



# ESG Measurement and Impact

Florian Berg

19th of October 2022

Mannheim University



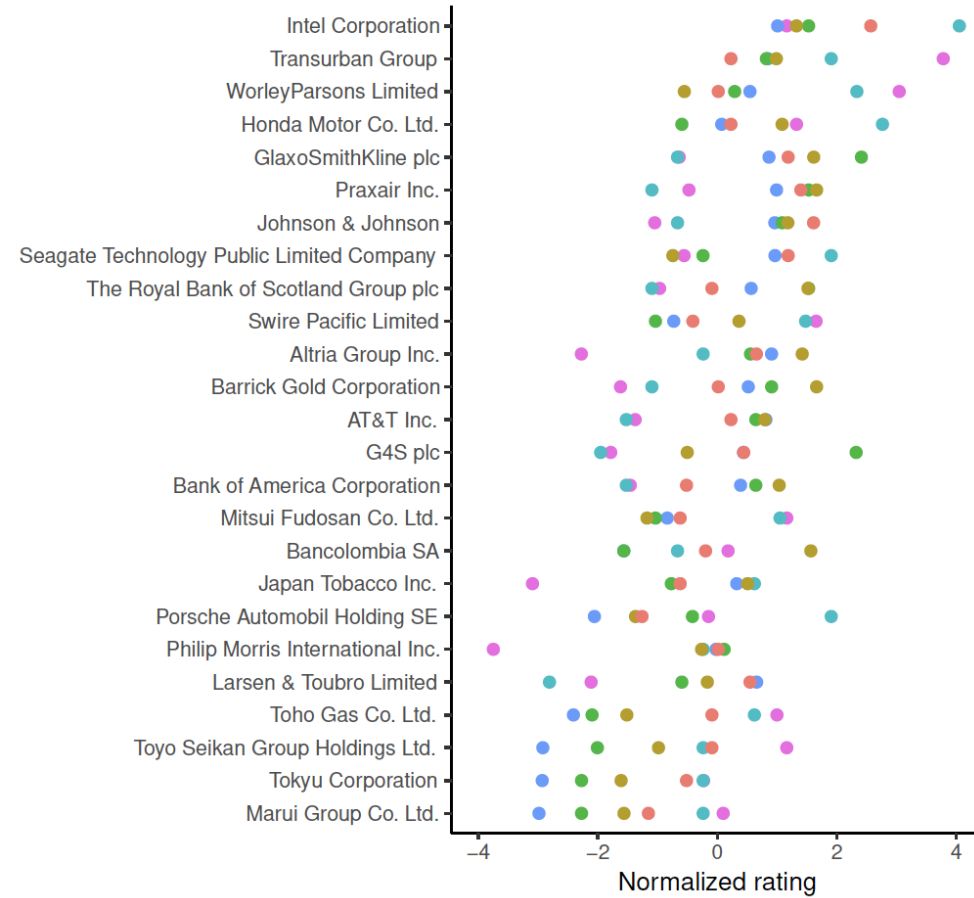
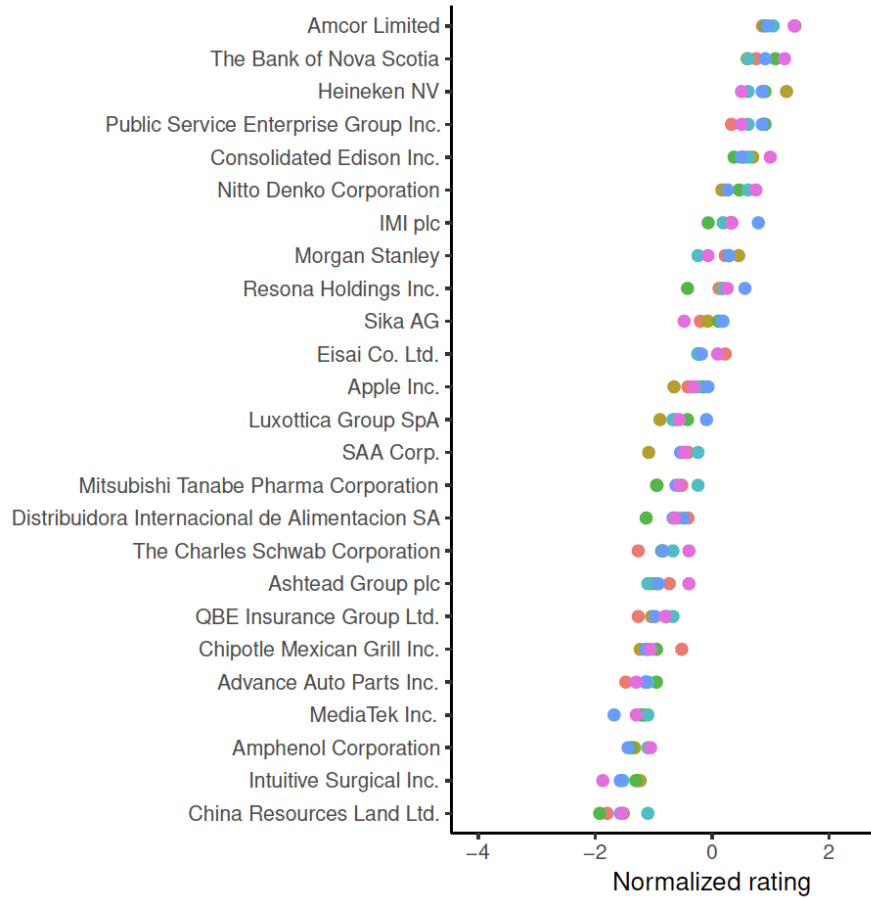
# Aggregate Confusion: The Divergence of ESG Ratings

