THE EFFECT OF ECONOMIC AND CLIMATE POLICY UNCERTAINTIES ON MOMENTUM STRATEGIES ACROSS DIFFERENT ESG LEVELS

Siwaphat PROMMANA[1] and Narapong SRIVISAL[1]
1 Faculty of Commerce and Accountancy, Chulalongkorn University, Thailand; 6784010326@student.chula.ac.th (S. P.); narapong@cbs.chula.ac.th (N. S.)

ARTICLE HISTORY
Received: 6 October 2025 **Revised:** 20 October 2025 **Published:** 3 November 2025

ABSTRACT
This paper investigates the profitability of ESG momentum strategies and their sensitivity to economic and climate policy uncertainty in NASDAQ and NYSE markets between 2011 and 2023. Momentum portfolios are formed by ranking firms on past returns within high- and low-ESG groups, and performance is evaluated using the Fama-French three-factor model.
The results confirm the presence of momentum profits, but primarily in low-ESG and low-governance firms, where weaker transparency and governance allow price trends to persist. High-ESG portfolios exhibit weaker or insignificant momentum effects. Importantly, when Economic Policy Uncertainty (EPU), Climate Policy Uncertainty (CPU), and their interaction are introduced, momentum alphas become insignificant. This indicates that abnormal returns are better understood as compensation for policy-related risks rather than unexplained anomalies. Decomposed analysis shows that forecast disagreement is the most influential component of EPU, with CPU amplifying its effect particularly in low-ESG and low-governance universes. News-based uncertainty matters only when combined with CPU, while CPI and Tax components remain largely irrelevant. Overall, the findings bridge sustainable finance and uncertainty literature, showing that ESG momentum profits are systematically linked to structural macroeconomic and climate policy uncertainties.
Keywords: Economic Policy Uncertainty, Climate Policy Uncertainty, Momentum Strategies, ESG Pillars

CITATION INFORMATION: Prommana, S., & Srivisal, N. (2025). The Effect of Economic and Climate Policy Uncertainties on Momentum Strategies across Different ESG Levels. *Procedia of Multidisciplinary Research, 3*(11), 4.

INTRODUCTION

The integration of Environmental, Social, and Governance (ESG) considerations into portfolios management has shifted from an ethical niche to a central pillar of modern investing. Recent literature shows that ESG performance is associated with risk mitigation, corporate resilience, and more stable cash flows. At the same time, momentum investing—where past winners continue to outperform losers—remains one of the most robust and persistent anomalies in asset pricing. The intersection of ESG and momentum strategies offers new opportunities for investors, but its performance under conditions of heightened uncertainty is less understood.

In this study, momentum strategies are defined using a 5-month lookback period month t-2 to t-6, a 1 month holding period t+1 and monthly rebalancing and following Jegadeesh and Titman (1993). Firms are ranked based on past cumulative returns and sorted into decile portfolios to form zero-cost winners minus losers (WML) portfolios. This design ensures systematic and replicable momentum construction, allowing the analysis to isolate policy uncertainty effects on momentum returns. This study investigates the effectiveness of ESG momentum strategies in U.S. equity markets and their sensitivity to macroeconomic and climate policy uncertainty. The analysis covers NYSE and NASDAQ firms between 2011 and 2023, a period marked by increasing ESG disclosure and growing relevance of policy risks. Portfolios are constructed by sorting firms into high- and low-ESG groups and then ranking by past returns to form momentum strategies. This design allows us to examine whether ESG momentum portfolios deliver economically meaningful and statistically significant returns, while also assessing their robustness to policy uncertainty shocks. Uncertainty represents a critical dimension in this context. Economic Policy Uncertainty (EPU) captures broad macroeconomic ambiguity that affects investor risk appetite, while Climate Policy Uncertainty (CPU) reflects regulatory unpredictability tied to climate transition policies. Both are potential destabilizers of forward-looking strategies such as ESG momentum. To provide deeper insights, the study also decomposes EPU into its four components: news-based uncertainty, forecast disagreement, tax provisions, and CPI disagreement, allowing identification of which channels are most influential for momentum returns. Based on these considerations, the study focuses on two objectives: The first, to test whether ESG momentum strategies generate more significant positive risk-adjusted returns across low-ESG groups rather than high-ESG groups. The second, to examine how EPU, CPU, and their components affect the risk-adjusted returns of ESG momentum strategies, with emphasis on whether low-ESG firms are more vulnerable. Accordingly, two hypotheses are proposed: Hypothesis 1: ESG momentum strategies generate more statistically significant positive risk-adjusted returns within low-ESG pillar groups rather than high-ESG pillar groups. Hypothesis 2: Risk-adjusted returns are negatively affected by increases in EPU and CPU, with stronger effects observed in low-ESG pillar groups.

