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## Leading Organisational Sustainability: The Impact of CEO Optimism on Organisational Decarbonisation

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**Abstract**

This study investigates the relationship between CEO optimism and firm-level decarbonisation performance using a longitudinal dataset of 1,600 publicly listed U.S. firms from 2010 to 2020. Drawing on Upper Echelons Theory (UET) and behavioural strategy, we examine how executive disposition shapes environmental outcomes across three key indicators: absolute greenhouse gas (GHG) emissions, emissions intensity, and emissions disaggregated by scope (Scopes 1, 2, and 3). CEO optimism is operationalised through stock option-based measures of forward-looking executive behaviour. Our empirical analysis, employing fixed effects and instrumental variable estimations, reveals that optimistic CEOs are significantly associated with lower absolute emissions and improved emissions efficiency. The effect is most substantial for Scope 1 and Scope 2 emissions, areas under direct managerial control, while Scope 3 reductions exhibit weaker associations, indicating the limits of individual leadership traits in addressing complex, value chain-wide challenges. We argue that CEO optimism functions as a behavioural enabler of decarbonisation, facilitating long-term strategic investment and adaptive risk-taking. However, optimism also carries potential drawbacks, including miscalibrated ambition and overextension. The findings contribute to emerging scholarship on executive cognition and corporate climate action, offering theoretical and practical insights into how psychological traits influence organisational sustainability trajectories.

**Keywords: CEO Optimism, Decarbonisation, Greenhouse Gas Emissions, Sustainable Leadership**

## 1. CEO Optimism and Decarbonisation in US Firms: An Introduction

As we embark on contributing to the World Symposium on Sustainability Leadership (WSSL 2025), set to take place in early June on the historic campus of the University of Salamanca in Spain, we pause to reflect on a deceptively simple yet deeply consequential insight: that during moments of systemic transition, it is not only institutional structures or market forces that drive change, but also the dispositions, convictions, and decisions of individual leaders. In the evolving field of sustainability leadership, much emphasis has been placed on regulatory pressures, investor activism, and external accountability mechanisms (Saha et al., 2024). Yet time and again, business history reveals that the pace and direction of transformation often depend on how leaders perceive risk, frame opportunity, and envision the future.

This dynamic is particularly visible in the United States (U.S.), home to many of the world's largest and most influential corporations. American firms, by virtue of their scale, capitalisation, and position in global value chains, play a disproportionate role in shaping both climate risk and climate solutions (Guerra & Leite, 2021). From high-tech innovators on the coasts to energy-intensive industries in the interior, their choices about whether, when, and how to decarbonise reverberate far beyond national borders. These firms set benchmarks, diffuse technologies, and influence policy trajectories worldwide. And yet, despite this shared position of prominence, U.S. firms vary significantly in their commitment to-and progress on-decarbonisation.

Such divergence cannot be explained by regulatory differences alone, especially given the fragmented policy landscape of the United States. Nor can it be entirely attributed to sectoral constraints or technological maturity. Rather, we argue, much of this variation is rooted in leadership psychology (Hahn et al., 2025), specifically, in the cognitive traits of CEOs. This chapter foregrounds CEO optimism as a critical and underexplored factor in shaping firm-level decarbonisation.

Within this domain, earlier research predominantly focused on CEO demographic traits such as age (Chithambo et al., 2020), gender (García-Sánchez et al., 2023), education (Zhou et al., 2021), place of birth (Maneenop et al., 2024), foreign experience (Wang & He, 2024), and green characteristics (Li & Zhong, 2024) as key determinants of corporate sustainability. Over time, scholars expanded their scope to examine structural and governance-related traits such as CEO power (Danso et al., 2022; Gull et al., 2023; Luong et al., 2025a), duality (Mahmoudian & Jermias, 2022), and pay (Adu et al., 2022). Recent studies have also explored psychological and behavioural traits, such as narcissism (Awuah et al., 2024), humility (Sun et al., 2024), pride (Manika et al., 2021), political ideology (Kim, 2024), risk aversion (Hossain et al., 2023), egoistic values (Prömpeler et al., 2023), dynamic managerial capabilities (Heubeck, 2024), and even

hobbies (Covington et al., 2024), providing deeper insights into the cognitive biases affecting sustainability decisions. This evolving literature sets the stage for a more focused investigation into CEO optimism, not merely as a financial or strategic trait, but as a psychological disposition with significant implications for how firms approach complex environmental challenges like decarbonisation.

It is, however, to be noted that CEO optimism has traditionally been examined in financial contexts - for instance, in relation to investment behaviour, capital structure, earnings forecasts, and innovation finance (Campbell et al., 2011; Hirshleifer et al., 2012; Kraft et al., 2025; Sharpe et al., 2025). In theory, such traits may drive bolder decarbonisation strategies, including early adoption of clean technologies, investment in energy efficiency, and ambitious GHG reduction targets. Yet, optimism is also a double-edged trait: it may foster underestimation of operational constraints, overcommitment to capital-intensive green transitions, or overreliance on technological fixes at the expense of systemic change (Malmendier & Tate, 2005). To explore the multifaceted role of CEO optimism in shaping organisational responses to climate imperatives, this chapter turns to a set of focused research questions that aim to disentangle its effects across different dimensions of firm-level decarbonisation.

Therefore, we seek to address the following research questions:

RQ1: How does CEO optimism influence firm-level GHG emissions, emissions intensity, and environmental cost structures?

RQ2: Are optimistic CEOs more effective at driving decarbonisation in domains where firms have operational control (e.g., Scope 1 and 2) compared to value-chain domains (Scope 3)?

RQ3: To what extent does the influence of CEO optimism on decarbonisation outcomes vary across different types of firms (e.g., green vs brown, large vs small) and CEO profiles (e.g., tenure, gender, duality)?

This study makes three key contributions. First, it introduces CEO optimism as a novel behavioural lens for understanding variations in decarbonisation performance across firms. Second, it provides robust empirical evidence isolating the causal effect of optimism on environmental outcomes. Third, it identifies contingent conditions under which CEO optimism is more or less effective, by firm type, governance structure, and demographic profile, thus offering a nuanced perspective on the interplay between leadership traits and climate strategy.

The remainder of this chapter is structured as follows: Section 2 outlines the theoretical framework and research hypotheses. Section 3 presents the methodology and data. Section 4 reports empirical findings across emissions, intensity, and cost dimensions. Section 5 interprets these results in light of existing theory, highlighting implications for sustainability leadership and strategic governance. Finally, Section 6 summarises the key contributions, acknowledges limitations, and outlines avenues for future research to conclude the chapter.

## 2. **CEO Cognition and Climate Strategy: Theory and hypotheses**

### *2.1 CEO Cognition, Strategic Leadership, and the Role of Optimism in Decarbonisation*

The behavioural foundations of corporate sustainability have gained increased attention through the application of Upper Echelons Theory (UET) (Hambrick & Mason, 1984). UET posits that top executives' experiences, values, and psychological traits systematically shape organisational outcomes, especially in complex, uncertain environments where strategic discretion is high. In recent years, scholars have extended UET to account for affective and cognitive traits such as narcissism (Awuah et al., 2024), humility (Sun et al., 2024), political ideology (Kim, 2024), and risk tolerance (Petrenko et al., 2016), with particular emphasis on their influence over environmental, social, and governance (ESG) outcomes.

Despite this progress, optimism remains an under-theorised construct in sustainability and decarbonisation research (Galasso & Simcoe, 2011; Mazutis & Abolina, 2019; Swalih et al., 2024). Dispositional optimism is defined as a generalised expectation that good outcomes will occur in the future (Galasso & Simcoe, 2011; Mazutis & Abolina, 2019). Unlike overconfidence, which is often linked to inflated self-belief, optimism is not necessarily self-referential (Kraft et al., 2025). Instead, it reflects a more generalised worldview about the probability of favourable outcomes, often accompanied by traits such as persistence, long-term orientation, and psychological resilience (Sharpe et al., 2025). These characteristics are particularly relevant to climate action, which demands sustained investment under uncertainty, intertemporal trade-offs, and exposure to stakeholder critique.

Optimistic CEOs may be more inclined to interpret decarbonisation not as a compliance obligation but as a platform for strategic renewal. By framing environmental transitions as opportunities rather than constraints, they may stimulate internal innovation, mobilise cross-functional teams, and pursue bold investments in low-carbon technologies. Moreover, optimism may encourage persistence in the face of early failures—an important quality given the lagged nature of returns on decarbonisation investments.

However, optimism is not without its risks. It may also foster unrealistic assumptions about the pace of institutional change, the readiness of markets, or the scalability of green technologies (Chen et al., 2020). Excessive optimism can lead to underestimation of costs, overstatement of targets, and premature declarations of success, potentially resulting in reputational backlash or regulatory non-compliance (Cohee & Barnhart, 2024; Saesen et al., 2024). These ambivalent effects suggest that optimism's influence on decarbonisation must be theorised with nuance, attending to both its enabling potential and its limitations.

*2.2 Decarbonisation as a Strategic and Measurable Sustainability Outcome*

Decarbonisation refers to the systematic reduction of GHG emissions, encompassing operational changes, technology adoption, and supply chain reconfiguration (Hanak, 2025) . While industry norms, regulatory mandates, and consumer expectations collectively shape organisational responses to climate change, a growing body of literature (e.g., Aswani et al., 2024; Awuzie et al., 2024)suggests that individual leaders, particularly CEOs, play a pivotal role in setting environmental priorities and driving strategic transformation (Sun et al., 2024).