with

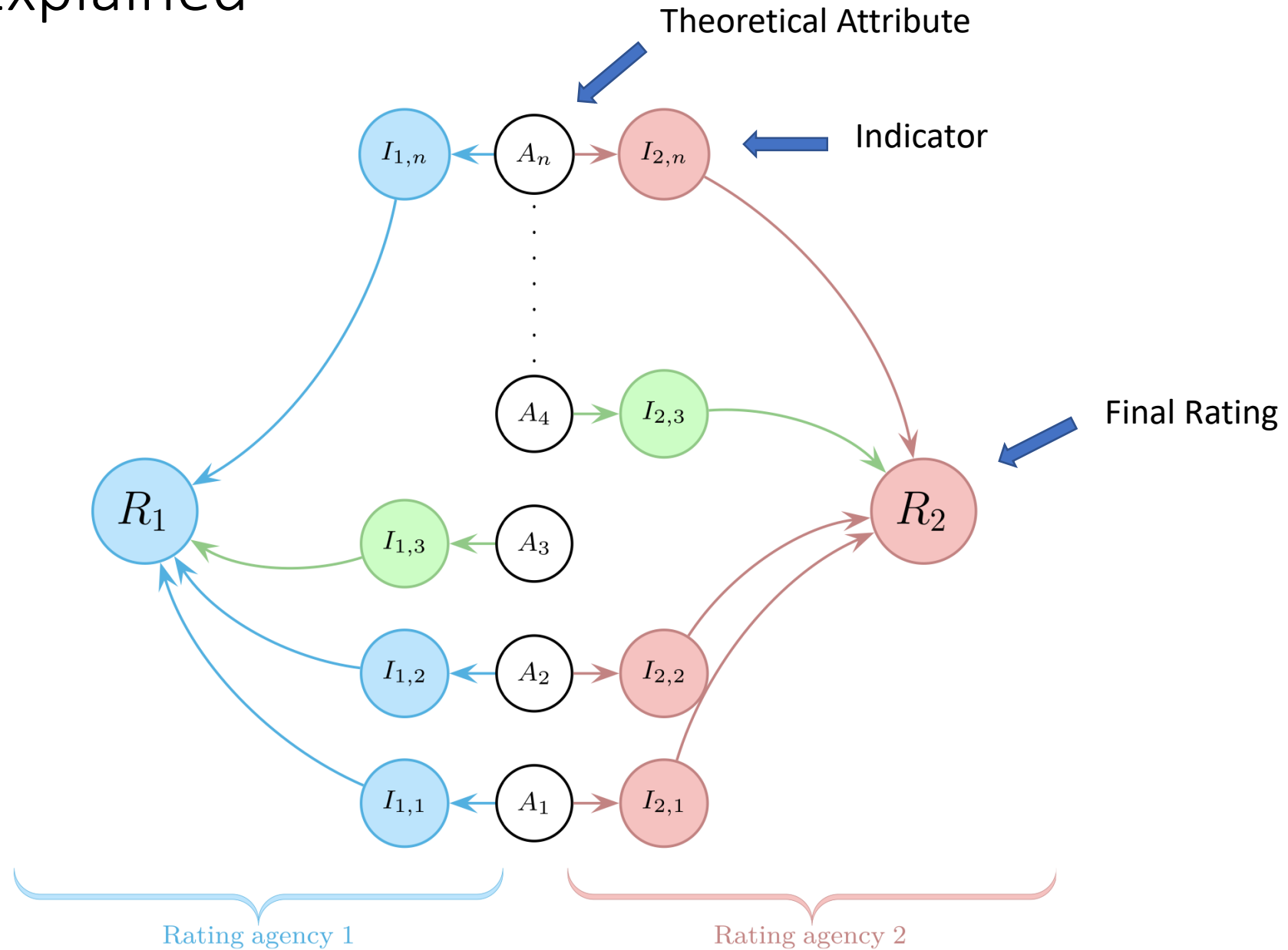
Julian Koelbel

Roberto Rigobon

# Aggregate Confusion



# ESG Ratings Explained



# Correlations

	KL SA	KL MO	KL SP	KL RE	KL MS	SA MO	SA SP	SA RE	SA MS	MO SP	MO RE	MO MS	SP RE	SP MS	RE MS	Average
ESG	0.53	0.49	0.44	0.42	0.53	0.71	0.67	0.67	0.46	0.7	0.69	0.42	0.62	0.38	0.38	0.54
E	0.59	0.55	0.54	0.54	0.37	0.68	0.66	0.64	0.37	0.73	0.66	0.35	0.7	0.29	0.23	0.53
S	0.31	0.33	0.21	0.22	0.41	0.58	0.55	0.55	0.27	0.68	0.66	0.28	0.65	0.26	0.27	0.42
G	0.02	0.01	-0.01	-0.05	0.16	0.54	0.51	0.49	0.16	0.76	0.76	0.14	0.79	0.11	0.07	0.30

# Category Example: Water

---

Rater	Indicator name	Category
Refinitiv	Emission Reduction/Discharge into Water System	Water
Refinitiv	Resource Reduction/Water Recycling	Water
Refinitiv	Resource Reduction/Water Use	Water
KLD	ENV.CON.Water Management	Water
KLD	ENV.STR.Water Stress	Water
MSCI	Water Stress Mgmt	Water
S&P Global	Water Operations	Water
S&P Global	Water Related Risks	Water
Sustainalytics	Water Intensity-Raw Score	Water
Sustainalytics	Water Management Programmes-Raw Score	Water
Moody's ESG	Water	Water

---

# 3 Sources of Divergence

Scope: which attributes are included?

Weights: how are indicators aggregated?

Measurement: how are these attributes measured?

# 3 Sources of Divergence

Scope: which attributes are included?

Weights: how are indicators aggregated?

Measurement: how are these attributes measured?



# Correlations between Categories

	KL SA	KL MO	KL SP	KL RE	KL MS	SA MO	SA SP	SA RE	SA MS	MO SP	MO RE	MO MS	SP RE	SP MS	RE MS	Average
Access & Affordability	0.41		0.57	0.25	0.78		0.67	0.47	0.56				0.55	0.71	0.43	0.54
Air Quality								0.27								0.27
Business Ethics	0.1	0.05	0.05	0.09	0.35	0.68	0.43	0.73	0.08	0.43	0.69	0.05	0.25	0.17	0.01	0.28
Competitive Behavior		-0.06		0.56	0.76						0	-0.05			0.56	0.30
