Voluntary carbon disclosures –
Walking the walk or just talking the talk?

SIMON ANETSMANN[#], STEFAN TRÜCK[*], MARCO WILKENS[#]
UNIVERSITY OF AUGSBURG
DEPARTMENT OF ACTUARIAL STUDIES AND BUSINESS ANALYTICS

10th Financial Risk Day, April 20, 2021

Outline

1. Motivation

2. Disclosure Theories

3. The Carbon Disclosure Project

4. Empirical Analysis

5. Conclusions

Motivation

Increasing importance of corporate social reporting (CSR) and voluntary carbon disclosure for industry.

The question "Does it pay to be green" and the corresponding link between environmental and corporate financial performance has been extensively in the focus of business and environmental research.

So far relatively little research on the effects of carbon disclosure on subsequent company financial and environmental performance.

Motivation

| Carbon Trading | "What gets measured can be managed" | Surge of voluntary disclosure programs like CDP |
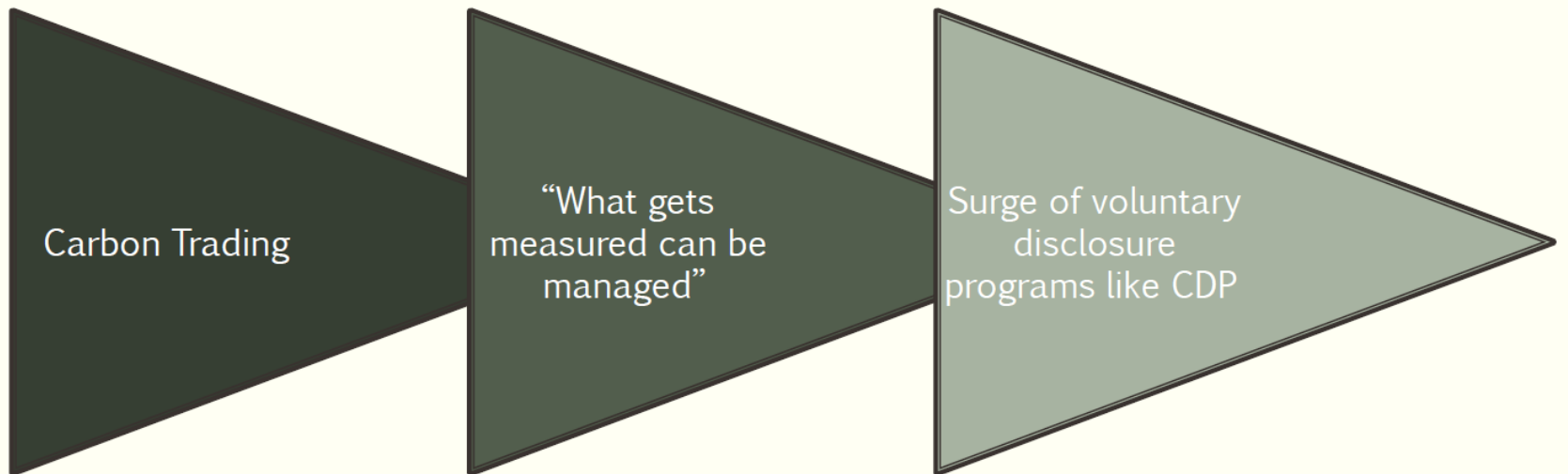
? Does the hypothesized positive effect of carbon disclosure exist and how is it influenced by impression management and disclosure quality? ?

Motivation

- Rise of carbon trading and voluntary carbon disclosure in recent years.

- Increased demand for environmental disclosure by stakeholders.

- Establishment of carbon emissions as additional risk factor (stranded assets, divestment, carbon bubbles, etc.)

- Public debate centering around an assumed positive effect of carbon disclosure.

- **Expectation about a positive relationship between voluntary disclosure and environmental (possibly also financial) performance** of companies.

- Better financial performance of clean / reporting companies should be driven by changes in preference of investors.

Motivation

- A number of related studies with rather discouraging results:
  - No significant changes in holdings of different investor groups for a sample period up to 2016 (Benz et al., 2021)
  - No significant effect of carbon disclosure scores on future financial performance of firms (Anetsmann et al., 2021)
  - Firms with unfavorable news to disclose use linguistic obfuscation in information disclosure to manage the tension between the pressure for more complete disclosures and the desire to project a positive image (Fabrizio and Kim, 2019).

- Provide a study that thoroughly examines the relationship between carbon disclosure and environmental performance.

- Examine the impact of the assigned disclosure score as well as additional textual measures of disclosure quality (so-called impression score)

Theories of Carbon Disclosure

The "outside-in" view – disclose to improve

- **Stakeholder communication and disclosure in response to public pressure leads to enhanced measurement activities and consequently advances sustainability performance** (Burritt and Schaltegger, 2010)

- "Outside-in" path to corporate sustainability, as public expectations are assessed by corporates in order to be capable of deriving performance measures for the company.

- Carbon reporting leads to gains in efficiency in the management of emissions and consequently to an improvement of carbon performance (Tang and Demeritt, 2018).

