THE STOCK MARKET PRICING OF GREEN AND BROWN FIRMS

EVIDENCE FROM U.S. PRESIDENTIAL ELECTIONS

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Bachelor Thesis

Stockholm School of Economics

2026

The Stock Market Pricing of Green and Brown Firms: Evidence from U.S. Presidential Elections

Abstract:

This paper provides evidence that U.S. presidential elections generate systematic differences in cumulative abnormal returns between green and brown firms. Conducting an event study across the 2016, 2020, and 2024 elections, we find that Republican outcomes are associated with a relative outperformance of brown firms, while the 2020 Democratic outcome produces the reverse. This green-minus-brown return differential is consistent with investors repricing climate exposure in response to information shocks manifested by election outcomes. We find that the consistency of this pattern across the years varies depending on the choice of climate exposure proxy used for portfolio construction, while the magnitude of the repricing can potentially be attributed to the political context of each election.

Keywords:

ESG, green and brown stocks, event study, U.S. elections, climate policy, stock returns, political finance, climate finance

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Bachelor Thesis
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1. Introduction

Political polarization has intensified substantially over the past two decades, particularly in the United States. At the same time, climate change has become increasingly politicized, with Democratic and Republican candidates taking more distinct positions on climate-related topics. As such, political elections play a key role in shaping the expected regulatory environment central to how investors price assets. In this paper, we investigate whether U.S. presidential elections act as information shocks that systematically generate differential cumulative abnormal returns (CARs) between "green" and "brown" firms across election cycles.

The question is empirically interesting because the actual market reaction is unclear. On one hand, election outcomes may be partially or fully anticipated and therefore already priced in. Although the outcome is uncertain, investors might update their expectations before the election date based on available information from polls or other sources. In that case, the election outcome would provide little new information to the market and would not constitute a meaningful shock, resulting in limited abnormal returns. Alternatively, if climate policy effects are perceived as uncertain or delayed, they might altogether have a limited impact on asset prices. Furthermore, climate policy represents only one dimension of a much broader regulatory environment affected by elections. Investors may place greater weight on factors other than climate policy when updating expectations about firm valuation.

On the other hand, presidential elections may still create meaningful shifts in expectations if the outcome changes the perceived direction of future climate policy and is relevant to asset pricing. In that case, firms with different climate exposure may experience differing abnormal returns around the election date. Therefore, elections might result in significant abnormal returns for green and brown stocks, or no meaningful difference between them, making the empirical effect ambiguous. Finally, each election is characterized by its own political and economic context which makes it particularly interesting to analyze the results across elections in order to identify any systematic patterns.

We hypothesize that brown firms outperform green firms around the election day in Republican outcomes, and that the reaction reverses in Democratic outcomes. The underlying mechanism is that elections may induce changes in investor beliefs about the expected future policy. Thus, if climate policy exposure is material to firm valuation, firms' short-term abnormal returns should be affected accordingly.

Following the portfolio construction approach of Pástor et al. (2022), we examine these effects through the performance of green-minus-brown (GMB) portfolios across the 2016, 2020, and 2024 U.S. presidential elections. The GMB portfolio measures the relative performance of green and brown stocks. Additionally, we analyze whether this effect varies across different climate exposure proxies used to define the "greenness" of a firm. We classify firms as either green or brown based on rating agency scores and emissions-based metrics: LSEG ESG Score, MSCI Environmental Pillar Score, MSCI Adjusted ESG Score, Scope 1 Emissions Intensity, Industry Relative Scope 1 Emissions Intensity, and Scope 1 Emissions Intensity Shadow portfolios. We conduct event studies over a symmetric window of ± 10 trading days around each election date. For each classification criterion, we construct green and brown portfolios and compute CARs over the event window.

We face several empirical challenges when studying this question. First, investors may update their expectations before election day, making it difficult to isolate the exact timing and magnitude of the market reaction. Our event-study framework with a symmetric window around the election date allows us to capture both anticipation effects before the election

and price adjustments after the outcome is known. Second, presidential elections are not pure climate policy shocks, as election outcomes affect several policy dimensions at the same time. As a result, it is difficult to isolate the component of stock market reactions specifically driven by changes in climate policy expectations. We address this by covering a wide range of climate exposure proxies which helps to triangulate the relevant climate policy channel. Finally, the analysis is limited by data availability. Sustainability data coverage is narrower in earlier years, as fewer firms reported emissions and rating agencies covered fewer companies. In addition, only a small number of U.S. presidential elections take place in a period where climate policy is politically salient, which limits the time horizon of the analysis.

Our findings show that U.S. presidential elections act as information shocks that generate systematic differences in CARs between green and brown firms. Brown firms tend to outperform green firms following Republican election outcomes (2016 and 2024), while the pattern is reversed in the Democratic outcome (2020). These findings are relatively robust to alternative factor models, portfolio cutoffs, and event windows, although the effects are weaker in narrower windows and broader portfolio definitions.

The extent to which the effect is systematic across election outcomes also varies depending on the climate exposure proxy used to define the "greenness" of the assets. We discuss the possibility of this reflecting the differences between the measures and their relevance for asset pricing. Industry Relative Scope 1 Emissions Intensity and Scope 1 Emissions Intensity Shadow yield the strongest results across the three elections, while portfolios based on rating agency-scores are more mixed and inconclusive. The magnitude of the effect also varies across elections, which we attribute to three co-existing mechanisms reflecting the fundamental differences between the elections: (i) the degree of surprise associated with the election outcome, (ii) the level of political polarization, and (iii) investor attention to climate related risk.

The results suggest that climate exposure is reflected in asset prices around discrete political events, and that the choice of climate exposure measure is consequential for both the detection and interpretation of these effects. Measures that more closely align with the underlying regulatory mechanisms, such as industry-relative emissions, appear to capture election-driven repricing more effectively than broader sustainability proxies.

However, the results should be interpreted carefully and are not directly expandable beyond U.S. listed firms. The analysis is also limited to three presidential elections, each taking place in a distinct political and macroeconomic context. Moreover, elections affect several policy dimensions simultaneously, which makes it difficult to isolate a purely climate-specific channel. Data coverage is another constraint, particularly in earlier years.

Related Literature

Our paper contributes to three strands of literature. First, it relates to the political finance literature on stock market reactions to political events. Existing research shows that elections affect financial markets. Pantzalis et al. (2000) examine international stock market indices around election periods and find that national elections are associated with significant stock market reactions, consistent with the resolution of policy uncertainty. Similarly, Santa-Clara and Valkanov (2003) document a "presidential premium", showing that excess stock market returns vary systematically across U.S. presidencies. More closely related to our setting, Wolfers and Zitzewitz (2016) show that financial markets priced a significant "Trump discount" as election probabilities changed, while Wagner et al. (2018) show that firm-level stock market reactions to the 2016 election varied with firms' exposure to anticipated tax policy

changes. These studies show that elections are relevant asset-pricing events and that market reactions can vary across firms depending on how they are affected by anticipated policy changes. However, much of this literature focuses either on broad market-level reactions or on a single election cycle. We contribute by examining abnormal returns around three U.S. presidential elections within a common empirical framework, allowing us to compare short-term market reactions across multiple election outcomes.

Second, our paper contributes to the climate finance literature studying whether and how climate exposure is reflected in asset prices. Existing evidence remains mixed. Monasterolo and De Angelis (2020) find limited stock market reactions to the Paris Agreement among carbon-intensive sectors relative to low-carbon indices, suggesting that climate transition risk may not be fully incorporated into asset prices. In contrast, Ilhan et al. (2021) show that investors demand greater downside protection for carbon-intensive firms, while Bolton and Kacperczyk (2021) document a "carbon premium", where firms with higher carbon emissions earn higher expected returns. Relatedly, Pástor et al. (2022) construct a green-minus-brown (GMB) portfolio and show that green stocks outperform brown stocks when climate concerns unexpectedly increase. These papers show that climate exposure can affect asset prices, but they also point to the importance of how climate exposure is measured. We contribute by studying these different dimensions within the same election-based event-study framework, allowing us to examine how different forms of climate exposure are reflected in abnormal returns around political events.

Third, our paper is most closely related to literature at the intersection of climate finance and political finance, studying how financial markets respond to climate policy events and election outcomes. Diaz-Rainey et al. (2021) show that major climate policy announcements, including the 2016 election of Donald Trump, affected abnormal returns in U.S. oil and gas firms. Pham et al. (2023) find that environmentally friendly firms, defined by inclusion in a green economy index, react significantly to climate policy events, including the 2020 U.S. presidential election. Ramelli et al. (2021) examine the 2016 and 2020 U.S. elections and find that both carbon-intensive firms and firms with stronger climate responsibility experienced positive abnormal returns after the 2016 election, while carbon-intensive firms underperformed around the 2020 election. More recently, Comincioli and Donadelli (2026) study green and brown portfolio CARs around the 2024 U.S. presidential election and find that results differ across classification measures. These papers are closest to our research question, but existing evidence is often limited to specific elections, specific types of firms, or specific definitions of climate exposure. We contribute by providing a unified event-study analysis of GMB abnormal returns across the 2016, 2020, and 2024 U.S. presidential elections. Rather than treating climate exposure as a single firm characteristic, we examine several distinct dimensions of climate exposure, allowing us to study how different forms of climate exposure are reflected in stock prices around election-driven changes in expected policy.

Overall, the existing literature shows that political events affect financial markets, that climate exposure is relevant for asset prices, and that climate-related political events can generate heterogeneous stock market reactions across firms. Our paper connects these strands by studying whether GMB abnormal returns vary across U.S. presidential election outcomes and across different dimensions of climate exposure.

The paper is structured as follows. Section 2 reviews the institutional background. Section 3 covers the data. Section 4 describes empirical methodology. Section 5 presents the main results, and Section 6 provides robustness checks. Section 7 discusses the findings and their limitations, and Section 8 concludes.

2. Institutional Background

Political Polarization

As illustrated in Figure 1, political polarization in the United States has increased substantially over the past two decades. The trend started around 2008 and became more pronounced following the 2016 election. Similarly, climate change and environmental policy have become increasingly politically polarized in the United States. This polarization has intensified over recent decades, reflecting both a decline in pro-environmental attitudes among Republicans and a strengthening of environmental concern among Democrats (Smith et al., 2024). As a result, election outcomes are associated with increasingly distinct expectations regarding climate policy.

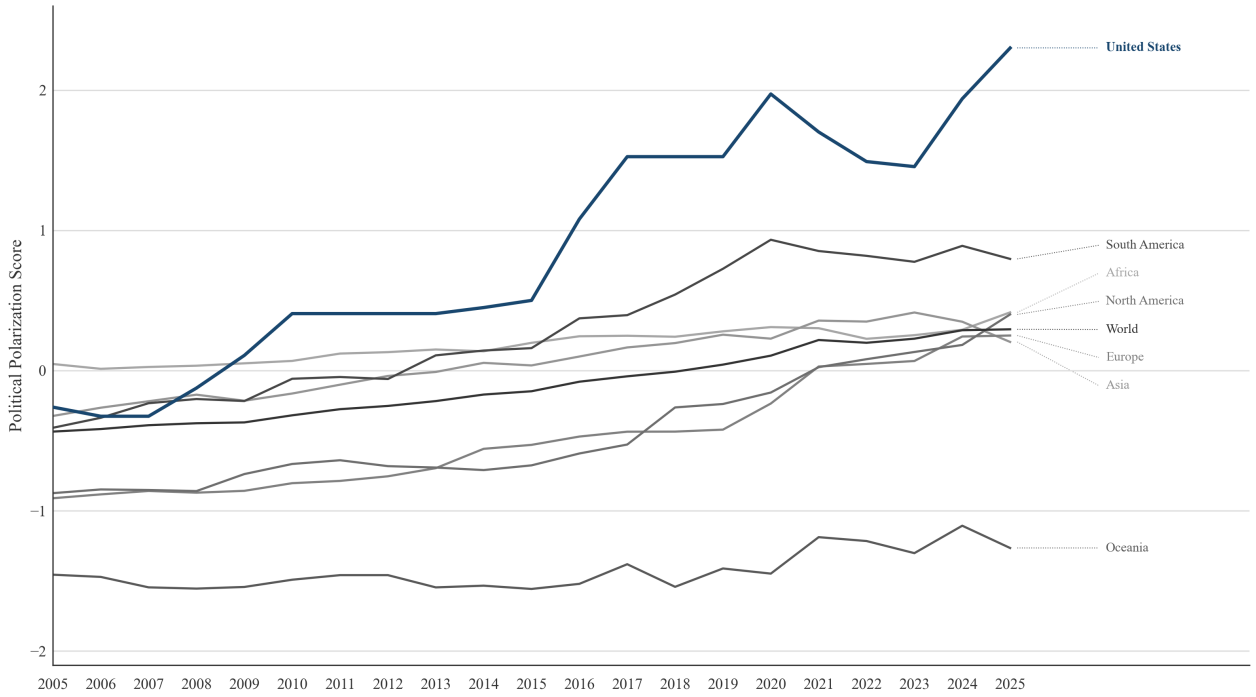


Figure 1. Political Polarization by Region. This figure plots political polarization scores across world regions from 2005 to 2025. Higher scores correspond to greater societal polarization, and a score of 0 represents the cross-country, cross-year average. The United States is highlighted separately to show its relative position compared with other regions. Source: Our World in Data (2026).

Paris Agreement and Carbon Legislation

The Paris Agreement is a legally binding international treaty on climate change adopted first in 2015 by 195 Parties. The goal is to limit global warming to "well below 2C above pre-industrial levels", striving to limit it to 1.5C (UNFCCC, 2015). Participating countries adopted climate action plans, Nationally Determined Contributions (NDCs), where they, amongst others, communicate actions and policy strategies they will take to reduce greenhouse gas emissions. These include carbon pricing mechanisms, such as carbon taxes and emissions trading systems, as well as regulatory standards and subsidies for low-carbon technologies. Climate policy therefore affects firms by changing expected compliance costs, for example.

While many of these policies apply broadly across the economy, their design is often struc-

tured at the sector or industry level. For example, emissions trading systems such as the EU Emissions Trading System (EU ETS) allocate emissions allowances based on sector-specific benchmarks, which define emissions intensity thresholds for different industries. Firms are therefore evaluated relative to their peers, with more carbon-intensive firms facing higher effective costs.

Recent Developments in the U.S.

The candidates made their stance on climate change clear before the election outcomes. While Hillary Clinton's 2016 campaign described climate change as "an urgent threat and a defining challenge of our time" (Hillary for America, 2016) and Joe Biden's 2020 campaign proposed a clean-energy transition with a target of net-zero emissions by 2050 (Joe Biden for President, 2019). In contrast, Donald Trump publicly questioned the validity and economic relevance of climate change (Cillizza, 2017). Consequently, election outcomes lead to changes in the expected regulatory landscape faced by firms relevant for asset pricing.

Recent U.S. election cycles illustrate how these differences translated into materially different climate-policy directions. Following the 2016 election, the Trump administration adopted a very clear stance on climate policy, which included the rollback of numerous environmental regulations and the formal withdrawal from the Paris Agreement, signaling a reduced federal emphasis on emissions reduction and climate-related oversight.

In contrast, the 2020 election marked a shift toward more expansive climate policy. Under the Biden administration, the United States rejoined the Paris Agreement, and the 2022 Inflation Reduction Act introduced extensive tax credits and subsidies for clean energy, alongside approximately USD 369 billion in climate-related spending. This represented a clear policy signal in favor of decarbonization, with direct implications for firms exposed to transition opportunities.

The 2024 election again signaled a reversal in regulatory direction. On his first day in office, January 20, 2025, President Trump signed an executive order to withdraw the United States from the Paris Agreement, fulfilling a campaign promise to exit the climate pact. Furthermore, in February 2026, the Trump administration overturned the 2009 endangerment finding, which had established greenhouse gases as a threat to public health and formed the legal basis for federal emissions regulation.

This shift highlights how election outcomes can lead to discrete and economically meaningful changes in the regulatory landscape faced by firms.

3. Data

In this section, we describe the data and sources used in the analysis. We first present the firm-level data used to construct the portfolios. We then describe the additional data used to estimate expected returns and conduct robustness checks.

3.1 Firm-level Data

Table 1. Descriptive Statistics of Portfolio Criteria

This table reports descriptive statistics for the firm-level variables used to construct green and brown portfolios. Statistics are reported separately for the 2016, 2020, and 2024 election years. N denotes the number of firms with a valid criterion value in the given year. The table reports the mean, standard deviation, minimum, 10th percentile, median, 90th percentile, and maximum of each variable. All statistics are computed using raw criterion values before applying any portfolio cutoff. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 Emissions Intensity Shadow row reports descriptive statistics for the universe of firms with reported (not estimated) Scope 1 emissions intensity values; it therefore represents a strict subset of the Scope 1 Emissions Intensity (Reported or Estimated) sample. The shadow portfolio criterion then compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of lower climate-related transparency.

Portfolio Metric	Year	N	Mean	Std	Min	P10	Median	P90	Max
LSEG ESG Score	2016	1069	41.070	19.655	0.852	18.302	37.943	70.286	93.030
	2020	2520	38.337	19.583	0.454	15.823	34.670	68.163	93.262
	2024	3274	41.798	19.983	3.357	16.727	39.621	70.601	92.940
MSCI Environmental Pillar Score	2016	2516	4.725	2.087	0.100	2.100	4.600	7.400	10.000
	2020	3549	4.560	2.106	0.100	1.800	4.400	7.100	10.000
	2024	2520	4.976	2.307	0.100	2.000	4.900	8.000	10.000
MSCI ESG Adjusted Score	2016	2486	4.203	1.837	0.100	1.800	4.100	6.700	10.000
	2020	3147	4.545	1.865	0.200	2.100	4.400	7.000	10.000
	2024	2547	5.269	1.985	0.200	2.600	5.300	8.000	10.000
Scope 1 Emissions Intensity (Reported or Estimated)	2016	751	133.297	537.856	0.014	0.981	10.035	271.239	6246.803
	2020	2418	138.961	619.535	0.001	1.092	7.963	223.846	11723.033
	2024	3092	93.621	417.967	0.000	0.536	6.065	122.163	7043.348
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	2016	751	1.000	1.570	0.000	0.089	0.661	1.962	17.991
	2020	2418	1.000	1.653	0.000	0.098	0.642	1.836	31.726
	2024	3092	1.000	3.126	0.000	0.056	0.513	1.730	108.183
Scope 1 Emissions Intensity Shadow	2016	223	1.424	2.259	0.000	0.000	0.264	5.371	9.361
	2020	675	1.727	2.632	0.000	0.000	0.323	6.219	9.887
	2024	1077	1.072	1.622	0.000	0.000	0.212	3.920	6.293

The stock universe consists of all U.S. listed stocks as of February 2026 obtained via London Stock Exchange Group (2026), a total of 9241 stocks.

To create the different portfolios and more specifically classify each firm as either green or brown we use a wide range of metrics. The rating agency scores used across our main analysis and robustness tests are the following: (i) the LSEG ESG Score, obtained from London Stock Exchange Group (2026), an industry relative measure ranging from 0 to 100 which evaluates firm performance across environmental, social, and governance (ESG) dimensions; (ii) the MSCI Adjusted ESG Score obtained from MSCI ESG Research (2026) and ranges from 0 to 10, an industry relative measure that accounts for ESG-related controversies in addition to

firms' ESG performance; and (iii) the MSCI Environmental Pillar (EP) Score, obtained from MSCI ESG Research (2026), which focuses specifically on firms' environmental performance and exposure to environmental risks. We also use two carbon intensity measures: (i) Scope 1 Emissions Intensity (Reported or Estimated) obtained from London Stock Exchange Group (2026), and (ii) a constructed Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) which is based on GICS industry code. The data for emissions intensity and agency scores is lagged and represents the information to which investors had access to at the election date.

Sample sizes vary across metrics and years, reflecting the broader trend towards mandatory and voluntary sustainability disclosure. Detailed distributional statistics are reported in Table 1.

3.2 Additional Data

Stock daily returns time series are sourced from CRSP using the Wharton Research Data Services (2026) database. Daily Fama-French factor return time series are obtained from the Wharton Research Data Services (2026) database and used to estimate expected portfolio returns in the estimation window. These factors include: the market excess return (MKT-RF), which captures the return of the broad market portfolio above the risk-free rate and reflects systematic market risk; the Small-Minus-Big factor (SMB), which represents the return spread between small- and large-capitalization firms and proxies for size risk; the High-Minus-Low factor (HML), which measures the return differential between high and low book-to-market firms and captures value risk; the Robust-Minus-Weak factor (RMW), which reflects the profitability premium earned by firms with strong versus weak operating profitability; the Conservative-Minus-Aggressive factor (CMA), which captures the investment premium by going long conservative and short aggressive investing firms; and the Up-Minus-Down momentum factor (UMD), which measures the return spread between recent winner and loser stocks. Portfolio weights are determined by firm-level market capitalisation, also sourced from CRSP via Wharton Research Data Services (2026).

4. Empirical Method

4.1 Event Study Methodology

Using the event study method we examine the asset price reaction of green, brown, and green-minus-brown (GMB) stock portfolios to the three most recent U.S. Presidential elections: November 8th 2016, November 3rd 2020, and November 5th 2024. We first estimate the expected portfolio returns in the absence of an election shock, which we subsequently use to calculate abnormal returns (ARs) as the difference between the actual and expected returns of each portfolio. By conducting our analysis on a portfolio level rather than on individual stocks, we reduce idiosyncratic noise and isolate systematic differences in returns related to climate exposure.

The choice of the benchmark model used to estimate expected returns plays an important role in the event study setup. We employ the Fama-French four-factor model (FF4) as our primary specification. It is a widely used benchmark in event studies, offering a specification that controls for the most common sources of cross-sectional return variation without over-

fitting. FF4 augments the standard three-factor model of Fama and French (1993) with the momentum factor of Carhart (1997), capturing the market excess return, the size premium (SMB), the value premium (HML), and the momentum premium (UMD).

To assess the sensitivity of our results to model choice, we re-estimate all CARs using the Fama-French five-factor model (FF5), which additionally controls for profitability (RMW) and investment (CMA), and an augmented FF5 with momentum (FF5+); results are reported in the Section 5 Robustness Checks.

The event study setup is illustrated in Figure 2. We define the event date t_0 as the election day itself. The estimation window spans from $t_0 - 250$ to $t_0 - 30$ trading days, yielding 221 trading days of data used to estimate the FF4 factor loadings. A 30 trading day gap is imposed between the end of the estimation window and the event date to limit spillover from the pre-election anticipation price movements.

The event window spans $[\tau_1, \tau_2] = [-10, +10]$ trading days around the election date, capturing both the immediate market reaction on the day of the result and the price movement two weeks before and after the election. This symmetric window is wide enough to capture delayed reactions arising while remaining narrow enough to minimize the risk of confounding events influencing the CARs.