The expectation of stronger momentum payoffs in low-ESG pillar groups is rooted in their structural market characteristics. Low-ESG firms often exhibit weaker governance, lower transparency, and less institutional ownership, leading to slower incorporation of new information into prices. These frictions create fertile ground for trend continuation and return persistence, allowing momentum strategies to capture mispricing more effectively. By contrast, high-ESG firms—typically larger and more institutionally held—tend to incorporate information faster, leaving less room for momentum strategies to generate abnormal profits. Therefore, Hypothesis 1 focuses on low-ESG groups as the primary source of positive momentum returns.

This streamlined framework positions the paper to contribute to both sustainable finance and uncertainty literature, offering insights into whether ESG momentum can withstand policy shocks or whether its profitability is contingent on stability in economic and climate-related policy environments.

LITERATURE REVIEWS

Momentum is one of the most persistent anomalies in asset pricing. Jegadeesh and Titman (1993) show that past winners continue to outperform losers, a finding replicated across markets and asset classes (Asness et al., 2013). Competing explanations suggest either behavioral biases such as underreaction (Barberis et al., 1998; Daniel et al., 1998) or compensation for systematic risks (Fama & French, 2012). While momentum delivers robust returns, it is vulnerable to reversals and "crashes" during periods of high volatility (Daniel & Moskowitz, 2016).

Economic policy uncertainty (EPU) is an important factor influencing investment and asset pricing. The index developed by Baker, Bloom, and Davis (2016) shows that EPU spikes reduce investment, employment, and stock returns. Uncertainty also undermines momentum strategies by increasing volatility and weakening trend signals (Fang & Peress, 2009; Barroso & Santa-Clara, 2015). More recently, climate policy uncertainty (CPU) has been introduced to capture regulatory ambiguity around climate transition policies (Gavriilidis, 2021). Unlike EPU, CPU operates through sector-specific channels and has been shown to increase firm-level volatility (Engle et al., 2020). Parallel to this, ESG integration has shifted from ethical concerns to a mainstream investment approach. Research finds that strong ESG performance can lower risk, stabilize cash flows, and attract long-term capital (Friede et al., 2015; Giese et al., 2019). ESG also mitigates downside risk, as markets penalize poor ESG performance more heavily (Krüger, 2015). Recent studies extend this to ESG momentum, showing that firms improving their ESG scores generate superior returns and resilience during periods of market stress (Avramov et al., 2022; Kaiser & Welters, 2019).

Despite this progress, the interaction between ESG momentum and policy uncertainty remains underexplored. Traditional momentum weakens under uncertainty shocks, but ESG integration may provide resilience. Moreover, disaggregating EPU into its components—news, forecast disagreement, tax provisions, and CPI disagreement—offers further insight into how different sources of uncertainty affect asset pricing (Baker et al., 2016).

This paper addresses this gap by examining whether ESG momentum strategies yield significant returns and how they respond to EPU, CPU, and decomposed uncertainty components.

RESEARCH METHODOLOGY

In response to examining the effect of economic and climate policy uncertainties on momentum strategies across different ESG levels in NASDAQ and NYSE market, the study was designed to adopt a quantitative research approach. The population of the study consisted of inactive and active stocks from 2011 to 2023. The study requirement for momentum portfolio construction, inactive and active stocks were complete ESG pillar scores. The data collection used three primary sources. First, Refinitiv DataStream provides yearly ESG pillar scores. Second, Wharton research data service provides the monthly return including normal returns and delisting returns used to adjusted return of delisted stocks at delisting month. Also, Fama and French three factors using as risk factors (Fama & French, 1992). Third, Economic policy uncertainty website provides index of economic policy uncertainty (EPU) and climate policy uncertainty (CPU), including the components of economic policy uncertainty: News, Forecast, CPI and Tax based on methodology of Baker, Bloom and Davis (2106) which are weight-calculated and provided in the economic policy uncertainty website. This decomposition provides a structured view of how specific sources of policy uncertainty interact with climate policy risk and momentum profitability.

Table 1 shows the correlation between the uncertainty factors showing how they related

Correlation	EPU	CPU	News	Forecast	CPI	Tax
EPU	1					
CPU	0.384***	1				
News	0.927***	0.480***	1			
Forecast	0.547***	0.069	0.331***	1		
CPI	0.404***	0.135*	0.134*	0.387***	1	
Tax	0.314***	-0.288***	-0.015	0.396***	0.432***	1

The study uses the Fama-French three factors including market (MKT-Rf), size (SMB), value (HML) risk factors as the control variables which are standard risk factors capturing systematics variations in equity returns. These variables help separate effect of policy uncertainty on momentum strategies which include economic policy and climate policy uncertainties that are incorporated as additional controls, reflecting macroeconomic and policy risks that influence investment behavior, foreign capital allocation and firms' risk-taking incentives. By controlling both market-based and policy-related factors, the analysis aims to attribute momentum returns more precisely to uncertainty exposures.

