Bachelor-Arbeit

im Studiengang

International Finance

zur Erlangung des Grades eines

Bachelor of Science (B.Sc.)

Thema

The Influence of U.S. Policy on Clean Energy Markets: An Event Study

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geb. am 07.11.2004 in Mexiko

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im Winter Semester 2025/26
am Fachbereich 3: Wirtschaft und Recht
der Frankfurt University of Applied Sciences

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Abgabedatum: 17.02.2026

Abstract

This study examines the impact of the 2024 U.S. presidential election on clean energy fund performance, addressing whether the election generated abnormal returns and whether effects differed across regions. It was assumed that the election constituted a political and regulatory shock, leading to negative short-term abnormal performance, particularly for U.S.-focused clean energy funds, while international portfolios were expected to react more moderately. A multi-stage event study framework was applied using Buy-and-Hold Abnormal Returns (BHARs) for 112 clean energy funds relative to broad market and conventional energy-sector benchmarks across short-, medium- and long-term horizons. The results show statistically significant underperformance immediately after the election, with abnormal returns worsening over the medium term and then reversing in the longest horizon. Regional differences were substantial: U.S.-exposed funds experienced the strongest decline, whereas European and China-focused funds remained more stable. Over longer horizons, U.S.-focused and globally diversified portfolios exhibited a pronounced recovery and transitioned into positive abnormal performance, while European and China-focused funds remained persistently negative relative to benchmarks. Overall, the findings highlight the relevance of political uncertainty for sustainable investments.

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List of Abbreviations

BHAR: Buy and Hold Abnormal Returns

BHAR_MM: Buy and Hold Abnormal Returns based on the Market Model

EMH: Efficient Market Hypothesis

ETFs: Exchange Traded Funds

GRS: Green Revenue Share

TRI: Total Return Index

U.S.: United States

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1 Introduction

The aftermath of a presidential election often marks a pivotal moment for financial markets, as political uncertainty is resolved and policy expectations are reassessed. Presidential elections in the United States [U.S.] represent a critical source risk, with potential implications for investment decisions, sectoral performance, and capital allocation. Clean energy funds, operating at the intersection of financial markets and climate policy, are uniquely sensitive to shifts in regulatory expectations. Understanding how these funds respond to such political events is therefore essential for both investors and policymakers, given the strategic role of these assets in the transition toward a sustainable economy (Marti-Ballester, 2022; Bei & Wang, 2023).

This study analyzes the impact of the 2024 U.S. presidential election on clean energy fund performance, focusing on abnormal returns in the aftermath of Donald Trump's electoral victory. While previous research has examined the effect of elections and climate-related policy changes on green stock prices (e.g., Ramelli et al., 2021; Pham et al. 2023; Umar et al., 2022), the evidence on clean energy funds (particularly from a multi-regional perspective) remains limited. This distinction is important because clean energy funds differ from individual stocks in several ways: they represent diversified portfolios, are subject to professional management and may involve strategic rebalancing in anticipation of political outcomes (Berk & Binsbergen, 2015). By focusing on funds rather than individual securities and by analyzing sector-level responses, this study contributes to the literature by examining the short-, medium-, and long-term dynamics of market reactions to political events, as well as their implications for portfolio allocation decisions and investor behavior.

Conceptually, this study integrates insights from the Efficient Market Hypothesis (Fama, 1970) and behavioral finance (Barberis & Thaler, 2003), acknowledging that markets adjust to new information while also reflecting investor sentiment and overreactions. Methodologically, it applies a multi-stage event study framework to quantify abnormal returns and cumulative performance across funds and geographical regions. Empirically, the analysis provides evidence on the magnitude, direction, and persistence of clean energy fund reactions to a major U.S. political event, offering insight into sector specific risk and political sensitivity in sustainable investment products.

By linking political events with financial market responses, the study informs investors, portfolio managers and policymakers about the vulnerabilities and opportunities in clean energy markets, highlighting how policy uncertainty and election outcomes shape investment performance in this sector.

In the following, the paper first reviews the relevant literature and presents the theoretical framework on which the research objectives are based. It then explains the sample used and methodology followed before discussing the results. Finally, the paper considers limitations and implications of the results.

2 Literature Review

Several studies have examined the impact of U.S. elections and policy changes on financial markets and instruments, focusing on overall market responses as well as sector specific effects, particularly in clean energy and climate-related stocks. However, research that explicitly investigates these dynamics at the fund level remains scarce, despite the growing importance of clean energy funds as investment vehicles.

Ramelli, et al. (2021) analyze stock price reactions and climate-related performance around the 2016 and 2020 U.S. elections. Using Russell 3000 firms with data on carbon intensity and climate responsibility (proxied by ESG scores), they find that in 2016, low carbon-intensity firms were penalized while high climate-responsibility firms were rewarded. After the 2020 election, climate-responsible stocks initially fell but then recovered strongly. The study highlights the 'boomerang hypothesis,' where short-term rollbacks on climate policy were expected to be temporary, maintaining long-term expectations of positive climate regulations.

More recent work has focused on the 2024 election cycle. Dennis Koch and Dirk Schiereck (2025) explore the effect of green revenues on stock returns using Russell 3000 stocks and Green Revenue Share (GRS). They report that firms with higher GRS suffered negative abnormal returns after the Trump assassination attempt but benefited after the Harris candidacy announcement. Following the presidential election, negative cumulative abnormal returns were observed for GRS firms, especially in top-tier green revenue groups. These findings underline the sensitivity of green firms to political developments and shifting election-related expectations.

Shaker et al. (2025) investigate the overall market reactions to the 2024 U.S. election using S&P 1500 stocks. They find that investors responded positively to anticipated stimulus, deregulation and sectoral benefits (particularly in energy and finance). Negative returns were limited to consumer non-durables and chemical sectors. DeHaven et al. (2024) provide a more detailed study for the 2020 election, showing minute-by-minute correlations between election probabilities (minutely probability of a Democrats win) and financial indicators (exchange rates of dollar to foreign currencies and stock market indexes like the S&P 500 or the Russell 200). Their findings highlight that stocks rose with higher democratic win probability, the U.S. dollar fell and that reductions in uncertainty were tightly correlated with price movements. Their findings demonstrate how market expectations and uncertainty influence price movements in the U.S.

Beyond elections themselves, related climate policy milestones have also been shown to generate significant market reactions. Pham et al. (2023) examine 118 green energy stocks around milestones such as the Paris Agreement, its U.S. ratification, Trump's election in 2016, the Paris Agreement withdrawal, Biden's election in 2020 and the Inflation Reduction Act. They find negative abnormal returns following the Paris Agreement ratification. In turn, the strongest market reaction occurs after Biden's election confirmation, where abnormal returns rise to roughly +15% within twenty trading days, substantially larger than the response to Trump's 2016 election (around +5%). Volatility peaked after the Paris Agreement withdrawal and Trump's 2016 election, with Biden's election generating larger positive Cumulative Abnormal Returns than Trump's.

Political uncertainty is not limited to electoral events, as exogenous geopolitical shocks can also affect clean energy markets. Umar et al. (2022) analyze clean energy, conventional energy, and metals markets around the Russia-Ukraine war. Their event study demonstrates negative abnormal returns immediately following the outbreak, reflecting the responsiveness of energy-related sectors to unexpected global events.

Historical evidence further illustrates the influence of U.S. elections on broader market performance. Niederhofer et al. (1970) and Tomic et al. (2023) show that markets expand when Republican candidates win and contract under Democratic victories, with particularly strong effects in energy, financial and military sectors. These findings highlight the relationship of political outcomes and sector-specific sensitivities.

Taken together, the existing literature demonstrates that U.S. presidential elections and climate-related policy events generate significant and often sector-specific market reactions, particularly for green and clean energy firms. Across different election cycles, investors reassess regulatory expectations and anticipated policy support, leading to measurable abnormal returns and shifts in volatility. The evidence further highlights the central role of political uncertainty, as market valuations respond closely to evolving election probabilities and unexpected political shocks. However, while these studies provide substantial stock-level evidence, comparatively little is known about how such political dynamics translate to clean energy funds as diversified and professionally managed investment vehicles.

3 Theoretical Framework

This research project is grounded on several theoretical assumptions concerning market efficiency, event studies, sector-specific risk, political uncertainty and the behavior of capital markets.

The starting point is the efficient market hypothesis [EMH], as proposed by Fama (1970), which assumes that capital markets are efficient in the sense that security prices at any time fully reflect all available information. Under this framework, prices incorporate investors' expectations about future events, including political events such as elections. Elections are therefore treated as a form of information and any expectations surrounding their potential outcomes (positive or negative for the sector) should already be embedded in asset prices prior to the event. Consequently, abnormal returns observed around the election day capture the market's response to new information (meaning election outcome) rather than the anticipated components of the event (meaning the election happening).

Fama's (1970) framework for expected returns formalized this idea, describing the price of a security at time t+1 as a function of the expected returns conditional on information available at time t: $E\left(\tilde{p}_{j,t+1}\middle|\Phi_t\right) = \left[1 + E(\tilde{r}_{j,t+1}|\Phi_t)\right]p_{jt}$, where E is the expected value operator, $p_{j,t}$ is the price of security j at t time t, and Φ_t represents the information set fully reflected in the price.[1] While this framework implies that trading strategies based solely on publicly available information should not systematically generate excess returns, the objective of this study is not to identify

[1] In other words, this means that tomorrow's expected price equals today's price adjusted by the expected return, conditional on currently available information.

profitable trading strategies. Instead, the following uses the logic of market efficiency to decompose observed returns and isolate the component attributable to information shocks. In this context, clean energy funds are not assumed to be driven exclusively by information; rather, the framework allows for returns to be influenced by systematic risk, sectoral characteristics, and political uncertainty, while still treating information as a key driver of price adjustments. Elections may therefore act as focal events that amplify sentiment-driven trading, particularly in sectors such as clean energy where expectations about future policy play a central role.

While EMH provides a benchmark for expected returns, behavioral finance suggests that not all market participants are fully rational (Barberis & Thaler, 2003). Investors may misinterpret or overreact to new information leading to deviations of asset prices from fundamental values. Trusts between market participants, expectations and risk aversion further shape asset prices (Baker & Nofsinger, 2010; Kahneman & Tversky, 1979). In the context of clean energy, these behavioral factors can exacerbate volatility, particularly when coupled with policy uncertainty. Elections, regulatory shifts and sector specific developments may trigger over- or underreaction.

These two theoretical perspectives (EMH and behavioral finance) also imply different expectations regarding the duration and persistence of abnormal returns. Under EMH, any new information contained in the election outcome should be incorporated rapidly into asset prices. Consequently, abnormal performance should be concentrated into a narrow window around the event and should disappear quickly as markets adjust to updated information. Behavioral finance, however, suggests that investor reactions may not be fully immediate or proportionate.

To empirically examine how markets respond to added information, event studies provide a methodological tool, offering direct evidence on market efficiency and price reactions to identifiable events (Fama, 1991; MacKinlay, 1997). A critical theoretical consideration is the identification of the event itself. Although markets may partially anticipate political events such as elections, the election day represents a clear and well-defined information point and the day after, the first opportunity investors have to act on realized outcomes.

Beyond general market reactions, this framework assumes that clean energy funds exhibit sector-specific risk that differentiates them from both the overall market and conventional energy assets. Empirical evidence indicates that movements in oil prices, technology stocks, and interest rates influences clean energy stock prices (Henriques & Sadorsky, 2008; Sadorsky, 2012). High

energy sector volatility tends to amplify declines in clean energy returns (Bouri et. al, 2020) and clean energy ETFs are more sensitive to market turmoil than conventional energy ETFs (Alexopolus, 2018). Periods of economic uncertainty in the energy sector tend to translate into disproportionately larger declines in clean energy returns. Moreover, long-term economic trends, such as changes in energy prices, technological development, subsidies, tax incentives and consumer behavior, shape the attractiveness of clean energy investments (Kanawal & Islam, 2025). As a result, when uncertainty affects the market, clean energy assets are expected to react more strongly than both the general market and traditional energy assets.

Political uncertainty is another critical factor influencing stock returns. Elections, as policy relevant events, introduce uncertainty that can increase volatility, reduce investment, and lower returns in policy sensitive sectors (Lubos & Veronesi, 2012; Scott, Bloom, & Davis, 2016). This effect is expected to be especially pronounced in policy-sensitive sectors, where future profitability depends heavily on regulatory framework, subsidies, or government support. Regulatory risk is a key component of political uncertainty in clean energy markets. Unclear environmental and climate policies, as well as retroactive changes to subsidies or support mechanisms, can significantly affect the expected returns of clean energy investments (Kaminker & Stewart, 2012). As a result, election outcomes that signal potential shifts in environmental regulation are expected to generate statistically significant abnormal returns in clean energy funds.

Taken together, these theoretical perspectives suggest that presidential elections represent meaningful information shocks for financial markets, particularly in sectors whose profitability depends on regulatory frameworks and government support. Clean energy funds, due to their sector-specific exposure and sensitivity to climate policy expectations, provide a relevant setting in which political uncertainty may translate into abnormal market reactions. The Efficient Market Hypothesis offers a benchmark for how quickly such information should be incorporated into prices, while behavioral finance highlights the potential for delayed or disproportionate responses. Building on these foundations, the following section derives the specific research objectives and expectations guiding the empirical analysis.

4 Research Objectives

Building on the theoretical framework which has highlighted market efficiency, behavioral finance, political uncertainty, and sector-specific risk as well as the empirical literature on election-driven market reactions and climate-related assets, this study aims to empirically *assess the impact of the 2024 U.S. presidential election on clean energy markets*. While existing studies predominantly focus on stock-level responses to elections and climate policy events, evidence on clean energy funds remains limited.

The primary objective of this study is to evaluate whether the outcome of the 2024 U.S. presidential elections generated abnormal returns in clean energy markets, and whether these reactions differ across sectors, regions and time horizons. Specifically, the study pursues three interrelated objectives. First, it aims to assess *how clean energy funds react to the election outcome relative to the broader market and the conventional energy sector*. Prior literature suggests that clean energy assets are particularly sensitive to political and regulatory uncertainty. Accordingly, the study expects clean energy funds to experience significantly negative abnormal returns compared to the overall market and general energy.