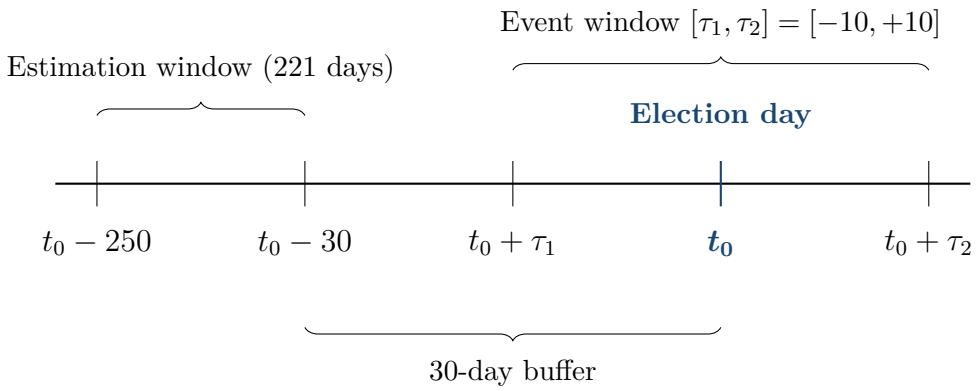


Figure 2. Event Study Timeline. This figure shows the timeline used in the event study analysis. Expected returns are estimated over the estimation window from $t_0 - 250$ to $t_0 - 30$, corresponding to 221 trading days. The 30-day gap between the estimation window and the event window is included to limit contamination from anticipation effects before the election. The event window covers the period from 10 trading days before to 10 trading days after election day, defined as $[\tau_1, \tau_2] = [-10, +10]$ with $t_0 = 0$ representing the election date.

4.1.1 Event Study Assumptions

The interpretation of the event-study results relies on several assumptions. First, the FF4 model estimated over the pre-event estimation window must provide an appropriate benchmark for normal portfolio returns in the absence of the election event. Second, the estimation window should not be contaminated by election-related price movements. We therefore end the estimation window 30 trading days before the election date to reduce the influence of pre-election anticipation on the estimated factor loadings. Third, the event window must capture the relevant market reaction to the election outcome. Since investors may update expectations before election day and prices may continue to adjust after the outcome is known, we use a symmetric event window around the election date. Fourth, portfolio classifications and weights must be predetermined relative to the event. We therefore construct the green and brown portfolios using information available before each election. Finally, the interpretation

of the GMB CARs assumes that no other contemporaneous shocks systematically drive the relative abnormal returns of green and brown portfolios during the event window. While this assumption cannot be fully verified, the short event window helps limit the influence of unrelated events.

4.1.2 Abnormal Return Estimation

We begin by computing the excess returns of each portfolio i in the estimation window:

$$R^e_{i,t} = R_{i,t} - R_{f,t} \tag{1}$$

We then run the FF4 regression using these excess returns:

$$R^e_{i,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + s_i\, SMB_t + h_i\, HML_t + u_i\, UMD_t + \varepsilon_{i,t} \tag{2}$$

Using the estimated model parameters from the estimation window, we calculate the expected excess returns in the event window:

$$NR_{i,t} = \widehat{\alpha}_i + \widehat{\beta}_i(R_{m,t} - R_{f,t}) + \widehat{s}_i\, SMB_t + \widehat{h}_i\, HML_t + \widehat{u}_i\, UMD_t \tag{3}$$

The abnormal return for portfolio i at time t is then obtained as the difference between the realized excess return and the expected excess return:

$$AR_{i,t} = R^e_{i,t} - NR_{i,t} \tag{4}$$

Finally, by summing the abnormal returns over the event window $[\tau_1, \tau_2]$, we obtain the cumulative abnormal return (CAR):

$$CAR_i(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_{i,t} \tag{5}$$

4.1.3 Statistical Inference

To assess whether the cumulative abnormal returns are statistically distinguishable from zero, we employ the CAR t-test. The test is grounded in the estimation-window standard deviation of abnormal returns, which serves as the benchmark for normal return variation:

$$\hat{S}_i = \sqrt{\frac{1}{M-K} \sum_{t \in \text{est.}} AR^2_{i,t}} \tag{6}$$

where M is the length of the estimation window and $K = 5$ is the number of estimated parameters in the FF4 model. The CAR t-test statistic is then given by:

$$t_{CAR_i} = \frac{CAR_i(\tau_1, \tau_2)}{\sqrt{L} \cdot \hat{S}_i} \sim t_{M-K} \tag{7}$$

The denominator scales by $\sqrt{L}$, where $L = \tau_2 - \tau_1 + 1$ is the event window length, reflecting that the variance of the summed abnormal returns grows linearly with the number of observations. The null hypothesis $H_0 : \text{CAR}_i = 0$ is tested against the two-sided alternative hypothesis $H_1 : \text{CAR}_i \neq 0$, with rejection indicating a statistically significant cumulative price reaction to the election event.

4.1.4 HAC Standard Errors

A key assumption underlying the standard CAR t-test is that the abnormal returns $AR_{i,t}$ are independently and identically distributed (i.i.d.), such that the estimation-window variance $\hat{S}_i$ provides an unbiased benchmark for normal return variation. Specifically, we find evidence of both serial autocorrelation and conditional heteroskedasticity in the residuals of certain portfolios. Test results for years 2016, 2020 and 2024 can be found in Appendix B (Table B.1, Table B.2, and Table B.3, respectively).

While we retain OLS to estimate the FF4 factor loadings in equation (2) , we depart from the conventional approach when computing the estimation-window variance of abnormal returns. Rather than treating the squared residuals as i.i.d. draws, we employ a Heteroskedasticity and Autocorrelation Consistent (HAC) variance estimator to construct $\hat{S}_i$. This ensures that the denominator of the CAR t-statistic properly accounts for any serial dependence and non-constant variance in the $AR_{i,t}$ series, yielding a more reliable inference.

4.2 Portfolio Construction Methodology

Emission Intensity and Agency Score Based Portfolios

For each of the three elections, we construct separate green, brown, and GMB portfolios. Portfolios are constructed independently for each election based on the firm-level characteristics in the period leading up to each event. This keeps the portfolios aligned with the information available at each election date.

We employ five greenness metrics spanning two broad categories: emissions intensity and rating agency scores. The emissions-based metrics include Scope 1 Emissions Intensity and Industry Relative Scope 1 Emissions Intensity. The agency score based metrics include LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI Adjusted ESG Score. For the industry-relative metrics, firms are ranked against peers within their own industry, whereas for the absolute metrics, firms are ranked across the full sample universe.

For each metric, we sort all firms in the sample universe and assign the top 10% with the lowest emissions intensity or highest agency scores to the green portfolio, and the bottom 10% with the highest emissions intensity or lowest agency scores to the brown portfolio. The GMB portfolio is then constructed by longing the green portfolio and shorting the brown portfolio, capturing the differential return between the two portfolios.

All portfolios are value-weighted, with weights determined by market capitalization of the stocks measured at the end of the estimation window. Formally, the weight of firm j in portfolio p is:

$$w_{j,p} = \frac{MktCap_{j,T_w}}{\sum_{k \in p} MktCap_{k,T_w}} \tag{8}$$

where T_w denotes the weighing date. Brown firms receive negative weights in the GMB portfolio, so that the portfolio return is:

$$R_{GMB,t} = \sum_{j \in \mathcal{G}} w_j R_{j,t} - \sum_{j \in \mathcal{B}} w_j R_{j,t} \tag{9}$$

Value-weighting the portfolios ensures that they reflect the economic significance of each firm and that we mitigate the influence of small and illiquid stocks that may otherwise introduce idiosyncratic noise.

Shadow Emissions Portfolios

A key challenge in constructing green and brown portfolios based on emissions data is that not all firms report their emissions directly. Firms that do not report are typically assigned estimated values by data providers, which introduces measurement error and potential selection bias, as non-reporting firms may systematically differ from reporting firms in ways that confound the analysis. To address this, we construct a separate Shadow Emissions portfolio that exploits the reporting status of firms to define the green and brown groups in a different way.

The green portfolio consists exclusively of firms that have reported their Scope 1 emissions and fall within the bottom 10% of the emissions intensity distribution among all reporting firms. This ensures that green firms are genuinely low-emitting companies whose environmental performance is directly observable, rather than inferred from model-based estimates.

The brown portfolio is constructed via a matched sampling procedure. We identify a set of shadow firms, those whose emissions are not directly reported. For each green firm, we find the closest match among the shadow pool using a two-step matching procedure. First, we restrict candidates to firms operating within the same GICS Industry Group, ensuring that matched pairs are economically comparable. Second, among industry peers, we select the shadow firm with the closest log market capitalization to the green firm, subject to a caliper of 0.7 log points to prevent poor-quality matches. Each shadow firm can be matched to at most one green firm, ensuring that the brown portfolio has no repeated observations.

Formally, for each green firm g, the matched shadow firm $b^*(g)$ is chosen as:

$$b^*(g) = \underset{b \in \mathcal{S}(g)}{\arg\min} \, |\log MktCap_b - \log MktCap_g| \tag{10}$$

where $\mathcal{S}(g)$ denotes the set of available unmatched shadow firms in the same GICS Industry Group as g, subject to:

$$|\log MktCap_b - \log MktCap_g| \leq 0.7 \tag{11}$$

If no industry match is available within the caliper, the procedure falls back to the full shadow pool to find the match outside the firm industry. Market capitalisation is measured at the end of the estimation window, consistent with the weighting date used across all portfolio specifications. This construction yields a green portfolio of low-emitting, transparent firms and a brown portfolio of size- and industry-matched firms whose emissions are omitted, allowing the GMB portfolio performance to capture the market's differential valuation of emissions transparency rather than simply emissions levels.

Portfolio Descriptive Statistics

Full descriptive statistics for all portfolios are reported in Appendix A. Tables A.1, A.2, and A.3 report the number of constituent stocks, mean and standard deviation of the criterion variable, value-weighted mean market capitalisation, and summary return statistics for the green, brown, and GMB portfolios across the 2016, 2020, and 2024 elections respectively. Factor loadings estimated over the estimation window are provided in Tables A.4, A.5, and A.6. Finally, Tables A.7, A.8, and A.9 report the pairwise return correlations and annualised standard deviations for all portfolio series across the 2016, 2020, and 2024 elections respectively.

5. Empirical Results

This section presents the main results from the event studies conducted around the U.S. presidential elections of 2016, 2020, and 2024. We report cumulative abnormal returns (CARs) estimated using the Fama-French four-factor model with value weighting, over the [-10, +10] event window centered on each election date. Results are organized by climate exposure proxy. For each measure, we examine the sign and magnitude of the green, brown and green-minus-brown (GMB) portfolio CARs. The full set of point estimates and t-statistics is reported in Table 2.

5.1 Rating Agency Scores

LSEG ESG Score

Figure 3 plots the CAR dynamics for portfolios constructed using the LSEG ESG Score across the three election windows. The results differ substantially across years.

In 2016, the LSEG-based portfolios show a modest divergence between brown and green firms. The brown portfolio has a positive CAR of 0.59% ($t = 1.01$), while the green portfolio declines to -0.56% ($t = -2.72$, significant at the 1% level). This yields a negative GMB CAR of -1.16% ($t = -1.77$, significant at the 10% level). Although the direction indicates brown-firm outperformance relative to green firms, the economic magnitude is limited and the statistical significance is weak. The separation between the portfolios begins slightly before election day and continues after the election, but remains moderate compared with 2024.

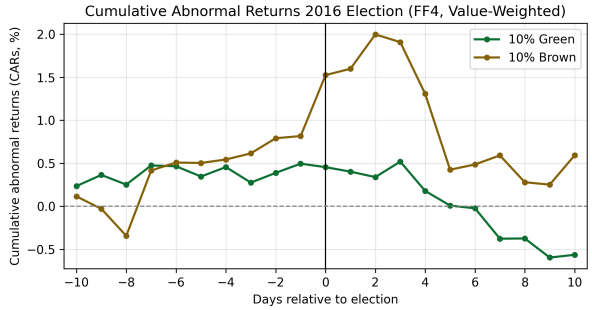
The 2020 election does not display a comparable difference in CARs. Both portfolios decline over the event window, with the green portfolio reaching -0.62% ($t = -2.07$, significant at the 5% level) and the brown portfolio reaching -0.36% ($t = -0.28$). Since the two portfolios move in the same direction and remain close in magnitude, the GMB CAR is close to zero at -0.16% ($t = -0.12$). The GMB series also fluctuates around zero for much of the event window, suggesting that the LSEG ESG Score does not identify a meaningful difference in abnormal returns between green and brown firms in 2020.

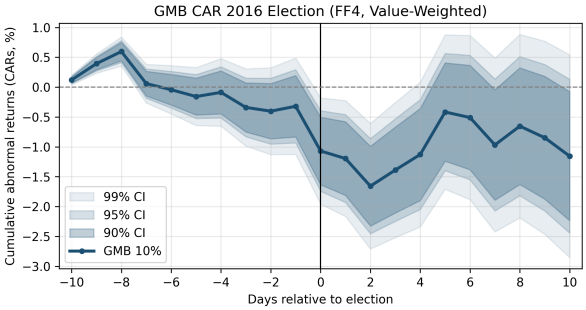
The 2024 election shows a much sharper divergence. The brown portfolio rises strongly after the election and reaches a CAR of 4.10% ($t = 3.95$, significant at the 1% level), while the green portfolio declines to -2.15% ($t = -11.00$, significant at the 1% level). The resulting GMB CAR is therefore large and negative, at -6.25% ($t = -5.65$, significant at the 1%

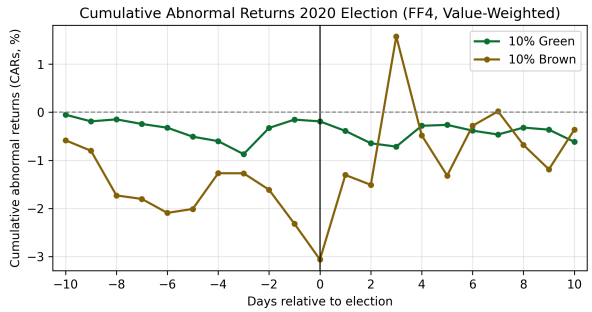
Table 2. CARs Across U.S. Elections (FF4, Value-Weighted)

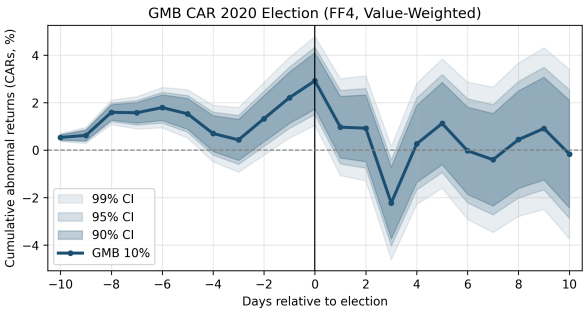
This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-10, +10]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF4 model, and portfolios are value-weighted. The FF4 model includes the market excess return, size, value, and momentum factors: MKT-RF, SMB, HML, and UMD. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

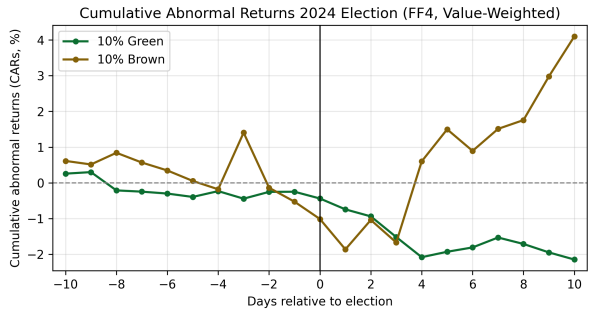
		2016	2020	2024
Portfolio	Mode	[-10,+10]	[-10,+10]	[-10,+10]
LSEG ESG Score 10%	GMB	$-1.16\%^{*}$ (-1.77)	-0.16% (-0.12)	$-6.25\%^{***}$ (-5.65)
	Green	$-0.56\%^{***}$ (-2.72)	$-0.62\%^{**}$ (-2.07)	$-2.15\%^{***}$ (-11.00)
	Brown	0.59% (1.01)	-0.36% (-0.28)	$4.10\%^{***}$ (3.95)
MSCI Environmental Pillar Score 10%	GMB	-0.42% (-1.07)	0.38% (0.55)	$2.63\%^{***}$ (4.05)
	Green	$-1.24\%^{***}$ (-7.05)	$-1.17\%^{***}$ (-3.63)	$2.16\%^{***}$ (6.41)
	Brown	$-0.83\%^{**}$ (-2.44)	$-1.45\%^{**}$ (-2.37)	-0.47% (-0.89)
MSCI ESG Adjusted Score 10%	GMB	$-1.85\%^{***}$ (-2.94)	-1.20% (-1.33)	0.61% (0.37)
	Green	$-1.42\%^{***}$ (-4.55)	$-2.08\%^{***}$ (-5.50)	$-2.23\%^{***}$ (-4.74)
	Brown	0.43% (1.00)	-0.79% (-0.98)	$-2.84\%^{*}$ (-1.90)
Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	1.68% (1.48)	0.37% (0.30)	-0.05% (-0.05)
	Green	0.19% (0.38)	0.18% (0.30)	$-0.99\%^{**}$ (-2.50)
	Brown	$-1.48\%^{*}$ (-1.92)	-0.10% (-0.12)	-0.94% (-1.45)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	$-1.79\%^{**}$ (-2.45)	$3.46\%^{***}$ (3.20)	$-5.23\%^{***}$ (-4.69)
	Green	$-1.29\%^{**}$ (-1.98)	$1.98\%^{***}$ (2.84)	$-3.80\%^{***}$ (-5.09)
	Brown	0.49% (1.28)	$-1.39\%^{*}$ (-1.79)	$1.43\%^{***}$ (2.68)
Scope 1 Emissions Intensity Shadow 10%	GMB	$-1.89\%^{***}$ (-2.59)	$2.06\%^{*}$ (1.68)	$-9.21\%^{***}$ (-8.36)
	Green	-0.61% (-0.87)	0.55% (0.69)	-1.27% (-1.60)
	Brown	$1.27\%^{***}$ (3.01)	$-1.42\%^{*}$ (-1.81)	$7.94\%^{***}$ (10.10)

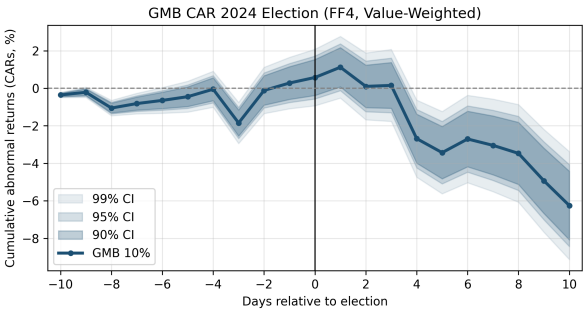












(a) Green and Brown Portfolio CARs **(b)** Green Minus Brown Portfolio CARs

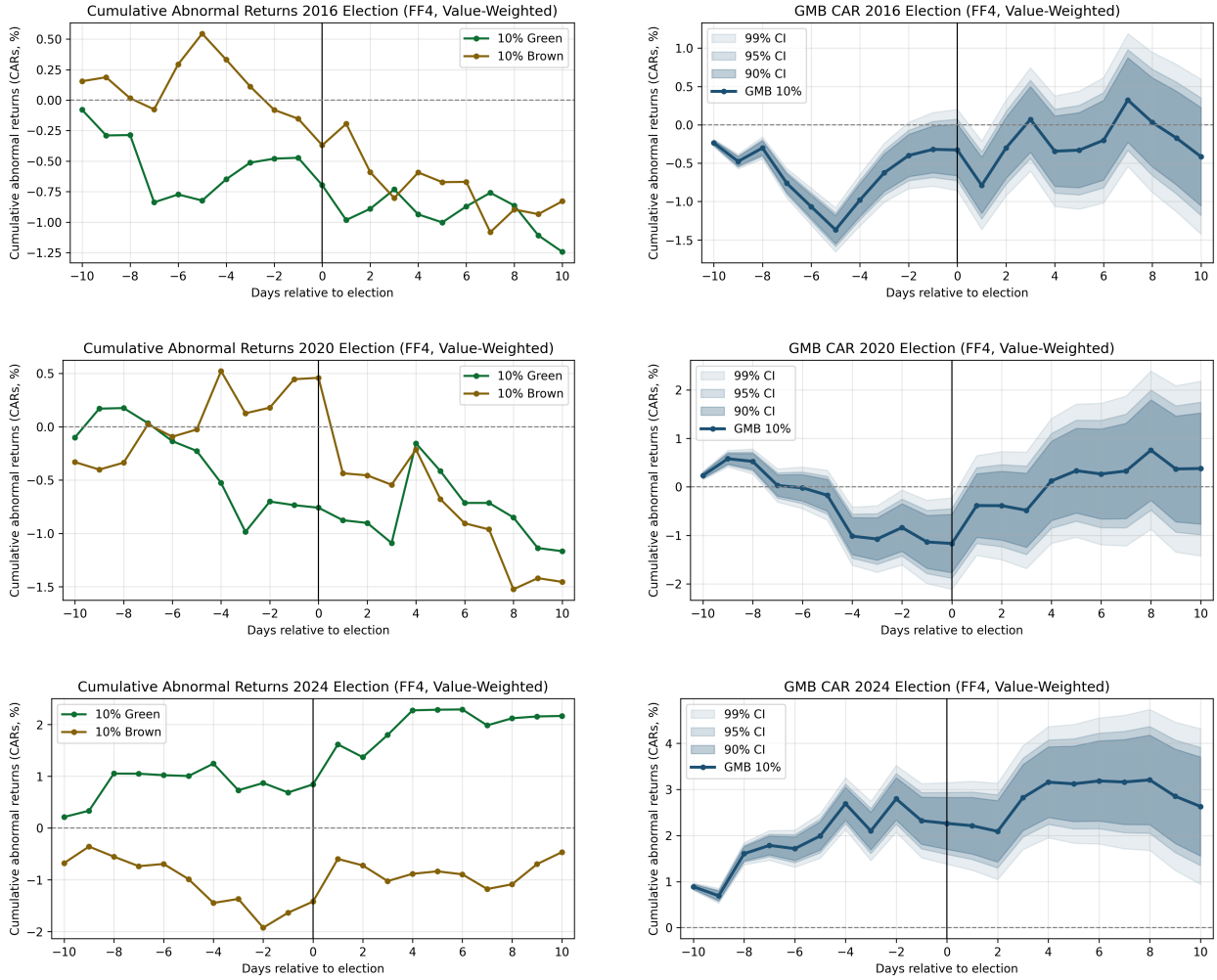
Figure 3. CARs Around U.S. Presidential Elections: LSEG ESG Score. This figure plots cumulative abnormal returns (CARs) for portfolios constructed using the LSEG ESG Score around the 2016, 2020, and 2024 U.S. presidential elections. The LSEG ESG Score is a broad ESG rating intended to capture firms' overall environmental, social, and governance performance. The event window covers $[-10, +10]$ trading days around election day, with $t_0 = 0$ denoting the election date. Expected returns are estimated using the Fama-French four-factor model (FF4), and portfolios are value-weighted. Panel (a) shows CARs for the green and brown portfolios separately. Green portfolios include firms in the top 10% of the LSEG ESG Score distribution in the relevant election year, while brown portfolios include firms in the bottom 10%. Panel (b) shows the green-minus-brown (GMB) portfolio CAR, calculated as the green portfolio CAR minus the brown portfolio CAR. The shaded areas around the GMB series show 90%, 95%, and 99% confidence intervals. The vertical line indicates election day and the horizontal dashed line indicates zero cumulative abnormal returns.

level). Unlike in 2016, the effect is both economically large and statistically strong. The post-election decline in the GMB CAR reflects a clear widening of the gap between the rising brown portfolio and the declining green portfolio.

Overall, the LSEG ESG Score provides mixed evidence across election cycles. The GMB CAR is negative in both 2016 and 2024, but the 2016 estimate is modest and only weakly significant, while the 2024 estimate is large and highly significant. The 2020 estimate is close to zero and statistically insignificant. Thus, the LSEG ESG Score captures a clear green-brown divergence in 2024, weaker evidence of divergence in 2016, and no meaningful divergence in 2020.

