The following paper was researched and written as part of LSE GROUPS 2025.

LSE GROUPS takes place during the final fortnight of the LSE Spring Term. Undergraduate students are placed in small groups; these are cross-year, interdisciplinary, and group members do not know one another in advance. Each group must then devise its own research question and carry out every stage of a small-scale research project, in less than two weeks.

LSE GROUPS is part of the LSE commitment to students learning through enquiry and developing the skills needed for knowledge creation.

The overall theme of LSE GROUPS 2025 was *Visions for the Future*

This paper was submitted on the final Thursday afternoon of the project. Students then presented their work at a conference, on the closing Friday.

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London School of Economics and Political Science

Donating Left, Polluting Right? The Impact of Corporate Political Leanings on Environmental Performance

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Abstract

This research examines the relationship between patterns in corporate political donations and subsequent fluctuations in carbon intensity among U.S. corporations. Current literature indicates that companies strategically contribute to shaping environmental legislation; however, research has predominantly concentrated on contribution amounts rather than party affiliation, neglected temporal delays between political influence and emissions, and aggregated results across sectors. Utilising Neo-pluralist Theory and Signalling Theory, we assert that companies aligned with Democratic values will demonstrate more substantial decreases in carbon intensity than those aligned with Republican principles.

We analysed 37 firms in the oil/gas and chemical industries during three electoral cycle s (2017–2023) and calculate a Corporate Political Leaning (CPL) ratio that spans from -1 (all Republican) to +1 (entirely Democratic). We employ fixed effects panel regression t o examine the relationship between CPL and yearly percentage changes in carbon intensit y (CO_2 emissions/revenue).

The results suggest a negative but statistically insignificant relationship between Democratic-leaning corporate political activity and year-over-year changes in carbon intensity ($\beta = -0.272$). Sector-specific effects (oil vs. chemical) did not appear substantial, while state-level differences—particularly between Texas-based firms and others—were more pronounced. Key limitations of the study include the small sample size ($N = 37$), potential measurement error in self-reported emissions data, and the absence of clear regulations around investments in renewable technologies. Future research should address these issues by expanding the sample, extending the temporal scope, and incorporating direct measures of environmental investment to better capture how government policy influences corporate environmental performance.

Keywords: corporate political leaning, carbon intensity, environmental performance

*Authors are listed in alphabetical order; no order of contribution is implied.

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1 Introduction

Corporate political activity is a critical mechanism through which firms attempt to influence regulatory environments, with politically connected firms experiencing higher stock returns and increased access to finance following election cycles (Claessens et al., 2008; Hillman et al., 2004). However, corporate political engagement in the context of environmental outcomes remains under-explored, particularly the dynamic changes in environmental performance that might reflect corporate responsiveness to political climates (Katic & Hillman, 2023).

Existing research has primarily focused on static relationships between political connections and firm outcomes, largely overlooking the dynamic relationship between political activity and environmental performance changes over time (Lawton et al., 2012). The limited studies examining this relationship have employed cross-sectional analyses that are limited in capturing firms' dynamic adjustments to changing political landscapes, and do not explore temporal lags between political donations and environmental effects (Hillman et al., 2009). Furthermore, resource dependence theory suggests firms engage in political activity to secure favourable regulatory treatment (Pfeffer & Salancik, 1978; Hillman et al., 2009), while stakeholder theory proposes that political donations may signal broader engagement strategies including substantive environmental improvements (Freeman, 1984; Kujala et al., 2022), warranting further analysis.

This study seeks to quantitatively answer whether corporate political leanings (CPL) influence subsequent year-over-year changes in carbon emission intensity (CEI), and whether corporate greenwashing mediates this relationship (Lyon & Maxwell, 2008; Delmas & Burbano, 2011).

The following literature review grounds this study within existing work on corporate environmental performance, political psychology, and greenwashing, highlighting the key gaps the analysis seeks to address.

2 Literature Review

American corporations face an impossible balancing act between climate-conscious investors and carbon-dependent profitability. With 52% of Americans prioritising global warming (Kennedy & Johnson, 2020), companies must satisfy ESG demands while navigating dramatic policy swings between election cycles (Tee et al., 2024; Wholf & Quinn, 2025). Firms have developed sophisticated behavioural strategies beyond compliance or resistance—signalling sustainability to attract green investors, qualify for subsidies, and enable environmental marketing (Clark & Crawford, 2011). Yet this signalling may mask a critical mechanism: strategic political donations that exploit regulatory gaps rather than drive genuine emission reductions.

Political manipulation remains the key challenge in environmental compliance. While government regulation most consistently drives corporate environmental behaviour (Safiullah & Kabir, 2024), U.S. climate politics' polarisation creates uneven enforcement across geopolitical contexts (Tee et al., 2024). Republicans overwhelmingly oppose environmental legislation while Democrats support stronger climate governance (Wholf & Quinn, 2025). This asymmetry enables corporate strategy: politically connected firms face lower government fines and avoid punitive scrutiny (Heitz et al., 2021), while paradoxically, pure environmental performers increase political spending toward anti-climate parties (Cho et al., 2006; Muttakin et al., 2020).

Neo-pluralist theory (NPT) and signalling theory explain how corporations use political donations to manage environmental pressures while avoiding substantive change. NPT posits that corporations deploy superior financial resources to secure future profitability through two mechanisms: donating to Democrats for performative compliance that generates positive headlines without structural changes (Murray, 2020; Clark & Crawford, 2011), or supporting anti-environmental candidates for deregulation prospects in carbon-intensive industries (Wholf & Quinn, 2025; Fich et al., 2022). Each dollar donated to environmentally unfriendly parties increases the investors' market value by more than $900 when the bills opposed by the League of Conservation Voters (a Environmental advocacy group) pass (Fich et al., 2022), with regulatory relaxation correlating with increased emissions (Heitz et al., 2021).

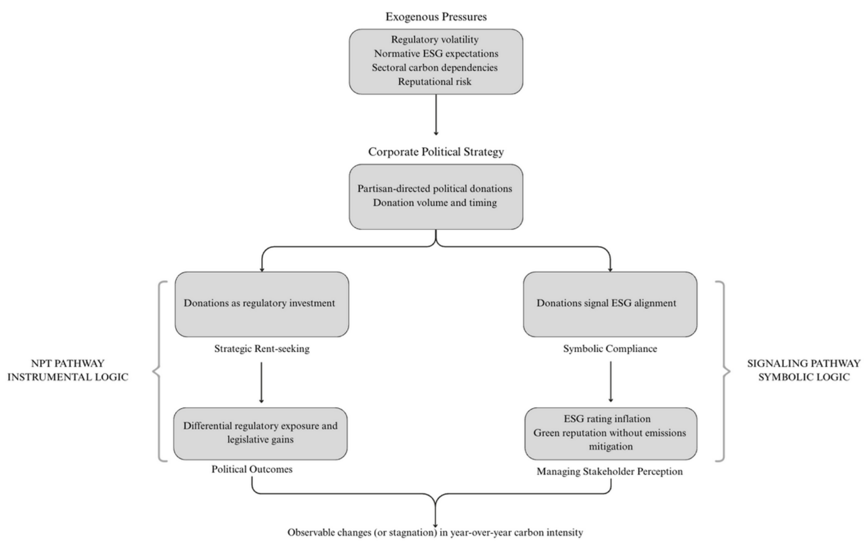

Figure 1: Visualisation of Theoretical Framework

Political donations themselves become signalling tools—stakeholders interpret them as environmental commitment despite minimal emission reductions (Murray, 2020; Gounopoulos et al., 2021), paralleling "greenwashing" where poor performers strategically signal positive performance (De Freitas Netto et al., 2020; Benabou & Tirole, 2010; Montgomery et al., 2023). Every $100,000 donation increase is associated with a 0.12-unit ESG rating increase (Carè et al., 2025), while regulators monitor firms supporting environmentally friendly parties less frequently, allowing profit maximisation despite intensive carbon outputs (Lyon & Maxwell, 2008). This creates counter-intuitive behaviours: democratically aligned firms donate to Republicans to hedge political risk (Goswami et al., 2025), while carbon-intensive firms support Democrats to mitigate backlash (Cho et al., 2006), with political connection costs often exceeding actual green investments (Tee et al., 2024).

3 Research Gap

Despite extensive literature, current research suffers three major limitations. First, studies examine donation volumes rather than partisan direction, neglecting varying amounts between parties (OpenSecrets, 2024).

Second, political influence operates on electoral cycles while emissions are time-lagged.

Third, donation-emission relationships vary by industry, yet studies aggregate across sectors.

Our study addresses these gaps by examining whether partisan donation direction—not just volume—predicts actual emission changes and how greenwashing mediates this relationship. This contribution reveals whether political donations indicate genuine environmental commitment or sophisticated avoidance mechanisms, providing policymakers with evidence to design manipulation-resistant regulations and offering investors tools to distinguish authentic progress from strategic signalling.

Therefore, we ask:

RQ_1: Do corporate political donation leanings (partisan direction, not just volume) affect year-over-year carbon intensity changes?

RQ_2: If so, does greenwashing mediate this relationship, allowing firms to maintain political flexibility while avoiding emission reductions?

4 Methods

This study examines whether CPL influences subsequent percentages of changes in carbon emission intensity. We analyse 37 firms over three electoral cycles (2017–2023), leveraging within-firm variation in political donations and environmental outcomes. Data was collected from Bloomberg (carbon intensity and operational data) and OpenSecrets (political donations by company, year, candidate, and amount).

Corporate Political Leanings (CPL)

We proxy CPL using the ratio of political donations to Republican versus Democratic candidates:

$$CPL = \frac{\text{Donations to Democratic Party/Members} - \text{Donation to Republican Party/Members}}{\text{Total Political Donations}} \quad (1)$$

This measure ranges from -1 (exclusively Republican) to +1 (exclusively Democratic) and is calculated for three periods: January 2017 to December 2018, January 2019 to December 2020, and January 2021 to December 2022.

Environmental Performance (%Δ Carbon Intensity)

We measure environmental performance through percentage changes in carbon intensity (annual carbon emissions normalised by total revenue) from December 2018 to December 2019, December 2020 to December 2021, and December 2022 to December 2023. Positive values indicate worse environmental performance, while negative values represent improved environmental performance.

Empirical Strategy

We employ firm and year fixed effects panel regression to address unobserved heterogeneity and time-varying shocks (Baltagi, 2021; Hausman, 1978).

$$\begin{aligned}\%\Delta\text{Carbon Intensity}_{i,t+1} = {} & \beta_0 + \beta_1\text{CPL}_{i,t} + \beta_2\text{ROA}_{i,t} \\ & + \beta_3\text{DebtAsset}_{i,t} + \beta_4\text{IndDir}_{i,t} \\ & + \beta_5\text{MTB}_{i,t} + \alpha_i + \gamma_t + \varepsilon_{i,t}\end{aligned} \tag{2}$$

Our identification of the causal effect relies on the assumption that, conditional on controls and fixed effects, changes in political donations are not simultaneously determined with future carbon intensity changes. We conduct several robustness checks, including exclusion of COVID period data, analysis using only balanced panel observations, and variations in control variable specifications.

The estimated firm-level standard deviation ($\sigma_u = 0.404$) and intraclass correlation ($\rho = 0.52$) indicate that over half of the variation in future carbon intensity changes stems from persistent, unobserved firm-level differences, justifying the use of fixed effects to mitigate omitted variable bias. Robustness tests and technical assumptions are detailed in Appendix B.

Control Variables

Our control variable selection follows established literature while addressing industry-specific considerations. We control for profitability using Return-on-Assets (ROA) as it affects both political donations and environmental investments: profitable firms have more resources for lobbying and clean technology adoption (Hill et al., 2013; Clarkson et al., 2008). Capital structure, measured by the Debt-to-Asset Ratio (D/A), is included as firms with access to more debt benefit from more funds to invest in carbon reduction or political donation, while high leverage ratios are often associated with higher carbon emissions (Andreoni & Galmarini, 2012).

We further control for the percentage of independent directors, as firms with higher board independence and environmental committees demonstrate enhanced carbon emissions performance (Elsayih, Datt, & Tang, 2021). Finally, growth opportunities—proxied by the Market-to-Book Ratio (MTB)—are controlled for, as firms with higher growth opportunities face lower borrowing costs (Chen & Zhao, 2006), providing financial flexibility for both political and environmental activities that is later manifested in lower carbon emissions (Bolton et al., 2022).

