

# ESG Reporting Divergence

Qiang Cheng

Yun Lou

Mengjie Yang

December 2024

AFAANZ Insight Series

# Motivation

- Corporate accountability requires ESG information.
  - ESG reporting is voluntary in the U.S.
    - 70% of Russel 1000 firms reported on ESG activities in 2020
    - Some follow frameworks, but others do not
    - The frameworks followed by companies vary: GRI (59%), SASB (45%), TCFD (23%)
- Information is not comparable across firms, which has impeded ESG investing (the 2017 CFO Institute survey).

# Examples of Difference in ESG reporting

Field Description	Advanced Micro ( <i>i</i> )	Intel ( <i>j</i> )
Nitrogen Oxide Emissions	0	1
Climate Change Policy	0	1
Risks of Climate Change Discussed	0	1
Number of Significant Environmental Fines	1	0
Amount of Significant Environmental Fines	1	0
Renewable Energy Use	1	0
Water Consumption	0	1
Quality Assurance and Recall Policy	0	1
Gender Pay Gap Breakout	0	1
% Disabled in Workforce	0	1
Fatalities - Total	0	1
Employee Turnover %	1	0
Total Hours Spent by Firm - Employee Training	0	1
Employee CSR Training	0	1

## Motivation (contd.)

- In June 2023, the ISSB issued two sustainability disclosure standards (IFRS S1 and S2):  
“The usefulness of sustainability-related financial information is enhanced if it is *comparable*, verifiable, timely and understandable.” (emphasis added)
- March 2022, the SEC proposed rules on climate-related disclosures to “standardize the process so investors find it easier to make *comparisons*.”

# Research Objective

- To understand the status quo of ESG reporting divergence
- To investigate potential adverse consequences of ESG reporting divergence for users
  - ESG rating providers
    - Does ESG reporting divergence affect ESG rating disagreement?
  - ESG mutual fund
    - Does ESG reporting divergence affect ESG fund allocation with respect to firms' ESG performance?

# Key Concepts

- ESG activities
  - activities in the ESG area
    - E.g., cutting GHG emission, improving employee safety, improving female representation on board
- ESG performance
  - Performance in the ESG area, commonly proxied by ESG ratings
    - E.g., the level of GHG emission, the number of employee incidents, the % of females on the board
- ESG reporting
  - **Whether the firm discloses the information**
    - **The focus (recognition) in this paper**
  - And if so, whether the definitions and estimations method are the same (the measurement)

# Construction of ESG reporting divergence

- What to capture: the heterogeneity in the availability of ESG items
  - 122 standardized ESG reporting fields collected by Bloomberg from firms' ESG reports, annual reports, or websites

Step 1: to construct a  $122 \times 1$  vector with indicators that represent the availability of each ESG reporting item for a firm-year:

$$v_{it} = (d_{it,1}, d_{it,2}, \dots, d_{it,121}, d_{it,122})$$

Step 2: firm-pair-year similarity in the reporting of ESG items

$$\text{Tanimoto Similarity}_{ijt} = \frac{v_{it} \cdot v_{jt}}{v_{it} \cdot v_{it} + v_{jt} \cdot v_{jt} - v_{it} \cdot v_{jt}}$$

Step 3: ESG reporting divergence at the firm-pair-year:  $1 -$

*Tanimoto Similarity*<sub>ijt</sub>

## Example: Advanced Micro (*i*) and Intel (*j*) in 2020

	$i \times j$	$i \times i$	$j \times j$
Environmental reporting fields (46)	22	25	30
Social reporting fields (46)	19	21	30
Governance reporting fields (30)	29	29	30
Total	70	75	90

$$ESG\_Diverg = 1 - \text{Tanimoto Similarity} = 1 - \frac{70}{75+90-70} = 0.263$$

$$E\_Diverg = 1 - \text{Tanimoto Similarity} = 1 - \frac{22}{25+30-22} = 0.333$$

$$S\_Diverg = 1 - \text{Tanimoto Similarity} = 1 - \frac{19}{21+30-19} = 0.406$$

$$G\_Diverg = 1 - \text{Tanimoto Similarity} = 1 - \frac{29}{29+30-29} = 0.033$$



# Validation Tests

	Firm <i>i</i> and firm <i>j</i> adopt the same reporting frameworks		Other firm-pairs		Difference	
	Mean	N	Mean	N	Mean	p-value
<i>ESG_Diverg</i>	0.294	23,227	0.390	412,954	-0.096	0.001

