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Double Materiality as a Driver of Impact-Material Sustainability Outcomes: Evidence from the European Union

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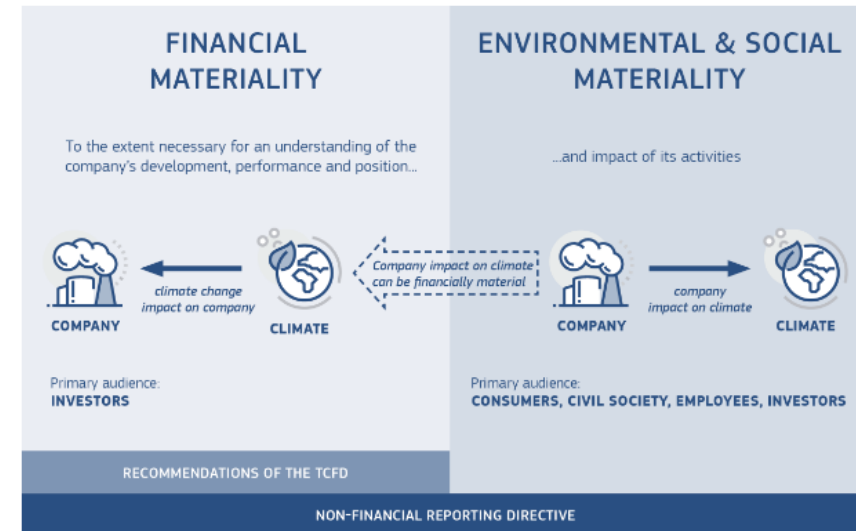
Rome – May 30, 2025

Unleash your inner pioneer



Agenda

- Motivation
- Theory and Hypothesis
- Data and Methodology
- Results
- Conclusions

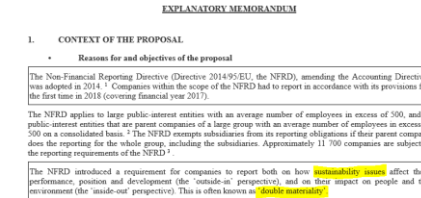


* Financial materiality is used here in the broad sense of affecting the value of the company, not just in the sense of affecting financial measures recognised in the financial statements.

Source: EC (2019) - <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0620%2801%29>

Motivation

- Fiechter et al. (2022) show an **improvement** in **overall sustainability performance** for EU firms following the NFRD relative to U.S. firms
 - Research gap: Dechow (2023); Wang et al. (2025)
 - Should we follow a single or double materiality approach in sustainability reporting (ISSB vs. NFRD/CSRD)?
 - Omnibus** (2025) discussions in the EU that considered dropping the double materiality perspective
- **RQ:** How does the passage of the NFRD – introducing **double materiality** – influence firms' **impact-material** sustainability performance?



Introduction of
double materiality



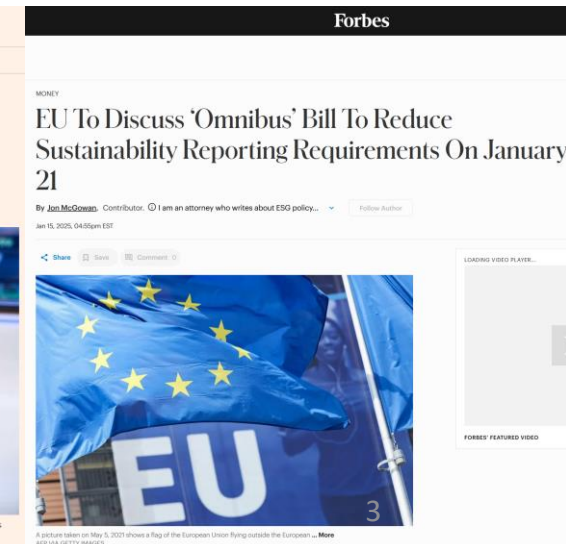
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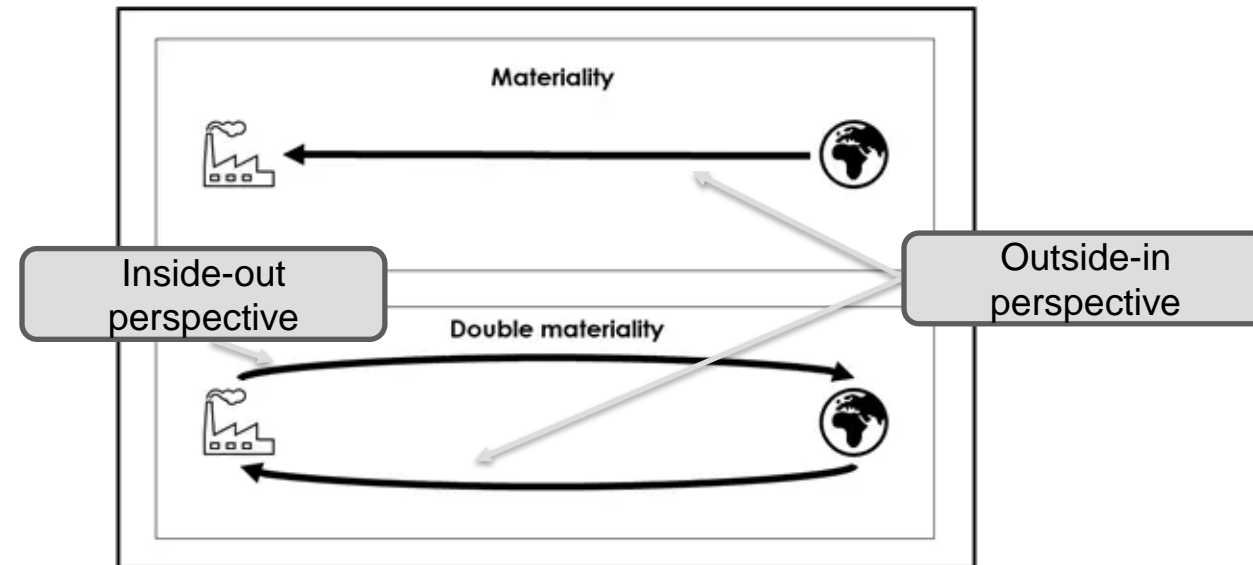
Real Effects of a Widespread CSR Reporting Mandate: Evidence from the European Union's CSR Directive

