.0982	-0.0518	-0.0991
	(1.867)	(1.615)	(2.135)	(1.594)	(-0.7657)	(-0.9985)	(-0.5331)	(-1.019)
Inflation	-0.1077*	-0.0877*	-0.1185*	-0.0912*	0.1344	0.1848	0.1086	0.2047
	(-2.473)	(-2.087)	(-2.633)	(-2.188)	(0.6752)	(0.9413)	(0.5705)	(1.018)
Unemployment	-0.1204·	-0.1296·	-0.1163·	-0.1165·	-0.3613·	-0.4821*	-0.3469·	-0.3497·
	(-1.984)	(-1.825)	(-1.973)	(-1.878)	(-1.992)	(-2.529)	(-1.874)	(-1.878)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	538	538	538	538	538	538	538	538
Adjusted R^2	0.69280	0.68040	0.69668	0.68437	0.70336	0.71032	0.70315	0.69134

Clustered (Cusip) co-variance matrix, t-stats in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Furthermore, the profitability models display statistically significant and positive connections between firm profitability and ESG measures similar to the entire sample and manufacturing models, yet also of general higher parameter magnitude. A one-unit increase in ESG score is associated with a 0.08 percentage point increase in profitability compared to only 0.05 in overall sample and manufacturing. The increased magnitude of ESG effects is also supported by the economic significance of 22% and 23% standard deviation increase of Tobin's Q and return on assets, respectively for one standard deviation increase in combined ESG score.

The high impact of social and governance topics might be explained by intense scrutiny from consumers and investors often experienced by companies in the information sector. Practices such as information security, data privacy, intellectual property, and such are highly valued. On the other hand, manufacturing companies might focus more on environmental aspects of their operations, such as emissions, waste management, and resource utilization. The higher ESG effect on firm value might result from less costly social and governance innovations and implementations. At the same time, new environmental-friendly concepts might require substantial R&D expenses, mitigating firm value and profitability in the manufacturing sector. Also, since good environmental practices are likely less costly in the information sector than in manufacturing, it makes sense that the profitability associated with environmental score is higher in the information sector.

5.4 Retail and Wholesale Trade

The NAICS retail trade sector comprises various businesses such as vehicle and parts dealerships, furniture stores, electronics and appliance stores, and food and beverage stores. The S&P 500 sample used in this study collects 615 observations from 48 unique companies between 2003 and 2022.

Although demonstrating similar magnitude in the ESG score coefficient in the firm value model (Models 1-4 Table A8) as the total sample model (Table 6), all observed ESG effects are insignificant at typical confidence levels. An explanation might be that consumers' ESG focus is centered on the actual products they purchase, which are attributed to manufacturing sector companies, rather than fixating on the retail dealer from which they obtain their goods. Other explanations for the non-significant ESG effect could be that consumers are more influenced by prices and product quality, resulting in a diminished impact of ESG activities.

Like retail trade, the wholesale trade sector does not show significant ESG impacts on company value and profitability (Table A9). Again, customer attention to ESG may primarily concern product origins from manufacturers rather than the retailers selling them. Additionally, prices could overshadow the ESG considerations of customers.

5.5 Professional, Scientific, and Technical Services

Table A10 displays the regression results of the professional, scientific, and technical services NAICS sector group, which entails services with a high level of expertise and training, such as legal counseling, consulting, and engineering services, to name a few. While the analysis does not indicate a significant relationship between ESG measures and firm value, a positive and significant relationship is found for ESG and social score on profitability. However, only at the 90% confidence level, which might be too low to be defined as a significant effect for the sample size 350.

These results might be explained by the nature of the industry, which generally has a lower environmental impact than manufacturing companies and tends to follow client-based business models. Furthermore, measuring ESG activities might be challenging in service-oriented sectors as ESG measures tend to be more qualitative than in others, resulting in less accurate ratings.

5.6 Mining, Quarrying, and Gas Extraction

The firm value of companies in the mining, quarrying, and gas extraction sector has a significantly positive relationship with environmental and social scores, as seen in Table A11. Especially environmental score seems feasible as the sector is highly regulated, and non-sustainable practices bear risks of penalization and large future expenditures. Even though environmental best practice seems to create firm value, the effect on profitability is only significant at the 10% confidence level. Environmental initiatives' costs and long-term nature might cause that environmental practice improvements may not immediately lead to enhanced profitability.

Nonetheless, the effects of ESG score on profitability seem to be mainly driven by the social score while also posting higher significant coefficient magnitudes (out of the profitability models) than in any other sample sector. Improved community relations and workforce safety may boost productivity, reduce operational disruptions, and help avoid costly penalties. When comparing the sector to manufacturing, significant coefficient magnitudes in the profitability models are twice as high in the mining sector.

5.7 Transportation and Warehousing

This sector includes businesses engaged in transporting passengers and goods by rail, road, water, or air, as well as storing goods and providing services to businesses that operate in those fields. While there are no significant sustainability effects on firm value, the effect on profitability is statistically significant for combined, environmental, and social scores (see Table A12). In terms of coefficient magnitude, it exceeds the manufacturing sector, yielding results similar to those of the information sector. It is only exceeded by the mining, quarrying, and oil and gas extraction sector. The positive relationship might result from higher fuel efficiency and optimized logistics caused by ESG initiatives (lowering emissions), resulting in operational cost savings.

