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Article

A new dimension of transparency: ESG disclosure and its effect on shareholder behavior

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Online-Appendix

„A New Dimension of Transparency: ESG Disclosure and Its Effect on Shareholder Behavior“

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Appendix

Appendix 1: Literature Overview

#	*Reference/Study*	*Data*	*Methodology / Main variables*	*Main finding*	*Limitation*
1	(Dhaliwal et al., 2011)	US firms between 1993 and 2007	Regression: CSR disclosure initiation → Change in institutional ownership	Voluntary CSR disclosure attracts dedicated institutional investors	Dummy variable for disclosure initiation, no consideration of disclosure levels, early study 2007
2	(Hoq et al., 2010)	Malaysian firms between 2000 and 2005	Regression: CSRD → % institutional ownership	CSRD reporting is found to be positively related to institutional ownership	Measure of CSRD is based on content analysis; Data sample
3	(Healy et al., 1999)	Selection of companies rated by the AIMR reports between 1978 and 1991	Regression: Disclosure increase → Change in institutional ownership	The disclosure rating increases are accompanied by increases […] in institutional ownership	Dummy variable for disclosure increase, no consideration of disclosure levels, general disclosure and not CSRD
4	(Moss et al., 2024)	2018-2019 RobinHood trading data matched with CSR press releases from CSRWire, 86 firms	Regression: ESG press releases → Number of Robinhood investors	Our tests do not detect a retail investor response to ESG press releases	Only ESG press releases and not general disclosure
5	(Serafeim, 2015)	Mainly US companies between 2002 and 2010;	Regression: Integrated Reporting → Change in long-term investors	- Companies that produce integrated reports show a clear tendency to have more long-term, “dedicated” holders and fewer transient	Integrated Reporting as explanatory variable is broader than ESG Disclosure;

#	*Reference/Study*	*Data*	*Methodology / Main variables*	*Main finding*	*Limitation*
		649 companies and 4,684 observations		investors. - Long-term investors are more likely to buy and hold shares in companies that provide more information	Definition of "long-term investors" as difference between % of dedicated and % of transient investors
6	(Lang & Lundholm, 1996)	Data from FAF reports between 1985 and 1989, 751 companies and 2,272 observations	Regression: Disclosure → Analyst following	Our conclusions suggest that firms can attract analysts […] by adopting more forthcoming disclosure practices	General Disclosure, not ESG-specific, old sample
7	(Bushee & Noe, 2000)	Data from AIMR between 1982 and 1996, 4,314 firm-year observations	Regression: AIMR Disclosure Score rank → % ownership of transient, dedicated and quasi-indexer institutional investors	- Institutional investors are attracted to firms with more forthcoming disclosure - Transient institutions […] invest more heavily in firms with higher disclosure rankings - Quasi-indexer institutions, which hold large, diversified portfolios and trade very infrequently, also invest more heavily in firms with higher disclosure ranking - Dedicated institutions […] show no sensitivity to disclosure rating levels or changes	General Disclosure, not ESG-specific, old sample

#	*Reference/Study*	*Data*	*Methodology / Main variables*	*Main finding*	*Limitation*
8	(Kalay, 2015)	Selection of US companies between 1996 and 2007, 7860 observations	Regression: Disclosure (Earnings guidance, press dissemination or investor relations) → investor sophistication	- Concentration of sophisticated investors is higher in firms that regularly issue earnings guidance - Less sophisticated investors concentrate their trading in firms with increased levels of news dissemination and superior IR - Changes in the firm's disclosure policy also relate to changes in the sophistication of the investor base	General Disclosure, not ESG-specific
9	(Eccles et al., 2014)	90 high-sustainability companies vs. 90 low-sustainability companies until 2003	Mean difference analysis: Comparison of investor differences (long-term (% dedicated) minus short-term (% transient)) between high- and low sustainability companies (number of ESG policies)	High sustainability companies are significantly more likely to attract dedicated rather than transient investors	Number of ESG policies considers more the actual ESG performance and less ESG disclosure
10	(Diamond & Verrecchia, 1991)	-	-	This paper argues that revealing public information to reduce information asymmetry can reduce a firm's cost of capital by attracting increased demand from large investors	Literature Review/Theoretical Models without empirical proof General Disclosure, not ESG-specific