Critical Incident Risk Mgmt.				0.21												0.21
Customer Privacy	0.48		0.27		0.75		0.17		0.45					0.42		0.42
Customer Welfare	0.31	-0.08	-0.06	0.02	0.67	-0.03	-0.11	-0.04	-0.07	0.48	0.47		0.42	0.4	0.38	0.20
Ecological Impacts	0.48	0.4	0.41	0.39	0.65	0.67	0.7	0.65	0.29	0.71	0.58	0.48	0.69	0.21	0.26	0.50
Employee Engagement, Diversity & Inclusion	0.17	0.2	0.15	0.2	0.72	0.57	0.4	0.54	0.45	0.51	0.55	0.42	0.58	0.45	0.55	0.43
Employee Health & Safety	0.01	0.27	0.27	0.34	0.73	-0.11	-0.16	-0.14	-0.06	0.63	0.66	0.5	0.55	0.44	0.59	0.30
Energy Mgmt.	0.22	0.13	0.49	0.25	0.8	0.4	0.27	0.27	0.4	0.32	0.41	0.59	0.2	0.4	0.48	0.38
GHG Emissions	0	-0.03		-0.06		0.32	0.63	0.59			0.56		0.36			0.30
Human Rights & Community Relations	-0.13	0.25	0.15	0.11		-0.03	-0.14	-0.09		0.54	0.49		0.64			0.18
Labor Practices	0.26	0.28	0.11	0.2	0.34	0.59	0.45	0.42	0.41	0.56	0.48	0.43	0.38	0.34	0.4	0.38
Mgmt. of the Legal & Regulatory Environment							0.05	-0.05					0.01			0.00
Materials Sourcing & Efficiency							0.35	0.42					0.57			0.45
Physical Impacts of Climate Change			0.44	0.42	0.8								0.54	0.54	0.5	0.54
Product Design & Lifecycle Mgmt.	0.29	0.07	0.31	0.29	0.78	0.31	0.47	0.35	0.42	0.35	0.3	-0.05	0.56	0.48	0.48	0.36
Product Quality & Safety	-0.05	0.06	0.16	0	0.63	-0.14		-0.03	0.07	0.46	0.21	0.11	0.38	-0.03	0.1	0.14
Selling Practices & Product Labeling	-0.5	-0.06	-0.38	0.24		0.38	0.68	0		0.49	0.05		-0.1			0.08
Supply Chain Mgmt.	0.15	0.17	0.13	0.16	0.62	0.57	0.53	0.56	0.61	0.66	0.62	0.6	0.53	0.34	0.48	0.45
Systemic Risk Mgmt.			0.24		0.65									0.24		0.38
Waste & Hazardous Materials Mgmt.	0.25	0.34	0.22	0.23	0.78	0.43	0.22	0.36	0.33	0.48	0.32	0.39	0.12	0.23	0.3	0.33
Water & Wastewater Mgmt.	0.36	0.36	0.23	0.23	0.67	0.47	0.29	0.31	0.45	0.48	0.32	0.5	-0.02	0.24	0.44	0.36
Average	0.17	0.15	0.21	0.22	0.68	0.34	0.33	0.29	0.31	0.51	0.42	0.33	0.38	0.35	0.40	