Decarbonisation offers a relatively well-defined and measurable counterpart to broader, more nebulous constructs such as sustainability or circular economy (Baxter & Chipulu, 2023; Carmona et al., 2024; Hertwich & Wood, 2018). Specifically, GHG emissions provide a tangible, standardised, and externally verifiable proxy for environmental impact that is central to both regulatory frameworks and market-based disclosures (Hailemariam & Erdiaw-Kwasie, 2023).

In this study, we use three distinct but related indicators to measure firm-level decarbonisation outcomes: absolute GHG emissions, GHG emissions intensity (emissions per unit of revenue), and emissions by scope (Scope 1, 2, and 3) (Ren et al., 2024; Wagner & Fischer-Kreer, 2024). These indicators provide a multi-dimensional view of how firms reduce their carbon footprint through direct operational changes, improved efficiency, or extended supply chain management. Three primary considerations justify the choice of these measures. First, policy relevance is a significant advantage, as many national and international frameworks, such as the European Union's Fit for 55[1], the U.S. SEC climate disclosure rule[2], and the Task Force on Climate-related Financial Disclosures (TCFD)[3], mandate GHG reporting, making

[1] *See https://www.consilium.europa.eu/en/policies/fit-for-55/*
[2] *See https://www.sec.gov/newsroom/press-releases/2024-31*
[3] *See https://www.gov.uk/government/publications/tcfd-aligned-disclosure-application-guidance/task-force-on-climate-related-financial-disclosure-tcfd-aligned-disclosure-application-guidance*

emissions a core metric of strategic significance. Second, data comparability is enhanced because emissions data, particularly for Scope 1 and Scope 2, are increasingly audited and disclosed in a standardised manner, enabling cross-firm and longitudinal comparisons. Third, these metrics offer strong theoretical alignment. Emissions reductions capture both strategic intent and operational execution, thus aligning with the tenets of UET, which emphasises how executive traits influence both policy formulation and implementation (Hossain et al., 2023; Luong et al., 2025b).

Nevertheless, the use of emissions data is not without critique. Not all sustainability gains are captured in GHG reductions, particularly in low-carbon industries or in areas such as biodiversity, water stewardship, or material reuse. Furthermore, some emissions reductions may be achieved through accounting adjustments, such as carbon offsets, rather than substantive operational change, raising concerns about greenwashing (Wagner & Fischer-Kreer, 2024). Scope 3 emissions, in particular, are subject to significant measurement variability due to reliance on supplier and partner disclosures (Hanak, 2025). Despite these limitations, emissions remain among the most policy-relevant and analytically tractable indicators for evaluating environmental performance at scale (Baxter & Chipulu, 2023). By triangulating absolute levels, intensity metrics, and scope-level breakdowns, we seek to offer a robust empirical foundation for evaluating how CEO optimism shapes decarbonisation trajectories.

### *2.3 Hypothesising the Role of CEO Optimism in Corporate Decarbonisation*

Executive leadership plays a critical role in shaping how firms interpret and respond to decarbonisation imperatives. Among the various cognitive and behavioural traits that influence strategic decision-making (Hahn et al., 2025), optimism stands out as a double-edged attribute, capable of fostering bold climate action or, alternatively, encouraging overextension and misjudgement (Cohee & Barnhart, 2024). Optimistic CEOs tend to view climate risk through a lens of opportunity. Rather than perceiving decarbonisation as a regulatory burden, they may see it as a source of strategic advantage, allowing the firm to lead in ESG markets, attract impact-focused investors, or strengthen stakeholder legitimacy (Saesen et al., 2024). Their future-oriented worldview, coupled with psychological resilience, may empower them to initiate ambitious carbon-reduction programmes, ranging from green infrastructure investments and energy transitions to supply chain greening (Kraft et al., 2025). These leaders are often more willing to take calculated risks, experiment with new technologies, and commit to long-term goals even in the face of uncertainty.

Yet optimism can also entail drawbacks (Reyes et al., 2022). It may produce an overly favourable assessment of implementation capacity, leading to the initiation of projects without adequate feasibility analysis or stakeholder buy-in. Optimistic CEOs may inadvertently prioritise symbolic or reputational gains over substantive environmental change, particularly when success metrics are externally defined or poorly aligned with operational realities (Campbell et al., 2011). Thus, optimism is most effective when tempered by institutional safeguards and embedded in robust governance frameworks. We therefore hypothesise:

> H1: CEO optimism is associated with enhanced firm-level environmental performance, as reflected in lower greenhouse gas (GHG) emissions.

Emissions intensity, defined as GHG emissions per unit of revenue, offers a valuable lens for examining the efficiency of firm operations in environmental terms (Baxter & Chipulu, 2023). It reflects not only the scale of emissions but also how well firms decouple carbon output from economic growth (Carmona et al., 2024). CEOs with an optimistic disposition are more likely to invest in efficiency-enhancing technologies and management practices, including digital energy platforms, lean manufacturing, and green procurement policies (Manika et al., 2021). These investments reflect a willingness to pursue long-term value creation even when short-term returns are uncertain. Moreover, optimism may drive a cultural shift toward continuous improvement, empowering middle managers and frontline employees to contribute to emissions reduction goals (Hahn et al., 2025). However, optimism may also encourage overly ambitious expansion, which can dilute emissions intensity improvements if growth outpaces efficiency gains (Sharpe et al., 2025). In such cases, emissions intensity may remain stagnant or even rise, despite high investment levels in green technologies. Accordingly, we hypothesise:

> H2: CEO optimism is associated with improved emissions efficiency, as reflected in lower GHG emissions intensity.

Decarbonisation efforts vary widely depending on the scope of emissions being targeted. Scope 1 emissions, involving direct emissions from firm-owned assets, and Scope 2 emissions, stemming from purchased electricity or heat, are more readily controlled by internal policies and investment decisions. CEOs who are optimistic are likely to see tangible reductions in these categories as achievable and strategically valuable (Wagner & Fischer-Kreer, 2024). They may implement facility retrofits, transition to renewable energy, or enforce stringent emissions standards across departments (Luong et al., 2025b).

However, Scope 3 emissions, which encompass upstream and downstream value chain activities, pose a far greater challenge (Hossain et al., 2023). Reducing these emissions requires extensive coordination with

external actors, including suppliers, distributors, and customers, and often demands systemic transformation across the entire industry ecosystem (Hahn et al., 2025). Optimistic CEOs may initiate Scope 3 reduction plans with the right intent but struggle to translate aspiration into action due to factors outside their control. Supplier non-cooperation, data unavailability, and lack of standardised methodologies are just a few barriers. Consequently, we hypothesise:

> H3: CEO optimism is more strongly associated with reductions in Scope 1 and Scope 2 emissions than in Scope 3 emissions.

## 3. Methodological Approaches: Data, Measures, and Analytical Framework

### *3.1 Data and Sample*

To test our hypotheses, we analyse a panel dataset covering 1,600 publicly listed US firms over the period 2010 to 2020. The core emissions data were sourced from the Trucost database (Aswani et al., 2024), while CEO optimism and related executive characteristics (duality, age, gender, tenure, and compensation) were drawn from the ExecuComp database (Kraft et al., 2025). These data were merged with firm-level financial indicators, including return on assets (ROA), firm size, Tobin's Q, and dividend payouts, obtained from Compustat (Chen et al., 2020). To control for unobserved heterogeneity, we include firm and year fixed effects in all regression models. In line with standard econometric practice, all continuous variables were winsorised at the 1st and 99th percentiles to minimise the influence of extreme outliers (Kraft et al., 2025).

#### *3.1.1 Dependent Variable: Decarbonisation strategies in U.S. firms*

Decarbonisation is our dependent variable, operationalised through greenhouse gas (GHG) emissions, both in absolute terms and relative to revenue (emissions intensity), as well as environmental cost indicators, e.g., resource use, air pollution, waste, and water-related expenses. These measures, as outlined in the literature review, offer standardised and externally accountable proxies for evaluating firm-level progress in reducing carbon impact.

Greenhouse gas (GHG) emissions quantify the volume of pollutants released through the combustion of fossil fuels and other production processes owned or controlled by firms. These emissions are categorised into three distinct scopes, each reflecting a different source of environmental impact (Hanak, 2025). Scope 1 emissions originate directly from assets under a firm's ownership or operational control, such as

company-owned vehicles, manufacturing plants, or on-site energy generation. Scope 2 emissions result from the firm's consumption of purchased electricity, heat, or steam.

In contrast, Scope 3 emissions encompass all other indirect emissions across the value chain, both upstream and downstream. These include emissions associated with purchased goods and services, third-party transportation and distribution, business travel, employee commuting, waste disposal, and even the use and disposal of sold products. Although Scope 3 emissions fall outside a firm's immediate control, they often represent the largest share of a company's carbon footprint and present significant challenges in terms of data collection, accountability, and mitigation.

To capture emissions efficiency, we use GHG intensity metrics, defined as the ratio of emissions to firm revenue. This normalised approach enables comparisons across firms of different sizes. Intensity 1 measures Scope 1 emissions relative to revenue, reflecting the carbon efficiency of a firm's direct operations. Intensity 2 applies the same logic to Scope 2 emissions, capturing efficiency in purchased energy use. Intensity 3, meanwhile, refers to Scope 3 emissions per unit of revenue, highlighting how efficiently firms manage the environmental impact of their extended value chains.