5.8 Administrative and Support, Waste Management and Remediation Services

This sector entails companies that offer a variety of recurring support activities for day-to-day operations to businesses. This includes clerical services, office planning, and personnel management. The empirical findings in Table A13 suggest that firm value has a positive and significant relationship with ESG score. Therefore, a one-unit increase in combined sustainability rating is associated with a 0.0222 increase in Tobin's Q, which marks the largest coefficient magnitudes on firm value in the sector analysis. This could be explained by the sector's strong link to the environment and its strict regulations, which especially firms in waste management and remediation are bound to. The magnitude of the environmental pillar effect on firm value is similar to the combined score, however, it is only significant at the 90% confidence level. Further, leading governance practices might reduce operational disruptions and risks of legal fines. Additionally, better ESG performance might attract the attention of investors, enhancing the firm's market value. As for environmental, governance score is only significant at the 90% confidence level.

Although parameter magnitudes of the ESG metrics on profitability indicate a positive relationship between the two, they are not statistically significant (Table A13, Models 5-8).

5.9 Other sectors

Accommodation and Food Services (Table A14), Finance and Insurance (Table A15), and Health Care and Social Assistance (Table A16) do not produce statistically significant effects of ESG ratings on either firm value or profitability at the 95% confidence level. Interestingly, however, the Health Care sector features opposing single pillar effects, potentially offsetting the general ESG score effect on firm value. The environmental score is positively associated with Tobin's Q, whereas the social score indicates a negative relationship. However, these findings are only significant at the 90% confidence level.

The remaining sectors (see Table A2 underneath Health Care and Social Assistance) were not included in the analysis since they feature only a small number of observations, which might lead to unreliable estimates and a general lack of statistical power even after small sample adjustments.

6 Conclusion

The findings of this study provide an understanding of the relationship between ESG ratings and financial performance, underscoring the importance of considering sector-specific dynamics. It is highlighted in the analysis across various sectors that the impact of ESG on firm value and profitability is not uniform and exhibits significant variation.

In the cross-sector analysis, it was observed that while some sectors showed a strong positive correlation between ESG ratings and financial performance, others exhibited no evident relationship. Additionally, the magnitude of the effect varies significantly across sectors. This variation suggests that the effectiveness of ESG initiatives and their influence on firm value and profitability are highly contingent on the business's sectoral characteristics and operational context. Unfortunately, further analysis did not reveal any quantifiable patterns in R&D intensity, asset tangibility, and sales-per-employee ratio, among other characteristics consistent with the regression outcomes.

One of the main insights from this study is the economic significance of ESG ratings. The changes in firm value and profitability indicate that the impact of ESG is not only statistically significant but also carries substantial economic weight.

Furthermore, the investigation into the individual pillars of ESG revealed varied influences on financial performance. The social pillar often emerged as a significant driver of the combined ESG effect, particularly in sectors where consumer and public perception play a crucial role. In contrast, the governance pillar rarely showed any significant influence in the whole sample and across industries, suggesting that different ESG aspects must be prioritized depending on the sector.

Sector-specific findings further underscore the diverse impacts of ESG. In sectors such as manufacturing, environmental and social considerations were paramount, aligning with the sector's operational focus and stakeholder expectations. Conversely, in sectors like information, governance and social aspects were more influential, reflecting these industries' unique challenges and priorities.

While extensive, this study acknowledges certain limitations. Including a broad set of control variables and fixed effects reduces the risk of potential endogeneity, yet it does not entirely eliminate it. Consequently, caution is advised in interpreting the results, especially concerning causality. To further mitigate the risk of reverse causality, high-value firms having more capacity to finance sustainability initiatives and subsequently achieve higher ESG ratings, investigating the impact of periodically lagged ESG ratings on financial performance might be a viable approach in future studies. Additionally, this study focuses on the largest firms in the United States, which means it does not consider the scenarios in other countries or the dynamics of smaller companies. These limitations present opportunities for further research in the form of different geographic or firm size focus. Furthermore, since the analysis controls for growth, the observed impact on Tobin's Q implies that higher ESG ratings might be partially attributable to a lower cost of capital, suggesting that investors perceive lower risks in firms with higher ESG ratings. This relationship may warrant further exploration to understand how ESG influences market valuation.

In conclusion, this research contributes to the discourse on ESG and corporate financial performance. It emphasizes the need for a sector-specific approach in formulating and implementing ESG strategies. As companies increasingly integrate sustainability into core operations, these findings offer valuable insights for business leaders and policymakers, highlighting the importance of a nuanced and informed approach to adopting sustainable business practices.