MSCI Environmental Pillar (EP) Score

Figure 4 reports the corresponding CAR paths for portfolios constructed using the MSCI Environmental Pillar (EP) Score. Compared with the LSEG ESG Score, the MSCI EP Score produces less consistent GMB results across years.



(a) Green and Brown Portfolio CARs **(b)** Green Minus Brown Portfolio CARs

Figure 4. CARs Around U.S. Presidential Elections: MSCI Environmental Pillar Score. This figure plots cumulative abnormal returns (CARs) for portfolios constructed using the MSCI Environmental Pillar (EP) Score around the 2016, 2020, and 2024 U.S. presidential elections. The MSCI EP Score measures firms' environmental performance, including exposure to and management of environmental risks and opportunities. The event window covers $[-10, +10]$ trading days around election day, with $t_0 = 0$ denoting the election date. Expected returns are estimated using the Fama-French four-factor model (FF4), and portfolios are value-weighted. Panel (a) shows CARs for the green and brown portfolios separately. Green portfolios include firms in the top 10% of the MSCI Environmental Pillar Score distribution in the relevant election year, while brown portfolios include firms in the bottom 10%. Panel (b) shows the green-minus-brown (GMB) portfolio CAR, calculated as the green portfolio CAR minus the brown portfolio CAR. The shaded areas around the GMB series show 90%, 95%, and 99% confidence intervals. The vertical line indicates election day and the horizontal dashed line indicates zero cumulative abnormal returns.

In 2016, the MSCI Environmental Pillar Score shows only limited green-brown divergence. Both portfolios decline over the event window, although the green portfolio falls somewhat more sharply than the brown portfolio. The brown portfolio reaches a CAR of -0.83% ($t = -2.44$), while the green portfolio declines to -1.24% ($t = -7.05$, significant at the 1% level). This yields a negative GMB CAR of -0.42% ($t = -1.07$). Although the direction

indicates weaker performance for green firms relative to brown firms, the magnitude is small and the GMB estimate is not statistically significant.

The 2020 election also shows weak relative performance differences. The brown portfolio declines to -1.45% ($t = -2.37$, significant at the 5% level), while the green portfolio falls to -1.17% ($t = -3.63$, significant at the 1% level). Since both portfolios move in the same direction and their final CARs remain relatively close, the GMB CAR is only 0.38% ($t = 0.55$). The positive direction differs from 2016, but the estimate is economically small and statistically insignificant. This indicates that the MSCI EP Score does not capture a meaningful green-brown spread in 2020.

The clearest result appears in 2024, but it moves in the opposite direction from the 2016 estimate. The brown portfolio remains slightly negative, with a CAR of -0.47% ($t = -0.89$), while the green portfolio increases substantially to 2.16% ($t = 6.41$, significant at the 1% level). This gives a positive GMB CAR of 2.63% ($t = 4.05$, significant at the 1% level). The 2024 result is therefore both economically meaningful and statistically strong, but it is not consistent with the negative GMB CAR observed in 2016.

Overall, the MSCI EP Score does not produce a systematic green-brown pattern across the three election cycles. The GMB CAR is negative in 2016, small and positive in 2020, and strongly positive in 2024. Only the 2024 GMB estimate is statistically significant, and the results do not show a clear reversal between Democratic and Republican election outcomes.

MSCI Adjusted ESG Score

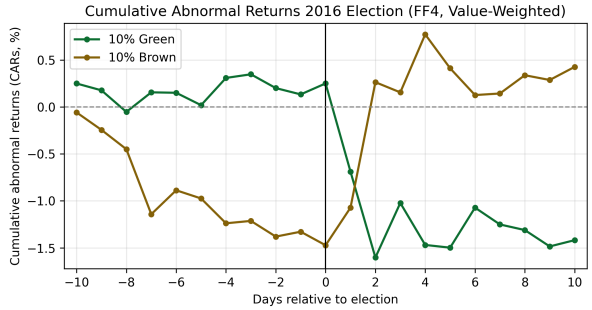
Figure 5 plots the CAR dynamics for portfolios constructed using the MSCI ESG Adjusted Score across the three election windows.

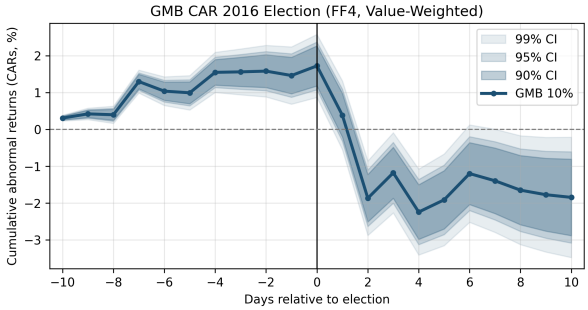
In 2016, the MSCI ESG Adjusted Score gives a clear negative GMB result. The brown portfolio records a small positive CAR of 0.43% ($t = 1.00$), while the green portfolio declines more sharply to -1.42% ($t = -4.55$, significant at the 1% level). This yields a GMB CAR of -1.85% ($t = -2.94$, significant at the 1% level). The result is therefore both economically meaningful and statistically significant. The divergence is mainly driven by the sharp post-election decline in the green portfolio, while the brown portfolio recovers after election day.

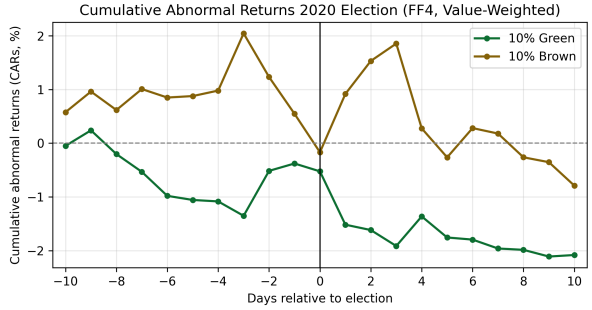
The 2020 election points in the same direction, but the evidence is weaker. The green portfolio again underperforms the brown portfolio, falling to -2.08% ($t = -5.50$, significant at the 1% level), while the brown portfolio reaches -0.79% ($t = -0.98$). This results in a negative GMB CAR of -1.20% ($t = -1.33$). Although the magnitude is not negligible, the estimate is not statistically significant, meaning that the relative performance is not statistically distinguishable from zero.

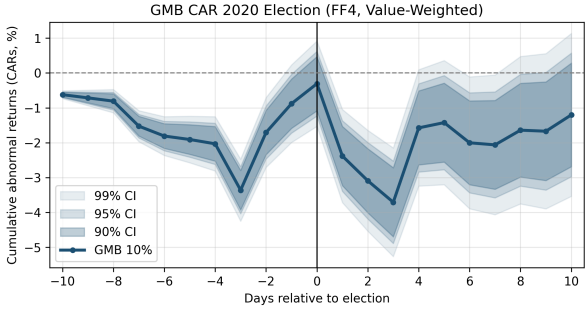
In 2024, the GMB estimate changes direction. Both portfolios decline over the event window, but the brown portfolio falls somewhat more than the green portfolio. The brown portfolio reaches -2.84% ($t = -1.90$, significant at the 10% level), compared with -2.23% for the green portfolio ($t = -4.74$, significant at the 1% level). This leaves the GMB portfolio with a small positive CAR of 0.61% ($t = 0.37$). The estimate is economically modest and statistically insignificant, indicating no clear green-brown divergence in this election window.

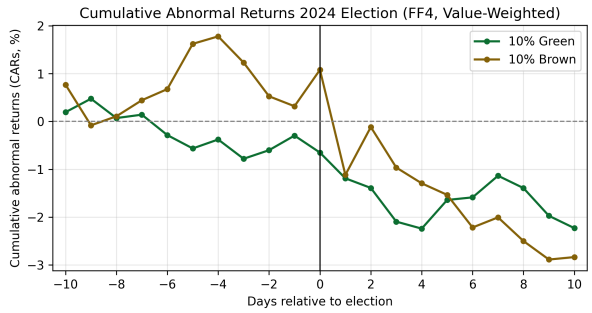
The MSCI ESG Adjusted Score provides mixed evidence. The 2016 result shows a clear and statistically significant negative GMB CAR, while the 2020 result points in the same direction but lacks statistical significance. In 2024, the GMB CAR turns positive, but remains small and insignificant. Thus, the MSCI ESG Adjusted Score captures a meaningful green-brown divergence only in 2016.

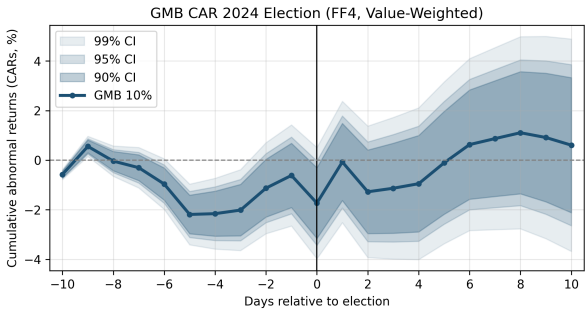












(a) Green and Brown Portfolio CARs **(b)** Green Minus Brown Portfolio CARs

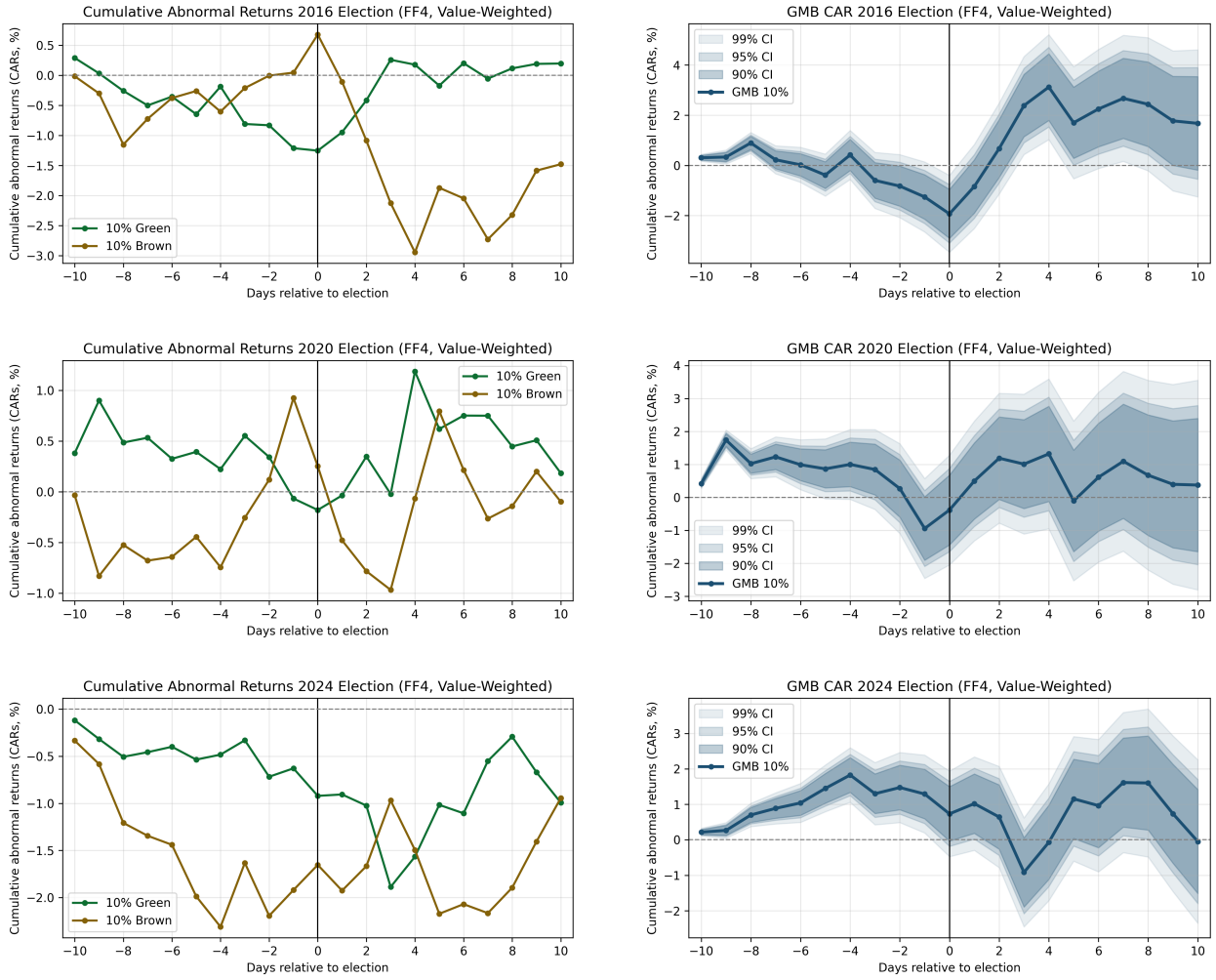
Figure 5. CARs Around U.S. Presidential Elections: MSCI ESG Adjusted Score. This figure plots cumulative abnormal returns (CARs) for portfolios constructed using the MSCI ESG Adjusted Score around the 2016, 2020, and 2024 U.S. presidential elections. The MSCI ESG Adjusted Score is a broad ESG rating that reflects firms' overall ESG performance after adjustments applied by MSCI. The event window covers $[-10, +10]$ trading days around election day, with $t_0 = 0$ denoting the election date. Expected returns are estimated using the Fama-French four-factor model (FF4), and portfolios are value-weighted. Panel (a) shows CARs for the green and brown portfolios separately. Green portfolios include firms in the top 10% of the MSCI ESG Adjusted Score distribution in the relevant election year, while brown portfolios include firms in the bottom 10%. Panel (b) shows the green-minus-brown (GMB) portfolio CAR, calculated as the green portfolio CAR minus the brown portfolio CAR. The shaded areas around the GMB series show 90%, 95%, and 99% confidence intervals. The vertical line indicates election day and the horizontal dashed line indicates zero cumulative abnormal returns.

Overall, the three rating agency-based measures provide mixed evidence. Within each measure, the GMB estimates do not follow a stable pattern across all three election cycles. However, a common feature is that all three measures produce negative GMB CARs in 2016, although the strength of the evidence differs across metrics. The 2020 and 2024 results are more mixed: the GMB estimates differ in both direction and statistical significance across the three rating agency scores. Thus, while the rating agency-based measures show some commonality in 2016, they do not produce a consistent green-brown pattern across the full sample of election windows. We turn next to emissions-based measures.

5.2 Emissions Metrics

Scope 1 Emissions Intensity (Reported or Estimated)

Figure 6 presents the CAR developments for portfolios constructed using Scope 1 Emissions Intensity, based on reported or estimated emissions data. Overall, this measure produces weak GMB results across the three election windows. The GMB CARs are small relative to the confidence intervals and none of the estimates are statistically significant.



(a) Green and Brown Portfolio CARs **(b)** Green Minus Brown Portfolio CARs

Figure 6. CARs Around U.S. Presidential Elections: Scope 1 Emissions Intensity. This figure plots cumulative abnormal returns (CARs) for portfolios constructed using Scope 1 emissions intensity around the 2016, 2020, and 2024 U.S. presidential elections. Scope 1 emissions intensity measures firms' direct greenhouse gas emissions from owned or controlled operations, scaled by firm activity. Scope 1 emissions intensity includes both reported and estimated emissions values, depending on data availability. The event window covers $[-10, +10]$ trading days around election day, with $t_0 = 0$ denoting the election date. Expected returns are estimated using the Fama-French four-factor model (FF4), and portfolios are value-weighted. Panel (a) shows CARs for the green and brown portfolios separately. Green portfolios include firms in the bottom 10% of the Scope 1 emissions intensity distribution in the relevant election year, while brown portfolios include firms in the top 10%. Panel (b) shows the green-minus-brown (GMB) portfolio CAR, calculated as the green portfolio CAR minus the brown portfolio CAR. The shaded areas around the GMB series show 90%, 95%, and 99% confidence intervals. The vertical line indicates election day and the horizontal dashed line indicates zero cumulative abnormal returns.

In 2016, the brown portfolio declines over the event window and ends with a CAR of −1.48% ($t = -1.92$, significant at the 10% level). In contrast, the green portfolio remains close to zero, ending at 0.19% ($t = 0.38$). This gives a positive GMB CAR of 1.68% ($t = 1.48$). Although the magnitude is larger than in the later election windows, the estimate is not statistically significant. The time-series pattern also shows a post-election reversal, with the brown portfolio falling and the green portfolio improving after election day. However, this movement does not translate into a statistically reliable GMB effect.

The 2020 election window shows even weaker differences between the two portfolios. The brown portfolio ends close to zero at −0.10% ($t = -0.12$), while the green portfolio ends slightly positive at 0.18% ($t = 0.30$). The resulting GMB CAR is therefore small and positive, at 0.37% ($t = 0.30$). Both the magnitude and statistical significance indicate that there is no meaningful green-brown divergence in this election window.

In 2024, both portfolios end the event window with negative CARs of similar magnitude. The brown portfolio reaches −0.94% ($t = -1.45$), while the green portfolio ends at −0.99% ($t = -2.50$, significant at the 5% level). As a result, the GMB CAR is close to zero, at −0.05% ($t = -0.05$). The event-time development shows a short-lived post-election separation, with the brown portfolio increasing and the green portfolio declining immediately after the election. However, this divergence does not persist through the full event window, leaving the final GMB estimate economically negligible and statistically insignificant.

Taken together, portfolios constructed using Scope 1 Emissions Intensity do not produce a consistent or statistically significant GMB pattern across election years. While some individual portfolio CARs are statistically significant, especially the brown portfolio in 2016 and the green portfolio in 2024, the relative performance between green and brown firms remains weak. The GMB estimates are positive in 2016 and 2020, slightly negative in 2024, and statistically insignificant in all three cases. This suggests that the broad Scope 1 intensity measure does not capture a stable green-brown return differential around the election windows.

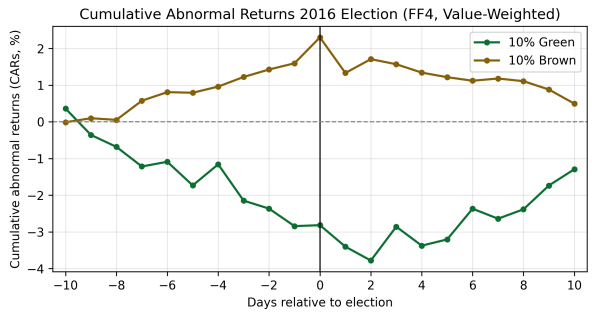
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)

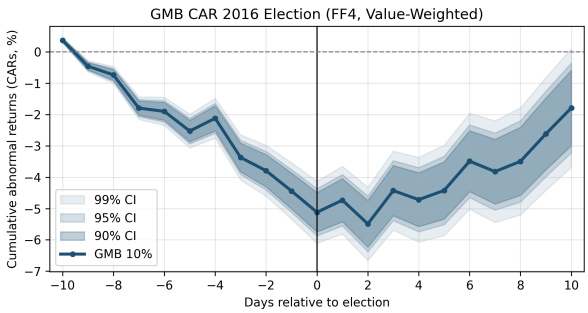
Figure 7 presents the CAR dynamics for portfolios constructed using Industry Relative Scope 1 Emissions Intensity, based on reported or estimated emissions data. In contrast to the absolute Scope 1 measure, the industry-relative measure produces a clearer GMB pattern across the three election windows.

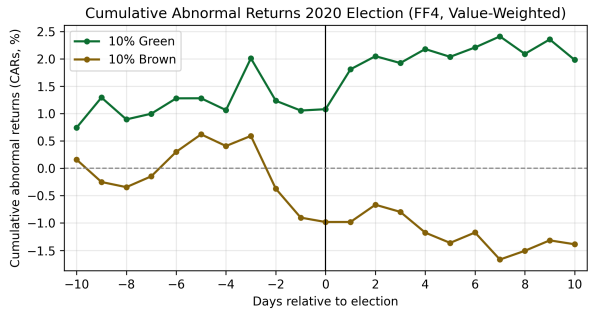
In 2016, the industry-relative measure shows a clear green-brown divergence. The brown portfolio remains positive, reaching a CAR of 0.49% ($t = 1.28$), while the green portfolio declines to −1.29% ($t = -1.98$, significant at the 5% level). This results in a negative GMB CAR of −1.79% ($t = -2.45$, significant at the 5% level). Unlike the absolute Scope 1 measure, the 2016 estimate is therefore both economically meaningful and statistically significant. The result is driven by the green portfolio falling while the brown portfolio remains above zero.

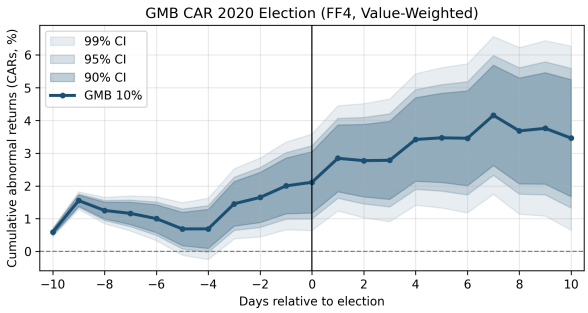
The 2020 election moves in the opposite direction. The brown portfolio declines to −1.39% ($t = -1.79$, significant at the 10% level), while the green portfolio increases to 1.98% ($t = 2.84$, significant at the 1% level). This produces a positive GMB CAR of 3.46% ($t = 3.20$, significant at the 1% level). The estimate is both economically large and statistically strong, indicating a clear reversal relative to 2016. The event-time pattern also shows this reversal, with the GMB CAR remaining positive after the election as the green portfolio outperforms the brown portfolio.

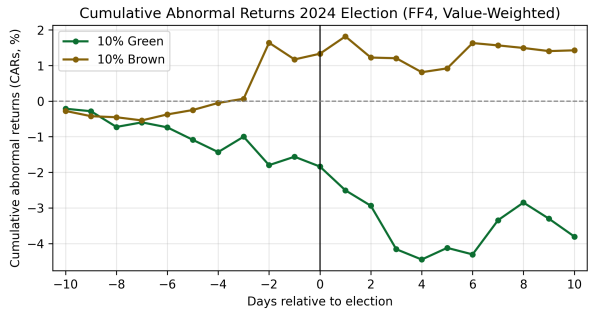
In 2024, the GMB pattern reverses again and becomes even larger in magnitude. The brown

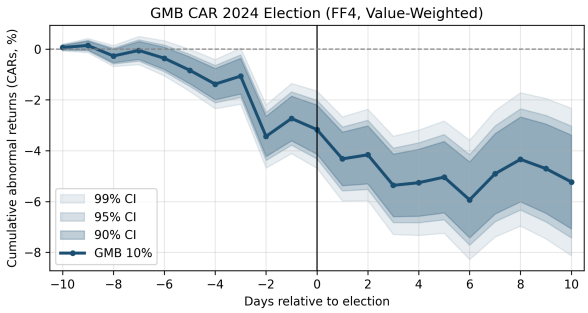












(a) Green and Brown Portfolio CARs **(b)** Green Minus Brown Portfolio CARs

Figure 7. CARs Around U.S. Presidential Elections: Industry-Relative Scope 1 Emissions Intensity. This figure plots cumulative abnormal returns (CARs) for portfolios constructed using industry-relative Scope 1 emissions intensity around the 2016, 2020, and 2024 U.S. presidential elections. Scope 1 emissions intensity includes both reported and estimated emissions values, depending on data availability. The industry-relative measure ranks firms based on their Scope 1 emissions intensity relative to firms in the same industry. The event window covers $[-10, +10]$ trading days around election day, with $t_0 = 0$ denoting the election date. Expected returns are estimated using the Fama-French four-factor model (FF4), and portfolios are value-weighted. Panel (a) shows CARs for the green and brown portfolios separately. Green portfolios include firms in the bottom 10% of the industry-relative Scope 1 emissions intensity distribution in the relevant election year, while brown portfolios include firms in the top 10%. Panel (b) shows the green-minus-brown (GMB) portfolio CAR, calculated as the green portfolio CAR minus the brown portfolio CAR. The shaded areas around the GMB series show 90%, 95%, and 99% confidence intervals. The vertical line indicates election day and the horizontal dashed line indicates zero cumulative abnormal returns.

portfolio reaches a positive CAR of 1.43% ($t = 2.68$, significant at the 1% level), while the green portfolio declines sharply to -3.80% ($t = -5.09$, significant at the 1% level). This gives a large negative GMB CAR of -5.23% ($t = -4.69$, significant at the 1% level). The 2024 estimate is therefore stronger than the 2016 result, both in magnitude and statistical significance. The widening gap is driven by the brown portfolio increasing while the green portfolio falls after the election.

