Greenwashing

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Motivation and Research Questions

"Nearly three-quarters of executives said most organizations in their industry would be caught greenwashing if they were investigated thoroughly, according to a survey of nearly 1,500 executives across 17 countries and seven industries conducted in January by the Harris Poll on behalf of Google Cloud."

Rochelle Toplensky, April 13, 2023, The Wall Street Journal

"The structuring of bonus-related sustainability targets has proven to be highly problematic, though, because it gives top management massive incentives to pursue systematic greenwashing."

Vargas and Kuhn, 2023, Greenpeace Report.

Motivation and Research Questions

- The pursuit of sustainability has become an important focus in today's corporate world.

- However, there is a concern that some companies are engaging in "greenwashing", which involves creating a misleading environmental image.

  o This includes making statements that misrepresent past environmental performance and/or mischaracterize future environmental intent.

  o Greenwashing can, therefore, be defined as a discrepancy between corporate green talk and actual green walk.

- Using the firm-level greenwashing measure, we study the implications of greenwashing on corporate performance and CEO incentives.

Greenwashing Intensity Measure

- We use earnings conference call transcripts to capture a firm's green talk, which are firm-specific, positive talk by executives about their firms' past and/or future environmental investments, efforts, and performance.

- We split each earnings call transcript into sentences and employ a state-of-the-art machine learning model, *FinBERT* (Huang, Wang, and Yang, 2022), to identify efficiently whether a sentence is green talk or not.

  - The testing results show that our fine-tuned FinBERT model achieves an impressive 90% accuracy rate in detecting green-talk-related sentences.

$$Green\ Talk\ Intensity_{i,t} = \frac{Average\ number\ of\ green\ talk\ sentences_{i,t}}{Average\ number\ of\ total\ sentences_{i,t}}$$

  - If a firm does not talk itself green in a year (i.e., average number of green talk sentences equals 0), we replace its Green Talk Intensity as missing.

  - We next compute $Rank^{GreenTalk}$, the percentile ranking of green talk intensity of a firm in a year.

Greenwashing Intensity Measure

- We employ RepRisk incidents as a metric to measure actual environmental performance of a firm.

  - We count the number of environmental incidents in each firm-year and rank the sample firms into percentiles each year based on this $Rank^{EnvIncidents}$. We then multiply the incident count percentile by -1 so that a lower value indicates worse actual environmental performance of a firm.

  $$GW_{i,t} = \frac{Rank_{i,t}^{GreenTalk} - Rank_{i,t}^{EnvIncidents}}{100}$$

  - If a firm does not have any green talk in a year, we replace the missing GW value by 0.

  - The value of *GW* ranges from 0 to 2, where 0 indicates non-greenwashing firms and 2 indicates intensive greenwashing firms.

  - After requiring non-missing stock returns and financial data, our final sample consists of 30,364 firm-year observations related to 107,464 earnings conference call transcripts and 4,060 unique U.S. public-listed firms.

Findings in Brief – Validation Tests

1) We observe that the economy-wide aggregate greenwashing measure markedly increased after the 2015 Paris Agreement.

2) We rank the measure by Fama-French 48 industries and find that the utilities industry has the highest level of greenwashing intensity among all industries.

3) We exploit the adoption of the 2015 Paris agreement as a quasi-natural experiment. Using DiD regressions, we find that relative to other firms, firms in the fossil fuel industry or the broader stranded asset industries (i.e., utilities; energy equipment & services; oil, gas & consumable fuels; construction materials; metals and mining), experienced a significant increase in greenwashing intensity after the adoption of the Paris agreement.

4) We find that cross-sectionally, firms with higher greenwashing intensity incur more future environmental incidents and experience more future environmental enforcement actions from the EPA.

5) We find that despite their higher likelihood of experiencing future environmental incidents and EPA enforcement actions, greenwashing firms do not produce more green innovations than non-greenwashing firms.

Findings in Brief – GW Implications

1) We find that firm-level heterogeneities explain most of the variation in greenwashing intensity.

2) Greenwashing is associated with lower CARs following earnings conference calls and predicts lower future corporate operating performance (ROA and OCF).

3) The -ve relationship in (2) are more pronounced for firms with greater information asymmetry and weaker institutional monitoring.

Findings in Brief – Why GW?