5 Results

Descriptive Statistics

Table 1 presents summary statistics for our sample of 37 firms across 105 firm-year observations. The mean percentage change in carbon intensity is 5% with substantial variation (SD = 0.39). Corporate political leanings average at -0.30, indicating a slight Republican bias in our sample.

Variable	**Mean**	**Std. Dev.**	**Min**	**Max**	**N**
%Δ Carbon Intensity	0.05	0.39	-0.76	1.64	110
CPL (Corporate Political Leaning)	-0.30	0.54	-1.00	1.00	110
ROA (%)	5.19	10.52	-25.10	71.94	110
Debt-to-Asset Ratio (%)	37.31	13.10	12.14	80.27	110
Board Independence (%)	86.48	6.88	60.00	100.00	109
Market-to-Book Ratio	3.99	5.12	0.12	37.73	106

Table 1: Descriptive Statistics of Key Variables

Regression Results and Robustness Checks

Table 2 presents the main regression results. Column (1) addresses RQ_1—i.e., whether corporate political donation leaning (CPL) affects year-over-year carbon intensity changes. Columns (2) and (3) explore heterogeneous effects by sector and state, respectively.

The coefficient on CPL in our baseline specification (Column 1) is -0.272 (SE $= 0.195$), indicating that a one-unit increase in Democratic leaning is associated with a 27.2 percentage point decrease in carbon intensity change. However, this relationship is not statistically significant at conventional levels ($p > 0.10$). The 95% confidence interval $[-0.656, 0.112]$ includes zero; therefore, we cannot reject the null hypothesis that there is no relationship between CPL and carbon intensity changes.

Column (2) examines whether the relationship differs between the chemical and oil sectors through an interaction term (CPL $\times$ Oil). The interaction coefficient of -0.004 (SE $= 0.382$, $p = 0.991$) is economically negligible and statistically insignificant, indicating no meaningful sectoral differences in how political leanings relate to environmental outcomes.

Column (3) investigates state-level heterogeneity, focusing on Texas-based firms given the state's Republican orientation and our sample concentration. The interaction term (CPL $\times$ Texas) yields a coefficient of 0.485 (SE $= 0.330$, $p = 0.150$). While this suggests that the effect of political leaning on carbon intensity in Texas ($0.069 = -0.416 + 0.485$) differs from other states, the interaction remains statistically insignificant. Notably, the main effect of CPL becomes significant in this specification ($\beta = -0.416$, $p < 0.05$), suggesting that firms outside Texas show a stronger relationship between Democratic leaning and emission reductions—where a one-unit increase in Democratic leaning from the current and past year leads to a 41.6 percentage point decrease in the following year's carbon intensity change.

As outlined in our empirical strategy, we conducted several robustness checks. Excluding the COVID period (2020) yields a CPL coefficient of -0.160 ($p > 0.10$), while restricting analysis to a balanced panel produces a coefficient of -0.117 ($p > 0.10$). Both remain statistically insignificant, confirming our main findings.

	(1) Baseline	(2) Sector Heterogeneity	(3) State Heterogeneity
Main Variables			
CPL_{t}	-0.272	-0.269	-0.416**
	(0.195)	(0.220)	(0.196)
CPL × Oil Sector		-0.004	
		(0.382)	
CPL × Texas			0.485
			(0.330)
Control Variables			
ROA	-0.013***	-0.013***	-0.010**
	(0.005)	(0.005)	(0.004)
Debt-to-Asset Ratio	-0.013	-0.013	-0.011
	(0.010)	(0.009)	(0.010)
Board Independence	-0.005	-0.005	-0.010
	(0.015)	(0.014)	(0.015)
Market-to-Book Ratio	-0.020**	-0.020**	-0.014***
	(0.008)	(0.008)	(0.004)
Time Effects			
Period 2 (2020–2021)	0.171	0.171	0.173
	(0.106)	(0.108)	(0.108)
Period 3 (2022–2023)	0.061	0.061	0.030
	(0.097)	(0.097)	(0.093)
Constant	0.935	0.934	1.324
	(1.321)	(1.338)	(1.348)
Model Statistics			
Number of Firms	37	37	37
R-squared (within)	0.187	0.187	0.224

Table 2: Robustness Checks on CPL Effects
Dependent Variable: Percentage Change in Carbon Intensity (%Δ Carbon Intensity)

Notes. Robust standard errors clustered at the firm level are shown in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Period 1 (2018–2019) serves as the reference period. Column 2 tests for differential effects between the oil/gas and chemical sectors. Column 3 tests for differential effects for Texas-based firms.

Mediation Analysis

Given the statistically non-significant main effect in our primary specification, we do not proceed with the mediation analysis proposed in RQ2, as testing mediation requires a significant direct effect to decompose (Baron & Kenny, 1986).

6 Discussion

Existing research establishes that corporate political donations influence future profitability and environmental outcomes (Claessens et al., 2008; Hill et al., 2013), yet ignores critical nuances including partisan donation direction, temporal lags between political influence and emissions, and industry-specific heterogeneity. We address these gaps by developing a novel Corporate Political Leanings (CPL) measure ranging from −1 (exclusively Republican) to +1 (exclusively Democratic) and employing fixed effects panel regression on 37 oil/gas and chemical firms across three electoral cycles (2017–2023).

Despite economically meaningful effect sizes—a full shift from Republican to Democratic donations implies a 54.4 percentage point reduction in carbon intensity change—we find no statistically significant relationship in our primary specification ($\beta = -0.272$, $p > 0.10$). However, geographic heterogeneity analysis reveals that firms outside Texas show a significant negative relationship between Democratic leaning and carbon intensity changes ($\beta = -0.416$, $p < 0.05$), suggesting regional political contexts may fundamentally shape how corporate political engagement translates into environmental outcomes.

Interpretation

Our null findings offer several critical insights that both challenge and refine existing theory. First, the non-significant main effect suggests that the relationship between political donations and environmental performance may be more complex than the direct mechanisms proposed by Neo-pluralist Theory (NPT). While NPT posits that corporations deploy financial resources to secure favourable regulatory outcomes (Muttakin et al., 2020), our results indicate that partisan donation direction alone may not predict environmental behaviour changes. This complexity stems from the multifaceted motivations driving corporate political donations—pragmatic, partisan, and socially symbolic goals (Clark & Wilson, 1961; Francia et al., 2003; McMenamin, 2013; Broockman & Malhotra, 2020; McMenamin & Power, 2023). When political contributions are made for pragmatic reasons within the ESG space, they may be used not to support actual compliance with climate regulations but rather to secure regulatory leniency or to resist stricter environmental standards (Muttakin et al., 2020; Heitz et al., 2021). In such cases, firms may appear politically active in the ESG discourse without making substantive reductions in carbon intensity. This disconnect can lead to a lack of observable correlation between donation behaviour and actual emission reduction efforts, especially when donations are intended to preserve the status quo rather than to support reform. Furthermore, firms may engage in sophisticated hedging strategies—simultaneously supporting both parties to maintain flexibility regardless of electoral outcomes (Goswami et al., 2025)—thereby obscuring any clear partisan-performance relationship.

Another possible explanation for the absence of a significant relationship is that firms can, and often do, pursue genuine carbon emission reductions without engaging in political donations. Empirical evidence suggests that firms refraining from political donations tend to demonstrate stronger environmental performance, possibly due to a more authentic commitment to ESG goals (Muttakin et al., 2020). This creates a scenario akin to Akerlof's (1970) "market for lemons": where firms that are genuinely "green" may not be able or willing to signal their quality credibly through political donations. Companies that allocate substantial resources to actual decarbonization efforts—such as investing in cleaner technology or operational transformation—may lack the financial or strategic capacity to also engage in costly political signalling. As a result, the market (or, in our case, the statistical relationship) becomes noisy, with high-quality (genuinely green) and low-quality (symbolically green) firms indistinguishable based on donation behaviour alone. Thus, the lack of observed correlation between political donations and carbon intensity reduction may stem not from an absence of climate action, but rather from a misalignment between signalling (via donations) and substantive outcomes (emissions reduction).

Additionally, our finding of no sectoral differences between oil and chemical industries (interaction coefficient = -0.004, $p = 0.991$) challenges assumptions about industry-specific political strategies. Both sectors face similar environmental regulations and stakeholder pressures, potentially homogenising their political-environmental strategies. This aligns with signalling theory's prediction that firms across carbon-intensive industries adopt similar performative strategies to manage reputational risks (Lyon & Maxwell, 2008).

Lastly, the significant geographic heterogeneity we uncover reconciles our findings with past literature and suggests that regional political contexts fundamentally shape donation-performance relationships. The stark difference between Texas-based firms and others indicates that state-level political culture and regulatory environments may moderate—or even overwhelm—the donation-performance relationship. In states with strong environmental movements and regulatory enforcement, Democratic donations may signal genuine commitment backed by substantive action. Conversely, in Republican-dominated states like Texas, where environmental regulations face consistent opposition (Wholf & Quinn, 2025), even Democratic-leaning donations may represent mere hedging without accompanying emission reductions.

Limitations and Future Directions

Several methodological limitations may also influence our findings and their divergence from past literature.

First, our temporal structure using one-year lags may inadequately capture the relationship between political influence and environmental outcomes. While we follow established practice (Hill et al., 2013), political efforts often target long-term regulatory frameworks whose environmental effects may not manifest for several years.

Second, data limitations significantly constrain our statistical power. With only 37 companies observed over 3 periods (105 observations), we fall well below econometric best practices recommending at least 50 groups and 5 time periods for two-way fixed effects models (Baltagi, 2021). Our power calculations indicate that we can only reliably detect main effects of 0.37 or larger, while our observed effect (-0.27) falls below this minimum detectable effect (MDE). Achieving 80% power would require approximately 73 additional companies, which may explain why economically meaningful effects remain statistically insignificant.

Third, measurement challenges in our dependent variable introduce additional uncertainty. Carbon intensity data relies on corporate self-reporting, creating vulnerability to greenwashing and measurement manipulation (De Freitas Netto et al., 2020). Moreover, normalising emissions by revenue introduces volatility, particularly for oil sector firms experiencing significant price fluctuations. For instance, Exxon Mobil's revenues varied from \$178 to \$398 billion during our study period, potentially biasing our measurement of environmental effort.

Implications

Despite null aggregate findings, our research carries important implications for policy and practice.

For policymakers, the geographic heterogeneity we document suggests that federal environmental policies may elicit dramatically different corporate responses across states. In politically aligned states, corporate political engagement may effectively signal environmental commitment, while in opposition states, the same donations may represent mere political hedging. This implies that effective climate policy must account for state-level political contexts and may require differentiated approaches rather than uniform federal mandates.

For investors and stakeholders evaluating corporate environmental commitments, our findings caution against interpreting political donations as reliable signals of environmental performance. The disconnect between donation patterns and emission outcomes—particularly in certain geographic contexts—suggests that ESG assessment frameworks should look beyond political activities to substantive operational changes. The potential for sophisticated greenwashing through political signalling, as suggested by our theoretical framework, requires more nuanced evaluation metrics.

For corporate strategists, our results highlight the limited effectiveness of political donations as tools for environmental reputation management. The null relationship suggests that stakeholders may increasingly see through performative political gestures, demanding genuine emission reductions rather than partisan signalling. This aligns with growing evidence that authentic environmental commitment, rather than political manoeuvring, drives long-term value creation (Carè et al., 2025).

7 Conclusion

This study analysed 37 firms across the oil, gas, and chemical sectors from 2017-2023, finding no statistically significant relationship between CPL and subsequent carbon emission intensity changes in our primary specification. However, the most notable finding reveals significant geographic heterogeneity: firms outside Texas demonstrate a statistically significant negative relationship between Democratic donations and carbon intensity changes, while this effect appears offset by Texas-based firms comprising 35% of our sample. While methodological limitations, such as small sample size constrain our statistical power, this research contributes the first analysis of political donation direction and environmental performance relationships. The substantial economic magnitudes observed, combined with geographic variation, suggest that meaningful relationships likely exist but require larger samples and longer observation periods to detect reliably.