	Firm <i>i</i> and firm <i>j</i> in the same extreme firm size quintile		Firm <i>i</i> and firm <i>j</i> in the opposite extreme firm size quintile		Difference	
	Mean	N	Mean	N	Mean	p-value
<i>ESG_Diverg</i>	0.254	165,734	0.387	98,800	-0.133	0.001

	Firm <i>i</i> and firm <i>j</i> in the same extreme ESG performance quintile		Firm <i>i</i> and firm <i>j</i> in the opposite extreme ESG performance quintile		Difference	
	Mean	N	Mean	N	Mean	p-value
<i>ESG_Diverg</i>	0.251	106,232	0.368	65,739	-0.117	0.001

# Construction of ESG Reporting Divergence (cont'd)

- Step 4: ESG reporting divergence at the firm-year:  $ESG\_Diverg_{it}$ 
  - The mean of the ESG reporting divergence for each firm  $i-j$  pair for all of the other  $J$  firms in the same industry (i.e., other than firm  $i$ ) in year  $t$ .
  - SASB's Sustainable Industry Classification System (SICS)

Variables	N	Mean	Std. Dev.	P25	Median	P75
$ESG\_Diverg$	14,927	0.316	0.118	0.222	0.295	0.401
$E\_Diverg$	14,927	0.916	0.105	0.863	0.957	1.000
$S\_Diverg$	14,927	0.600	0.161	0.478	0.583	0.715
$G\_Diverg$	14,927	0.095	0.051	0.064	0.085	0.108

# ESG Reporting Divergence by Year

Year	N	<i>ESG_Diverg</i>	<i>E_Diverg</i>	<i>S_Diverg</i>	<i>G_Diverg</i>
2006	97	0.353	0.879	0.618	0.090
2007	272	0.290	0.947	0.610	0.088
2008	387	0.293	0.941	0.617	0.086
2009	537	0.293	0.930	0.622	0.083
2010	583	0.300	0.939	0.751	0.075
2011	667	0.314	0.941	0.777	0.079
2012	711	0.324	0.938	0.770	0.081
2013	748	0.335	0.934	0.768	0.081
2014	774	0.341	0.931	0.757	0.082
2015	1,082	0.331	0.932	0.672	0.107
2016	1,523	0.315	0.935	0.656	0.106
2017	1,704	0.306	0.921	0.527	0.106
2018	1,915	0.306	0.915	0.499	0.104
2019	1,969	0.314	0.895	0.485	0.097
2020	1,958	0.325	0.865	0.492	0.095

# ESG Reporting Divergence by Industry

*Panel C: ESG Reporting Divergence by SIC5 Sector*

SICS Sector	N	<i>ESG_Diverg</i>	<i>E_Diverg</i>	<i>S_Diverg</i>	<i>G_Diverg</i>
Consumer Goods	1,240	0.322	0.901	0.599	0.085
Extractives & Minerals Processing	1,137	0.385	0.846	0.641	0.110
Food & Beverage	558	0.407	0.875	0.662	0.113
Financials	2,424	0.252	0.962	0.573	0.100
Health Care	1,826	0.283	0.973	0.569	0.095
Infrastructure	2,050	0.307	0.849	0.584	0.072
Renewable Resources & Alternative Energy	114	0.424	0.879	0.652	0.131
Resource Transformation	1,763	0.349	0.891	0.625	0.086
Services	1,008	0.281	0.949	0.591	0.102
Technology & Communications	2,182	0.327	0.955	0.613	0.104
Transportation	625	0.370	0.878	0.617	0.114

# Predictions

- ESG rating providers:
  - Costs of information processing (of focal and comparable firms' ESG) ↑
  - For ESG rating providers
    - The reliance on public ESG information ↓
    - The reliance on private information ↑

**H1:** Ceteris paribus, ESG reporting divergence is positively associated with ESG rating disagreement.

# Predictions

- ESG mutual funds
  - They rely on ESG ratings and ESG information to make asset allocation decisions (Avramov et al. 2022).
  - Firms with better ESG performance attract ESG fund (Hartzmark and Sussman 2019).
- ESG reporting divergence → Costs of information processing ↑
  - ESG funds find it more difficult to evaluate firms' ESG performance.
  - ESG funds rely less on ESG ratings to allocate assets.