To address the two objectives of this study, two analytical approaches were implemented: First, completed ESG pillar stocks will be descending ranked at year t-1 to use as sample in year t with yearly rebalance, then divided into two groups by twenty percentiles of highest and lowest scores, getting the result of High and Low-ESG pillar groups, the sample of completed ESG pillars scores is rebalanced every year. Second, each group of stocks will be investigated past 5-month cumulative return of each stock (Jegadeesh & Titman, 1993; Lehman, 1990; Grinblatt & Maskowitz, 2004) as month t-2 to t-6, descending ranked at month t to hold at month t+1 (holding period 1 month) with monthly rebalance, then divided into two groups by ten percentiles of highest and lowest scores, getting the results of winner and loser groups. Based on the winner and loser decile, simple zero-cost portfolios going long winners and short losers (WML), are constructed. The winner and loser decile portfolios are rebalanced every month, thereby increasing the liquidity of the portfolios. Additionally, the study follows Asness et al. (2013) and sorted stocks based on momentum signal and consequently a rank is assigned to each stock. Based on cross-sectional rank of momentum signal, the weighting of each stock *i* at time *t* is calculated following equation 1.

$$w_{it}^{s} = c_t(rank(S_{it}) - \frac{\sum_i rank(S_{it})}{N}) \quad (1)$$

The Newey-West time series regression analysis with lag 5 was conducted using Fama-French three factors model to examine the existing of momentum premium. The time-series regression model was conducted using lag one month of standardized economic and climate policy uncertainties index with Fama-French three factors to examine the effect of the uncertainties to the momentum portfolio return.

RESEARCH RESULTS

The momentum premium is positive and significant across high- and low-rated ESG pillar stocks.

Table 2 The summary of momentum risk-adjusted returns using Fama-French three factors model of each ESG pillar scores.

	ESG		Env		Soc		Gov	
	High-rated	Low-rated	High-rated	Low-rated	High-rated	Low-rated	High-rated	Low-rated
Sample	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Alpha
Full sample								
Equal-weight	-0.0005	0.0127*	-0.0017	0.0062	0.0035	0.0089	0.0016	0.0136**
Signal-weight	0.0001	0.0058*	-0.001	0.0026	0.0009	0.0041	0.0000	0.0067**

Note. Following the equation: $R_{i,t} - R_{f,t} = \alpha_i + \beta_1 MKTRF_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t}$. Momentum portfolios are constructed monthly at month t and regressed on lagged uncertainty factors at month t-1 using Newey-West standard errors with 5 lags. The ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 2 presents the performance of the momentum strategies across high- and low-ESG pillar portfolios using Fama-French three factors model. Consistent with classical findings (Jegadeesh & Titman, 1993), the result is generally positive momentum premium, meaning that portfolios going long on past winners and short on past losers generate abnormal returns. However, the significance of momentum premium varies across ESG categories. The study found that momentum portfolios based on low-ESG and low-Governance stocks showing statistically positive alphas, while the alphas of high-ESG pillar portfolios are weaker and insignificant.

Heterogeneity suggests that quality of ESG pillar influences how effectively momentum strategies can extract returns. The high-ESG pillar firms tend to attract larger, long-term institutional investors, such as pension funds and ESG funds, which reduces mispricing and trading frictions. The price of high-ESG pillar firms may quickly adjust new information, less the gaps for momentum strategies to make profit. In the other hand, the low-ESG pillar firms are often small firms, riskier firms, less transparent firms, may be delayed price adjustment which making them have more opportunities for momentum strategies. The mechanism aligns with Kaiser and Welters (2019), ESG screening tends to reduce momentum profitability by decreasing the opportunities for arbitrage although improving downside risk management.

The emerging of abnormal returns in low-rate governance is important channel. The consistently strong momentum strategies in low-governance firms suggest that weaker governance leads to less efficient markets that mispricing persists longer. Moreover, poor governance limits transparency and increases information asymmetry affect the improvement of momentum strategies. In contrast, high-governance firms may foster stronger investor monitoring and faster price corrections, affecting decreasing momentum effect.