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Appendix A

Additional Tables and Figures

Table 1

Neo-Pluralist Theory – How Corporate Influence Government	
Definition	Despite the multiple pressure groups in society, business influence has an overwhelming impact on political development and implementation due to its financial resources. The state may serve corporate interests "voluntarily or under pressure" and thus may not be able to compel corporations to meet societal expectations regarding greenhouse gas emissions (Muttakin et al, 2020)
Example	A political party relies partly on business financial support in an election
	Government / Partisan leaders may ignore the corporate violation of environmental policies in the interest of economic growth (Montgomery et al, 2023)
	Directly apply political donations to establish a political relationship and reduce future penalties for environmental violations (Heitz et al, 2021)
	Some Green businesses also donate to anti-environmental parties/candidates to reduce the environmental standard, so reaching 'green' with lower cost (Carè et al, 2025).
Signally Theory – Performative Green Behaviours	
Definition	The stakeholders rely on information to assess corporations' positions. Political donations as a signal to mislead consumers, investors, the government and other stakeholders in the direction they wish (Gounopoulos et al, 2021)
Example	Political donations to either party can increase the reputation of the business and grow their influence on policymakers, as NPT suggest (Murray, 2020)

Political donations to an environmentally friendly party increase its political influence **and serve** as a signal that they prefer to be “green” (Cho et al, 2006). The regulators monitor them less frequently while limited resources.

Table 2

Descriptive Statistics for Chemical Sector Variables

Variable	*n*	*M*	*SD*	Min	Max
Carbon Intensity Change	**54**	**134.29**	**473.91**	**-257.88**	**2799.37**
Carbon Intensity Change in %	**54**	**.16**	**.35**	**-.66**	**1.64**
Donation Leaning	**54**	**-0.05**	**0.52**	**-0.99**	**1**
Return on Assets	**54**	**6.76**	**4.45**	**-5.42**	**19.65**
Price to Book Ratio	**54**	**5.14**	**5.38**	**.89**	**37.73**
Independent Directors (%)	**53**	**87.34**	**6.93**	**60**	**100**
Debt-to-Asset Ratio	**54**	**38.82**	**12.44**	**17.56**	**64.85**

Note. The Descriptive Statistics for the Variables in the Chemical Sector. In donation leaning, the negative reference is to the Republican.

Table 3

Descriptive Statistics for Oil & Gas Sector Variables

Variable	*n*	*M*	*SD*	Min	Max
Carbon Intensity Change	**56**	**-73.78**	**293.19**	**-1854.67**	**402.84**
Carbon Intensity Change in %	**56**	**-.05**	**.40**	**-.76**	**1.37**
Donation Leaning	**56**	**-.54**	**.45**	**-1**	**1**
Return on Assets	**56**	**3.68**	**13.99**	**-25.1**	**71.94**
Price to Book Ratio	**56**	**2.80**	**4.60**	**.12**	**33.42**
Independent Directors (%)	**52**	**85.66**	**6.80**	**66.67**	**92.31**
Debt-to-Asset Ratio	**56**	**38.82**	**13.66**	**12.14**	**80.27**

Note. The Descriptive Statistics for the Variables in the Oil & Gas Sector. In donation leaning, the negative reference is to the Republican.

Table 4

Correlation Matrix between Variables

Variable	1)	2)	3)	4)	5)	6)
1) Carbon Intensity Change in %	-					
2) Donation Ratio	**.13(.18)**	-				
3) Return on Assets	**-.08(.42)**	**-.04(.67)**	-			
4) Price to Book Ratio	**.01(.90)**	**.10(.33)**	**.09(.34)**	-		
5) Independent Directors in %	**-.22(.02)**	**.01(.94)**	**-.16(.10)**	**-.03(.79)**	-	
6) Debt-to-Asset Ratio	**.01(.88)**	**.01(.91)**	**-.24*(.01)**	**0.34**(.00)**	**-.05(.60)**	-

Notes. The number in () is the p-value.

* $p < .05$

** $p < .01$

Figure 1

Change in the Carbon Intensity (in %) of Each Company Over Time

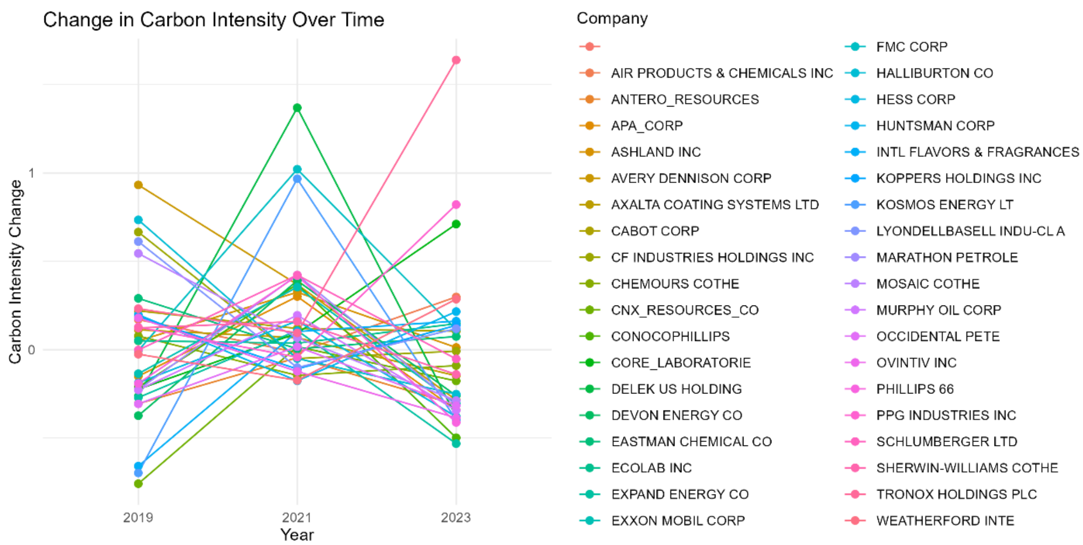


Figure 2

Change in the Donation Ratio of Each Company Over Time

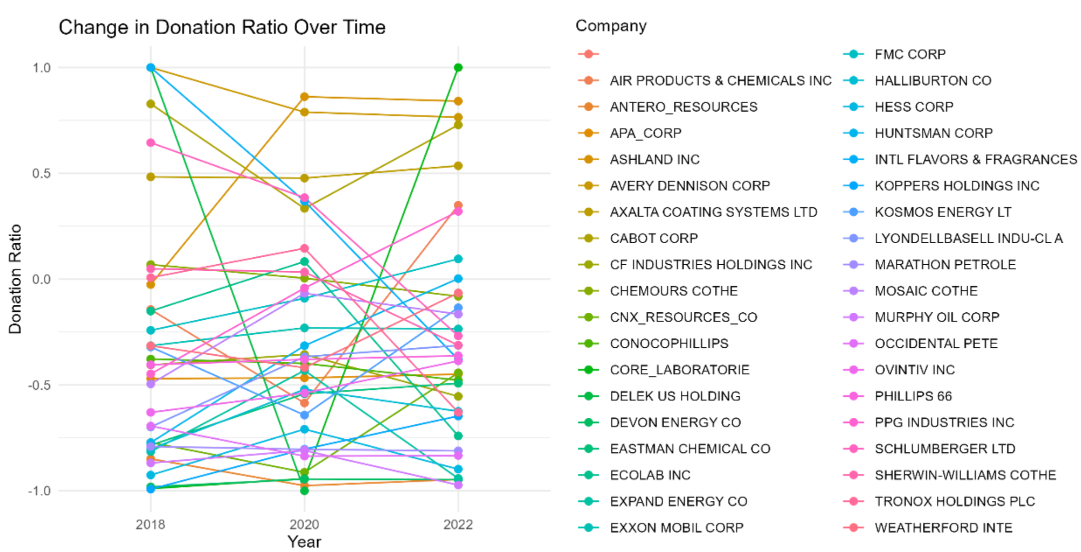


Figure 3

Density and Histogram Plot of Company Carbon Intensity Change in Percentage in 2019

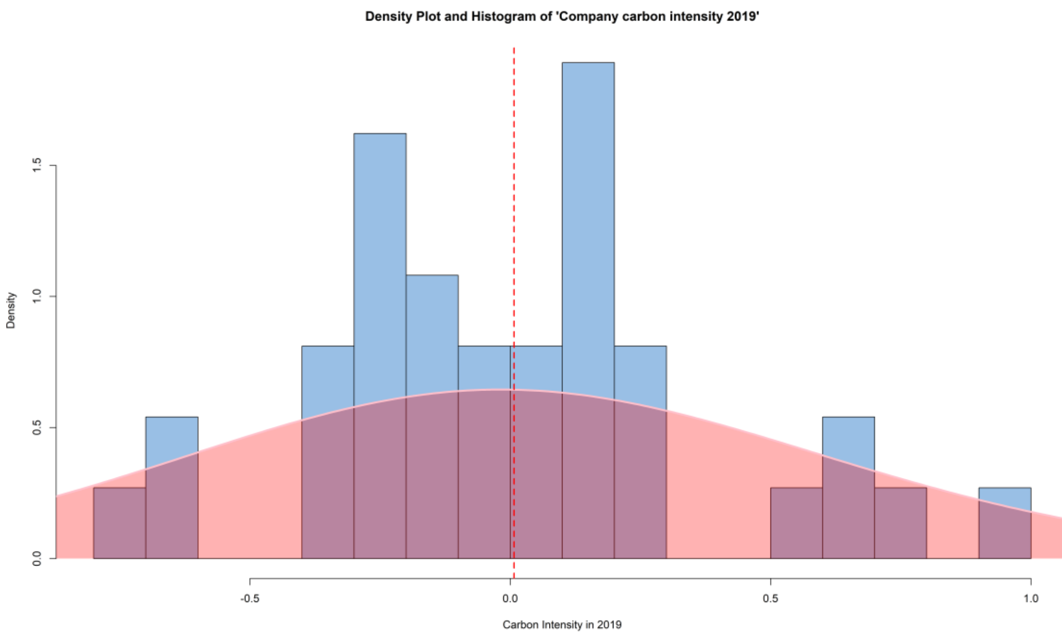


Figure 4

Density and Histogram Plot of Company Carbon Intensity Change in Percentage in 2021

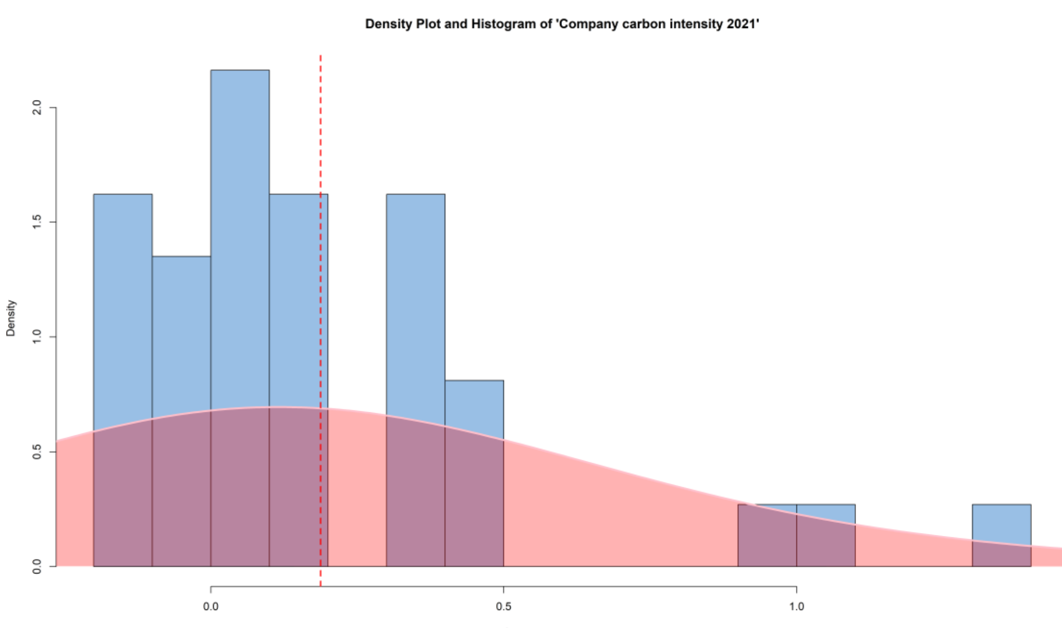


Figure 5

Density and Histogram Plot of Company Carbon Intensity Change in Percentage in 2023