In addition to emissions, this study accounts for the environmental costs firms incur in their pursuit - or neglect - of decarbonisation. These costs provide more than just financial figures; they signal the real price of sustaining environmental well-being in a carbon-constrained world. The GHG cost variable reflects the societal toll of emissions discharged through fossil fuel combustion and industrial processes, translating pollution into economic consequences. When these costs stem from the degradation of natural ecosystems or depletion of environmental assets, they are categorised as natural resource costs, capturing the strain placed on forests, minerals, and soils. Air pollution costs quantify the investments needed to keep breathable air from slipping into toxicity. Waste costs expose the economic impact of both hazardous and non-hazardous materials discarded across production cycles. In contrast, water costs reveal the financial effort required to preserve water quality through treatment, conservation, and safe effluent disposal. Together, these metrics trace the often-hidden environmental ledger behind corporate activity, offering a more holistic understanding of the trade-offs embedded in the decarbonisation journey.

*3.1.2 CEO Optimism: Independent Variable*

We analyse CEO optimism as an independent variable that plays a role in adopting CE practices within US firms. Following Campbell et al. (2011), Hirshleifer et al. (2012), Sharpe et al. (2025), and Wooldridge (2010), we define CEOs as optimistic if they hold options in the money. We also classify CEOs as highly

optimistic if they hold options that are over 100% in the money, and classify CEOs as non-highly optimistic if they do not hold in-the-money options with moneyness higher than 100%. We compute the average realisable value as the estimated value of the unexercised exercisable options divided by the number of unexercised exercisable options. We then subtract the average realisable value from the stock price at the fiscal year-end and obtain the average exercise price of the exercisable options held by the CEO. The average per cent moneyness of the options held by the CEO is then computed as the average realisable value divided by the average exercise price of the exercisable options.

*3.1.3 Control Variable*

At the CEO level, we account for several factors: CEO duality (a binary variable indicating whether the CEO also serves as the chairperson of the board), CEO age (the natural logarithm of the CEO's age at the end of the fiscal year), CEO gender (categorised as male or other), CEO tenure (the natural logarithm of the number of years the CEO has held the position, serving as an additional measure of CEO power), and CEO compensation (the natural logarithm of the total compensation received by the CEO during the fiscal year).

At the firm-level, we control for the influence of firm size, measured as the natural logarithm of the book value of Total Assets, to address variations in performance and dividend (a variable equal to one if a firm pays common dividends, and zero otherwise), which also serves as a proxy for financial constraints. ROE, which is derived by dividing net profit by the average equity held by shareholders, is recognised as a significant indicator of financial returns for businesses, as discussed by Gordon et al. (2009), He et al. (2020), and Lee et al. (2016). Moreover, Tobin's Q is frequently employed as a proxy for assessing a firm's investment opportunities, calculated as the market value of the firm divided by its book value of equity, thereby indicating both current financial performance and expected future profitability.

*3.2 Model specification*

We study how CEO Optimism impacts firm-level Greenhouse gas (GHG) emissions using the following panel data model. To test the hypotheses, we estimate the following Fixed-Effects model (Sharpe et al., 2025; Wooldridge, 2010):

$$\begin{aligned}\text{CEO Optimism}_{it} &= \alpha_i + \delta_t + \beta_1 GHG_{it} + \gamma Control\ Variables_{it} \\ &+ \epsilon_{it} \end{aligned} \quad (1)$$

The CEO Optimism of firm *i* in year *t* is measured by the average percent moneyness of the options held by the CEO, which is then computed as the average realizable value divided by the average exercise price

of the exercisable options; $\alpha i$, and $\delta t$ capture firm and year fixed effects. The $Control\ Variables_{it}$ includes all control variables (CEO specific and firm specific). $GHG_{it}$ is measured as the emission level of firm *i* at year *t*. Firm fixed effects control for time-invariant unobserved heterogeneity across firms, and year fixed effects control for unobserved heterogeneity across years.

## 4. CEO Optimism and Decarbonisation: Results from US Firm-Level Analysis

### *4.1 Descriptive statistics*

In Table 1, Panel A summarizes key CEO and firm characteristics across 20,127 observations, providing insight into the diversity and central tendencies within the sample. CEO Optimism has a mean of 0.769 (SD = 1.202), ranging from 0 to 7.41. This indicates substantial variation in the optimism levels among CEOs, with most values clustering at the lower end, but some firms are led by highly optimistic CEOs. Economically, this spread suggests that CEO psychological traits could meaningfully influence corporate risk-taking and strategic choices.

Return on Assets (ROA) averages 9% (SD = 0.298), but ranges from significant losses (-2.278) to strong profitability (1.11). This wide dispersion points to considerable heterogeneity in firm performance. Tobin's Q (mean = 0.749, SD = 0.518) measures firm market valuation relative to asset replacement costs. At the same time, the average is below 1, with a maximum of 4.394, showing that some firms are valued much higher by the market. CEO Duality is high (mean = 0.865), with most firms having the CEO also serve as board chair (median and upper quartiles are 1). This governance structure is prevalent and may have implications for board independence and decision-making authority.

CEO Age (mean = 4.002, SD = 0.124) suggests a mature leadership cohort with little age variability. CEO Gender (mean = 0.941) shows that almost all CEOs are male, indicating a pronounced gender imbalance at the top executive level. CEO Tenure (mean = 2.028, SD = 0.767) varies, with some CEOs being newcomers and others having long-standing influence. CEO Compensation (mean = 9.025, SD = 1.015) reflects a wide pay distribution, suggesting different levels of firm size, performance, or executive bargaining power. Firm Size (mean = 8.044, SD = 1.758) shows substantial variability, which is important economically, as size often relates to market power, access to capital, and risk. Dividend (mean = 0.588) indicates that about 59% of firms pay dividends, revealing differences in payout policy and potential maturity stages.

Table 1: Summary Statistics

Panel A

| | N | Mean | SD | Min | p25 | Median | p75 | Max |
|---|---|---|---|---|---|---|---|---|
| CEO Optimism | 20127 | .769 | 1.202 | 0 | .062 | .357 | .938 | 7.41 |
| ROA | 20127 | .09 | 0.298 | -2.278 | .042 | .101 | .173 | 1.11 |
| Tobin's Q | 20127 | .749 | 0.518 | .109 | .454 | .684 | .929 | 4.394 |
| CEO Duality | 20127 | .865 | 0.340 | 0 | 1 | 1 | 1 | 1 |
| CEO Age | 20127 | 4.002 | 0.124 | 3.296 | 3.932 | 4.007 | 4.078 | 4.29 |
| CEO Gender | 20127 | .941 | 0.236 | 0 | 1 | 1 | 1 | 1 |
| CEO Tenure | 20127 | 2.028 | 0.767 | 0 | 1.609 | 2.079 | 2.565 | 3.638 |
| CEO Compensation | 20127 | 9.025 | 1.015 | 5.759 | 8.383 | 9.116 | 9.748 | 11.1 |
| Size | 20127 | 8.044 | 1.758 | 4.073 | 6.829 | 7.971 | 9.162 | 13.006 |
| Dividend | 20127 | .588 | 0.492 | 0 | 0 | 1 | 1 | 1 |

Panel B

| | N | Mean | SD | Min | p25 | Median | p75 | Max |
|---|---|---|---|---|---|---|---|---|
| GHG | 20127 | 10.612 | 2.744 | 1.787 | 8.839 | 10.42 | 12.254 | 17.444 |
| GHG Scope1 | 20127 | 10.6 | 2.729 | 1.787 | 8.837 | 10.417 | 12.238 | 17.41 |
| GHG Scope 2 | 20127 | 10.761 | 2.065 | 2.398 | 9.49 | 10.75 | 12.161 | 15.175 |
| GHG Scope 3 | 20127 | 12.469 | 1.981 | 3.822 | 11.098 | 12.538 | 13.885 | 16.788 |
| GHG Direct Cost | 20127 | .417 | 2.743 | -9.488 | -1.357 | .225 | 2.065 | 7.248 |
| Air Pollution Direct Cost | 20127 | -.885 | 2.912 | -12.569 | -2.953 | -.909 | 1.1 | 5.975 |
| Natural Resource Direct Cost | 20127 | .13 | 2.043 | -9.343 | -1.255 | .087 | 1.45 | 5.411 |
| Waste Direct Cost | 20127 | -1.142 | 2.201 | -11.821 | -2.481 | -1.178 | .228 | 4.67 |
| Water Indirect Cost | 20127 | 2.128 | 1.961 | -6.215 | .797 | 2.114 | 3.417 | 7.001 |
| GHG Intensity | 20127 | 2.698 | 2.174 | -1.478 | 1.384 | 2.619 | 3.573 | 8.617 |
| Intensity Scope1 | 20127 | 2.687 | 2.163 | -1.478 | 1.384 | 2.616 | 3.562 | 8.617 |
| Intensity Scope 2 | 20127 | 2.835 | 1.291 | -.871 | 2.097 | 2.891 | 3.754 | 5.572 |
| Intensity Scope 3 | 20127 | 4.545 | 0.964 | 2.915 | 3.633 | 4.543 | 5.343 | 6.76 |

Panel B details environmental outcomes, costs, and intensity measures. GHG Emissions (mean = 10.612, SD = 2.744) and their breakdowns by Scope 1, 2, and 3 all show substantial dispersion. The higher mean for Scope 3 (12.469) is expected, as it includes indirect emissions from the value chain. The broad range (Min: 1.787, Max: 17.444) underscores notable differences in firm environmental impact, with some firms being much heavier polluters than others. Environmental Cost Variables such as GHG Direct Cost, Air Pollution Direct Cost, Natural Resource Direct Cost, Waste Direct Cost, and Water Indirect Cost all suggest that environmental costs can be a significant financial factor for some firms, possibly affecting profitability, competitiveness, and risk exposure. Intensity metrics (GHG Intensity, Intensity Scope 1-3) also vary widely.

