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The effect of co-opted boards on corporate carbon performance: Evidence from financially material industries

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ABSTRACT

We examine the relationship between co-opted boards and corporate carbon performance. Results show that co-opted boards decrease GHG intensity in financially material industries with no effect in non-financially material industries. For firms in financially material industries, this relationship is time-variant and positive when we interact GHG intensity with R&D investments. This result posits inefficient R&D allocation in the presence of co-opted boards. Our findings bring a more nuanced picture concerning the influence of co-opted boards on corporate carbon performance.

1. Introduction

Climate change poses numerous financial risks to corporations with varying financial significance, or materiality, across industries (Khan et al., 2016). In response, shareholders and other stakeholders increasingly scrutinise corporate GHG emissions metrics to better understand how they manage their climate-related financial risks (PRI, 2022).

Corporations, particularly those with high financial materiality, are now required assessing not only their total level of GHG emission but also their GHG intensity to evaluate the costs pertaining to environmental action or inaction (Haque and Ntim, 2020). This approach provides a relative, or normalised, view of GHG emissions that accounts for the effectiveness of GHG management practices based on the corporations' activities, giving a more granular understanding of their carbon performance (TCFD, 2017).

Boards of directors are pivotal in overseeing these practices. Nevertheless, co-opted boards, comprising directors appointed after the CEO assumed office (Coles et al., 2014), have divided the academic literature into two competing streams—the 'dark' and 'bright' streams (Nguyen et al., 2021; Zaman et al., 2021). Therefore, it is essential to examine the influence of co-opted boards on GHG management practices.

From the 'dark' side, rooted in the agency theory, co-opted boards are seen as weakening board oversight due to the loyalty of co-opted directors to CEOs. This can lead CEOs to make short-term decisions that prioritise their interests over those of shareholders and other stakeholders, having detrimental consequences on environmental sustainability. Some studies report that co-opted boards negatively impact ESG performance, including poorer ESG scores (El Saleh and Jurdi, 2023; Maneenop et al., 2024) and higher climate change risks (Ghafoor et al., 2023).

Conversely, the 'bright' side, anchored in the resource dependency theory, values the expertise, informational and network resources of co-opted boards. Studies show that corporations with co-opted boards exhibit better environmentally sustainable behaviours, such as lower ESG controversies, lower absolute GHG emissions and better waste management practices (Ghafoor and Gull, 2024; Gull et al., 2023, 2024). Nevertheless, it remains unclear whether this relationship prevails for industries with financial materiality and predicts future environmental management efficiency.

Following the 'bright' side perspective, we argue that co-opted boards are associated with lower GHG intensity in corporations where GHG emissions are financially material. This proposition emphasises informational gains emanating from co-opted boards for the corporations. Moreover, we expect that co-opted boards will improve the efficiency of GHG management practices across time when studies document that environmental initiatives may take time to materialise (Hart and Ahuja, 1996). Finally, we posit that this relationship will be moderated by R&D intensity, for either side of the argument: given the 'bright' side, co-opted boards will lead to investments in more efficient R&D projects (Chintrakarn et al., 2016).

Our study contributes to the stream of research investigating the effect of co-opted boards on environmental sustainability. While much of the existing literature focuses on environmental, social, and governance (ESG) performance and disclosures, little attention has been paid

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Table 1
Baseline analysis.

	Financially material industries		Non-financial material industries	
	Dep: *GHG intensity* (1)	Dep: *DEI* (2)	Dep: *GHG intensity* (3)	Dep: *DEI* (4)
Fracdirafter	−0.220***	−0.198***	0.009	0.009
	(0.067)	(0.066)	(0.006)	(0.006)
Controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Intercept	0.544*	1.417***	−0.120***	−0.081**
	(0.314)	(0.310)	(0.034)	(0.034)
Observations	2107	2107	3608	3608
R-squared	0.542	0.530	0.207	0.207

Note: In all tables, regressions have been repeated with all proxies of co-opted directors with similar results. Robust standard errors are presented in parenthesis, and ***, **, * indicate the statistical significance at the 0.01, 0.05, and 0.1 levels.

to corporate carbon performance and our work aims to address this gap (Gull et al., 2023). In addition, we disentangle the complex effect of co-opted boards on GHG emissions within financially material industries. Our findings demonstrate that co-opted boards in industries where GHG emissions are financially material reduce significantly GHG intensity. Nevertheless, this relationship is time-variant and becomes positive when we interact it with R&D investments, suggesting an overinvestment in inefficient R&D projects.