#	*Reference/Study*	*Data*	*Methodology / Main variables*	*Main finding*	*Limitation*
11	(Ramdhony et al., 2024)	Listed companies in Mauritius between 2009 and 2018	PVAR analysis, ESGD + Government Ownership + Director Ownership + Ownership Concentration + Controls → $ESGD_{t+2}$ + Government $Ownership_{t+2}$ + Director $Ownership_{t+2}$ + Ownership $Concentration_{t+2}$ + $Controls_{t+2}$	ESGD responds negative to government ownership and ownership concentration and positive to earlier ESGD Simultaneously they suggest a significant negative effect of ESGD on future levels of government ownership and director ownership	Sample Multivariate regression type results in limited interpretability because of correlation of dependent variables No consideration of institutional ownership

Appendix 2: Variable Description

Variable	*Description*	*Source (example)*
	Main independent variables	
ESGD	ESG Disclosure Score, ranging from 0 to 100, indicating the extent of a company's ESG data reporting. Two scoring variants are used. 1) Refinitiv Score: Based on a percentile rank that compares company ESG disclosure relative to sector peers and country norms, covering topics like CSR and sustainability reporting practices. 2) Bloomberg Score: Evaluates disclosure scope across standardized ESG topics, with equal weight for Environmental, Social, and Governance pillars. The score measures disclosure breadth, not performance, and applies consistently across sectors and regions.	(Ramdhony et al., 2024)
ESG	ESG Performance Score, assessing a company's overall Environmental, Social, and Governance (ESG) practices. Two scoring variants are used: 1) Refinitiv Score: Based on a percentile rank. Score value between 0 and 100. Calculated out of 186 metrics across environmental, social, and governance dimensions, reflecting overall performance as reported by the company. 2) Bloomberg Score: Ranges from 0 to 10, where 10 indicates the highest ESG performance. This score uses a weighted power mean of pillar scores, with weights determined by Bloomberg's assessment of financial materiality for each ESG component.	(Serafeim, 2015)
*ESGD*ESG*	Interaction term between the ESG disclosure score and ESG performance score. Included to explore whether the combined effect of ESGD and ESG has an amplified impact on ownership variables. Examining their interaction helps to reveal any potential synergies between these factors that might further influence investor interest.	(Dhaliwal et al., 2011)
ESGD x ESG	Short version for visualization purposes, represents both variables and their interaction term: ESGD + ESG + ESGD*ESG	
	Dependent variables	
PctOwnInst	Total percentage of shares held by institutional investors, as defined by Orbis data. Includes ownership links classified as "SHH" and "active", values extracted from the column "Total % (only figures)". Institutional investors include insurance companies, banks, mutual & pension funds, financial companies, private equity firms, venture capital, and hedge funds.	(Ramdhony et al., 2024)

Variable	*Description*	*Source (example)*
PctOwnCorp	Total percentage of shares held by corporate investors, analogue to *PctOwnInst*. Mapped categories include corporations, self-ownership, aggregated unnamed shareholders, and public entities.	
PctOwnGov	Total percentage of shares held by government entities, analogue to *PctOwnInst*. Mapped categories include Foundation/Research Institute and Public Authorities, States, and Governments.	(Ramdhony et al., 2024)
PctOwnInd	Total percentage of shares held by individual investors, analogue to *PctOwnInst*. Mapped categories include Unnamed Private Shareholders (aggregated), One or More Known Individuals or Families, and Employees/Managers/Directors.	
PctOwn	Fictive variable for illustrative purposes, placeholder in the multivariate regression model for the combination of *PctOwnInst*, *PctOwnCorp*, *PctOwnGov* and *PctOwnInd*	
TotOwn	The sum of shares held by institutional investors, corporate investors, government entities, and individual investors (*PctOwnInst + PctOwnCorp + PctOwnGov + PctOwnInd)*	
OwnConc	Ownership concentration represents the sum of five largest shareholdings, regardless the ownership type. Selection from those links that are classified as "SHH" and "active", values extracted from the column "Total % (only figures)".	(Ramdhony et al., 2024)
Control variables		
Log(TotAsts)	*TotAsts* represents the total assets reported by a company. If not reported, it is calculated as the sum of Total Current Assets and Total Non-Current Assets. A logarithmic transformation is applied to address heteroskedasticity due to the right-skewed distribution of firm sizes, as larger firms often experience diminishing returns to size. Control variable for the company's size, extracted from Refinitiv.	(Ramdhony et al., 2024) (Hoq et al., 2010)
Beta	5 Year Adjusted Monthly Beta represents a company's common stock price volatility relative to market price volatility over a 5-year period, calculated using a least squares linear regression line. It requires a minimum of 40 monthly price close change values within the 5-year trading period. Control variable for the company's risk, extracted from Refinitiv.	(Dhaliwal et al., 2011) (Hoq et al., 2010)
Lev	Represents the ratio of Total Debt to Total Capital. Control variable for the company's risk, extracted from Refinitiv.	(Dhaliwal et al., 2011) (Hoq et al., 2010) (Serafeim, 2015)
EPS	Earnings Per Share represents the company's actual value normalized to reflect the I/B/E/S default currency and adjusted for corporate	(Dhaliwal et al., 2011) (Hoq et al.,