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Theory and Hypothesis

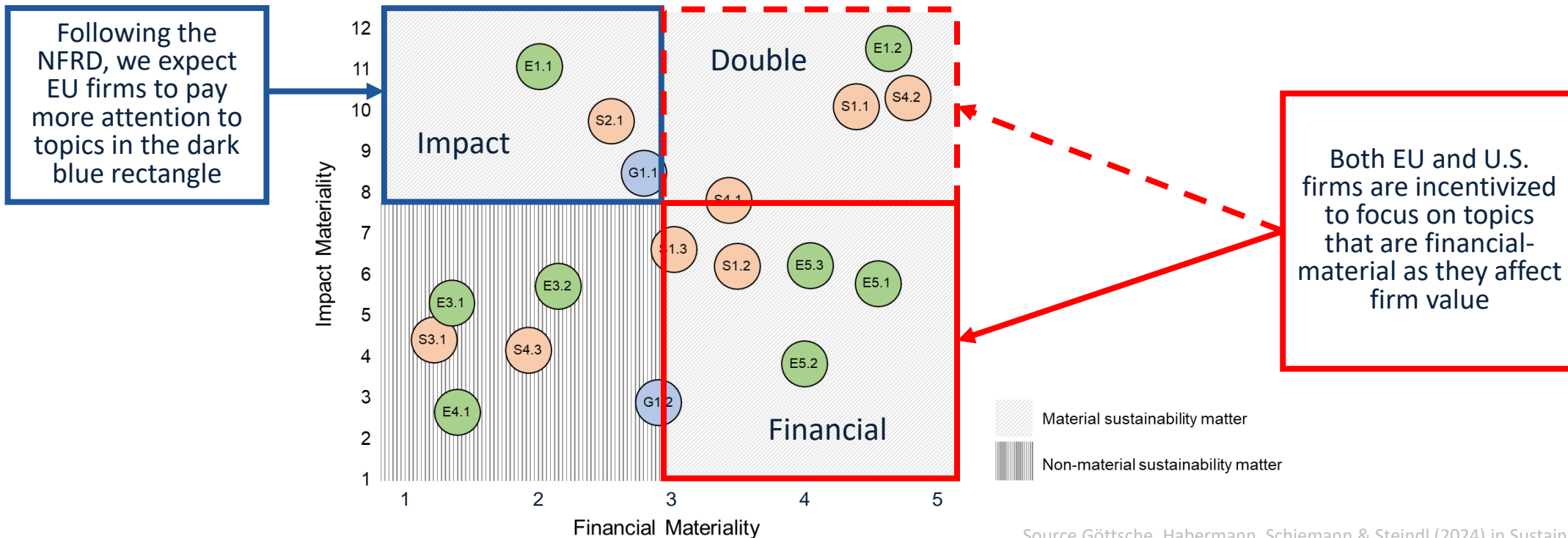
- Definition of materiality in sustainability reporting (EFRAG, 2024)
 - **Financial materiality:**
 - **Outside-in perspective:** How sustainability issues affect firm performance and value
 - Pertains to the material information about **risks and opportunities related to sustainability topics**
 - **Impact materiality:**
 - **Inside-out perspective:** firms' impact on people and the environment
 - Pertains to the material information about the undertaking's **impacts on people or the environment** related to sustainability topics