Taken together, Industry Relative Scope 1 Emissions Intensity produces one of the clearest patterns among the portfolio classifications. The GMB CAR is statistically significant in all

three election years: negative in 2016, positive in 2020, and negative in 2024. This contrasts with the absolute Scope 1 measure, where the GMB estimates are statistically insignificant and show no stable direction. Overall, measuring emissions intensity relative to industry peers captures green-brown return differences more clearly than the absolute emissions intensity measure.

5.3 Shadow Portfolios

Scope 1 Emissions Intensity Shadow

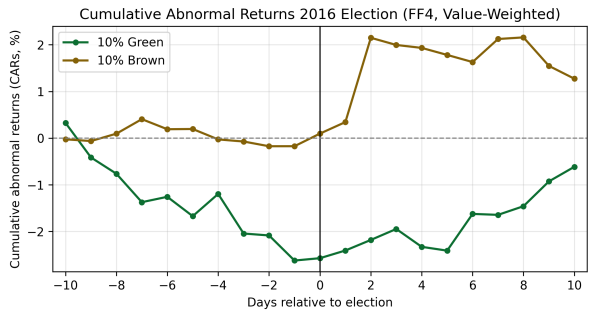
Figure 8 presents the CAR dynamics for portfolios constructed using the Scope 1 Emissions Intensity Shadow measure. This classification produces one of the clearest GMB patterns across the three election windows, with statistically significant estimates in all three years.

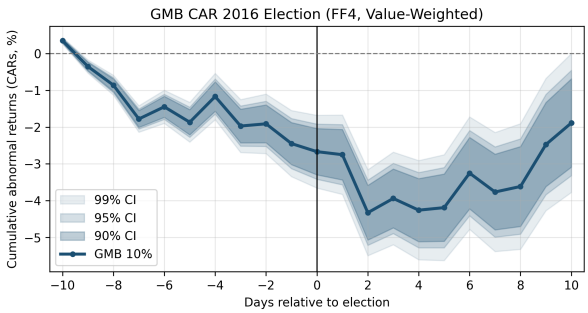
In 2016, the shadow measure shows a clear divergence between brown and green firms. The brown portfolio increases to 1.27% ($t = 3.01$, significant at the 1% level), while the green portfolio ends negative at -0.61% ($t = -0.87$). This produces a negative GMB CAR of -1.89% ($t = -2.59$, significant at the 1% level). The result is therefore both economically meaningful and statistically significant, mainly reflecting the strong positive performance of the brown portfolio relative to the green portfolio.

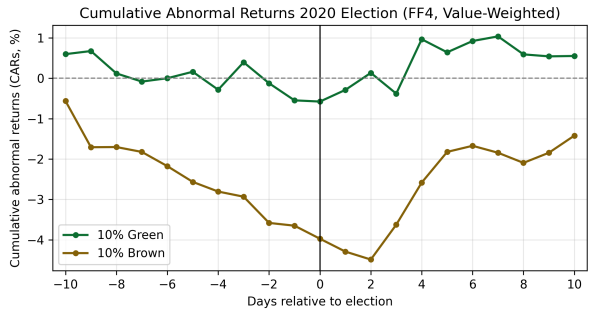
The 2020 election reverses this pattern. The brown portfolio declines to -1.42% ($t = -1.81$, significant at the 10% level), while the green portfolio ends slightly positive at 0.55% ($t = 0.69$). This leads to a positive GMB CAR of 2.06% ($t = 1.68$, significant at the 10% level). Although the statistical evidence is weaker than in 2016, the direction and magnitude still indicate a meaningful change in relative performance, with green firms outperforming brown firms over the event window.

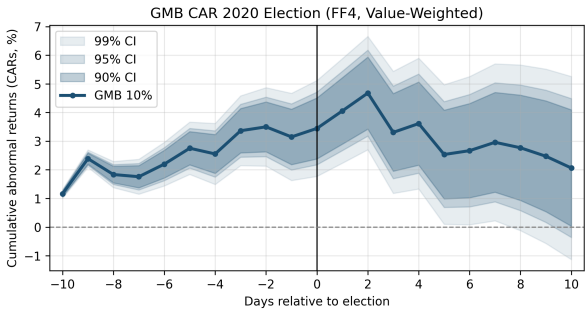
The strongest result appears in 2024. The brown portfolio rises sharply after the election and reaches 7.94% ($t = 10.10$, significant at the 1% level), while the green portfolio remains negative at -1.27% ($t = -1.60$). This results in a large negative GMB CAR of -9.21% ($t = -8.36$, significant at the 1% level). The estimate is substantially larger than in the previous election windows and is highly statistically significant. The time-series pattern also shows that the divergence begins before the election date and accelerates immediately after, as the brown portfolio rises sharply while the green portfolio remains below zero.

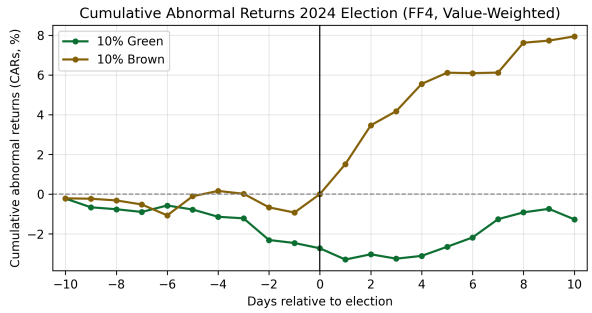
Taken together, the Scope 1 Emissions Intensity Shadow measure produces a clear and statistically significant GMB pattern across election years. The GMB CAR is negative in 2016, positive in 2020, and strongly negative in 2024. This pattern is similar to the one observed for Industry Relative Scope 1 Emissions Intensity, but the magnitudes are larger, particularly in 2024. The 2024 result is especially pronounced, with the brown portfolio delivering the largest positive CAR across the measures and the GMB portfolio reaching -9.21%.

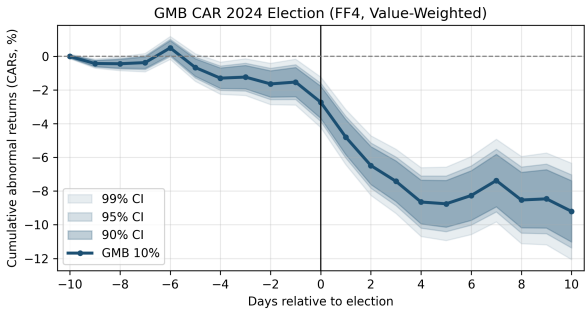












(a) Green and Brown Portfolio CARs **(b)** Green Minus Brown Portfolio CARs

Figure 8. CARs Around U.S. Presidential Elections: Scope 1 Emissions Intensity Shadow. This figure plots cumulative abnormal returns (CARs) for portfolios constructed using the Scope 1 emissions intensity shadow criterion around the 2016, 2020, and 2024 U.S. presidential elections. The shadow emissions criterion compares firms with low reported Scope 1 emissions intensity to matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related opacity. Scope 1 emissions intensity measures firms' direct greenhouse gas emissions from owned or controlled operations, scaled by firm activity. The event window covers $[-10, +10]$ trading days around election day, with $t_0 = 0$ denoting the election date. Expected returns are estimated using the Fama-French four-factor model (FF4), and portfolios are value-weighted. Panel (a) shows CARs for the green and brown portfolios separately. Green portfolios include reporting firms in the bottom 10% of the Scope 1 emissions intensity distribution in the relevant election year, while brown portfolios include matched non-reporting firms. Panel (b) shows the green-minus-brown (GMB) portfolio CAR, calculated as the green portfolio CAR minus the brown portfolio CAR. The shaded areas around the GMB series show 90%, 95%, and 99% confidence intervals. The vertical line indicates election day and the horizontal dashed line indicates zero cumulative abnormal returns.

6. Robustness Checks

To assess the robustness of our results, we conduct additional tests, changing key elements of the empirical design such as the factor models, cutoffs and event windows.

6.1 Alternative Factor Models

As an initial robustness check, we re-estimate cumulative abnormal returns (CARs) using two alternative factor model specifications: the Fama–French five-factor model (FF5) and an augmented five-factor model that additionally controls for momentum (FF5+). Results are reported in Appendix C (Table C.1 and Table C.2, respectively).

The core findings from our main FF4 specification are robust across all three models. The general pattern of green-minus-brown (GMB) portfolio performance persists, with predominantly negative returns following Republican election outcomes (2016 and 2024) and positive returns following the Democratic outcome (2020). This consistency suggests that the documented CARs are not driven by the specific factor structure used to model expected returns and are not attributable to firm differences in profitability or investment characteristics.

Importantly, the results remain similar when moving from the FF4 to the FF5 specification, despite the exclusion of the momentum factor in the latter. The persistence of the main patterns suggests that the observed GMB CARs are not driven by dynamics related to momentum.

6.2 Alternative Portfolio Cutoffs

We re-estimate CARs using two alternative cutoff thresholds when constructing green and brown portfolios: a 20% cut and a 30% cut. This allows us to examine whether our results are driven by extreme observations, or reflects a general pattern across most firms. Results are reported in Appendix C (Table C.3 and Table C.4, respectively).

Overall, the results remain consistent across alternative cutoffs. The general pattern of GMB portfolio performance persists across election cycles with generally negative CARs following Republican election outcomes (2016 and 2024) and positive CARs following the Democratic outcome (2020). The sign of the effect is preserved across most specifications and proxies. However, increasing the cutoff from 10% to 20% and 30% leads to an attenuation in both the magnitude and statistical significance of the CARs. Some estimates also change sign under the broader portfolio definitions, including at the 20% threshold. The results are less stable once the green and brown portfolios are expanded beyond the firms with the most extreme climate exposures, which suggests that investor reallocation is concentrated among firms with the strongest green or brown characteristics.

6.3 Alternative Event Windows

To assess the robustness of our main findings to the choice of event window, we re-estimate cumulative abnormal returns (CARs) using two narrower windows centred on the election date: a $[-5, +5]$ eleven-day window and a $[-1, +1]$ three-day window. This allows us to examine whether the results are concentrated around the immediate resolution of the election outcome. Results are reported in the Appendix in Appendix C (Table C.6 and Table C.5, respectively).

Overall, the main findings remain robust across alternative event windows. The general pattern of GMB performance persists, with predominantly negative CARs following Republican outcomes (2016 and 2024) and positive CARs following the Democratic outcome (2020). This pattern is most consistent for the Industry Relative Scope 1 Emissions Intensity and shadow

emissions specifications, which continue to show economically meaningful and statistically significant CARs in the shorter windows.

However, the results become more ambiguous as we shorten the event-window: the magnitudes are smaller, statistical significance is weaker, and some estimates change sign. This suggests that the market reaction is not always fully concentrated within the immediate window around the election date. These results suggest that investors do not adjust only immediately around the election, but may also react to information before the election and continue adjusting after the outcome is known.

6.4 Industry Bias

A potential concern with the GMB results is that they reflect industry exposure rather than green-brown repricing. This would be the case if the GMB portfolios are systematically tilted toward industries that, independently of firms' environmental characteristics, perform in a way that mechanically produces the observed GMB pattern.

We examine this in two steps. First, we estimate CARs for value-weighted GICS industry portfolios using the same event study methodology as in the main analysis. Results are reported in Appendix C (Table C.7). Several industries show large and statistically significant CARs. However, these reactions do not follow a systematic party-specific pattern. No industry consistently performs positively after Republican outcomes and negatively after the Democratic outcome, or vice versa. This suggests that the general GMB results are unlikely to be explained by a single set of industries systematically benefiting from one party being elected.

Second, we compare the industry weights in each GMB portfolio with the corresponding industry CARs. Results are reported in Figure C.1 through Figure C.6 of Appendix C. If industry bias were driving the results, we would expect the sign of the industry weights and the sign of the industry CARs to align in a way that explains the direction of the GMB return in each election year. The figures do not show such a consistent alignment. Instead, positive and negative GMB weights are often attached to industries whose own CARs would push the portfolio in the opposite direction, and this varies across proxies and election years.

7. Discussion and Limitations

7.1 Discussion

General Insights

Our findings show a general pattern in the response of GMB portfolio abnormal returns around the election date. We observe that brown firms tend to outperform green firms in terms of CARs following Republican election outcomes (2016 and 2024), with the opposite pattern appearing in the Democratic outcome (2020) for a majority of the specifications. Importantly, these results should not be interpreted as one portfolio of firms systematically experiencing positive abnormal returns while the other experiences negative returns. Rather, the findings suggest that different election outcomes create financial environments that are relatively more favorable for one group compared to the other. The key insight is that the

relative performance between the two groups shifts systematically across election cycles, with Republican outcomes favoring brown firms relative to green firms, and Democratic outcomes showing the opposite pattern.

Additionally, the time series behavior of CARs provides further insight into the role of elections as market-relevant events, specifically in the climate policy context. Across most specifications, CARs display sharp movements immediately following the election date, sometimes accompanied by reversals of pre-event trends. These dynamics are consistent with the interpretation of presidential elections as informational shocks. Even though some information about the likely outcome may be incorporated into prices before the event, the election result itself appears to provide an update to investor expectations. The observed reversals also suggest that pre-election pricing may, at least in part, reflect expectations that are corrected once uncertainty is resolved. This interpretation aligns with and supports prior literature such as Pantzalis et al. (2000) in the sense that elections act as events that resolve policy uncertainty and are associated with significant stock market reactions.

In this sense, our findings are also related to Wagner et al. (2018), who show that firms' stock price reactions to the 2016 election reflected updated expectations about future corporate tax reform rather than implemented policy changes. Our results point to a similar mechanism in the climate-policy setting. The CAR movements around election dates are unlikely to reflect immediate changes in regulation, since major climate-policy changes are not implemented on election day. Instead, the results suggest that investors update their expectations about the future policy environment and revalue green and brown firms accordingly. This interpretation is important because it frames the documented GMB patterns as expectation-driven repricing rather than direct reactions to realized policy changes.

Mechanisms

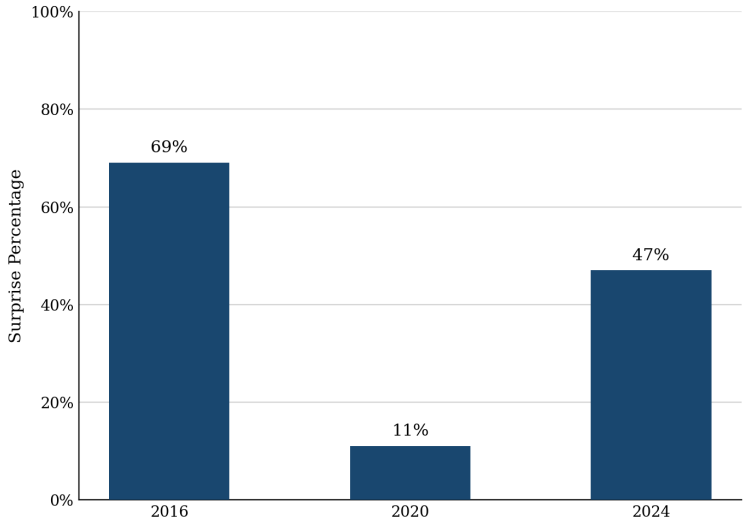


Figure 9. Election Surprise. This figure reports the election surprise measure for the 2016, 2020, and 2024 U.S. presidential elections. Election surprise is defined as one minus the FiveThirtyEight-implied win probability of the candidate who ultimately won the election, using the last available forecast before election day. Higher values therefore indicate a more unexpected election outcome. Sources: FiveThirtyEight (2016), FiveThirtyEight (2020), FiveThirtyEight (2024).

Another insight from the results is that the magnitude of the CARs vary significantly across election years. We attribute these differences to three key mechanisms that may amplify and affect the abnormal returns: (i) the degree of surprise associated with the election outcome,

(ii) the level of political polarization, and (iii) investor attention to climate related risk. These mechanisms reflect the fundamentally different environments across the three elections.

The role of surprise is particularly important since we use the event study framework. If the election outcome is widely anticipated, it is likely to be priced in asset prices prior to the event day and the event window. In such cases, the event itself gives limited new information to investors, which would result in moderate abnormal returns within the event window. Likewise, unexpected outcomes would probably cause bigger shifts in expectations and therefore generate stronger abnormal returns. To capture the degree of surprise associated with each election outcome, we proxy surprise using pre-election win probabilities (see Figure 9), defining it as one minus the ex-ante probability of the winning candidate. This is a simple way to approximate how unexpected the realized outcome was from the perspective of market participants. Consistent with this mechanism, the relatively modest and less consistent effects observed in 2020 compared to 2024 may reflect the fact that the outcome was largely anticipated and therefore already priced in. However, the results also indicate that surprise alone cannot fully explain the observed patterns. While the 2016 election represented the largest surprise, the magnitude of the CARs is generally stronger in 2024. This could be attributed to the next mechanism at play.

Indeed, political polarization may amplify the economic effect of election outcomes. As policy differences, including climate policy, between parties become more pronounced, elections may lead to larger changes in expected climate policy direction and therefore larger changes in expected asset prices. Through this lens, the larger magnitude of CARs in 2024 relative to the 2016 election window can be interpreted as reflecting a higher degree of political polarization.

Finally, the growing trend of ESG considerations may also contribute to the observed patterns of increasing magnitude. The trend of ESG has developed over time, through both increased investor attention and improved data availability (EY, 2024). As a result, investors may be better equipped to identify and price differences in firms' exposure to climate-related risks in more recent periods. This may help explain why return differentials appear more pronounced in 2024.

Taken together, the differences in the magnitude of CARs across elections appears to reflect a combination of these mechanisms. Despite the high degree of surprise in the 2016 election, it took place in an environment with lower political polarization and more limited incorporation of ESG considerations into investment decisions. In contrast, the 2020 election, associated with low surprise but high polarization, exhibits more moderate effects. The 2024 election presents a different pattern: although the outcome only was a moderate level of surprise, the observed effects are stronger. This could reflect both increased political polarization and a more mature ESG environment, which together amplify the extent to which election outcomes translate into differential pricing of climate exposure. Additionally, the fact that Donald Trump had previously served as president from 2016 to 2020 could have reduced uncertainty about the policy implications of his re-election, allowing investors to reprice assets more decisively around the event day. Notably, for several specifications, the patterns observed in 2016 reappear with greater magnitude in 2024, reinforcing the idea that these effects are systematic but depend on the broader environment in which elections occur.

Climate Exposure Proxies

Furthermore, the extent to which the general pattern systematically appears within the portfolios differs depending on the measure used to proxy climate policy exposure. These variations are not limited to comparisons across broader categories such as comparisons of

agency scores to emissions-based measures, but arise within categories as well. We interpret this heterogeneity as resulting from the proxies capturing different dimensions of climate exposure and from differences in how investors view this information.

In line with this, ESG-based measures generally yield more inconclusive results, as shown in the Section 5.1. Rating Agency Scores. The different ESG metrics do not consistently give rise to similar CARs, either in direction or magnitude. This suggests that they capture different aspects of sustainability and are not most relevant in this setting. Indeed, ESG scores aggregate by construction multiple dimensions of sustainability (environmental, social, and governance factors). As a result, they may not isolate the specific component of firm exposure that is directly affected by election-driven changes in climate policy. In the short term, investors prioritize indicators directly linked to regulatory exposure, meaning ESG-based measures may not be perceived as directly relevant or particularly informative in this context, which therefore could explain the weaker and less systematic CAR patterns. ESG metrics may be better suited to capturing longer-term shifts in investor sentiment toward sustainability rather than perceived climate policy exposure. Consistent with this interpretation, Pástor et al. (2022) show that changes in climate-related preferences are reflected in return differentials over longer horizons, suggesting that ESG-based measures may be more informative in a long-run setting than in short-run event studies.

Interestingly, the MSCI Environmental Pillar Score, which in principle should address the issue of broader ESG measures by focusing specifically on environmental characteristics, also yields weak and inconsistent patterns across specifications. This suggests that even more narrowly defined agency scores may not fully capture the dimensions of firm exposure that are most relevant in the context of election shocks. One possible explanation is that such scores still aggregate multiple environmental aspects, such as resource use and waste management which are not all directly tied to relevant regulation described in the Section 2. Institutional Background. They may remain too broad to isolate the policy-relevant channel, and may therefore be perceived as less relevant for short-term repricing.

In contrast to broader agency score based measures, the Industry-Relative Emissions Intensity stands out with consistent and economically meaningful results in the analysis. By ranking firms relative to their industry peers, this measure captures within-industry differences in emissions intensity: the dimension along which climate policy most directly affects firms (see Section 2. Institutional Background). Firms face costs and constraints relative to their peers rather than in absolute terms. As a result, the economically relevant exposure to policy risk depends on how emission-intensive a firm is compared to its industry constituents. This interpretation is consistent with the large and systematic GMB effects observed for the industry-relative measure, particularly in 2024, and indicates that this proxy aligns closely with the mechanism through which election outcomes affect investor repricing of assets. Furthermore, the importance of this industry adjustment is highlighted when looking at the unadjusted Scope 1 Emissions Intensity proxy results, which yield almost no consistent or statistically significant results across the years.

The shadow emissions portfolios provide an additional and informative perspective by shifting the focus from environmental performance to environmental transparency. In this setting, the brown portfolio is not composed of high-emission firms, but rather of firms that do not report emissions. As such, the results capture how investors view the absence of reliable environmental information. The strong and statistically significant CARs over the election windows suggest that investors systematically differentiate between reporting and non-reporting firms. In this way, non-disclosure of emissions may in itself be perceived as a risk factor. Firms not reporting emissions might be seen as more exposed to regulatory pressure, particularly

in environments where climate policy is expected to tighten.

This mechanism becomes particularly evident when comparing the 2020 and 2024 election outcomes. In 2020, the shift toward a more climate-focused policy environment is associated with a positive GMB portfolio, consistent with investors penalizing firms that may be less prepared for increased regulation. In contrast, in 2024, the strongly negative CAR for the GMB portfolio can be interpreted as a relief of the perceived risk associated with non-reporting firms. Additionally, as emissions reporting becomes more common, non-reporting firms stand out more clearly as a distinct group. Therefore, the shadow classification may become a stronger signal over time, allowing investors to more sharply differentiate between reporting and non-reporting firms. This may help explain why the shadow specification produces particularly large CAR magnitudes in 2024.