Variable	*Description*	*Source (example)*
	actions (e.g., stock splits). Defined as the value that the contributing analyst uses to assess a security, and this figure may include or exclude certain items based on the analyst's specific model. Control variable for the company's profitability, extracted from Refinitiv.	2010) (Serafeim, 2015)
Grwth	3 Year Compounded Annual Growth Rate of a company's total revenue over the past three years. It is calculated using the formula. Control variable for the company's growth, extracted from Refinitiv.	(Dhaliwal et al., 2011) (Serafeim, 2015)
TrdVol	Represents the average trading value of a company's shares measured over the most recent completed 52 calendar weeks. Control variable for the company's stock liquidity, extracted from Refinitiv.	(Dhaliwal et al., 2011) (Serafeim, 2015)
ROA	Measures the return on assets before taxes, calculated as Income Before Taxes divided by Total Assets. Control variable for the company's performance, extracted from Refinitiv.	(Ramdhony et al., 2024)
MTB	Price to Book Value on a share level, measures a company's stock price relative to its book value per share, calculated as the closing price divided by book value per share. Control variable for the company's performance, extracted from Refinitiv.	(Dhaliwal et al., 2011) (Serafeim, 2015)
Board	The total number of board members at the end of the fiscal year. Control variable for the company's corporate governance system, extracted from Refinitiv.	(Ramdhony et al., 2024)
Fixed effects		
Year	Year of the respective observation. Controls for time-fixed effects that may affect all entities in a dataset, allowing for a clearer analysis of individual or group-level changes over time.	(Dhaliwal et al., 2011) (Serafeim, 2015)
Industry	Refers to the Refinitiv Business Classification (TRBC) Industry Group Description, which classifies companies based on their primary business activities. Controls for industry-fixed effects that may affect all entities in a dataset, allowing for a clearer analysis of individual or group-level changes over time.	(Dhaliwal et al., 2011) (Serafeim, 2015)
Country	Refers to the country of headquarters. Controls for country-fixed effects that may affect all entities in a dataset, allowing for a clearer analysis of individual or group-level changes over time.	(Serafeim, 2015)
Firm	Refers to the respective company, separated by their ISIN. Controls for firm-fixed effects that may affect all entities in a dataset, allowing for a clearer analysis of individual or group-level changes over time.	(Hoq et al., 2010) (Serafeim, 2015)
Fixed effects I	Set of fixed-effect control variables that includes *Year, Industry* and *Country*	
Fixed effects II	Set of fixed-effect control variables that includes *Year* and *Firm*	

Appendix 3: Summary Statistics for the Entire Data Sample

	N	*Mean*	*Median*	*SD*	*Min*	*Max*
Refinitiv ESGD	5,252	58.34	57.76	15.86	0	90.80
Refinitiv ESG	5,252	65.84	69.16	17.04	3.91	95.74
Bloomberg ESGD	5,310	51.61	52.71	13.09	6.19	84.55
Bloomberg ESG	5,136	3.56	3.70	1.58	0	8.05
TotAsts	5,556	123,117	13,846	414,451	22	7,967,699
Beta	5,262	0.95	0.92	0.44	-0.45	3.31
Lev	5,484	41.79	39.78	26.49	0	419.62
EPS	5,334	5.23	2.20	66.03	-3,980.64	1,595
Grwth	5,380	8.20	5.05	24.14	-80.83	800.18
TrdVol	5,551	763	62	2,512	0	30,172
ROA	5,506	7.53	5.93	12.40	-60.66	292.58
MTB	5,340	5.25	2.36	21.55	0.03	801.50
Board	5,074	11.02	11	3.73	1	34
PctOwnInst	5,527	32.19	27.86	21.39	0	253.59
PctOwnCorp	5,527	13.77	9.05	17.29	0	200
PctOwnGov	5,527	4.19	2.65	7.48	0	126.04
PctOwnInd	5,527	3.25	0	13.77	0	371.32
TotOwn	5,635	52.37	49.51	30.73	0	417.73
OwnConc	5,401	26.52	21.97	20.10	0	200