- For a CDP sample of Global 500 companies during the years 2008 to 2011, companies with more thorough disclosure show lower carbon intensities in subsequent years (Qian and Schaltegger, 2013, 2017)

The "legitimacy" view – disclose to conform

- Legitimacy, considered a status rather than a process, can only be prevalent if a company's value construct is in accordance with the values of the system that it belongs to (Lindblom, 1994)

- Firms will act to maintain their perceived legitimacy by changing their output and operations to conform to expectations of the public.

- **Disclosure is assumed to be a legitimacy tool and would neither mirror nor have a positive impact on performance.**

- In this case disclosure demonstrates the adherence to social norms and regulations demanding it **("tick-box attitude").**

- Hassan and Romilly (2018) investigate a multi-year sample of global scope, observing that worse environmental performance is preceded by increased disclosure.

The "greenwashing" view – disclose to impress

- While pressure from organizational outsiders affects corporate disclosure, it may not bring forth complete and unbiased information (Liesen et al., 2015).

- Discretional environmental reporting → Companies are free to share biased information or selectively communicate to the outside world as they see fit (Gray & Bebbington, 2000).

- **Companies may only disclose to circumvent a closer examination by public** (Stanny, 2013).

- **Disclosure can be driven by an opportunistic motive and serves an impression management tool** which enables strategic introduction of bias into the reporting (Merkl-Davies and Brennan, 2007).

- Strategy: emphasize good news, whereas bad news are obfuscated, and make use of thematic or rhetorical manipulation of verbal information.

- CDP report preparers use more obfuscation if they wish to lessen the negative impact of lower CDP scores (Fabrizio & Kim, 2019).

Disclosure Theories and Hypotheses

1

"Outside-in" view – disclose to impress

- View coined by Schaltegger and Wagner (2006)
- Disclosure as impetus to change operations, since measurement enables better management
- Evidence: Qian and Schaltegger (2013, 2017); Alsaifi (2021); theoretical insights by Tang and Demeritt (2018)

H1: $CDP_t \uparrow \rightarrow CEP_{t+1} \uparrow$

2

The "legitimacy" view – disclose to conform

- View based on legitimacy view
- Disclosure as pure means to justify license of operations and to adhere to social pressure
- Evidence: Matisoff (2013); He, Tang and Wang (2013); Hassan and Romilly (2018); theoretical insights by Tang and Demeritt (2018)

H2: $CDP_t \uparrow \rightarrow CEP_{t+1}$ $0 / \downarrow$

3

The "greenwashing" view – disclose to impress

- Based on hard-to-quantify nature of CSR reports, disclosure quality influences informational value
- According to impression management strategies (Merkl-Davies and Brennan; 2007) quality indicators are derived
- Evidence: Fabrizio and Kim (2016; 2019)

H3: $Quality_t \downarrow \rightarrow CEP_{t+1} \downarrow$
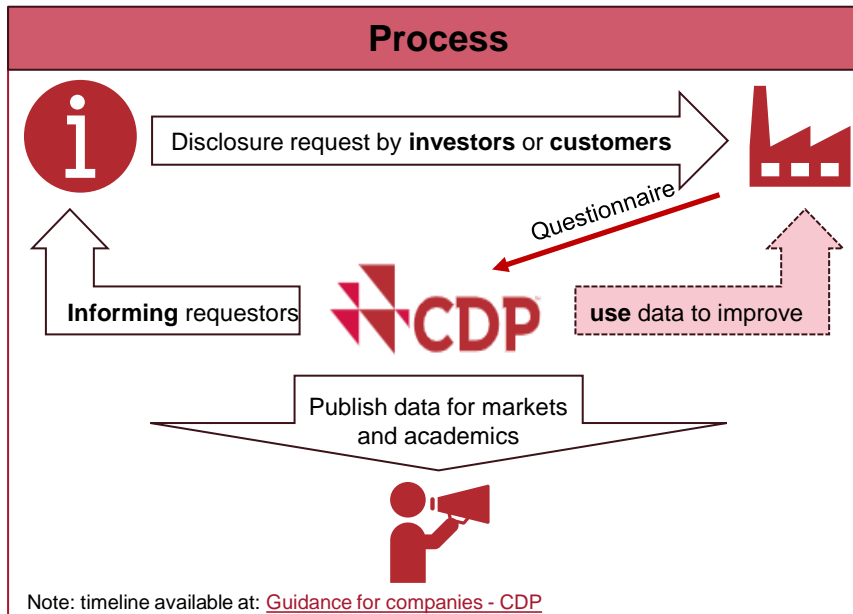
The Carbon Disclosure Project

CDP is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.

The Carbon Disclosure Project

- The Carbon Disclosure Project (CDP) was founded in 2000 as an international association of investors with concerns about the impact of climate change on corporations.

- By 2020, the number of signatory investors urging companies to disclose in the climate change program encompasses 515 investors with US$106 trillion Assets under Management.

- The number of companies asked to disclose grows steadily, targeting over 8,000 companies in 2020.