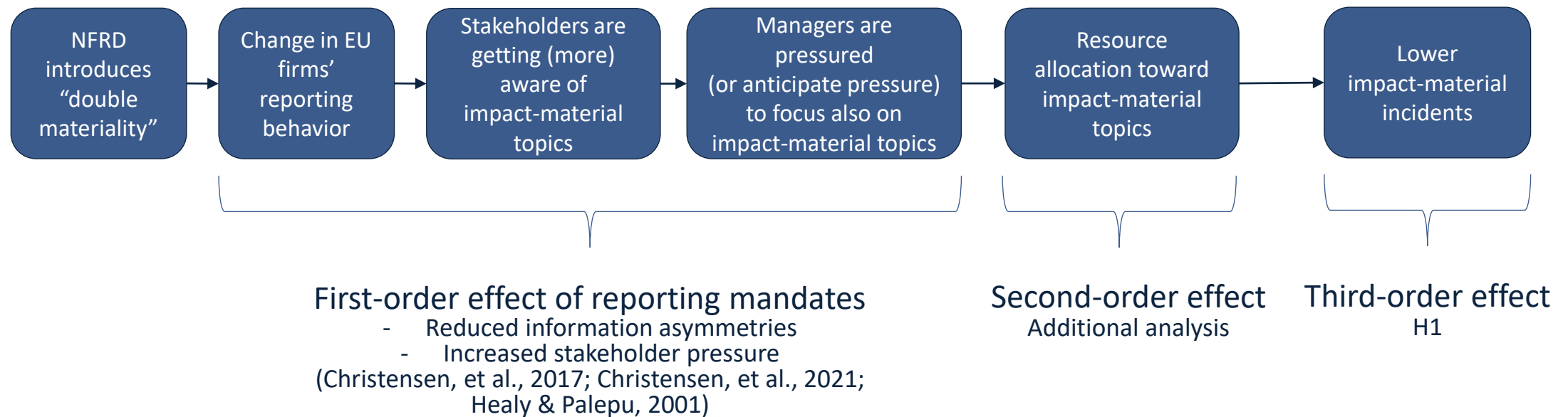
Theory and Hypothesis

- The materiality matrix – the result of the materiality assessment process

Materiality Matrix Automobilindustrie



Theory and Hypothesis



Hypothesis 1:

Firms subject to the NFRD improve their performance on impact-material sustainability topics to a higher extent than firms not subject to the NFRD.

Anecdotal Evidence of First-order Effects

- Changes in EU firms' sustainability reporting behavior – the case of Taylor Wimpey

2014 Report

Clear focus on risk and opportunities

> **Financial materiality**

Our Sustainability Steering Group (SSG) is responsible for reviewing Taylor Wimpey's Sustainability and Climate Change Risk and Opportunity Register on a six-monthly basis. The register aims to highlight all relevant material risks and opportunities facing the Company in relation to sustainability and climate change.



2016 Report

Next to the focus on risk and opportunities, also focus on impacts

> **Double materiality (including impact materiality)**

The assessment considered and ranked a wide range of issues. It took account of how important each issue is to our business strategy; which issues could represent a significant risk or opportunity for the business; how important each issue is to our key stakeholders (including investors, customers, employees, communities and local government); and whether our business operations could have a significant negative or positive impact on an issue. Further details are included on page 44.

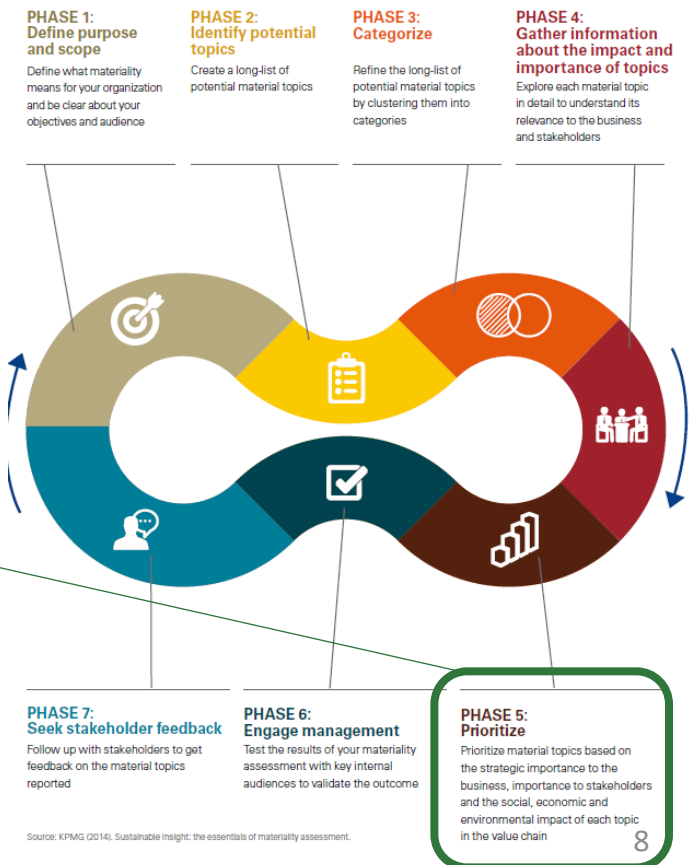
Anecdotal Evidence of First-order Effects

- Big4 auditing firms start to include impact materiality perspective (as of 2014)

PHASE 5: Prioritize

Prioritize material topics based on the strategic importance to the business, importance to stakeholders and the social, economic and environmental impact of each topic in the value chain