Appendix 4: Multivariate Analysis with Bloomberg Measures

	DF	*Pillai*	*approx F*	*num Df*	*den Df*	*Pr(>F)*	
Bloomberg ESGD	1	0.003	3.258	4	4325	0.011	*
Bloomberg ESG	1	0.016	17.048	4	4325	0.000	***
*Bloomberg ESGD*ESG*	1	0.001	0.543	4	4325	0.704	
Log(TotAsts)	1	0.053	60.191	4	4325	0.000	***
Beta	1	0.009	9.408	4	4325	0.000	***
Lev	1	0.013	14.761	4	4325	0.000	***
EPS	1	0.010	10.596	4	4325	0.000	***
Grwth	1	0.006	6.158	4	4325	0.000	***
Log(TRVOL)	1	0.381	664.815	4	4325	0.000	***
ROA	1	0.007	7.956	4	4325	0.000	***
MTB	1	0.002	1.862	4	4325	0.114	
Fixed effect: year	6	0.032	5.800	24	17312	0.000	***
Fixed effect: industry	52	0.292	6.548	208	17312	0.000	***
Fixed effect: country	24	0.434	21.963	96	17312	0.000	***

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 5: Multivariate Analysis with Refinitiv Measures and Firm-Fixed Effects

	DF	*Pillai*	*approx F*	*num Df*	*den Df*	*Pr(>F)*	
Refinitiv ESGD	1	0.159	187.084	4	3945	0.000	***
Refinitiv ESG	1	0.075	80.129	4	3945	0.000	***
*Refinitiv ESGD*ESG*	1	0.001	0.789	4	3945	0.532	
Log(TotAsts)	1	0.179	215.468	4	3945	0.000	***
Beta	1	0.013	12.836	4	3945	0.000	***
Lev	1	0.036	36.350	4	3945	0.000	***
EPS	1	0.022	22.358	4	3945	0.000	***
Grwth	1	0.006	6.152	4	3945	0.000	***
Log(TRVOL)	1	0.650	1832.219	4	3945	0.000	***
ROA	1	0.021	21.599	4	3945	0.000	***
MTB	1	0.004	4.399	4	3945	0.002	**
Fixed effect: year	6	0.100	16.802	24	15792	0.000	***
Fixed effect: firm	767	2.804	12.074	3068	15792	0.000	***

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 6: Multivariate Analysis with Bloomberg Measures and Firm-Fixed Effects

	DF	*Pillai*	*approx F*	*num Df*	*den Df*	*Pr(>F)*	
Bloomberg ESGD	1	0.010	9.055	4	3638	0.000	***
Bloomberg ESG	1	0.057	54.912	4	3638	0.000	***
*Bloomberg ESGD*ESG*	1	0.000	0.253	4	3638	0.908	
Log(TotAsts)	1	0.182	201.876	4	3638	0.000	***
Beta	1	0.027	25.090	4	3638	0.000	***
Lev	1	0.078	76.701	4	3638	0.000	***
EPS	1	0.029	27.401	4	3638	0.000	***
Grwth	1	0.018	16.374	4	3638	0.000	***
Log(TRVOL)	1	0.677	1910.181	4	3638	0.000	***
ROA	1	0.023	21.511	4	3638	0.000	***
MTB	1	0.007	6.032	4	3638	0.000	***
Fixed effect: year	6	0.101	15.695	24	14564	0.000	***
Fixed effect: firm	763	3.073	15.810	3052	14564	0.000	***

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 7: Univariate Analysis with Bloomberg Measures

	(I)	*(II)*	*(III)*	*(IV)*	*(V)*	*(VI)*	*(VII)*
Bloomberg ESGD	0.018	0.011	0.085**	-0.00003	-0.015	0.120**	0.060
Bloomberg ESG		0.436**	1.580***	0.569***	0.337	-0.047	-1.043
*Bloomberg ESGD*ESG*			-0.022**		0.004	-0.009	0.003
Log(TotAsts)				-3.005***	-3.005***		0.213
Beta				-0.487	-0.489		-0.050
Lev				0.055***	0.056***		0.002
EPS				-0.001	-0.001		0.002
Grwth				-0.040***	-0.040***		-0.002
Log(TRVOL)				1.295***	1.294***		
ROA				-0.029	-0.028		0.039
MTB				-0.013	-0.013		-0.003
Fixed Effects	Y, I, C	Y, I, C	Y, I, C	Y, I, C	Y, I, C	Y, F	Y, F
Constant	26.649***	25.390***	21.503***	72.528***	73.326***		
Observations	*5,245*	*4,890*	*4,890*	*4,422*	*4,422*	*4,890*	*4,455*
R^2	*0.440*	*0.473*	*0.473*	*0.541*	*0.541*	*0.825*	*0.860*
Adjusted R^2	*0.431*	*0.463*	*0.464*	*0.531*	*0.531*	*0.791*	*0.831*
Residual Std. Error	*16.059*	*15.385*	*15.380*	*14.015*	*14.016*	*9.611*	*8.425*
F Statistic	*48.268****	*50.679****	*50.173****	*55.462****	*54.858****		
df	*5160*	*4804*	*4803*	*4329*	*4328*	*4084*	*3667*