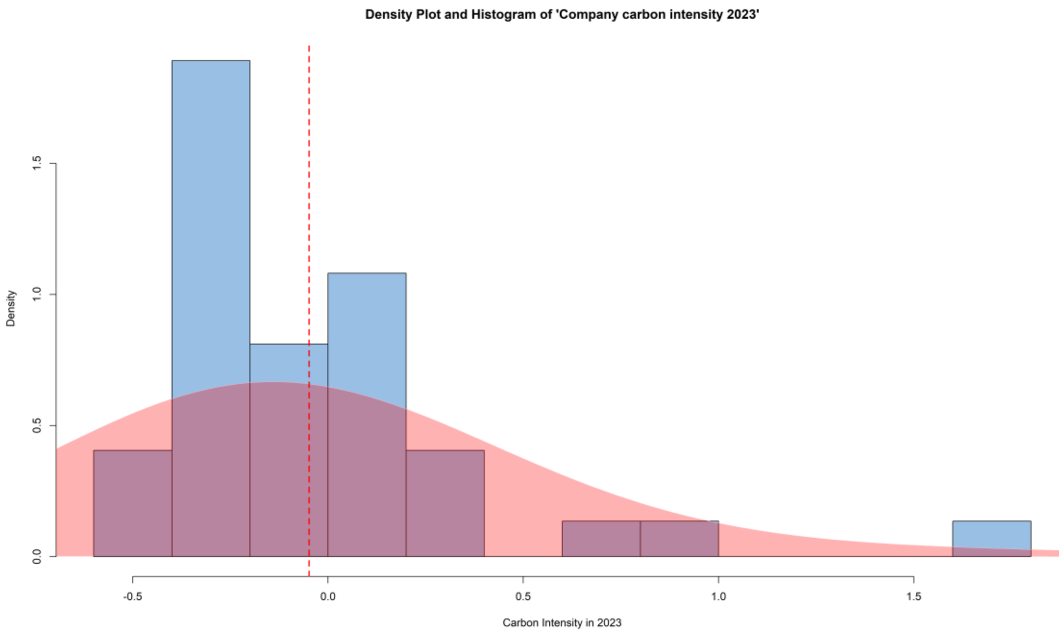
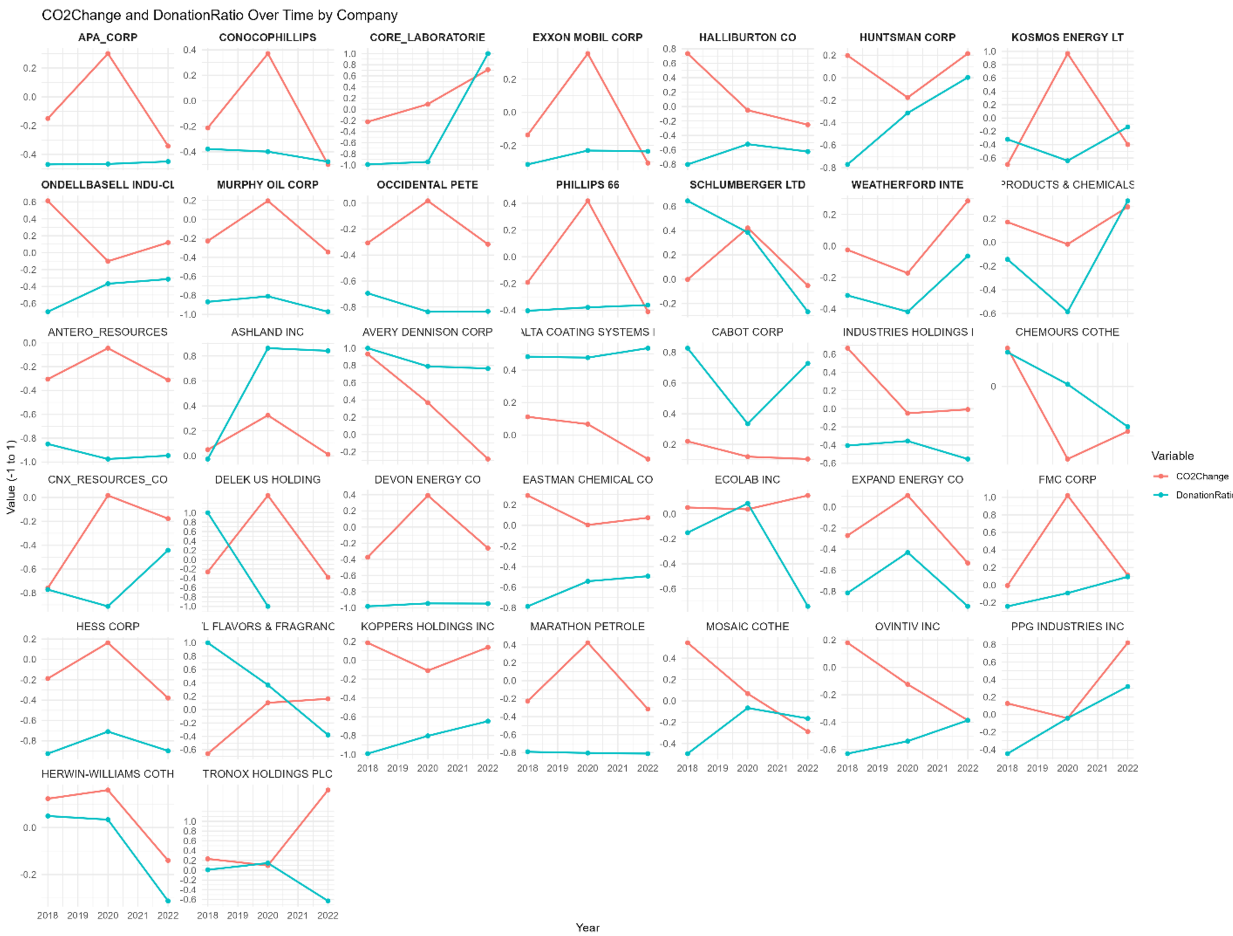


Figure 6

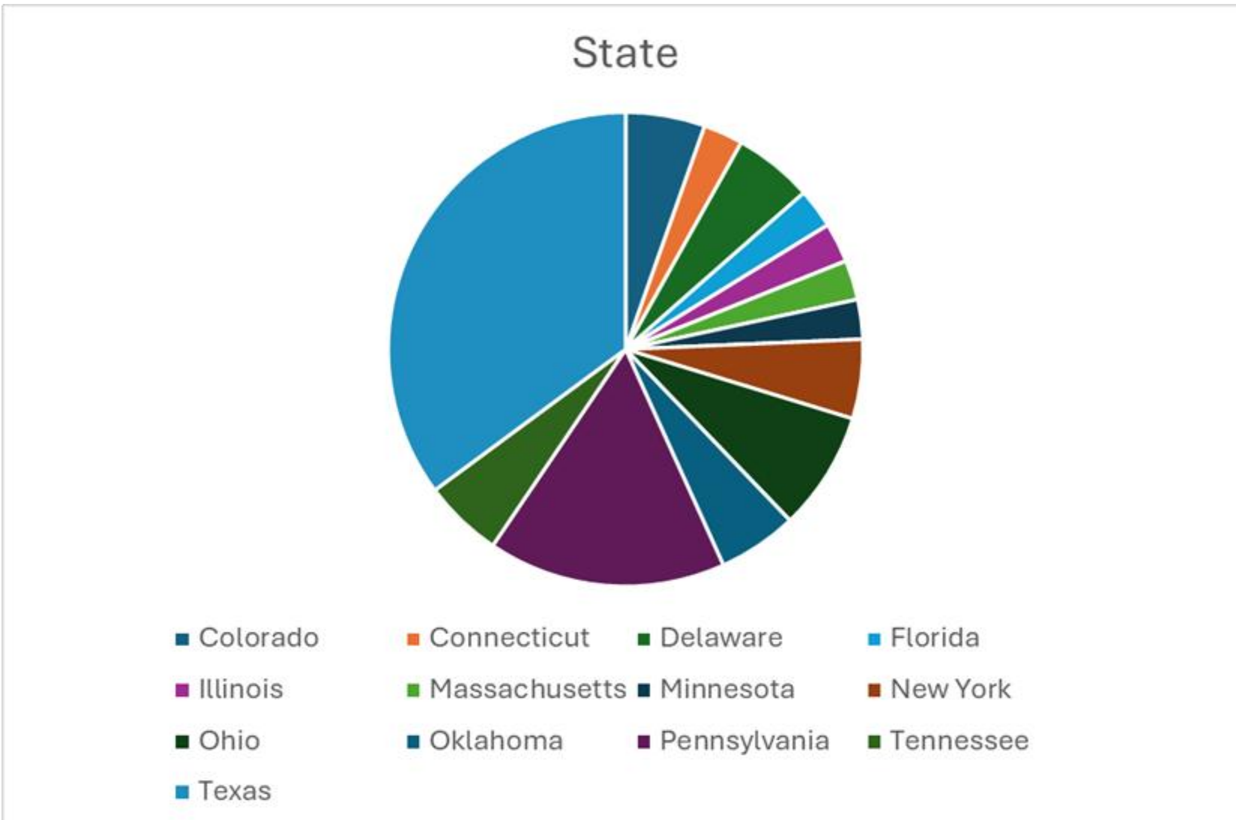
The Tendency of the Carbon Intensity Change in Percentage and the Donation Ratio Change for Each Company

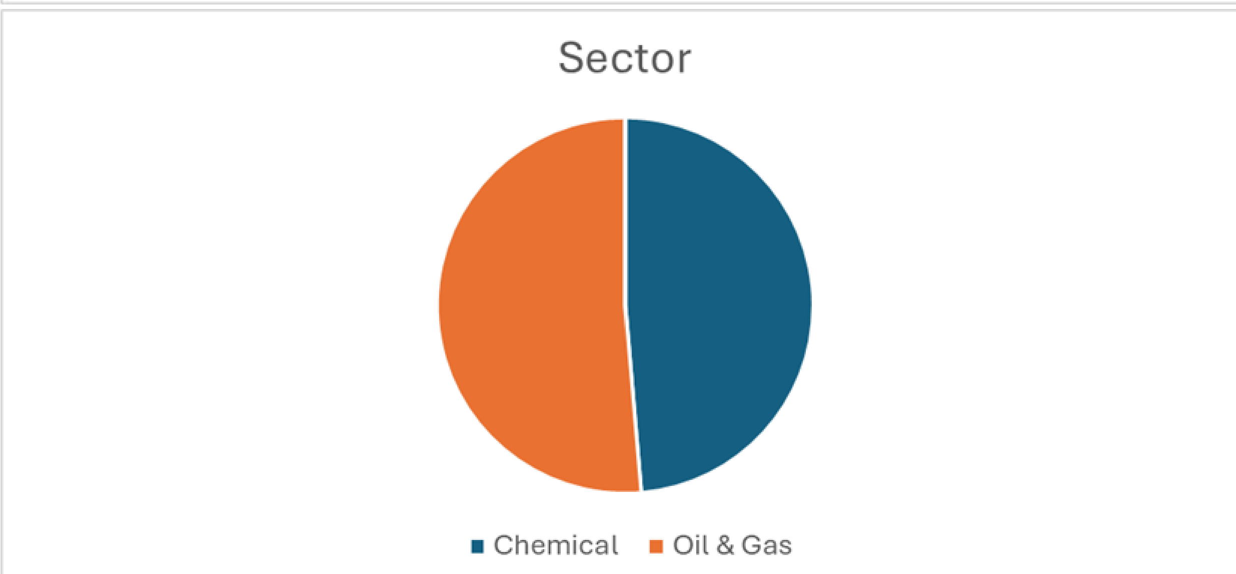


Notes. The **bold**ed companies are from Texas

Figure 7

Characteristics of our Sample





Note. The above graph is the state distribution and the below is the sector distribution

Figure 8

Robustness Check 1: Exclude Covid Period

Fixed-effects (within) regression		Number of obs =	69
Group variable: **company_id**		Number of groups =	37
R-squared:		Obs per group:	
Within = **0.2697**		min =	1
Between = **0.0342**		avg =	1.9
Overall = **0.0170**		max =	2
		F(6, 36) =	2.40
corr(u_i, Xb) = **-0.7395**		Prob > F =	0.0469

(Std. err. adjusted for **37** clusters in **company_id**)

delta_co2	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
donation_ratio	-.1596874	.1397041	-1.14	0.261	-.4430206	.1236457
roa	-.0266453	.0115754	-2.30	0.027	-.0501214	-.0031692
pb	-.0223597	.0077538	-2.88	0.007	-.038085	-.0066343
inddirectors	.0023878	.012351	0.19	0.848	-.0226611	.0274367
debtasset	-.006115	.014698	-0.42	0.680	-.035924	.023694
3.period	.031032	.1040535	0.30	0.767	-.1799983	.2420623
_cons	.2108302	1.167514	0.18	0.858	-2.156998	2.578659
sigma_u	.53831584					
sigma_e	.32717475					
rho	.73025211	(fraction of variance due to u_i)				