**H2:** Ceteris paribus, the association between ESG ratings and ESG fund allocation is weaker for firms with high ESG reporting divergence than for firms with low ESG reporting divergence.

# Data

- ESG reporting items: Bloomberg
- ESG ratings: MSCI, Refinitiv, Sustainalytics, Moody's, and S&P
- ESG Fund: Morningstar
- 2005-2021

# Research Design for H1

$$\begin{aligned}
 & \text{ESG Rating Disagreement}_{it} \\
 &= a_0 + a_1 \text{ESG\_Diverg}_{it} + a_2 \text{ESG Disclosure}_{it} + a_3 \text{ESG\_Rating}_{it} \\
 &+ \text{Firm Controls} + \text{Industry FE} + \text{Year FE} + \text{ESG Rater Combination FE} + \varepsilon_{it}
 \end{aligned}$$

- Dependent variable:
  - *ESG Rating Disagreement*: the standard deviation of a firm's ESG ratings from up to five rating providers
- Main independent variable: *ESG\_Diverg*
- Two ESG-related controls
  - ESG rating: the industry-year-adjusted ESG performance (heterogeneity in firms' ESG activities)
  - ESG disclosure: the level of ESG disclosures (Christensen et al. 2022)
- Prediction of H1:  $\alpha_1 > 0$



# Main Tests of H1

Dependent variable	H1	<i>ESG Rating</i>	<i>E Rating</i>	<i>S Rating</i>	<i>G Rating</i>
		<i>Disagreement</i>	<i>Disagreement</i>	<i>Disagreement</i>	<i>Disagreement</i>
		(1)	(2)	(3)	(4)
<i>ESG_Diverg</i>	+	2.810** (2.10)			
<i>E_Diverg</i>	+		13.029*** (6.94)		
<i>S_Diverg</i>	+			2.329*** (2.77)	
<i>G_Diverg</i>	+				7.519*** (2.99)
Control variables		Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes
Industry FE		Yes	Yes	Yes	Yes
ESG Rater Combination FE		Yes	Yes	Yes	Yes
N		14,927	14,927	14,927	14,927
Adj. R <sup>2</sup>		0.169	0.403	0.210	0.113

A one-standard-deviation increase in ESG reporting divergence is associated with 4.5% increase in ESG rating disagreement relative to its sample standard deviation.

# Research Design for H2

$$\begin{aligned}
 & ESG \text{ Fund Holding}_{it} \\
 &= a_0 + a_1 ESG\_Rating_{it} + a_2 ESG\_Diverg_{it} \times ESG\_Rating_{it} + a_3 ESG\_Diverg_{it} \\
 &+ a_4 ESG \text{ Disclosure}_{it} + Firm \text{ Controls} + Industry \text{ FE} + Year \text{ FE} \\
 &+ ESG \text{ Rater Combination FE} + \varepsilon_{it}
 \end{aligned}$$

- Dependent variable:
  - $ESG \text{ Fund Holding}_{it}$ : the percentage of firm  $i$ 's outstanding shares held by ESG mutual funds at the end of year  $t$
- Prediction of H2:  $\alpha_2 < 0$