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 8: Further Analyses – Overview

Model description	*Source (example)*	*Appendix*	*Model equation*	*Result*
Time shift of *PctOwnInst*	(Kalay, 2015), (Dhaliwal et al., 2011), (Serafeim, 2015)	Appendix 9	$PctOwnInst_{t+1} = ESGD_t$ x $ESG_t + Controls_t + Fixed\ Effects\ I_t$	*ESGD:* 0.060, *ESGD*ESG:* -0.001
			$PctOwnInst_{t+2} = ESGD_t$ x $ESG_t + Controls_t + Fixed\ Effects\ I_t$	*ESGD:* 0.067, *ESGD*ESG:* -0.002
			$PctOwnInst_{t+3} = ESGD_t$ x $ESG_t + Controls_t + Fixed\ Effects\ I_t$	*ESGD:* 0.064, *ESGD*ESG:* -0.001
			$PctOwnInst_{t+4} = ESGD_t$ x $ESG_t + Controls_t + Fixed\ Effects\ I_t$	*ESGD:* 0.111*, *ESGD*ESG:* -0.002*
			$PctOwnInst_{t+5} = ESGD_t$ x $ESG_t + Controls_t + Fixed\ Effects\ I_t$	*ESGD:* 0.070, *ESGD*ESG:* -0.002
Impact of changes in *ESGD* on changes in *PctOwnIns*	(Kalay, 2015), (Bushee & Noe, 2000)	Appendix 10	$\Delta PctOwnInst_{t-1,t} = \Delta ESGD_{t-1,t}$ x $\Delta ESG_{t-1,t} + Controls_t + Fixed\ Effects\ I_t$	*ΔESGD:* 0.473, *ΔESGD*ΔESG:* 0.002
			$\Delta PctOwnInst_{t,t+1} = \Delta ESGD_{t-1,t}$ x $\Delta ESG_{t-1,t} + Controls_t + Fixed\ Effects\ I_t$	*ΔESGD:* 0.033, *ΔESGD*ΔESG:* 0.001
Subset of low (<25% quantile) and high (>75% quantile) stock liquidity firms	-	Appendix 11	$PctOwnInst_t = ESGD_t$ x $ESG_t + Controls_t + Fixed\ Effects\ I_t$	Low stock liquidity: *ΔESGD:* -0.201, *ΔESGD*ΔESG:* 0.005 High stock liquidity: *ΔESGD:* 0.170*, *ΔESGD*ΔESG:* -0.003*

Model description	*Source (example)*	*Appendix*	*Model equation*	*Result*
PVAR model with 1-year-lag	(Ramdhony et al., 2024)	Appendix 12	$PctOwnInst_t + ESGD_t + ESG_t + TotAsts_t + ROA_t + Board_t + Company + Year \rightarrow PctOwnInst_{t+1} + ESGD_{t+1} + ESG_{t+1}$	$ESGD_t \rightarrow PctOwnInst_{t+1}$: 0.048* $PctOwnInst_t \rightarrow ESGD_{t+1}$: -0.029
Difference-in-Difference Approach: Firms with high ESGD-Score changes between 2016 and 2022 (> 10 points) vs. low changes (-2.5 points < change < 2.5 points)	(Eccles et al., 2014)	Appendix 13	$(PctOwnInst_{2022,\ HighChange} - PctOwnInst_{2016,\ HighChange}) - (PctOwnInst_{2022,\ LowChange} - PctOwnInst_{2016,\ LowChange})$	DiD: 3.49
Effect of *ESGD* on ownership concentration *OwnConc* (Sum of shareholdings of the five biggest shareholders)	-	Appendix 14	$OwnConc_t = ESGD_t \times ESG_t + Controls_t + Fixed\ Effects\ I_t$	*ESGD:* 0.043, *ESGD*ESG:* -0.001