Figure 9

Robustness Check 2: Balanced Panel Only

Fixed-effects (within) regression		Number of obs =	103
Group variable: **company_id**		Number of groups =	36
R-squared:		Obs per group:	
Within = **0.1421**		min =	1
Between = **0.0397**		avg =	2.9
Overall = **0.0001**		max =	3
		F(7, 35) =	3.38
corr(u_i, Xb) = **-0.7346**		Prob > F =	0.0073

(Std. err. adjusted for **36** clusters in **company_id**)

delta_co2	Coefficient	Robust std. err.	t	P>|t|	[95% conf.	interval]
donation_ratio	-.1174103	.1854806	-0.63	0.531	-.493956	.2591354
roa	-.0124569	.004328	-2.88	0.007	-.0212431	-.0036706
pb	-.0166929	.0071911	-2.32	0.026	-.0312916	-.0020941
inddirectors	-.0046191	.0139193	-0.33	0.742	-.0328767	.0236385
debtasset	-.0145624	.0100716	-1.45	0.157	-.0350089	.005884
period						
2	.1471165	.1075812	1.37	0.180	-.0712849	.365518
3	.0376184	.0994215	0.38	0.707	-.164218	.2394548
_cons	1.019192	1.320839	0.77	0.446	-1.662254	3.700639
sigma_u	.35816715					
sigma_e	.37724581					
rho	.47407467	(fraction of variance due to u_i)				

Figure 10

Fully Party Switch Output

```
.
. display "Full party switch (Republican -1 to Democrat +1):"
Full party switch (Republican -1 to Democrat +1):

. display "  Effect: " %8.1f `full_switch' " tons CO2"
  Effect:     -0.5 tons CO2

. display "  Standard error: " %8.1f `full_switch_se'
  Standard error:      0.4

. display "  95% CI: [" %8.1f (`full_switch' - 1.96*`full_switch_se') ///
>     ", " %8.1f (`full_switch' + 1.96*`full_switch_se') "]"
  95% CI: [    -1.3,      0.2]

. display ""


. display "Context:"
Context:

. display "  As % of mean CO2 change: " %6.1f (`full_switch' / `mean_co2' * 100) "%"
  As % of mean CO2 change: -1030.4%

. display "  In standard deviations: " %5.3f (`full_switch' / `sd_co2')
  In standard deviations: -1.390

. display ""
```

Appendix B

Key Formular of Our Study

1. Improvement in the t-statistic

$$Improvement\ Factor = \frac{|t_{target}|}{|t_{current}|} = \frac{1.96}{1.40}$$

2. Sample-Size Calculation

$$\sqrt{n_{company\ we\ need}} = (Improvment\ Factor)\sqrt{n_{company\ we\ have}}$$

3. Other Models

1) When interacting with the Oil & Gas Sector

$$\%\Delta Carbon\ Intensity_{i,t+1} = \beta_0 + \beta_1 \mathrm{CPL}_{i,t} + \beta_2 ROA_{i,t} + \beta_3 DebtAsset_{i,t} + \beta_4 IndDir_{i,t} + \beta_5 MTB_{i,t} + \beta_6 (CPL_{i,t} \times Oil_i) + \alpha_i + \gamma_t + \varepsilon_{i,t}$$

2) When interacting with the Companys from Texas

$$\%\Delta Carbon\ Intensity_{i,t+1} = \beta_0 + \beta_1 \mathrm{CPL}_{i,t} + \beta_2 ROA_{i,t} + \beta_3 DebtAsset_{i,t} + \beta_4 IndDir_{i,t} + \beta_5 MTB_{i,t} + \beta_6 (CPL_{i,t} \times Texas_i) + \alpha_i + \gamma_t + \varepsilon_{i,t}$$

Appendix C:
Stata Coding

```
clear all

* Load data
import excel "Final Dataset_Both.xlsx", sheet("Company Data") firstrow clear

* Create company ID and handle duplicates
encode Ticker, generate(company_id)

* Handle duplicates if they exist
duplicates drop
quietly duplicates report company_id
if r(unique_value) != r(N) {
	egen company_id_unique = group(Ticker State Sector)
	drop company_id
	rename company_id_unique company_id
}

* Reshape to long
reshape long DonationRatio_ CO2Change_ ROA_ PB_ IndDirectors_ DA_, i(company_id)
j(year)

* Rename variables
rename (DonationRatio_ CO2Change_ ROA_ PB_ IndDirectors_ DA_) ///
		(donation_ratio CO2Change_current roa pb inddirectors debtasset)

* Create state and sector FE variables
encode State, generate(state_fe)
encode Sector, generate(sector_fe)

* Create dependent variable
sort company_id year
by company_id: gen delta_co2 = CO2Change_current[_n+1]

* Keep donation years
keep if inlist(year, 2018, 2020, 2022)

* Create period variable
gen period = 1 if year==2018
replace period = 2 if year==2020
replace period = 3 if year==2022
```

```
* Drop missing
drop if missing(donation_ratio) | missing(delta_co2)

* Set panel structure
xtset company_id period

********************************************************************************
* DESCRIPTIVE STATISTICS
********************************************************************************

display _newline(2)
display "============================================================"
display "DESCRIPTIVE STATISTICS"
display "============================================================"

* Summary statistics for main variables
summarize delta_co2 donation_ratio roa pb inddirectors debtasset, detail

* Create a clean summary table
estpost summarize delta_co2 donation_ratio roa pb inddirectors debtasset
esttab using "summary_stats.rtf", replace ///
    cells("mean(fmt(2)) sd(fmt(2)) min(fmt(2)) max(fmt(2)) count(fmt(0))") ///
    title("Summary Statistics") ///
    nomtitle nonumber

* By period
display _newline(2)
display "SUMMARY BY PERIOD:"
tabstat delta_co2 donation_ratio roa pb inddirectors debtasset, ///
    by(period) stats(mean sd n) format(%9.2f)

* By state (create texas variable first if you want state analysis)
gen texas_temp = (State == "Texas")
display _newline(2)
display "SUMMARY BY STATE (Texas vs Others):"
tabstat delta_co2 donation_ratio, by(texas_temp) stats(mean sd n) format(%9.2f)
drop texas_temp   // Drop temporary variable


log using "state_statistics_all_variables.txt", replace text

display "SUMMARY STATISTICS BY STATE - ALL VARIABLES"
display "==========================================="
display "Date: $S_DATE Time: $S_TIME"
```

```
display ""

* Run all statistics
display "=== CO2 CHANGES BY STATE ==="
tabstat delta_co2, by(State) statistics(n mean sd min max) format(%9.2f)

display _n(2) "=== DONATION RATIOS BY STATE ==="
tabstat donation_ratio, by(State) statistics(n mean sd min max) format(%9.3f)

display _n(2) "=== RETURN ON ASSETS BY STATE ==="
tabstat roa, by(State) statistics(n mean sd min max) format(%9.2f)

display _n(2) "=== PRICE-TO-BOOK RATIO BY STATE ==="
tabstat pb, by(State) statistics(n mean sd min max) format(%9.2f)

display _n(2) "=== INDEPENDENT DIRECTORS (%) BY STATE ==="
tabstat inddirectors, by(State) statistics(n mean sd min max) format(%9.2f)

display _n(2) "=== DEBT-TO-ASSET RATIO BY STATE ==="
tabstat debtasset, by(State) statistics(n mean sd min max) format(%9.2f)

log close

* By sector
display _newline(2)
display "SUMMARY BY SECTOR:"
tabstat delta_co2 donation_ratio, by(sector_fe) stats(mean sd n) format(%9.2f)

display _newline(2)
display "DETAILED STATISTICS BY SECTOR"
display "============================"
bysort Sector: summarize delta_co2 donation_ratio roa pb inddirectors debtasset

* Correlation matrix
display _newline(2)
display "CORRELATION MATRIX:"
pwcorr delta_co2 donation_ratio roa pb inddirectors debtasset, sig star(0.05)

* Panel structure summary
display _newline(2)
display "PANEL STRUCTURE:"
xtsum delta_co2 donation_ratio roa pb inddirectors debtasset

* Export to outreg2 format
```

```
*outreg2 using summary_table.doc, replace sum(detail) ///
      keep(delta_co2 donation_ratio roa pb inddirectors debtasset)

********************************************************************************
* FIXED EFFECTS (Main Specification)
********************************************************************************
ssc install outreg2, replace
xtreg delta_co2 donation_ratio roa pb inddirectors debtasset i.period, ///
      fe vce(cluster company_id)
outreg2 using reg_test.doc, replace
estimates store fe_simple

* Store key results
local b_donation_fe = _b[donation_ratio]
local se_donation_fe = _se[donation_ratio]
local p_donation_fe = 2*ttail(e(df_r), abs(`b_donation_fe'/`se_donation_fe'))

display _newline(2)
display "================================================================="
display "MODEL 1: FIXED EFFECTS RESULTS"
display "================================================================="
display "Donation coefficient: " %8.2f `b_donation_fe'
display "Standard error: " %8.2f `se_donation_fe'
display "P-value: " %6.3f `p_donation_fe'
display "Within R-squared: " %6.3f e(r2_w)
display "================================================================="

********************************************************************************
* HETEROGENEITY TESTS
********************************************************************************

display _newline(2)
display "================================================================="
display "TESTING FOR HETEROGENEOUS EFFECTS"
display "================================================================="

* Sector heterogeneity
gen donation_X_oil = donation_ratio * (sector_fe == 2)
xtreg delta_co2 donation_ratio donation_X_oil roa pb inddirectors ///
      debtasset i.period, fe vce(cluster company_id)
outreg2 using reg_test.doc
estimates store fe_sector_het

display "Sector interaction coefficient: " %8.3f _b[donation_X_oil]
```

```
display "P-value: " %5.3f (2*ttail(e(df_r), abs(_b[donation_X_oil]/_se[donation_X_oil])))

* State heterogeneity (Texas vs others)
gen texas = (State == "Texas")
gen donation_X_texas = donation_ratio * texas
xtreg delta_co2 donation_ratio donation_X_texas roa pb inddirectors ///
      debtasset i.period, fe vce(cluster company_id)
outreg2 using reg_test.doc
estimates store fe_state_het

display _newline(1)
display "Texas interaction coefficient: " %8.3f _b[donation_X_texas]
display "P-value: " %5.3f (2*ttail(e(df_r), abs(_b[donation_X_texas]/_se[donation_X_texas])))

********************************************************************************
* ROBUSTNESS CHECKS
********************************************************************************

display _newline(2)
display "============================================================"
display "ROBUSTNESS CHECKS"
display "============================================================"

* Exclude COVID period
xtreg delta_co2 donation_ratio roa pb inddirectors debtasset i.period ///
      if period != 2, fe vce(cluster company_id)
estimates store fe_no_covid
display "Without COVID period - Donation coefficient: " %8.3f _b[donation_ratio]

* Balanced panel only
gen balanced = 1
bysort company_id: replace balanced = 0 if _N < 3
xtreg delta_co2 donation_ratio roa pb inddirectors debtasset i.period ///
      if balanced == 1, fe vce(cluster company_id)
estimates store fe_balanced
display "Balanced panel only - Donation coefficient: " %8.3f _b[donation_ratio]

********************************************************************************
* ECONOMIC SIGNIFICANCE AND FULL PARTY SWITCH
********************************************************************************

* Restore main FE model
quietly estimates restore fe_simple
```

```
display _newline(2)
display "================================================================"
display "ECONOMIC SIGNIFICANCE: FULL PARTY SWITCH EFFECTS"
display "================================================================"

* Calculate effects
local full_switch = `b_donation_fe' * 2
local full_switch_se = `se_donation_fe' * 2

* Get context
quietly summarize delta_co2
local mean_co2 = r(mean)
local sd_co2 = r(sd)
quietly summarize donation_ratio
local sd_donation = r(sd)

display "Full party switch (Republican -1 to Democrat +1):"
display "   Effect: " %8.1f `full_switch' " tons CO2"
display "   Standard error: " %8.1f `full_switch_se'
display "   95% CI: [" %8.1f (`full_switch' - 1.96*`full_switch_se') ///
        ", " %8.1f (`full_switch' + 1.96*`full_switch_se') "]"
display ""
display "Context:"
display "   As % of mean CO2 change: " %6.1f (`full_switch' / `mean_co2' * 100) "%"
display "   In standard deviations: " %5.3f (`full_switch' / `sd_co2')
display ""
display "One SD increase in donations (" %4.2f `sd_donation' "):"
display "   Effect: " %8.1f (`b_donation_fe' * `sd_donation') " tons CO2"

* Clean up
capture drop donation_X_* texas balanced
```