In conclusion, table 2 confirms the existence of momentum premium but highlights that magnitude depends on ESG pillar or characteristics. The study findings imply a fundamental trade-off for investors: low-ESG universe offers stronger momentum profits but greater risk exposure, while high-ESG universe provides weaker momentum returns but may provide risk mitigation in the time of market stress. This study sets the stage for understanding how macroeconomic and climate policy uncertainties influence momentum performance.

The effect of economic and climate policy uncertainties on momentum portfolio returns across different ESG pillar groups.

Table 3 The effect of economic and climate policy uncertainties on momentum portfolio returns across different ESG pillar levels. Including interaction term of the uncertainties.

Full sample	EPU	CPU	EPUCPU	Alpha	Adj. R-squared
ESG stocks					
High-rated					
Equal-weight	-0.003	0.0019	-0.0033	0.0007	0.0501
	(0.0052)	(0.0049)	(0.0050)	(0.0051)	
Signal-weight	-0.0015	0.0012	-0.0003	0.0002	0.1326
	(0.0031)	(0.0030)	(0.0031)	(0.0031)	
Low-rated					
Equal-weight	0.0068	0.0120**	0.0166***	0.0065	0.0562
	(0.0064)	(0.0061)	(0.0062)	(0.0063)	
Signal-weight	0.0003	0.0063*	0.0084**	0.0026	0.1143
	(0.0035)	(0.0034)	(0.0035)	(0.0035)	
Env stocks					
High-rated					
Equal-weight	-0.0022	0.0027	-0.0014	-0.0012	0.0236
	(0.0049)	(0.0047)	(0.0048)	(0.0049)	
Signal-weight	-0.0008	0.0014	0.0000	-0.001	0.0425
	(0.0030)	(0.0029)	(0.0029)	(0.0029)	
Low-rated					
Equal-weight	-0.0009	0.0079	0.0083	0.003	0.0324
	(0.0055)	(0.0052)	(0.0053)	(0.0054)	
Signal-weight	-0.0015	0.0039	0.0060*	0.0003	0.0752
	(0.0032)	(0.0031)	(0.0032)	(0.0032)	
Soc stocks					
High-rated					
Equal-weight	-0.0041	0.0008	-0.0028	0.0045	0.0436
	(0.0050)	(0.0048)	(0.0049)	(0.0049)	
Signal-weight	-0.0014	0.0009	-0.0002	0.001	0.0833
	(0.0031)	(0.0029)	(0.0030)	(0.0030)	
Low-rated					
Equal-weight	0.0047	0.0128**	0.0095	0.0054	0.0594
	(0.0059)	(0.0057)	(0.0058)	(0.0059)	
Signal-weight	-0.0005	0.0073**	0.0054	0.0021	0.0922
	(0.0035)	(0.0033)	(0.0034)	(0.0034)	
Gov stocks					
High-rated					
Equal-weight	0.0014	0.0053	0.0003	0.0016	0.0262
	(0.0056)	(0.0053)	(0.0054)	(0.0055)	
Signal-weight	-0.0015	0.0028	0.0002	-0.0001	0.131
	(0.0032)	(0.0031)	(0.0032)	(0.0032)	
Low-rated					
Equal-weight	0.0073	0.0105*	0.0145***	0.0082	0.0493
	(0.0056)	(0.0054)	(0.0055)	(0.0056)	
Signal-weight	0.0024	0.0052	0.0078**	0.0038	0.1051
	(0.0033)	(0.0032)	(0.0033)	(0.0033)	

Note. EPU refers to economic policy uncertainty index, CPU refers to climate policy uncertainty index. Following the equation: $R_{i,t} - R_{f,t} = \alpha_i + \beta_1 MKTRF_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 EPU_{t-1} + \beta_5 CPU_{t-1} + \beta_6 EPU_{t-1} CPU_{t-1} + \varepsilon_{i,t}$. Momentum portfolios are constructed monthly at month t and regressed on lagged uncertainty factors at month t-1 using Newey-West standard errors with 5 lags. The ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3 investigates how momentum portfolios return respond to economic policy uncertainty (EPU), climate policy uncertainty (CPU) and the interaction term (EPUCPU). The study findings reveal patterns: CPU is positive and significant in multiple specifications, and the interaction term is also positive and significant. The interesting period and market of the study is in U.S. equity market during 2011 to 2023, increasing climate policy uncertainty and interaction of climate and economic policy uncertainty reinforce momentum portfolios returns rather than decreasing momentum portfolios returns.