Second, the following examines *whether the reaction of the U.S. clean energy markets differs from that of clean energy markets in other geographical regions*. Given the significant role of U.S. climate policy in shaping domestic investment conditions, it is expected that U.S. clean energy funds will exhibit stronger and more pronounced negative abnormal returns than their counterparts from other geographical exposures.

Third, this study aims to analyze *how does the effect plays out over time* by distinguishing between short-, medium- and long-term reactions. Consistent with behavioral finance theory and prior event study findings, short-term market reactions are expected to reflect heightened uncertainty, sentiment driven trading, and portfolio rebalancing after the election. Over longer horizons, as uncertainty resolves and policy intentions become clearer, abnormal performance is expected to diminish and converge toward zero.

Together, these objectives provide a structured framework for empirically testing the impact of political events on clean energy funds.

5 Method

The methodology applied to answer the research question follows the standard event study framework as described by MacKinlay (1997), complemented by the recommendations of Barber and Lyon (1997) and Dionysiou (2012), which focus on methodological considerations relevant for long-run event studies. This framework allows for the assessment of how financial markets or instruments react to a specific event by identifying abnormal performance relative to an appropriate benchmark.

Event studies are particularly suited for analyzing whether an event contains economically meaningful information that is reflected in asset performance under the assumption of market efficiency, meaning that the effects of an event will be incorporated in securities prices. In the context of this project, this approach is used to evaluate the performance of clean energy funds following the 2024 US presidential election.

5.1 Sample

The following section focuses on explaining how the sample for both clean energy funds and for the benchmarks necessary for the calculations was constructed.

5.1.1 Clean Energy Fund Sample

To construct a meaningful and representative sample of clean energy funds, the Fund Screener tool of Refinitiv Workspace was employed. The objective was to identify funds with a primary investment focus on clean energy equities.

The initial screening was conducted using the Fund Search Tool and applied the following criteria:

- Asset universe: Exchange-Traded Funds (ETFs) and Mutual Funds
- Asset status: Active
- Asset type: Equity
- Primary share class: Yes
- Launch date: before 5th November 2023 (a year before the election)[2]

[2] This restriction ensures that all funds possess sufficient return history for estimation window calculations in the robustness method and avoids biases related to newly launched funds

- Asset name: Containing predefined clean energy related keywords (listed in **Appendix 1**)

These criteria ensured that only established funds with an explicit clean energy orientation and sufficient performance history were included. Following the initial screening, a manual review was conducted to ensure the relevance and data quality of each of the selected funds. Funds were retained only if they met the following conditions:

- Investment objectives: Explicit focus on investments in clean or renewable energy in their investment mandates
- Data availability: Total return Index (TRI) data available over the sample period (one year before elections, 5th of November of 2024, and one year after)
- Holdings composition: Holdings predominantly related to clean energy activities.
- Cash holdings: Funds with cash positions exceeding 90% of total holdings were excluded.[3]
- Duplicates: Duplicate funds were excluded unless both an ETF and mutual funds variant existed

The final sample was classified by a composite assessment of fund exposure using two indicators provided by Refinitiv Workspace (LSEG Data & Analytics, 2025). First, the *geographical focus* variable reflects the fund's stated investment mandate or objective. Second, the *global holdings-based* classification gives the actual geographical distribution of the identifiable equity portion of the fund's holdings.[4] In cases where the mandate-based geographical focus and the holdings-based classification were inconsistent or there was missing data, the final classification was determined through a manual review of the fund's investment mandate and portfolio composition. This procedure ensured that the assigned geographical exposure accurately reflected both the stated investment strategy and the realized investment behavior of the fund.

The final sample consisted of 112 clean energy funds (a list of which can be found in **Appendix 2**), comprising 69 mutual funds (61.61%) and 43 ETFs (38.39%). The sample is predominantly global in scope with 69.64% of funds classified as having global geographical exposure, followed by China-focused (14.29%) and U.S.-focused (8.93%) funds, while the remaining observations are distributed across a small number of regional and country-specific categories including European,

[3] This threshold was chosen to exclude inactive funds (that do not have actual clean energy holdings)
[4] Refinitiv assigns this category based on whether more than 70% of equity holdings are concentrated in a single country or a defined geographical region, or classified as global if no such concentration was present (LSEG Data & Analytics, 2025).

Korean and Israeli funds. The funds exhibit substantial variation in age, with an average fund age of 8.07 years and a median of 4.85 years, reflecting both established and relatively recent clean energy investment products. Asset currencies are diverse, though U.S. dollar-denominated funds represent the largest share (34.82%), followed by euro, Chinese yuan and South Korean won. Thematic coverage is broad, encompassing 17 distinct clean-energy related keywords, with "clean energy," "renewable energy" and "energy transition" being the most frequently represented themes. A full breakdown of the descriptive statistics of the sample can be found in **Appendix 3**.

5.1.2 Benchmark Sample

To establish appropriate proxies for systematic market exposure, a set of benchmark indices was selected. The benchmarks were chosen to capture both broad equity market movements and energy-sector-specific performance across the different geographical regions.

Broad market benchmarks replicate underlying indices for each geographical division, capturing overall market movements and serving as references for general systematic risk. Similarly, energy-sector benchmarks track the performance of energy-specific indices within each geographical division, reflecting sector-specific dynamics that may influence clean energy funds independently of the broader market. MSCI World and MSCI World Energy indices were employed as universal reference points for the whole sample of clean energy funds and for the global sector. This approach ensures that each fund is evaluated against benchmarks aligned with both its geographic and sectoral context. A complete overview of all benchmark indices included in the analysis is provided in **Appendix 4.**

5.2 Data

The LSEG Workspace Excel add-in was used to retrieve historical daily data on the Total Return Index (TRI) for each fund, covering at least a year before the event. Discrete daily returns were calculated using the standard relative difference formula:

$$R_{i,t} = \frac{TRI_{i,t} - TRI_{i,t-1}}{TRI_{i,t-1}}$$

5.3 The Event Windows

The event was defined as the U.S. presidential election, held on the 5th of November of 2024. To examine both the timing and persistence of market reactions, multiple event windows τ were used. Short-term windows of +1, +5, +20, and +30 days capture immediate market responses. Medium-term windows of +50, +75, +100, +110[5] and +125 days account for the adjustment to the unfolding of post-election expectations. Finally, long-term windows of, +150, +200 and +250 days, to assess market adaptation to subsequent policy signals and announcements.[6] The event day itself was excluded from the analysis, since the earliest point at which financial markets can incorporate election information is the first trading day after the outcome is revealed (τ = +1).[7]

5.4 Event Study Procedure

The event study is conducted in two stages, reflecting both fund-level and sector-level analyses. In the first stage, each clean energy fund is evaluated individually against its corresponding benchmark. For the general sample the benchmarks are the MSCI World Index and the MSCI World Energy.

To assess abnormal performance following the election event, the study computes buy-and-hold abnormal returns (BHARs), which capture the absolute cumulative difference between holding the clean energy fund and holding its benchmark over the same horizon. For each fund i and event window length τ, BHAR is defined as:

$$BHAR_{i,\tau} = \left(\prod_{t=t1}^{t2}(1 + R_{i,t})\right) - \left(\prod_{t=t1}^{t2}(1 + R_{b,t})\right)$$

where $R_{i,t}$ represents the daily return of fund i, and $R_{b,t}$ the daily return of the corresponding benchmark. This measure directly reflects the abnormal buy-and-hold performance an investor would experience when investing in the fund rather than in the matched benchmark.

The mean across funds is then aggregated within each portfolio:

[5] A 110-day event window was selected based on the Total Return Index (TRI), as notable deviations from the mean were observed, corresponding to the onset of the U.S.–China trade war in 2025.
[6] All event windows start at $t = 1$, i.e., the first trading day after the election date; the election-day session ($t = 0$) is excluded to ensure that the outcome is fully observed.
[7] The election was called by most credible news sources at 5:34 a.m. ET on Wednesday the 6th of November 2024 (Associated Press AP, 2024)

$$\overline{BHAR_\tau} = \frac{1}{N}\sum_{i=1}^{N} BHAR_{i,\tau}$$

The statistical significance of the mean BHARs is assessed using both a normal statistical test and a skewness adjusted one. This approach is chosen over conventional t-tests because BHARs are typically non-normally distributed, especially over long horizons, making standard parametric tests unreliable. The null hypothesis tested is: $H_0: E(\overline{BHAR_\tau}) = 0$, which states that, in the absence of an event related effect, the mean buy-and-hold abnormal performance of the fund should not differ from zero.

For days $t = 1, \cdots, 30$ normal statistical tests are used, treating the mean BHAR as short run:

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}\left(BHAR_{i,\tau} - \overline{BHAR_\tau}\right)^2} \qquad t_{raw} = \frac{\overline{BHAR_\tau}}{S/\sqrt{N}}$$

and for days $t = 30, \cdots, N$ skewness adjusted tests are used to account for the effects of non-normality. First the sample's skewness is computed, to then compute the adjusted t-statistic and two-tailed p-value:

$$skew_\tau = \frac{1/N \sum_{t=1}^{N}\left(BHAR_{i,\tau} - \overline{BHAR_\tau}\right)^3}{s^3} \quad t_{SA} = t_{raw} + \frac{skew_\tau}{6}(t_{raw}^2 - 1)$$

$$p_{SA} = 2 \cdot \left(1 - \Phi\left(\left|t_{SA}\right|\right)\right)$$

where $\Phi(|*|)$ is the cumulative distribution function of the standard normal distribution.

To test whether US clean energy funds experienced a stronger abnormal decline than other regions, regional mean buy-and-hold abnormal returns ($\overline{BHAR}_t^r$) are compared using a Welch cross-sectional difference-in-means t-test under the alternative hypothesis $H_1: E(BHAR_\tau^{US}) < E(BHAR_\tau^r)$ with the t-value computed as follows:

$$\mathrm{t} = \frac{\overline{BHAR}_\tau^{US} - \overline{BHAR}_\tau^r}{\sqrt{\frac{s_{US,\tau}^2}{N_{US}} + \frac{s_{r,\tau}^2}{N_r}}}$$

5.5 Robustness

As a robustness measure, the study additionally applies the standard market model event study framework as outlined by Mackinlay (1997). While the main analysis relies on benchmark-hold buy-and-hold abnormal returns (BHARs), the market model approach provides an alternative assessment of abnormal performance based on expected returns under hypothetical normal market conditions. However, this approach was not adopted as the primary methodology for two reasons. First, in long-horizon event studies, the market model is less commonly used as a main specification, since its assumptions are better suited to short-run windows and may generate biased inferences over extended horizons (Barber & Lyon, 1997). Second, market-model abnormal returns are highly sensitive to the precision of the estimated beta coefficients. Because expected returns depend directly on the estimated relationship between the assets and the market during the estimation period, even small errors in beta estimation can significantly affect abnormal return calculations, particularly over long event windows. For these reasons, the market model is employed here as a robustness check rather than the central framework.

The estimation window used to calculate the market model parameters comprised the 120 trading days ending seven trading days before the event date. This buffer period was included to avoid potential contamination from information leakage or anticipation effects immediately preceding the election. This estimation period spanned from the 10th of May 2024 to the 25th of October 2024.

Specifically, the expected return of fund *i* on day *t* is given by:

$$\hat{E}(R_{i,t}) = \alpha + \hat{\beta}_i R_{b,t} \quad \textit{(with alpha=0)}^{8} \qquad \hat{\beta}_i = \frac{\sum_{t \in est} R_{b,t} R_{i,t}}{\sum_{t \in est} R_{b,t}^2}$$

The abnormal return of each fund is calculated as the difference between its realized and expected returns. This measure allows for assessment of whether individual funds experienced unusual performances surrounding the event:

$$AR_{i,t} = R_{i,t} - \hat{E}(R_{i,t})$$

[8] Alpha is set to zero to focus solely on the fund's sensitivity to its benchmark, rather than any constant abnormal performance, ensuring that abnormal returns reflect only deviations from expected benchmark-driven behavior.

In the second stage, abnormal returns are aggregated across the sample to examine collective trends, this to evaluate whether, on average, funds over- or underperformed relative to their benchmarks on a given day. The average abnormal return (AAR) on day t is computed as:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$$

To evaluate cumulative performance over longer post-election horizons, abnormal returns are further aggregated using Buy-and-Hold Abnormal Returns, which measure the difference between the return an investor would earn by holding a fund over the event window τ and the return that would have been expected if the fund had only followed expected benchmarked performance. In other words, BHAR using the market models expected returns compares the compounded realized return of the fund to the compounded return of its expected performance had the effects of the event not been present:

$$BHAR_{i,t}^{MM} = \left(\prod_{t=t1}^{t2}\left(1 + R_{i,t}\right)\right) - \left(\prod_{t=t1}^{t2}\left(1 + \hat{E}\left(R_{i,t}\right)\right)\right)$$

6 Limitations

Several limitations of the study should be acknowledged to contextualize the results.

First, as noted by Barber and Lyon (1997), the use of reference portfolios such as index-tracking ETFs for computing long-run abnormal returns introduces inherent constraints. These portfolios undergo periodic mechanical rebalancing, which makes them imperfect proxies for a true buy-and-hold event asset. Barber and Lyon recommend using matched single-asset benchmarks; however, in the context of a multi-regional clean energy fund event study, constructing such matched controls is infeasible. Doing so would introduce substantial selection bias due to heterogeneous market structures and sector definitions across regions. Consequently, region-specific index-based portfolios are employed as proxies for systematic market exposure, rather than literal comparators. Long-horizon abnormal performance should therefore be interpreted as deviations relative to these market proxies rather than absolute excess returns.

Another limitation is the potential of the benchmarks being contaminated: general energy indices, as well as the market indices, may contain clean energy firms, meaning the benchmark is

partially correlated with the clean energy fund. This overlap can attenuate estimated abnormal returns, so the results should be interpreted as performance relative to the broader energy market rather than purely as excess return over non-clean-energy assets.

Furthermore, the fund holdings, investment objectives and geographical classifications are based on data collected in late 2025. Historical data for these criteria was not readily available for all the funds in the sample and attempting to retroactively construct it could introduce additional errors. As a result, these may not precisely reflect the composition or focus of each fund in 2024, the year of the event and any adjustments in each funds composition or investment mandates that might have occurred in response to market developments or the election itself are not captured. Consequently, the analysis assumes that fund characteristics observed in 2025 are reasonably approximate to their 2024 composition, and potential deviations should be considered when interpreting the results.