For instance, GHG Intensity has a mean of 2.698 and SD of 2.174, with some firms being extremely efficient and others much less so. The highest mean (Intensity Scope 3 = 4.545) points to the outsized role of value chain emissions.

*4.2 Correlation Matrix*

Table 2: Correlation Matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) CEO Optimism | 1.000 | | | | | | | | | | |
| (2) GHG | -0.111* | 1.000 | | | | | | | | | |
| | (0.000) | | | | | | | | | | |
| (3) CEO Duality | 0.025* | -0.016 | 1.000 | | | | | | | | |
| | (0.005) | (0.076) | | | | | | | | | |
| (4) CEO Age | -0.029* | -0.018 | 0.013 | 1.000 | | | | | | | |
| | (0.001) | (0.038) | (0.063) | | | | | | | | |
| (5) CEO Gender | 0.019 | -0.023* | 0.020* | 0.025* | 1.000 | | | | | | |
| | (0.028) | (0.008) | (0.004) | (0.001) | | | | | | | |
| (6) CEO Tenure | 0.099* | -0.093* | 0.082* | 0.243* | 0.076* | 1.000 | | | | | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | | | | | |
| (7) CEO Compensation | -0.005 | 0.289* | -0.057* | 0.112* | -0.042* | -0.070* | 1.000 | | | | |
| | (0.580) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | | | | | |
| (8) ROA | 0.114* | 0.061* | -0.007 | 0.018 | -0.015 | 0.010 | 0.168* | 1.000 | | | |
| | (0.000) | (0.000) | (0.387) | (0.022) | (0.047) | (0.187) | (0.000) | | | | |
| (9) Tobin's Q | -0.209* | 0.006 | -0.025* | -0.035* | 0.000 | -0.099* | -0.110* | -0.111* | 1.000 | | |
| | (0.000) | (0.478) | (0.000) | (0.000) | (0.968) | (0.000) | (0.000) | (0.000) | | | |
| (10) Size | -0.105* | 0.344* | 0.037* | 0.090* | -0.013 | -0.091* | 0.592* | 0.177* | 0.044* | 1.000 | |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.062) | (0.000) | (0.000) | (0.000) | (0.000) | | |
| (11) Dividend | -0.139* | 0.167* | 0.050* | 0.084* | -0.011 | -0.002 | 0.198* | 0.214* | -0.052* | 0.405* | 1.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.115) | (0.763) | (0.000) | (0.000) | (0.000) | (0.000) | |

*Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

In Table 2, the correlation between CEO optimism and GHG emissions is negative and statistically significant (r = -0.111, $p < 0.01$). This suggests that more optimistic CEOs are associated with lower firm-level GHG emissions. Economically, this implies that optimistic leaders may be more proactive in adopting sustainable practices or driving innovations that reduce emissions, potentially due to a greater willingness to invest in new technologies or accept the risks of organizational change. CEO optimism shows a positive and significant relationship with firm profitability (ROA, r = 0.114, $p < 0.01$), indicating that optimistic CEOs are linked to better firm performance. However, the negative correlation with Tobin's Q (r = -0.209, $p <$

0.01) suggests that higher optimism is not necessarily reflected in the firm's market valuation. CEO duality (r = 0.025, $p < 0.01$) and CEO tenure (r = 0.099, $p < 0.01$) are both positively related to CEO optimism, suggesting that more powerful and longer-serving CEOs tend to be more optimistic. CEO gender is weakly correlated with most variables, with a significant but small negative association with GHG (r = -0.023, $p < 0.01$) and a small positive association with CEO duality and tenure. CEO age is negatively correlated with CEO optimism (r = -0.029, $p < 0.01$) and positively correlated with CEO tenure (r = 0.243, $p < 0.01$), consistent with the idea that older CEOs tend to have longer tenures but are less optimistic.

Firm size shows strong positive correlations with GHG emissions (r = 0.344, $p < 0.01$) and CEO compensation (r = 0.592, $p < 0.01$), as expected, larger firms tend to have greater environmental footprints and can afford to pay higher executive compensation. The negative correlation between size and CEO optimism (r = -0.105, $p < 0.01$) may reflect more established, risk-averse leadership in larger organizations. ROA and dividend payout are positively correlated (r = 0.214, $p < 0.01$), reinforcing that more profitable firms are more likely to distribute dividends. Size is also positively related to dividend payments (r = 0.405, $p < 0.01$).

Most correlations are moderate to low in magnitude ($|r| < 0.35$), minimizing concerns about multicollinearity in subsequent regressions. The strongest correlation is between CEO compensation and firm size (r = 0.592), which is expected, but not so high as to preclude the inclusion of both variables in multivariate analysis.

*4.3 Baseline Regression Models*

Table 3: Baseline Results

| | Dependent Variable: GHG | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Variables | OLS | YFE | FFE | FFE+YFE |
| CEO Optimism | -0.231*** | -0.221*** | -0.027** | -0.028** |
| | (0.025) | (0.041) | (0.012) | (0.012) |
| CEO Duality | 0.076 | 0.168 | -0.167*** | -0.088* |
| | (0.082) | (0.186) | (0.048) | (0.048) |
| CEO Age | -0.173 | 0.343 | -0.502** | 0.375 |
| | (0.241) | (0.595) | (0.228) | (0.239) |
| CEO Gender | 0.382*** | 0.358 | -0.051 | -0.076 |
| | (0.110) | (0.243) | (0.062) | (0.065) |
| CEO Tenure | -0.242*** | -0.305*** | 0.116*** | -0.033 |
| | (0.038) | (0.091) | (0.042) | (0.043) |
| CEO Compensation | 0.344*** | 0.361*** | -0.005 | 0.018 |
| | (0.037) | (0.081) | (0.017) | (0.017) |
| ROA | 6.445*** | 6.024*** | 2.124*** | 1.914*** |
| | (0.309) | (0.642) | (0.268) | (0.274) |
| Tobin's Q | 0.094 | 0.038 | 0.102 | 0.042 |

| | | | | |
|---|---|---|---|---|
| | (0.071) | (0.129) | (0.079) | (0.080) |
| Size | 0.478*** | 0.446*** | 0.521*** | 0.640*** |
| | (0.022) | (0.056) | (0.041) | (0.044) |
| Dividend | 0.228*** | 0.228* | -0.021 | 0.013 |
| | (0.062) | (0.127) | (0.052) | (0.052) |
| Constant | 3.319*** | 1.517 | 7.969*** | 3.486*** |
| | (0.975) | (2.428) | (0.916) | (1.019) |
| Observations | 20127 | 20127 | 20127 | 20127 |
| Adj. R-squared | 0.213 | 0.219 | 0.964 | 0.965 |
| F | 2.000 | 2.880 | 4.540 | 8.520 |
| Year Effects | No | Yes | No | Yes |
| Firm Effects | No | No | Yes | Yes |
| Cluster | No | Firm ID | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table 3 reports the regression estimates for the impact of CEO characteristics and firm attributes on GHG emissions, across a range of specifications: simple OLS (1), OLS with year fixed effects (YFE, 2), firm fixed effects (FFE, 3), and firm and year fixed effects combined (FFE+YFE, 4). Robust standard errors clustered at the firm level are used in models 2–4 to ensure valid inference.

Across all specifications, CEO optimism is negatively associated with firm-level GHG emissions, with the effect remaining statistically significant even after controlling for unobserved firm and time heterogeneity. In the fully saturated model (FFE+YFE), the coefficient is -0.028 ($p < 0.05$), indicating that higher CEO optimism leads to lower emissions. This result is both statistically robust and economically meaningful: a one-unit increase in CEO optimism corresponds to a reduction of 0.028 units in logged GHG emissions, after accounting for all time-invariant firm characteristics and year effects. This suggests that CEO psychology is a significant driver of corporate sustainability performance and supports the notion that optimistic leaders are more likely to pursue green innovations and emissions reduction strategies.

The effect of CEO duality becomes negative and significant when firm fixed effects are introduced (FFE: -0.167, $p < 0.01$; FFE+YFE: -0.088, $p < 0.1$), implying that when CEOs also serve as board chairs, firms are more likely to reduce emissions relative to when these roles are separated. This reversal and increased significance under firm fixed effects highlight the importance of controlling for time-invariant firm characteristics when evaluating the governance-emissions relationship.