Firms with greater GW:

1) tend to receive higher future E ratings;

2) have lower probability of forced CEO turnover and turnover-to-performance sensitivity (after PA 2015);

3) exhibit lower CEO pay-for-performance sensitivity and wealth-to-stock-volatility sensitivity;

4) are also more likely to link their CEO pay with corporate environmental performance in corporate compensation contract; and

5) have lower future R&D and acquisition activities, lower future leverage, and greater future cash holdings.

➢ Managers commit greenwashing to reduce their risk-taking effort, increase their job security and compensation, and enjoy a quieter life at the expense of shareholders and other stakeholders.

Literature Contributions

1. Our study contributes to the burgeoning literature on greenwashing.

2. Our study contributes to the literature on textual analysis in finance.

3. Our study contributes to the longstanding literature on the agency problem of corporate managers (Jensen and Mecklin, 1976; Fama and Jensen,1983).

   - We contribute to this literature by showing that greenwashing is another manifestation of corporate agency problem, and corporate managers tend to commit greenwashing to benefit themselves at the expenses of shareholders and other stakeholders of the firm.

Data and Sample

- Earnings Conference Call Transcripts.

  o Standard & Poor Capital IQ database (CIQ) during the 2005-2021 period.

  o Raw dataset includes 217,006 earnings call transcripts of 9,925 global firms.

- Actual corporate environmental activities: RepRisk; firm-level negative environmental incidents from 2007 to 2021.

- U.S. EPA's Integrated Compliance Information System (ICIS): Plant-level environmental enforcement cases; we aggregate the number of environmental enforcement cases from plant-year to firm-year level.

- Firm-level environmental ratings: MSCI KLD, Refinitiv, and Sustainalytics.

- CEO forced-turnover and compensation data: Peters and Wagner (2014); Coles, Daniel, and Naveen (2006); He, Nguyen, Qiu, and Zhang (2023).

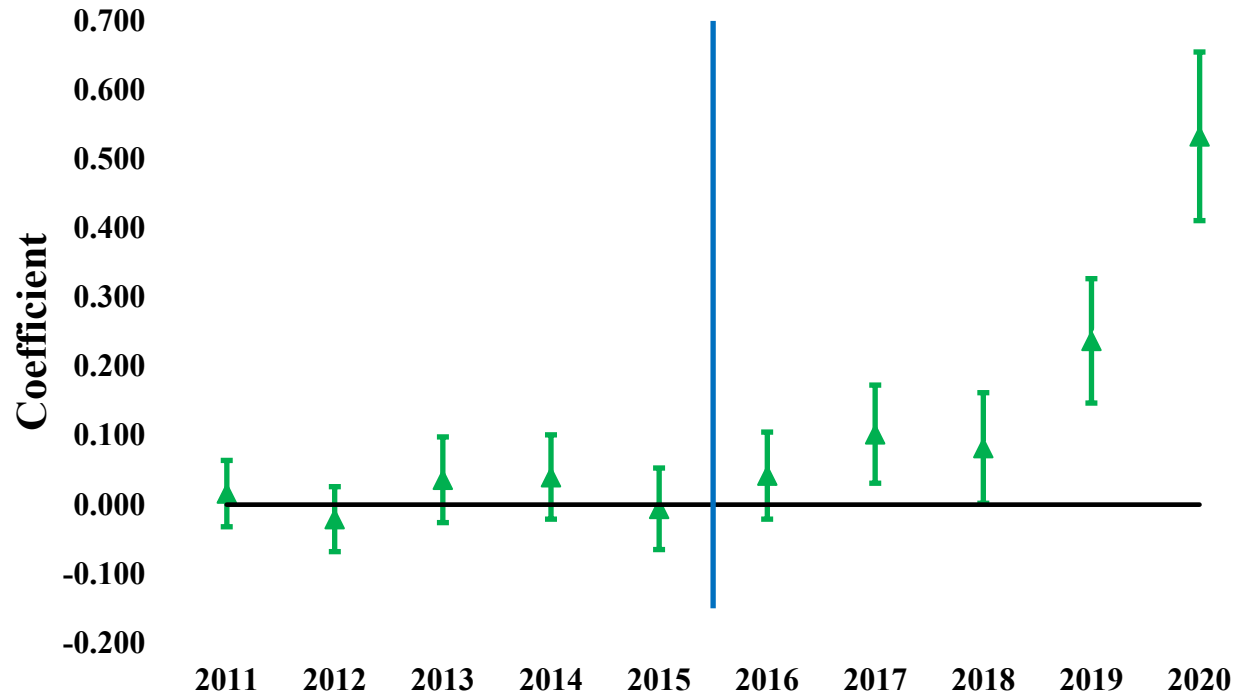- Stock return from the CRSP and financial data from Compustat.