Survivorship bias may also influence the findings, as only funds remaining active by the time of data collection were included. Funds that close prior to or shortly after the election are excluded, potentially inflating estimated performance. Similarly, the fund selection criteria relied on energy-related keywords in fund names. Funds with clean energy exposure but without explicit keyword mentions were not included.

Another limitation arises from the heterogeneity of the fund's reaction. Different funds may respond differently to the same event depending on size, region, or strategy. Aggregating abnormal returns in the calculation of mean BHARs may mask important differences, and the results should therefore be interpreted as indicative of the sample as a whole rather than of individual funds.

Moreover, longer event windows may overlap with other macroeconomic or geopolitical developments in early 2025 that affect energy markets and investor sentiment. Consequently, abnormal returns measured over extended horizons may incorporate not only the election outcome but also subsequent policy signals or external shocks. Accordingly, attribution of long-horizon abnormal returns solely to the election outcome is inherently limited.

Taken together, these limitations highlight that the results should be interpreted as indicative of clean energy fund performance relative to broad energy and market proxies, rather than as precise measures of excess returns over a hypothetical perfect benchmark.

7 Results

This section presents the empirical findings of the event study. Results are reported both relative to broad market benchmarks and conventional energy-sector benchmarks and focusing on the mean portfolio performance as opposed to the per fund performance.[9] In line with the research objectives, findings are structured around the three hypotheses formulated in Section 4, focusing on (1) *the overall reaction of clean energy markets compared to the benchmarks*, (2) *regional differences across geographical exposures*, and (3) *the persistence of election effects overtime*.

7.1 Abnormal Performance

Hypothesis 1 proposed that clean energy funds would experience negative abnormal returns in response to election outcome, reflecting increased political and regulatory uncertainty as well as expectations of less favorable climate policy support. Accordingly, clean energy funds as a whole were expected to underperform both the broader market and the conventional energy sector in the post-election period.

The empirical evidence provides strong support for Hypothesis 1. Across the full clean energy fund sample ('ALL'), abnormal performance was predominantly negative in the immediate aftermath of the election. Short term BHAR estimates indicate that clean energy funds significantly underperformed both broad market benchmarks and conventional energy-sector benchmarks within the first trading days following the event.

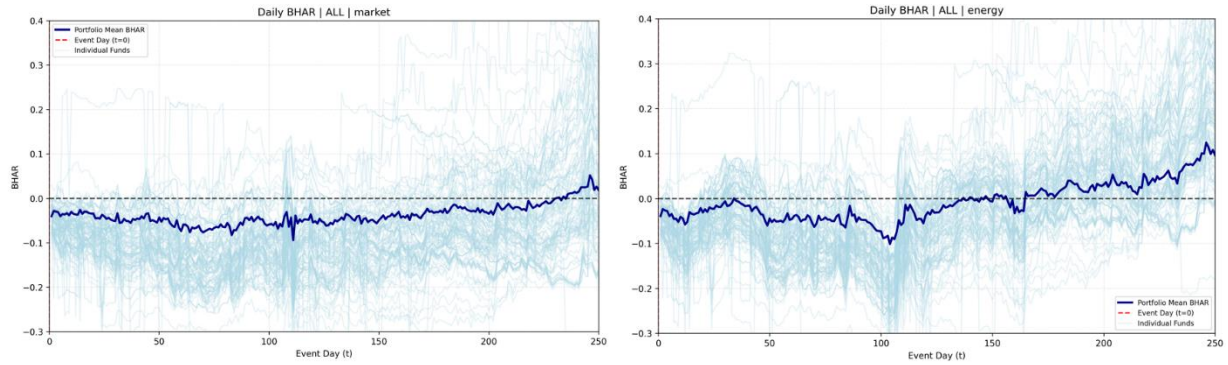


Figure 1: Daily BHAR Trajectories of 'All' Clean Energy Funds

[9] The full results distributed by geographical exposure and benchmark used can be found in **Appendix 5**.

As shown by **Figure 1**, the post-election BHAR trajectories, and **Figure 2**, which shows significance, in the shortest event window (+1 trading day, or the first day the market was able to respond to the outcome of the election), mean BHAR were significantly negative. Relative to the MSCI World Energy benchmark, clean energy funds exhibited a BHAR of approximately -4.6% ($p < 0.01$) while relative to the MSCI World -4.3% ($p < 0.01$).

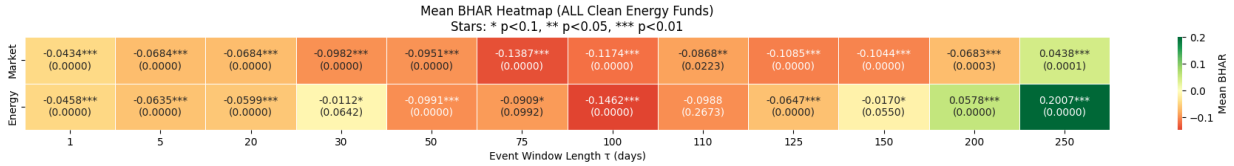


Figure 2: Mean BHAR and significance of ALL Clean Energy Funds over each window

Importantly, the abnormal performance does not appear to be driven by a small number of extreme outlier funds, as shown by the distribution of individual fund BHAR paths represented by the numerous faint lines in **Figure 1**. Furthermore, **Figure 3** provides further evidence on the breadth of the response by reporting the number and share of funds exhibiting negative BHAR across event windows. In the immediate post-election period, 99% of clean energy funds experienced negative abnormal returns relative to both benchmarks.[10]

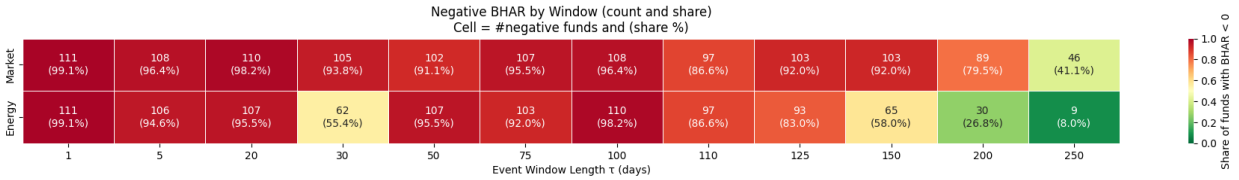


Figure 3: Number and Percentage of Clean Energy Funds with Negative BHAR by Window

Negative abnormal performance persisted across the medium-term horizon. By +50 trading days, cumulative BHAR remained significantly below benchmark performance, reaching approximately -9.9% ($p < 0.01$) relative to general energy and -9.5% ($p < 0.01$) relative to the market.

Across longer horizons, underperformance remained pronounced, although the magnitude differed depending on the benchmark. At +75 trading days, mean BHAR was approximately -9.0%

[10] The single, outlier, fund that exhibited positive BHAR on the first day after the election was the 'Hennessy Energy Transition Fund' that exhibited positive BHAR of 2.84% relative to energy and 3.08% relative to the market. This is a U.S. exposed fund.

($p < 0.10$) relative to MSCI World Energy, while deviations relative to the broader market deepened to around -13.9% ($p < 0.01$), indicating prolonged underperformance beyond the immediate event window. The largest negative abnormal performance occurred around +100 days. Relative to the energy benchmark, mean BHARs declined further to approximately -14.6% ($p < 0.01$), while relative to the market benchmark it remained substantially negative at around -11.7% ($p < 0.01$). This medium-term decline is clearly visible in the downward trajectory of BHAR in **Figure 1**.

In contrast to the negative short- and medium-term response, longer event windows reveal substantial reversal in abnormal performance. From approximately +150 trading days onward, BHAR began to recover, eventually turning positive across both benchmark categories. By the end of the +250-trading day horizon (which represents a year after the election), clean energy funds exhibited significantly positive long-run abnormal returns. Relative to MSCI World Energy, cumulative BHARs increased to approximately +20.0% ($p < 0.01$), while BHARs relative to MSCI World reached around +4.4% ($p < 0.01$), indicating that, one year after the election, the clean energy funds have not only recovered, but outperformed conventional energy and modestly exceeded the broad market.

The reversal in abnormal performance at the +250 trading day horizon is also reflected in the distribution of fund-level outcomes. At the end of the event window, only 9 funds still exhibit negative BHAR relative to the MSCI World Energy benchmark, suggesting that the long-run recovery is broad-based across the clean energy fund sample rather than driven by a small number of extreme performers. Relative to the MSCI World benchmark, however, the recovery appears more heterogeneous, with 46 funds continuing to display negative abnormal returns, suggesting that while clean energy funds largely outperform the conventional energy sector in the long run, their performance relative to the broader market remains more mixed.

This stronger reversal relative to the energy benchmark may partly reflect the fact that the conventional energy index itself tracked below the broader market during the later post-election period, implying that clean energy outperformance in the long run is driven both by sectoral recovery and by comparatively weaker performance within traditional energy. However, because longer event windows may overlap with other contemporaneous shocks, attribution of the full +250-day reversal exclusively to the election outcome remains inherently limited.

7.2 Regional Dimension

Hypothesis 2 proposed that U.S.-exposed clean energy funds would experience a stronger negative abnormal response to the election outcome than clean energy funds in other geographical regions. This expectation follows from the assumption that domestic portfolios are more directly exposed to shifts in the U.S. climate and energy policy, while non-U.S. funds are partially insulated through alternative regulatory environments and more diversified policy frameworks. To empirically assess this, the results are presented in two steps. First, differences in buy and hold abnormal performance are examined. Second, the magnitude of the U.S. reaction is formally compared to other geographical exposures using statistical difference tests.

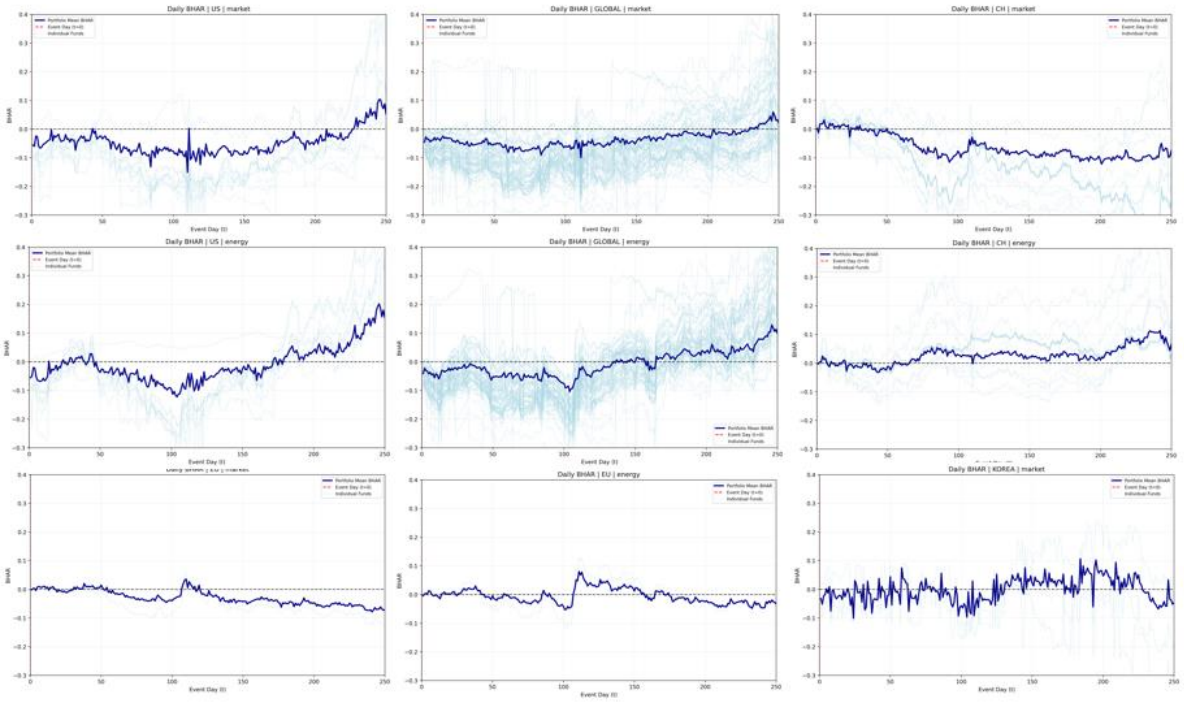


Figure 4: Clean Energy Funds BHAR Paths per Geographical Region

The results moderately support Hypothesis 2. Clean energy fund reactions differed substantially across regions, indicating pronounced geographical heterogeneity in the extent of election-related political uncertainty. Importantly, the observed regional patterns suggest that election sensitivity is not uniform across clean energy markets but depends critically on the degree of exposure to the U.S. policy risk.