First, during the heightened uncertainty, the information becomes noisy, investors face the difficulty of accessing fundamental values with confidence due to income forecast, fiscal policy movement and climate transition regulation remain ambiguous. The past returns become outstanding and credible signal for investors. Instead of relying on uncertain fundamentals, investors predict recent performance trends. This mechanism increases demand for winners and selling pressure on losers, directly impacts to reinforcing momentum portfolios returns. Second, uncertainties affect the institutional behavior, several quantitative and factor-based funds reallocate risk based on volatility and macroeconomic signals. During uncertainties increase, some institutions decrease the exposure to valuation strategies or growth-based strategies and increase technical strategies such as momentum. The transference increases capital flow into the momentum portfolios when uncertainties are high, increasing profitability. Third, investor behavior when uncertainties increase risk aversion and create viewpoint of narrative and estimated trading from how the firms have been working recently. This behavior reinforces the momentum strategies in uncertainty period, generating self-reinforcing cycle which where uncertainties increase capital into momentum strategies, affected increases momentum portfolios returns. The results show that Low-ESG pillar momentum portfolios present stronger positive exposure to CPU and uncertainty interaction term than high-ESG pillar momentum portfolios. Low-ESG pillar firms are normally smaller, less transparent, more speculative, and more attractive for short-term investment. High-ESG pillar firms are typically lager and more institutionally held, which decreases the responsiveness of policy uncertainties. Therefore, interaction between uncertainties and ESG highlights the importance of difference: firms with Low-ESG pillar tend to perform better when investors chase uncertain market trends. The explicit observation of the result from table 3 is that alphas of momentum portfolios become insignificant when uncertainty factors are introduced. The Fama-French three factors model regressions, momentum portfolios appear to generate significant abnormal returns on low ESG and low governance scores. This abnormal return is initially interpreted as evidence of persistent mispricing and behavioral anomalies. However, the abnormal returns disappear when uncertainties are considered, imply that momentum strategies are significantly loaded on uncertainty factors as the compensation for bearing uncertainty risk. In particular, the findings that climate policy uncertainty has explanatory power indicate that the markets have begun to price climate transition risk. The alignment evidence appears in the literature on climate finance that shows carbon transition risks and climate policy uncertainty are increasingly relevant determinants of asset pricing.

In conclusion, the result from table 3 found that momentum strategies strongly perform during uncertain environment of climate policy and interaction of economic and climate policy, although the profitability of momentum portfolios is not generating abnormal returns, investors earn returns as reward for holding portfolios which expose to risk of the policy regime. This is the understanding of the risk-return trade off when integrating ESG pillar scores to considerations, as the sensitivity of momentum strategies to uncertainties is not the same across ESG universe in U.S. market.

The effect of components of economic policy uncertainty and climate policy uncertainty on momentum portfolio returns across different ESG pillar groups.

Table 4 The effect of components of economic policy uncertainty and climate policy uncertainty on momentum portfolio returns across different ESG pillar levels. Including interaction terms of the components and climate policy uncertainty.