GW Validation – Annual Variation

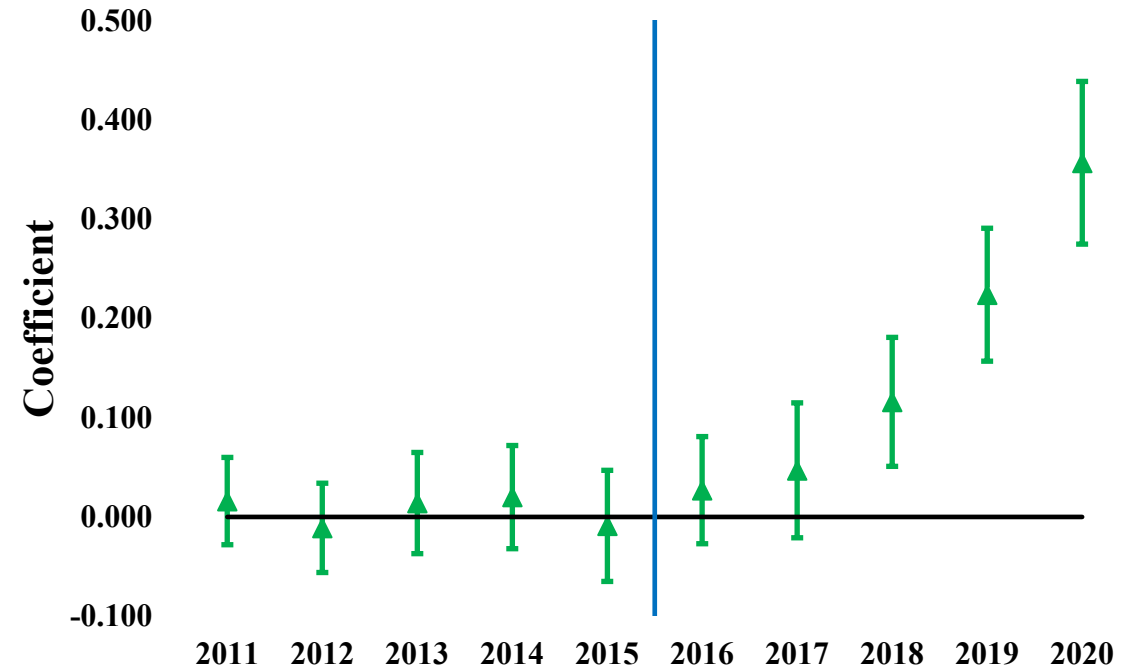Legend: # GW Firms — Average GW — % GW Firms