As illustrated by regional BHAR trajectories in **Figure 4**, U.S. focused clean energy funds exhibited the largest and most immediate abnormal underperformance in the post-election period. In the shortest event window (+1 trading day), U.S. portfolios showed significantly larger negative abnormal returns than other regional funds groups, indicating that investors rapidly incorporated negative expectations of domestic regulatory shifts into clean energy valuations, with a mean BHAR of -6.3% ($p < 0.01$) in the + 1 trading window relative to energy and -6.1% relative to the market (**Figure 5**). This immediate adjustment was also broad-based across funds: 90% U.S. funds exhibited negative BHAR already in the +1 window

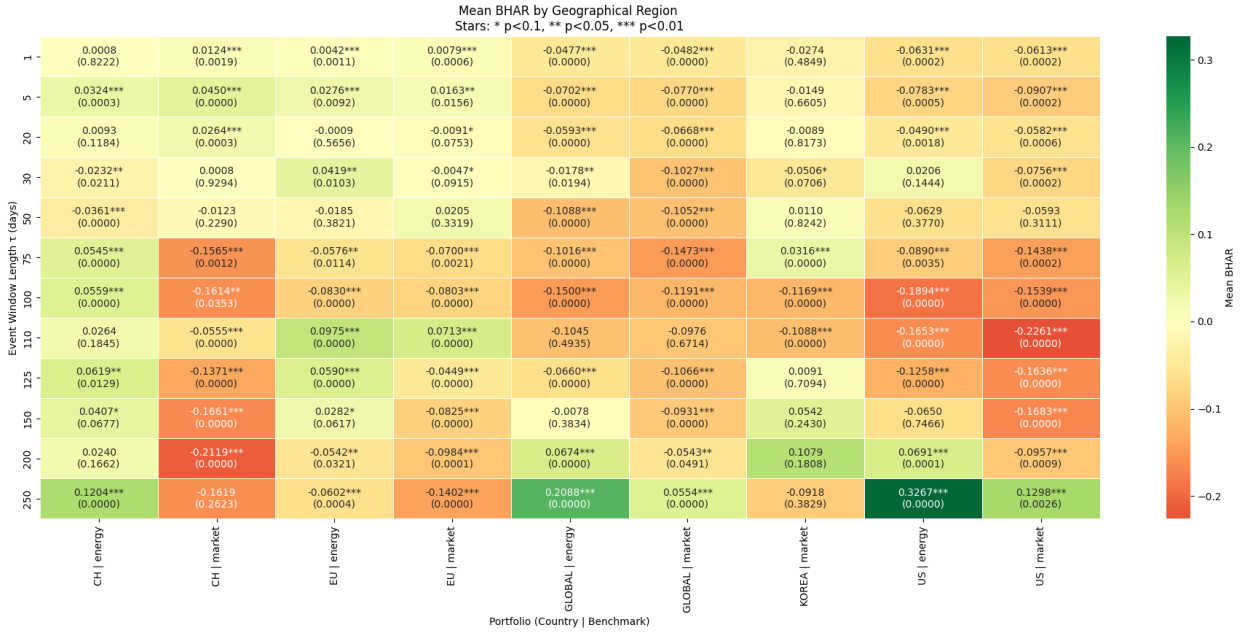


Figure 5: Mean BHAR by Geographical Region and Significance

The initial negative adjustment persisted into the medium-term, where U.S. fuds reached the lowest cumulative BHAR levels across all regions at +110 days relative to energy where mean BHAR falls to -18,9% ($p < 0.01$) and relative to the market -22.6% ($p < 0.01$) at +125 days. This is the strongest sustained underperformance observed in the regional decomposition.

In contrast, Chinese clean energy funds display a considerably more muted abnormal response. In the short run, mean BHAR remain close to zero (0.8% relative to energy and 1.3% relative to the market) and statistically insignificant at the +1 horizon. The fund-level behavior confirms this limited reaction: only a relatively small share of Chinese funds exhibits negative BHAR in the immediate post-election window (37,5% relative to energy and 12.5% relative to the market), suggesting that the election shock was not broadly transmitted into Chinese clean energy

valuations. Over medium-term horizons, some negative deviations emerge, particularly when performance is measured relative to the broader market. However, relative to the energy benchmark, Chinese funds do not exhibit the pronounced and persistent underperformance observed in the U.S. case. The more substantial decline becomes visible primarily in the market comparison. By the +200 trading day horizon, mean BHAR reaches approximately −21.2% ($p < 0.01$) relative to the MSCI World benchmark, while deviations relative to the energy benchmark remain considerably smaller. This pattern suggests that the longer-term underperformance of Chinese clean energy funds is not driven by a sharp election-specific repricing comparable to the U.S. case.

European funds follow a similar asymmetric pattern, although the portfolio is only comprised of two funds and results should be viewed as descriptive. For the first two windows, +1 and +5 days, European funds don't exhibit negative mean BHAR. In longer windows, mean BHAR are moderately negative around +100 days (around -8% ($p < 0.01$) relative to both benchmarks), a temporary mid-term reversal occurs at +110 days and the funds experience a significant positive spike of +9.8% ($p < 0.01$) relative to energy and +7.1% ($p < 0.01$) relative to the market. However, this improvement is not sustained. Beyond the mid-term horizon, European BHAR steadily decline again, and by +250 days the portfolio remains significantly negative, with values of -6.0% ($p < 0.01$) relative to energy and -14.0% ($p < 0.01$) relative to the market benchmark. This suggests that European funds initially reassessed the shock but ultimately repriced clean energy funds downward over the longer horizons.

The global clean energy portfolio occupies an intermediate position. Although they are classified separately from purely U.S.-exposed funds, global portfolios typically contain substantial U.S. holdings, even if they don't exceed the 70% threshold used for clean geographical identification.[11] Global funds behave in a pattern closely resembling U.S. portfolios, as visible in their similar downward medium-term adjustment and long-term recovery (**Figure 4**). This could suggest that even partial U.S. exposure is sufficient for global clean energy funds to inherit domestic election sensitivity.

[11] Although global funds typically hold substantial U.S. positions, they also differ from U.S.-focused portfolios in terms of currency exposure and broader geographic diversification.

Korea-focused funds exhibit yet another pattern. Although only market benchmark comparisons are available, Korean clean energy funds display comparatively higher volatility and less steady adjustment dynamics. As shown in **Figure 4**, the Korean BHAR path does not follow a smooth trajectory but fluctuates more strongly across horizons, suggesting less stable pricing dynamics. This interpretation is reinforced by the substantial variation in abnormal performance within the portfolio. For instance, at the +250 day horizon standard deviation reaches 21.9%, given the small number of Korean funds in the sample (N=4), these results suggest that the Korean portfolio is characterized by particularly heterogenous fund-level behavior.

In comparison, other regional portfolios exhibit lower dispersion of individual funds. As reflected in the smoother trajectories of these portfolios in **Figure 5**, funds within those groups tend to adjust in a more uniform manner. For example, U.S.-focused portfolios show standard deviations of at most 15.5% by the +250 day (in the energy comparison). Chinese funds display standard deviations below 16.2%. The global portfolio has higher dispersion generally below 20%. This contrast suggests that abnormal performance is driven by broader market-wide or policy-related factors rather than highly idiosyncratic fund-specific shocks.

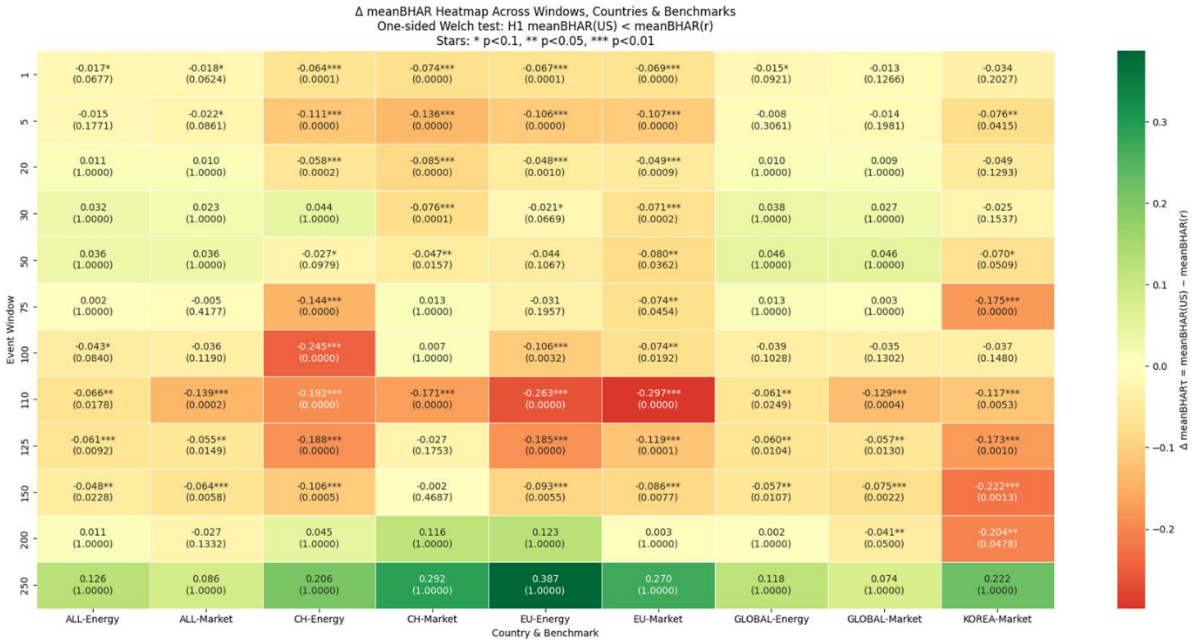


Figure 6: Mean BHAR difference Relative to the US and Significance

The statistical significance of these cross-sectional differences is supported by the one-sided Welch tests reported in **Figure 6**, which compares U.S. mean BHAR to those of other regional portfolios across different event windows. The heatmap reports the difference in mean

abnormal performance between the U.S. portfolio and each regional group, where negative values indicate significantly stronger underperformance of U.S.-focused funds.

A clear pattern emerges: regional divergences are not concentrated in the immediate aftermath of the election, but instead build gradually and peak in the medium-term horizon. While short-run differences are already statistically significant, they are smaller in magnitude than the later gaps. For example, at the +1 trading day window, the U.S. portfolio underperformed European funds by approximately -6.7% ($p < 0.01$) and Chinese funds by -6.4% ($p < 0.01$) in the energy benchmark comparison. This suggests that although U.S. funds reacted most negatively right away, gaps to other regions widened over time.

The strongest and most persistent divergences occur between +75 and +150 trading days after the election, consistent with the period of maximum abnormal underperformance observed in the U.S. portfolio itself. At the +110 trading day horizon, U.S. clean energy funds underperformed European portfolios by approximately -26.3% relative to the energy benchmark and -29.7% relative to the market benchmark (both $p < 0.01$), representing the largest statistically significant regional gap in the sample. Similarly, differences between U.S. and China-focused portfolios remained substantially negative, reaching -19.2% (energy) and -17.1% (market) at the same horizon ($p < 0.01$). These results indicate that the election shock translated into a uniquely severe and prolonged valuation adjustment for domestically exposed clean energy funds.

Global portfolios occupy an intermediate position,, they do not differ as sharply from the U.S. portfolio as Europe or China do. For example, at +110 trading days, the U.S. global difference is only -6.1% ($p < 0.05$) in the energy comparison, though it remains larger at -12.9% relative to the market benchmark ($p < 0.01$).

Korean portfolios display a different and less stable pattern. The U.S. and Korea have significantly positive gaps in the medium term (e.g., +17.5% at +75 days and +22.2% at +150 days, $p < 0.01$), followed by a negative divergence at +200 days (-20.4%, $p < 0.05$).

Finally, regional differences lose strength in the long run. By the +250 trading day horizon, several gaps turn positive but significance is lost, indicating that U.S. funds no longer systematically underperform other regions and in some cases recover more strongly but is a more homogenous effect. This convergence suggests that the election-related shock was concentrated in

the short- and medium-term period, rather than representing a permanent divergence in clean energy fund performance across geographies.

Overall, these findings confirm that geographical exposure plays a crucial role in determining the sensitivity of clean energy funds to U.S. outcomes. The significantly stronger abnormal underperformance of U.S.-focused funds, combined with the immediate behavior of globally exposed portfolios and the comparatively muted reactions in Europe and China, provided strong support for Hypothesis 2.

7.3 Temporal Dimension

Hypothesis 3 proposed that the abnormal return effect associated with the 2024 U.S. presidential election would be concentrated in the short-term but would diminish over longer horizon. Specifically, the hypothesis expected that while clean energy funds may initially react negatively to the election outcome, abnormal performance should gradually converge back toward zero as uncertainty resolves and markets incorporate the new information into prices.

The results do not find evidence to fully support Hypothesis 3. Across portfolios and regions, abnormal returns are clearly present in the short- and medium-term periods following the election. However, rather than fading out over time, abnormal performance persists through a pronounced temporal restructuring: initial underperformance deepens into a medium-term trough, followed by either long-run reversal or continued weakness depending on geographical exposure.

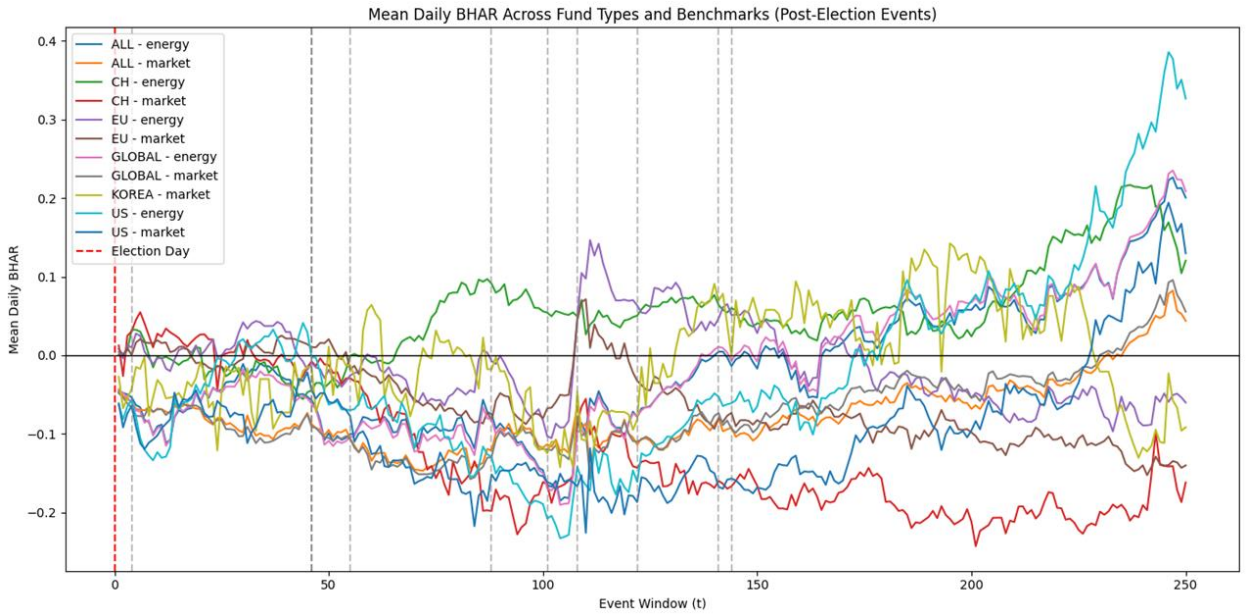


Figure 7: Daily Mean BHAR by Regions (Market vs. Energy Benchmarks)

As shown in **Figure 7**, most clean energy portfolios experience negative abnormal returns immediately after the election, followed by a deeper cumulative decline during the medium-term adjustment phase. The negative reaction is most pronounced between approximately +75 and +125 trading days after the event, consistent with the results presented in sections 7.1 and 7.2. For instance, U.S.-focused funds reach mean BHAR levels of roughly -18.9% ($p < 0.01$) around the +100 trading day horizon relative to the energy benchmark, representing the strongest negative deviation across groups. The full sample portfolio also displays significant abnormal underperformance over this medium-term period, reaching approximately -14.6% by +100 days (compared to energy).