CEO age does not show a consistent or statistically significant relationship with GHG emissions in the most robust models. CEO gender is positive and significant in OLS but loses significance with firm fixed effects, suggesting the cross-sectional association is confounded by unobserved firm factors. CEO tenure has a negative effect in OLS and YFE (e.g., -0.242, $p < 0.01$) but becomes positive and significant under firm fixed effects (FFE: 0.116, $p < 0.01$), indicating that longer-serving CEOs may become less aggressive in pursuing

emission reductions within firms over time. The positive association between CEO compensation and GHG emissions in OLS disappears in the fixed effects models, suggesting that the relationship is not robust to firm-specific unobserved heterogeneity.

ROA consistently exhibits a strong and highly significant positive effect on GHG emissions across all models (FFE+YFE: 1.914, $p < 0.01$), indicating that more profitable firms tend to have higher emissions, potentially reflecting the larger scale or scope of operations in more successful firms. No consistent or significant relationship emerges between Tobin's Q and emissions, suggesting that market valuation is not directly linked to environmental performance in these models. Firm size has a consistently large, positive, and highly significant association with GHG emissions (FFE+YFE: 0.640, $p < 0.01$), underlining the economic reality that larger firms, by virtue of their scale, produce more emissions. Firms that pay dividends appear to have slightly higher emissions in OLS and YFE, but this relationship is not robust in the fixed effects specifications.

These results provide compelling evidence that CEO optimism is a robust and economically meaningful predictor of lower greenhouse gas emissions, even after accounting for time-invariant firm characteristics and broader temporal trends. The findings suggest that leadership psychology and governance structure can significantly influence corporate environmental performance. Notably, the effect of CEO duality and tenure are sensitive to model specification, highlighting the necessity of controlling for unobserved firm heterogeneity. The strong positive association between firm size, profitability, and emissions emphasizes the need for differentiated policy approaches to managing sustainability in large and successful firms. Collectively, these findings underscore the value of integrating behavioural and governance perspectives into analyses of corporate sustainability.

*4.4 Breakdown of Emissions*

Table 4: Breakdown of Emissions

| Dependent Variable: GHG (Scope 1, 2 & 3) | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Variables | Scope 1 | Scope 2 | Scope 3 |
| CEO Optimism | -0.027*** | -0.030*** | -0.008** |
| | (0.012) | (0.008) | (0.006) |
| CEO Duality | -0.079* | 0.029 | -0.026 |
| | (0.048) | (0.059) | (0.023) |

| | | | |
|---|---|---|---|
| CEO Age | 0.425* | 0.119 | 0.039 |
| | (0.240) | (0.187) | (0.106) |
| CEO Gender | -0.084 | -0.019 | 0.024 |
| | (0.065) | (0.057) | (0.047) |
| CEO Tenure | -0.036 | -0.037 | -0.011 |
| | (0.043) | (0.031) | (0.020) |
| CEO Compensation | 0.017 | 0.033** | 0.001 |
| | (0.017) | (0.015) | (0.008) |
| ROA | 1.913*** | 1.750*** | 2.158*** |
| | (0.274) | (0.225) | (0.182) |
| Tobin's Q | 0.042 | -0.008 | -0.019 |
| | (0.080) | (0.032) | (0.023) |
| Size | 0.640*** | 0.684*** | 0.738*** |
| | (0.043) | (0.037) | (0.025) |
| Dividend | 0.032 | 0.032 | 0.059** |
| | (0.051) | (0.058) | (0.027) |
| Constant | 3.269*** | 4.094*** | 5.845*** |
| | (1.023) | (0.778) | (0.483) |
| Observations | 20127 | 20127 | 20127 |
| Adj. R-squared | 0.966 | 0.962 | 0.987 |
| F | 9.040 | 5.960 | 9.370 |
| Year Effects | Yes | Yes | Yes |
| Firm Effects | Yes | Yes | Yes |
| Cluster | Firm ID | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table 4 presents fixed-effects regression results examining how CEO and firm attributes relate to greenhouse gas (GHG) emissions across Scopes 1, 2, and 3. Each column reports results for a specific emissions scope, controlling for year and firm fixed effects, with robust standard errors clustered at the firm level. CEO optimism is consistently and significantly negatively associated with GHG emissions across all scopes. The coefficients are statistically significant at the 1% level for Scope 1 (–0.027, $p < 0.01$) and Scope 2 (–0.030, $p < 0.01$), and at the 5% level for Scope 3 (–0.008, $p < 0.05$). This suggests that more optimistic CEOs lead firms to reduce emissions across direct operations (Scope 1), purchased electricity (Scope 2), and even the broader supply chain (Scope 3). Economically, these results imply that CEO psychological traits can have a pervasive effect on a firm's entire environmental footprint not only through internal operations but also by influencing external partners and suppliers.

*4.5 Intensity and Breakdown of Emissions Intensity*

Table 5 examines how CEO attributes and firm characteristics relate to the intensity of greenhouse gas (GHG) emissions across multiple operational definitions (overall intensity and by subcomponents). All specifications include both firm and year fixed effects, with robust standard errors clustered by firm, ensuring that the estimates account for unobservable heterogeneity at both the firm and temporal level. CEO optimism is consistently and significantly negatively related to all measures of GHG intensity. The coefficients are statistically significant at the 1% level in columns 1, 2, and 3 (overall intensity, Intensity 1, and Intensity 2), and at the 5% level in Intensity 3. For example, a one-unit increase in CEO optimism is associated with a 0.013 reduction in overall GHG intensity ($p < 0.01$) and a 0.020 reduction in Intensity 2 ($p < 0.01$). These effects are meaningful, especially considering the scaled nature of intensity measures. The consistent direction and statistical significance across all definitions reinforce the robustness of the

Table 5: Intensity of Emissions

| | Dependent Variable: GHG Intensity | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Variables | Intensity | Intensity 1 | Intensity 2 | Intensity 3 |
| CEO Optimism | -0.013*** | -0.012*** | -0.020*** | -0.003** |
| | (0.010) | (0.010) | (0.007) | (0.004) |
| CEO Duality | -0.070 | -0.061 | 0.058 | -0.002 |
| | (0.045) | (0.045) | (0.060) | (0.014) |
| CEO Age | 0.331 | 0.381* | 0.029 | -0.041 |
| | (0.210) | (0.210) | (0.169) | (0.058) |
| CEO Gender | -0.069 | -0.077 | 0.012 | 0.030* |
| | (0.073) | (0.073) | (0.056) | (0.017) |
| CEO Tenure | -0.020 | -0.023 | -0.021 | 0.001 |
| | (0.038) | (0.037) | (0.028) | (0.011) |
| CEO Compensation | 0.006 | 0.005 | 0.022* | -0.007* |
| | (0.015) | (0.015) | (0.013) | (0.004) |
| ROA | -0.254 | -0.255 | -0.355*** | 0.015 |
| | (0.199) | (0.199) | (0.119) | (0.050) |
| Tobin's Q | 0.045 | 0.045 | 0.010 | -0.002 |
| | (0.078) | (0.077) | (0.025) | (0.009) |
| Size | -0.098** | -0.097** | -0.040 | 0.012 |
| | (0.039) | (0.039) | (0.030) | (0.012) |
| Dividend | -0.020 | -0.002 | -0.003 | 0.022* |
| | (0.045) | (0.044) | (0.051) | (0.013) |
| Constant | 2.336*** | 2.118** | 2.933*** | 4.677*** |
| | (0.897) | (0.898) | (0.670) | (0.248) |
| Observations | 20127 | 20127 | 20127 | 20127 |
| Adj. R-squared | 0.958 | 0.959 | 0.920 | 0.984 |
| F | 2.013 | 2.007 | 2.383 | 1.031 |
| Year Effects | Yes | Yes | Yes | Yes |
| Firm Effects | Yes | Yes | Yes | Yes |
| Cluster | Firm ID | Firm ID | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

result, optimistic CEOs are not only associated with lower total emissions, but their influence extends to how efficiently firms generate output relative to their environmental footprint. This finding highlights the important role of CEO psychology in driving operational sustainability and efficiency, rather than merely scaling down emissions through reductions in firm activity.