2. Empirical design

2.1. Data and sample

Our study focuses on a sample of U.S. publicly listed firms in the Russell 3000 index from 2011 to 2022. The sample period starts in 2011, with the implementation of the Dodd-Franck Act of 2010, and ends in 2022. Data on co-opted directors come from Coles et al. (2014) database and data on carbon performance and firm characteristics come from Thomson Reuters Asset 4 database accessed through Refinitiv. The Sustainability Accounting Standard Board (SASB) industry classification is utilised to establish the financial materiality of GHG emissions. The final sample consists of 2107 firm-year observations for financially material industries and 3608 firm-year observations for non-financially material industries.

2.2. Methodology

To analyse the influence of co-opted boards on corporate carbon performance, we employ pooled regressions through the following model:

$$CCP_{it} = \alpha + \beta 1 * Co - opted_{it} + \beta 2 * X_{it} + \gamma_{it} + \varepsilon_{it} \quad (1)$$

Corporate carbon performance (*CCP*) is approximated by greenhouse gas emission intensity (*GHGIntensity*) and direct emission intensity (*DEI*). *Co-opted* is a proxy for the measures of the proportions of board directors appointed following the CEO's appointment. *X* is the matrix of control variables and γ represents time and industry effects. Definitions of variables can be found in Appendix A and descriptive statistics in Appendix B.

3. Results

3.1. Co-opted boards and corporate carbon performance

Column (1) of Table 1 shows that the proxy for co-opted boards (*fracdirafter*) is negatively and significantly associated with *GHGIntensity*

Table 2
Timing effect.

	Financially material industries		Non-financial material industries	
T + 1	Dep: *GHG intensity* (1)	Dep: *DEI* (2)	Dep: *GHG intensity* (3)	Dep: *DEI* (4)
Fracdirafter	−0.275***	−0.251***	0.008	0.008
	(0.076)	(0.076)	(0.007)	(0.007)
Controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Intercept	0.777**	1.207***	−0.134***	−0.107***
	(0.332)	(0.334)	(0.040)	(0.040)
Observations	1804	1804	3047	3047
R-squared	0.574	0.561	0.248	0.246
	Financially material industries		Non-financial material industries	
T + 3	Dep: *GHG intensity* (5)	Dep: *DEI* (6)	Dep: *GHG intensity* (7)	Dep: *DEI* (8)
Fracdirafter	−0.216**	−0.205**	0.008	0.008
	(0.084)	(0.084)	(0.008)	(0.008)
Controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Intercept	0.593	0.593	−0.155***	−0.148***
	(0.407)	(0.406)	(0.051)	(0.051)
Observations	1269	1269	2.032	2032
R-squared	0.589	0.588	0.308	0.306

Table 3
Interaction effect with R&D intensity.

	Financially material industries		Non-financial material industries	
	Dep: *GHG intensity* (1)	Dep: *DEI* (2)	Dep: *GHG intensity* (3)	Dep: *DEI* (4)
Fracdirafter	−0.239***	−0.197***	0.007	0.007
	(0.077)	(0.075)	(0.008)	(0.008)
RDIntensity	−3.888***	−2.774***	−0.055	−0.076
	(0.730)	(0.948)	(0.046)	(0.048)
Fracdirater*RDIntensity	2.270***	0.889	0.071	0.084
	(0.781)	(0.948)	(0.080)	(0.081)
Controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Intercept	0.550*	1.417***	−0.119***	−0.079**
	(0.315)	(0.311)	(0.034)	(0.034)
Observations	2107	2107	3608	3608
R-squared	0.543	0.531	0.208	0.207

in financially material industries, while column (3) demonstrates that this effect is not significant in non-financially material industries. These results indicate that high board co-optation improves corporate carbon performance, consistent with the 'bright' side argument. Columns (2) and (4) exhibit similar results.