- As highlighted by CDP, neither themselves nor scoring partners verify information that is disclosed by individual companies, but only advise to provide accurate responses.
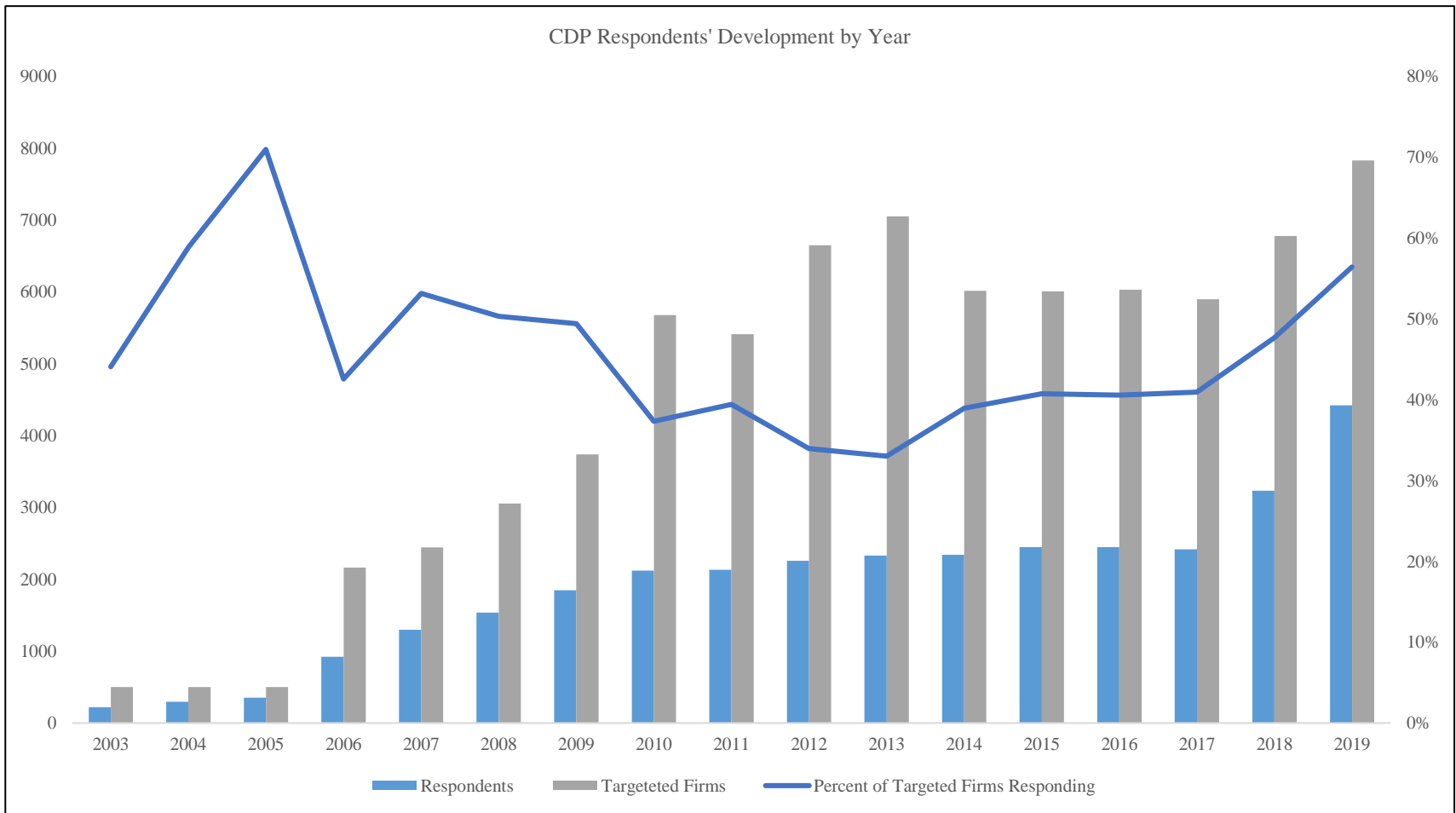
The Process

Process

Disclosure request by **investors** or **customers**

Questionnaire

CDP

use data to improve

Informing requestors

Publish data for markets and academics

Note: timeline available at: Guidance for companies - CDP

Questionnaire

- Conducted online
- Self-selection into sector
- Sector-specific additional questions
- Guidance document and scoring method available
- Assessed by analysts
- Data not verified

Introduction
Governance
Risks and opportunities
Business strategy
Targets and performance
Emissions methodology
Emissions data
Emissions breakdown
Energy
Additional metrics
Verification
Carbon pricing
Engagement
Other land management impacts
Signoff

Purpose

1	Create **awareness** through disclosure	2	Help improve **climate change management**	3	Provide **information** about climate **risks** and low-carbon **opportunities**

Increasing Participation

CDP Respondents' Development by Year

Legend: Respondents — Targeteted Firms — Percent of Targeted Firms Responding

The Carbon Disclosure Project

- CDP acts as an information intermediary by actively collecting carbon disclosure information and aggregating it into ratings to provide company outsiders with relevant information.

- The scores enable industry-based benchmarking, i.e. companies answer sector-adjusted questionnaires.

- The scores also reflect the detail and completeness of disclosure as well as corporations' awareness of climate issuesand their environmental management methods.