# Reverse Engineering

	Sustainalytics	S&P Global	Refinitiv	Moody's ESG	MSCI	KLD
Access & Affordability	0.032**	0	0	-	0.207***	0.099***
Air Quality	0.022*	-	0	-	-	-
Business Ethics	0.12***	0.059***	0.098***	0.186***	0.055*	0.273***
Competitive Behavior	-	-	0.049***	0.01	0	0.134***
Critical Incident Risk Mgmt.	0	-	0	-	-	0.106***
Customer Privacy	0.033***	0.04***	-	-	0.27***	0.122***
Customer Welfare	0.131***	0.072***	0.089***	0.031***	0.031	0.118***
Ecological Impacts	0.322***	0.156***	0.007	0.19***	0.419***	0.216***
Employee Engagement, Diversity & Inclusion	0.08***	0.226***	0.152***	0.198***	0.406***	0.139***
Employee Health & Safety	0.019	0.056***	0.051***	0.133***	0.174***	0.178***
Energy Mgmt.	0.037***	0.004	0.028*	0.101***	0.211***	0.054***
GHG Emissions	0.144***	0.01***	0.03	0.036***	-	0.024***
Human Rights & Community Relations	0.101***	0.084***	0.079***	0.03***	-	0.31***
Labor Practices	0.075***	0.064***	0.072***	0.189***	0.149***	0.209***
Mgmt. of the Legal & Regulatory Environment	0.023*	0.004	0.005	-	-	0
Materials Sourcing & Efficiency	0.013	0.095***	0.133***	-	-	-
Physical Impacts of Climate Change	-	0.14***	0.069***	-	0.089***	0.238***
Product Design & Lifecycle Mgmt.	0.05***	0.052***	0.101***	0.01	0.484***	0.138***
Product Quality & Safety	0.065***	0	0.064***	0.064***	0.427***	0.219***
Selling Practices & Product Labeling	0	0.031***	0	0	-	0.086***
Supply Chain Mgmt.	0.245***	0.053***	0.049***	0.037***	0.163***	0.122***
Systemic Risk Mgmt.	-	0.059***	-	-	0.362***	0.106***
Waste & Hazardous Materials Mgmt.	0.059***	0.016*	0.032**	0.001	0.077**	0.193***
Water & Wastewater Mgmt.	0.066***	0.017**	0.029**	0	0.039*	0.176***
Unclassified Indicators	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.87	0.98	0.92	0.96	0.76	0.98
Observations	924	924	924	924	924	924

# Key Findings

		Scope	Measurement	Weights
KLD	Sustainalytics	18%	69%	13%
KLD	Moody's ESG	31%	59%	10%
KLD	S&P Global	20%	68%	11%
KLD	Refinitiv	22%	63%	15%
KLD	MSCI	81%	17%	3%
Sustainalytics	Moody's ESG	20%	64%	16%
Sustainalytics	S&P Global	22%	70%	8%
Sustainalytics	Refinitiv	12%	66%	22%
Sustainalytics	MSCI	68%	30%	2%
Moody's ESG	S&P Global	41%	56%	3%
Moody's ESG	Refinitiv	19%	79%	2%
Moody's ESG	MSCI	66%	41%	-6%
S&P Global	Refinitiv	23%	74%	3%
S&P Global	MSCI	59%	52%	-10%
Refinitiv	MSCI	68%	38%	-7%
Average		38%	56%	6%

← Important!