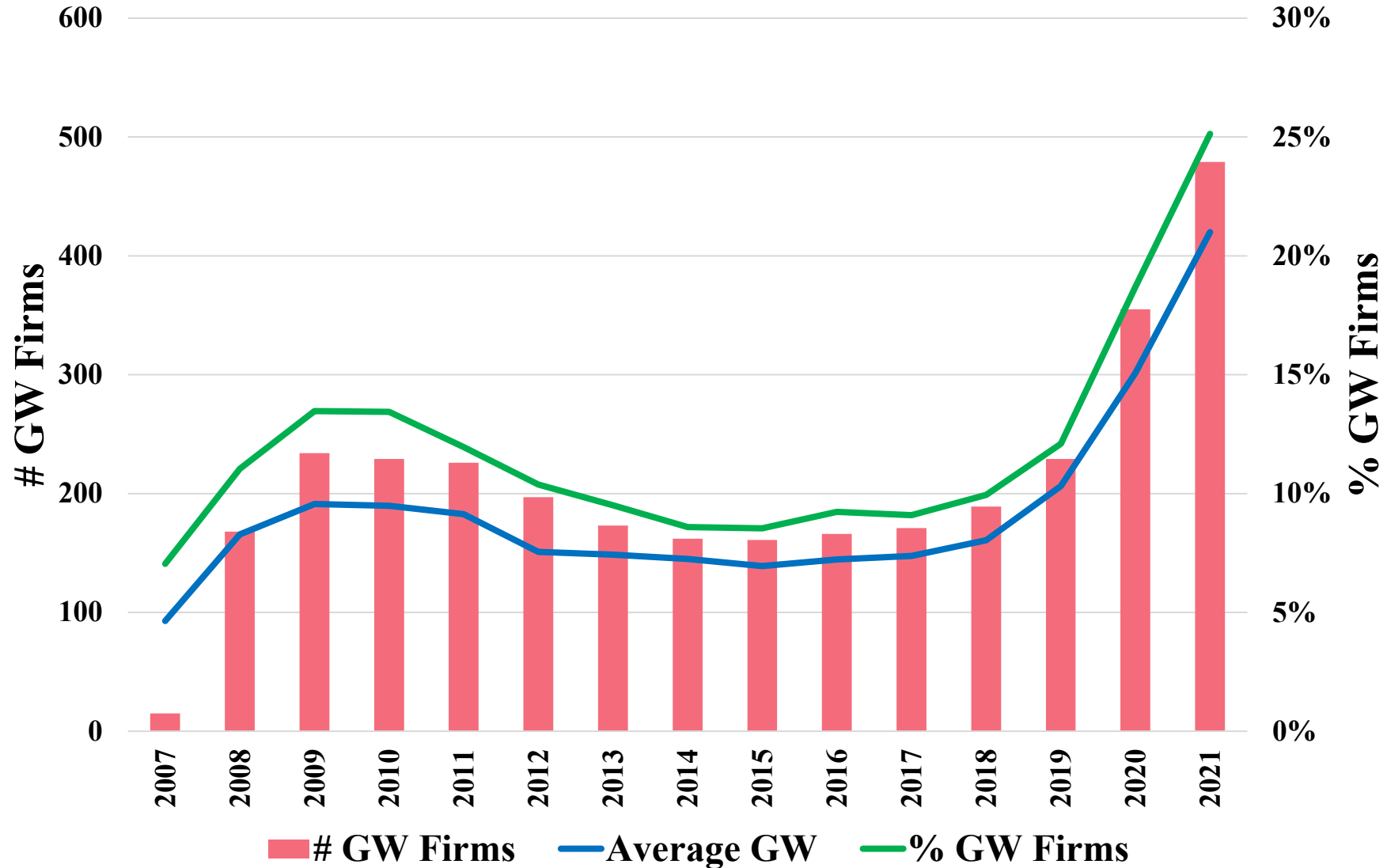
GW Validation – Top 10 Industries (FF48)
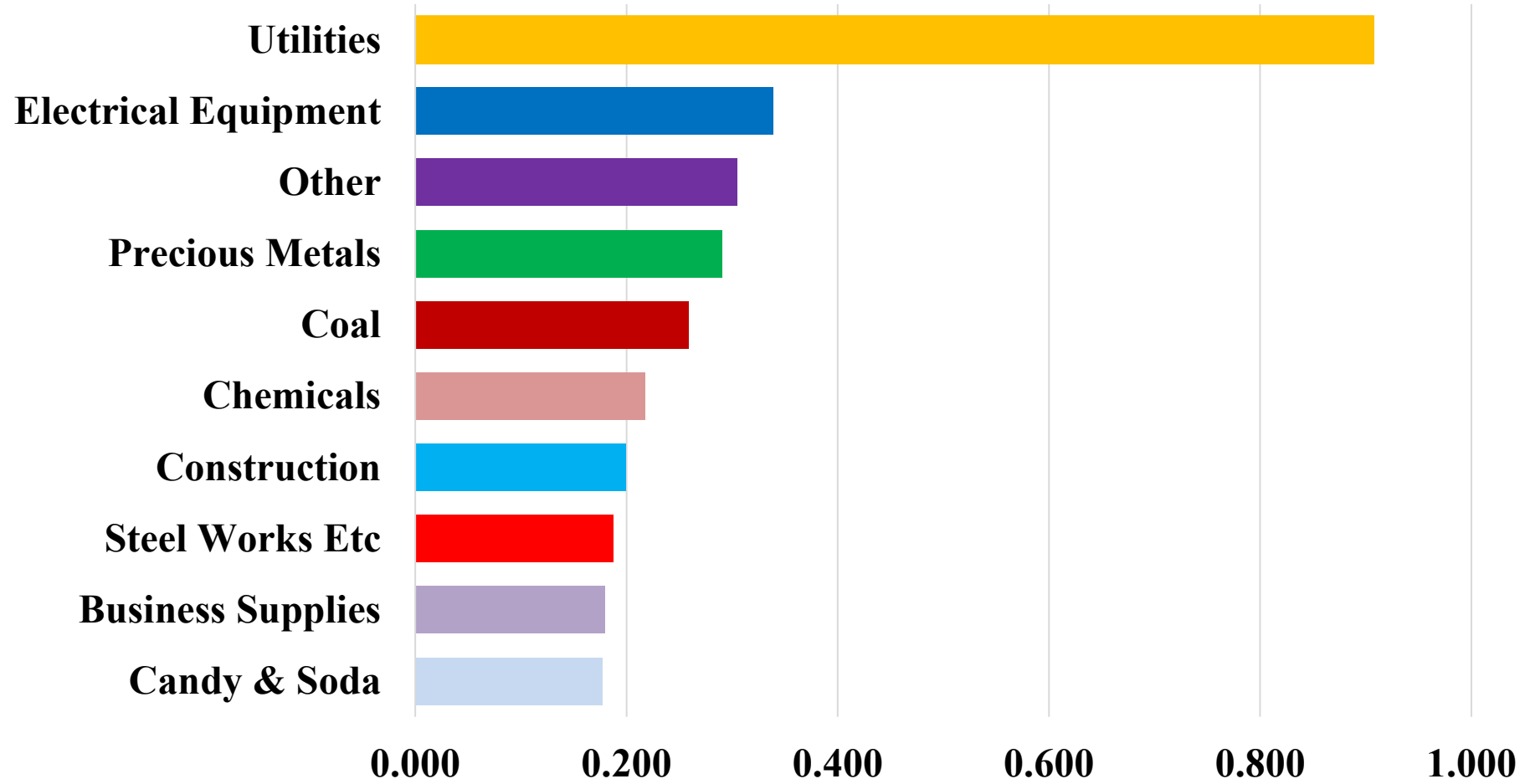
GW Validation – The 2015 PA Effect