3.2. Predictive regressions—time-varying relationships

We repeat our baseline regressions using dependent variables at $t+1$ and $t+3$ (i.e., one and three years ahead). Columns (1) and (5) of Table 2 present a negative association between co-opted boards and *GHGIntensity* in $t+1$ and $t+3$ for financially material industries, while columns (3) and (7) indicate that this association is not significant for non-financially material industries. The results are similar in the other columns of Table 2 with *DEI*. However, the magnitude of the effect is stronger in $t+1$ and decreases in $t+3$ for finally material industries, suggesting that the relationship between co-opted boards and corporate carbon performance is time-variant.

3.3. The interaction effect of R&D investments

Following the 'bright' side perspective on co-opted boards, we posit that their impact on GHG intensity is moderated by R&D intensity because they bring crucial informational resources that will help CEOs invest in more efficient R&D projects (Chintrakarn et al., 2016).

Column (1) of Table 3 reveal that co-opted boards in financially material industries where corporate R&D intensity is high have a positive significant effect on *GHGIntensity*, while columns (2), (3) and (4) display no significant effect. Contrary to the 'bright' side argument, the presence of co-opted boards in high R&D intensity corporations does not forecast an improving and efficient GHG management. This finding is consistent with the study of Harris et al. (2019) documenting that the presence of co-opted boards leads to overinvestments in inefficient R&D projects.

4. Conclusion

Our study provides a nuanced examination of co-opted boards on corporate carbon performance in industries where GHG emissions are financially material, by showing that their negative effects are significant but not uniform across time and do not hold in the context of high R&D investments. Our findings have important implications for academics studying co-opted boards, for practitioners searching for ways to reduce their carbon footprint, and for policymakers willing to regulate a controversial governance initiative that has significant impacts on the environment.

Data availability

Data will be made available on request.

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Appendix A. Definitions of variables

Variables	Definition
GHGIntensity	GHG emission intensity is the ratio of the Scope 1 (direct) and Scope 2 (indirect) emissions to net sales.
DEI	Direct emission intensity is the ratio of Scope 1 (direct) emissions to net sales.
Fracdirafter	The fraction of directors appointed after CEO.
Fracdirafterind	The fraction of independent directors appointed after CEO.
Twfracdirafter	The sum of the tenure of co-opted directors divided by the total tenure of all directors.
Twfracdirafterind	The sum of the tenure of independent co-opted directors divided by the total tenure of all directors.
ROA	The return on assets is the ratio of net income to total assets.
Leverage	The ratio of debt in current liabilities plus debt in long-term debt divided by the total shareholders' equity.
FirmSize	The natural log of total assets.
CEODual	1, if the company's CEO is also chairman of the board, 0 otherwise.
InstOwn	The percentage of institutional ownership to total company ordinary shareholdings.
BrdWmn	The percentage of women on the board.
IndDir	The percentage of independent directors on the board.
BoardSize	The number of directors on the company's board.
CSRCommittee	1, if the company has a sub-board committee dedicated to CSR, 0 otherwise.

Appendix B. Descriptive statistics

Variable	Financially material industries		Non-financially material industries	
	Mean	Std. Dev.	Mean	Std. Dev.
GHGIntensity	0.644	1.249	0.021	0.118
DEI	0.749	1.222	0.027	0.118
Fracdirafter	0.435	0.281	0.465	0.296
Fracdirafterind	0.377	0.259	0.404	0.269
Twfracdirafter	0.254	0.271	0.286	0.295
Twfracdirafterind	0.214	0.232	0.238	0.244
ROA	5.180	5.662	6.578	5.748
Leverage	4.355	1.242	4.276	1.470
FirmSize	9.390	1.410	9.401	1.719
CEODual	0.420	0.493	0.423	0.494
InstOwn	88.553	12.111	90.931	11.256
BrdWmn	23.290	9.741	25.908	10.341
IndDir	85.560	7.900	85.379	7.849
BoardSize	10.525	2.092	10.577	2.138
CSRCommittee	0.583	0.493	0.469	0.499

Note: This table presents the descriptive statistics for the full sample. See Appendix A for the definitions of variables.

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