Beyond this medium-term period, abnormal return paths do not simply converge back toward zero. Instead, portfolios exhibit a gradual recovery that eventually transition into positive abnormal performance. In particular, U.S.-exposed funds undergo a pronounced long-run reversal: by the +250 trading day horizon, the U.S. clean energy portfolio reaches +32.7% ($p < 0.01$) relative to the energy benchmark, indicating that the initial election-driven underperformance was more than fully offset in the longer run.

However, this reversal is not uniform across all geographical exposures. While global and U.S.-focused portfolios show strong recoveries, European and China-focused clean energy funds do not exhibit the same sustained rebound. Both regions display temporary mid-term

improvements, but BHAR trajectories weaken again toward the end of the sample. By +250 trading days, European and China portfolios remain significantly negative relative to the market benchmark, suggesting that abnormal underperformance persists longer outside the U.S. context.

Benchmark choice further shapes the temporal interpretation of these effects. In the U.S. and global portfolios, long-run abnormal performance becomes considerably stronger relative to the conventional energy benchmark than relative to the broad market benchmark. This implies that the recovery reflects not only general price adjustment, but also a relative revaluation of clean energy compared to traditional energy over the post-election year. Similarly, Chinese funds recover largely relative to energy over longer horizons, while remaining negative compared to the market. European funds show a comparable pattern, with abnormal performance being more pronounced when compared to the market.

Overall, this indicates that post-election dynamics reflect not only absolute repricing of clean energy funds but also repricing of their benchmarks. An examination of the indexed benchmark returns (see Appendix 5) shows that in the early post-election period the broad market and conventional energy indices move closely together across regions. However, from the medium-term onward, their trajectories begin to diverge: the broad equity market recovers more strongly, while the conventional energy benchmark fails to keep pace

.These findings suggest that abnormal performance following the election does not simply dissipate over time, but instead undergoes a temporal restructuring, with initial underperformance deepening in the medium term and, in some cases, reversing thereafter. Rather than converging smoothly back to zero, deviations from benchmark performance persist across extended horizons and evolve differently across portfolios.

However, given the length of the event windows, longer-run abnormal returns should be interpreted with caution. While the initial reaction is closely aligned with the election outcome, medium- and long-term dynamics may also reflect subsequent macroeconomic developments or geopolitical events that unfold during the post-election period. Accordingly, the persistence of abnormal returns does not necessarily imply a continuous election effect but rather indicates that the election acted as a catalyst for valuation adjustments that continued to interact with broader market forces over time.

7.4 Robustness

As an additional robustness measure, the event study was replicated using an alternative expected return specification based on the market model. While the main analysis computed BHAR relative to realized benchmark index returns, this robustness approach replaces benchmark performance with market-model expected returns. In doing so, abnormal returns are adjusted for systematic market exposure, providing a complementary measure of whether the observed election effects persist once differences in market risk are accounted for. The resulting abnormal performance estimates are denoted as BHAR_MM.[12]

Overall, the market model results confirm the central findings of the benchmark-based BHAR analysis. As shown in **Figure 8**, clean energy funds exhibit statistically significant negative abnormal performance immediately following the election, followed by a further deterioration over the medium-term horizon. The downward adjustment remains most pronounced between approximately +75 and +125 trading days after the event, indicating that the election shock generated persistent abnormal deviations beyond the initial short-window.

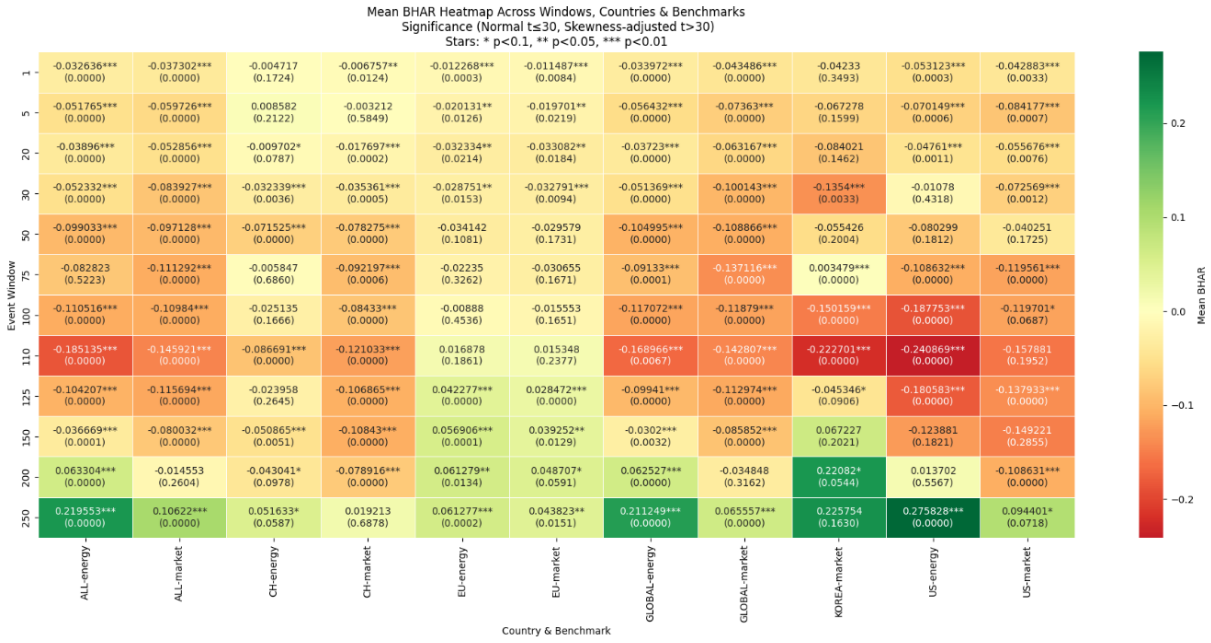


Figure 8: Mean BHAR_MM based on Market Model and Significance

[12] The full results of the robustness test can be found in **Appendix 6**

Regional heterogeneity remains clearly visible. U.S.-exposed portfolios continue to show the strongest abnormal decline during the medium term, supporting the interpretation that domestic political uncertainty was the primary transmission channel. However, the market model robustness analysis reveals an important difference in long-run adjustment dynamics for non-U.S. portfolios (**Figure 9**). While the normal BHAR approach suggested continued underperformance in Europe- and China-focused funds over extended horizons, the BHAR_MM trajectories indicate that these portfolios recover more strongly and ultimately exhibit positive abnormal performance by the +250 trading day horizon.

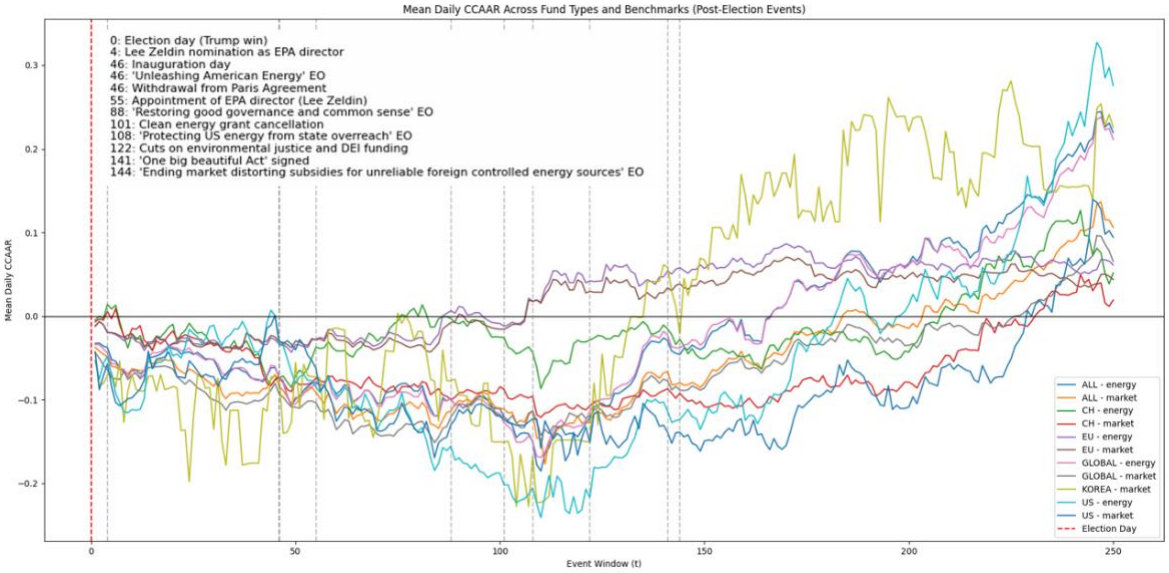


Figure 9: Daily CCAAR by Regions and Benchmarks

This divergence highlights that long-run conclusions are sensitive to the abnormal return measurement framework. Under direct sector benchmark comparisons, European and China funds remain relatively weak. In contrast, when performance is measured relative to market-model expected returns, these same portfolios exhibit long-run outperformance.

Taken together, these robustness results strengthen confidence in the main conclusions concerning short and medium-term findings, while indicating that long-run recovery patterns (particularly outside the U.S.) depend on whether abnormal performance is evaluated relative to conventional energy benchmarks or relative to market-model expected returns.

8 Discussion

The following section interprets the empirical findings documented in Section 7 and situates them within the theoretical framework and the related literature on election-driven market reactions and sustainability-related assets. Overall the results indicate (i) an immediate negative repricing of clean energy funds following the 2024 election outcome, (ii) a continued deterioration into the medium term, amplified by subsequent policy signals, (iii) pronounced heterogeneity across regional exposures consistent with differences in policy risk transmission, (iv) a long run recovery of some regions that is difficult to attribute to pro-clean energy policy signaling and therefore requires alternative interpretative lenses, (v) a continued negative performance of European and Chinese-exposed clean energy funds that is not consistent when testing for robustness.

8.1 Policy Expectations and Political Uncertainty

The significant negative BHARs observed in the shortest windows are consistent with the interpretation that investors rapidly revised expectations about the future regulatory and subsidy environment for clean energy under a Republican administration. This aligns with the broader election literature documenting systematic sectoral reallocations around election outcomes and the tendency for energy-related industries to respond strongly to anticipated deregulation or shifts in climate policy (Lubos & Veronesi, 2012; Bloom et al., 2016). The fact that clean energy underperforms both the market and the conventional energy benchmarks immediately after the election supports the idea that this was not merely a general market reaction, but a sector specific repricing linked to political risk.

The short-run decline is also consistent with findings from climate-election studies at the stock level. For example, Ramelli et al. (2021) document that election outcomes can trigger abrupt negative reactions among climate-responsible firms when investors anticipate rollbacks in environmental policy. Similarly, Pham et al. (2023) show that major political milestones, such as the ratification of the Paris Agreement in 2016, are associated with negative abnormal returns and heightened volatility in green energy stocks. The present study extends this evidence to the fund level, demonstrating that other clean energy investment products exhibit comparable election sensitivity.

Importantly, the distribution of individual fund trajectories in **Figure 1**, suggests that this reaction reflects broad-based readjustments rather by being driven by a small number of outlier funds, and therefore discards abnormal performance being driven by idiosyncratic fund events.

8.2 Post-Event Policy Signaling

A notable feature of the results is that abnormal performance persists and deepens well beyond the immediate election window. Rather than stabilizing shortly after the event, mean BHARs reach their lowest levels in the medium-term horizon (with the exception of European funds.) This pattern suggests that clean energy performance was influenced not only by the election outcome itself but also by subsequent political developments and continued policy signaling. In the clean energy context, profitability expectations are closely tied to subsidies, tax incentives, and environmental regulation (Kanawal & Islam, 2025). Consequently, investors may continue to revise valuations beyond the initial election outcome as the post-election policy trajectory becomes clearer over time.

The period following the election and Donald Trump's victory was characterized by a sequence of executive orders and institutional developments that reinforced expectations of an unfavorable climate-policy environment. On inauguration day (+46 days), the administration issued Executive Order 14154, *"Unleashing American Energy,"* which explicitly emphasized deregulation and the expansion of domestic fossil energy production (The White House, 2025a). The same day also marked the renewed withdrawal from the Paris Agreement (The White House, 2025b), signaling a sharp break from international climate cooperation.

Subsequent political developments provided further negative regulatory signals for the clean energy sector. For example, the nomination and later appointment of Lee Zeldin, a vocal anti-sustainability advocate, as director of the Environmental Protection Agency (+4 and +55) contributed to expectations of a less supportive policy (Poltico, 2024). Later executive orders continued to intensify this trajectory. Executive Order 14260, *"Protecting American Energy From State Overreach"* (+108), directly targeted state-level climate regulation, instructing federal authorities to challenge environmental measures viewed as restrictive to domestic energy expansion (The White House, 2025c). This, coupled with the breakout of the trade war between the U.S. and China (+110) likely reinforced investor expectations of prolonged regulatory difficulties, and coincided contributing to the continued decline in cumulative abnormal returns

well beyond the election itself and explaining the extreme negative mean BHAR observed on the medium term.

Taken together, these developments suggest that the observed medium-term trough in abnormal performance reflects not only the election outcome, but also the sequential arrival of policy-relevant information that extended the period of uncertainty and negative sentiment. Clean energy funds therefore appear to have been subject to an evolving political risk environment, in which markets updated expectations repeatedly as regulatory intentions became progressively more explicit.

This dynamic is also consistent with behavioral finance interpretations of delayed adjustment and sentiment-driven overshooting in politically sensitive sectors (Barberis & Thaler, 2003). Rather than converging rapidly back toward benchmark performance, clean energy valuations continued to deviate as investors processed a sustained stream of adverse political and regulatory developments.