Full sample	News	Forecast	CPI	Tax	NewsCPU	ForecastCPU	CPICPU	TaxCPU	CPU	Alpha	Adj. R-squared
ESG stocks											
High-rated											
Equal-weight	-0.0068	0.0126^{**}	-0.0084	0.0008	-0.002	-0.0051	-0.0017	0.0059	0.0057	0.003	0.0494
	(0.0060)	(0.0058)	(0.0060)	(0.0093)	(0.0052)	(0.0058)	(0.0054)	(0.0118)	(0.0071)	(0.0064)	
Signal-weight	-0.0023	0.0053	-0.0033	-0.0024	-0.0006	-0.001	-0.0001	-0.0003	0.0012	0.0005	0.1895
	(0.0037)	(0.0036)	(0.0037)	(0.0057)	(0.0032)	(0.0036)	(0.0033)	(0.0073)	(0.0044)	(0.0040)	
Low-rated											
Equal-weight	-0.0059	0.0137^{**}	-0.0008	-0.0037	0.0138^{**}	0.0199^{***}	-0.0009	-0.0151	0.0113	0.0004	0.0354
	(0.0072)	(0.0069)	(0.0071)	(0.0111)	(0.0062)	(0.0069)	(0.0065)	(0.0142)	(0.0085)	(0.0077)	
Signal-weight	-0.0055	0.0075^{*}	-0.0016	-0.0024	0.0066^{*}	0.0097^{**}	0.0000	-0.0067	0.0062	-0.0001	0.1573
	(0.0040)	(0.0039)	(0.0040)	(0.0062)	(0.0035)	(0.0039)	(0.0036)	(0.0079)	(0.0047)	(0.0043)	
Env stocks											
High-rated											
Equal-weight	-0.0049	0.0116^{**}	-0.0043	-0.002	0.0000	-0.0075	-0.0029	0.0084	0.0051	0.002	0.0203
	(0.0057)	(0.0055)	(0.0057)	(0.0089)	(0.0050)	(0.0055)	(0.0052)	(0.0113)	(0.0068)	(0.0062)	
Signal-weight	-0.0009	0.005	-0.0011	-0.0046	-0.0003	-0.0024	-0.0006	0.0000	0.0003	-0.0005	0.0436
	(0.0035)	(0.0034)	(0.0035)	(0.0055)	(0.0030)	(0.0034)	(0.0032)	(0.0069)	(0.0041)	(0.0038)	
Low-rated											
Equal-weight	-0.0098	0.0093	-0.0036	0.0008	0.0119^{**}	0.0015	-0.0026	-0.0039	0.0104	-0.0004	0.012
	(0.0064)	(0.0061)	(0.0063)	(0.0099)	(0.0055)	(0.0061)	(0.0057)	(0.0126)	(0.0075)	(0.0068)	
Signal-weight	-0.0057	0.0048	-0.0029	0.0025	0.0059^{*}	0.0041	-0.0013	0.0015	0.0065	0.0001	0.0736
	(0.0038)	(0.0037)	(0.0038)	(0.0059)	(0.0033)	(0.0037)	(0.0034)	(0.0075)	(0.0045)	(0.0041)	
Soc stocks											
High-rated											
Equal-weight	-0.0093	0.0119^{**}	-0.0059	0.0002	-0.002	-0.0004	-0.0027	0.0037	0.0043	0.006	0.0334
	(0.0058)	(0.0056)	(0.0058)	(0.0090)	(0.0050)	(0.0056)	(0.0052)	(0.0115)	(0.0069)	(0.0062)	
Signal-weight	-0.0028	0.0058^{*}	-0.0023	-0.0045	-0.0007	0.0011	-0.0008	-0.0036	-0.0002	0.0003	0.0885
	(0.0036)	(0.0034)	(0.0035)	(0.0055)	(0.0031)	(0.0035)	(0.0032)	(0.0071)	(0.0042)	(0.0038)	
Low-rated											
Equal-weight	-0.0051	0.0137^{**}	-0.0027	-0.0029	0.0098	0.0054	0.0007	-0.0082	0.0133	0.0014	0.0464
	(0.0069)	(0.0066)	(0.0068)	(0.0107)	(0.0060)	(0.0067)	(0.0062)	(0.0136)	(0.0081)	(0.0074)	
Signal-weight	-0.005	0.0080^{**}	-0.0037	-0.002	0.0035	0.0065^{*}	0.0016	-0.0049	0.0076	0.0003	0.1182
	(0.0040)	(0.0038)	(0.0039)	(0.0062)	(0.0034)	(0.0038)	(0.0036)	(0.0078)	(0.0047)	(0.0043)	
Gov stocks											
High-rated											
Equal-weight	-0.0038	0.0136^{**}	-0.0124^{*}	0.005	0.0002	-0.0029	0.0047	0.0028	0.0104	0.002	0.0324
	(0.0065)	(0.0062)	(0.0064)	(0.0100)	(0.0056)	(0.0062)	(0.0058)	(0.0127)	(0.0076)	(0.0069)	
Signal-weight	-0.004	0.006	-0.0051	0.0009	-0.0003	0.0008	0.002	-0.0005	0.0046	-0.0004	0.1568
	(0.0038)	(0.0037)	(0.0038)	(0.0059)	(0.0033)	(0.0037)	(0.0034)	(0.0075)	(0.0045)	(0.0041)	
Low-rated											
Equal-weight	-0.0023	0.0086	-0.0036	0.0022	0.0134^{**}	0.0143^{**}	-0.0004	-0.0101	0.0116	0.0034	0.0394
	(0.0065)	(0.0062)	(0.0064)	(0.0100)	(0.0056)	(0.0063)	(0.0058)	(0.0128)	(0.0076)	(0.0069)	
Signal-weight	-0.0025	0.0055	-0.0018	-0.0007	0.0073^{**}	0.0069^{*}	-0.001	-0.0054	0.0053	0.0014	0.1182
	(0.0038)	(0.0037)	(0.0038)	(0.0060)	(0.0033)	(0.0037)	(0.0035)	(0.0076)	(0.0045)	(0.0041)	

Note. News refers to news-based policy uncertainty, Forecast refers to forecast disagreement from economists influenced by purchasing goods and services by state, local and federal government, CPI refers to core consumer price index from disagreement of economists, Tax refers to temporary tax code provisions that extended at the last minute. Following the equation: $R_{i,t} - R_{f,t} = \alpha_i + \beta_1 MKTRF_t + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 News_{t-1} + \beta_5 Forecast_{t-1} + \beta_6 CPI_{t-1} + \beta_7 Tax_{t-1} + \beta_8 News_{t-1} CPU_{t-1} + \beta_9 Forecast_{t-1} CPU_{t-1} + \beta_{10} CPI_{t-1} CPU_{t-1} + \beta_{11} Tax_{t-1} CPU_{t-1} + \beta_{12} CPU_{t-1} + \varepsilon_{i,t}$. Momentum portfolios are constructed monthly at month t and regressed on lagged uncertainty factors at month t-1 using