This proxy sensitivity provides one explanation for why existing evidence on climate-related stock market reactions to elections remains mixed. Prior studies often rely on a single election cycle, sector, or climate exposure proxy, meaning their conclusions may depend heavily on how green and brown firms are identified. Our results suggest that these differences are not necessarily contradictory, but may reflect that different proxies capture different dimensions of climate exposure.

GMB Performance Drivers: Explanatory Power of Classic Risk Factors

Furthermore, an interesting insight can be drawn from looking at the adjusted R^2 values which represent the explanatory power of the FF4 model (Table 3). The R^2 values are rather high for green and brown portfolios, ranging between 74 and 98 percent across all election years and proxies. However, the explanatory power drops substantially for GMB portfolios (to only 27 percent on average in 2016 and around 40 percent in subsequent election years). The main drivers of this low explanatory power are the MSCI ESG Adjusted Score, Industry Relative Scope 1 Emissions Intensity, and Scope 1 Shadow Emissions portfolios.

In the case of the MSCI ESG Adjusted Score, the low R^2 is consistent with the mixed and largely insignificant CAR results around election dates, together they suggest that this particular proxy fails to capture any systematic economic effect. The interpretation is more informative for the other low-R^2 drivers, which simultaneously exhibit consistent, statistically significant, and economically meaningful CARs around election events. For these portfolios, the low explanatory power of the FF4 model in the estimation window indicates that their day-to-day return variation is not well captured by standard market risk factors under normal conditions. The pronounced response around election dates is therefore unlikely to reflect mechanical exposure to conventional factors, and is instead consistent with the repricing of a distinct, policy-related source of risk.

By contrast, GMB portfolios with high estimation-window R^2, where FF4 accounts for the bulk of return variation under normal conditions, offer weaker evidence even when they produce significant CARs, since such results are harder to disentangle from the underlying factor dynamics already embedded in the portfolio construction.

Table 3. FF4 Model Fit by Portfolio and Election Year

This table reports the adjusted coefficient of determination, $\bar{R}^2$, from OLS regressions of daily portfolio excess returns on the Fama-French four-factor model (FF4). The FF4 model includes the market excess return, size, value, and momentum factors: MKT-RF, SMB, HML, and UMD. Regressions are estimated separately for each portfolio, portfolio mode, and election year using the estimation window from $t_0 - 250$ to $t_0 - 30$ trading days before the election date. Values are reported in percent. All portfolios are value-weighted. The table reports results for green, brown, and green-minus-brown (GMB) portfolios, where the GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of lower climate-related transparency. The Average block reports the mean adjusted $\bar{R}^2$ across the corresponding green, GMB, and brown portfolio rows.

Panel A. GMB Portfolio FF4 $\bar{R}^2$ Values (%)

Portfolio	2016	2020	2024
LSEG ESG Score	34.0	52.7	58.5
MSCI Environmental Pillar Score	70.4	81.3	56.9
MSCI ESG Adjusted Score	1.5	19.1	0.2
Scope 1 Emissions Intensity (Reported or Estimated)	26.2	57.4	64.6
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	20.3	19.6	35.1
Scope 1 Emissions Intensity Shadow	6.5	21.1	19.7
Average	26.5	41.9	39.2

Panel B. Green Portfolio FF4 $\bar{R}^2$ Values (%)

Portfolio	2016	2020	2024
LSEG ESG Score	96.9	99.3	97.1
MSCI Environmental Pillar Score	97.8	98.7	86.4
MSCI ESG Adjusted Score	95.4	98.6	89.5
Scope 1 Emissions Intensity (Reported or Estimated)	88.9	97.9	91.6
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	79.8	96.4	83.0
Scope 1 Emissions Intensity Shadow	79.8	96.0	68.8
Average	89.8	97.8	86.1

Panel C. Brown Portfolio FF4 $\bar{R}^2$ Values (%)

Portfolio	2016	2020	2024
LSEG ESG Score	89.5	91.7	78.0
MSCI Environmental Pillar Score	94.7	97.6	88.2
MSCI ESG Adjusted Score	92.3	94.1	50.6
Scope 1 Emissions Intensity (Reported or Estimated)	78.4	94.8	68.1
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	93.4	93.7	80.4
Scope 1 Emissions Intensity Shadow	89.6	95.0	80.1
Average	89.6	94.5	74.2

7.2 Limitations

Several limitations of this study should be acknowledged in the interpretation of the results before concluding.

A fundamental constraint is the limited number of election events available for analysis. This study examines three U.S. presidential elections, 2016, 2020, and 2024, representing the only cycles for which both adequate climate data coverage and a sufficiently polarized policy environment make the research question empirically meaningful. With only three observations, it is inherently difficult to distinguish systematic patterns from election-specific dynamics. Each election is characterized by its own political and macroeconomic context, including differences in market conditions, poll uncertainty, and the relative salience of climate policy, which introduces substantial heterogeneity across observations. As a result, the patterns identified should be interpreted with caution, as they may partly reflect context-specific factors rather than generalizable relationships. Future research could address this limitation as additional election cycles become available, or by applying a similar framework to other countries with comparable variation in climate policy and sufficient data coverage. Such extensions would help assess the extent to which the observed patterns generalize beyond the specific setting studied here.

A further limitation concerns the identification of a climate-specific channel. Presidential elections are not clean policy shocks along a single dimension; they simultaneously shift expectations across tax, trade, macroeconomic, and regulatory policy, many of which are independently material to firm valuation. While the use of green-minus-brown portfolios and a wide range of climate exposure proxies helps isolate the climate-related component of abnormal returns, it cannot fully exclude the possibility that the documented return differentials partly reflect other policy expectations that happen to correlate with firms' environmental profiles. This confounding is inherent to the event study setting and represents a boundary on the causal interpretation of the results.

Data availability poses an additional constraint. The coverage of firm-level ESG-scores and emissions data is more limited for earlier years, as fewer firms reported their emissions voluntarily and rating agencies covered fewer companies. This restricts the number of firms that can be reliably classified as green or brown and results in smaller samples for the 2016 election. This may introduce selection bias if the firms in the sample are systematically different from excluded firms in ways that affect their stock market sensitivity to election outcomes.

Finally, the shadow emissions portfolio captures a distinct economic channel that warrants careful interpretation. Rather than measuring emissions exposure directly, it treats non-disclosure as a signal of environmental opacity. As a result, the portfolio reflects how investors price disclosure risk, rather than emissions performance per se. While this provides a complementary perspective on climate-related risk, it also limits direct comparability with ESG- and emissions-based portfolios, which are designed to capture different dimensions of exposure. In addition, the matched sample is constrained by the availability of suitable industry peers within the specified caliper, which limits the sample size and may affect the representativeness of the constructed portfolios.

8. Conclusion

This paper examines whether U.S. presidential elections generate systematic differences in stock market returns between green and brown firms. Using event studies around the 2016,

2020, and 2024 elections, we construct green-minus-brown portfolios based on a range of climate exposure proxies and estimate cumulative abnormal returns using the Fama-French four-factor model.

The results suggest that presidential elections act as information shocks that trigger an immediate update of investor expectations regarding climate policy. Across most specifications, brown firms tend to outperform green firms following Republican election outcomes (2016 and 2024), while the pattern reverses under the Democratic outcome (2020). This directional consistency across election cycles suggests a systematic relationship between the outcome of the election and the pricing of climate-exposed assets.

The strength of these effects varies across elections, which reflects fundamental differences in the environment of elections themselves. We attribute this variation to the interplay of three mechanisms: the degree of surprise associated with the election outcome, the extent of political polarization, and investor attention to climate topics. In this sense, the pricing of climate exposure depends on how salient and economically consequential climate policy is perceived to be by investors. The results also show that the extent to which these patterns appear depends on how climate exposure is measured. Proxies that align more closely with the underlying regulatory mechanism, such as Industry Relative Scope 1 Emissions Intensity, produce more consistent and economically meaningful results, suggesting that investors primarily look at differences in firms' relative exposure to policy-driven costs. In contrast, broader measures yield weaker and less systematic patterns, indicating that they may capture dimensions of sustainability that are less directly relevant for short-term repricing around elections. The results also suggest that investors perceive non-disclosure as a climate policy risk itself.

Our results remain robust but decline in magnitude when using narrower event windows and broader portfolio definitions. The effect is strongest among firms with the clearest climate exposure and is not fully confined to the immediate election date, but may also reflect investor adjustment before and after the event. The results should also be interpreted with caution and might not extend beyond the context of the U.S.-listed firms. The analysis is based on only three presidential elections, each with its own political and macroeconomic context, which limits the extent to which the findings can be generalized. In addition, the results may be confounded by other policy expectations that shift around presidential elections. Data availability also restricts the sample, particularly in earlier years. Future research could extend this framework to additional election cycles and international settings to assess the generalizability of election-related green-brown repricing.

By showing that election outcomes are associated with differential abnormal returns between green and brown firms, this study contributes to the growing literature at the intersection of political and climate finance. The findings also have important implications for equity investors. The results suggest that U.S. presidential elections can create short-term repricing between green and brown firms. Election risk should therefore be viewed as a source of differences in returns across firms, particularly for portfolios with clear exposure to high-emission firms, low-emission firms, or firms with limited emissions disclosure. For corporate managers, the implications are more indirect. The results suggest that emissions profiles and disclosure practices can affect how investors perceive firms when political expectations change. In this way, climate exposure is not only a long-term regulatory issue, but also a source of short-term sensitivity around elections.

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Appendix

Supplementary Tables and Figures

A. Portfolio descriptive statistics

Table A.1. Portfolio Descriptive Statistics: 2016 U.S. Presidential Election

This table reports descriptive statistics for the green, brown, and green-minus-brown (GMB) portfolios constructed for the 2016 U.S. presidential election. Statistics are computed over the pre-event estimation window used to estimate expected returns in the event study. *Portfolio* refers to the classification measure used to form the portfolios. The table is organised into three panels: Panel A reports statistics for the GMB portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Green and brown portfolios are formed from the top and bottom deciles of each classification measure, respectively. For rating score measures, higher scores indicate stronger environmental or ESG performance; for emissions-based measures, lower emissions intensity indicates greener firms. Scope 1 Emissions Intensity is defined as Scope 1 greenhouse gas emissions relative to firm revenue. Industry Relative Scope 1 Emissions Intensity measures Scope 1 Emissions Intensity relative to firms within the same industry. The Shadow emissions measure compares low-emission reporting firms with matched non-reporting firms. N reports the number of stocks in each portfolio. For GMB portfolios, N is the combined number of stocks in the green and brown portfolios. *Criterion* reports the mean and standard deviation of the underlying classification variable used to assign firms to portfolios. Criterion statistics are not applicable for GMB portfolios and are therefore reported as n.a. *Market Cap.* reports the mean and standard deviation of firm market capitalization in USD millions. *Returns* reports the mean, standard deviation, and skewness of daily value-weighted portfolio returns in percent. All portfolios are value-weighted using market capitalization. The factor model is the Fama–French four-factor model (FF4).

Panel A. GMB Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	205	n.a.	n.a.	35747.97	66313.30	-0.01	0.57	0.226
MSCI Environmental Pillar Score	349	n.a.	n.a.	21817.02	50386.62	0.01	0.62	0.049
MSCI ESG Adjusted Score	400	n.a.	n.a.	19241.74	53625.41	0.00	0.40	0.801
Scope 1 Emissions Intensity (Reported or Estimated)	147	n.a.	n.a.	26530.56	69223.11	-0.02	0.94	-0.280
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	148	n.a.	n.a.	19603.86	59444.47	-0.01	0.67	0.168
Scope 1 Emissions Intensity Shadow	48	n.a.	n.a.	55501.76	105915.68	-0.00	0.60	0.052

Table A.1. Portfolio Descriptive Statistics: 2016 U.S. Presidential Election (*continued*)

Panel B. Green Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	104	78.214	5.658	62907.03	82150.35	0.05	0.90	-0.255
MSCI Environmental Pillar Score	180	8.847	0.919	38793.13	65728.62	0.05	0.96	-0.392
MSCI ESG Adjusted Score	201	7.415	0.793	26867.52	64769.97	0.05	0.95	-0.341
Scope 1 Emissions Intensity (Reported or Estimated)	75	0.559	0.265	35326.87	85426.02	0.04	1.14	-0.231
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	74	0.047	0.028	23594.93	79796.02	0.05	1.09	-0.266
Scope 1 Emissions Intensity Shadow	25	0.314	0.146	67328.54	132135.86	0.02	1.19	-0.151

Panel C. Brown Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	101	13.137	3.990	7774.14	21483.51	0.07	1.26	-0.457
MSCI Environmental Pillar Score	169	1.274	0.444	3836.41	5844.60	0.04	1.23	-0.274
MSCI ESG Adjusted Score	199	1.434	0.325	11577.64	38030.31	0.05	1.00	-0.405
Scope 1 Emissions Intensity (Reported or Estimated)	72	1089.421	1328.936	17367.73	45615.92	0.06	1.26	0.092
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	74	4.245	3.361	15666.73	27485.77	0.06	1.15	-0.519
Scope 1 Emissions Intensity Shadow	23	0.000	0.000	42646.56	67728.46	0.03	1.02	-0.390

Table A.2. Portfolio Descriptive Statistics: 2020 U.S. Presidential Election

This table reports descriptive statistics for the green, brown, and green-minus-brown (GMB) portfolios constructed for the 2020 U.S. presidential election. Statistics are computed over the pre-event estimation window used to estimate expected returns in the event study. *Portfolio* refers to the classification measure used to form the portfolios. The table is organised into three panels: Panel A reports statistics for the GMB portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Green and brown portfolios are formed from the top and bottom deciles of each classification measure, respectively. For rating score measures, higher scores indicate stronger environmental or ESG performance; for emissions-based measures, lower emissions intensity indicates greener firms. Scope 1 Emissions Intensity is defined as Scope 1 greenhouse gas emissions relative to firm revenue. Industry Relative Scope 1 Emissions Intensity measures Scope 1 Emissions Intensity relative to firms within the same industry. The Shadow emissions measure compares low-emission reporting firms with matched non-reporting firms. N reports the number of stocks in each portfolio. For GMB portfolios, N is the combined number of stocks in the green and brown portfolios. *Criterion* reports the mean and standard deviation of the underlying classification variable used to assign firms to portfolios. Criterion statistics are not applicable for GMB portfolios and are therefore reported as n.a. *Market Cap.* reports the mean and standard deviation of firm market capitalization in USD millions. *Returns* reports the mean, standard deviation, and skewness of daily value-weighted portfolio returns in percent. All portfolios are value-weighted using market capitalization. The factor model is the Fama–French four-factor model (FF4).

Panel A. GMB Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	487	n.a.	n.a.	34658.23	115912.96	-0.16	1.29	-0.183
MSCI Environmental Pillar Score	438	n.a.	n.a.	26351.43	94623.63	0.06	1.07	-0.088
MSCI ESG Adjusted Score	506	n.a.	n.a.	23944.45	89288.32	0.03	0.72	-0.165
Scope 1 Emissions Intensity (Reported or Estimated)	474	n.a.	n.a.	27270.46	124690.59	0.16	1.27	-0.076
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	476	n.a.	n.a.	22190.37	121616.51	0.04	0.84	-0.940
Scope 1 Emissions Intensity Shadow	149	n.a.	n.a.	45605.73	168062.01	0.00	0.86	0.171

Table A.2. Portfolio Descriptive Statistics: 2020 U.S. Presidential Election (*continued*)

Panel B. Green Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	249	76.720	6.029	66449.13	155520.84	0.11	2.20	-0.375
MSCI Environmental Pillar Score	203	8.830	0.898	52666.02	134357.18	0.15	2.32	-0.472
MSCI ESG Adjusted Score	226	7.868	0.792	42208.57	122831.29	0.17	2.39	-0.504
Scope 1 Emissions Intensity (Reported or Estimated)	240	0.509	0.296	43701.81	172178.23	0.17	2.56	-0.372
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	237	0.042	0.029	26973.88	135997.30	0.18	2.51	-0.579
Scope 1 Emissions Intensity Shadow	78	0.242	0.131	65395.57	226963.98	0.20	2.62	-0.363

Panel C. Brown Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	238	11.015	4.001	1257.67	2917.69	0.27	2.84	-1.158
MSCI Environmental Pillar Score	235	1.283	0.464	3732.08	8072.95	0.09	2.67	-0.352
MSCI ESG Adjusted Score	280	1.745	0.289	9149.85	41852.01	0.15	2.38	-1.049
Scope 1 Emissions Intensity (Reported or Estimated)	234	1247.511	1578.862	10345.46	22908.73	0.01	2.66	-0.436
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	239	4.194	3.799	17447.05	105518.60	0.14	2.21	-0.451
Scope 1 Emissions Intensity Shadow	71	0.000	0.000	23864.77	46237.77	0.20	2.42	-0.821

Table A.3. Portfolio Descriptive Statistics: 2024 U.S. Presidential Election

This table reports descriptive statistics for the green, brown, and green-minus-brown (GMB) portfolios constructed for the 2024 U.S. presidential election. Statistics are computed over the pre-event estimation window used to estimate expected returns in the event study. *Portfolio* refers to the classification measure used to form the portfolios. The table is organised into three panels: Panel A reports statistics for the GMB portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Green and brown portfolios are formed from the top and bottom deciles of each classification measure, respectively. For rating score measures, higher scores indicate stronger environmental or ESG performance; for emissions-based measures, lower emissions intensity indicates greener firms. Scope 1 Emissions Intensity is defined as Scope 1 greenhouse gas emissions relative to firm revenue. Industry Relative Scope 1 Emissions Intensity measures Scope 1 Emissions Intensity relative to firms within the same industry. The Shadow emissions measure compares low-emission reporting firms with matched non-reporting firms. N reports the number of stocks in each portfolio. For GMB portfolios, N is the combined number of stocks in the green and brown portfolios. *Criterion* reports the mean and standard deviation of the underlying classification variable used to assign firms to portfolios. Criterion statistics are not applicable for GMB portfolios and are therefore reported as n.a. *Market Cap.* reports the mean and standard deviation of firm market capitalization in USD millions. *Returns* reports the mean, standard deviation, and skewness of daily value-weighted portfolio returns in percent. All portfolios are value-weighted using market capitalization. The factor model is the Fama–French four-factor model (FF4).

Panel A. GMB Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	614	n.a.	n.a.	51107.93	250230.53	-0.12	1.28	-0.207
MSCI Environmental Pillar Score	500	n.a.	n.a.	37070.62	169730.49	-0.02	0.71	-0.374
MSCI ESG Adjusted Score	505	n.a.	n.a.	33048.83	205362.89	-0.06	1.24	-2.007
Scope 1 Emissions Intensity (Reported or Estimated)	612	n.a.	n.a.	38326.68	201755.47	0.09	1.12	-0.085
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	603	n.a.	n.a.	30159.04	208795.40	0.08	1.04	0.209
Scope 1 Emissions Intensity Shadow	234	n.a.	n.a.	36063.20	228803.08	-0.07	0.85	0.011

Table A.3. Portfolio Descriptive Statistics: 2024 U.S. Presidential Election (*continued*)

Panel B. Green Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	328	77.236	4.947	94560.11	336601.52	0.17	0.86	-0.315
MSCI Environmental Pillar Score	270	9.087	0.822	64811.40	227519.75	0.14	0.73	-0.537
MSCI ESG Adjusted Score	245	8.589	0.612	59418.66	282022.02	0.20	1.09	-0.018
Scope 1 Emissions Intensity (Reported or Estimated)	308	0.233	0.160	57792.36	278212.75	0.21	1.11	-0.116
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	303	0.025	0.017	40401.06	266861.42	0.24	1.38	-0.036
Scope 1 Emissions Intensity Shadow	134	0.099	0.067	54587.45	301195.28	0.15	0.99	-0.188

Panel C. Brown Portfolios

		Criterion		Market Cap. (USD mn)		Returns (%)		
Portfolio	N	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Skewness
LSEG ESG Score	286	12.352	3.139	1274.66	3913.93	0.29	1.65	-0.019
MSCI Environmental Pillar Score	230	1.274	0.533	4625.97	10322.11	0.16	1.02	0.074
MSCI ESG Adjusted Score	260	1.982	0.502	8200.33	76553.82	0.25	1.58	1.329
Scope 1 Emissions Intensity (Reported or Estimated)	304	847.266	1067.909	18604.88	53690.72	0.12	0.82	-0.339
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	300	4.987	9.019	19745.16	124265.85	0.16	0.92	-0.602
Scope 1 Emissions Intensity Shadow	100	0.000	0.000	11240.71	15756.16	0.22	1.28	-0.099

Table A.4. Factor Loadings: 2016 U.S. Presidential Election (FF4, Value-Weighted)

This table reports factor loadings estimated for the green, brown, and green-minus-brown (GMB) portfolios constructed for the 2016 U.S. presidential election. Loadings are estimated via OLS over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. *Portfolio* refers to the classification measure used to form the portfolios. The table is organised into three panels: Panel A reports loadings for the GMB portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Green and brown portfolios are formed from the top and bottom deciles of each classification measure, respectively. For rating score measures, higher scores indicate stronger environmental or ESG performance; for emissions-based measures, lower emissions intensity indicates greener firms. Scope 1 Emissions Intensity is defined as Scope 1 greenhouse gas emissions relative to firm revenue. Industry Relative Scope 1 Emissions Intensity measures Scope 1 Emissions Intensity relative to firms within the same industry. The Shadow emissions measure compares low-emission reporting firms with matched non-reporting firms. *Alpha* reports the intercept of the factor model regression, expressed as a daily return in percent. *MKT-RF* is the excess return on the market portfolio. *SMB* is the size factor (small-minus-big). *HML* is the value factor (high-minus-low book-to-market). *UMD* is the momentum factor (up-minus-down). N is the number of daily return observations used in estimation. R^2 and $\bar{R}^2$ are the unadjusted and adjusted coefficients of determination, respectively. t-statistics are reported in parentheses below each coefficient. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively. All portfolios are value-weighted using market capitalization.