KPMG's guide to the materiality process



Data and Methodology

Statistic	EU			U.S.		
	N	Mean	St. Dev.	N	Mean	St.Dev
<i>Dependent variables</i>						
OverallESGIncident	2,849	27.80	17.25	2,849	31.05	15.04
FinancialESGIncident	2,849	17.11	17.00	2,849	18.86	17.01
ImpactESGIncident	2,849	23.38	16.86	2,849	26.82	14.77
<i>Control variables</i>						
lnTA	2,849	16.17	1.42	2,849	16.47	0.97
lnAF	2,849	2.88	0.47	2,849	3.00	0.35
LEV	2,849	0.75	1.02	2,849	0.66	0.22
CFO	2,849	0.14	0.28	2,849	0.11	0.07
lnFF	2,849	4.32	0.30	2,849	4.41	0.19
ATO	2,849	1.14	2.09	2,849	0.69	0.50
DPS	2,849	0.55	0.81	2,849	0.53	0.70
lnTQ	2,849	0.45	0.59	2,849	0.76	0.49
PPE	2,849	0.35	0.57	2,849	0.37	0.28
ROA	2,849	0.09	0.21	2,849	0.06	0.07
CORPGOV	2,849	60.34	20.78	2,849	59.42	21.44
<i>Policy test variables</i>						
EMISSION	414	74.30	22.35	630	62.52	32.19
WORKFORCE	558	80.47	16.23	531	75.27	19.60
HUMANRIGHTS	1,359	62.89	31.58	1,350	45.77	37.59
PRODUCTRESP	585	69.57	27.12	423	52.03	29.91
CORRUPTION	765	52.16	23.34	639	63.36	8.53

Notes: This table shows descriptive statistics for EU and U.S. firms in the PSM sample.

Panel A: Selection criteria					EU Sample				U.S. Sample			
Start: Unmatched Sample 2011 – 2021					5,865				5,692			
ISINs based on Fiechter et al. 2022												
Less observations of firms:												
Without RepRisk data					792				1,800			
Without data for Bloomberg Disclosure Score					91				49			
Without data for control variables					64				0			
Financial institutions (SICS = FN)					1,422				1,155			
Final sample before matching					3,496				2,668			
Final sample after matching					2,849				2,849			
Panel B: Sample distribution per year												
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
EU firms	259	259	259	259	259	259	259	259	259	259	259	
U.S. firms	259	259	259	259	259	259	259	259	259	259	259	
Panel C: Sample distribution per industry												
SICS	EU				US				Total			
CG	209				110				319			
EM	286				242				528			
FB	286				396				682			
HC	187				187				374			
IF	451				308				759			
RR	22				99				121			
RT	506				374				880			
SV	297				660				957			
TC	418				176				594			
TR	187				297				484			
Total	2,849				2,849				5,698			

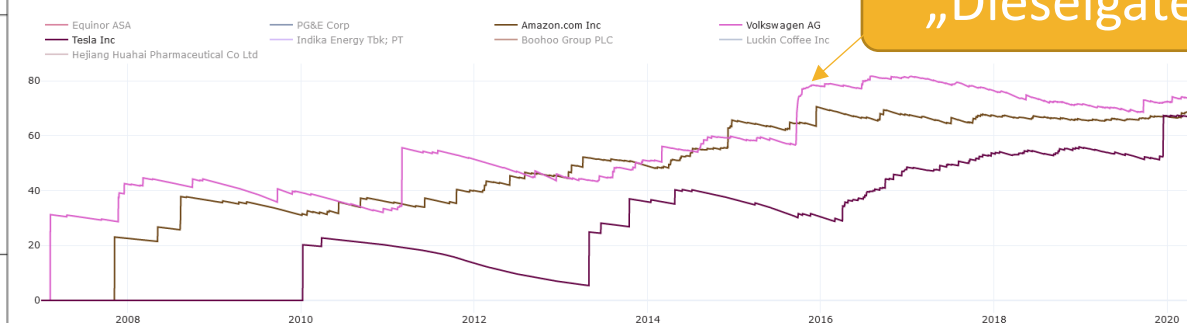
Note. Fiechter et al. (2022) provide a list of EU and U.S. firms that fulfill the selection criteria for the NFRD. We follow this selection and use the identified ISINs as our initial EU sample. Due to an alternative dependent variable (i.e., RepRisk) and alternative selection criteria (i.e., sample period and the exclusion of financial institutions), the sample size and distribution differ.

Data and Methodology

- How to measure real effects? RepRisk Incident (RRI) Score
 - Rules-based methodology: the scores are updated daily by screening over 100,000 public sources (e.g., print and online media, newsletters, and government bodies) in 23 languages; each incident is evaluated based on three parameters: severity, reach, and novelty
 - RRI covers 28 ESG issues spanning over the ESG pillars
 - RRI is a score that ranges from zero to 100, where zero is the best possible performance (i.e., there were no ESG incidents for a respective firm) while 100 is the worst performance
 - **RRI can be aligned with SASB Standards** = financial material and immaterial RRI (i.e., ESG incidents)

Environment	Social		Governance
Environmental Footprint <ul style="list-style-type: none"> • Climate change, GHG emissions, and global pollution • Local pollution • Impacts on landscapes, ecosystems, and biodiversity • Overuse and wasting of resources • Waste issues • Animal mistreatment 	Community Relations <ul style="list-style-type: none"> • Human rights abuses, corporate complicity • Impacts on communities • Local participation issues • Social discrimination 	Employee Relations <ul style="list-style-type: none"> • Forced labor • Child labor • Freedom of association and collective bargaining • Discrimination in employment • Occupational health and safety issues • Poor employment conditions 	Corporate Governance <ul style="list-style-type: none"> • Corruption, bribery, extortion, money laundering • Executive compensation issues • Misleading communication • Fraud • Tax evasion • Tax optimization
Cross-cutting Issues <ul style="list-style-type: none"> • Controversial products and services • Products (health and environmental issues) • Supply chain issues • Violation of national legislation • Violation of international standards 			