OUTPUT:

```
. doedit "D:\New model6.do"

. do "D:\New model6.do"

. clear all

.
. * Load data
. import excel "Final Dataset_Both.xlsx", sheet("Company Data") firstrow clear
(61 vars, 77 obs)

.
. * Create company ID and handle duplicates
. encode Ticker, generate(company_id)

.
. * Handle duplicates if they exist
. duplicates drop

Duplicates in terms of all variables

(39 observations deleted)

. quietly duplicates report company_id

. if r(unique_value) != r(N) {
.         egen company_id_unique = group(Ticker State Sector)
.         drop company_id
.         rename company_id_unique company_id
. }

.
. * Reshape to long
. reshape long DonationRatio_ CO2Change_ ROA_ PB_ IndDirectors_ DA_, i(company_id)
j(year)
(j = 2016 2017 2018 2019 2020 2021 2022 2023)
(variable DonationRatio_2016 not found)
(variable CO2Change_2016 not found)
(variable DonationRatio_2017 not found)
(variable DonationRatio_2019 not found)
(variable DonationRatio_2021 not found)
(variable DonationRatio_2023 not found)
(variable ROA_2023 not found)
```

```
(variable PB_2023 not found)
(variable IndDirectors_2023 not found)
(variable DA_2023 not found)

Data                                        Wide    ->    Long
-----------------------------------------------------------------------------
Number of observations                      38      ->    304
Number of variables                         62      ->    31
j variable (8 values)                               ->    year
xij variables:
DonationRatio_2016 DonationRatio_2017 ... DonationRatio_2023->DonationRatio_
CO2Change_2016 CO2Change_2017 ... CO2Change_2023->CO2Change_
            ROA_2016 ROA_2017 ... ROA_2023      ->    ROA_
                PB_2016 PB_2017 ... PB_2023     ->    PB_
IndDirectors_2016 IndDirectors_2017 ... IndDirectors_2023->IndDirectors_
                DA_2016 DA_2017 ... DA_2023     ->    DA_
-----------------------------------------------------------------------------

.
. * Rename variables
. rename (DonationRatio_ CO2Change_ ROA_ PB_ IndDirectors_ DA_) ///
>            (donation_ratio CO2Change_current roa pb inddirectors debtasset)

.
. * Create state and sector FE variables
. encode State, generate(state_fe)

. encode Sector, generate(sector_fe)

.
. * Create dependent variable
. sort company_id year

. by company_id: gen delta_co2 = CO2Change_current[_n+1]
(49 missing values generated)

.
. * Keep donation years
. keep if inlist(year, 2018, 2020, 2022)
(190 observations deleted)

.
. * Create period variable
. gen period = 1 if year==2018
```

```
(76 missing values generated)

. replace period = 2 if year==2020
(38 real changes made)

. replace period = 3 if year==2022
(38 real changes made)

.
. * Drop missing
. drop if missing(donation_ratio) | missing(delta_co2)
(4 observations deleted)

.
. * Set panel structure
. xtset company_id period

Panel variable: company_id (unbalanced)
 Time variable: period, 1 to 3
         Delta: 1 unit

.
. ****************************************************************************
. * DESCRIPTIVE STATISTICS
. ****************************************************************************
.
. display _newline(2)



.                                                                      display
"=================================================================="
==================================================================

. display "DESCRIPTIVE STATISTICS"
DESCRIPTIVE STATISTICS

.                                                                      display
"=================================================================="
==================================================================

.
. * Summary statistics for main variables
```

```
. summarize delta_co2 donation_ratio roa pb inddirectors debtasset, detail

                          delta_co2
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.6979818      -.7589102
 5%    -.4120595      -.6979818
10%    -.3425745      -.6594085       Obs                 110
25%    -.2123974      -.5319187       Sum of wgt.         110

50%     .0165269                      Mean           .0527033
                        Largest       Std. dev.      .3907019
75%     .1943559       .9668759
90%     .4833279       1.020895       Variance        .152648
95%     .8209231        1.36903       Skewness       1.181748
99%      1.36903       1.639077       Kurtosis       5.705397

                        donation_ratio
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.9920839             -1
 5%    -.9727681      -.9920839
10%    -.9336199      -.9895829       Obs                 110
25%    -.7720798      -.9814951       Sum of wgt.         110

50%    -.3922981                      Mean          -.2956351
                        Largest       Std. dev.       .543121
75%     .0024067              1
90%     .5901674              1       Variance       .2949805
95%     .8410548              1       Skewness       .8221001
99%            1              1       Kurtosis       2.875022

                             roa
-------------------------------------------------------------
      Percentiles      Smallest
 1%        -17.9          -25.1
 5%        -6.82          -17.9
10%       -2.705         -15.99       Obs                 110
25%          .58         -15.75       Sum of wgt.         110

50%        5.325                      Mean           5.193545
                        Largest       Std. dev.      10.52441
75%         8.07          18.19
90%       11.595          19.65       Variance       110.7631
```

95%	15.55	52.32	Skewness	2.70004
99%	52.32	71.94	Kurtosis	20.05561

pb

	Percentiles	Smallest		
1%	.4	.12		
5%	.75	.4		
10%	.95	.61	Obs	106
25%	1.71	.68	Sum of wgt.	106
50%	2.575		Mean	3.989906
		Largest	Std. dev.	5.124577
75%	4.74	10.65		
90%	9.09	13.04	Variance	26.26129
95%	10.55	33.42	Skewness	4.657261
99%	33.42	37.73	Kurtosis	28.79504

inddirectors

	Percentiles	Smallest		
1%	66.67	60		
5%	71.43	66.67		
10%	75	66.67	Obs	109
25%	83.33	71.43	Sum of wgt.	109
50%	90		Mean	86.47872
		Largest	Std. dev.	6.88403
75%	90.91	92.31		
90%	91.67	92.31	Variance	47.38987
95%	92.31	92.31	Skewness	-1.489884
99%	92.31	100	Kurtosis	5.040224

debtasset

	Percentiles	Smallest		
1%	14.51	12.14		
5%	19.99	14.51		
10%	22.44	15.61	Obs	110
25%	29.16	17.56	Sum of wgt.	110
50%	34.84		Mean	37.31009
		Largest	Std. dev.	13.10152
75%	44.38	64.7		

```
90%         56.395              64.85         Variance          171.6498
95%           59.34              78.89         Skewness          .8114437
99%           78.89              80.27         Kurtosis          3.688699

.
. * Create a clean summary table
. estpost summarize delta_co2 donation_ratio roa pb inddirectors debtasset

                 |   e(count)    e(sum_w)      e(mean)        e(Var)          e(sd)         e(min)
e(max)        e(sum)
-------------+---------------------------------------------------------------------------------------
     delta_co2 |           110             110      .0527033       .152648      .3907019    -.7589102
1.639077     5.797368
donation_r~o  |           110             110    -.2956351     .2949805       .543121              -1
1    -32.51986
            roa |           110             110     5.193545     110.7631     10.52441          -25.1
71.94        571.29
              pb   |                    106                       106          3.989906          26.26129
5.124577             .12          37.73         422.93
inddirectors  |           109             109     86.47872     47.38987       6.88403               60
100       9426.18
     debtasset |           110             110     37.31009     171.6498     13.10152          12.14
80.27       4104.11

. esttab using "summary_stats.rtf", replace ///
>         cells("mean(fmt(2)) sd(fmt(2)) min(fmt(2)) max(fmt(2)) count(fmt(0))") ///
>         title("Summary Statistics") ///
>         nomtitle nonumber
(output written to summary_stats.rtf)

.
. * By period
. display _newline(2)




. display "SUMMARY BY PERIOD:"
SUMMARY BY PERIOD:

. tabstat delta_co2 donation_ratio roa pb inddirectors debtasset, ///
>         by(period) stats(mean sd n) format(%9.2f)

Summary statistics: Mean, SD, N
```

Group variable: period

period	delta_~2	donati~o	roa	pb	inddir~s	debtas~t
1	0.01	-0.31	4.03	4.60	86.14	36.33
	0.38	0.59	8.34	5.77	7.41	15.62
	37.00	37.00	37.00	35.00	37.00	37.00
2	0.19	-0.31	3.93	3.22	86.69	37.99
	0.34	0.50	10.49	2.80	6.46	12.30
	37.00	37.00	37.00	36.00	37.00	37.00
3	-0.04	-0.26	7.69	4.17	86.61	37.62
	0.42	0.54	12.28	6.22	6.93	11.23
	36.00	36.00	36.00	35.00	35.00	36.00
Total	0.05	-0.30	5.19	3.99	86.48	37.31
	0.39	0.54	10.52	5.12	6.88	13.10
	110.00	110.00	110.00	106.00	109.00	110.00

.
. * By state (create texas variable first if you want state analysis)
. gen texas_temp = (State == "Texas")

. display _newline(2)

. display "SUMMARY BY STATE (Texas vs Others):"
SUMMARY BY STATE (Texas vs Others):

. tabstat delta_co2 donation_ratio, by(texas_temp) stats(mean sd n) format(%9.2f)

Summary statistics: Mean, SD, N
Group variable: texas_temp

texas_temp	delta_~2	donati~o
0	0.08	-0.23
	0.40	0.60
	71.00	71.00

```
            1 |       0.01       -0.41
              |       0.37        0.41
              |      39.00       39.00
-----------+--------------------
        Total |       0.05       -0.30
              |       0.39        0.54
              |     110.00      110.00
--------------------------------

. drop texas_temp    // Drop temporary variable

.
.
. log using "state_statistics_all_variables.txt", replace text
-----------------------------------------------------------------------------------------------------------------------
----
      name:  <unnamed>
       log:  D:\state_statistics_all_variables.txt
  log type:  text
 opened on:  19 Jun 2025, 15:33:08

.
. display "SUMMARY STATISTICS BY STATE - ALL VARIABLES"
SUMMARY STATISTICS BY STATE - ALL VARIABLES

. display "=============================================="
==============================================

. display "Date: $S_DATE Time: $S_TIME"
Date: 19 Jun 2025 Time: 15:33:08

. display ""



.
. * Run all statistics
. display "=== CO2 CHANGES BY STATE ==="
=== CO2 CHANGES BY STATE ===

. tabstat delta_co2, by(State) statistics(n mean sd min max) format(%9.2f)

Summary for variables: delta_co2
Group variable: State (State)
```

State	N	Mean	SD	Min	Max
Colorado	6.00	-0.17	0.21	-0.39	0.18
Connecticut	3.00	0.66	0.85	0.09	1.64
Delaware	6.00	0.04	0.16	-0.15	0.33
Florida	3.00	0.11	0.42	-0.29	0.54
Illinois	3.00	0.20	0.40	-0.05	0.67
Massachusetts	3.00	0.15	0.06	0.10	0.22
Minnesota	3.00	0.08	0.06	0.04	0.15
New York	6.00	-0.13	0.34	-0.66	0.16
Ohio	9.00	0.12	0.41	-0.32	0.93
Oklahoma	6.00	-0.16	0.34	-0.53	0.39
Pennsylvania	18.00	0.10	0.38	-0.76	1.02
Tennessee	5.00	0.29	0.63	-0.26	1.37
Texas	39.00	0.01	0.37	-0.70	0.97
Total	110.00	0.05	0.39	-0.76	1.64

.