Panel A. GMB Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	−0.0000	−0.3359***	−0.2508***	0.0676	−0.0919*	221	0.352	0.340
	(-0.14)	(-7.74)	(-3.04)	(0.79)	(-1.74)			
MSCI Environmental Pillar Score	0.0002	0.0060	−0.4955***	−0.5807***	0.1610***	221	0.710	0.704
	(0.96)	(0.20)	(-8.40)	(-11.20)	(5.33)			
MSCI ESG Adjusted Score	0.0000	−0.0320	−0.1123	0.0538	−0.0130	221	0.033	0.015
	(0.15)	(-0.72)	(-1.60)	(0.84)	(-0.28)			
Scope 1 Emissions Intensity (Reported or Estimated)	−0.0001	0.2509***	−0.0589	−0.4712***	0.3456***	221	0.275	0.262
	(-0.22)	(3.22)	(-0.39)	(-3.65)	(3.54)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	−0.0001	−0.1019*	−0.2205**	−0.5194***	−0.0496	221	0.217	0.203
	(-0.17)	(-1.76)	(-2.38)	(-4.26)	(-0.80)			
Scope 1 Emissions Intensity Shadow	−0.0001	0.0939*	−0.1366	−0.3006***	−0.0969	221	0.082	0.065
	(-0.30)	(1.70)	(-1.41)	(-2.65)	(-1.50)			

Table A.4. Factor Loadings: 2016 U.S. Presidential Election (FF4, Value-Weighted) (*continued*)

Panel B. Green Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	0.0003***	0.9482***	−0.1709***	0.1031***	0.0230	221	0.969	0.969
	(2.66)	(59.75)	(-4.97)	(3.55)	(1.28)			
MSCI Environmental Pillar Score	0.0003***	1.0422***	−0.1566***	0.0017	0.0553***	221	0.978	0.978
	(2.73)	(82.04)	(-6.59)	(0.06)	(3.47)			
MSCI ESG Adjusted Score	0.0002	1.0109***	−0.1163***	−0.0686*	0.0421**	221	0.955	0.954
	(1.51)	(53.38)	(-3.53)	(-1.92)	(2.16)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0000	1.1582***	−0.2008***	−0.0309	0.0048	221	0.891	0.889
	(0.18)	(33.79)	(-3.32)	(-0.43)	(0.12)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0002	1.0574***	−0.1848**	−0.3526***	−0.0124	221	0.802	0.798
	(0.62)	(24.25)	(-2.52)	(-3.46)	(-0.26)			
Scope 1 Emissions Intensity Shadow	−0.0001	1.1464***	−0.2775***	−0.2115*	−0.0416	221	0.802	0.798
	(-0.26)	(24.95)	(-3.47)	(-1.90)	(-0.78)			

Panel C. Brown Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	0.0003	1.2841***	0.0799	0.0355	0.1149**	221	0.897	0.895
	(1.20)	(34.65)	(1.09)	(0.46)	(2.50)			
MSCI Environmental Pillar Score	0.0001	1.0362***	0.3389***	0.5824***	−0.1057***	221	0.948	0.947
	(0.26)	(40.11)	(6.35)	(14.16)	(-4.17)			
MSCI ESG Adjusted Score	0.0002	1.0429***	−0.0040	−0.1223***	0.0551*	221	0.924	0.923
	(0.91)	(33.17)	(-0.08)	(-2.73)	(1.66)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0002	0.9073***	−0.1419	0.4403***	−0.3408***	221	0.788	0.784
	(0.42)	(15.46)	(-1.30)	(4.52)	(-4.87)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0003	1.1594***	0.0357	0.1668***	0.0372	221	0.935	0.934
	(1.39)	(36.11)	(0.64)	(3.43)	(1.13)			
Scope 1 Emissions Intensity Shadow	0.0000	1.0525***	−0.1409**	0.0891	0.0552	221	0.898	0.896
	(0.10)	(35.44)	(-2.32)	(1.65)	(1.35)			

Table A.5. Factor Loadings: 2020 U.S. Presidential Election (FF4, Value-Weighted)

This table reports factor loadings estimated for the green, brown, and green-minus-brown (GMB) portfolios constructed for the 2020 U.S. presidential election. Loadings are estimated via OLS over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. *Portfolio* refers to the classification measure used to form the portfolios. The table is organised into three panels: Panel A reports loadings for the GMB portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Green and brown portfolios are formed from the top and bottom deciles of each classification measure, respectively. For rating score measures, higher scores indicate stronger environmental or ESG performance; for emissions-based measures, lower emissions intensity indicates greener firms. Scope 1 Emissions Intensity is defined as Scope 1 greenhouse gas emissions relative to firm revenue. Industry Relative Scope 1 Emissions Intensity measures Scope 1 Emissions Intensity relative to firms within the same industry. The Shadow emissions measure compares low-emission reporting firms with matched non-reporting firms. *Alpha* reports the intercept of the factor model regression, expressed as a daily return in percent. *MKT-RF* is the excess return on the market portfolio. *SMB* is the size factor (small-minus-big). *HML* is the value factor (high-minus-low book-to-market). *UMD* is the momentum factor (up-minus-down). N is the number of daily return observations used in estimation. R^2 and $\bar{R}^2$ are the unadjusted and adjusted coefficients of determination, respectively. t-statistics are reported in parentheses below each coefficient. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively. All portfolios are value-weighted using market capitalization.

Panel A. GMB Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	-0.0017^{***}	-0.1478^{***}	-0.9767^{***}	0.0952	-0.1849^{***}	221	0.536	0.527
	(-2.71)	(-2.93)	(-7.19)	(0.96)	(-2.59)			
MSCI Environmental Pillar Score	-0.0005	0.0520^{**}	-0.4378^{***}	-0.4583^{***}	-0.0230	221	0.817	0.813
	(-1.53)	(1.98)	(-6.64)	(-9.35)	(-0.58)			
MSCI ESG Adjusted Score	0.0001	0.0528^{*}	-0.2850^{***}	0.0248	0.0460	221	0.205	0.191
	(0.16)	(1.70)	(-2.71)	(0.43)	(0.88)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0005	0.1509^{***}	-0.2678^{**}	-0.4215^{***}	0.1122	221	0.582	0.574
	(0.81)	(3.15)	(-2.17)	(-3.86)	(1.34)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0002	0.1544^{***}	0.0063	0.0223	0.1337^{**}	221	0.210	0.196
	(0.41)	(3.98)	(0.11)	(0.30)	(2.28)			
Scope 1 Emissions Intensity Shadow	-0.0005	0.1347^{***}	-0.2979^{***}	-0.1510	-0.0831	221	0.225	0.211
	(-0.92)	(4.11)	(-4.22)	(-1.62)	(-1.00)			

Table A.5. Factor Loadings: 2020 U.S. Presidential Election (FF4, Value-Weighted) (*continued*)

Panel B. Green Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	0.0002*	0.9812***	−0.1070***	−0.0199	−0.0201	221	0.993	0.993
	(1.80)	(103.94)	(-4.69)	(-1.01)	(-1.51)			
MSCI Environmental Pillar Score	0.0006***	1.0321***	−0.0810**	0.0061	0.0487**	221	0.988	0.987
	(3.41)	(87.58)	(-2.15)	(0.24)	(2.56)			
MSCI ESG Adjusted Score	0.0006***	1.0812***	−0.0191	−0.1150***	0.0494**	221	0.986	0.986
	(3.20)	(103.13)	(-0.61)	(-3.68)	(2.37)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0006**	1.1537***	−0.1357**	−0.0766*	0.0343	221	0.979	0.979
	(2.16)	(55.67)	(-2.41)	(-1.89)	(1.05)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0007**	1.1258***	−0.0801	−0.1049**	0.0354	221	0.965	0.964
	(2.04)	(58.34)	(-1.43)	(-2.46)	(0.92)			
Scope 1 Emissions Intensity Shadow	0.0008**	1.1767***	−0.1968***	−0.1142**	0.0350	221	0.961	0.960
	(2.28)	(49.72)	(-3.85)	(-2.21)	(0.80)			

Panel C. Brown Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	0.0019***	1.1291***	0.8700***	−0.1153	0.1646**	221	0.919	0.917
	(3.25)	(25.93)	(6.40)	(-1.30)	(2.43)			
MSCI Environmental Pillar Score	0.0011***	0.9803***	0.3571***	0.4642***	0.0715*	221	0.976	0.976
	(3.71)	(38.10)	(8.43)	(9.14)	(1.92)			
MSCI ESG Adjusted Score	0.0005	1.0286***	0.2662**	−0.1400**	0.0032	221	0.942	0.941
	(1.27)	(36.24)	(2.27)	(-2.48)	(0.06)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0000	1.0030***	0.1324*	0.3447***	−0.0781	221	0.949	0.948
	(0.10)	(28.34)	(1.68)	(3.99)	(-1.20)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0004	0.9716***	−0.0861	−0.1273**	−0.0985**	221	0.938	0.937
	(1.02)	(34.83)	(-1.36)	(-2.22)	(-1.98)			
Scope 1 Emissions Intensity Shadow	0.0012***	1.0422***	0.1013**	0.0367	0.1180**	221	0.951	0.950
	(3.27)	(53.43)	(2.02)	(0.58)	(2.02)			

Table A.6. Factor Loadings: 2024 U.S. Presidential Election (FF4, Value-Weighted)

This table reports factor loadings estimated for the green, brown, and green-minus-brown (GMB) portfolios constructed for the 2024 U.S. presidential election. Loadings are estimated via OLS over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. *Portfolio* refers to the classification measure used to form the portfolios. The table is organised into three panels: Panel A reports loadings for the GMB portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Green and brown portfolios are formed from the top and bottom deciles of each classification measure, respectively. For rating score measures, higher scores indicate stronger environmental or ESG performance; for emissions-based measures, lower emissions intensity indicates greener firms. Scope 1 Emissions Intensity is defined as Scope 1 greenhouse gas emissions relative to firm revenue. Industry Relative Scope 1 Emissions Intensity measures Scope 1 Emissions Intensity relative to firms within the same industry. The Shadow emissions measure compares low-emission reporting firms with matched non-reporting firms. *Alpha* reports the intercept of the factor model regression, expressed as a daily return in percent. *MKT-RF* is the excess return on the market portfolio. *SMB* is the size factor (small-minus-big). *HML* is the value factor (high-minus-low book-to-market). *UMD* is the momentum factor (up-minus-down). N is the number of daily return observations used in estimation. R^2 and $\bar{R}^2$ are the unadjusted and adjusted coefficients of determination, respectively. t-statistics are reported in parentheses below each coefficient. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively. All portfolios are value-weighted using market capitalization.

Panel A. GMB Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	-0.0014^{**}	-0.1444	-1.1040^{***}	0.1687	-0.0026	221	0.592	0.585
	(-2.55)	(-1.49)	(-11.91)	(1.48)	(-0.03)			
MSCI Environmental Pillar Score	-0.0004	-0.0205	-0.5325^{***}	-0.2134^{***}	-0.0704	221	0.577	0.569
	(-1.28)	(-0.36)	(-11.43)	(-3.29)	(-1.47)			
MSCI ESG Adjusted Score	-0.0006	-0.1770	-0.0397	-0.1417	-0.0106	221	0.020	0.002
	(-0.72)	(-1.17)	(-0.26)	(-0.82)	(-0.07)			
Scope 1 Emissions Intensity (Reported or Estimated)	-0.0000	0.3776^{***}	-0.0325	-0.7012^{***}	0.4637^{***}	221	0.653	0.646
	(-0.07)	(5.34)	(-0.47)	(-8.07)	(6.09)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0001	0.2806^{***}	-0.0038	-0.4364^{***}	0.3621^{***}	221	0.362	0.351
	(0.11)	(2.71)	(-0.05)	(-3.34)	(3.06)			
Scope 1 Emissions Intensity Shadow	-0.0006	-0.1912^{**}	-0.3791^{***}	-0.0040	-0.2382^{***}	221	0.212	0.197
	(-1.17)	(-1.98)	(-4.98)	(-0.04)	(-2.68)			

Table A.6. Factor Loadings: 2024 U.S. Presidential Election (FF4, Value-Weighted) (*continued*)

Panel B. Green Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	0.0003***	1.0325***	−0.0882***	−0.0659***	0.0528***	221	0.972	0.971
	(2.69)	(55.38)	(-5.17)	(-3.06)	(2.91)			
MSCI Environmental Pillar Score	0.0002	0.9032***	−0.1085***	0.0885**	−0.1006***	221	0.866	0.864
	(1.16)	(30.06)	(-4.32)	(2.41)	(-3.81)			
MSCI ESG Adjusted Score	0.0003	1.1381***	−0.0793*	−0.1747***	0.2374***	221	0.896	0.895
	(1.33)	(25.63)	(-1.91)	(-3.63)	(4.90)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0004*	1.1786***	−0.0793**	−0.2013***	0.2380***	221	0.918	0.916
	(1.85)	(29.74)	(-2.35)	(-4.31)	(5.70)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0005	1.3273***	−0.0282	−0.3319***	0.3186***	221	0.833	0.830
	(1.26)	(19.36)	(-0.55)	(-3.96)	(4.44)			
Scope 1 Emissions Intensity Shadow	0.0002	0.9741***	0.0651	−0.1681**	−0.0613	221	0.693	0.688
	(0.64)	(17.65)	(1.19)	(-2.12)	(-0.81)			

Panel C. Brown Portfolios

Portfolio	Alpha	MKTRF	SMB	HML	UMD	N	R^2	Adj. R^2
LSEG ESG Score	0.0015***	1.1769***	1.0157***	−0.2346**	0.0554	221	0.784	0.780
	(2.86)	(13.66)	(12.18)	(-2.27)	(0.67)			
MSCI Environmental Pillar Score	0.0005*	0.9237***	0.4240***	0.3019***	−0.0302	221	0.884	0.882
	(1.81)	(23.07)	(11.65)	(6.54)	(-0.83)			
MSCI ESG Adjusted Score	0.0007	1.3152***	−0.0396	−0.0331	0.2480**	221	0.515	0.506
	(0.99)	(9.72)	(-0.29)	(-0.22)	(2.01)			
Scope 1 Emissions Intensity (Reported or Estimated)	0.0002	0.8009***	−0.0468	0.4999***	−0.2257***	221	0.687	0.681
	(0.75)	(16.01)	(-0.81)	(8.58)	(-4.33)			
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0002	1.0467***	−0.0243	0.1044	−0.0434	221	0.808	0.804
	(0.81)	(20.46)	(-0.54)	(1.64)	(-0.75)			
Scope 1 Emissions Intensity Shadow	0.0007*	1.1653***	0.4442***	−0.1641**	0.1768**	221	0.805	0.801
	(1.66)	(17.48)	(7.43)	(-2.18)	(2.50)			

Table A.7. Portfolio Correlation Matrices: 2016 U.S. Presidential Election (FF4, Value-Weighted)

This table reports pairwise Pearson correlations and annualised standard deviations of daily portfolio returns for the 2016 U.S. presidential election. Returns are computed over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Panel A reports statistics for the GMB (green-minus-brown) portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Each panel presents a lower-triangular correlation matrix across the six portfolio classification criteria. Diagonal entries (in italics) report the annualised standard deviation of daily returns in percent. Off-diagonal entries report the Pearson correlation coefficient between the corresponding portfolio pair. All portfolios are value-weighted using market capitalization. The portfolio classification criteria are: (1) LSEG ESG Score; (2) MSCI Environmental Pillar Score; (3) MSCI ESG Adjusted Score; (4) Scope 1 Emissions Intensity (Reported or Estimated); (5) Industry Relative Scope 1 Emissions Intensity (Reported or Estimated); (6) Scope 1 Emissions Intensity Shadow.

Panel A. GMB Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*9.0%*					
(2)	0.12	*9.8%*				
(3)	0.15	0.13	*6.3%*			
(4)	-0.25	0.51	0.03	*14.8%*		
(5)	0.20	0.28	0.01	0.43	*10.7%*	
(6)	-0.15	0.03	0.20	0.30	0.68	*9.6%*

Panel B. Green Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*14.2%*					
(2)	0.97	*15.3%*				
(3)	0.96	0.97	*15.1%*			
(4)	0.90	0.94	0.95	*18.1%*		
(5)	0.83	0.86	0.91	0.96	*17.4%*	
(6)	0.84	0.87	0.91	0.98	0.98	*18.9%*

Panel C. Brown Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*19.9%*					
(2)	0.84	*19.5%*				
(3)	0.91	0.86	*15.9%*			
(4)	0.73	0.86	0.73	*20.0%*		
(5)	0.95	0.88	0.89	0.79	*18.2%*	
(6)	0.89	0.84	0.93	0.69	0.90	*16.3%*

Table A.8. Portfolio Correlation Matrices: 2020 U.S. Presidential Election (FF4, Value-Weighted)

This table reports pairwise Pearson correlations and annualised standard deviations of daily portfolio returns for the 2020 U.S. presidential election. Returns are computed over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Panel A reports statistics for the GMB (green-minus-brown) portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Each panel presents a lower-triangular correlation matrix across the six portfolio classification criteria. Diagonal entries (in italics) report the annualised standard deviation of daily returns in percent. Off-diagonal entries report the Pearson correlation coefficient between the corresponding portfolio pair. All portfolios are value-weighted using market capitalization. The portfolio classification criteria are: (1) LSEG ESG Score; (2) MSCI Environmental Pillar Score; (3) MSCI ESG Adjusted Score; (4) Scope 1 Emissions Intensity (Reported or Estimated); (5) Industry Relative Scope 1 Emissions Intensity (Reported or Estimated); (6) Scope 1 Emissions Intensity Shadow.

Panel A. GMB Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*20.4%*					
(2)	0.37	*17.0%*				
(3)	0.48	0.36	*11.5%*			
(4)	0.18	0.72	0.15	*20.1%*		
(5)	-0.17	0.12	-0.05	0.34	*13.3%*	
(6)	0.25	0.32	0.21	0.52	0.54	*13.7%*

Panel B. Green Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*34.9%*					
(2)	0.99	*36.8%*				
(3)	0.99	0.99	*37.9%*			
(4)	0.98	0.99	0.99	*40.7%*		
(5)	0.97	0.97	0.97	0.99	*39.9%*	
(6)	0.96	0.97	0.97	0.99	1.00	*41.6%*

Panel C. Brown Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*45.0%*					
(2)	0.91	*42.3%*				
(3)	0.95	0.91	*37.8%*			
(4)	0.89	0.97	0.89	*42.2%*		
(5)	0.89	0.89	0.94	0.89	*35.1%*	
(6)	0.93	0.91	0.96	0.91	0.94	*38.4%*

Table A.9. Portfolio Correlation Matrices: 2024 U.S. Presidential Election (FF4, Value-Weighted)

This table reports pairwise Pearson correlations and annualised standard deviations of daily portfolio returns for the 2024 U.S. presidential election. Returns are computed over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Panel A reports statistics for the GMB (green-minus-brown) portfolios, Panel B for the green portfolios, and Panel C for the brown portfolios. Each panel presents a lower-triangular correlation matrix across the six portfolio classification criteria. Diagonal entries (in italics) report the annualised standard deviation of daily returns in percent. Off-diagonal entries report the Pearson correlation coefficient between the corresponding portfolio pair. All portfolios are value-weighted using market capitalization. The portfolio classification criteria are: (1) LSEG ESG Score; (2) MSCI Environmental Pillar Score; (3) MSCI ESG Adjusted Score; (4) Scope 1 Emissions Intensity (Reported or Estimated); (5) Industry Relative Scope 1 Emissions Intensity (Reported or Estimated); (6) Scope 1 Emissions Intensity Shadow.

Panel A. GMB Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*20.3%*					
(2)	0.57	*11.2%*				
(3)	0.21	-0.08	*19.6%*			
(4)	0.15	0.34	0.03	*17.7%*		
(5)	0.14	0.03	0.33	0.75	*16.5%*	
(6)	0.53	0.26	0.22	-0.04	0.03	*13.5%*

Panel B. Green Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*13.7%*					
(2)	0.87	*11.7%*				
(3)	0.95	0.77	*17.2%*			
(4)	0.96	0.78	0.96	*17.7%*		
(5)	0.93	0.67	0.94	0.96	*21.9%*	
(6)	0.83	0.75	0.69	0.81	0.77	*15.8%*

Panel C. Brown Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)
(1)	*26.3%*					
(2)	0.81	*16.2%*				
(3)	0.53	0.51	*25.1%*			
(4)	0.56	0.78	0.36	*13.0%*		
(5)	0.68	0.73	0.68	0.68	*14.6%*	
(6)	0.84	0.77	0.68	0.53	0.76	*20.3%*

B. Diagnostic Checks

Table B.1. Autocorrelation and Heteroskedasticity Diagnostic Tests: 2016

This table reports residual diagnostic tests for the abnormal return series estimated over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Diagnostics are reported separately for the green-minus-brown(GMB), green, and brown portfolios for each portfolio classification criterion. Panel A reports p-values from the Ljung–Box portmanteau test for residual autocorrelation at lags 1, 3, 5, and 10. Panel B reports p-values from the Breusch–Pagan test for conditional heteroskedasticity, where the auxiliary regression uses the same factor model regressors as the main estimation. For both tests, a low p-value indicates rejection of the null hypothesis of no autocorrelation (Panel A) or homoskedasticity (Panel B). All portfolios are value-weighted using market capitalization. The factor model is Fama-French 4-factor model. p-values are reported directly; *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

Panel A. Ljung–Box Test

Portfolio	Lag	GMB	Green	Brown
LSEG ESG Score	1	0.9367	0.2216	0.9253
	3	0.9503	0.6805	0.7847
	5	0.9954	0.7589	0.9540
	10	0.2594	0.0650*	0.6542
MSCI Environmental Pillar Score	1	0.0145**	0.0721*	0.2522
	3	0.0319**	0.1420	0.0654*
	5	0.0700*	0.3350	0.1896
	10	0.3302	0.5770	0.4894
MSCI ESG Adjusted Score	1	0.0122**	0.2115	0.0641*
	3	0.0639*	0.2728	0.3097
	5	0.1120	0.4641	0.0853*
	10	0.0064***	0.0633*	0.0462**
Scope 1 Emissions Intensity (Reported or Estimated)	1	0.7290	0.4758	0.4206
	3	0.8791	0.8135	0.7876
	5	0.7888	0.9527	0.9016
	10	0.8926	0.7711	0.9792
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	1	0.0574*	0.3676	0.8909
	3	0.2405	0.7915	0.4281
	5	0.1414	0.9377	0.1839
	10	0.1868	0.6538	0.3723
Scope 1 Emissions Intensity Shadow	1	0.0825*	0.2405	0.1494
	3	0.3577	0.4872	0.1797
	5	0.4216	0.6955	0.0485**
	10	0.4301	0.3040	0.1483

Panel B. Breusch–Pagan Test

Portfolio	GMB	Green	Brown
LSEG ESG Score	0.5237	0.1395	0.5166
MSCI Environmental Pillar Score	0.0717*	0.1267	0.3329
MSCI ESG Adjusted Score	0.2246	0.1109	0.1716
Scope 1 Emissions Intensity (Reported or Estimated)	0.2200	0.1094	0.2148
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.1520	0.1643	0.7857
Scope 1 Emissions Intensity Shadow	0.0471**	0.1264	0.0868*

Table B.2. Autocorrelation and Heteroskedasticity Diagnostic Tests: 2020

This table reports residual diagnostic tests for the abnormal return series estimated over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Diagnostics are reported separately for the green-minus-brown(GMB), green, and brown portfolios for each portfolio classification criterion. Panel A reports p-values from the Ljung–Box portmanteau test for residual autocorrelation at lags 1, 3, 5, and 10. Panel B reports p-values from the Breusch–Pagan test for conditional heteroskedasticity, where the auxiliary regression uses the same factor model regressors as the main estimation. For both tests, a low p-value indicates rejection of the null hypothesis of no autocorrelation (Panel A) or homoskedasticity (Panel B). All portfolios are value-weighted using market capitalization. The factor model is Fama-French 4-factor model. p-values are reported directly; *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

Panel A. Ljung–Box Test

Portfolio	Lag	GMB	Green	Brown
LSEG ESG Score	1	0.0315**	0.0837*	0.0294**
	3	0.1846	0.1370	0.1745
	5	0.2789	0.0981*	0.2603
	10	0.0445**	0.0182**	0.0381**
MSCI Environmental Pillar Score	1	0.0339**	0.8937	0.0633*
	3	0.1302	0.0246**	0.2448
	5	0.0229**	0.0775*	0.0091***
	10	0.0053***	0.0912*	0.0001***
MSCI ESG Adjusted Score	1	0.2112	0.8742	0.0667*
	3	0.0505*	0.5719	0.0026***
	5	0.1577	0.6773	0.0079***
	10	0.3150	0.7066	0.0632*
Scope 1 Emissions Intensity (Reported or Estimated)	1	0.2520	0.0007***	0.2947
	3	0.1229	0.0080***	0.1591
	5	0.1601	0.0264**	0.0342**
	10	0.2099	0.1366	0.0185**
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	1	0.3327	0.1180	0.6992
	3	0.4670	0.2928	0.8407
	5	0.4365	0.5373	0.8875
	10	0.7741	0.8034	0.8858
Scope 1 Emissions Intensity Shadow	1	0.1061	0.1543	0.5331
	3	0.0615*	0.3997	0.2254
	5	0.1315	0.7015	0.1486
	10	0.1638	0.8835	0.0182**