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8 Appendix

Table A1: Literature summary

Authors (Year)	Financial Metric	ESG Metric	Sample Period	Geography	Findings
Aydogmus et al. (2022)	Tobin's Q, ROA	Refinitiv	2013–2021	Worldwide	Positive Relationship
Kim and Lee (2021)	ROA, Credit rating	MSCI ESG	1991–2013	Worldwide	Positive Relationship
Velte (2017)	ROA	Thomson Reuters Datastream	2010–2014	Germany	Positive Relationship ROA (no effect for Tobin's Q)
Brogi and Lagasio (2019)	ROA	Equally-weighted pillar index based on MSCI ESG KLD STATS	2007–2014	United States	Positive Relationship
Yoon et al. (2018)	Stock price	Korean Corporate Governance Services (KCGS)	2010–2015	Korea	Positive Relationship
Dalal and Thaker (2019)	Tobin's Q, ROA	NSE 100 ESG Index database	2015–2017	India	Positive Relationship
Chang and Lee (2022)	Tobin's Q	ESG activities extracted from sustainability reports	2002–2020	Korea	Positive Relationship
Wong et al. (2021)	Tobin's Q, Cost of capital	Bloomberg ESG scores	2010–2014	Malaysia	Positive Relationship Tobin's Q (Cost of capital negative)
Yu et al. (2018)	Tobin's Q	Bloomberg ESG disclosure score	2012–2016	Worldwide	Positive Relationship
Fatemi et al. (2018)	Tobin's Q	KLD ESG Stats, Bloomberg ESG disclosure scores	2006–2011	United States	Positive Relationship
Brammer et al. (2006)	Stock returns	EIRIS database	2002–2005	United Kingdom	Negative Relationship
Marsat and Williams (2011)	Tobin's Q and price-to-book ratio	MSCI ESG ratings	2005–2009	Worldwide	Negative Relationship
Duque-Grisales and Aguilera-Caracue (2021)	ROA	Thomson Reuters Eikon	2011–2015	Multi-Latinas	Negative Relationship
Giannopolous et al. (2022)	Tobin's Q, ROA	Thomson Reuters Eikon scores	2010–2019	Norway	Positive effect on Tobin's Q, Negative effect on ROA
Atan et al. (2018)	Tobin's Q, ROA, WACC	Bloomberg ESG score	2010–2013	Malaysia	No significant effect for Tobin's Q or ROA

Table A2: Sample sectors

NAICS Sector	Companies
Manufacturing	275
Information	63
Retail Trade	48
Professional, Scientific, and Technical Services	38
Mining, Quarrying, and Oil and Gas Extraction	34
Transportation and Warehousing	17
Wholesale Trade	16
Accommodation and Food Services	13
Finance and Insurance	13
Administrative and Support and Waste Management and Remediation Services	12
Health Care and Social Assistance	8
Real Estate and Rental and Leasing	6
Construction	3
Educational Services	3
Other Services (except Public Administration)	2
Utilities	2
Agriculture, Forestry, Fishing and Hunting	1
Arts, Entertainment, and Recreation	1
Sum	555

Table A3: Manufacturing subsectors

Manufacturing Subsector	Companies
Computer and Electronic Product Manufacturing	87
Chemical Manufacturing	47
Machinery Manufacturing	23
Food Manufacturing	18
Transportation Equipment Manufacturing	18
Miscellaneous Manufacturing	17
Beverage and Tobacco Product Manufacturing	14
Paper Manufacturing	7
Apparel Manufacturing	6
Fabricated Metal Product Manufacturing	6
Petroleum and Coal Products Manufacturing	6
Primary Metal Manufacturing	6
Electrical Equipment, Appliance, and Component Manufacturing	5
Nonmetallic Mineral Product Manufacturing	4
Plastics and Rubber Products Manufacturing	4
Leather and Allied Product Manufacturing	2
Wood Product Manufacturing	2
Furniture and Related Product Manufacturing	1
Printing and Related Support Activities	1
Textile Product Mills	1
Sum	275

Table A4: Pearson correlation table

	Q	ROA	ESG_Score	E_Score	S_Score	G_Score	Assets	Leverage	Rev_3y	EPS	Interest	GDP	Inflation
Q	1.00												
ROA	0.50	1.00											
ESG_Score	0.02	0.01	1.00										
E_Score	-0.01	-0.01	0.88	1.00									
S_Score	0.06	0.05	0.91	0.76	1.00								
G_Score	-0.04	-0.03	0.69	0.44	0.43	1.00							
Assets	-0.26	-0.21	0.50	0.51	0.47	0.29	1.00						
Leverage	0.01	-0.05	0.18	0.18	0.16	0.12	0.15	1.00					
Rev_3y	0.22	0.13	-0.19	-0.19	-0.14	-0.15	-0.04	-0.16	1.00				
EPS	0.13	0.28	0.08	0.07	0.08	0.05	0.12	0.03	0.09	1.00			
Interest	-0.11	0.04	-0.44	-0.43	-0.42	-0.24	-0.23	-0.26	0.11	-0.12	1.00		
GDP	0.09	0.05	-0.12	-0.15	-0.13	-0.02	-0.04	-0.04	0.08	0.07	0.30	1.00	
Inflation	0.05	0.06	-0.09	-0.11	-0.09	-0.02	-0.04	-0.03	0.11	0.05	0.30	0.67	1.00
Unemployment	-0.13	-0.00	0.00	0.05	0.01	-0.05	-0.05	-0.08	-0.07	-0.06	-0.17	-0.54	-0.37

Table A5: F test results

Test	Tobin's Q Model	ROA Model
Chi-Squared	18.11	14.96
Degrees of Freedom 1	554	554
Degrees of Freedom 2	5222	5222
P-Value	$< 2.2e\text{-}16$	$< 2.2e\text{-}16$
Conclusion	Fixed effects over pooled	Fixed effects over pooled