# Main Tests of H2

Dependent variable	H2	<i>ESG Fund Holding</i>			
		(1)	(2)	(3)	(4)
<i>ESG_Rating</i>		0.092*** (7.15)			
<i>ESG_Diverg</i> × <i>ESG_Rating</i>	–	-0.254*** (-2.72)			
<i>E_Rating</i>			0.079*** (5.23)		
<i>E_Diverg</i> × <i>E_Rating</i>	–		-0.164* (-1.69)		
<i>S_Rating</i>				0.056*** (4.47)	
<i>S_Diverg</i> × <i>S_Rating</i>	–			-0.243*** (-3.91)	
<i>G_Rating</i>					0.034** (2.36)
<i>G_Diverg</i> × <i>G_Rating</i>	–				-0.022 (-0.10)
Control variables		Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes
Industry FE		Yes	Yes	Yes	Yes
ESG Rater Combination FE		Yes	Yes	Yes	Yes
N		12,573	12,573	12,573	12,573
Adj. R <sup>2</sup>		0.198	0.196	0.190	0.187

A one-standard-deviation increase in ESG reporting divergence reduces the sensitivity of ESG fund holdings to ESG ratings by 32.6% (when ESG reporting divergence is at the sample mean).

# Sensitivity Tests

- Alternative measures of reporting divergence:
  - TNIC industry classification
  - SASB materiality items
- Use firm fixed effects
- No differential effects across high and low ESG disclosure subsamples

# SASB materiality items

Dependent Variable	<i>E Rating Disagreement</i>	<i>S Rating Disagreement</i>	<i>ESG Fund Holding</i>	
	(1)	(2)	(3)	(4)
<i>E_Diverg</i>	5.636*** (4.14)		-0.129 (-1.63)	
<i>E_Rating</i>	2.640*** (8.58)		0.081*** (5.08)	
<i>E_Rating</i> × <i>E_Diverg</i>			-0.132** (-2.08)	
<i>S_Diverg</i>		2.778*** (4.95)		-0.074* (-1.96)
<i>S_Rating</i>		1.776*** (8.58)		0.057*** (4.37)
<i>S_Rating</i> × <i>S_Diverg</i>				-0.081** (-2.16)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
ESG Rater FE	Yes	Yes	Yes	Yes
N	13,482	12,630	11,335	11,464
Adj. R <sup>2</sup>	0.387	0.210	0.205	0.153

# Additional Test: ESG Rating Informativeness

Dependent Variable	<i>Future ESG Insight Score</i>	
	(1)	(2)
<i>ESG_Rating</i>	2.557*** (7.91)	2.673*** (7.92)
<i>ESG_Diverg</i>		0.486 (0.19)
<i>ESG_Rating</i> × <i>ESG_Diverg</i>		-5.465*** (-2.72)
<i>ESG Disclosure</i>	-0.026 (-0.91)	0.007 (0.22)
<i>Firm Size</i>	-1.028*** (-4.87)	-1.034*** (-4.84)
<i>ROA</i>	0.097 (0.05)	0.246 (0.13)
<i>MTB</i>	-0.007 (-0.36)	-0.007 (-0.37)
<i>Leverage</i>	-1.651 (-1.41)	-1.667 (-1.42)
<i>Analysts</i>	0.277 (0.70)	0.245 (0.61)
<i>Institutional Ownership</i>	0.722 (0.75)	0.579 (0.60)
Year FE	Yes	Yes
Industry FE	Yes	Yes
ESG Rater FE	Yes	Yes
N	12,476	12,476
Adj. R <sup>2</sup>	0.165	0.166

# Additional Test: Spillover Effect of EU Regulation

- European Union (EU) passed Directive 2014/95
  - public-interest entities in the EU with more than 500 employees to prepare annual nonfinancial reports (i.e., ESG reports) from fiscal year 2017.
  - The objective: “to increase the relevance, consistency and comparability” of ESG reporting among the EU firms.
- This applies to US firms’ subsidiaries in the EU

## → Potential effect on US parent firms

- ↓ ESG reporting divergence among industries with a high proportion of firms with subsidiaries in the EU (treatment industries)
- ↓ ESG rating disagreement
- ↑ ESG fund allocation with respect to ESG performance

# Additional Test: Spillover Effect of EU Regulation

## Panel A:

Dependent variable	<i>ESG_Diverg</i>	<i>E_Diverg</i>	<i>S_Diverg</i>	<i>G_Diverg</i>
	(1)	(2)	(3)	(4)
<i>Treat_Post</i>	-0.062***	-0.059***	0.006	-0.002
	(-4.64)	(-5.35)	(0.35)	(-0.38)