8.3 Regional Heterogeneity

The geographical dimension of the findings further supports the interpretation that political uncertainty played a central transmission role. U.S.-focused clean energy funds experience the strongest and most persistent abnormal underperformance in the medium-term, whereas European and China-focused portfolios exhibit substantially smaller and smoother deviations in the short-run. However, these non-U.S. portfolios do not display the same pronounced long-run reversal observed in the U.S. case and remain persistently negative over extended horizons.[13]

This pattern is consistent with the theoretical expectation that domestic portfolios are more directly exposed to shifts in U.S. climate and energy regulation, while foreign portfolios are partially insulated through alternative institutional environments. The intermediate behavior of global portfolios reinforces this interpretation, as even partial U.S. exposure appears sufficient to transmit domestic election sensitivity.

The results therefore contribute to the literature by demonstrating that election effects are not uniform across clean energy markets but are strongly shaped by geographical exposure and the degree of dependence on U.S. policy conditions. While previous studies have mainly examined

[13] This interpretation is sensitive to the abnormal returns specification, as discussed in the robustness analysis.

stock-level responses (Ramelli et al., 2021; Koch & Schiereck, 2025), the present analysis provides fund-level evidence of heterogeneous political sensitivity across regions.

8.4 Reversal

The most conceptually challenging result is the long-run reversal of abnormal performance. While European and China-focused clean energy funds follow a more expected adjustment path, characterized by relatively small but persistent deviations and potential continued underperformance, the U.S.-focused, global, and full-sample portfolios exhibit a pronounced reversal. Although these portfolios experience significant abnormal underperformance in the short and medium term, abnormal returns ultimately turn positive, and clean energy funds outperform both market and conventional energy benchmarks over longer horizons.

This pattern is particularly difficult to reconcile with standard political-risk expectations that the paper assumed. Given the sustained sequence of adverse political signaling and regulatory uncertainty following the election, one would normally expect U.S.-exposed clean energy funds to exhibit a persistently downward trajectory, or at best a gradual convergence back toward zero as uncertainty becomes absorbed into valuations. Conversely, non-U.S. clean energy portfolios could plausibly be expected to show weaker effects or even relative resilience, as international funds may represent alternative investment destinations for investors seeking clean energy exposure under less hostile policy conditions.

Empirically, however, the adjustment process unfolds in the opposite direction. The strongest long-run recovery occurs precisely in U.S.-focused and globally exposed portfolios, while European and China-focused funds remain persistently negative relative to benchmarks even over extended horizons. This outcome is difficult to reconcile with a simple substitution mechanism in which capital reallocates away from politically constrained U.S. markets toward foreign alternatives. In particular, the continued underperformance of China and Europe is conceptually surprising, since these regions would, under conventional reasoning, be expected to benefit from a relative attractiveness premium if investors perceived the U.S. policy environment as structurally unfavorable.

The recovery in U.S.-exposed portfolios is therefore difficult to interpret through contemporaneous policy developments alone, as the post-election environment does not contain

clear positive regulatory shocks that would immediately justify renewed outperformance. One plausible explanation is that markets rapidly priced in an extreme downside policy scenario in the immediate aftermath of the election. Once pessimistic expectations were fully incorporated into valuations, subsequent developments may have had diminishing marginal impact, allowing prices to recover even in the absence of favorable policy signals. At the same time, part of the observed reversal reflects benchmark dynamics: long-run outperformance is substantially stronger relative to conventional energy benchmarks than relative to broad market benchmarks. Given that traditional energy lagged the broader market in the post-election period, relative clean energy outperformance may partly capture sector divergence rather than purely fund-specific recovery.

One plausible theoretical explanation is offered by the "boomerang hypothesis" described by Ramelli et al. (2021). This hypothesis suggests that investors may interpret adverse climate-policy shocks as temporary, maintaining long-run expectations of ambitious environmental regulation. Under this view, short-run rollbacks may ultimately increase the probability of stronger long-term climate policy, generating valuation recoveries once worst-case expectations become fully priced. Applied to the present findings, the long-term reversal may reflect market correction dynamics following an initial overreaction, as well as renewed investment based on structural transition trends rather than immediate policy support. This interpretation is particularly consistent with the fact that long-run outperformance is stronger relative to conventional energy benchmarks than relative to broad market benchmarks, suggesting a sector-relative revaluation rather than a purely general market recovery.

8.6 Implications

Taken together, the empirical dynamics provide evidence that election-related abnormal performance in clean energy funds is not confined to a narrow event window. Under the efficient market hypothesis (Fama, 1970), abnormal returns should disappear quickly once new political information becomes public. The persistence of abnormal deviations beyond the election, followed by reversal rather than convergence toward zero, indicates that adjustment was gradual and extended over time.

This pattern is more consistent with behavioral finance interpretations of delayed reaction, sentiment-driven trading, and over- or underreaction in politically sensitive sectors (Barberis & Thaler, 2003). Elections therefore appear to function not as isolated information shocks but as the

beginning of a broader uncertainty cycle, during which expectations are continuously updated through subsequent policy signals and evolving risk perceptions

These findings have several implications for investors and portfolio managers. First, clean energy funds appear particularly vulnerable to election-driven regulatory uncertainty, suggesting that political risk represents a material component of sector-specific volatility. Investors in sustainability-oriented products should therefore account for election cycles as an additional risk factor, especially in markets where clean energy profitability is strongly shaped by government support. Second, the persistence of abnormal returns beyond the immediate election window implies that political shocks may unfold gradually through sequential policy signals rather than being fully incorporated on the event day. This highlights the importance of medium-term risk management, as market adjustment may continue for months after the election outcome becomes known. Finally, the observed regional heterogeneity suggests that geographical diversification may partially mitigate domestic policy exposure. Non-U.S.-focused portfolios displayed comparatively more stable abnormal return paths, indicating that clean energy investments operate under different regulatory and institutional environments. From a policy perspective, the results underline that credible and stable climate regulation is essential to reduce uncertainty premiums and support sustained capital allocation toward green energy.

9 Conclusion

This study investigated the impact of the 2024 U.S. presidential election on the performance of clean energy funds using a multi-stage event study approach. By examining buy-and-hold abnormal returns across 112 funds relative to both broad market benchmarks and conventional energy-sector benchmarks, the analysis assessed whether the election resulted in abnormal performance, how effects differed across geographical regions, and whether market reactions persisted over time.

The results indicate that the election constituted a significant political event for clean energy investments. Clean energy funds experienced statistically significant negative BHAR in the immediate post-election period, underperforming both benchmark categories. This short-term decline suggests that investors adjusted expectations regarding future policy support for renewable energy and the regulatory environment under the incoming administration. Furthermore, abnormal

underperformance intensified over the medium-term horizon, pointing to sustained uncertainty and continued market reassessment beyond the initial event window.

A key contribution of this study lies in the regional comparison and in extending the evidence from stocks to clean energy funds. The findings show that U.S.-focused clean energy funds were most strongly affected, displaying the largest and most persistent negative abnormal returns. In contrast, European and China-focused funds reacted more moderately, while global portfolios exhibited intermediate sensitivity. These results highlight that exposure to domestic political and regulatory conditions plays a role in determining the vulnerability of clean energy assets to election-driven shocks. In the long-run horizon, however, the initial downward reaction was followed by a recovery, with clean energy funds eventually outperforming both benchmarks.

Importantly, long-run dynamics differed substantially across regions. While U.S.-exposed and globally diversified portfolios exhibited a pronounced recovery and ultimately transitioned into positive abnormal performance relative to benchmarks, European and China-focused funds remained persistently negative over extended horizons. This asymmetry suggests that election-related repricing does not simply fade out over time but evolves unevenly across clean energy markets, and that long-run valuation adjustments cannot be explained by policy signaling alone.

Overall, the study demonstrates that U.S. political events represent a relevant risk factor for clean energy fund performance, with effects that extend beyond short-term volatility and differ substantially across regions. These findings are relevant for investors seeking to manage political and regulatory risk in sustainable portfolios and underline the importance of stable policy frameworks for clean energy market development.

Several limitations should be noted, including potential benchmark contamination, survivorship bias, and constraints related to fund classification. Future research may build on these results by incorporating additional fund characteristics, alternative benchmark specifications, or broader political event settings.

In conclusion, the 2024 U.S. presidential election generated significant and regionally heterogeneous abnormal performance in clean energy funds, confirming the close relationship between political uncertainty and sustainable financial markets while highlighting that long-run adjustment processes remain strongly dependent on geographical exposure and market expectations.

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Appendix 1

List of Keywords Used:

1. Green energy
2. Clean energy
3. Renewable energy
4. Solar energy
5. Sustainable energy
6. Energy transition
7. Clean power
8. Alternative energy
9. Low carbon energy
10. Transition energy
11. Bioenergy
12. Energy solutions
13. Smart grid
14. Smart energy
15. Energy innovation
16. Wind Energy
17. Green Power

Appendix 2

Sample of Clean Energy Funds Used

Lipper RIC	Asset Name	Geographical Exposure	Asset Universe
LP62904644	Amova China Energy Innovation Equity Fund	China	Mutual Funds
LP68608049	CCB Principal New Energy Industry Equity Fund A	China	Mutual Funds
LP68748132	ChinaAMC CSI Green Electricity Index ETF	China	Exchange Traded Funds
LP68733196	CICC SSI Clean Energy Index Seed Fund A	China	Mutual Funds
LP68323046	Cinda New Energy Industrial Fund A	China	Mutual Funds
LP68753337	E Fund CSI Green Electricity Index ETF	China	Exchange Traded Funds
LP68746774	Fullgoal CSI Green Electricity Index ETF	China	Exchange Traded Funds
LP68591012	Global X China Clean Energy ETF HKD	China	Exchange Traded Funds
LP68751151	Guotai CNI Green Electricity ETF Seed Feeder Fd A	China	Mutual Funds
LP68741036	Guotai CNI Green Electricity Index ETF	China	Exchange Traded Funds
LP68734800	Harvest Clean Energy Equity Seed Fund A	China	Mutual Funds
LP68733646	Harvest CNI Green Electricity Idx ETF Feeder Fd A	China	Mutual Funds
LP68701869	Harvest CNI Green Electricity Index ETF	China	Exchange Traded Funds
LP68653207	Phillip China Green Energy and Environment	China	Mutual Funds
LP68758721	Tianhong CNI Green Electricity Index Seed Fund A	China	Mutual Funds
LP68754276	TISCO China Clean Energy	China	Mutual Funds
LP68589091	Triodos Energy Transition Europe Fund R-cap	Europe	Mutual Funds
LP68779358	UB Renewable Energy R growth	Europe	Mutual Funds
LP68679548	Yapi Kredi Clean Energy Variable Fund Class A	Global	Mutual Funds
LP68746911	YLTF (4D) Index Global Green Energy - AI Based	Global	Mutual Funds
LP68012449	Ak Alternative Energy Foreign Equity F	Global	Mutual Funds
LP68580301	Allianz Smart Energy AT (USD)	Global	Mutual Funds
LP65088107	Alpha Asset Global Renewable Energy Equity 1 A	Global	Mutual Funds
LP68551430	AXA WF - Clean Energy A Cap USD	Global	Mutual Funds
LP68731336	BetaShares Energy Transition Metals ETF	Global	Exchange Traded Funds
LP60056149	BGF Sustainable Energy Fund A2 USD	Global	Mutual Funds
LP68654424	BMO Clean Energy ETF Fund Series A	Global	Mutual Funds
LP68636162	BMO Clean Energy Index Fund Series ETF	Global	Exchange Traded Funds
LP60023788	BNPP Clean Energy Solutions Clsc Cap	Global	Mutual Funds
LP40115552	Calvert Global Energy Solutions Fund;A	Global	Mutual Funds
LP68711426	Deka Future Energy ESG UCITS ETF	Global	Exchange Traded Funds
LP65087149	DNB Fund - Renewable Energy Retail A EUR	Global	Mutual Funds
LP68017355	DSP Gbl Clean Energy FOF-Growth	Global	Mutual Funds
LP68633775	Eastspring Global Green Energy	Global	Mutual Funds
LP65058312	ENETIA Energy Transition Fund A EURh	Global	Mutual Funds
LP40232919	Fidelity Clean Energy ETF	Global	Exchange Traded Funds
LP40121975	First Trust Global Wind Energy ETF	Global	Exchange Traded Funds
LP40180715	First Trust NASDAQ Cln Edge Smart Grid Infra Ix Fd	Global	Exchange Traded Funds