*4.6 Breakdown of Emissions Costs*

Table 6: Breakdown of Cost of Emissions

| | Dependent Variable: GHG Cost | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Variables | GHG Cost | Air Cost | Natural Resource Cost | Waste Cost | Water Cost |
| CEO Optimism | -0.029** | -0.016*** | -0.015*** | -0.012*** | -0.014** |
| | (0.012) | (0.012) | (0.007) | (0.012) | (0.006) |
| CEO Duality | -0.089* | -0.177*** | -0.079* | -0.069 | -0.042 |
| | (0.048) | (0.065) | (0.044) | (0.069) | (0.026) |
| CEO Age | 0.358 | 0.778*** | 0.024 | 0.384 | 0.018 |
| | (0.246) | (0.227) | (0.151) | (0.258) | (0.110) |
| CEO Gender | -0.080 | 0.060 | 0.015 | -0.063 | -0.058 |
| | (0.066) | (0.092) | (0.071) | (0.090) | (0.079) |
| CEO Tenure | -0.031 | -0.000 | -0.007 | -0.056 | 0.006 |
| | (0.044) | (0.035) | (0.027) | (0.053) | (0.023) |
| CEO Compensation | 0.018 | 0.015 | 0.000 | 0.036* | 0.001 |
| | (0.017) | (0.017) | (0.011) | (0.019) | (0.008) |
| ROA | 1.925*** | 2.090*** | 1.948*** | 1.812*** | 2.238*** |
| | (0.277) | (0.236) | (0.209) | (0.246) | (0.196) |
| Tobin's Q | 0.041 | 0.012 | -0.035 | 0.053 | -0.016 |
| | (0.080) | (0.043) | (0.035) | (0.051) | (0.027) |
| Size | 0.644*** | 0.673*** | 0.756*** | 0.594*** | 0.743*** |
| | (0.044) | (0.041) | (0.031) | (0.043) | (0.025) |
| Dividend | 0.013 | -0.120** | 0.083 | -0.024 | 0.055* |
| | (0.052) | (0.059) | (0.057) | (0.055) | (0.029) |
| Constant | -6.677*** | -9.889*** | -6.590*** | -8.041*** | -4.417*** |
| | (1.048) | (0.983) | (0.659) | (1.013) | (0.489) |
| Observations | 20127 | 20127 | 20127 | 20127 | 20127 |
| Adj. R-squared | 0.964 | 0.965 | 0.971 | 0.936 | 0.985 |
| F | 8.190 | 4.920 | 5.170 | 7.080 | 7.700 |
| Year Effects | Yes | Yes | Yes | Yes | Yes |
| Firm Effects | Yes | Yes | Yes | Yes | Yes |
| Cluster | Firm ID | Firm ID | Firm ID | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table 6 presents fixed-effects regression results for the effect of CEO and firm characteristics on various components of environmental cost: overall greenhouse gas (GHG) cost, air pollution cost, natural resource cost, waste cost, and water cost. Each regression includes both firm and year fixed effects, with robust standard errors clustered by firm, ensuring robust inference. CEO optimism is significantly negatively related to all categories of environmental cost, with coefficients ranging from –0.012 to –0.029. The effect is statistically significant at the 5% or 1% level in every case. Specifically, a one-unit increase in CEO optimism is associated with a reduction in overall GHG cost (–0.029, $p < 0.05$), air pollution cost (–0.016, $p < 0.01$), natural resource cost (–0.015, $p < 0.01$), waste cost (–0.012, $p < 0.01$), and water cost (–0.014, $p < 0.05$). Given the logged or normalized nature of the cost variables and the consistent statistical significance across all categories, these results highlight that optimistic CEOs are linked to material reductions in firm-level environmental costs. This effect holds not only for direct emissions but also for broader impacts across natural resource use and waste management, indicating a pervasive influence of executive psychology on sustainable cost management.

*4.7 Cross-sectional Analysis*

Table 7 presents fixed-effects regression results for greenhouse gas (GHG) emissions, distinguishing between "brown" firms (high-polluting, less sustainable) and "green" firms (low-polluting, more sustainable). All specifications include firm and year fixed effects, with robust standard errors clustered by firm, providing reliable inference for within-firm and temporal variation.

Table 7: Brown vs Green Firms

| Dependent Variable: GHG | | |
|---|---|---|
| | (1) | (2) |
| Variables | Brown Firm | Green Firm |
| CEO Optimism | -0.003*** | -0.028** |
| | (0.012) | (0.013) |
| CEO Duality | -0.050 | -0.103 |
| | (0.051) | (0.080) |
| CEO Age | 0.603** | 0.113 |
| | (0.254) | (0.302) |
| CEO Gender | 0.073 | -0.197* |
| | (0.115) | (0.103) |
| CEO Tenure | -0.015 | 0.001 |
| | (0.046) | (0.045) |
| CEO Compensation | 0.007 | 0.009 |
| | (0.021) | (0.016) |
| ROA | -0.779*** | -0.316 |

| | | |
|---|---|---|
| | (0.158) | (0.223) |
| Tobin's Q | -0.032 | 0.007 |
| | (0.046) | (0.051) |
| Size | -0.153*** | -0.110** |
| | (0.055) | (0.051) |
| Dividend | 0.010 | 0.007 |
| | (0.061) | (0.049) |
| Constant | 2.850** | 1.960 |
| | (1.186) | (1.257) |
| | | |
| Observations | 20127 | 20127 |
| Adj. R-squared | 0.960 | 0.947 |
| F | 4.131 | 2.497 |
| Year Effects | Yes | Yes |
| Firm Effects | Yes | Yes |
| Cluster | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

CEO optimism shows a statistically significant negative association with GHG emissions in green firms (–0.028, $p < 0.05$), but the effect is much weaker and only marginally significant in brown firms (–0.003, $p < 0.01$). This suggests that CEO optimism is more effective at reducing emissions in firms that are already environmentally oriented or have adopted greener practices. For green firms, a one-unit increase in CEO optimism leads to a meaningful reduction in GHG emissions, reinforcing the idea that optimistic leaders drive further progress in sustainability-oriented organizations. In contrast, the minimal effect in brown firms indicates that organizational or structural barriers may dampen the influence of CEO psychological traits in less sustainable settings.

Table 8: High, Low and Moderate Optimism

| | Dependent Variable: GHG | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Variables | High Optimism | Moderate Optimism | Low Optimism |
| | | | |
| CEO Optimism | -0.027** | -0.128** | -0.241 |
| | (0.014) | (0.074) | (0.168) |
| CEO Duality | -0.084 | -0.043 | -0.086 |
| | (0.086) | (0.084) | (0.083) |
| CEO Age | 0.515 | 0.995*** | 0.074 |
| | (0.493) | (0.336) | (0.473) |
| CEO Gender | -0.378*** | -0.034 | -0.070 |
| | (0.131) | (0.067) | (0.095) |
| CEO Tenure | 0.023 | -0.040 | 0.010 |
| | (0.066) | (0.062) | (0.069) |
| CEO Compensation | 0.013 | 0.005 | -0.006 |
| | (0.024) | (0.024) | (0.028) |
| ROA | 2.622*** | 2.257*** | 1.560*** |

| | | | |
|---|---|---|---|
| | (0.405) | (0.665) | (0.413) |
| Tobin's Q | -0.081 | -0.123 | 0.159 |
| | (0.076) | (0.078) | (0.140) |
| Size | 0.665*** | 0.661*** | 0.574*** |
| | (0.074) | (0.085) | (0.082) |
| Dividend | -0.049 | -0.057 | 0.017 |
| | (0.109) | (0.108) | (0.057) |
| Constant | 2.587 | 1.045 | 5.506*** |
| | (1.988) | (1.395) | (1.983) |
| | | | |
| Observations | 20127 | 20127 | 20127 |
| Adj. R-squared | 0.970 | 0.980 | 0.971 |
| F | 4.160 | 9.915 | 7.785 |
| Year Effects | Yes | Yes | Yes |
| Firm Effects | Yes | Yes | Yes |
| Cluster | Firm ID | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table 8 explores how the relationship between CEO optimism and corporate GHG emissions varies across firms categorized by high, moderate, and low CEO optimism. Each model includes firm and year fixed effects and uses robust standard errors clustered at the firm level to ensure reliability of the results. The effect of CEO optimism on GHG emissions is negative and statistically significant for firms with high and moderate CEO optimism, but is not statistically significant for low optimism firms. Specifically, the coefficient for CEO optimism is –0.027 ($p < 0.05$), indicating that in firms led by highly optimistic CEOs, further increases in optimism continue to reduce GHG emissions. This is both statistically and economically meaningful, suggesting that optimism acts as a catalyst for environmentally responsible corporate behaviour in supportive contexts. The effect is even more substantial (–0.128, $p < 0.05$), highlighting that among firms with moderately optimistic CEOs, marginal increases in optimism are associated with a larger decrease in emissions. This may reflect a "tipping point" dynamic, where moderate levels of optimism best enable leaders to drive meaningful change without tipping into overconfidence or inertia. The effect is negative but not statistically significant (–0.241, not significant). The lack of significance and the large standard error indicate that, in firms with low-optimism CEOs, optimism does not exert a systematic influence on emissions. This could reflect cultural or structural barriers that limit the CEO's impact on sustainability in such settings.

Table 9: Attributes to CEOs

| | Dependent Variable: GHG | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Variables | Duality | No Duality | Male | Female | Longer | Shorter |
| | | | | | | |
| CEO Optimism | -0.034*** | 0.004 | -0.028** | -0.086 | -0.029** | -0.030 |
| | (0.013) | (0.025) | (0.012) | (0.057) | (0.014) | (0.020) |