Newey-West standard errors with 5 lags. The ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4 provides the decomposition of EPU into major components: News-based policy uncertainty, forecast disagreement, CPI disagreement, and temporary tax provision. Additionally, the composition of EPU is interacted with CPU to access interaction effect on momentum portfolios. The results reveal important the different effects of uncertainty on momentum portfolios returns.

The result of standalone components, the forecast component consistently exerts positive and significant effect on momentum portfolios returns across various specifications. Forecast disagreement shows significant positive coefficient across several groups. These results indicate that when economists disagree on fiscal or growth movement, investors rely more on recent firms' performance, making strengthening momentum strategies effect. In other words, the forecast disagreement is the most consistent and economically meaningful driver of momentum portfolios returns. As the standalone component economic risk factors, News-based uncertainty is insignificant with negative across all specifications. These results imply that short-term news uncertainty do not systematically affect medium-horizon momentum strategies. Moreover, CPI and Tax components are insignificant, reflecting the limited role of CPI and tax provision in shaping momentum portfolios returns.

The result of interaction terms components, while the standalone effect of CPU is weak but the interaction terms with economic uncertainty components produces significant effects, especially in Low-rated ESG pillar momentum portfolios. First, NewsCPU appears significantly. While News alone is not significant and systematically priced, the presence of climate policy risk shows more market sensitivity to uncertainties. This implies that short-term policy announcement or debates gain greater weight in investor decision-making when climate policy is uncertainty. The effect is outstanding in low-rated ESG, low-rated Env and low-rated Gov, this suggests that firms with weaker ESG pillar firms are perceived more vulnerable to climate-related policy changes. Momentum portfolios return in these samples reflect investors to chase the winners' firms which responses to headlines of climate policy when the fundamentals are unclear or uncertain. Second, ForecastCPU appears significantly. Fundamentals are difficult to interpret macroeconomic forecast disagreement on growth or inflation of purchasing, while climate transition policies provide more layers of uncertainty about costs, regulations and investment requirements. The investors faced compounded uncertainty, left fundamentals and instead rely more on observation price trends. The effect of situations explains why momentum strategies generate higher returns, especially in low-rated ESG firms and low-rated Gov firms where information is weaker and speculative trading is more widespread. In contrast, CPICPU and TaxCPU are not significant. The absence of significance shows that not all components of economic policy uncertainty interact meaningfully with climate policy uncertainty.

The critical insight is that after considering the interaction terms, risk-adjusted returns become loss significance for all portfolios samples. This absence of significance, underscoring that momentum portfolio returns, reflects compensation for exposure to structural risk and climate-related uncertainty. While the primary analysis relies on the Fama-French three-factor model, the interpretation of statistical significance is robust to alternative specifications. The consistent significance of CPU and ForecastCPU suggests that these effects are not model-specific but rather structurally embedded in uncertainty-momentum interactions. Future extensions can formally compare results across factor models (e.g., Carhart four-factor or industry-adjusted models) to verify stability. This interpretive step strengthens the credibility of the findings by ensuring that the observed relationships are not sensitive to a single estimation framework.

DISCUSSION & CONCLUSION

The findings highlight that the momentum strategy's profitability is concentrated in the low-ESG pillar universe. These firms, often characterized by smaller size and weaker governance structures, provide greater opportunities for mispricing and delayed price adjustments. As a result, investors benefit through higher momentum premiums in low-ESG groups. High-ESG firms, in contrast, offer limited momentum upside because of faster information absorption and stronger investor monitoring. This asymmetry underscores that the 'benefit' of ESG momentum strategies lies primarily with low-ESG groups, not uniformly across the ESG spectrum.