# ESG Confusion and Stock Returns: Tackling the Problem of Noise

with

Julian Koelbel

Anna Pavlova

Roberto Rigobon

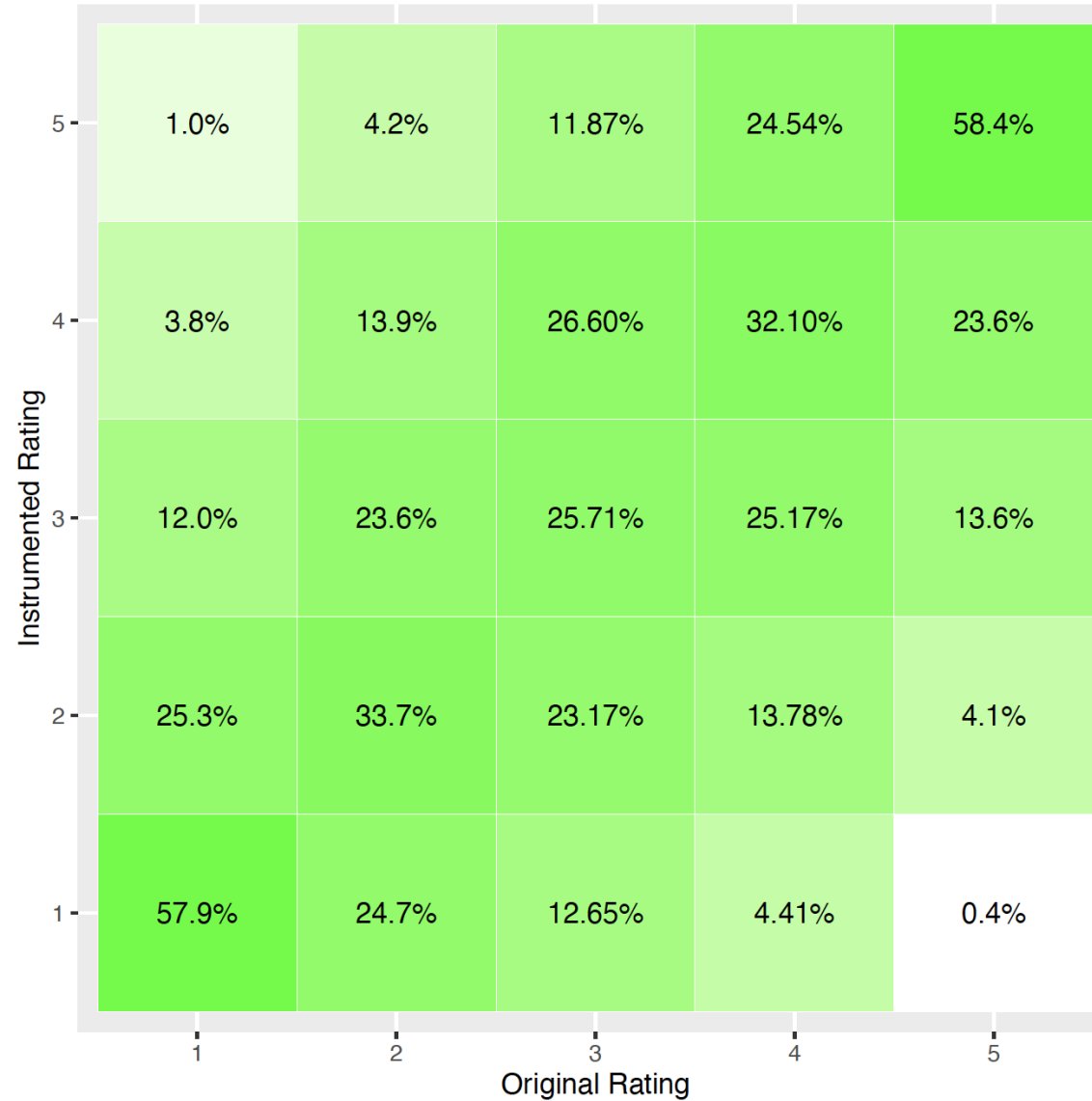
# Results

Region	Rater	OLS			Pruned IV			Ftest
		Coeffs	StdErr		Coeffs	StdErr		
EUR	ISS	0.152	0.071	**	0.137	0.054	***	1258
	MSCI	0.123	0.053	**	0.194	0.071	***	1029
	Refinitiv	0.012	0.066		0.183	0.071	***	1660
	RepRisk	0.146	0.069	**	0.333	0.072	***	432
	S&P Global	0.122	0.083		0.055	0.055		1296
	Sustainalytics	0.123	0.076		0.237	0.071	***	881
	TVL	0.039	0.066		0.634	0.071	***	125
	Moody's	0.027	0.076		0.220	0.071	***	1874
GBP	ISS	-0.265	0.132	**	-0.218	0.101	**	1160
	MSCI	-0.153	0.100		-0.318	0.136	**	225
	Refinitiv	-0.122	0.109		-0.309	0.132	**	758
	RepRisk	0.394	0.090	***	0.194	0.138		188
	S&P Global	-0.035	0.115		-0.313	0.133	**	863
	Sustainalytics	-0.025	0.128		-0.457	0.133	***	311
	TVL	0.087	0.078		0.705	0.127	***	142
	Moody's	-0.142	0.122		-0.252	0.133	*	883
JPY	ISS	0.134	0.071	*	0.143	0.056	***	1680
	MSCI	0.092	0.057		0.477	0.068	***	686
	Refinitiv	0.187	0.057	***	0.104	0.071		2065
	RepRisk	0.096	0.063		0.063	0.074		298
	S&P Global	0.093	0.074		0.330	0.068	***	1769
	Sustainalytics	0.258	0.075	***	0.473	0.069	***	591
	TVL	0.033	0.054		0.707	0.072	***	158
	Moody's	0.047	0.060		0.265	0.068	***	3230
USD	ISS	0.069	0.055		0.021	0.041		3637
	MSCI	0.067	0.041		0.149	0.057	***	1168