- Every year an A-List is created to acknowledge the performance of the best disclosers which is then published separately.
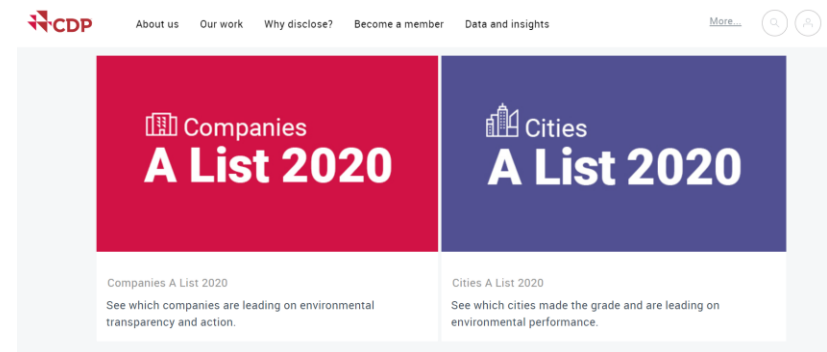
The Scores

Leadership	60-100%	A
	1-59%	A-
Management	45-70%	B
	1-44%	B-
Awareness	45-79%	C
	1-44%	C-
Disclosure	45-79%	D
	1-44%	D-
Starting to disclose (removed after 2015)		E
Failure to disclose or late response		F

Impression Management

- Consistent with the suggested framework of greenwashing, we focus on the manipulation of CSR disclosure via two avenues of impression management:

  (a) the obfuscation of bad news by reading ease manipulation, and

  (b) the emphasis on good news by thematic manipulation.

- We focus on three measures based on textual analysis related to the tone, readability, and length of reports.
- We use computer-aided text analysis (CATA) or so-called 'text mining techniques' to reveal further information about the quality of disclosure.
- We examine the textual properties of the report narratives to provide an objective analysis of disclosure quality while enabling the evaluation of large samples (Muslu et al., 2019).

Quantifying Disclosure Quality - Metrics

Tone

- Accounting for potential opportunistic reporting behavior and greenwashing tendencies.

- Lyon and Maxwell (2011) suggest that firms disclosing more negative aspects are expected to be more credible.

- CDP reports with overwhelmingly positivity (POS) words and less negativity (NEG) are considered to be of lower disclosure quality.

- The overall tone (TONE) is evaluated by using the commonly applied word list of financial positive and negative words created by Loughran and McDonald (2011).

Quantifying Disclosure Quality - Metrics

Readability

- Obfuscation hypothesis: firms produce less readable reports to hide bad performance
- Good performers are assumed to increase transparency to signal their doing
- We apply the SMOG (Simple Measure of Gobbledygook) index → answers with higher SMOG scores indicate lower report quality and greater impression management tendencies.

Length

- Expecting good performers to be more forthcoming (Li, 2008), longer texts are considered to be composed by good performers with no intention to hide information and vice versa.
- Disclosure length is separated from text complexity to circumvent a confounding effect.

Quantifying Disclosure Quality - Metrics

- The three components are then transformed to uniformly distributed variables ranging from 0 to 1 by ranking the companies yearly into percentiles, before an aggregated quality score **(IMPRESSION)** is built.

- Firms with lower reporting quality are expected to apply more impression management and greenwashing and will have a higher score.

- **A higher score is indicated by more positivity and less readable disclosure that is less extensive.**

1

Greenwashing tendencies:

- Tone measured via word lists of Loughran and McDonalds (2011)
- Overly positive disclosure points at greenwashing intent

2

Obfuscation intent:

- Reading ease/difficulty measured via SMOG score
- Complex writing obfuscates message clarity and points at lower quality

3

Net report length:

- Residuals of regression of text length on the respective SMOG
- Based on obfuscation hypothesis good performers will be more forthcoming, i. e. have longer reports

Empirical Analysis

INDUSTRIES AND COUNTRIES - CDPCOMPANIES

Distribution across countries

- 21% US companies

- 12% UK

- 11% Japan

- 5% Canada

- 4% South Africa

- 4% France

- 4% Australia

- 4% Germany

- 3% Sweden

- 3% Switzerland

- ….

ICB Industry Name	Frequency	Percent	Cumulative
Industrials	2,352	16.38	16.38
Consumer Discretionary	1,704	11.86	28.24
Financials	1,601	11.15	39.39
Basic Materials	1,061	7.39	46.78
Consumer Staples	946	6.59	53.37
Technology	894	6.22	59.59
Utilities	675	4.70	64.29
Energy	652	4.54	68.83
Health Care	640	4.46	73.29
Telecommunications	481	3.35	76.64
Real Estate	477	3.32	79.96
Na	2,880	20.04	100.00
Total	14,363	100.00	