Fossil Fuel Industry vs. Other Industries

Stranded Asset Industries vs. Other Industries

GW Validation – Incidents, Patents

	GW	Controls	Ind. FE	Year FE	N	Adj. R^2
Log(1+ # Environmental Incidents)$_{t+1}$	0.237***	✓	✓	✓	30,364	0.319
	(0.032)					
Log(1 + # Formal Enforcements)$_{t+1}$	0.022**	✓	✓	✓	30,364	0.104
	(0.011)					
Log(1 + # Informal Enforcements)$_{t+1}$	0.029**	✓	✓	✓	30,364	0.145
	(0.014)					
Log(1 + # Violations)$_{t+1}$	0.038	✓	✓	✓	30,364	0.192
	(0.031)					
Log(1 + Green Patent Count)$_{t+1, t+3}$	0.003	✓	✓	✓	17,052	0.115
	(0.003)					
Log(1 + Green Patent Citations)$_{t+1, t+3}$	0.002	✓	✓	✓	17,052	0.088
	(0.004)					

GW Decomposition

|	FF48	2-Digit SIC	3-Digit SIC	4-Digit SIC
Year FE	1.86%	1.86%	1.86%	1.86%
Industry FE	27.55%	26.12%	35.59%	36.88%
Industry × Year FE	3.09%	2.67%	3.54%	3.67%
Firm Level	67.50%	69.35%	59.01%	57.59%
Permanent differences across firms within industries (Firm FE)	27.91%	29.66%	20.76%	20.30%
Variation over time in identity of firms within industries (residual)	39.59%	39.69%	38.25%	37.29%

GW – CAR, ROA, and OCF

|	CAR (0,4)			ROA_{t+1}		Operating Cash Flow $_{t+1}$	
GW^Q	-0.003**	-0.004***	GW	-0.024***	-0.029***	-0.014***	-0.019***
	(0.001)	(0.001)		(0.004)	(0.004)	(0.002)	(0.003)
Firm Controls	✓	✓	Firm Controls	✓	✓	✓	✓
Industry FE	✓		Industry FE	✓		✓	
Year-Quarter FE	✓		Year FE	✓		✓	
Industry-Year-Quarter FE		✓	Industry-Year FE		✓		✓
Obs.	107,464	107,464	Obs.	30,364	30,364	27,145	27,145
Adj. R2	0.200	0.217	Adj. R2	0.389	0.403	0.569	0.577

GW^Q = greenwashing intensity in the same year-quarter as the earnings conference call date.