	Refinitiv	0.064	0.055		0.032	0.057		3361
	RepRisk	0.022	0.056		0.036	0.057		443
	S&P Global	0.012	0.045		0.083	0.057		3106
	Sustainalytics	0.140	0.069	**	0.168	0.057	***	592
	TVL	0.051	0.046		0.294	0.057	***	349
	Moody's	-0.027	0.056		0.098	0.057	*	4300

# Noise-to-Signal

	All	Pruned IV	Lasso IV
<b>Panel A: Estimation statistics</b>			
Total Possible Coefficients	512	256	256
Estimated Coefficients	427	252	175
Attenuation Cases	302	199	103
Non-Attenuations Cases	92	40	52
Sign switching	33	13	20
<b>Panel B: Noise-to-signal ratio, average by region (%)</b>			
EUR	75.42	74.89	76.98
GBP	58.94	58.15	60.15
JPY	53.61	57.97	45.35
USD	63.20	64.94	59.90
<b>Panel C: Noise-to-signal ratio, average by ESG rater (%)</b>			
ISS	18.22	19.42	16.85
MSCI	57.74	57.72	57.85
Refinitiv	68.43	66.91	71.63
RepRisk	43.04	41.98	49.79
S&P Global	75.96	76.11	75.64
Sustainalytics	54.46	60.26	47.33
TVL	90.73	90.57	91.03
Moody's	65.57	68.79	60.75
<b>Panel D: Noise-to-signal ratio, average by return horizon (%)</b>			
1-month returns	65.77	65.47	66.08
2-month returns	65.71	67.14	63.71
3-month returns	62.42	65.06	57.16
4-month returns	59.97	62.99	52.57
5-month returns	60.01	63.01	52.91
6-month returns	55.71	57.62	50.74
7-month returns	60.44	61.73	57.35
8-month returns	62.17	64.34	56.64
<b>Panel E: Noise-to-signal ratio, overall average (%)</b>			
Overall Average	61.71	63.35	58.55