Empirical Analysis

CDP PERFORMANCE SCORE DISTRIBUTION

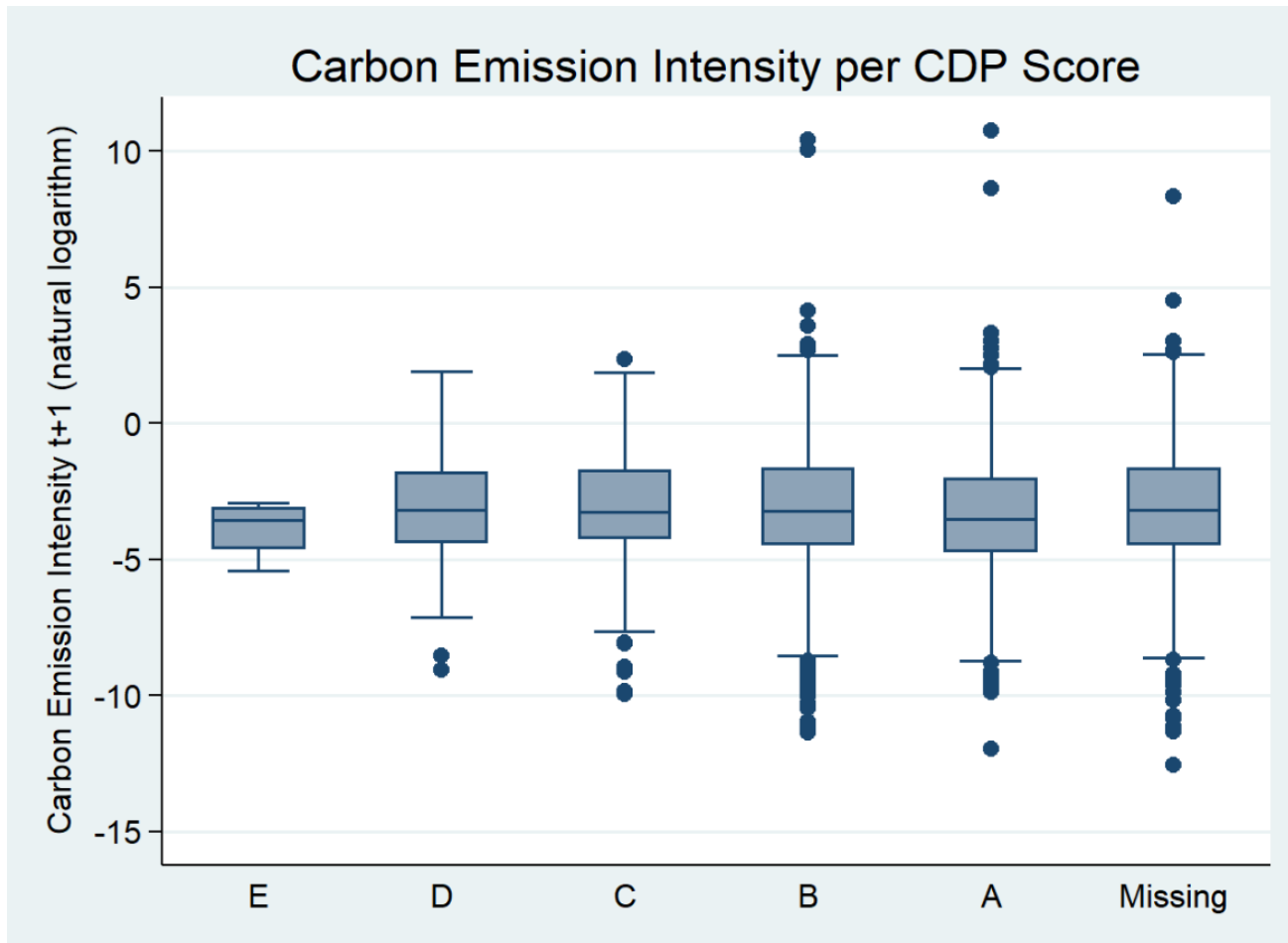| Performance Score	Frequency	Percent	Cumulative
A	1,225	8.53	8.53
A-	1,522	10.60	19.13
B	4,487	31.24	50.37
B-	214	1.49	51.86
C	3,947	27.48	79.34
C-	76	0.53	79.86
D	2,255	15.70	95.56
D-	136	0.95	96.51
E	501	3.49	100.00
Total	14,363	100.00	