GW – CAR, ROA, and OCF
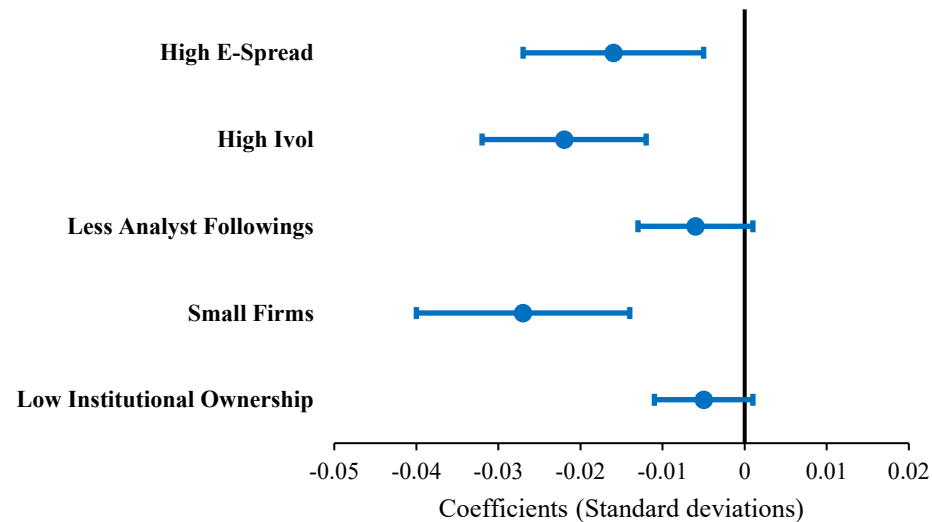

Stock Price Reactions

ROA
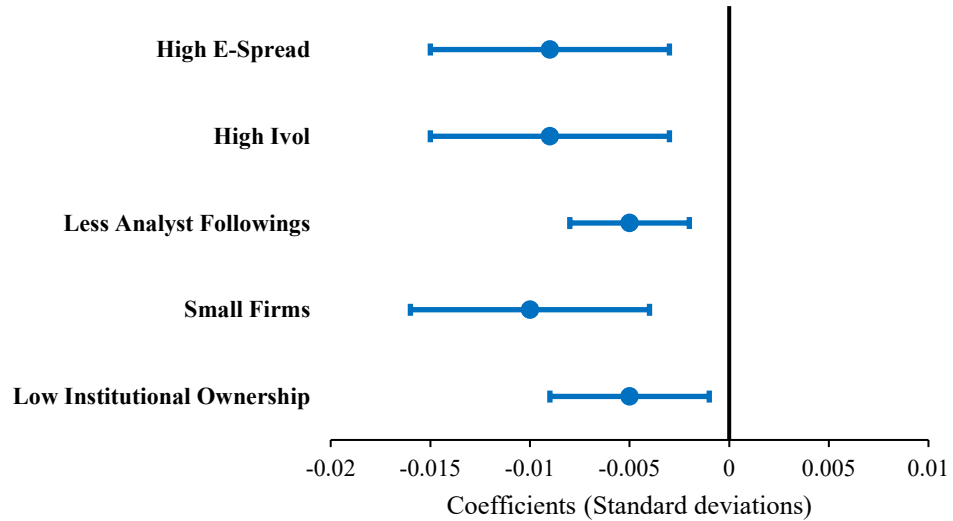
Operating Cash Flow
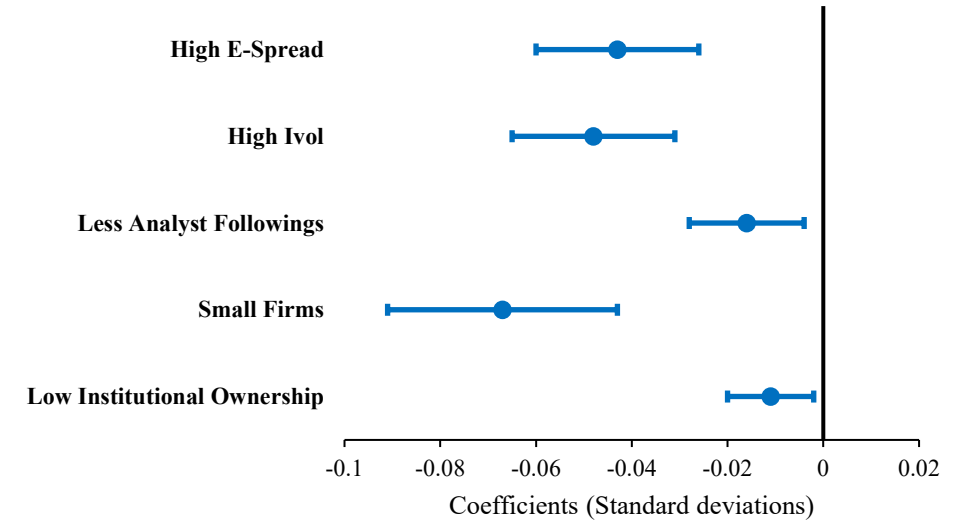
The negative effects of GW on CAR, future ROA, and OCF are more pronounced for firms with greater information asymmetry and weaker institutional monitoring.