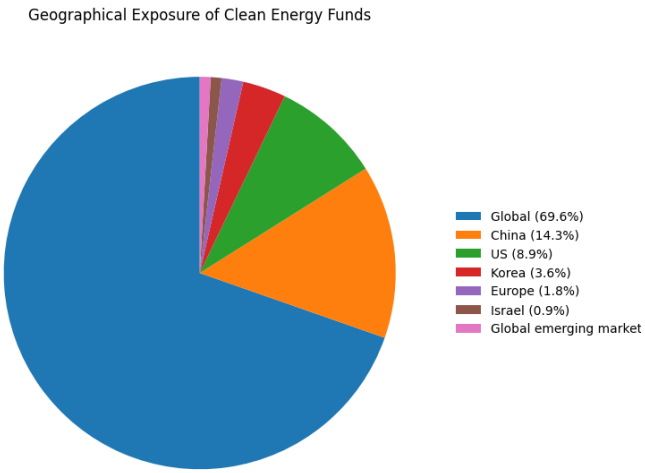
LP68688843	Franklin Templeton SinoAm Global Clean Energy ETF	Global	Exchange Traded Funds
LP68728209	Fubon Global ESG Green Energy ETF	Global	Exchange Traded Funds
LP68696296	Global X Wind Energy UCITS ETF USD Acc	Global	Exchange Traded Funds
LP40229708	Goldman Sachs Clean Energy Income Fund;P	Global	Mutual Funds
LP40107648	Guinness Atkinson Alternative Energy Fund	Global	Mutual Funds
LP65106669	Guinness Sustainable Energy C USD Acc	Global	Mutual Funds
LP68632481	Guinness Sustainable Energy UCITS ETF Acc	Global	Exchange Traded Funds
LP68641107	Harvest Clean Energy ETF - Class A Units	Global	Exchange Traded Funds
LP60032428	Ibercaja New Energy A, FI	Global	Mutual Funds
LP60058600	Invesco Energy Transition Enablement A USD Acc	Global	Mutual Funds
LP40115924	Invesco Global Clean Energy ETF	Global	Exchange Traded Funds
LP68662725	Invesco Solar Energy UCITS ETF USD Acc	Global	Exchange Traded Funds
LP68725589	Invesco Wind Energy UCITS ETF Acc	Global	Exchange Traded Funds
LP40120600	iShares Global Clean Energy ETF	Global	Exchange Traded Funds
LP68706393	iShares Global Clean Energy Index ETF	Global	Exchange Traded Funds
LP65101708	iShares Global Clean Energy Trnstn UCITS ETF USD D	Global	Exchange Traded Funds
LP68778159	iShares S&P/TSX Energy Transition Mtrls Idx ETF	Global	Exchange Traded Funds
LP68645968	KB Global Clean Energy Hydrogen Economy Eq A	Global	Mutual Funds
LP68651517	KB RISE Global Clean Energy S&P ETF	Global	Exchange Traded Funds
LP68121010	KBI Global Energy Transition EUR A	Global	Mutual Funds
LP68723697	Kernel S&P Global Clean Energy	Global	Mutual Funds
LP65081231	Kiwoom Asset Future Energy Equity 1 Cls A1	Global	Mutual Funds
LP68744377	KTAM Green Energy A	Global	Mutual Funds
LP68622973	L&G Clean Energy UCITS ETF USD Acc	Global	Exchange Traded Funds
LP68579123	LUX IM Future Energy DXL EUR	Global	Mutual Funds
LP68726668	Manulife Glo Clean Energy Equity Feeder USD A	Global	Mutual Funds
LP68740587	Mediolanum Energy Transition L A Euro	Global	Mutual Funds
LP68720348	Metro Clean Energy Equity Feeder	Global	Mutual Funds
LP68619679	MFC Renewable Energy - D	Global	Mutual Funds
LP68633807	More (E) Clean Energy (4D)	Global	Mutual Funds
LP68636443	MTF TR (4D) Bluestar Solar Energy Industry USD-Hgd	Global	Mutual Funds
LP68631116	MTF TR (E) Indxx Renewable Energy USD-Hedged (4D)	Global	Mutual Funds
LP68689163	Optinova Conventional & Clean Energy R	Global	Mutual Funds
LP65076086	Pictet-Clean Energy Transition-P USD	Global	Mutual Funds
LP68695521	Polar Capital Future Energy Class A acc USD	Global	Mutual Funds
LP68680462	Polar Capital Smart Energy R USD ACC	Global	Mutual Funds
LP68650372	Principal Global Clean Energy - A	Global	Mutual Funds
LP68685868	QNB Finance Clean Energy&Water Fund Basket Fund	Global	Mutual Funds
LP68443980	Quaero Capital Accessible Clean Energy A USD Cap	Global	Mutual Funds
LP68627290	Robeco Smart Energy D EUR	Global	Mutual Funds
LP68642730	Samsung Energy Transition Equity FOF H A	Global	Mutual Funds
LP65080999	Samsung Global Clean Energy Equity FOF 1 Class A	Global	Mutual Funds
LP68647918	SCB Global Clean Energy A	Global	Mutual Funds

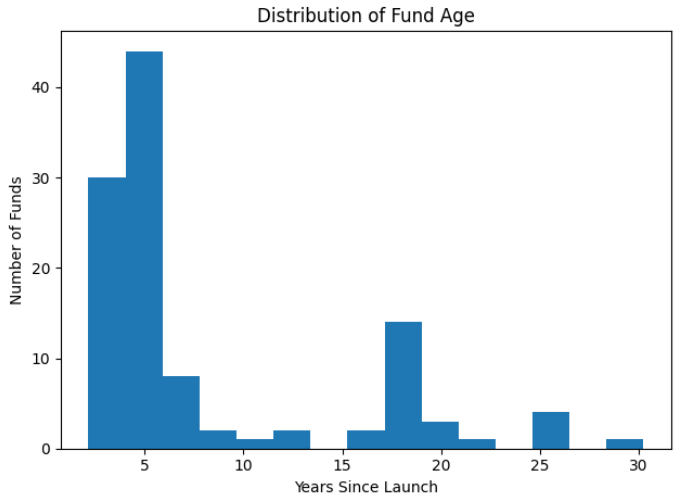
LP68638308	Schroder Global Alternative Energy Fund Q1 Acc GBP	Global	Mutual Funds
LP68560460	Schroder ISF Global Alternative Energy A Acc USD	Global	Mutual Funds
LP40230992	SmartETFs Sustainable Energy II ETF	Global	Exchange Traded Funds
LP68679600	Storebrand Renewable Energy A	Global	Mutual Funds
LP68790795	THEAM QUANT New Energy Opportunities Clsc EUR Cap	Global	Mutual Funds
LP68453982	TM Gravis Clean Energy Income C GBP Net Acc	Global	Mutual Funds
LP62904551	TokioMarine Renewable Energy Inc Strategy(Annual)	Global	Mutual Funds
LP40235794	TrueShares Eagle Global Renewable Energy Inc ETF	Global	Exchange Traded Funds
LP68648383	VanEck Global Clean Energy ETF	Global	Exchange Traded Funds
LP40115701	VanEck Low Carbon Energy ETF	Global	Exchange Traded Funds
LP40021168	Victory Global Energy Transition Fund;A	Global	Mutual Funds
LP40232654	Virtus Duff & Phelps Clean Energy ETF	Global	Exchange Traded Funds
LP68754060	Virtus GF Clean Energy Fund A Shares USD Acc	Global	Mutual Funds
LP68768525	WisdomTree Renewable Energy UCITS ETF USD Acc	Global	Exchange Traded Funds
LP68741889	WS Guinness Sustainable Energy Y Acc GBP	Global	Mutual Funds
LP68731406	Triodos EM Renewable Energy I USD Cap	Global emerging markets	Mutual Funds
LP68633828	Ayalon (E) Israel - US Green Energy (4C)	Israel	Mutual Funds
LP68583071	Mirae Asset TIGER Fn Renewable Energy ETF	Korea	Exchange Traded Funds
LP68583073	NH-Amundi HANARO Green Energy ETF	Korea	Exchange Traded Funds
LP68651472	Samsung KODEX Renewable Energy Active ETF	Korea	Exchange Traded Funds
LP68679376	Timefolio TIMEFOLIO K-Renewable Energy Active ETF	Korea	Exchange Traded Funds
LP40224492	ALPS Clean Energy ETF	US	Exchange Traded Funds
LP68684725	CIBC Clean Energy Index ETF	US	Exchange Traded Funds
LP40113822	First Trust NASDAQ Clean Edge Green Energy Idx Fd	US	Exchange Traded Funds
LP68284339	First Trust NASDAQ® Clean Edge® Green Energy ETF	US	Exchange Traded Funds
LP40117533	Firsthand Alternative Energy Fund	US	Mutual Funds
LP40206313	Hennessy Energy Transition Fund;Institutional	US	Mutual Funds
LP40099457	Invesco WilderHill Clean Energy ETF	US	Exchange Traded Funds
LP68679412	Samsung KODEX US Clean Energy Nasdaq ETF	US	Exchange Traded Funds
LP40225253	State Street SPDR S&P Kensho Clean Power ETF	US	Exchange Traded Funds
LP68648429	TISCO New Energy	US	Mutual Funds

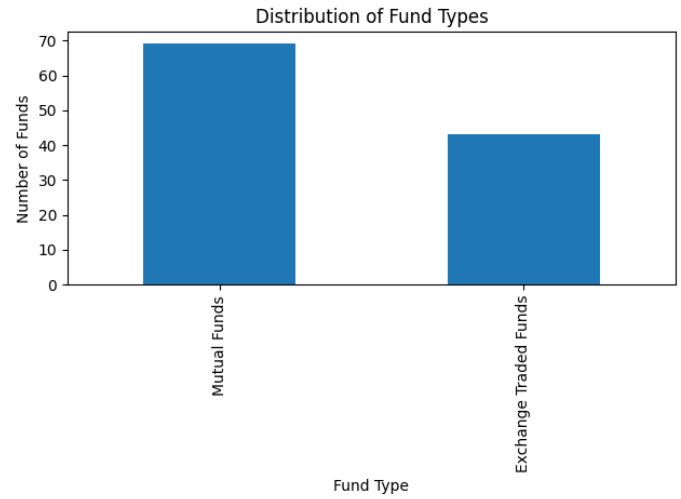
Appendix 3

Descriptive Statistics

Keyword	Frequency
Clean energy	40
Renewable energy	13
Energy transition	10
Green energy	9
Green electricity	8
Alternative energy	5
New Energy	5
Sustainable energy	5
Future energy	4
Wind Energy	3
Smart energy	3
Solar energy	2
Energy Innovation	1
Energy solutions	1
Smart grid	1
Low Carbon energy	1
Clean power	1







Appendix 4

Market Benchmarks

Lipper RIC	Asset Name	Geographical Exposure	Benchmark For
LP40188923	iShares MSCI China ETF	China	Chinese clean energy funds
LP40207784	iShares Core MSCI Europe ETF	Europe	European funds funds
LP65141193	iShares MSCI World Index ETF	Global	Global clean energy funds and complete sample (ALL)
LP68060182	iShares MSCI Korea UCITS ETF USD (Acc)	Korea	Korean clean energy funds
LP68036938	iShares MSCI USA UCITS ETF USD (Acc)	United States of America	U.S. clean energy funds

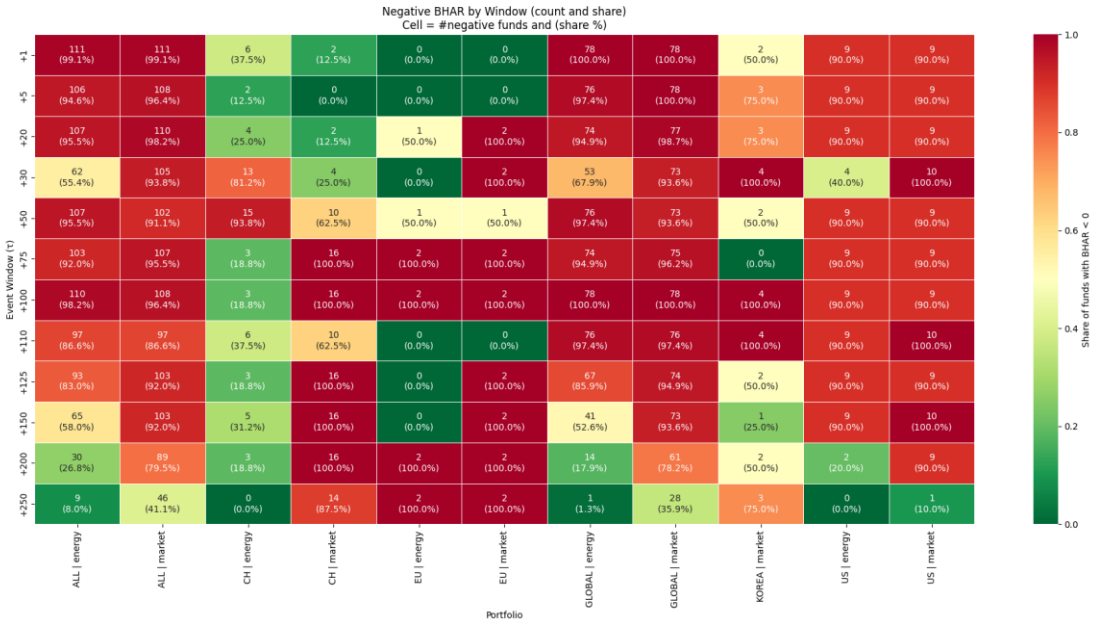
Energy Benchmarks

Lipper RIC	Asset Name	Geographical Exposure	Benchmark For
LP68216324	China Universal CSI Energy Index ETF	China	Chinese clean energy funds
LP68290247	SPDR MSCI Europe Energy UCITS ETF	Europe	European clean energy funds
LP40056103	iShares US Energy ETF	United States of America	U.S. clean energy funds
LP68364678	SPDR MSCI World Energy UCITS ETF	Global	Global clean energy funds and complete sample (ALL)

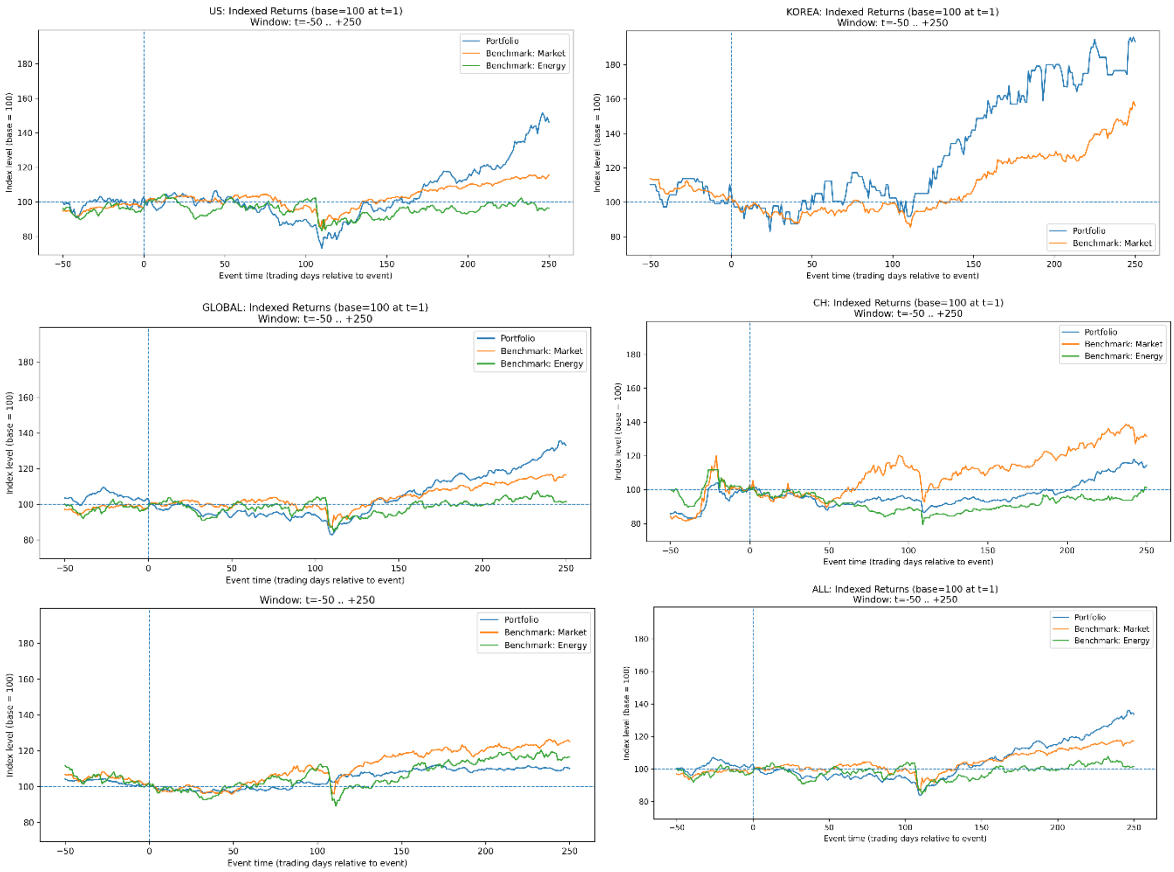
Appendix 5

Extra results of the main method

Count of clean energy funds with negative BHAR_MM by window and geographical region