The Carbon Disclosure Project
PERFORMANCE SCORE DEVELOPMENT

CDP Scores and Carbon Emission Intensity (t+1)
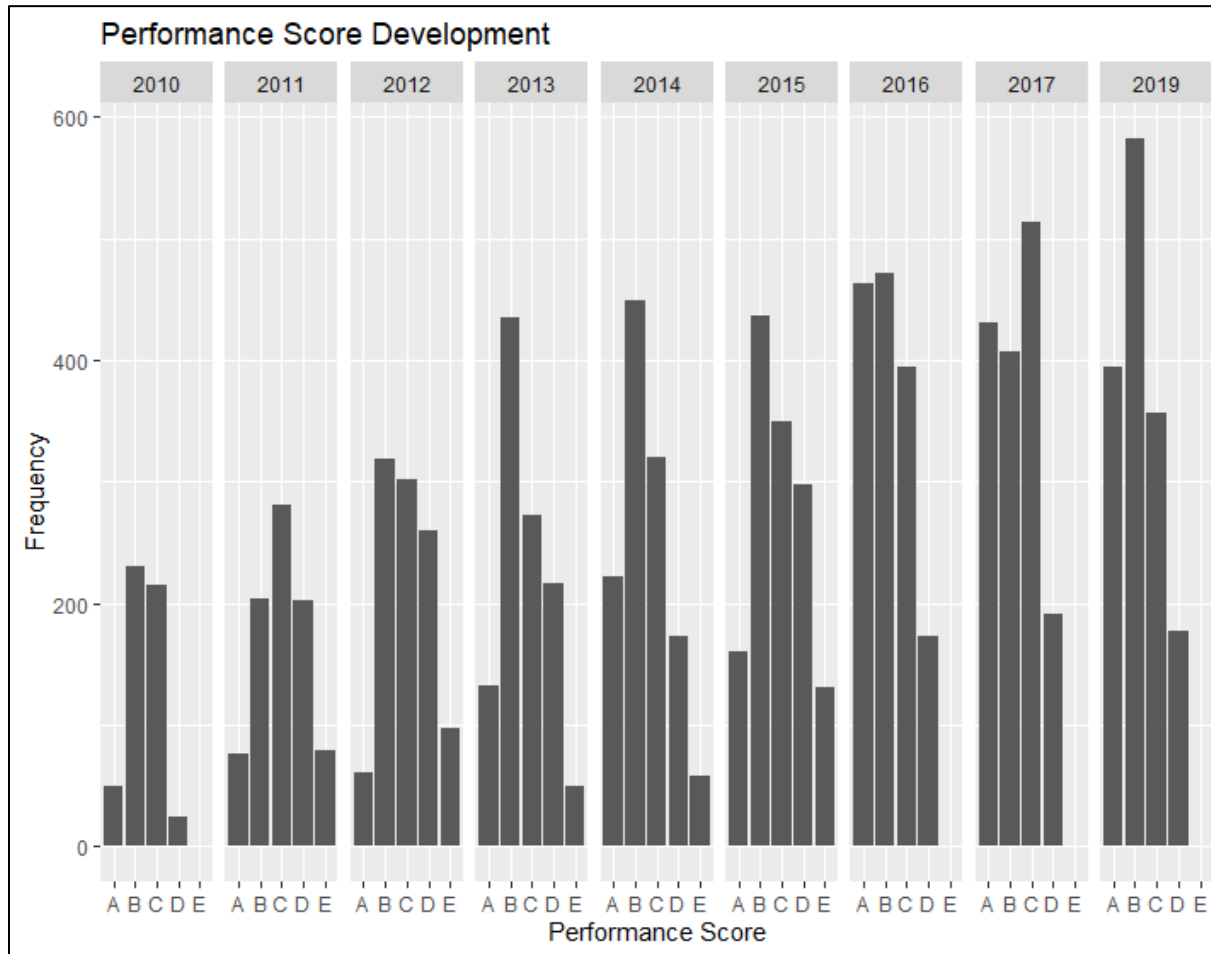
Carbon Emission Intensity per CDP Score

Impression Scores and Carbon Emission Intensity (t+1)

Carbon Emission Intensity per IMPRESSION Score
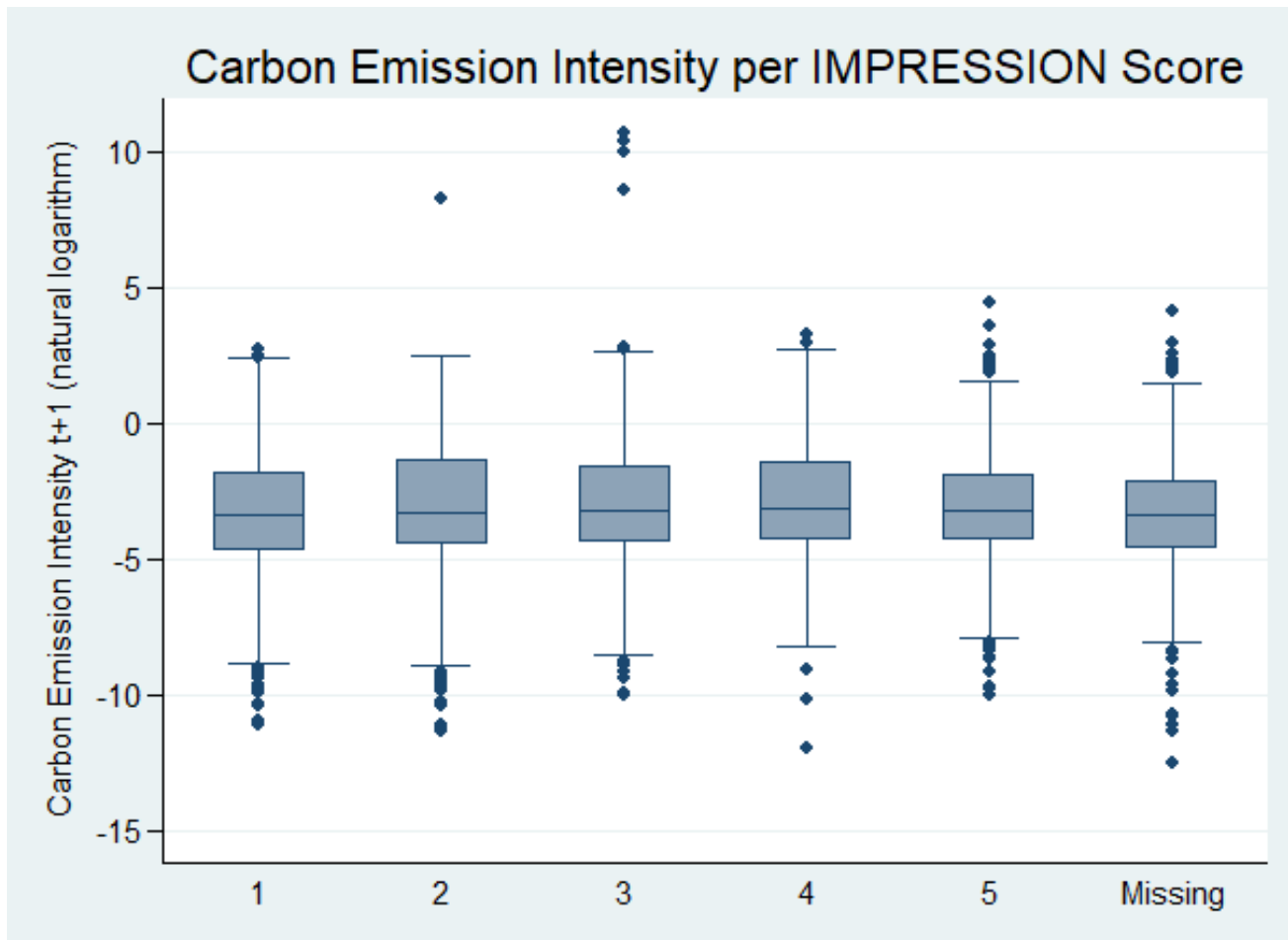
CDP Scores and Changes in Carbon Emission Intensity (t+1)