Appendix 9: Further Analysis – Univariate Regression with Lagged Ownership

	$PctOwnInst_{t+1}$	$PctOwnInst_{t+2}$	$PctOwnInst_{t+3}$	$PctOwnInst_{t+4}$	$PctOwnInst_{t+5}$
Refinitiv ESGD	0.060	0.067	0.064	0.111**	0.070
Refinitiv ESG	0.209***	0.204***	0.221***	0.278***	0.234***
*Refinitiv ESGD*ESG*	-0.001*	-0.002*	-0.001	-0.002**	-0.002
Log(TotAsts)	-3.752***	-3.620***	-3.808***	-4.161***	-4.106***
Beta	-0.906	-0.192	0.210	0.192	-0.556
Lev	0.045***	0.043***	0.035**	0.032*	0.031
EPS	0.003	-0.0002	0.004	0.001	-0.011
Grwth	-0.029**	-0.020	-0.017	-0.021	-0.011
Log(TRVOL)	1.325***	1.140***	1.096***	1.575***	1.815***
ROA	-0.036	-0.022	-0.017	-0.007	0.009
MTB	-0.004	-0.006	-0.003	-0.012	-0.014
Fixed Effects	Y, I, C	Y, I, C	Y, I, C	Y, I, C	Y, I, C
Constant	81.524***	80.845***	81.274***	76.425***	71.200***
Observations	3,989	3,269	2,543	1,837	1,166
R^2	0.549	0.547	0.568	0.576	0.572
Adjusted R^2	0.538	0.534	0.552	0.554	0.538
Residual Std. Error	13.839	13.615	12.727	12.424	12.382
F Statistic	51.464***	42.102***	36.168***	26.931***	16.984***
df	3896	3177	2453	1748	1080

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 10: Further Analysis – Univariate Regression with Delta-Values

	$\Delta_{t-1,t}$ *PctOwnInst*	$\Delta_{t,t+1}$ *PctOwnInst*
$\Delta_{t-1,t}$ *Refinitiv ESGD*	0.712	0.046
$\Delta_{t-1,t}$ *Refinitiv ESG*	0.021	0.089
$\Delta_{t-1,t}$ *Refinitiv ESGD*ESG*	0.002	0.001
Log(TotAsts)	-5.119	-0.858
Beta	3.269	-1.756
Lev	0.044	-0.031
EPS	-0.019	-0.001
Grwth	0.171	0.111*
Log(TRVOL)	2.988	0.500
ROA	-0.164	-0.142*
MTB	0.127	0.029
Fixed Effects	Y, I, C	Y, I, C
Constant	81.492	28.855
Observations	3,869	3,175
R^2	0.025	0.032
Adjusted R^2	0.002	0.004
Residual Std. Error	218.133	42.946
F Statistic	1.070	1.140
df	3777	3056

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 11: Further Analysis – Univariate Regression on Stock Liquidity Subgroups

	(I): Low Stock Liquidity	*(II): High Stock Liquidity*
Refinitiv ESGD	-0.201*	0.170**
Refinitiv ESG	-0.089	0.406***
*Refinitiv ESGD*ESG*	0.005	-0.004**
Log(TotAsts)	-1.346*	-4.312***
Beta	1.174	-2.098**
Lev	-0.103***	0.117***
EPS	-0.001	0.002
Grwth	-0.003	-0.011
Log(TRVOL)	2.035***	-0.779
ROA	-0.381***	0.046*
MTB	-0.012	-0.022
Fixed Effects	Y, I, C	Y, I, C
Constant	26.903	155.750***
Observations	1,058	1,238
R^2	0.345	0.649
Adjusted R^2	0.295	0.629
Residual Std. Error	15.996	13.108
F Statistic	6.910***	31.819***
df	982	1169

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Subgroups (I) and (II) represent splits of the full data sample based on stock liquidity (TrdVol). Subgroup (I) consists of companies in the lowest 25% quantile (first quartile) of stock liquidity, while Subgroup (II) includes companies in the highest 25% quantile (fourth quartile).

Appendix 12: Further Analysis – PVAR Model

	Refinitiv ESGD$_{t+1}$	*Refinitiv ESG$_{t+1}$*	*PctOwnInst$_{t+1}$*
Refinitiv ESGD	0.573***	-0.232***	0.048*
Refinitiv ESG	0.015	0.768***	0.030
PctOwnInst	-0.029	-0.298***	0.644***
Exogeneous Variables	*Log(TotAsts), ROA, Board*		
Fixed effects	Year, Firm		
Observations	3576		
Groups	782		
Obs per group: min	1		
Obs per group: avg	4.57		
Obs per group: max	5		

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 13: Further Analysis – Difference-in-Difference Approach

Group	∅ *PctOwnInst* 2016	∅ *PctOwnInst* 2022	Delta	DiD
Control	25.494	16.996	8.498	3.488
Treatment	24.529	19.519	5,010	