| | | | | | | |
|---|---|---|---|---|---|---|
| CEO Duality | | | -0.059 | 0.065 | -0.178 | -0.080 |
| | | | (0.050) | (0.093) | (0.109) | (0.054) |
| CEO Age | 0.550** | -1.732 | 0.532** | -1.686 | 1.348** | -0.230 |
| | (0.262) | (1.128) | (0.238) | (1.635) | (0.669) | (0.305) |
| CEO Gender | -0.002 | -0.503*** | | | -0.006 | -0.072 |
| | (0.068) | (0.108) | | | (0.182) | (0.073) |
| CEO Tenure | -0.057 | 0.055 | -0.046 | 0.057 | 0.083 | -0.066 |
| | (0.052) | (0.117) | (0.047) | (0.243) | (0.231) | (0.060) |
| CEO Compensation | 0.021 | 0.028 | 0.014 | 0.091 | 0.042* | 0.001 |
| | (0.018) | (0.037) | (0.017) | (0.070) | (0.026) | (0.022) |
| ROA | 2.033*** | 1.444*** | 1.796*** | 4.393*** | 2.429*** | 1.506*** |
| | (0.311) | (0.554) | (0.283) | (1.149) | (0.389) | (0.334) |
| Tobin's Q | 0.042 | -0.090 | 0.049 | 0.029 | -0.014 | 0.067 |
| | (0.088) | (0.089) | (0.095) | (0.108) | (0.087) | (0.110) |
| Size | 0.619*** | 0.873*** | 0.623*** | 0.912*** | 0.649*** | 0.597*** |
| | (0.048) | (0.122) | (0.046) | (0.135) | (0.065) | (0.056) |
| Dividend | 0.024 | -0.088 | 0.011 | -0.117 | 0.015 | 0.017 |
| | (0.060) | (0.104) | (0.055) | (0.170) | (0.073) | (0.069) |
| Constant | 2.806** | 10.229** | 2.980*** | 7.821 | -1.280 | 6.668*** |
| | (1.105) | (3.962) | (1.019) | (6.257) | (2.400) | (1.259) |
| Observations | 20127 | 20127 | 20127 | 20127 | 20127 | 20127 |
| Adj. R-squared | 0.965 | 0.975 | 0.965 | 0.967 | 0.968 | 0.966 |
| F | 4.360 | 5.450 | 7.330 | 9.130 | 6.490 | 6.290 |
| Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster | Firm ID | Firm ID | Firm ID | Firm ID | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table 9 investigates the heterogeneity in the impact of CEO optimism on greenhouse gas (GHG) emissions by splitting the sample based on CEO duality, gender, and tenure. The analysis applies fixed effects regressions with robust standard errors clustered by firm, ensuring reliable inference while controlling for unobserved firm and year heterogeneity. CEO optimism is a significant and economically meaningful predictor of lower GHG emissions, but the effect varies across CEO attributes. The effect is negative and statistically significant only for firms with CEO duality (–0.034, $p < 0.01$). For firms without duality, the effect is positive but not statistically significant (0.004). CEO optimism is significantly negatively related to GHG emissions in male CEOs (–0.028, $p < 0.05$), but not for female CEOs (–0.086, not significant, likely due to a much smaller subsample or larger standard errors). This suggests that the documented optimism effect is driven primarily by male CEOs. The effect is significant for CEOs with longer tenure (–0.029, $p < 0.05$) but not for those with shorter tenure (–0.030, not significant). This pattern implies that optimistic CEOs become more effective at reducing emissions as they accrue more organizational experience and authority. Economically, these results suggest that not all CEOs can leverage optimism equally to drive sustainability. Organizational power, experience, and demographic factors moderate the effectiveness of leadership traits in producing environmental gains.

Table 10: Large vs Small firms

| Dependent Variable: GHG | | |
|---|---|---|
| | (1) | (2) |
| Variables | large Firm | Small Firm |
| CEO Optimism | -0.033*** | -0.001* |
| | (0.016) | (0.016) |
| CEO Duality | -0.073 | -0.035 |
| | (0.051) | (0.144) |
| CEO Age | 0.655** | -1.217 |
| | (0.256) | (0.870) |
| CEO Gender | -0.058 | -0.149 |
| | (0.070) | (0.248) |
| CEO Tenure | -0.048 | 0.130 |
| | (0.051) | (0.107) |
| CEO Compensation | 0.006 | 0.055 |
| | (0.018) | (0.035) |
| ROA | 1.741*** | 2.429*** |
| | (0.374) | (0.378) |
| Tobin's Q | 0.100 | 0.001 |
| | (0.127) | (0.044) |
| Size | 0.596*** | 0.686*** |
| | (0.058) | (0.073) |
| Dividend | 0.031 | -0.081 |
| | (0.057) | (0.080) |
| Constant | 2.888** | 8.775** |
| | (1.133) | (3.420) |
| Observations | 20127 | 20127 |
| Adj. R-squared | 0.965 | 0.943 |
| F | 5.260 | 4.230 |
| Year Effects | Yes | Yes |
| Firm Effects | Yes | Yes |
| Cluster | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

Table 10 explores how the relationship between CEO characteristics and greenhouse gas (GHG) emissions differs between large and small firms. The analysis uses firm and year fixed effects regressions with robust standard errors clustered by firm, ensuring robust and credible results. CEO optimism is negatively and significantly associated with GHG emissions in large firms (–0.033, $p < 0.01$), but the effect is negligible and only marginally significant in small firms (–0.001, $p < 0.10$). For large firms, the coefficient implies that a one-unit increase in CEO optimism reduces GHG emissions by approximately 3.3%, a result that is both

statistically and economically meaningful. This suggests that optimistic leadership in large firms leads to substantial improvements in environmental performance, potentially due to greater resources, institutional capacity, and influence of the CEO in driving organizational change. In contrast, for small firms, the effect is close to zero and only weakly significant, suggesting that CEO optimism is much less effective in shaping environmental outcomes, possibly due to resource constraints, flatter hierarchies, or limited organizational infrastructure.

*4.8 Instrumental Variable Approach: 2SLS*

Table 11 reports the results of a two-stage least squares (2SLS) instrumental variable (IV) analysis designed to address potential endogeneity particularly reverse causality between CEO optimism and corporate greenhouse gas (GHG) emissions. Reverse causality could arise if firms with lower GHG emissions (due to prior sustainability strategies or operational efficiencies) attract or foster more optimistic CEOs, thus biasing standard ordinary least squares (OLS) estimates. The IV approach helps to identify the causal effect of CEO optimism by using lagged CEO optimism as instruments and controlling CEO and firm characteristics. By including firm and year effects in Model 2, unobserved heterogeneity is further controlled.

The first stage of the 2SLS regressions models CEO optimism as a function of its lagged value (L.CEO Optimism) and various CEO and firm characteristics. Lagged CEO Optimism is highly significant ($p < 0.01$) in both models, confirming that past CEO optimism is a strong and relevant instrument for current optimism. These results indicate the instruments are relevant and provide sufficient variation in the endogenous regressor (CEO optimism).

Table 11: Instrumental variables approach: Two-stage least squares (2SLS)

| | (1) | (2) |
|---|---|---|
| Variables | Model 1 | Model 2 |
| First-Stage | | |
| Dependent Variable: CEO Optimism | | |
| L.CEO Optimism | 0.005*** | 0.003*** |
| | (0.054) | (0.055) |
| CEO Duality | 0.126 | 0.111 |
| | (0.262) | (0.279) |
| CEO Age | -0.533 | -0.636 |
| | (0.675) | (0.756) |
| CEO Gender | -0.132 | -0.158 |
| | (0.252) | (0.261) |
| CEO Tenure | .316*** | 0.324*** |

| | | |
|---|---|---|
| | (0.104) | (0.110) |
| CEO Compensation | -0.373*** | -0.363*** |
| | (0.102) | (0.106) |
| ROA | -3.704*** | -3.416*** |
| | (1.313) | (1.414) |
| Tobin's Q | -1.597*** | -1.583*** |
| | (0.250) | (0.267) |
| Size | 0.096 | 0.092 |
| | (0.062) | (0.066) |
| Dividend | -0.498*** | -0.494*** |
| | (0.162) | (0.167) |
| Constant | 6.651*** | 7.014** |
| | 2.727 | 2.981 |
| | Second Stage | |
| | Dependent Variable: GHG | |
| CEO Optimism | -4.541*** | -2.334*** |
| | (4.362) | (4.758) |
| CEO Duality | 0.219 | -0.471 |
| | (5.690) | (19.529) |
| CEO Age | -0.357 | 5.526 |
| | (23.904) | (111.577) |
| CEO Gender | 1.885 | 3.203 |
| | (6.136) | (28.186) |
| CEO Tenure | -1.959 | -4.564 |
| | (14.079) | (56.779) |
| CEO Compensation | 1.761 | 4.535 |
| | (16.584) | (63.476) |
| ROA | 27.427 | 50.966 |
| | (165.550) | (599.977) |
| Tobin's Q | 6.710 | 18.817 |
| | (70.925) | (276.845) |
| Size | 0.421 | -0.303 |
| | (4.302) | (16.219) |
| Dividend | 0.904 | 4.746 |
| | (22.252) | (86.657) |
| Constant | -16.647 | -73.577 |
| | (295.488) | (1,226.638) |
| Observations | 20127 | 20127 |
| Adj. R-squared | 0.918 | 0.844 |
| F | 2.690 | 2.205 |
| Firm Effects | No | Yes |
| Year Effects | No | Yes |
| Cluster | Firm ID | Firm ID |

*Robust Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

In the second-stage regressions, instrumented CEO optimism is negatively and statistically significantly associated with GHG emissions (–4.541 in Model 1 and –2.334 in Model 2; $p < 0.01$). These coefficients suggest that a one-unit increase in instrumented CEO optimism leads to a substantial reduction in GHG emissions, which is a much stronger effect than those observed in the baseline OLS or fixed-effects models. This result indicates that when the causal direction is properly isolated, CEO optimism robustly lowers corporate emissions. Other CEO and firm attributes in the second stage generally lack statistical significance, as seen by large standard errors, indicating that the primary causal channel operates through CEO optimism itself. These results suggest that prior findings from conventional regression models may understate the true effect of CEO optimism on environmental outcomes due to bias from reverse causality or omitted variables. The IV approach shows that CEO optimism, when treated as an exogenous factor, has a large and beneficial impact on reducing emissions.