Carbon Emission Intenstiy Change per CDP Score
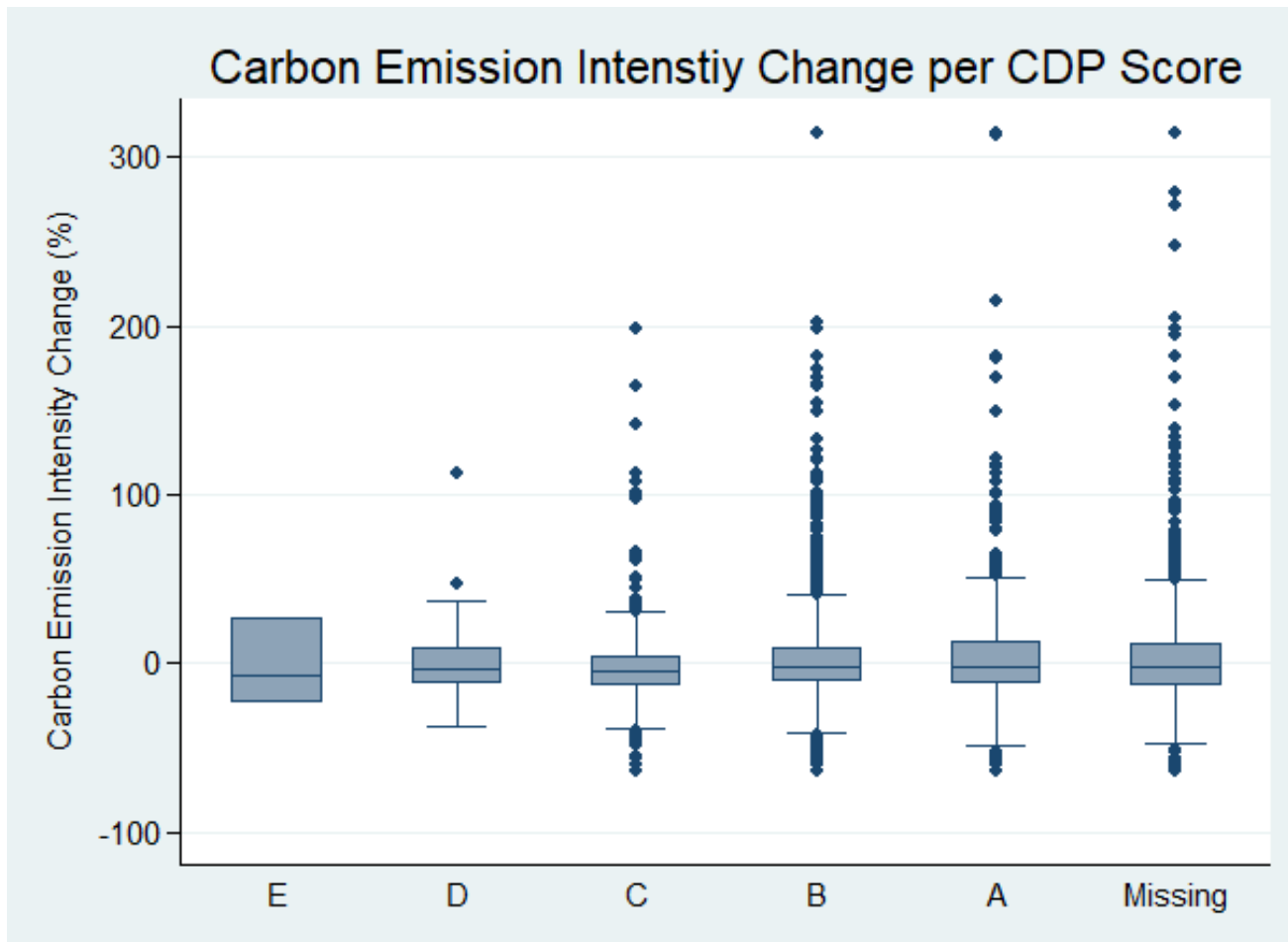
Estimated Models

$$\Delta CARBON_{it+1} = \alpha_i + \beta CDP\_SCORE_{it} + \gamma \Delta Controls_{it} + \delta FE_i + \varepsilon_{it} \qquad (1)$$

$$\Delta CARBON_{it+1} = \alpha_i + \theta IMPRESSION_{it} + \gamma \Delta Controls_{it} + \delta FE_i + \varepsilon_{it} \qquad (2)$$

$$\Delta CARBON_{it+1} = \alpha_i + \beta CDP\_SCORE_{it} + \theta IMPRESSION_{it} + \gamma \Delta Controls_{it} + \delta FE_i + \varepsilon_{it} \qquad (3)$$