ESG Scores



„Dieselgate“

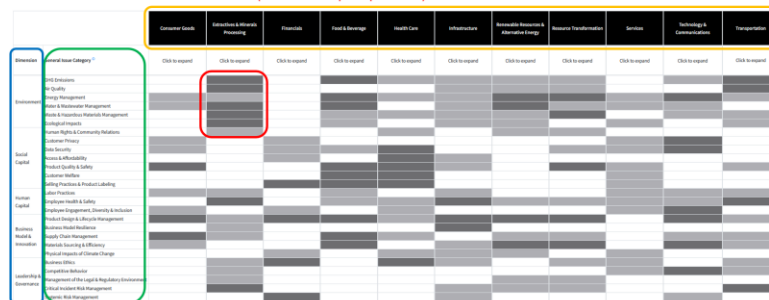
Data and Methodology

- What can we measure with RepRisk Incident Scores?

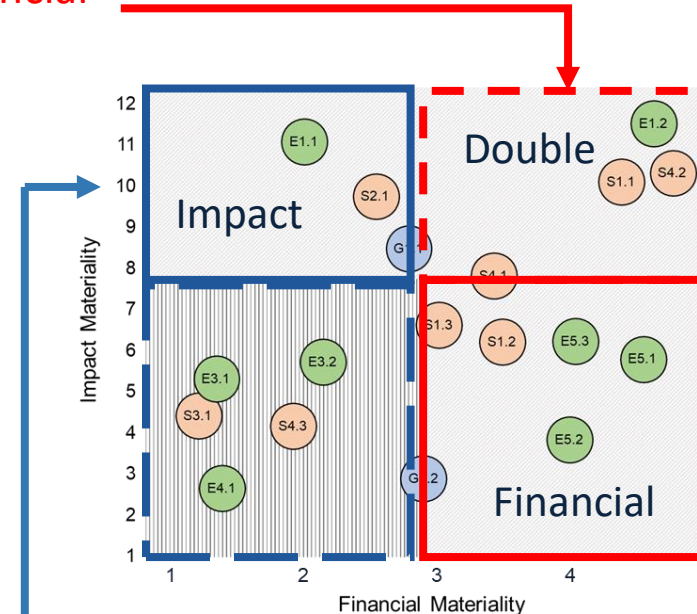
- *FinancialESGIncident* captures all SASB financial-material topics (i.e., the black boxes)

Sustainability Accounting Standards Board (SASB) Materiality Map®

- 5 Dimensions (Environment, Social Capital, Human Capital, Business Model & Innovation, Leadership & Governance)
- 26 General Issue Categories (GIC)
- 11 Sectors and 77 Sub-sectors
- Focus on financial material issues (outside-in perspective)



- *ImpactESGIncident* captures all remaining topics (including impact-material topics)



Environment	Social	Governance
E1.1 Energy	S1.1 Health & Safety	G1.1 Corruption and bribery
E1.2 Climate Change Mitigation	S1.2 Training and skills development	G1.2 Political Engagement
E3.1 Water consumption	S1.3 Equal treatment and opportunities for all	
E3.2 Water discharges	S2.1 Human Rights	
E4.1 Biodiversity and ecosystems	S3.1 Communities' economic, social and cultural rights	
E5.1 Waste	S4.1 Privacy	
E5.2 Resources inflows	S4.2 Personal safety of consumers and/or end-users	
E5.3 Circular economy	S4.3 Responsible marketing practices	

Material sustainability matter
Non-material sustainability matter

Data and Methodology

- We test our hypotheses with the model that is denoted by Eq. (1) (firm and time subscripts omitted):

$$ImpactESGIncident = \beta_0 + \beta_1 EU\ FIRMS \times AFTER + \sum \beta_k X_k + \delta + \varphi + \varepsilon \quad (1)$$

- ***ImpactESGIncident*** is the dependent variable
- ***EU FIRMS*** is an indicator variable that is one for EU firms and zero for U.S. firms. ***AFTER*** is 1 if *YEAR* > 2013.
- We test the average treatment effect with *EU FIRMS* × *AFTER*
- Further, *YEAR* is a factor variable (2011 to 2021) with 2013 as the base year (i.e., the coefficient is zero by construction)
- The interaction ***EU FIRMS* × *YEAR*** shows the yearly treatment effects (*YEAR* > 2013)
- The vector *X* includes time-variant firm-level controls, such as firm size and profitability
- δ are firm fixed effects, φ are time fixed effects, and ε depicts the error term

Main results

Post-NFRD:

- Lower **impact**-material ESG incidents
- No change in **financial**-material ESG incidents
- **Treatment effect is statistically different** for impact and financial-material ESG incidents