Appendix 14: Further Analysis – Univariate Regression on Ownership Concentration

	OwnConc
Refinitiv ESGD	0.043
Refinitiv ESG	-0.054
*Refinitiv ESGD*ESG*	-0.001
Log(TotAsts)	0.461
Beta	-0.321
Lev	-0.105***
EPS	-0.012
Grwth	-0.012
Log(TRVOL)	-0.627**
ROA	-0.035
MTB	0.013
Fixed Effects	Y, I, C
Constant	28.654***
Observations	4,722
R^2	0.109
Adjusted R^2	0.092
Residual Std. Error	18.3384628
F Statistic	6.116***
df	4628

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 15: Robustness Checks – Overview

Model description	*Source (example)*	*Appendix*	*Result*
Regression model without outliers	(Draper, 1998, p. 75 et seq.) (Ciaburro, 2018)	Appendix 16	*ESGD*: 0.073*, *ESGD*ESG*: -0.002*
Lasso regression	(Ciaburro, 2018)	Appendix 17	All variables are relevant
Box-Cox transformation	(Draper, 1998, p. 277 et seq.)	Appendix 18	*ESGD*: 0.019**, *ESGD*ESG*: -0.001**
Log transformation	(Ciaburro, 2018)	Appendix 19	*ESGD*: 0.218***, *ESGD*ESG*: -0.064***
VIF values	(Draper, 1998, p. 375 et seq.)	Appendix 20	Moderate VIF values, only higher (natural) values for *ESGD*, *ESG* and *ESGD*ESG*, which can be explained through their interrelation. To separate their effects, this cannot be avoided
Bootstrapping	(Draper, 1998, p. 585 et seq.)	Appendix 21	Positive *ESGD* coefficient is very likely (lower Confidence Interval at -0.009 vs. upper Confidence Interval at 0.147; estimated coefficient at 0.072)
Durbin-Watson test	(Draper, 1998, p. 69 et seq.)	-	Durbin-Watson-Value = 1.9652, p-value = 0.7603 High p-value and Durbin-Watson-Value close to 2 indicate low autocorrelation of error terms

Model description	*Source (example)*	*Appendix*	*Result*
Breusch-Pagan test	(Wooldridge, 2020, p. 270 et seq.)	-	Breusch-Pagan-Value = 131.75, p-value = 0.005 Low p-value and high Breusch-Pagan-Value indicate that heteroscedasticity could be possible
Q-Q-Plot	(Draper, 1998, p. 61 et seq.)	Appendix 22	The central portion of the data aligns well with the normal distribution, but extreme values show deviations, indicating the presence of outliers or heavy tails
Robust standard errors	(Draper, 1998, p. 567 et seq.)	Appendix 23	*ESGD*: 0.072*, *ESGD*ESG*: -0.002

Appendix 16: Robustness Check – Regression Model Without Outliers

	PctOwnInst
Refinitiv ESGD	0.073*
Refinitiv ESG	0.258***
*Refinitiv ESGD*ESG*	-0.002**
Log(TotAsts)	-3.737***
Beta	-0.763
Lev	0.051***
EPS	0.001
Grwth	-0.021
Log(TRVOL)	1.381***
ROA	-0.030
MTB	-0.009
Fixed Effects	Y, I, C
Constant	77.301***
Observations	4,493
R^2	0.541
Adjusted R^2	0.532
Residual Std. Error	14.063
F Statistic	55.857***
df	4399

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 17: Robustness Check – Lasso Regression

	Coefficient
Refinitiv ESGD	-0.010
Refinitiv ESG	0.104
*Refinitiv ESGD*ESG*	0.00004
Log(TotAsts)	-3.611
Beta	-1.775
Lev	0.035
EPS	-0.014
Grwth	-0.023
Log(TRVOL)	0.793
ROA	-0.028
MTB	-0.013
Constant	94.947

Appendix 18: Robustness Check – Box-Cox Transformation

	PctOwnInst (optimal transformed)
Refinitiv ESGD	0.019**
Refinitiv ESG	0.069***
*Refinitiv ESGD*ESG*	-0.001**
Log(TotAsts)	-0.910***
Beta	-0.167
Lev	0.014***
EPS	-0.001
Grwth	-0.007**
Log(TRVOL)	0.391***
ROA	-0.013***
MTB	-0.003
Fixed Effects	Y, I, C
Constant	20.156***
Observations	4,733
R^2	0.529
Adjusted R^2	0.520
Residual Std. Error	3.361
F Statistic	56.126***
df	4639

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

Appendix 19: Robustness Check – Log Transformation

	Log(PctOwnInst)
Log(Refinitiv ESGD)	0.218***
Log(Refinitiv ESG)	0.751***
*Log(Refinitiv ESGD*ESG)*	-0.064***
Log(TotAsts)	-0.162***
Beta	-0.010
Lev	0.003***
EPS	-0.0004
Grwth	-0.002**
Log(TRVOL)	0.086***
ROA	-0.004***
MTB	-0.001
Fixed Effects	Y, I, C
Constant	2.366***
Observations	4,733
R^2	0.352
Adjusted R^2	0.339
Residual Std. Error	0.819
F Statistic	27.038***
df	4639