Table A6: Breusch-Pagan test results

Test	Tobin's Q Model	ROA Model
Chi-Squared	6839.1	7909.2
Degrees of Freedom	1	1
P-Value	$< 2.2e\text{-}16$	$< 2.2e\text{-}16$
Conclusion	Random effects over pooled	Random effects over pooled

Table A7: Pooled OLS model comparison

Dependent Variables:	Q			ROA		
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
(Intercept)	1.941***	5.681***	6.442***	11.80***	29.08***	23.23***
	(0.1127)	(0.4427)	(0.5288)	(0.7240)	(2.481)	(2.831)
ESG_Score	0.0015	0.0145***	0.0141***	0.0054	0.0684***	0.0907***
	(0.0020)	(0.0024)	(0.0023)	(0.0124)	(0.0120)	(0.0131)
Log_Assets		-0.4745***	-0.5265***		-2.124***	-2.418***
		(0.0537)	(0.0503)		(0.2756)	(0.2720)
Leverage		0.0027	0.0019		-0.0186	-0.0025
		(0.0036)	(0.0035)		(0.0207)	(0.0203)
Revenue_3y			0.0193***			0.0517***
			(0.0032)			(0.0124)
EPS			0.0254***			0.4035***
			(0.0072)			(0.1152)
Interest			-0.2261***			0.6856***
			(0.0384)			(0.2055)
GDP			0.0414***			0.0727
			(0.0091)			(0.0487)
Inflation			-0.0249			0.0686
			(0.0198)			(0.1140)
Unemployment			-0.1001***			0.1813*
			(0.0131)			(0.0753)
Fit statistics						
Observations	5,786	5,786	5,786	5,786	5,786	5,786
Adjusted R^2	0.00022	0.09612	0.21051	-1.55×10^{-6}	0.06512	0.17657

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A8: Regression results Retail Trade

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0037				-0.0031			
	(0.0041)				(0.0220)			
E_Score		0.0033				0.0118		
		(0.0023)				(0.0177)		
S_Score			0.0028				0.0142	
			(0.0029)				(0.0201)	
G_Score				-0.0007				-0.0239·
				(0.0032)				(0.0127)
Log_Assets	-0.6372**	-0.6602**	-0.6246**	-0.5925**	-4.179**	-4.438**	-4.350***	-4.051**
	(0.1840)	(0.1945)	(0.1802)	(0.1760)	(1.205)	(1.300)	(1.196)	(1.172)
Leverage	0.0090	0.0092	0.0090	0.0091	-0.0377	-0.0376	-0.0384	-0.0376
	(0.0082)	(0.0082)	(0.0083)	(0.0084)	(0.0601)	(0.0597)	(0.0599)	(0.0604)
Revenue_3y	0.0263**	0.0268**	0.0261**	0.0259**	0.0253	0.0289	0.0262	0.0242
	(0.0091)	(0.0093)	(0.0091)	(0.0094)	(0.0260)	(0.0279)	(0.0269)	(0.0240)
EPS	0.0225*	0.0225*	0.0224*	0.0231*	0.1391	0.1365	0.1350	0.1391
	(0.0099)	(0.0099)	(0.0100)	(0.0098)	(0.0956)	(0.0960)	(0.0964)	(0.0958)
Interest	-0.1331*	-0.1261*	-0.1409*	-0.1568*	-0.6901·	-0.5749	-0.6097	-0.7872*
	(0.0606)	(0.0532)	(0.0616)	(0.0612)	(0.3863)	(0.3726)	(0.3883)	(0.3896)
GDP	0.0580**	0.0595**	0.0585**	0.0563**	-0.1205	-0.1071	-0.1072	-0.1155
	(0.0196)	(0.0193)	(0.0197)	(0.0186)	(0.1119)	(0.1149)	(0.1126)	(0.1095)
Inflation	-0.0935*	-0.0946*	-0.0935*	-0.0920*	-0.0800	-0.0905	-0.0889	-0.0805
	(0.0400)	(0.0397)	(0.0405)	(0.0399)	(0.1650)	(0.1664)	(0.1619)	(0.1634)
Unemployment	-0.0950***	-0.0979***	-0.0974***	-0.0994***	-0.3662*	-0.3636*	-0.3612*	-0.4156*
	(0.0266)	(0.0257)	(0.0259)	(0.0280)	(0.1531)	(0.1524)	(0.1523)	(0.1556)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	612	612	612	612	612	612	612	612
Adjusted R^2	0.72508	0.72585	0.72481	0.72409	0.66374	0.66444	0.66434	0.66651

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A9: Regression results Wholesale Trade