. display _n(2) "=== DONATION RATIOS BY STATE ==="

=== DONATION RATIOS BY STATE ===

. tabstat donation_ratio, by(State) statistics(n mean sd min max) format(%9.3f)

Summary for variables: donation_ratio
Group variable: State (State)

State	N	Mean	SD	Min	Max
Colorado	6.000	-0.721	0.239	-0.976	-0.386
Connecticut	3.000	-0.159	0.413	-0.630	0.146
Delaware	6.000	0.278	0.447	-0.081	0.862
Florida	3.000	-0.243	0.224	-0.495	-0.067
Illinois	3.000	-0.438	0.103	-0.554	-0.356
Massachusetts	3.000	0.630	0.261	0.334	0.828
Minnesota	3.000	-0.269	0.425	-0.741	0.083
New York	6.000	-0.257	0.781	-0.926	1.000
Ohio	9.000	-0.009	0.728	-0.811	1.000
Oklahoma	6.000	-0.844	0.210	-0.981	-0.432
Pennsylvania	18.000	-0.214	0.512	-0.992	0.535
Tennessee	5.000	-0.364	0.789	-1.000	1.000

Texas	39.000	-0.412	0.413	-0.990	1.000
Total	110.000	-0.296	0.543	-1.000	1.000

.
. display _n(2) "=== RETURN ON ASSETS BY STATE ==="

=== RETURN ON ASSETS BY STATE ===

. tabstat roa, by(State) statistics(n mean sd min max) format(%9.2f)

Summary for variables: roa
Group variable: State (State)

State	N	Mean	SD	Min	Max
Colorado	6.00	2.87	4.61	-2.32	9.93
Connecticut	3.00	9.21	5.10	3.35	12.64
Delaware	6.00	3.96	2.73	0.01	7.52
Florida	3.00	0.59	6.69	-5.42	7.80
Illinois	3.00	6.26	6.20	-0.71	11.17
Massachusetts	3.00	7.02	1.73	5.03	8.21
Minnesota	3.00	6.32	2.17	4.74	8.80
New York	6.00	-0.57	7.97	-15.75	6.86
Ohio	9.00	8.16	3.19	2.75	12.97
Oklahoma	6.00	14.16	29.45	-3.97	71.94
Pennsylvania	18.00	5.26	4.78	-6.18	16.44
Tennessee	5.00	6.51	1.26	4.86	7.86
Texas	39.00	4.10	12.11	-25.10	52.32
Total	110.00	5.19	10.52	-25.10	71.94

.
. display _n(2) "=== PRICE-TO-BOOK RATIO BY STATE ==="

=== PRICE-TO-BOOK RATIO BY STATE ===

. tabstat pb, by(State) statistics(n mean sd min max) format(%9.2f)

Summary for variables: pb

Group variable: State (State)

State	N	Mean	SD	Min	Max
Colorado	6.00	1.01	0.69	0.12	1.93
Connecticut	3.00	2.34	0.59	1.86	3.00
Delaware	6.00	4.04	3.61	1.19	10.65
Florida	3.00	1.07	0.26	0.89	1.37
Illinois	3.00	3.64	0.91	2.77	4.58
Massachusetts	3.00	2.64	0.34	2.33	3.00
Minnesota	3.00	6.95	2.15	5.12	9.32
New York	6.00	3.10	2.12	1.43	7.15
Ohio	9.00	10.47	11.12	1.16	37.73
Oklahoma	4.00	2.14	0.79	1.34	3.15
Pennsylvania	18.00	4.44	2.46	0.40	10.59
Tennessee	5.00	2.04	0.53	1.48	2.73
Texas	37.00	3.55	5.31	0.68	33.42
Total	106.00	3.99	5.12	0.12	37.73

.
. display _n(2) "=== INDEPENDENT DIRECTORS (%) BY STATE ==="

=== INDEPENDENT DIRECTORS (%) BY STATE ===

. tabstat inddirectors, by(State) statistics(n mean sd min max) format(%9.2f)

Summary for variables: inddirectors
Group variable: State (State)

State	N	Mean	SD	Min	Max
Colorado	6.00	85.60	7.35	75.00	91.67
Connecticut	3.00	66.47	6.37	60.00	72.73
Delaware	6.00	89.52	1.34	87.50	90.91
Florida	3.00	86.54	4.49	83.33	91.67
Illinois	3.00	91.67	0.00	91.67	91.67
Massachusetts	3.00	82.32	0.87	81.82	83.33
Minnesota	3.00	89.75	4.44	84.62	92.31
New York	6.00	91.65	0.44	90.91	92.31
Ohio	8.00	87.58	6.83	72.73	91.67
Oklahoma	6.00	79.79	7.03	71.43	87.50

```
  Pennsylvania |     18.00     87.44      2.96     83.33     92.31
     Tennessee |      5.00     82.14     12.08     66.67     91.67
         Texas |     39.00     87.47      5.97     71.43    100.00
--------------+--------------------------------------------------
         Total |    109.00     86.48      6.88     60.00    100.00
-----------------------------------------------------------------

.
. display _n(2) "=== DEBT-TO-ASSET RATIO BY STATE ==="


=== DEBT-TO-ASSET RATIO BY STATE ===

. tabstat debtasset, by(State) statistics(n mean sd min max) format(%9.2f)

Summary for variables: debtasset
Group variable: State (State)

         State |         N      Mean        SD       Min       Max
--------------+--------------------------------------------------
      Colorado |      6.00     37.09      6.07     28.01     43.74
   Connecticut |      3.00     56.14     10.53     44.38     64.70
      Delaware |      6.00     43.05     15.83     22.99     61.60
       Florida |      3.00     24.32      4.07     19.99     28.06
      Illinois |      3.00     33.24      2.78     30.03     34.85
 Massachusetts |      3.00     34.08      4.85     28.70     38.11
     Minnesota |      3.00     37.52      5.29     32.69     43.18
      New York |      6.00     35.46      5.17     30.19     44.56
          Ohio |      9.00     39.80     10.94     26.40     55.62
      Oklahoma |      6.00     41.34     23.35     21.04     80.27
  Pennsylvania |     18.00     38.86     14.30     17.56     64.85
     Tennessee |      5.00     33.91      6.10     24.69     40.85
         Texas |     39.00     35.37     13.75     12.14     78.89
--------------+--------------------------------------------------
         Total |    110.00     37.31     13.10     12.14     80.27
-----------------------------------------------------------------

.
. log close
      name:  <unnamed>
       log:  D:\state_statistics_all_variables.txt
  log type:  text
 closed on:  19 Jun 2025, 15:33:08
--------------------------------------------------------------------------------------------------------------
```

```
----

.
. * By sector
. display _newline(2)




. display "SUMMARY BY SECTOR:"
SUMMARY BY SECTOR:

. tabstat delta_co2 donation_ratio, by(sector_fe) stats(mean sd n) format(%9.2f)

Summary statistics: Mean, SD, N
Group variable: sector_fe (Sector)

   sector_fe |   delta_~2   donati~o
-------------+--------------------
   Chemicals |       0.16      -0.05
             |       0.35       0.52
             |      54.00      54.00
-------------+--------------------
Oil and Gas  |      -0.05      -0.54
             |       0.40       0.45
             |      56.00      56.00
-------------+--------------------
       Total |       0.05      -0.30
             |       0.39       0.54
             |     110.00     110.00
----------------------------------

.
. display _newline(2)




. display "DETAILED STATISTICS BY SECTOR"
DETAILED STATISTICS BY SECTOR

. display "============================="
=============================
```

```
. bysort Sector: summarize delta_co2 donation_ratio roa pb inddirectors debtasset

--------------------------------------------------------------------------------------------------------------------
----
-> Sector = Chemicals

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
   delta_co2 |         54    .1579074    .3546622  -.6594085   1.639077
donation_r~o |         54    -.045742    .5206617  -.9920839          1
         roa |         54    6.760926    4.445851      -5.42      19.65
          pb |         54    5.140185    5.379484        .89      37.73
inddirectors |         53     87.3466    6.926653         60        100
-------------+---------------------------------------------------------
   debtasset |         54    38.81815    12.44069      17.56      64.85

--------------------------------------------------------------------------------------------------------------------
----
-> Sector = Oil and Gas

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
   delta_co2 |         56   -.0487434     .399955  -.7589102    1.36903
donation_r~o |         56   -.5366034    .4504821         -1          1
         roa |         56    3.682143    13.99027      -25.1      71.94
          pb |         52    2.795385    4.597589        .12      33.42
inddirectors |         56    85.65732      6.8031      66.67      92.31
-------------+---------------------------------------------------------
   debtasset |         56    35.85589    13.66199      12.14      80.27


.
. * Correlation matrix
. display _newline(2)




. display "CORRELATION MATRIX:"
CORRELATION MATRIX:

. pwcorr delta_co2 donation_ratio roa pb inddirectors debtasset, sig star(0.05)

             | delta_~2 donati~o      roa       pb inddir~s debtas~t
```

```
-------------+---------------------------------------------------
   delta_co2 |   1.0000 
             |
             |
donation_r~o |   0.1295   1.0000 
             |   0.1774
             |
         roa |  -0.0771  -0.0409   1.0000 
             |   0.4236   0.6717
             |
          pb |   0.0123   0.0953   0.0928   1.0000 
             |   0.9005   0.3313   0.3443
             |
inddirectors |  -0.2181*  0.0075  -0.1576  -0.0262   1.0000 
             |   0.0227   0.9381   0.1017   0.7906
             |
   debtasset |   0.0145   0.0104  -0.2403*  0.3398* -0.0506   1.0000 
             |   0.8805   0.9142   0.0114   0.0004   0.6011
             |

. 
. * Panel structure summary
. display _newline(2)



. display "PANEL STRUCTURE:"
PANEL STRUCTURE:

. xtsum delta_co2 donation_ratio roa pb inddirectors debtasset

Variable         |      Mean   Std. dev.       Min        Max |    Observations
-----------------+--------------------------------------------+----------------
delta_~2 overall |  .0527033    .3907019  -.7589102   1.639077 |     N =     110
         between |              .2083423  -.3065567   .6552141 |     n =      37
         within  |              .3345276  -.7640524   1.062696 | T-bar = 2.97297
                 |                                             |
donati~o overall | -.2956351     .543121         -1          1 |     N =     110
         between |              .4591615  -.9580506    .851336 |     n =      37
         within  |              .2947542  -1.295635   1.015135 | T-bar = 2.97297
                 |                                             |
roa      overall |  5.193545    10.52441      -25.1      71.94 |     N =     110
         between |              5.254121  -4.933333   21.94667 |     n =      37
```

```
            within   |                 9.133054   -26.03979    55.18688 | T-bar = 2.97297
                     |                                                  |
pb          overall  |   3.989906     5.124577         .12       37.73  |     N =     106
            between  |                4.056525    .6033333       20.44  |     n =      37
            within   |                3.091574   -5.900094    21.27991  | T-bar = 2.86486
                     |                                                  |
inddir~s    overall  |   86.47872      6.88403          60         100  |     N =     109
            between  |                6.237941    66.46667    94.44667  |     n =      37
            within   |                3.383907    75.76538    95.56872  | T-bar = 2.94595
                     |                                                  |
debtas~t    overall  |   37.31009     13.10152       12.14       80.27  |     N =     110
            between  |                11.36686    14.08667    57.97333  |     n =      37
            within   |                6.659752    5.023424    64.25342  | T-bar = 2.97297

.
. * Export to outreg2 format
. *outreg2 using summary_table.doc, replace sum(detail) ///
>         keep(delta_co2 donation_ratio roa pb inddirectors debtasset)
.
. *******************************************************************************
. * FIXED EFFECTS (Main Specification)
. *******************************************************************************
. ssc install outreg2, replace
checking outreg2 consistency and verifying not already installed...
all files already exist and are up to date.

. xtreg delta_co2 donation_ratio roa pb inddirectors debtasset i.period, ///
>         fe vce(cluster company_id)

Fixed-effects (within) regression               Number of obs     =        105
Group variable: company_id                      Number of groups  =         37

R-squared:                                      Obs per group:
     Within  = 0.1871                                         min =          1
     Between = 0.0673                                         avg =        2.8
     Overall = 0.0000                                         max =          3

                                                F(7, 36)          =       3.61
corr(u_i, Xb) = -0.7544                         Prob > F          =     0.0048

                              (Std. err. adjusted for 37 clusters in company_id)
------------------------------------------------------------------------------
             |               Robust
   delta_co2 | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
```

```
---------------+----------------------------------------------------------------
donation_ratio |   -.2715402    .1945965     -1.40    0.171     -.6662001     .1231198
           roa |   -.0133867    .0045312     -2.95    0.005     -.0225764    -.0041971
            pb |   -.0201888    .0076851     -2.63    0.013     -.0357749    -.0046027
  inddirectors |    -.004564    .0144533     -0.32    0.754     -.0338766     .0247486
     debtasset |   -.0134074    .0099758     -1.34    0.187     -.0336394     .0068245
               |
        period |
             2 |    .1714595    .1057255      1.62    0.114
-.0429617     .3858807
             3 |    .0612277     .096651      0.63    0.530
-.1347896     .2572451
               |
         _cons |    .9353356    1.321159      0.71    0.484       -1.7441
3.614771
---------------+----------------------------------------------------------------
       sigma_u |   .40360226
       sigma_e |   .38784978
           rho |   .51989538   (fraction of variance due to u_i)
--------------------------------------------------------------------------------

. outreg2 using reg_test.doc, replace
reg_test.doc
dir : seeout

. estimates store fe_simple


.
. * Store key results
. local b_donation_fe = _b[donation_ratio]

. local se_donation_fe = _se[donation_ratio]

. local p_donation_fe = 2*ttail(e(df_r), abs(`b_donation_fe'/`se_donation_fe'))

.
. display _newline(2)



.                                                                        display
"================================================================"
================================================================
```

```
. display "MODEL 1: FIXED EFFECTS RESULTS"
MODEL 1: FIXED EFFECTS RESULTS

. display
"==========================================================="
===========================================================

. display "Donation coefficient: " %8.2f `b_donation_fe'
Donation coefficient:       -0.27

. display "Standard error: " %8.2f `se_donation_fe'
Standard error:         0.19

. display "P-value: " %6.3f `p_donation_fe'
P-value:   0.171

. display "Within R-squared: " %6.3f e(r2_w)
Within R-squared:   0.187

. display
"==========================================================="
===========================================================

.
. *****************************************************************************
. * HETEROGENEITY TESTS
. *****************************************************************************
.
. display _newline(2)




. display
"==========================================================="
===========================================================

. display "TESTING FOR HETEROGENEOUS EFFECTS"
TESTING FOR HETEROGENEOUS EFFECTS

. display
"==========================================================="
===========================================================
```

```
.
. * Sector heterogeneity
. gen donation_X_oil = donation_ratio * (sector_fe == 2)

. xtreg delta_co2 donation_ratio donation_X_oil roa pb inddirectors ///
>         debtasset i.period, fe vce(cluster company_id)

Fixed-effects (within) regression               Number of obs     =        105
Group variable: company_id                      Number of groups  =         37

R-squared:                                      Obs per group:
     Within  = 0.1871                                         min =          1
     Between = 0.0680                                         avg =        2.8
     Overall = 0.0000                                         max =          3

                                                F(8, 36)          =       3.26
corr(u_i, Xb) = -0.7555                         Prob > F          =     0.0068

                           (Std. err. adjusted for 37 clusters in company_id)
------------------------------------------------------------------------------
             |               Robust
   delta_co2 | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
donation_ratio |  -.2692545   .2204486    -1.22   0.230     -.716345    .1778361
donation_X_oil |  -.0043685   .3821997    -0.01   0.991    -.7795054    .7707685
         roa |  -.0134147   .0046152    -2.91   0.006    -.0227748   -.0040546
          pb |  -.0202194   .0075391    -2.68   0.011    -.0355094   -.0049293
inddirectors |  -.0045335   .0143542    -0.32   0.754    -.0336453    .0245782
   debtasset |  -.0134378   .0090263    -1.49   0.145    -.0317439    .0048683
             |
      period |
          2  |   .1712094   .1080132     1.59   0.122
-.0478515    .3902703
          3  |   .0612764   .0967764     0.63   0.531
-.1349953    .257548
             |
       _cons |   .9336601   1.338002     0.70   0.490    -1.779933
3.647253
-------------+----------------------------------------------------------------
     sigma_u |  .40433745
     sigma_e |  .39106771
         rho |  .51667835   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