## Panel B:

Dependent variable	<i>E Rating Disagreement</i>	<i>ESG Fund Holding</i>
	(1)	(2)
<i>Treat_Post</i>	-0.071**	0.096
	(-2.01)	(1.56)
<i>E_Rating</i>		0.098***
		(4.85)
<i>Treat_Post</i> × <i>E_Rating</i>		0.134*
		(1.69)



# Contributions

- This is the first paper that provides systematic evidence on ESG reporting divergence among US firms.
- This paper contributes to the literature
  - ESG rating disagreement: ESG reporting divergence is an important determinant
  - Comparability: this paper extends the literature from financial reporting comparability to non-financial information comparability
- The paper provides suggestive evidence on the potential effect of the SEC proposals on climate risk and IFRS standards on sustainability reporting.

# Thank you!

# Sample Selection

Selection Criteria	# Firm-years	# Firms
<i>The ESG rating disagreement sample:</i>		
Firm-year observations with non-missing ESG disclosure divergence measures from 2005 to 2021	34,132	3,098
Keep firm-year observations with ESG ratings from at least two raters from 2006 to 2020	15,196	2,156
Keep firm-year observations with non-missing values on control variables	14,927	2,146
<i>The ESG fund holding sample:</i>		
Keep firm-year observations with non-missing values on ESG fund holdings	12,573	1,844

# Results for High and Low ESG Disclosure Subsamples

Dependent Variable	<i>ESG Rating Disagreement</i>		<i>ESG Fund Holding</i>	
	<i>High ESG Disclosure</i>	<i>Low ESG Disclosure</i>	<i>High ESG Disclosure</i>	<i>Low ESG Disclosure</i>
	(1)	(2)	(3)	(4)
<i>ESG_Diverg</i>	3.896*** (2.77)	4.489*** (2.78)	0.250** (2.04)	0.360*** (3.35)
<i>ESG_Rating</i>			0.132*** (9.86)	0.066*** (5.05)
<i>ESG_Rating</i> × <i>ESG_Diverg</i>			-0.398*** (-4.40)	-0.104 (-0.87)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
ESG Rater FE	Yes	Yes	Yes	Yes
N	7,684	7,243	6,287	6,286
Adj. R <sup>2</sup>	0.178	0.176	0.236	0.141
P-value for the difference in the coefficient on				
<i>ESG_Diverg</i>		0.849		
<i>ESG_Rating</i> × <i>ESG_Diverg</i>			0.163	

# Determinants Analysis

<i>Dependent variable</i>	<i>ESG_Diverg</i>	
	<i>Coeff. (t-value)</i> (1)	<i>Shapley value</i> (2)
<i>Same_Reporting_Framework</i>	-0.114*** (-14.43)	0.73
<i>ESG_Rating</i>	0.015*** (8.33)	13.23
<i>ESG_Rating_Diff</i>	0.023*** (9.50)	8.33
<i>ESG Disclosure</i>	0.006*** (24.01)	31.32
<i>Firm Size</i>	0.002 (1.36)	5.31
<i>Firm Size_Diff</i>	0.018*** (11.15)	8.58
<i>ROA</i>	0.029*** (3.21)	1.27
<i>ROA_Diff</i>	0.026*** (3.58)	0.47
<i>MTB</i>	-0.000 (-0.90)	0.03
<i>MTB_Diff</i>	-0.000*** (-2.59)	0.09
<i>Leverage</i>	-0.004 (-0.76)	0.50
<i>Leverage_Diff</i>	-0.003 (-0.46)	0.10
<i>Analysts</i>	-0.006*** (-3.11)	2.39
<i>Analysts_Diff</i>	0.004* (1.75)	2.08
<i>Institutional Ownership</i>	-0.037*** (-6.31)	0.51
<i>Institutional Ownership_Diff</i>	0.039*** (4.44)	0.28
Year FE	Yes	1.94
Industry FE	Yes	22.85
N	14,927	
Adj. R <sup>2</sup>	0.720	