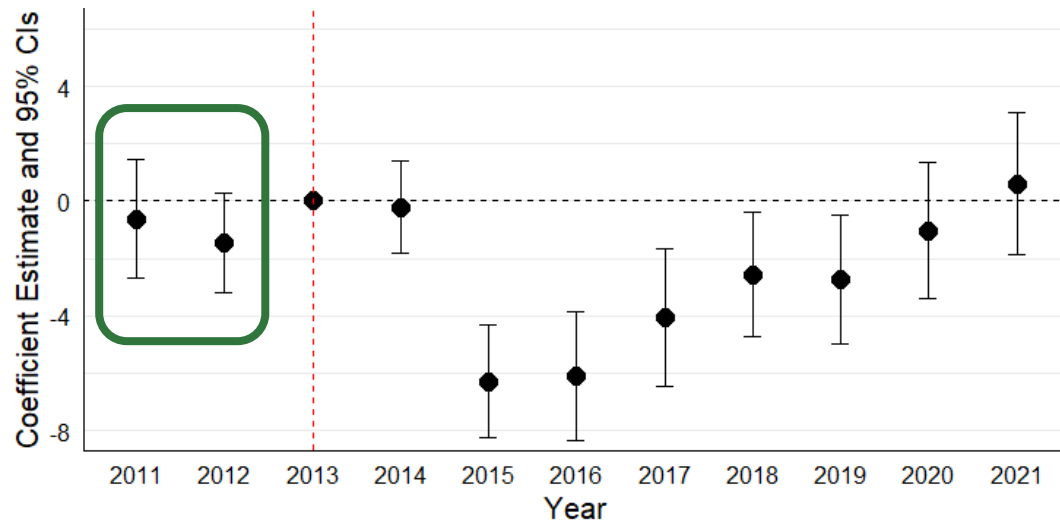
Table 3: Impact-material versus financial-material sustainability outcomes

VARIABLES	(1) ImpactESGIncident	(2) FinancialESGIncident
EU FIRMS × AFTER	-2.169*** (-2.633)	-0.286 (-0.339)
lnTA	3.752*** (5.137)	3.876*** (4.467)
lnAF	0.113 (0.090)	-0.928 (-0.761)
LEV	-2.091 (-1.600)	-0.110 (-0.096)
CFO	-2.649 (-1.196)	-5.060** (-2.218)
lnFF	4.399** (2.508)	11.772*** (6.192)
ATO	0.329 (0.620)	0.124 (0.165)
DPS	0.250 (1.182)	0.395** (2.191)
PPE	-0.708 (-0.257)	4.886 (1.595)
lnTQ	0.906 (1.120)	2.062** (2.440)
ROA	-2.937 (-1.236)	0.053 (0.019)
CORPGOV	0.013 (1.166)	0.009 (0.683)
Difference test: EU FIRMS × AFTER (1) ≠ (2)		
Estimated (bootstrap) difference (2) - (1)	-1.882***	
p-value (bootstrap)	0.003	
Observations	5,698	5,698
Firm fixed effects	Yes	Yes
Industry × year fixed effects	Yes	Yes
Adjusted R-squared	0.249	0.242
Number of FirmID	518	518

Notes: The table shows the results for estimating Eq. (1) using OLS regression with ImpactESGIncident or FinancialESGIncident as the dependent variable. AFTER is a dummy variable that is one after the year 2013 and zero otherwise. EU FIRMS is a dummy variable that equals one for firms headquartered in an EU member state and is zero otherwise. By interacting AFTER with EU FIRMS, we receive the average treatment effects. Reported t-statistics (in parentheses) are based on heteroscedasticity-robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The estimated difference in EU FIRMS × AFTER of Col. (1) and Col. (2) is obtained via a nonparametric bootstrap procedure with 100 resamples clustered at the firm level. The reported p-value corresponds to the hypothesis test that the treatment effects are equal across the outcome variables ImpactESGIncident and FinancialESGIncident. Detailed variable descriptions can be found in Table A of Appendix C.

Parallel Trends

- Dynamic DiD impact-material sustainability performance
 - Significantly lower impact-material incidents in the post period.
 - In the pre-period, coefficients are small in magnitude and statistically insignificant