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	-0.0001				0.0186			
	(0.0077)				(0.0408)			
E_Score		0.0002				-0.0101		
		(0.0055)				(0.0242)		
S_Score			0.0036				0.0553	
			(0.0070)				(0.0391)	
G_Score				-0.0053				-0.0157
				(0.0039)				(0.0125)
Log_Assets	-0.3679	-0.3759	-0.4497	-0.2683	-3.059*	-2.411·	-3.901**	-2.365*
	(0.3646)	(0.3113)	(0.3552)	(0.3178)	(1.357)	(1.184)	(1.299)	(0.8549)
Leverage	-0.0084	-0.0085	-0.0082	-0.0089	-0.1223*	-0.1185*	-0.1187**	-0.1228*
	(0.0093)	(0.0094)	(0.0092)	(0.0100)	(0.0432)	(0.0483)	(0.0388)	(0.0480)
Revenue_3y	0.0027	0.0027	0.0034	0.0030	0.0327	0.0297	0.0417	0.0318
	(0.0048)	(0.0051)	(0.0051)	(0.0047)	(0.0214)	(0.0184)	(0.0239)	(0.0185)
EPS	0.0170	0.0171	0.0172	0.0160	0.2712	0.2680	0.2723·	0.2664
	(0.0259)	(0.0254)	(0.0241)	(0.0251)	(0.1603)	(0.1662)	(0.1406)	(0.1607)
Interest	-0.1462	-0.1446	-0.1396	-0.1621	-0.5701	-0.6829	-0.5346	-0.6793
	(0.0977)	(0.0866)	(0.0990)	(0.1033)	(0.4937)	(0.5364)	(0.4878)	(0.5378)
GDP	0.0540*	0.0544·	0.0566*	0.0631·	-0.0434	-0.0644	-0.0078	-0.0215
	(0.0235)	(0.0266)	(0.0219)	(0.0306)	(0.1101)	(0.1050)	(0.1054)	(0.1056)
Inflation	-0.0710	-0.0715	-0.0726	-0.0803	0.2144	0.2374	0.1933	0.1905
	(0.0549)	(0.0550)	(0.0558)	(0.0512)	(0.1543)	(0.1696)	(0.1714)	(0.1426)
Unemployment	-0.0031	-0.0030	-0.0028	0.0039	-0.0841	-0.0892	-0.0766	-0.0611
	(0.0479)	(0.0501)	(0.0480)	(0.0533)	(0.1226)	(0.1323)	(0.1083)	(0.1348)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	160	160	160	160	160	160	160	160
Adjusted R^2	0.85117	0.85117	0.85176	0.85330	0.92549	0.92537	0.93020	0.92578

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A10: Regression results Professional, Scientific and Technical Services

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0080				0.0646·			
	(0.0065)				(0.0350)			
E_Score		0.0022				0.0255		
		(0.0038)				(0.0206)		
S_Score			0.0041				0.0517·	
			(0.0040)				(0.0257)	
G_Score				0.0061				0.0256
				(0.0042)				(0.0219)
Log_Assets	-0.7057·	-0.6541·	-0.6601·	-0.6627·	-3.805*	-3.527*	-3.663*	-3.251*
	(0.4056)	(0.3871)	(0.3902)	(0.3859)	(1.785)	(1.666)	(1.674)	(1.604)
Leverage	0.0645*	0.0662*	0.0657*	0.0652*	0.1279	0.1397	0.1323	0.1400
	(0.0263)	(0.0261)	(0.0256)	(0.0255)	(0.1127)	(0.1202)	(0.1149)	(0.1118)
Revenue_3y	0.0382***	0.0382***	0.0380***	0.0377***	0.0525*	0.0535*	0.0516*	0.0485*
	(0.0050)	(0.0052)	(0.0052)	(0.0050)	(0.0242)	(0.0246)	(0.0248)	(0.0236)
EPS	0.0535	0.0587	0.0572	0.0544	0.5082*	0.5456*	0.5243*	0.5387**
	(0.0645)	(0.0643)	(0.0630)	(0.0639)	(0.1948)	(0.2106)	(0.2020)	(0.1958)
Interest	-0.0107	-0.0222	-0.0208	-0.0258	0.0236	-0.0298	0.0043	-0.1339
	(0.0758)	(0.0715)	(0.0823)	(0.0768)	(0.3497)	(0.3478)	(0.3323)	(0.3489)
GDP	0.1331**	0.1330**	0.1349**	0.1298**	0.1003	0.1005	0.1253	0.0856
	(0.0420)	(0.0426)	(0.0430)	(0.0410)	(0.1173)	(0.1231)	(0.1286)	(0.1147)
Inflation	-0.0587	-0.0572	-0.0600	-0.0548	0.0578	0.0667	0.0292	0.0840
	(0.0790)	(0.0771)	(0.0778)	(0.0778)	(0.2312)	(0.2252)	(0.2296)	(0.2285)
Unemployment	0.1242·	0.1241·	0.1266*	0.1240·	0.1824	0.1711	0.1979	0.1948
	(0.0621)	(0.0636)	(0.0618)	(0.0630)	(0.2021)	(0.2103)	(0.1993)	(0.2081)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	350	350	350	350	350	350	350	350
Adjusted R^2	0.75781	0.75701	0.75721	0.75807	0.74706	0.74273	0.74665	0.74270

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A11: Regression results Mining, Quarrying, and Gas Extraction