Indexed actual returns paths of each clean energy fund portfolio against its benchmarks



Detailed results are included in the zip file called ES_10 including:

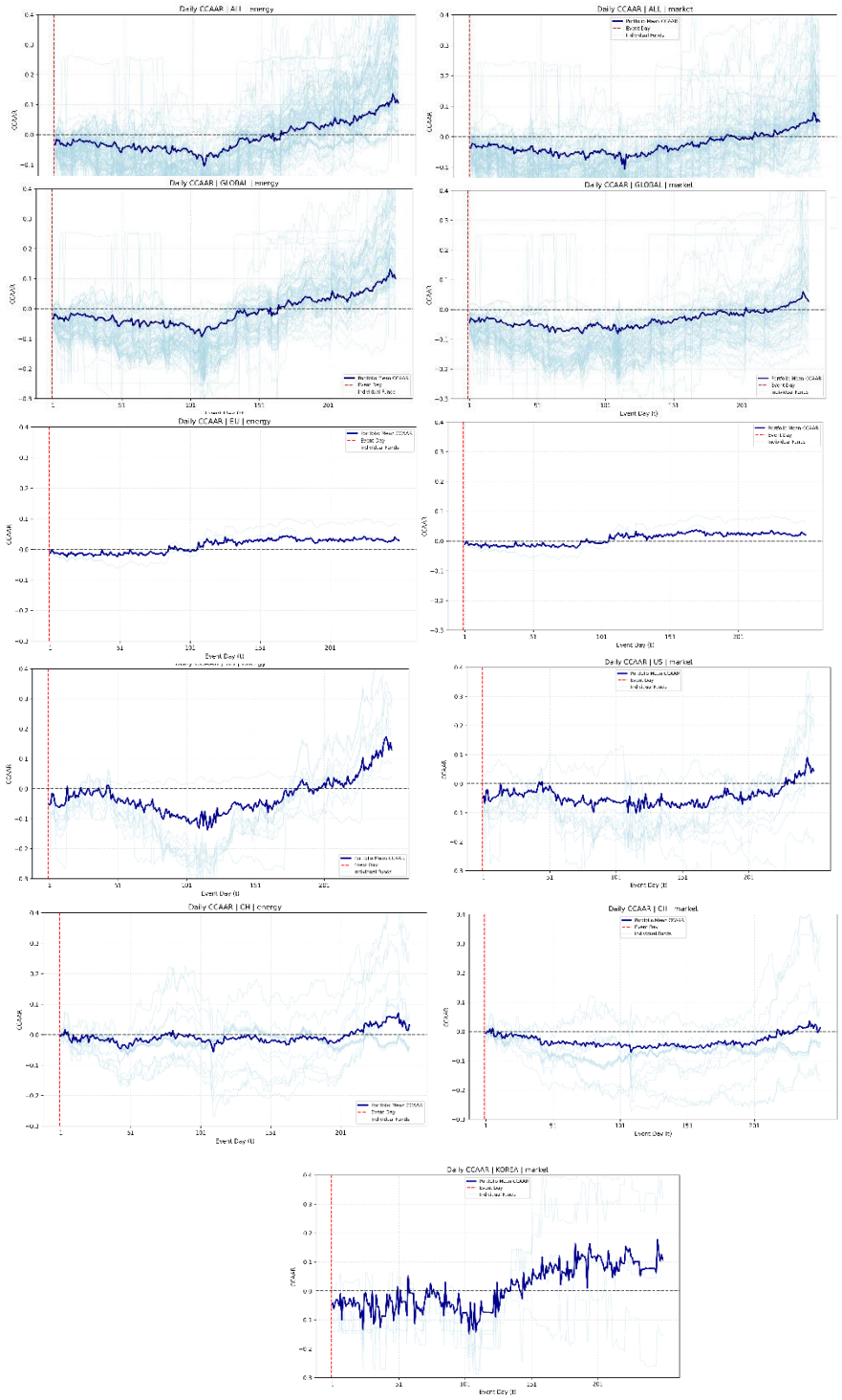
1. DATA_DR_2.xslx: TRI as extracted from Refinitiv Workspace
2. Folder EVENT_STUDY_OUTPUT: Results of the event study divided first by geographical region and then by benchmark used for comparison and computation of expected returns. Outputs here use skewness adjusted significance testing.
    a. bhar_window_statistics.csv: per window results, mean BAHRs significance testing
    b. daily_aar_and_bhar.csv: daily results, mean BHARs
    c. fund_daily_bhar.csv: daily BHARs of each fund
    d. fund_level_bhar_by_window.csv: per window BHAR of each fund
    e. combined_window_statistics_BHAR.csv: summary file
3. Folder EVENT_STUDY_OUTPUT_SIG_NORMAL: The results here follow a similar structure as 1 but outputs are generated using a normal significance test.
    a. bhar_window_statistics.csv: per window results, mean BAHRs significance testing
    b. daily_aar_and_bhar.csv: daily results, mean BHARs
    c. fund_daily_bhar.csv: daily BHARs of each fund
    d. fund_level_bhar_by_window.csv: per window BHAR of each fund
    e. combined_window_statistics_BHAR_MM.csv: summary file
4. Folder HYPOTHESIS_TEST_OUTPUT
    a. diff_in_means_US_vs_others_energy.csv: welch one side significance test of mean difference for energy compared means
    b. diff_in_means_US_vs_others_market.csv: welch one side significance test of mean difference for market compared means

Scripts used for calculations and plotting are also included in the ES_10 zip file

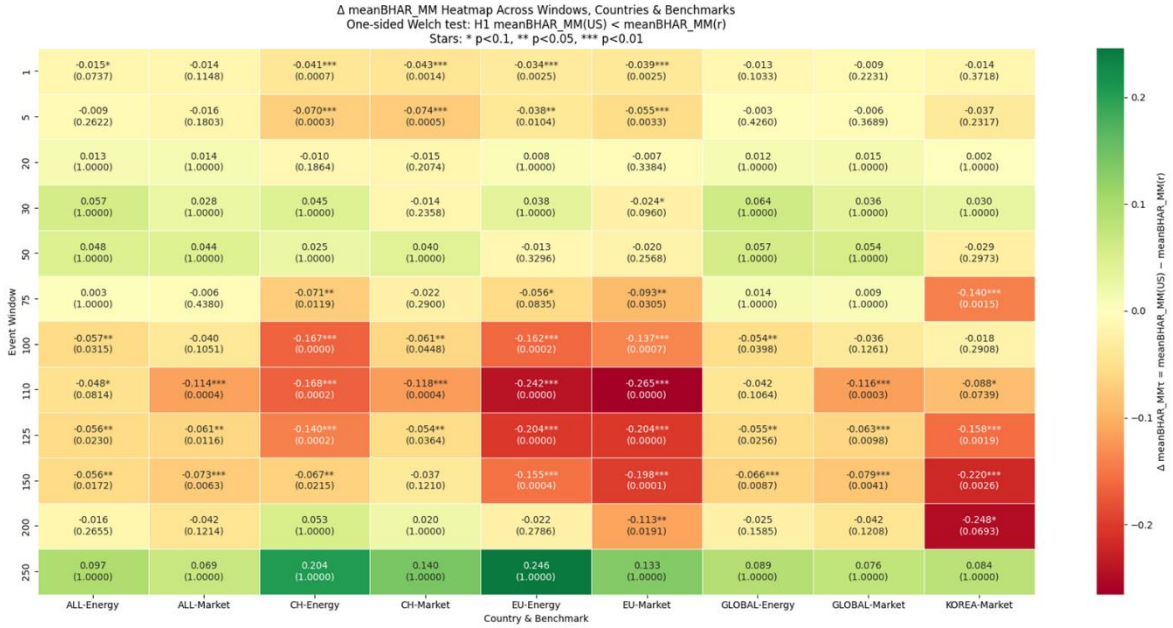
Appendix 6

Results of the Robustness Method

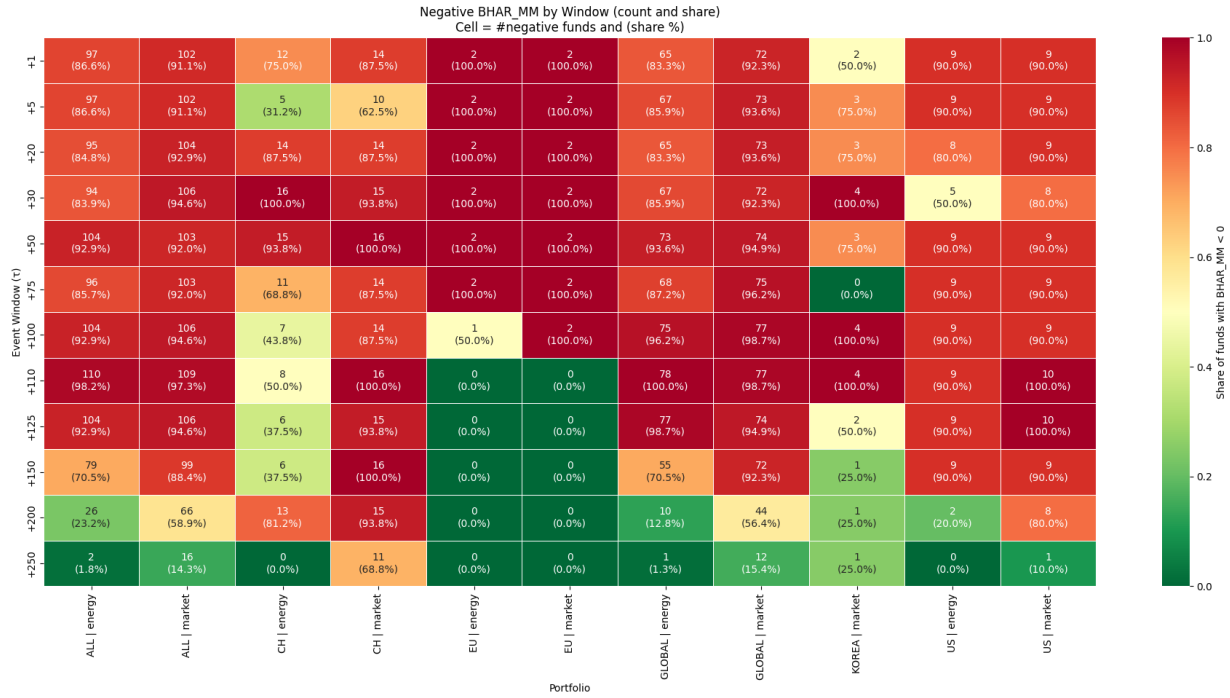
BHAR_MM paths per fund by geographical region



Mean BHAR_MM difference between U.S. funds and other geographical regions



Count of clean energy funds with negative BHAR_MM by window and geographical region



Detailed results for robustness are included in the zip file called ES_11 including:

1. Folder EVENT_STUDY_OUTPUT: Results of the event study divided first by geographical region and then by benchmark used for comparison and computation of expected returns. Outputs here use skewness adjusted significance testing.
    a. bhar_window_statistics.csv: per window results, mean BAHR_MM significance testing
    b. daily_aar_and_bhar_MM.csv: daily results, mean BHAR_MM
    c. fund_daily_bhar_MM.csv: daily BHAR_MM of each fund
    d. fund_level_bhar_MM_by_window.csv: per window BHAR of each fund
    e. betas_used.csv: fund level betas for the calculation of the market model based expected returns
2. Folder EVENT_STUDY_OUTPUT_SIG_NORMAL: The results here follow a similar structure as 1 but outputs are generated using a normal significance test.
    a. bhar_window_statistics.csv: per window results, mean BAHR_MM significance testing
    b. daily_aar_and_bhar_MM.csv: daily results, mean BHAR_MM
    c. fund_daily_bhar_MM.csv: daily BHAR_MM of each fund
    d. fund_level_bhar_MM_by_window.csv: per window BHAR of each fund
    e. betas_used.csv: fund level betas for the calculation of the market model based expected returns
3. Folder HYPOTHESIS_TEST_OUTPUT
    a. diff_in_means_US_vs_others_energy.csv: welch one side significance test of mean difference for energy compared means
    b. diff_in_means_US_vs_others_market.csv: welch one side significance test of mean difference for market compared means

Scripts used for calculations and plotting are also included in the ES_11 zip file

Declaration of Authorship

Eigenständigkeitserklärung

International Finance

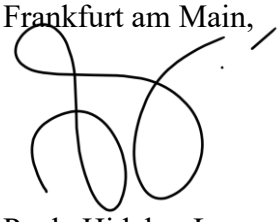
Bachelor Arbeit

Matrikelnummer: 144601

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Frankfurt am Main,



Paola Hidalgo Lasso