Panel B. Breusch–Pagan Test

Portfolio	GMB	Green	Brown
LSEG ESG Score	0.3116	0.0731*	0.8764
MSCI Environmental Pillar Score	0.8485	0.2928	0.0129**
MSCI ESG Adjusted Score	0.4726	0.8097	0.2023
Scope 1 Emissions Intensity (Reported or Estimated)	0.0012***	0.0679*	0.0002***
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.5090	0.4395	0.6071
Scope 1 Emissions Intensity Shadow	0.5060	0.0904*	0.9158

Table B.3. Autocorrelation and Heteroskedasticity Diagnostic Tests: 2024

This table reports residual diagnostic tests for the abnormal return series estimated over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Diagnostics are reported separately for the green-minus-brown(GMB), green, and brown portfolios for each portfolio classification criterion. Panel A reports p-values from the Ljung–Box portmanteau test for residual autocorrelation at lags 1, 3, 5, and 10. Panel B reports p-values from the Breusch–Pagan test for conditional heteroskedasticity, where the auxiliary regression uses the same factor model regressors as the main estimation. For both tests, a low p-value indicates rejection of the null hypothesis of no autocorrelation (Panel A) or homoskedasticity (Panel B). All portfolios are value-weighted using market capitalization. The factor model is Fama-French 4-factor model. p-values are reported directly; *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

Panel A. Ljung–Box Test

Portfolio	Lag	GMB	Green	Brown
LSEG ESG Score	1	0.2144	0.9738	0.2173
	3	0.1541	0.7062	0.1531
	5	0.1106	0.4942	0.0803*
	10	0.0449**	0.8739	0.0232**
MSCI Environmental Pillar Score	1	0.9987	0.0145**	0.0928*
	3	0.6416	0.0512*	0.3041
	5	0.8859	0.1608	0.4621
	10	0.7212	0.1401	0.1600
MSCI ESG Adjusted Score	1	0.0703*	0.3166	0.0824*
	3	0.1812	0.7918	0.1862
	5	0.3212	0.4906	0.2988
	10	0.7180	0.5686	0.6308
Scope 1 Emissions Intensity (Reported or Estimated)	1	0.6311	0.2233	0.9672
	3	0.8595	0.2021	0.9481
	5	0.7254	0.1524	0.9379
	10	0.8422	0.3376	0.9757
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	1	0.7443	0.1982	0.7403
	3	0.7774	0.5608	0.1520
	5	0.4937	0.3456	0.2758
	10	0.8853	0.5390	0.2862
Scope 1 Emissions Intensity Shadow	1	0.5201	0.5508	0.9090
	3	0.8476	0.9300	0.1408
	5	0.4497	0.7890	0.2045
	10	0.5947	0.9203	0.4960

Panel B. Breusch–Pagan Test

Portfolio	GMB	Green	Brown
LSEG ESG Score	0.2135	0.4471	0.4132
MSCI Environmental Pillar Score	0.0256**	0.4948	0.1295
MSCI ESG Adjusted Score	0.2350	0.4831	0.2244
Scope 1 Emissions Intensity (Reported or Estimated)	0.3566	0.0931*	0.6952
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated)	0.0121**	0.0214**	0.4653
Scope 1 Emissions Intensity Shadow	0.6347	0.9245	0.4245

C. Robustness Checks

Table C.1. CARs Across U.S. Elections (FF5, Value-Weighted)

This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-10, +10]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF5 model, and portfolios are value-weighted. The FF5 model includes the market excess return, size, value, profitability, and investment factors: MKT-RF, SMB, HML, RMW, and CMA. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

		2016	2020	2024
Portfolio	Mode	[-10,+10]	[-10,+10]	[-10,+10]
LSEG ESG Score 10%	GMB	$-2.14\%^{***}$ (-3.29)	0.18% (0.14)	$-5.69\%^{***}$ (-5.33)
	Green	$-0.48\%^{***}$ (-2.69)	$-0.54\%^{*}$ (-1.82)	$-2.02\%^{***}$ (-10.27)
	Brown	$1.66\%^{***}$ (2.82)	-0.63% (-0.55)	$3.67\%^{***}$ (3.64)
MSCI Environmental Pillar Score 10%	GMB	$0.93\%^{**}$ (2.19)	0.60% (0.86)	$1.70\%^{***}$ (2.80)
	Green	$-0.77\%^{***}$ (-4.21)	$-1.35\%^{***}$ (-4.33)	$1.56\%^{***}$ (4.60)
	Brown	$-1.71\%^{***}$ (-4.79)	$-1.86\%^{***}$ (-3.06)	-0.13% (-0.26)
MSCI ESG Adjusted Score 10%	GMB	$-2.28\%^{***}$ (-3.76)	$-2.48\%^{***}$ (-2.95)	$2.75\%^{*}$ (1.70)
	Green	$-1.44\%^{***}$ (-5.24)	$-2.29\%^{***}$ (-6.20)	$-1.82\%^{***}$ (-3.61)
	Brown	$0.83\%^{*}$ (1.94)	0.29% (0.42)	$-4.56\%^{***}$ (-3.13)
Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	$4.34\%^{***}$ (4.58)	0.72% (0.61)	-0.19% (-0.20)
	Green	0.07% (0.16)	0.48% (0.82)	$-0.95\%^{**}$ (-2.18)
	Brown	$-4.27\%^{***}$ (-5.70)	-0.14% (-0.18)	-0.75% (-1.12)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	$-2.66\%^{***}$ (-4.33)	$2.23\%^{**}$ (2.05)	$-3.46\%^{***}$ (-3.11)
	Green	$-1.89\%^{***}$ (-3.21)	$2.26\%^{***}$ (3.52)	$-2.77\%^{***}$ (-3.58)
	Brown	$0.78\%^{**}$ (2.23)	0.13% (0.17)	0.69% (1.36)
Scope 1 Emissions Intensity Shadow 10%	GMB	$-3.21\%^{***}$ (-4.61)	$2.91\%^{***}$ (2.77)	$-8.93\%^{***}$ (-8.69)
	Green	$-1.37\%^{**}$ (-2.27)	0.73% (0.97)	$-1.76\%^{**}$ (-2.28)
	Brown	$1.85\%^{***}$ (4.52)	$-2.09\%^{***}$ (-2.95)	$7.18\%^{***}$ (9.72)

Table C.2. Cumulative Abnormal Returns Across U.S. Elections (FF5+, Value-Weighted)

This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-10, +10]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF5+ model, and portfolios are value-weighted. The FF5+ model includes the market excess return, size, value, profitability, investment, and momentum factors: MKT-RF, SMB, HML, RMW, CMA, and UMD. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

		2016	2020	2024
Portfolio	Mode	[-10,+10]	[-10,+10]	[-10,+10]
LSEG ESG Score 10%	GMB	$-1.24\%^{*}$ (-1.92)	-0.70% (-0.57)	$-5.67\%^{***}$ (-5.31)
	Green	$-0.54\%^{***}$ (-3.03)	$-0.66\%^{**}$ (-2.24)	$-2.08\%^{***}$ (-10.91)
	Brown	0.71% (1.21)	0.13% (0.12)	$3.60\%^{***}$ (3.56)
MSCI Environmental Pillar Score 10%	GMB	-0.35% (-0.89)	0.38% (0.54)	$1.86\%^{***}$ (3.08)
	Green	$-1.26\%^{***}$ (-7.42)	$-1.15\%^{***}$ (-3.74)	$1.73\%^{***}$ (5.26)
	Brown	$-0.91\%^{***}$ (-2.65)	$-1.43\%^{**}$ (-2.35)	-0.13% (-0.26)
MSCI ESG Adjusted Score 10%	GMB	$-1.96\%^{***}$ (-3.28)	$-2.24\%^{***}$ (-2.67)	2.56% (1.59)
	Green	$-1.73\%^{***}$ (-6.23)	$-2.00\%^{***}$ (-5.47)	$-2.11\%^{***}$ (-4.48)
	Brown	0.23% (0.57)	0.34% (0.49)	$-4.67\%^{***}$ (-3.21)
Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	1.03% (1.11)	1.66% (1.42)	-0.67% (-0.76)
	Green	-0.24% (-0.57)	0.83% (1.44)	$-1.19\%^{***}$ (-3.05)
	Brown	$-1.27\%^{*}$ (-1.82)	-0.74% (-0.94)	-0.52% (-0.82)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	$-2.60\%^{***}$ (-4.23)	$3.21\%^{***}$ (3.07)	$-3.99\%^{***}$ (-3.74)
	Green	$-1.98\%^{***}$ (-3.37)	$2.79\%^{***}$ (4.48)	$-3.19\%^{***}$ (-4.38)
	Brown	$0.62\%^{*}$ (1.75)	-0.33% (-0.43)	0.80% (1.58)
Scope 1 Emissions Intensity Shadow 10%	GMB	$-2.59\%^{***}$ (-3.78)	$2.94\%^{***}$ (2.80)	$-8.63\%^{***}$ (-8.45)
	Green	$-1.36\%^{**}$ (-2.25)	$1.24\%^{*}$ (1.71)	$-1.62\%^{**}$ (-2.08)
	Brown	$1.23\%^{***}$ (3.07)	$-1.60\%^{**}$ (-2.26)	$7.01\%^{***}$ (9.68)

Table C.3. CARs Across U.S. Elections (FF4, Value-Weighted)

This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-10, +10]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF4 model, and portfolios are value-weighted. The FF4 model includes the market excess return, size, value, and momentum factors: MKT-RF, SMB, HML, and UMD. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

		2016	2020	2024
Portfolio	Mode	[-10,+10]	[-10,+10]	[-10,+10]
LSEG ESG Score 20%	GMB	−0.22%	6.69%***	−3.99%***
		(-0.45)	(5.02)	(-4.60)
	Green	−0.23%	−0.30%	−1.65%***
		(-1.40)	(-1.56)	(-12.64)
	Brown	−0.01%	−6.90%***	2.35%***
		(-0.03)	(-5.45)	(2.80)
MSCI Environmental Pillar Score 20%	GMB	−2.01%***	1.61%	2.67%***
		(-4.18)	(1.63)	(4.82)
	Green	−1.45%***	−0.59%**	0.97%***
		(-10.89)	(-2.22)	(3.42)
	Brown	0.57%	−2.10%**	−1.70%***
		(1.34)	(-2.31)	(-3.79)
MSCI ESG Adjusted Score 20%	GMB	0.61%	−0.53%	−2.02%**
		(1.28)	(-0.71)	(-1.96)
	Green	−1.02%***	−1.68%***	−2.93%***
		(-4.46)	(-5.96)	(-8.68)
	Brown	−1.63%***	−1.07%*	−0.91%
		(-5.24)	(-1.65)	(-0.97)
Scope 1 Emissions Intensity (Reported or Estimated) 20%	GMB	0.34%	−0.79%	−0.06%
		(0.40)	(-0.79)	(-0.09)
	Green	−0.81%**	−0.51%	−0.90%***
		(-2.03)	(-0.99)	(-3.30)
	Brown	−1.14%**	0.38%	−0.84%*
		(-2.21)	(0.63)	(-1.89)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 20%	GMB	0.05%	2.07%**	−2.14%***
		(0.08)	(2.47)	(-3.18)
	Green	−0.64%*	0.53%	−1.96%***
		(-1.67)	(1.16)	(-5.52)
	Brown	−0.68%*	−1.45%***	0.19%
		(-1.88)	(-2.69)	(0.45)
Scope 1 Emissions Intensity Shadow 20%	GMB	−0.36%	3.15%***	−6.23%***
		(-0.75)	(3.11)	(-8.14)
	Green	0.20%	0.08%	−1.19%***
		(0.39)	(0.13)	(-3.10)
	Brown	0.56%	−2.98%***	5.04%***
		(1.53)	(-3.98)	(7.96)

Table C.4. CARs Across U.S. Elections (FF4, Value-Weighted)

This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-10, +10]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF4 model, and portfolios are value-weighted. The FF4 model includes the market excess return, size, value, and momentum factors: MKT-RF, SMB, HML, and UMD. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

		2016	2020	2024
Portfolio	Mode	[-10,+10]	[-10,+10]	[-10,+10]
LSEG ESG Score 30%	GMB	$-0.70\%^{*}$ (-1.89)	$5.17\%^{***}$ (5.18)	$-4.76\%^{***}$ (-7.09)
	Green	$-0.50\%^{***}$ (-4.20)	$-0.42\%^{**}$ (-2.58)	$-1.60\%^{***}$ (-15.72)
	Brown	0.20% (0.66)	$-5.50\%^{***}$ (-5.55)	$3.16\%^{***}$ (4.90)
MSCI Environmental Pillar Score 30%	GMB	$-0.90\%^{**}$ (-2.50)	1.27% (1.55)	$1.75\%^{***}$ (3.56)
	Green	$-1.46\%^{***}$ (-11.34)	$-0.57\%^{**}$ (-2.17)	$0.87\%^{***}$ (3.11)
	Brown	$-0.56\%^{*}$ (-1.95)	$-1.75\%^{**}$ (-2.35)	$-0.88\%^{**}$ (-2.17)
MSCI ESG Adjusted Score 30%	GMB	0.11% (0.31)	$-1.64\%^{**}$ (-2.46)	-1.13% (-1.49)
	Green	$-0.97\%^{***}$ (-5.55)	$-1.24\%^{***}$ (-5.72)	$-0.99\%^{***}$ (-3.76)
	Brown	$-1.09\%^{***}$ (-4.74)	0.50% (0.86)	0.15% (0.23)
Scope 1 Emissions Intensity (Reported or Estimated) 30%	GMB	1.09% (1.59)	0.28% (0.39)	$1.38\%^{**}$ (2.34)
	Green	$-0.84\%^{**}$ (-2.28)	-0.55% (-1.47)	$0.42\%^{*}$ (1.79)
	Brown	$-1.93\%^{***}$ (-5.01)	$-0.75\%^{*}$ (-1.67)	$-0.96\%^{**}$ (-2.45)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 30%	GMB	$-1.11\%^{**}$ (-2.38)	$1.59\%^{**}$ (2.15)	-0.03% (-0.05)
	Green	$-1.35\%^{***}$ (-4.94)	0.24% (0.60)	-0.31% (-1.20)
	Brown	-0.24% (-0.79)	$-1.27\%^{***}$ (-2.58)	-0.28% (-0.76)
Scope 1 Emissions Intensity Shadow 30%	GMB	$-1.42\%^{***}$ (-3.44)	$2.70\%^{***}$ (2.94)	$-4.25\%^{***}$ (-6.44)
	Green	$-0.74\%^{*}$ (-1.69)	-0.16% (-0.28)	$-1.28\%^{***}$ (-4.61)
	Brown	$0.69\%^{**}$ (2.27)	$-2.76\%^{***}$ (-3.89)	$2.96\%^{***}$ (5.14)

Table C.5. CAR Across U.S. Elections (FF4, Value-Weighted)

This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-5, +5]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF4 model, and portfolios are value-weighted. The FF4 model includes the market excess return, size, value, and momentum factors: MKT-RF, SMB, HML, and UMD. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

		2016	2020	2024
Portfolio	Mode	[-5,+5]	[-5,+5]	[-5,+5]
LSEG ESG Score 10%	GMB	−0.37% (-1.09)	−0.67% (-0.93)	−2.78%*** (-4.80)
	Green	−0.46%*** (-4.21)	0.06% (0.38)	−1.63%*** (-15.92)
	Brown	−0.08% (-0.27)	0.77% (1.16)	1.15%** (2.12)
MSCI Environmental Pillar Score 10%	GMB	0.74%*** (3.62)	0.35% (0.97)	1.41%*** (4.13)
	Green	−0.23%** (-2.48)	−0.28%* (-1.66)	1.26%*** (7.15)
	Brown	−0.97%*** (-5.42)	−0.59%* (-1.82)	−0.14% (-0.52)
MSCI ESG Adjusted Score 10%	GMB	−2.95%*** (-8.96)	0.39% (0.82)	0.85% (0.99)
	Green	−1.65%*** (-10.09)	−0.78%*** (-3.91)	−1.36%*** (-5.51)
	Brown	1.30%*** (5.85)	−1.11%*** (-2.62)	−2.21%*** (-2.83)
Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	1.68%*** (2.84)	−1.10%* (-1.71)	0.12% (0.25)
	Green	0.18% (0.67)	0.29% (0.92)	−0.62%*** (-2.96)
	Brown	−1.49%*** (-3.69)	1.44%*** (3.43)	−0.73%** (-2.15)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	−2.52%*** (-6.62)	2.47%*** (4.36)	−4.68%*** (-8.00)
	Green	−2.12%*** (-6.19)	0.76%** (2.08)	−3.39%*** (-8.64)
	Brown	0.41%** (2.02)	−1.66%*** (-4.09)	1.29%*** (4.64)
Scope 1 Emissions Intensity Shadow 10%	GMB	−2.74%*** (-7.20)	0.34% (0.52)	−9.25%*** (-16.05)
	Green	−1.15%*** (-3.11)	0.64% (1.53)	−2.08%*** (-4.99)
	Brown	1.59%*** (7.18)	0.35% (0.86)	7.18%*** (17.44)

Table C.6. CARs Across U.S. Elections (FF4, Value-Weighted)

This table reports Cumulative Abnormal Returns (CARs) for green, brown, and green-minus-brown (GMB) portfolios around the 2016, 2020, and 2024 U.S. presidential elections. CARs are reported over the event window $[-1, +1]$, where $t_0 = 0$ denotes the election date. Expected returns are estimated using the FF4 model, and portfolios are value-weighted. The FF4 model includes the market excess return, size, value, and momentum factors: MKT-RF, SMB, HML, and UMD. The GMB portfolio is defined as the green portfolio minus the brown portfolio. For rating-based criteria, green portfolios consist of firms in the top 10% of the score distribution in the relevant election year, while brown portfolios consist of firms in the bottom 10%. These rating-based criteria include the LSEG ESG Score, MSCI Environmental Pillar Score, and MSCI ESG Adjusted Score, where higher scores correspond to greener firms. For Scope 1 emissions intensity, green portfolios consist of firms in the bottom 10% of the emissions intensity distribution, while brown portfolios consist of firms in the top 10%. Scope 1 emissions intensity measures direct greenhouse gas emissions from owned or controlled operations, scaled by revenue, and includes both reported and estimated emissions values depending on data availability. The industry-relative Scope 1 emissions intensity criterion ranks firms by Scope 1 emissions intensity relative to firms in the same industry. The Scope 1 emissions intensity shadow criterion compares low-emissions reporting firms with matched non-reporting firms, where non-reporting status is treated as an indicator of higher climate-related transparency. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

		2016	2020	2024
Portfolio	Mode	[-1,+1]	[-1,+1]	[-1,+1]
LSEG ESG Score 10%	GMB	$-0.79\%^{***}$ (-8.50)	$-0.36\%^{*}$ (-1.82)	$1.24\%^{***}$ (7.82)
	Green	0.01% (0.48)	-0.06% (-1.47)	$-0.49\%^{***}$ (-17.55)
	Brown	$0.81\%^{***}$ (9.66)	$0.31\%^{*}$ (1.70)	$-1.73\%^{***}$ (-11.65)
MSCI Environmental Pillar Score 10%	GMB	$-0.39\%^{***}$ (-7.01)	$0.45\%^{***}$ (4.57)	$-0.58\%^{***}$ (-6.28)
	Green	$-0.50\%^{***}$ (-19.95)	$-0.18\%^{***}$ (-3.82)	$0.75\%^{***}$ (15.45)
	Brown	$-0.11\%^{**}$ (-2.35)	$-0.62\%^{***}$ (-7.03)	$1.33\%^{***}$ (17.69)
MSCI ESG Adjusted Score 10%	GMB	$-1.20\%^{***}$ (-13.35)	$-0.68\%^{***}$ (-5.25)	$1.06\%^{***}$ (4.48)
	Green	$-0.89\%^{***}$ (-19.95)	$-1.00\%^{***}$ (-18.54)	$-0.59\%^{***}$ (-8.76)
	Brown	$0.31\%^{***}$ (5.08)	$-0.32\%^{***}$ (-2.72)	$-1.64\%^{***}$ (-7.71)
Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	-0.02% (-0.09)	0.23% (1.33)	$-0.45\%^{***}$ (-3.59)
	Green	-0.12% (-1.56)	$-0.38\%^{***}$ (-4.33)	$-0.19\%^{***}$ (-3.30)
	Brown	-0.10% (-0.91)	$-0.60\%^{***}$ (-5.24)	$0.27\%^{***}$ (2.87)
Industry Relative Scope 1 Emissions Intensity (Reported or Estimated) 10%	GMB	$-0.94\%^{***}$ (-9.06)	$1.20\%^{***}$ (7.73)	$-0.88\%^{***}$ (-5.55)
	Green	$-1.04\%^{***}$ (-11.13)	$0.57\%^{***}$ (5.77)	$-0.71\%^{***}$ (-6.61)
	Brown	$-0.10\%^{*}$ (-1.73)	$-0.61\%^{***}$ (-5.48)	$0.18\%^{**}$ (2.34)
Scope 1 Emissions Intensity Shadow 10%	GMB	$-0.84\%^{***}$ (-8.09)	$0.56\%^{***}$ (3.18)	$-3.16\%^{***}$ (-20.09)
	Green	$-0.32\%^{***}$ (-3.19)	-0.16% (-1.44)	$-0.98\%^{***}$ (-8.66)
	Brown	$0.52\%^{***}$ (8.56)	$-0.71\%^{***}$ (-6.32)	$2.18\%^{***}$ (19.39)

Table C.7. CARs by GICS Industry Around U.S. Elections (FF4, Value-Weighted)

This table reports cumulative abnormal returns (CARs) for value-weighted GICS industry group portfolios around the 2016, 2020, and 2024 U.S. presidential elections. Each row corresponds to a GICS industry group, constructed by pooling all stocks in the investment universe assigned to that industry. Each column reports the CAR over the event window $[-10, +10]$ trading days around the election date, where $t_0 = 0$ denotes election day. Expected returns are estimated using the Fama-French four-factor model, comprising the market excess return (MKT-RF), size (SMB), value (HML), and momentum (UMD) factors, over the pre-event estimation window of 221 trading days, spanning from 250 to 30 trading days before the election date. Portfolio weights are based on market capitalization at the end of the estimation window and are held fixed throughout the event window. t-statistics are reported in parentheses. Statistical significance is denoted by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