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0051*				0.1094**			
	(0.0024)				(0.0336)			
E_Score		0.0060**				0.0617·		
		(0.0019)				(0.0358)		
S_Score			0.0050**				0.0883**	
			(0.0018)				(0.0264)	
G_Score				-0.0021				0.0362
				(0.0017)				(0.0250)
Log_Assets	-0.3830***	-0.4365***	-0.3729***	-0.3039**	-6.292**	-6.100*	-5.860**	-5.082*
	(0.0942)	(0.0970)	(0.0997)	(0.0861)	(2.156)	(2.255)	(2.117)	(1.885)
Leverage	-0.0043	-0.0039	-0.0044	-0.0028	-0.2674***	-0.2534***	-0.2658***	-0.2563***
	(0.0035)	(0.0036)	(0.0037)	(0.0038)	(0.0602)	(0.0578)	(0.0593)	(0.0655)
Revenue_3y	0.0008	0.0009	0.0008	0.0002	0.0207	0.0171	0.0183	0.0149
	(0.0009)	(0.0009)	(0.0009)	(0.0010)	(0.0166)	(0.0161)	(0.0169)	(0.0171)
EPS	0.0007	0.0011	0.0009	0.0000	1.710***	1.707***	1.712***	1.695***
	(0.0039)	(0.0039)	(0.0040)	(0.0036)	(0.2101)	(0.2158)	(0.2142)	(0.2131)
Interest	0.0916**	0.1021***	0.0898**	0.0689*	-0.2209	-0.3166	-0.3212	-0.5370
	(0.0275)	(0.0272)	(0.0287)	(0.0301)	(0.4225)	(0.4668)	(0.4555)	(0.4556)
GDP	0.0229·	0.0217	0.0244·	0.0169	-0.5923*	-0.6518*	-0.5823*	-0.6526*
	(0.0131)	(0.0132)	(0.0126)	(0.0131)	(0.2529)	(0.2470)	(0.2634)	(0.2551)
Inflation	-0.0232	-0.0202	-0.0261	-0.0137	1.333*	1.440**	1.309*	1.432**
	(0.0201)	(0.0202)	(0.0197)	(0.0212)	(0.5307)	(0.5065)	(0.5436)	(0.5208)
Unemployment	-0.0021	-0.0020	-0.0049	-0.0116	0.0784	0.0228	0.0112	0.0457
	(0.0159)	(0.0151)	(0.0160)	(0.0169)	(0.2751)	(0.2822)	(0.2801)	(0.2865)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	352	352	352	352	352	352	352	352
Adjusted R^2	0.49834	0.50616	0.50133	0.49465	0.78072	0.77847	0.78061	0.77758

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A12: Transportation and Warehousing

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	-0.0051				0.0825**			
	(0.0036)				(0.0265)			
E_Score		0.0012				0.0708**		
		(0.0035)				(0.0226)		
S_Score			-0.0058·				0.0629*	
			(0.0030)				(0.0220)	
G_Score				-0.0034·				0.0199
				(0.0017)				(0.0122)
Log_Assets	-0.0321	-0.1946	-0.0665	-0.1048	-4.951*	-6.124**	-3.975·	-3.361·
	(0.2521)	(0.3027)	(0.2147)	(0.2163)	(2.120)	(1.920)	(1.985)	(1.717)
Leverage	0.0075	0.0090	0.0077	0.0091	-0.1241*	-0.0963	-0.1309*	-0.1425*
	(0.0073)	(0.0080)	(0.0071)	(0.0068)	(0.0580)	(0.0578)	(0.0565)	(0.0574)
Revenue_3y	-0.0036	-0.0018	-0.0048	-0.0025	0.1268**	0.1204**	0.1309**	0.1046*
	(0.0057)	(0.0058)	(0.0052)	(0.0057)	(0.0331)	(0.0355)	(0.0343)	(0.0367)
EPS	0.0262*	0.0202·	0.0263*	0.0244*	0.5867***	0.5878***	0.6113***	0.6463***
	(0.0112)	(0.0112)	(0.0106)	(0.0106)	(0.1081)	(0.1099)	(0.1133)	(0.1179)
Interest	-0.0661	-0.0231	-0.0697	-0.0457	-0.3748	-0.3100	-0.5122	-0.8346*
	(0.0522)	(0.0615)	(0.0473)	(0.0518)	(0.3778)	(0.3933)	(0.3794)	(0.3469)
GDP	0.0231	0.0299	0.0246	0.0262	-0.0527	-0.0017	-0.0934	-0.1187
	(0.0266)	(0.0290)	(0.0256)	(0.0258)	(0.0936)	(0.1010)	(0.0998)	(0.0829)
Inflation	-0.0326	-0.0378	-0.0299	-0.0371	0.0932	0.0699	0.0842	0.1590
	(0.0276)	(0.0265)	(0.0267)	(0.0291)	(0.3189)	(0.3026)	(0.3231)	(0.3277)
Unemployment	-0.0217	-0.0237	-0.0174	-0.0244	-0.4124*	-0.3881·	-0.4485*	-0.3761*
	(0.0287)	(0.0288)	(0.0292)	(0.0290)	(0.1796)	(0.1837)	(0.1821)	(0.1772)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	218	218	218	218	218	218	218	218
Adjusted R^2	0.79775	0.79501	0.79992	0.79805	0.81596	0.81773	0.81276	0.80364

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A13: Regression results Administrative and Support, Waste Management and Remediation Services