# Instrumented vs Original Ratings



# Is History Repeating Itself: The (Un)Predictable past of ESG Ratings

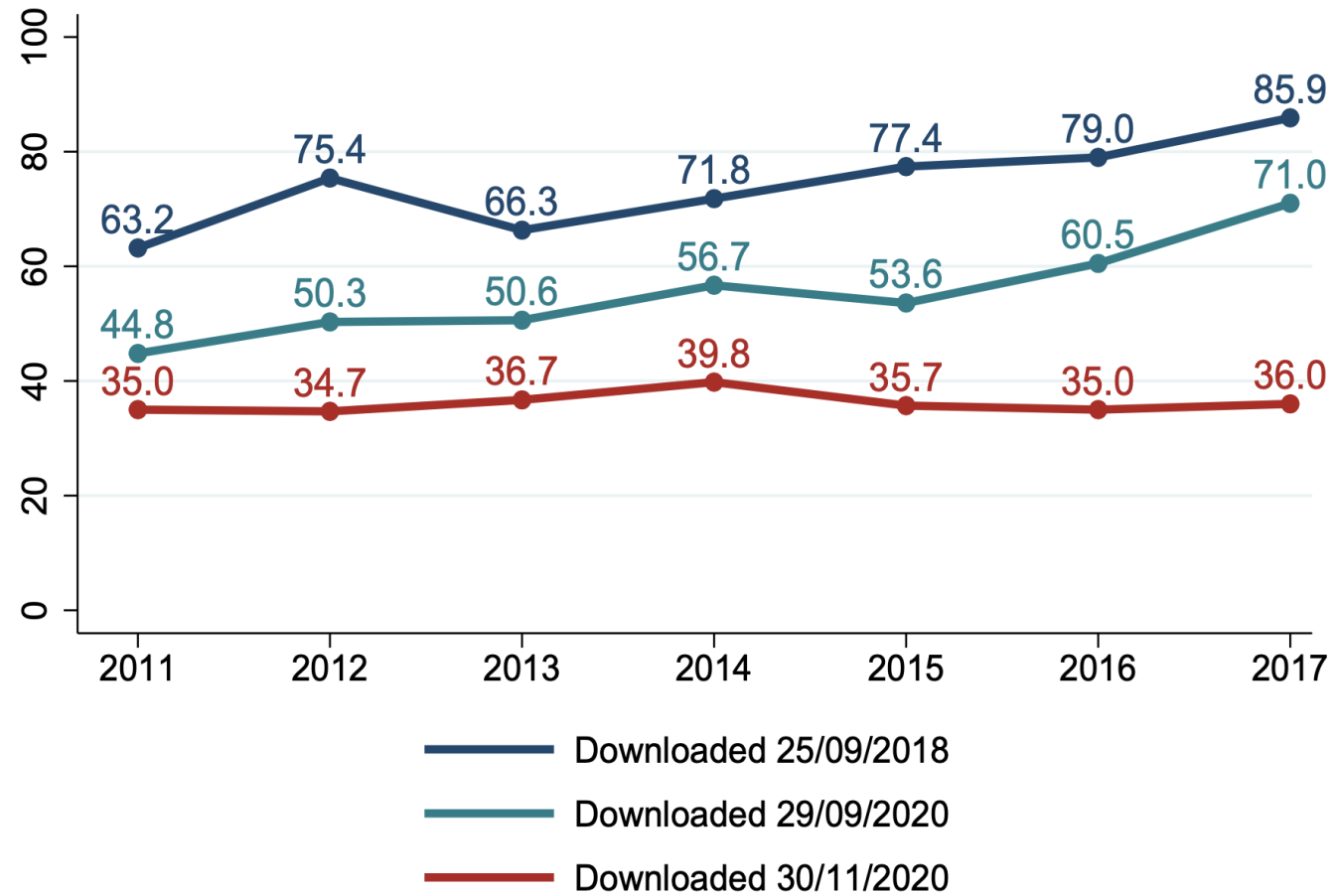
with

Kornelia Fabisik

Zacharias Sautner



# Retroactive Rewritings in the Refinitiv Database



The same firm has three different trajectories in three different downloads

# Downloads and Returns

09/2018	09/2020	03/2021
<i>Future Return</i>	<i>Future Return</i>	<i>Future Return</i>
(4)	(5)	(6)
0.892	<b>1.170**</b>	<b>1.332**</b>
(1.56)	<b>(2.09)</b>	<b>(2.33)</b>
20,874	20,874	20,874

The newer the download the higher the correlation with stock returns!

# Changes Between Downloads

	2011	2012	2013	2014	2015	2016	2017	Full Sample
Panel A: Firm-Years with Changes in Total ESG Score								
<i>ESG Score</i>	80%	80%	80%	80%	88%	92%	94%	86%
Panel B: Firm-Years with Changes in Pillar Scores								
<i>E Score</i>	51%	54%	50%	48%	53%	46%	50%	50%
<i>S Score</i>	58%	59%	59%	55%	68%	74%	73%	65%
<i>G Score</i>	43%	44%	45%	49%	54%	62%	66%	54%
Panel B: Firm-Years with Changes in Raw Data Items								
Raw Data Items	4%	4%	4%	4%	6%	7%	8%	6%

We compare ESG scores downloaded on February 9 and March 23, 2021 (just six weeks apart)!