GW – CEO Incentives

	GW	Firm Controls	Ind.-Year FEs	N	Adj. R2
Refinitive E Score $_{t+1}$	8.033***	✓	✓	16,519	0.522
	(1.124)				
KLD E Score $_{t+1}$	0.088*	✓	✓	17,580	0.295
	(0.051)	.	.		
Sustainalytics E Score $_{t+1}$	2.682***	✓	✓	7,367	0.38
	(0.727)				

GW – CEO Incentives

	Delta $_{t+1}$	Vega $_{t+1}$	1 (E Pay) $_{t+1}$	E Pay Intensity $_{t+1}$	1 (Forced Turnover) $_{t+1}$
GW	-0.093	-0.126	0.066***	0.002**	0.007
	(0.063)	(0.158)	(0.024)	(0.001)	(0.006)
GW × Post_2015	-0.17	-0.704***	0.007	0.005***	-0.018**
	(0.129)	(0.231)	(0.030)	(0.002)	(0.007)
Firm & CEO Controls	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓
Obs.	11,149	11,146	18,292	18,292	17,943
Adj. R2	0.526	0.25	0.131	0.22	0.011

GW – CEO Incentives

	CAPEX $_{t+1}$	R&D $_{t+1}$	Acquisition Expense $_{t+1}$	Total Investment $_{t+1}$	Leverage $_{t+1}$	Cash Holdings $_{t+1}$
GW	0.001	-0.004**	-0.004***	-0.004***	-0.025***	0.009***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.006)	(0.003)
Firm Controls	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Obs.	30,136	30,364	28,880	28,856	30,364	29,943
Adj. R2	0.422	0.576	0.072	0.62	0.283	0.423

Robustness Checks

We conduct multiple tests to verify the robustness of our findings, which include:

1) Running Poisson regressions for count dependent variables.

2) Separately looking at the effects of green-talk component and environmental incident component of the GW measure on stock returns following earnings conference calls and future operating performance.

3) Intensive margin analysis versus extensive margin analysis.

4) First-time greenwasher versus repeated greenwasher.

➢ We obtain qualitatively similar results across these robustness tests.

Conclusions

1) We use a state-of-the-art machine learning model, FinBERT, to measure a firm's greenwashing intensity, GW. We match the corporate green talks identified by the FinBERT model with the actual corporate environmental incidents from RepRisk to construct a comprehensive measure of firm-level greenwashing intensity.

2) We conduct various tests to validate our greenwashing measure. We observe that GW
   - increased after the 2015 Paris Agreement, especially for firms in fossil fuel and stranded assets industries;
   - is associated with more future environmental incidents and EPA's enforcements; and
   - does not yield more green innovations.

3) We find that GW
   - is associated with lower CARs and predicts lower future ROA and OCF; and
   - these -ve relationships are more pronounced for firms with greater information asymmetry and weaker institutional monitoring.

Conclusions

4) Firms with greater GW:

  a. tend to receive higher future E ratings;

  b. have lower probability of forced CEO turnover and turnover-to-performance sensitivity (after PA 2015);

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thank you !