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	-0.0057				0.0241			
	(0.0061)				(0.0488)			
E_Score		-0.0046				0.0015		
		(0.0043)				(0.0287)		
S_Score			-0.0063				0.0299	
			(0.0070)				(0.0463)	
G_Score				-0.0005				0.0183
				(0.0035)				(0.0308)
Log_Assets	-0.6082***	-0.5873***	-0.5921***	-0.6268***	-7.681*	-7.626**	-7.767*	-7.514*
	(0.1265)	(0.1288)	(0.1322)	(0.1319)	(2.543)	(2.487)	(2.625)	(2.465)
Leverage	0.0158***	0.0165***	0.0153***	0.0157***	0.0633	0.0637	0.0656	0.0637
	(0.0021)	(0.0017)	(0.0024)	(0.0020)	(0.0546)	(0.0546)	(0.0558)	(0.0554)
Revenue_3y	0.0026	0.0028	0.0023	0.0037	0.0483	0.0434	0.0503	0.0463
	(0.0059)	(0.0059)	(0.0059)	(0.0063)	(0.0523)	(0.0521)	(0.0528)	(0.0486)
EPS	0.0391	0.0425	0.0391	0.0443	0.8939***	0.8696***	0.8973***	0.8981***
	(0.0387)	(0.0358)	(0.0369)	(0.0363)	(0.1533)	(0.1340)	(0.1472)	(0.1636)
Interest	-0.2890**	-0.2934**	-0.3002*	-0.2622**	-1.233	-1.338.	-1.166	-1.333*
	(0.0893)	(0.0927)	(0.0988)	(0.0744)	(0.7144)	(0.6860)	(0.7652)	(0.5929)
GDP	0.0740	0.0751	0.0706	0.0779	0.4729	0.4572	0.4912.	0.4569
	(0.0592)	(0.0598)	(0.0579)	(0.0619)	(0.2709)	(0.2774)	(0.2651)	(0.2870)
Inflation	-0.1383	-0.1430	-0.1298	-0.1482	-0.9247*	-0.8831*	-0.9702*	-0.8919*
	(0.1010)	(0.1036)	(0.0998)	(0.1057)	(0.3475)	(0.3621)	(0.3367)	(0.3767)
Unemployment	-0.0605	-0.0574	-0.0628	-0.0594	-0.1514	-0.1574	-0.1400	-0.1515
	(0.0584)	(0.0549)	(0.0610)	(0.0610)	(0.2644)	(0.2614)	(0.2654)	(0.2561)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	137	137	137	137	137	137	137	137
Adjusted R^2	0.79958	0.80028	0.80053	0.79697	0.74279	0.74148	0.74373	0.74269

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A14: Regression results Accommodation and Food Services

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	-0.0057				0.0241			
	(0.0061)				(0.0488)			
E_Score		-0.0046				0.0015		
		(0.0043)				(0.0287)		
S_Score			-0.0063				0.0299	
			(0.0070)				(0.0463)	
G_Score				-0.0005				0.0183
				(0.0035)				(0.0308)
Log_Assets	-0.6082***	-0.5873***	-0.5921***	-0.6268***	-7.681*	-7.626**	-7.767*	-7.514*
	(0.1265)	(0.1288)	(0.1322)	(0.1319)	(2.543)	(2.487)	(2.625)	(2.465)
Leverage	0.0158***	0.0165***	0.0153***	0.0157***	0.0633	0.0637	0.0656	0.0637
	(0.0021)	(0.0017)	(0.0024)	(0.0020)	(0.0546)	(0.0546)	(0.0558)	(0.0554)
Revenue_3y	0.0026	0.0028	0.0023	0.0037	0.0483	0.0434	0.0503	0.0463
	(0.0059)	(0.0059)	(0.0059)	(0.0063)	(0.0523)	(0.0521)	(0.0528)	(0.0486)
EPS	0.0391	0.0425	0.0391	0.0443	0.8939***	0.8696***	0.8973***	0.8981***
	(0.0387)	(0.0358)	(0.0369)	(0.0363)	(0.1533)	(0.1340)	(0.1472)	(0.1636)
Interest	-0.2890**	-0.2934**	-0.3002*	-0.2622**	-1.233	-1.338.	-1.166	-1.333*
	(0.0893)	(0.0927)	(0.0988)	(0.0744)	(0.7144)	(0.6860)	(0.7652)	(0.5929)
GDP	0.0740	0.0751	0.0706	0.0779	0.4729	0.4572	0.4912.	0.4569
	(0.0592)	(0.0598)	(0.0579)	(0.0619)	(0.2709)	(0.2774)	(0.2651)	(0.2870)
Inflation	-0.1383	-0.1430	-0.1298	-0.1482	-0.9247*	-0.8831*	-0.9702*	-0.8919*
	(0.1010)	(0.1036)	(0.0998)	(0.1057)	(0.3475)	(0.3621)	(0.3367)	(0.3767)
Unemployment	-0.0605	-0.0574	-0.0628	-0.0594	-0.1514	-0.1574	-0.1400	-0.1515
	(0.0584)	(0.0549)	(0.0610)	(0.0610)	(0.2644)	(0.2614)	(0.2654)	(0.2561)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	137	137	137	137	137	137	137	137
Adjusted R^2	0.79958	0.80028	0.80053	0.79697	0.74279	0.74148	0.74373	0.74269

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A15: Regression results Finance and Insurance