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*

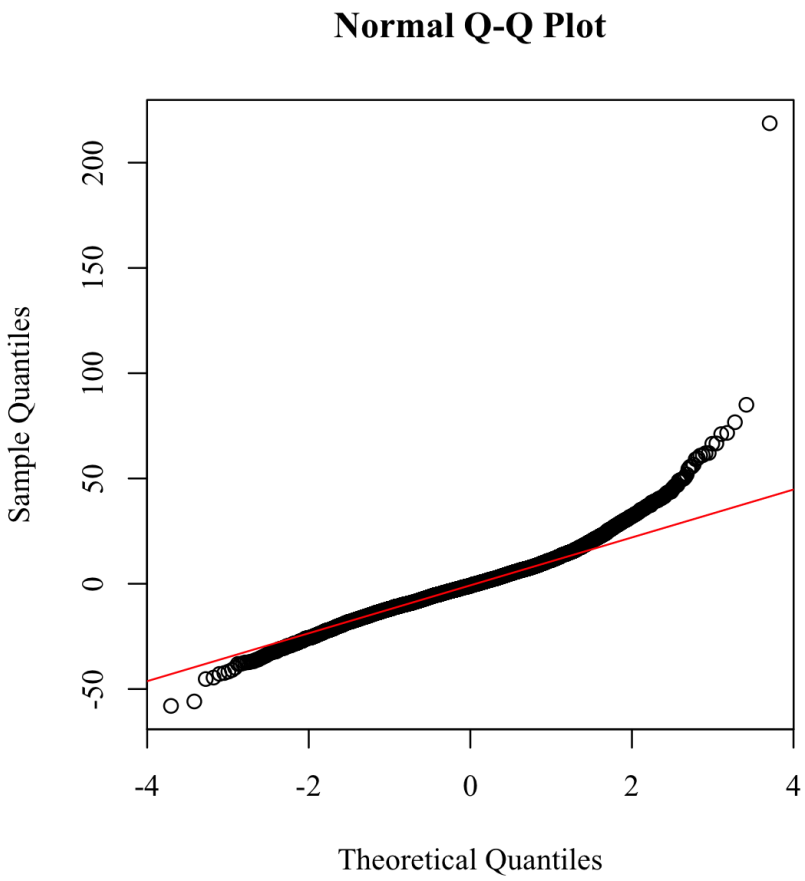
Appendix 20: Robustness Check – VIF Values

	VIF values
Refinitiv ESGD	6.866
Refinitiv ESG	8.614
*Refinitiv ESGD*ESG*	19.159
Log(TotAsts)	1.738
Beta	1.044
Lev	1.263
EPS	1.029
Grwth	1.066
Log(TRVOL)	1.275
ROA	1.38
MTB	1.244

Appendix 21: Robustness Check – Bootstrapping

	Lower Confidence Interval (95%)	*Upper Confidence Interval (95%)*	*Comparison: Estimated Coefficient*
Refinitiv ESGD	-0.009	0.147	*0.072*
Refinitiv ESG	0.142	0.334	*0.242*
*Refinitiv ESGD*ESG*	-0.003	0	*-0.002*
Log(TotAsts)	-4.17	-3.316	*-3.749*
Beta	-2.003	0.27	*-0.909*
Lev	0.024	0.074	*0.050*
EPS	-0.01	0.012	*0.001*
Grwth	-0.048	0	*-0.025*
Log(TRVOL)	1.036	1.765	*1.409*
ROA	-0.075	0.008	*-0.034*
MTB	-0.028	0.011	*-0.009*
Constant	66.599	87.154	*77.278*

Appendix 22: Robustness Check – Q-Q-Plot



Appendix 23: Robustness Check – Robust Standard Errors

	PctOwnInst
Refinitiv ESGD	0.072*
Refinitiv ESG	0.242***
*Refinitiv ESGD*ESG*	-0.002
Log(TotAsts)	-3.749***
Beta	-0.909
Lev	0.050***
EPS	0.001
Grwth	-0.025**
Log(TRVOL)	1.409***
ROA	-0.034
MTB	-0.009
Fixed Effects	Y, I, C
Constant	77.278***
Observations	4,733
R^2	0.541
Adjusted R^2	0.532
Residual Std. Error	14.036
F Statistic	58.795***
df	4639

, **, * Indicate statistical significance at the 5%, 1%, and 0.1% level, respectively*