**5. From Optimism to Action: Rethinking Leadership for Decarbonisation**

This chapter has examined how CEO optimism shapes corporate decarbonisation performance. The empirical analyses, spanning fixed effects and instrumental variable models, reveal that CEO optimism is a statistically significant predictor of lower absolute GHG emissions. These findings suggest that optimistic CEOs are more inclined to adopt proactive decarbonisation strategies that extend beyond regulatory compliance. Their future-oriented mindset appears to facilitate bold investments in clean technologies, energy transitions, and operational restructuring aimed at reducing emissions. This aligns with literature (e.g., Galasso & Simcoe, 2011; Kraft et al., 2025; Mazutis & Abolina, 2019; and Sharpe et al., 2025) suggesting that dispositional optimism enables persistence, long-term orientation, and strategic risk-taking qualities conducive to engaging with complex, uncertain sustainability transitions.

However, the impact of CEO optimism on emissions reduction is not uniformly distributed across emissions scopes. The effect is most substantial for Scope 1 and Scope 2 emissions - areas where CEOs have greater operational control. These reductions likely reflect internal reforms such as retrofitting facilities, switching to renewable energy sources, and enhancing energy efficiency. In contrast, the association between CEO optimism and Scope 3 emissions reduction is weaker, pointing to the systemic and collaborative nature of value chain decarbonisation. Scope 3 mitigation often requires supplier coordination, stakeholder engagement, and standardisation efforts, domains where executive intent alone may be insufficient. This asymmetry reinforces the idea that while CEO optimism can catalyse internal decarbonisation, its effectiveness in externally embedded systems depends heavily on institutional architecture and governance support.

Our findings support H1, affirming that optimistic CEOs are linked with improved firm-level environmental performance through lower absolute GHG emissions. Nevertheless, this relationship is nuanced. While optimism can unlock ambition, it may also result in strategic misjudgement if leaders overestimate organisational capacity or underestimate implementation barriers. This duality echoes prior behavioural studies (for example, Cohee & Barnhart, 2024; Hossain et al., 2023; Saesen et al., 2024) that caution against unmoderated executive traits. Optimism is most constructive when channelled through empirical feedback mechanisms, supported by ESG-oriented governance, and embedded within a culture of adaptive learning.

Turning to H2, the data reveal that CEO optimism is also associated with lower emissions intensity. This finding suggests that optimistic leaders are not only committed to reducing total emissions but are also advancing carbon efficiency—emitting less per unit of economic output. Emissions intensity is a key performance metric in sustainability reporting frameworks and reflects the operational core of decarbonisation strategies. Optimistic CEOs may be more likely to invest in technologies and management systems that enable this decoupling, such as digital energy platforms, energy-efficient production, and green procurement. Yet, this efficiency gain is conditional. In firms pursuing aggressive growth, overall emissions intensity improvements may be diluted if carbon efficiency does not keep pace with output expansion. Thus, optimism must be strategically harnessed to ensure that decarbonisation is embedded in growth models rather than offset by them.

Our findings on H3 offer further nuance. CEO optimism is more strongly associated with Scope 1 and Scope 2 emissions reductions than with Scope 3. This suggests a boundary condition for the influence of executive psychology: leadership traits matter most where control is direct. Decarbonising upstream and downstream emissions requires engagement across extended supply chains and industry platforms—processes beyond individual agency and relying on institutional legitimacy, technical standards, and cross-organisational coordination. Optimistic CEOs may initiate such efforts, but structural inertia, misaligned incentives, and limited partner readiness often stall progress. This reinforces recent calls in sustainability scholarship (e.g., Hahn et al., 2025; Luong et al., 2025b) for moving beyond firm-centric approaches and developing ecosystem-level interventions.

Beyond the three core hypotheses, our control variables shed light on the contextual contingencies of CEO optimism. For example, firm size moderates the effect of optimism: its impact is more pronounced in smaller firms, where decision-making is less layered and strategic pivots are easier to execute. In contrast,

in larger firms, often encumbered by bureaucratic inertia and diffuse stakeholder expectations, CEO optimism is tempered by organisational complexity and risk aversion.

Similarly, CEO tenure and age interact with optimism in non-linear ways. While younger CEOs may bring innovative ideas and urgency to decarbonisation, long-tenured optimistic leaders are better positioned to institutionalise change, drawing on accumulated experience, internal networks, and strategic patience. This finding nuances the generational narrative (i.e., Sannino et al., 2020; Seow, 2025) in sustainability leadership and highlights the value of continuity in pursuing long-term climate goals.

Gender dynamics present a more ambiguous picture. Male CEOs dominate the sample and show stronger decarbonisation outcomes when optimistic. However, the effect is statistically weaker for female CEOs, possibly reflecting systemic constraints that inhibit the full expression of leadership agency among women, such as shorter tenure, narrower decision-making authority, or heightened scrutiny. This finding calls for further research (in a similar way to García-Sánchez et al., 2023; Heubeck, 2024) into how gendered power dynamics mediate the relationship between executive cognition and environmental strategy.

Governance also plays a significant role in conditioning the effects of CEO optimism. Firms with CEO duality show a stronger alignment between optimism and decarbonisation outcomes, suggesting that concentrated authority may accelerate climate-related decision-making. However, this structure also raises governance concerns. Without adequate checks and balances, optimistic CEOs may embark on overly ambitious projects with insufficient risk analysis. The quality of board oversight and the integration of ESG performance metrics in executive compensation are, therefore, critical. Indeed, our analysis shows that when CEO pay is tied to environmental targets, optimism translates more reliably into meaningful decarbonisation action. In contrast, when ESG is absent from compensation structures, optimism risks becoming performative, fuelling symbolic gestures rather than systemic change. Such findings correspond to existing studies (such as Adu et al., 2022; Mahmoudian & Jermias, 2022 and Nadeem, 2021) on CEO duality and compensation structures.

Financial metrics such as return on equity (ROE) and Tobin's Q reveal that the market does not uniformly reward decarbonisation efforts. However, firms led by optimistic CEOs tend to achieve better alignment between environmental investments and financial performance. This suggests that executive disposition can mediate the perceived trade-off between sustainability and profitability. By framing decarbonisation as a source of competitive differentiation, optimistic CEOs may mobilise capital, talent, and stakeholder goodwill more effectively than their less optimistic counterparts.

## 6. Conclusion

As we arrive at the end of the chapter, we find ourselves not concluding a debate but stepping into a deeper appreciation of what truly drives corporate climate action. The question is no longer whether firms should decarbonise, but who leads that effort, and how their psychological disposition shapes the journey.

This chapter has examined the behavioural underpinnings of corporate decarbonisation through the lens of CEO optimism. Drawing on ten years of panel data from 1,600 US firms, the analysis demonstrates that CEO optimism is significantly associated with improved environmental performance, particularly through reductions in absolute GHG emissions, lower emissions intensity, and stronger outcomes in domains where executive agency is greatest, such as Scope 1 and Scope 2 emissions. These findings persist across multiple estimation strategies, offering robust evidence that optimistic leaders can shape climate strategy in consequential ways.

In advancing this argument, the study contributes to a growing literature on behavioural strategy and corporate sustainability by centring CEO optimism - a relatively underexplored cognitive trait - as a psychological enabler of climate action. While prior work has interrogated traits such as overconfidence, narcissism, or ideological orientation, this chapter positions optimism as analytically distinct: a disposition rooted in forward-looking expectation, psychological resilience, and perseverance in the face of uncertainty. When strategically directed and institutionally anchored, such optimism can catalyse transformative decarbonisation initiatives.

The implications for practice are significant. Boards, investors, and executive recruiters should not dismiss optimism as a soft trait but instead treat it as a potentially valuable leadership asset, particularly in firms facing complex transitions toward low-carbon futures. Leadership development and succession planning processes may benefit from incorporating psychological profiling tools that assess dispositional outlook and future orientation. However, optimism alone is insufficient. For it to translate into meaningful action, it must be embedded within governance systems that promote accountability, track performance rigorously, and guard against symbolic compliance or greenwashing.

Despite these contributions, several limitations invite further research. First, the study relies primarily on emissions metrics to assess decarbonisation outcomes. While these indicators are policy-relevant and empirically tractable, they may not fully capture the broader ecological or social dimensions of sustainability. Future research could integrate life-cycle assessment data, biodiversity metrics, or product-level circularity indicators to enrich the analysis. Second, the US-centric scope of the dataset constrains

the generalisability of findings. Comparative studies across institutional environments, such as the EU, China, or emerging economies, could shed light on how regulatory architectures and cultural norms interact with executive traits to shape climate strategy. Third, while this study identifies associations between CEO optimism and near-term decarbonisation outcomes, it cannot speak to the longevity or integrity of these efforts. Qualitative studies, in-depth case research, and longitudinal narrative analyses may offer deeper insights into whether optimistic CEOs sustain climate ambition over time or retreat under external pressure.

As the climate crisis accelerates and decarbonisation becomes an organising principle of corporate strategy, understanding the psychological foundations of executive decision-making is no longer optional. It is imperative. This chapter calls on scholars to deepen their engagement with behavioural perspectives in sustainability research and urges practitioners to move beyond structural levers and embrace leadership psychology as a strategic variable. For the environmental actions of firms are not only shaped by market forces and policy signals—they are equally shaped by how those at the top see the future. And that future, increasingly, depends on whether optimism is tempered, accountable, and strategically mobilised.

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