This study set out to examine the profitability of ESG momentum strategies and their sensitivity to economic and climate policy uncertainty in U.S. equity markets between 2011 and 2023. Using Fama-French three-factor regressions augmented with uncertainty indices; the analysis offers three main findings. First, the results confirm the existence of momentum profits across ESG-segmented portfolios, but with important heterogeneity. Momentum premiums are stronger and more significant in low-ESG and low-governance firms, while high-ESG portfolios yield weaker or insignificant alphas. This pattern is consistent with prior studies showing that firms with weaker ESG or governance profiles tend to have less efficient pricing due to lower transparency, smaller size, and limited institutional ownership. These frictions allow momentum strategies to exploit delayed price adjustments, whereas high-ESG firms, with greater institutional monitoring and disclosure, incorporate new information more rapidly, leaving fewer arbitrage opportunities. Second, the findings demonstrate that economic and climate policy uncertainties are critical risk factors shaping momentum payoffs. Both CPU and the interaction of EPUCPU enter positively and significantly, indicating that momentum strategies can perform strongly under heightened uncertainty. This contrasts with earlier studies documenting negative exposures to EPU, and suggests that in the post-2010 period, uncertainty reinforced capital flows into momentum rather than crowding them out. Behavioral and institutional mechanisms provide plausible explanations: in uncertain environments, investors increasingly extrapolate from past returns, while quantitative funds reallocate capital into technical strategies such as momentum. Importantly, once these uncertainty factors are included, the abnormal returns (alphas) of momentum portfolios lose significance. This implies that momentum profits are not unexplained anomalies but rather compensation for bearing policy-related risks, particularly those associated with climate transition. Third, decomposing EPU reveals that forecast disagreement is the most consistently significant component, exerting positive effects across several ESG categories. This indicates that structural uncertainty about macroeconomic outlooks strengthens the reliance on momentum signals. Furthermore, the interaction terms highlight that CPU amplifies these effects: ForecastCPU is strongly positive in low-ESG and low-governance portfolios, while NewsCPU becomes significant only in low-rated universes. These results suggest that climate policy ambiguity compounds macroeconomic disagreement, pushing investors toward trend-following in firms perceived as riskier or less sustainable. By contrast, CPI and Tax related uncertainty, whether standalone or interacted with CPU, are insignificant, underscoring that only certain forms of policy uncertainty meaningfully affect momentum strategies. Taken together, these findings carry important implications. For academics, the results contribute to the literature by demonstrating that ESG momentum profits are largely explained by exposure to uncertainty risks, bridging sustainable finance with uncertainty-based asset pricing. For practitioners, the results highlight a trade-off: while low-ESG portfolios offer higher momentum returns, these come with systematic exposures to economic and climate policy uncertainty. High-ESG portfolios provide weaker momentum profits but may serve as a hedge against uncertainty shocks.

In conclusion, this study shows that ESG momentum strategies remain profitable, but their abnormal returns are absorbed once policy uncertainty factors are accounted for momentum profits should therefore be interpreted as risk premium tied to structural macroeconomic and climate transition risks, rather than as evidence of persistent mispricing. Future research could extend the analysis by incorporating cross-country comparisons, alternative ESG data providers, higher-frequency uncertainty measures or using a variety of additional models and analyzing the results to see any pattern to further test the robustness of these findings.

REFERENCES

Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2018). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science, Articles in Advance*, 1-19

Asness, C. S., Moskowitz, T. J., & Pedersen, L. H. (2013). Value and momentum everywhere. *Journal of Finance, 68*(3), 929-985.

Avramov, D., Kaplanski, G., & Subrahmanyam, A. (2022). Sustainable investing with ESG rating uncertainty. *Journal of Financial Economics, 145*(2), 642-664.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *Quarterly Journal of Economics, 131*(4), 1593-1636.

Daniel, K., & Moskowitz, T. J. (2016). Momentum crashes. *Journal of Financial Economics, 122*(2), 221-247.

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *Journal of Finance, 53*(6), 1839-1885.

Engle, R. F., Giglio, S., Kelly, B., Lee, H., & Stroebel, J. (2020). Hedging climate change news. *Review of Financial Studies, 33*(3), 1184-1216.

Fama, E. F., & French, K. R. (2012). Size, value, and momentum in international stock returns. *Journal of Financial Economics, 105*(3), 457-472.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment, 5*(4), 210-233.

Gavriilidis, K. (2021). Measuring climate policy uncertainty. *SSN Electronic Journal*.

Giese, G., Lee, L.-E., Melas, D., Nagy, Z., & Nishikawa, L. (2019). Foundations of ESG investing: How ESG affects equity valuation, risk, and performance. *Journal of Portfolio Management, 45*(5), 69-83.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *Journal of Finance, 48*(1), 65-91.

Kaiser, L., & Welters, C. (2019). Risk-mitigating effect of ESG in momentum portfolios. *The Journal of Risk Finance, 20*(5), 542-555

Magnani, M., Guidolin, M., & Berk, I. (2024). Strong vs. stable: The impact of ESG rating momentum and their volatility on the cost of equity capital. *Journal of Asset Management, 25*, 666-699

Pastor, L., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520-545.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.