Control Variables:

- Firm Size   - Growth   - country fixed effects
- Leverage   - Capital Intensity   - industry fixed effects
- Return on Assets   - Asset Structure   - year fixed effects

Estimation Results – CDP Score

Variables	(1) - random ΔCARBON	(2) - fixed ΔCARBON	(3) - fixed ΔCARBON	(4) - fixed ΔCARBON	(5) - fixed ΔCARBON	(6) - fixed ΔCARBON
CDP_SCORE	0.034**	0.015	0.033***	0.035***	0.014	0.035***
	(3.29)	(1.45)	(3.32)	(3.33)	(1.45)	(3.40)
ΔSIZE	-0.117*	-0.028	-0.108	-0.091	-0.016	-0.087
	(-2.14)	(-0.48)	(-1.96)	(-1.61)	(-0.27)	(-1.53)
ΔLEV	0.011	0.007	0.011	0.012	0.006	0.013
	(0.68)	(0.43)	(0.63)	(0.72)	(0.37)	(0.75)
….						
Year	No	Yes	No	No	Yes	No
Industry	No	No	Yes	No	Yes	Yes
Country	No	No	No	Yes	No	Yes
Observations	2,962	2,962	2,959	2,962	2,959	2,959
R²	0.012	0.029	0.011	0.033	0.033	0.034

Estimation Results – Impression Score

Variables	(1) - random ΔCARBON	(2) - fixed ΔCARBON	(3) - fixed ΔCARBON	(4) - fixed ΔCARBON	(5) - fixed ΔCARBON	(6) - fixed ΔCARBON
IMPRESSION	0.029*	0.029*	0.026*	0.014	0.026*	0.013
	(2.36)	(2.43)	(2.12)	(1.22)	(2.16)	(1.11)
ΔSIZE	-0.133**	-0.058	-0.129*	-0.108*	-0.050	-0.108*
	(-2.60)	(-1.06)	(-2.51)	(-2.06)	(-0.91)	(-2.05)
... ...						
Year	No	Yes	No	No	Yes	No
Industry	No	No	Yes	No	Yes	Yes
Country	No	No	No	Yes	No	Yes
Observations	3,140	3,140	3,140	3,140	3,140	3,140
R²	0.004	0.028	0.009	0.046	0.033	0.047

Summary of Key Results

CDP Score

- No support for *outside-in* management view of a positive effect of carbon disclosure on carbon performance.

- Our results suggest that a better carbon disclosure performance is more likely to increase carbon emission intensity in the following year.

- This underpins notions made by advocates of the *legitimacy theory.*

- Our results suggest a 3.4% increase in carbon emission intensity per CDP_SCORE.

Impression

- Decreased disclosure quality proxied via IMPRESSION can be associated with following increases in emission intensity (2.9% per score notch).

- We find some evidence for impression management and greenwashing for firms prior to poor environmental performance.

Robustness Checks

- **Sample Composition**
    - Sample divided into two periods 2010-2014 and 2015-2019
    - → disclosure to the CDP has become with increasing likelihood a vehicle for legitimation (2015-2019 significant)
    - Distinguish between environmentally sensitive industries (energy, materials or utilities sector) and others
    - → IMPRESSION seems to have a greater effect on ΔCARBON for non-environmentally-sensitive corporations
    - Firms operating either in common law countries or in countries with national ETS
    - → CDP_SCORES more significant in civil law countries
    - Firms operating in countries with national ETS
    - → IMPRESSION and CDP_SCORES more significant in non-ETS countries

Robustness Checks

- **Distinction between scope 1 and scope 2 emissions:** firms may have greater power to influence direct CO_2 emissions, whereas indirectly emitted CO_2, may less likely be within their reach of impact

  → IMPRESSION has no significant influence on either, i.e. emission intensity changes of scope 1 or scope 2

  → CDP_SCORE is only exerting a significant positive effect on the change in scope 1 intensity, indicating that scope 1 emissions increase if they follow to good prior carbon disclosure performance

- **Allow for greater time lag t→ t+2**

  → CDP_SCORE and IMPRESSION widely insignificant

Conclusions

- **High carbon disclosure scores do not seem to provide any evidence for better environmental performance** in future periods.

- The outside-in management view can't be supported. Our results suggest that **companies do not walk the talk.**

- Results point at **legitimacy reasons for disclosure** that do not invoke real changes and rather leads to increases in carbon intensity.

- **Impression management tendencies and greenwashing** do indicate worse future performance..

- Additional tests point at the fact that lower risks of sanctions through stakeholders and fewer regulations (non-ETS, non-environmentally-sensitive, civil law countries) encourage opportunistic reporting behavior.

- Results somehow question the benefits and truthfulness of voluntary carbon disclosures.

Thank you!