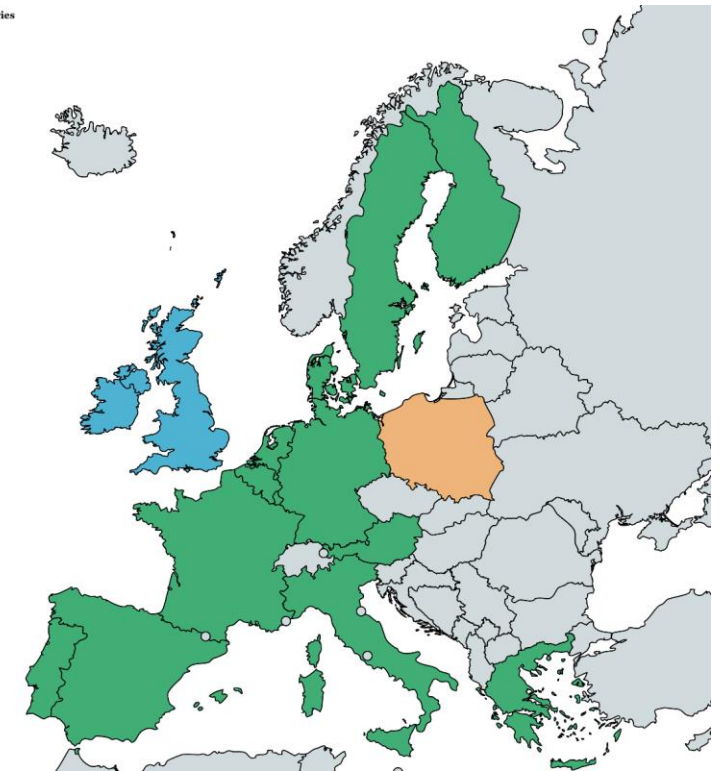
VARIABLES	(1) ImpactESGIncident
EU FIRMS × YEAR (= 2011)	-0.618 (-0.583)
EU FIRMS × YEAR (= 2012)	-1.448 (-1.626)
EU FIRMS × YEAR (= 2014)	-0.223 (-0.272)
EU FIRMS × YEAR (= 2015)	-6.287*** (-6.292)
EU FIRMS × YEAR (= 2016)	-6.115*** (-5.352)
EU FIRMS × YEAR (= 2017)	-4.070*** (-3.350)
EU FIRMS × YEAR (= 2018)	-2.573** (-2.324)
EU FIRMS × YEAR (= 2019)	-2.731** (-2.383)
EU FIRMS × YEAR (= 2020)	-1.035 (-0.858)
EU FIRMS × YEAR (= 2021)	0.597 (0.474)
Observations	5,698
Controls	Yes
Firm fixed effects	Yes
Industry × year fixed effects	Yes
Adjusted R-squared	0.260
Number of FirmID	518

Notes: The table shows the results for estimating Eq. (1) using OLS regression with ImpactESGIncident as the dependent variable. YEAR replaces AFTER and is a factor variable (2011 to 2021) with 2013 as the base year. EU FIRMS is a dummy variable that equals one for firms headquartered in an EU member state and is zero otherwise. By interacting YEAR with EU FIRMS, we receive yearly treatment effects, before (2011 and 2012) and after (2014 to 2021) the base year 2013, respectively. Reported t-statistics (in parentheses) are based on heteroscedasticity-robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable descriptions can be found in Table A of Appendix C.

EU Firms and Countries' Legal Origin

- Following Liang & Renneboog (2017; JoF), **common law countries** have **lower sustainability performance** (due to stronger shareholder focus) than civil law countries
- We anticipate **greater learning opportunities and a larger scope for improvement** among firms in EU common law countries
- We test this expectation by **splitting the treated group** into EU common law countries (**UK and Ireland**) and the remaining EU sample firms (**green** and **orange**)
- U.S. firms form the control group
- We further conduct a within EU test

EU common and civil law countries



EU Countries' Legal Origin

Post-NFRD:

- Main effect is concentrated in **common law** countries (Col. 1)
- And **not** in civil **law** countries (Col. 2)
- **Comparing EU** firms in **common vs. civil law** countries **support** our main findings (Col. 3)

VARIABLES	ImpactESGIncident		
	(1) EU common law countries vs. US	(2) Rest of EU vs. US	(3) EU common vs. EU civil law countries
EU COMMON × AFTER	-4.477*** (-4.049)		-4.020*** (-3.558)
EU REST × AFTER		-0.981 (-1.030)	
Test for difference in EU COMMON (Col. 1) and EU REST (Col. 2)			
χ ² -test p-value:	0.000		
Observations	3,883	4,664	2,805
Controls	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes
Adjusted R-squared	0.345	0.296	0.140
Number of FirmID	353	424	255

Notes: The table shows the results for estimating Eq. (1) using OLS regression conditional on countries' legal origin with ImpactESGIncident as the dependent variable. AFTER is a dummy variable that is one after the year 2013 and zero otherwise. In Col. 1, EU COMMON is a dummy variable that equals one for firms headquartered in the UK and IE (i.e., EU countries with common law) and is zero for firms headquartered in the US. In Col. 2, EU REST is a dummy variable that equals one for EU firms *not* headquartered in the UK and IE (i.e., no common law countries) and is zero for firms headquartered in the US. In Col. 3, EU COMMON is again a dummy variable that equals one for firms headquartered in the UK and Ireland (i.e., the EU countries with common law), but in this setting, we use EU firms in civil law countries (e.g., Germany or France) as controls. Thus, EU COMMON is zero for firms headquartered in EU member states with civil law countries. By interacting EU COMMON or EU REST with AFTER, we receive the average treatment effect. We report p-values from a χ²-tests for the differences in countries' legal origin across the *EU COMMON × AFTER* (Col. 1) and *EU REST × AFTER* (Col. 2). Reported t-statistics (in parentheses) are based on heteroscedasticity-robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable descriptions can be found in Table A of Appendix C.