	2016	2020	2024
Industry	[-10,+10]	[-10,+10]	[-10,+10]
Automobiles & Components	−3.05%*** (-2.97)	−10.40%** (-2.14)	40.65%*** (12.10)
Banks	5.91%*** (7.16)	2.96%*** (2.93)	4.97%*** (7.51)
Capital Goods	2.31%*** (4.78)	−1.22% (-1.26)	−3.47%*** (-5.71)
Commercial & Professional Services	1.21%*** (2.82)	1.83%** (2.15)	−2.99%*** (-4.60)
Consumer Discretionary Distribution & Retail	−0.17% (-0.18)	−5.43%*** (-4.26)	1.82%** (2.04)
Consumer Durables & Apparel	−0.90% (-0.99)	−7.63%*** (-4.75)	−8.12%*** (-7.34)
Consumer Services	5.26%*** (7.16)	−1.17% (-0.61)	1.92%*** (2.61)
Consumer Staples Distribution & Retail	5.36%*** (5.19)	2.07% (1.34)	2.52%*** (2.64)
Energy	−4.76%*** (-4.66)	6.66%*** (3.30)	3.52%*** (2.84)
Equity Real Estate Investment Trusts (REITs)	−7.77%*** (-7.95)	1.44% (0.87)	−4.29%*** (-4.56)
Financial Services	0.42% (0.87)	−0.69% (-0.89)	1.76%*** (3.13)
Food, Beverage & Tobacco	−7.55%*** (-11.16)	0.62% (0.56)	−5.10%*** (-6.54)
Health Care Equipment & Services	−5.79%*** (-10.13)	0.37% (0.31)	−2.69%*** (-3.33)
Household & Personal Products	−6.03%*** (-7.81)	−0.44% (-0.30)	−1.20% (-1.21)
Insurance	−0.05% (-0.11)	2.91%*** (2.95)	−2.51%*** (-2.65)
Materials	−2.84%*** (-3.74)	−2.13%** (-2.22)	−7.23%*** (-10.24)
Media & Entertainment	−2.94%*** (-3.49)	4.32%*** (3.81)	3.16%*** (2.73)
Pharmaceuticals, Biotechnology & Life Sciences	1.98%*** (2.87)	0.90% (0.89)	−14.53%*** (-16.65)
Real Estate Management & Development	−5.66%*** (-4.69)	−1.90% (-0.72)	−1.79% (-1.40)
Semiconductors & Semiconductor Equipment	−1.51% (-1.62)	−2.81%** (-2.16)	−6.64%*** (-3.65)
Software & Services	0.50% (0.90)	−4.86%*** (-4.63)	2.87%*** (3.41)
Technology Hardware & Equipment	−1.46% (-1.24)	−0.29% (-0.19)	−3.96%*** (-3.22)
Telecommunication Services	1.15% (1.42)	4.25%*** (4.32)	0.27% (0.26)
Transportation	4.97%*** (5.77)	−1.85% (-1.49)	−0.65% (-0.75)
Utilities	−6.25%*** (-5.50)	0.48% (0.28)	−3.72%*** (-3.79)

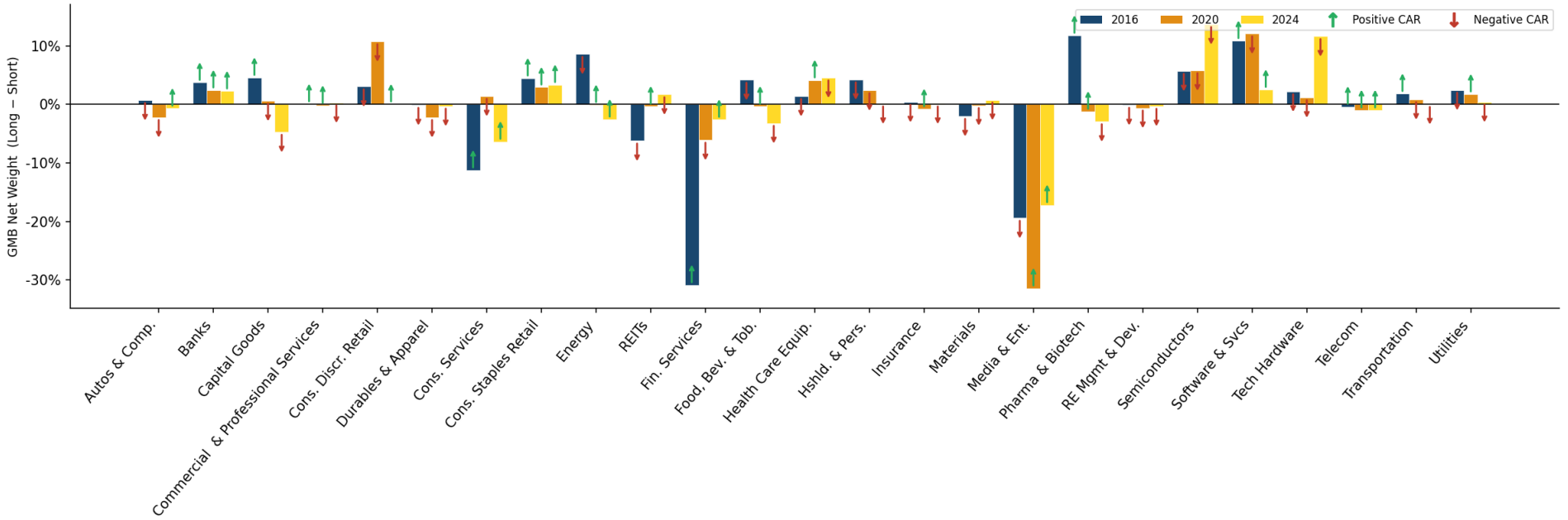

Figure C.1. GMB Portfolio Industry Composition: LSEG ESG Score. This figure displays the net green-minus-brown (GMB) industry weight for each GICS industry group across the 2016, 2020, and 2024 U.S. presidential elections, alongside the sign of the industry-level cumulative abnormal return (CAR). Bars represent the net weight of the GMB portfolio in each industry, computed as the value weight of green portfolio constituents minus the value weight of brown portfolio constituents, using market capitalization at the end of the pre-event estimation window. Positive (negative) bars indicate net long (short) GMB exposure to that industry. Bars are grouped by industry and coloured by election year. Arrows indicate the sign of the industry-level CAR over the $[-10, +10]$ event window: green upward arrows denote positive industry CARs and red downward arrows denote negative industry CARs. Industry CARs are estimated using the Fama-French four-factor model applied to value-weighted portfolios of all stocks in the investment universe belonging to each GICS industry group. The portfolio classification criterion is LSEG ESG Score.

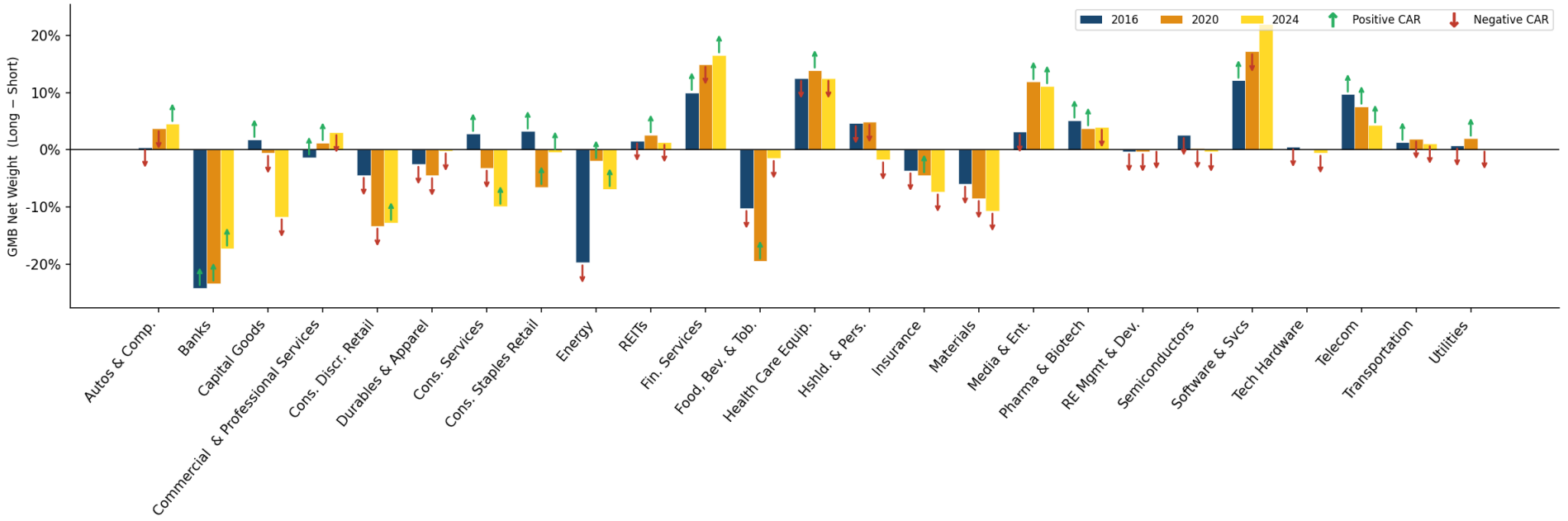

Figure C.2. GMB Portfolio Industry Composition: MSCI Environmental Pillar Score. This figure displays the net green-minus-brown (GMB) industry weight for each GICS industry group across the 2016, 2020, and 2024 U.S. presidential elections, alongside the sign of the industry-level cumulative abnormal return (CAR). Bars represent the net weight of the GMB portfolio in each industry, computed as the value weight of green portfolio constituents minus the value weight of brown portfolio constituents, using market capitalization at the end of the pre-event estimation window. Positive (negative) bars indicate net long (short) GMB exposure to that industry. Bars are grouped by industry and coloured by election year. Arrows indicate the sign of the industry-level CAR over the $[-10, +10]$ event window: green upward arrows denote positive industry CARs and red downward arrows denote negative industry CARs. Industry CARs are estimated using the Fama-French four-factor model applied to value-weighted portfolios of all stocks in the investment universe belonging to each GICS industry group. The portfolio classification criterion is MSCI Environmental Pillar Score.

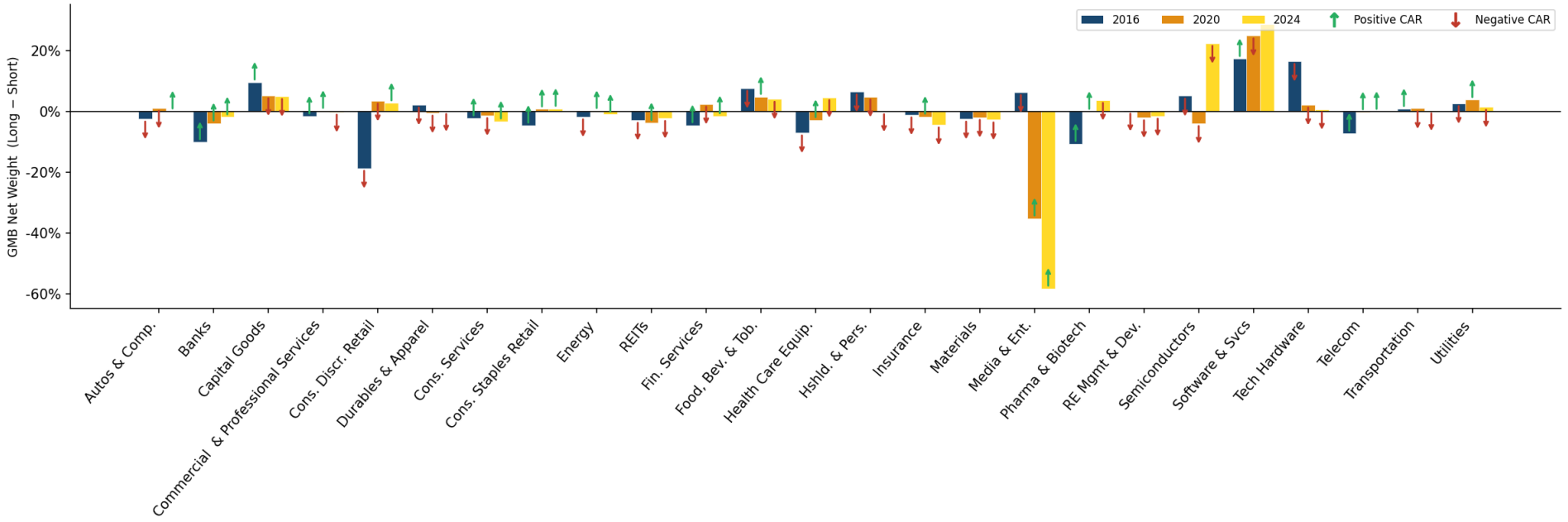

Figure C.3. GMB Portfolio Industry Composition: MSCI ESG Adjusted Score. This figure displays the net green-minus-brown (GMB) industry weight for each GICS industry group across the 2016, 2020, and 2024 U.S. presidential elections, alongside the sign of the industry-level cumulative abnormal return (CAR). Bars represent the net weight of the GMB portfolio in each industry, computed as the value weight of green portfolio constituents minus the value weight of brown portfolio constituents, using market capitalization at the end of the pre-event estimation window. Positive (negative) bars indicate net long (short) GMB exposure to that industry. Bars are grouped by industry and coloured by election year. Arrows indicate the sign of the industry-level CAR over the $[-10, +10]$ event window: green upward arrows denote positive industry CARs and red downward arrows denote negative industry CARs. Industry CARs are estimated using the Fama-French four-factor model applied to value-weighted portfolios of all stocks in the investment universe belonging to each GICS industry group. The portfolio classification criterion is MSCI ESG Adjusted Score.

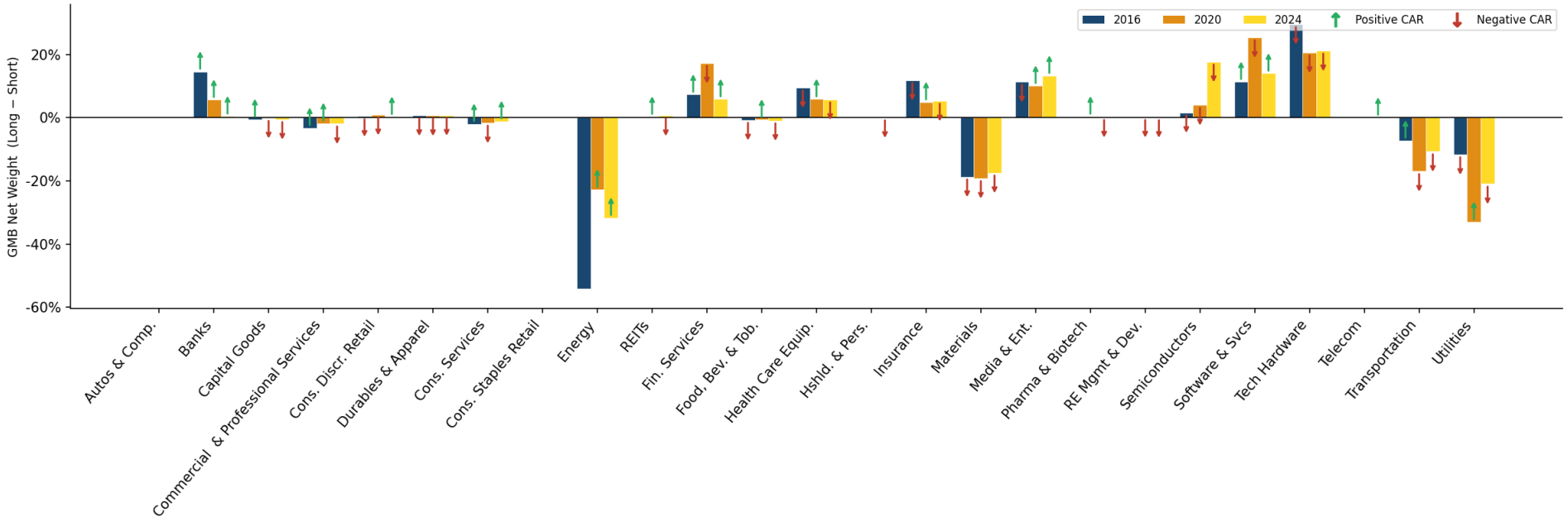

Figure C.4. GMB Portfolio Industry Composition: Scope 1 Emissions Intensity (Reported or Estimated). This figure displays the net green-minus-brown (GMB) industry weight for each GICS industry group across the 2016, 2020, and 2024 U.S. presidential elections, alongside the sign of the industry-level cumulative abnormal return (CAR). Bars represent the net weight of the GMB portfolio in each industry, computed as the value weight of green portfolio constituents minus the value weight of brown portfolio constituents, using market capitalization at the end of the pre-event estimation window. Positive (negative) bars indicate net long (short) GMB exposure to that industry. Bars are grouped by industry and coloured by election year. Arrows indicate the sign of the industry-level CAR over the $[-10, +10]$ event window: green upward arrows denote positive industry CARs and red downward arrows denote negative industry CARs. Industry CARs are estimated using the Fama-French four-factor model applied to value-weighted portfolios of all stocks in the investment universe belonging to each GICS industry group. The portfolio classification criterion is Scope 1 Emissions Intensity (Reported or Estimated).

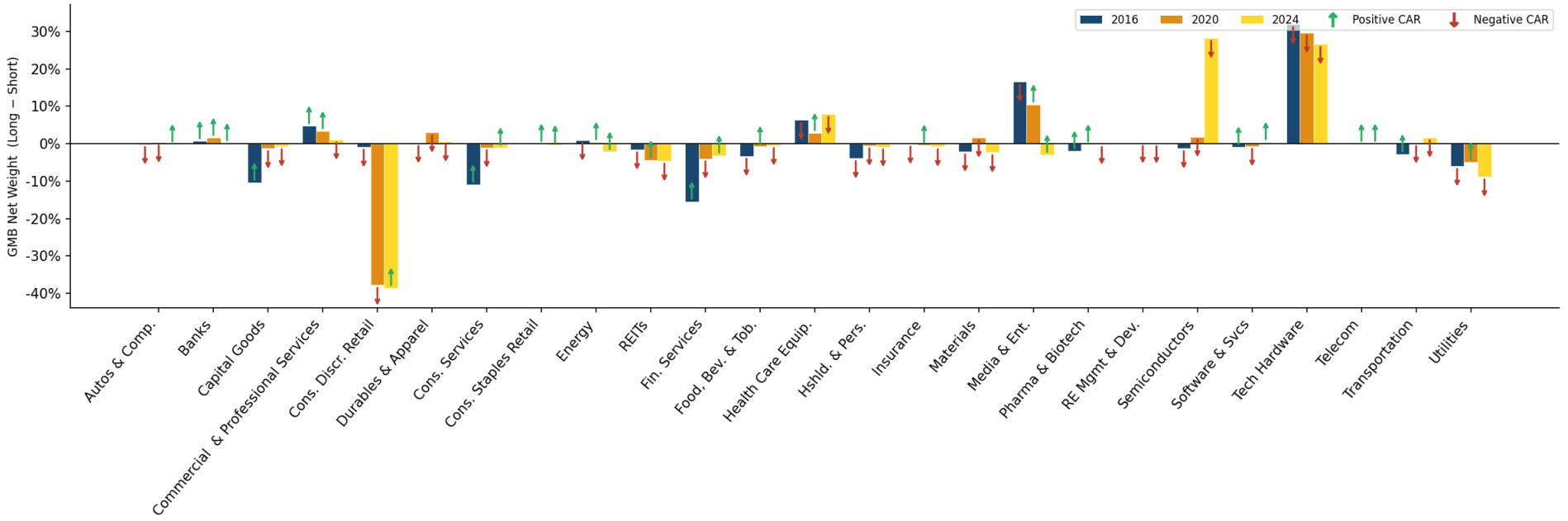

Figure C.5. GMB Portfolio Industry Composition: Industry Relative Scope 1 Emissions Intensity (Reported or Estimated). This figure displays the net green-minus-brown (GMB) industry weight for each GICS industry group across the 2016, 2020, and 2024 U.S. presidential elections, alongside the sign of the industry-level cumulative abnormal return (CAR). Bars represent the net weight of the GMB portfolio in each industry, computed as the value weight of green portfolio constituents minus the value weight of brown portfolio constituents, using market capitalization at the end of the pre-event estimation window. Positive (negative) bars indicate net long (short) GMB exposure to that industry. Bars are grouped by industry and coloured by election year. Arrows indicate the sign of the industry-level CAR over the $[-10, +10]$ event window: green upward arrows denote positive industry CARs and red downward arrows denote negative industry CARs. Industry CARs are estimated using the Fama-French four-factor model applied to value-weighted portfolios of all stocks in the investment universe belonging to each GICS industry group. The portfolio classification criterion is Industry Relative Scope 1 Emissions Intensity (Reported or Estimated).

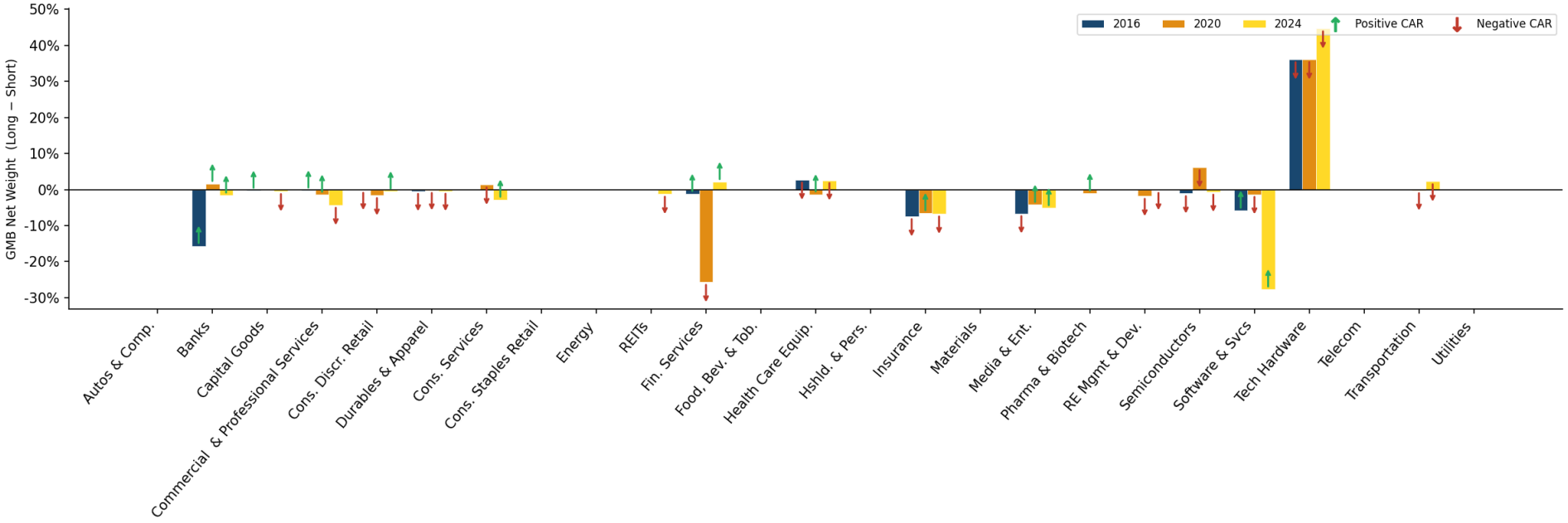

Figure C.6. GMB Portfolio Industry Composition: Scope 1 Emissions Intensity Shadow. This figure displays the net green-minus-brown (GMB) industry weight for each GICS industry group across the 2016, 2020, and 2024 U.S. presidential elections, alongside the sign of the industry-level cumulative abnormal return (CAR). Bars represent the net weight of the GMB portfolio in each industry, computed as the value weight of green portfolio constituents minus the value weight of brown portfolio constituents, using market capitalization at the end of the pre-event estimation window. Positive (negative) bars indicate net long (short) GMB exposure to that industry. Bars are grouped by industry and coloured by election year. Arrows indicate the sign of the industry-level CAR over the $[-10, +10]$ event window: green upward arrows denote positive industry CARs and red downward arrows denote negative industry CARs. Industry CARs are estimated using the Fama-French four-factor model applied to value-weighted portfolios of all stocks in the investment universe belonging to each GICS industry group. The portfolio classification criterion is Scope 1 Emissions Intensity Shadow.

AI Appendix

Recognition: While preparing this paper, we made use of the AI tools Claude and ChatGPT for assistance with Python coding and grammar. However, all analyses, interpretations, and conclusions are solely our own.