```
. outreg2 using reg_test.doc
reg_test.doc
dir : seeout

. estimates store fe_sector_het

.
. display "Sector interaction coefficient: " %8.3f _b[donation_X_oil]
Sector interaction coefficient:      -0.004

. display "P-value: " %5.3f (2*ttail(e(df_r), abs(_b[donation_X_oil]/_se[donation_X_oil])))
P-value: 0.991

.
. * State heterogeneity (Texas vs others)
. gen texas = (State == "Texas")

. gen donation_X_texas = donation_ratio * texas

. xtreg delta_co2 donation_ratio donation_X_texas roa pb inddirectors ///
>         debtasset i.period, fe vce(cluster company_id)

Fixed-effects (within) regression               Number of obs       =        105
Group variable: company_id                         Number of groups   =          37

R-squared:                                          Obs per group:
       Within   = 0.2239                                          min =           1
       Between = 0.0762                                           avg =         2.8
       Overall = 0.0043                                          max =           3

                                                    F(8, 36)             =       8.95
corr(u_i, Xb) = -0.7179                           Prob > F             =     0.0000

                                         (Std. err. adjusted for 37 clusters in company_id)
------------------------------------------------------------------------------
                       |                    Robust
          delta_co2 | Coefficient   std. err.        t      P>|t|       [95% conf. interval]
-----------------+------------------------------------------------------------
   donation_ratio  |       -.415978       .1955857        -2.13      0.040          -.8126441
-.0193118
donation_X_texas  |       .4854646      .3299818          1.47      0.150          -.1837695
1.154699
                 roa  |    -.0096356         .004085        -2.36      0.024          -.0179204
```

```
-.0013508
                pb  |    -.0143176      .0040888       -3.50      0.001        -.0226102
-.006025
    inddirectors    |        -.0102224            .0147073              -0.70            0.491
-.0400503      .0196055
       debtasset    |        -.0108266            .0095378              -1.14            0.264
-.03017      .0085169
                    |
          period |
                2      |          .1725044          .1076569              1.60            0.118
-.045834      .3908428
                3      |             .030411          .0928657              0.33            0.745
-.1579293      .2187514
                    |
           _cons  |      1.324355      1.347818         0.98      0.332        -1.409147
4.057858
-----------------+----------------------------------------------------------------
          sigma_u |   .39867411
          sigma_e |   .38210525
              rho |   .52121138     (fraction of variance due to u_i)
---------------------------------------------------------------------------------

. outreg2 using reg_test.doc
reg_test.doc
dir : seeout

. estimates store fe_state_het

.
. display _newline(1)



. display "Texas interaction coefficient: " %8.3f _b[donation_X_texas]
Texas interaction coefficient:       0.485

.          display          "P-value:          "          %5.3f          (2*ttail(e(df_r),
abs(_b[donation_X_texas]/_se[donation_X_texas])))
P-value: 0.150

.
. ******************************************************************************
. * ROBUSTNESS CHECKS
. ******************************************************************************
```

```
.
. display _newline(2)




.                                                                          display
"================================================================"
================================================================

. display "ROBUSTNESS CHECKS"
ROBUSTNESS CHECKS

.                                                                          display
"================================================================"
================================================================


.
. * Exclude COVID period
. xtreg delta_co2 donation_ratio roa pb inddirectors debtasset i.period ///
>       if period != 2, fe vce(cluster company_id)

Fixed-effects (within) regression               Number of obs     =         69
Group variable: company_id                      Number of groups  =         37

R-squared:                                      Obs per group:
     Within  = 0.2697                                         min =          1
     Between = 0.0342                                         avg =        1.9
     Overall = 0.0170                                         max =          2

                                                F(6, 36)          =       2.40
corr(u_i, Xb) = -0.7395                         Prob > F          =     0.0469

                              (Std. err. adjusted for 37 clusters in company_id)
--------------------------------------------------------------------------------
               |               Robust
     delta_co2 | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
---------------+----------------------------------------------------------------
donation_ratio |  -.1596874   .1397041    -1.14   0.261    -.4430206    .1236457
           roa |  -.0266453   .0115754    -2.30   0.027    -.0501214   -.0031692
            pb |  -.0223597   .0077538    -2.88   0.007     -.038085   -.0066343
  inddirectors |   .0023878    .012351     0.19   0.848    -.0226611    .0274367
     debtasset |   -.006115    .014698    -0.42   0.680     -.035924     .023694
      3.period |    .031032   .1040535     0.30   0.767    -.1799983    .2420623
```

```
             _cons  |    .2108302    1.167514     0.18    0.858    -2.156998
2.578659
---------------+----------------------------------------------------------------
       sigma_u |   .53831584
       sigma_e |   .32717475
           rho |   .73025211   (fraction of variance due to u_i)
--------------------------------------------------------------------------------

. estimates store fe_no_covid

. display "Without COVID period - Donation coefficient: " %8.3f _b[donation_ratio]
Without COVID period - Donation coefficient:    -0.160


.
. * Balanced panel only
. gen balanced = 1

. bysort company_id: replace balanced = 0 if _N < 3
(2 real changes made)

. xtreg delta_co2 donation_ratio roa pb inddirectors debtasset i.period ///
>       if balanced == 1, fe vce(cluster company_id)

Fixed-effects (within) regression               Number of obs     =        103
Group variable: company_id                        Number of groups  =         36

R-squared:                                        Obs per group:
     Within  = 0.1421                                         min =          1
     Between = 0.0397                                         avg =        2.9
     Overall = 0.0001                                         max =          3


                                                  F(7, 35)          =       3.38
corr(u_i, Xb) = -0.7346                          Prob > F          =     0.0073

                                 (Std. err. adjusted for 36 clusters in company_id)
--------------------------------------------------------------------------------
               |               Robust
     delta_co2 | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
---------------+----------------------------------------------------------------
donation_ratio |   -.1174103   .1854806    -0.63   0.531     -.493956    .2591354
           roa |   -.0124569    .004328    -2.88   0.007    -.0212431   -.0036706
            pb |   -.0166929   .0071911    -2.32   0.026    -.0312916   -.0020941
  inddirectors |   -.0046191   .0139193    -0.33   0.742    -.0328767    .0236385
     debtasset |   -.0145624   .0100716    -1.45   0.157    -.0350089     .005884
```

```
              |
       period |
           2  |   .1471165   .1075812     1.37   0.180
-.0712849    .365518
           3  |   .0376184   .0994215     0.38   0.707
-.164218    .2394548
              |
        _cons |   1.019192   1.320839     0.77   0.446    -1.662254
3.700639
--------------+----------------------------------------------------------------
      sigma_u |  .35816715
      sigma_e |  .37724581
          rho |  .47407467   (fraction of variance due to u_i)
-------------------------------------------------------------------------------

. estimates store fe_balanced

. display "Balanced panel only - Donation coefficient: " %8.3f _b[donation_ratio]
Balanced panel only - Donation coefficient:   -0.117

.
. *******************************************************************************
. * ECONOMIC SIGNIFICANCE AND FULL PARTY SWITCH
. *******************************************************************************
.
. * Restore main FE model
. quietly estimates restore fe_simple

.
. display _newline(2)



.                                                                        display
"============================================================"
============================================================

. display "ECONOMIC SIGNIFICANCE: FULL PARTY SWITCH EFFECTS"
ECONOMIC SIGNIFICANCE: FULL PARTY SWITCH EFFECTS

.                                                                        display
"============================================================"
============================================================
```

```
.
. * Calculate effects
. local full_switch = `b_donation_fe' * 2

. local full_switch_se = `se_donation_fe' * 2

.
. * Get context
. quietly summarize delta_co2

. local mean_co2 = r(mean)

. local sd_co2 = r(sd)

. quietly summarize donation_ratio

. local sd_donation = r(sd)

.
. display "Full party switch (Republican -1 to Democrat +1):"
Full party switch (Republican -1 to Democrat +1):

. display "    Effect: " %8.1f `full_switch' " tons CO2"
   Effect:         -0.5 tons CO2

. display "    Standard error: " %8.1f `full_switch_se'
   Standard error:          0.4

. display "    95% CI: [" %8.1f (`full_switch' - 1.96*`full_switch_se') ///
>          ", " %8.1f (`full_switch' + 1.96*`full_switch_se') "]"
   95% CI: [       -1.3,          0.2]

. display ""


. display "Context:"
Context:

. display "    As % of mean CO2 change: " %6.1f (`full_switch' / `mean_co2' * 100) "%"
   As % of mean CO2 change: -1030.4%

. display "    In standard deviations: " %5.3f (`full_switch' / `sd_co2')
   In standard deviations: -1.390
```

```
. display ""


. display "One SD increase in donations (" %4.2f `sd_donation' "):"
One SD increase in donations (0.54):

. display "    Effect: " %8.1f (`b_donation_fe' * `sd_donation') " tons CO2"
    Effect:         -0.1 tons CO2

.
. * Clean up
. capture drop donation_X_* texas balanced

.
end of do-file
```