Pre-NFRD Firm-level Differences

- We test whether we find plausible heterogeneity in the treatment effect based on (i.) the scope of non-financial disclosure, (ii.) the voluntary adoption of the Global Reporting Initiative (GRI) standards, and (iii.) the existence of a stakeholder engagement process

VARIABLES	ImpactESGIncident					
	(1)		(2)		(3)	
	Low disclosure scope		No GRI adoption		No stakeholder engagement	
	All years	Donut regression (2014 & 2015 dropped)	All years	Donut regression (2014 & 2015 dropped)	All years	Donut regression (2014 & 2015 dropped)
EU FIRMS × AFTER × LOWSCOPE	-3.228** (-2.147)	-4.091** (-2.423)				
EU FIRMS × AFTER × NOGRIADOPT			-2.413 (-1.484)	-3.833** (-2.075)		
EU FIRMS × AFTER × NOSTAKEENG					-1.979 (-1.318)	-3.509** (-2.088)
Observations	5,698	4,662	5,698	4,662	5,698	4,662
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.250	0.286	0.249	0.285	0.253	0.289
Number of FirmID	518	518	518	518	518	518

Notes: The table shows the results for estimating Eq. (1) using OLS regression and ImpactESGIncident as the dependent variable and the three-way interaction term EU FIRMS × AFTER × PRE-NFRD. AFTER is a dummy variable that is one after the year 2013 and zero otherwise. EU FIRMS is a dummy variable that equals one for firms headquartered in an EU member state and is zero otherwise. PRE-NFRD is either LOWSCOPE, NOGRIADOPT, or NOSTAKEENG. By interacting AFTER with EU FIRMS and PRE-NFRD, we receive the average treatment effect for the respective treatment group that is either LOWSCOPE, NOGRIADOPT, or NOSTAKEENG. Cols. 1, 3, and 5 use all sample years. In Cols. 2, 4, and 6, we conduct donut regressions by dropping the years 2014 and 2015. Reported t-statistics (in parentheses) are based on heteroscedasticity-robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable descriptions can be found in Table A of Appendix C.

NFRD Disclosure Topics and Internal Firm Changes

- Test of the second-order effect: internal resource allocation

Disclosure topic/ LSEG score	SASB GIC	Immaterial in sectors
Emission	GHG Emissions	CG and SV
Workforce	Labour Practices	HC, RR, and RT
Human Rights	Human Rights & Community Relations	CG, FB, IF, SV, TC, and TP
Product Responsibility	Product Quality & Safety	EM, RR, and TC
Corruption	Business Ethics	CG, FB, RR, and TC

Find all sector abbreviations here: Health Care (HC), Technology & Communications (TC), Extractives & Minerals Processing (EM), Transportation (TR), Services (SV), Resource Transformation (RT), Consumer Goods (CG), Food & Beverage (FB), Renewable Resources & Alternative Energy (RR), Infrastructure (IF).

The table shows the classification of sectors in which the respective dependent variable is (see Eq. (3)) is defined as immaterial (or impact material) according to the SASB materiality map (see Appendix A, Figure A). We further use the classification for limiting the sample to EU and U.S. firms operating in the respective sectors below. For instance, when focusing on emissions, we limit the sample to firms operating in the CG and SV sectors. By doing so, we can examine whether (treated) EU firms improved their internal performance on impact material sustainability topics to a higher extent than (control) U.S. firms.

VARIABLES	(1) EMISSION	(2) WORKFORCE	(3) HUMANRIGHTS	(4) PRODUCTRESP	(5) CORRUPTION	(6) BOARDDIVERSITY
EU FIRMS × AFTER	-10.29*** (-3.342)	4.198 (1.470)	-1.874 (-0.746)	19.12*** (4.599)	9.978*** (4.122)	5.507*** (7.637)
Observations	1,276	1,331	3,310	1,231	1,715	3,432
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.637	0.311	0.395	0.239	0.075	0.549
Number of FirmID	116	121	301	112	156	312

Notes: The table shows the results for estimating Eq. (2) using OLS regression and the respective LSEG policy scores as the dependent variable. The sample consists of both EU and U.S. firms operating in sectors for which the respective dependent variable is defined as an impact-material one (see Table C in Appendix D for more details on sample selection). EU FIRMS is a dummy variable that equals one for firms headquartered in an EU member state and is zero otherwise. AFTER is a dummy variable that is one after the year 2013 and zero otherwise. By interacting both variables, we receive the average treatment effect of double materiality on immaterial sustainability policies. Reported t-statistics (in parentheses) are based on heteroscedasticity-robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Detailed variable descriptions can be found in Table A of Appendix B.

Conclusions

- This study:
 - **expands the knowledge on the concept of materiality** (Bochkay et al., 2022; Göttzsche et al., 2023; Grewal et al., 2021; Spandel et al., 2022) as we shift the focus from financial materiality to double materiality.
 - addresses the call to investigate the **underlying mechanisms that drive the real effects** of non-financial disclosure mandates (Christensen et al., 2017; Dechow, 2023; Wang et al., 2025) by uncovering a previously unexplored mechanism: the introduction of mandatory double materiality disclosure.
 - given the private sector's important role in the transition to a more sustainable economy (Friedmann & Ormazabal, 2024), non-financial reporting mandates should incorporate **double rather than single (financial) materiality**.
 - provides important implications for policymakers: an exclusive focus on financial materiality in non-financial reporting means that potential **positive impacts** on the environment and society **are left on the table** (but our study cannot speak to the cost side).
 - Further research, using our methodological setting, can examine how the introduction of a non-financial disclosure mandate following **financial/impact/double materiality** can also lead to **impact-material sustainability outcomes**



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Titre fin

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