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	0.0024				0.0417			
	(0.0099)				(0.0289)			
E_Score		-0.0068				0.0191		
		(0.0083)				(0.0180)		
S_Score			0.0081				0.0379	
			(0.0058)				(0.0236)	
G_Score				-0.0028				-0.0006
				(0.0045)				(0.0164)
Log_Assets	-0.1458	0.0208	-0.2354	-0.0958	-3.221***	-3.089***	-3.261***	-2.701***
	(0.2026)	(0.1715)	(0.2197)	(0.2221)	(0.4028)	(0.3686)	(0.3741)	(0.2770)
Leverage	-0.0020	-0.0011	-0.0008	-0.0007	-0.0773·	-0.0721	-0.0666	-0.0704·
	(0.0156)	(0.0136)	(0.0174)	(0.0155)	(0.0433)	(0.0431)	(0.0420)	(0.0376)
Revenue_3y	0.0014	0.0013	0.0016	0.0014	0.0303***	0.0300***	0.0309***	0.0297***
	(0.0040)	(0.0040)	(0.0041)	(0.0040)	(0.0063)	(0.0058)	(0.0068)	(0.0061)
EPS	0.0075	0.0027	-0.0009	0.0097	0.5333**	0.5771**	0.5136**	0.5597**
	(0.0415)	(0.0469)	(0.0400)	(0.0434)	(0.1582)	(0.1578)	(0.1681)	(0.1700)
Interest	-0.0841	-0.1142	-0.0613	-0.1014	-0.4792	-0.5741	-0.4862	-0.6355·
	(0.0905)	(0.0923)	(0.0785)	(0.0796)	(0.3794)	(0.3419)	(0.3408)	(0.3301)
GDP	0.0525	0.0582	0.0543·	0.0518	0.2967·	0.2763·	0.3022·	0.2927·
	(0.0303)	(0.0388)	(0.0278)	(0.0306)	(0.1461)	(0.1414)	(0.1403)	(0.1418)
Inflation	0.0191	0.0200	0.0179	0.0284	-0.0549	0.0038	-0.0218	-0.0008
	(0.0725)	(0.0671)	(0.0653)	(0.0689)	(0.1967)	(0.1811)	(0.1718)	(0.1879)
Unemployment	-0.0266	-0.0115	-0.0136	-0.0198	-0.1116	-0.1314	-0.0372	-0.0913
	(0.0499)	(0.0494)	(0.0523)	(0.0500)	(0.1837)	(0.1717)	(0.1735)	(0.1695)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	104	104	104	104	104	104	104	104
Adjusted R^2	0.62288	0.63033	0.62813	0.62374	0.90177	0.90041	0.90194	0.89890

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*

Table A16: Regression results Health Care and Social Assistance

Dependent Variables:	Q				ROA			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
ESG_Score	-0.0021				0.0059			
	(0.0021)				(0.0319)			
E_Score		0.0041·				0.0282		
		(0.0020)				(0.0200)		
S_Score			-0.0045·				0.0095	
			(0.0024)				(0.0197)	
G_Score				-0.0023				-0.0160
				(0.0014)				(0.0193)
Log_Assets	-0.4980**	-0.6654***	-0.4805**	-0.5078**	-6.482**	-7.328***	-6.501***	-6.248**
	(0.1314)	(0.0932)	(0.1092)	(0.1208)	(1.297)	(1.067)	(1.197)	(1.188)
Leverage	-0.0026	-0.0050	-0.0007	-0.0028	-0.0129	-0.0182	-0.0164	-0.0027
	(0.0055)	(0.0036)	(0.0054)	(0.0052)	(0.0369)	(0.0379)	(0.0384)	(0.0370)
Revenue_3y	0.0080·	0.0092*	0.0087*	0.0076·	0.1055	0.1124·	0.1038	0.1012
	(0.0035)	(0.0030)	(0.0031)	(0.0034)	(0.0645)	(0.0587)	(0.0650)	(0.0645)
EPS	0.0201**	0.0158·	0.0264***	0.0170*	0.3421**	0.3251**	0.3293**	0.3327**
	(0.0057)	(0.0074)	(0.0046)	(0.0068)	(0.0829)	(0.0809)	(0.0867)	(0.0763)
Interest	0.0022	0.0345	-0.0056	0.0057	-0.1655	-0.0095	-0.1527	-0.2064
	(0.0228)	(0.0224)	(0.0259)	(0.0190)	(0.2988)	(0.2694)	(0.3299)	(0.3766)
GDP	0.0200	0.0138	0.0136	0.0226	0.1340	0.0950	0.1477	0.1561
	(0.0117)	(0.0092)	(0.0093)	(0.0141)	(0.1332)	(0.1218)	(0.1439)	(0.1171)
Inflation	-0.0299*	-0.0415·	-0.0251·	-0.0329*	-0.2037	-0.2640	-0.2127	-0.2063
	(0.0121)	(0.0203)	(0.0120)	(0.0131)	(0.2925)	(0.3035)	(0.2908)	(0.2707)
Unemployment	-0.0208	-0.0336**	-0.0203	-0.0184	0.2187	0.1711	0.2201	0.2769
	(0.0158)	(0.0078)	(0.0149)	(0.0182)	(0.2242)	(0.2123)	(0.2024)	(0.2006)
Fixed-effects								
Cusip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics								
Observations	88	88	88	88	88	88	88	88
Adjusted R^2	0.80693	0.82733	0.81598	0.81031	0.82859	0.83717	0.82888	0.83078

Clustered (Cusip) standard-errors in parentheses
*Signif. Codes: ***: 0.001, **: 0.01, *: 0.05, .: 0.1*