# The Economic Impact of ESG Ratings

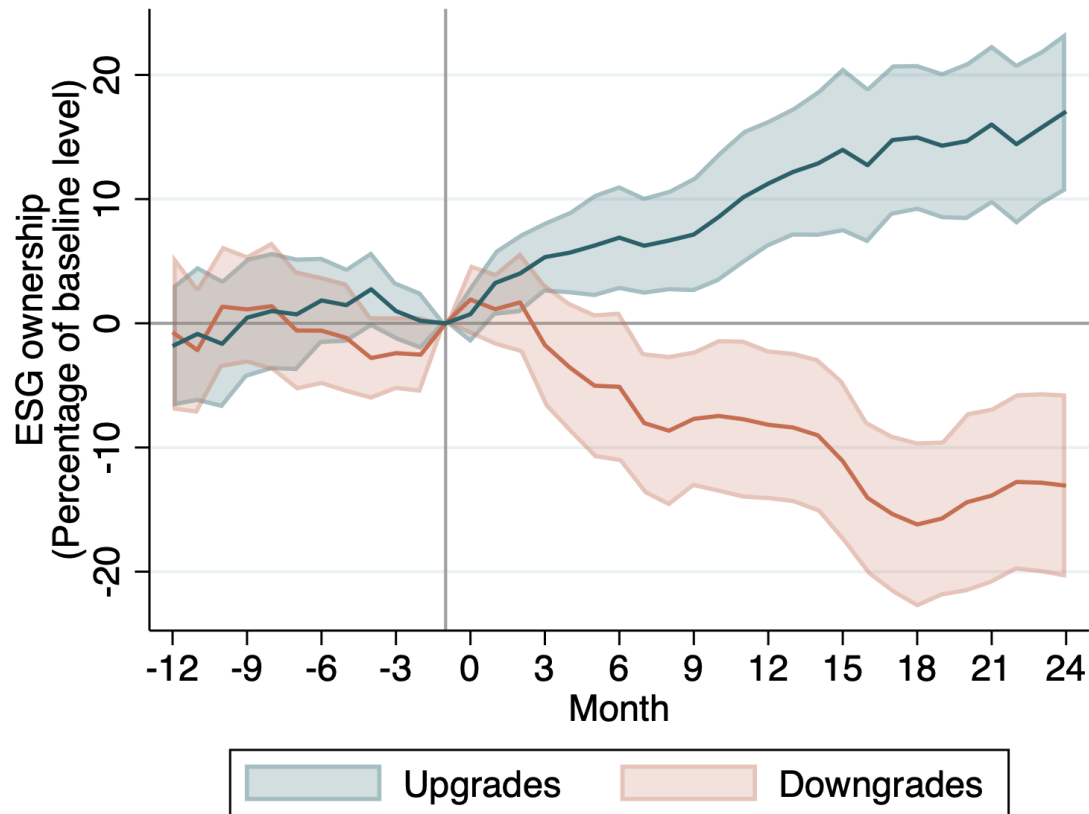
with

Florian Heeb

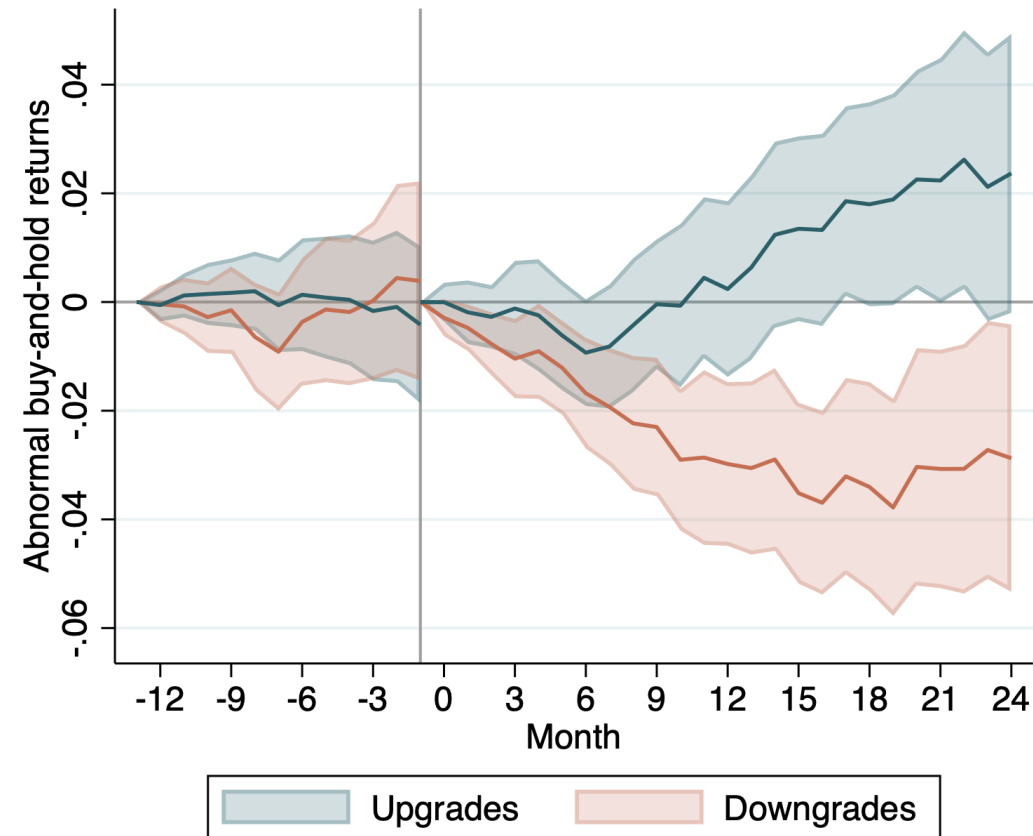
Julian Koelbel

# ESG Flows and Returns

### Fund Flows



### Returns



It takes 15 to 18 months for ESG mutual funds and returns to integrate MSCI ESG rating changes

# Implications

ESG ratings are complex constructs

ESG ratings contain a signal

No standardization

- expression of preferences
- substantial amount of measurement error