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Do Climate Negotiations Move Markets? Evidence Across Successive COP Conferences

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Abstract

Purpose – The present research evaluates how the successive global climate conferences held since COP26 in Glasgow through COP29 in Baku has affected the abnormal returns for Indian firms who operate in industry sectors that are considered environmentally intensive, along with the extent to which firm-specific attributes affect CARs.

Research Methodology – This empirical study employed event-study methodology combined with a multivariate cross-sectional regression methodology. The sample size used was 186 firms with a total of 744 firm-year observations from the BSE500 Index from 01 Apr 2021 to 31 Mar 2025.

Findings – The results show that the first two COP events (COP26 & 27) were associated with significant negative market reaction, especially in high-emission industries, however, the last two COP events (COP28 & 29), indicated relatively stable and segmented investor response. A sectoral level analysis also demonstrated that there has been a trend towards positive abnormal returns in the Renewable Energy and Infrastructure sectors because of enhanced policy clarity and increased investment momentum. Finally, the cross-sectional regression also established that the BTM ratio has been the most consistent factor determining firm sensitivity to climate policy announcement, and that previous returns have exhibited long-term mean-reversion effects. The research has shown that investor perceptions regarding climate policy developments have matured and investor behavior will continue to reflect this increasing awareness of climate policy developments and that the development of global environmental regimes will be correlated with the maturation of investor behavior.

Practical Implications – The implications suggest that there is a need for consistent and transparent climate policies so that investors can feel confident in investing and that the firms, especially those in carbon-intensive sectors, should expedite their transition to being "green" and incorporate sustainable business practices into their overall strategy to reduce regulatory risk and improve their long term valuation.

Keywords – COP26, COP27, COP28, COP29, event study, climate policy announcements, Glasgow Climate Pact, Baku Climate Pact, CAARs, Sustainable Development goals.

1. Research Background and Motivation

The need to address climate change has become an urgent international issue and many nations have come to realize that their efforts must be made now to mitigate the negative impacts of this crisis (Pandey et al., 2023; Abbass et al., 2022). The urgency of addressing climate change is consistent with the global agenda to achieve the Sustainable Development Goals (SDGs), and the commitments that were made at the United Nations Climate Change Conferences (COP). The SDGs consist of seventeen globally interconnected goals that were adopted by all member states of the United Nations in 2015 through the Agenda 2030 for Sustainable Development. The

goal of these goals was to develop solutions to a variety of environmental, social, and economic challenges, with the objective of developing a sustainable, equitable, and prosperous world by 2030 (Leal Filho et al., 2022).

These climate summits represent an ongoing series of global meetings (Conference of Parties [COP]) held in accordance with the UNFCCC. The primary objective of these summits is to bring together world leaders, policymakers, researchers and other stakeholders from around the globe to collectively respond to the implications of climate change. As seen from Glasgow to Baku, these climate summits have become critical junctures where environmental commitments intersect with economic and financial realities. In addition to their role in addressing environmental issues, these international climate talks also function as important catalysts for shaping global financial market sentiment and influencing investor confidence (Pandey et al., 2024).

The Glasgow Climate Pact was agreed upon at the Glasgow Climate Change Conference (COP26) in Glasgow, Scotland, in November 2021. The Pact represents an international commitment to reduce greenhouse gases and limit the increase in global temperature to no more than 1.5 °C above pre-industrial levels. As such, it calls upon countries to end the use of coal-based energy, reduce deforestation, and accelerate the move toward using renewable energy resources. In addition, the Pact recognizes that adapting to the effects of climate change is essential and requires the implementation of effective measures to mitigate those effects. (United Nations, 2021). On the other hand, SSIP was approved by the UNFCCC at the COP27 conference in Egypt in November 2022. The plan outlines how to achieve the goals of the Paris Agreement, which are to limit the increase in global temperature to less than 2 °C relative to pre-industrial levels. The plan requires the participating countries to report on their carbon footprint annually and report on their progress toward meeting their targets (United Nations, 2022). Furthermore, it emphasizes the need for developed countries to provide funding to assist developing countries transition to low-carbon economies. Thirdly, COP28, held in Dubai in December 2023, marked a significant moment in global climate politics. COP28 made two key commitments; the first being the initiation of "Global Stocktake" as called for in Article 10 of the Paris Agreement. The Global Stocktake is a mechanism that will provide a "periodic comprehensive global assessment and review" of Parties' progress toward the goals outlined in the Paris Agreement. This stocktaking process is designed to evaluate the effectiveness of existing nationally determined contributions (NDCs) and to encourage all parties to strengthen their efforts and submit more ambitious NDCs. In addition to the Global Stocktake, COP28 also saw the establishment of the "Loss and Damage Fund." The Loss and Damage Fund will be a fund that supports developing countries as they address the losses and damage associated with the adverse impacts of climate change (UNFCCC,2023). COP28 also reiterated the necessity of transitioning away from fossil fuel use. Specifically, COP28 noted that over 190 countries agreed to accelerate their transition away from fossil fuel use so that each country may meet its goal of achieving net-zero greenhouse gas emissions by 2050. Finally, at the COP29 meeting convened in Baku, Azerbaijan, in November 2024, the Baku Climate Unity Pact was adopted. The Pact established the "New Collective Quantified Goal (NCQG)" for climate finance. The NCQG calls upon developed nations to provide a minimum of $300 billion annually to support developing countries in their efforts to develop climate change mitigation and adaptation strategies (UNFCCC, 2024).

From Glasgow to Baku, each of the subsequent agreements is a significant step forward in meeting the world-wide challenge of climate change, as well as represents an expanding worldwide agreement that the need for mitigating actions should be addressed urgently. The agreements create new regulatory regimes, and new compliance obligations which may have considerable financial costs for businesses operating within the jurisdiction of the countries signing the agreements.

Thus, the research is driven by the necessity to evaluate the influence of climate change events in the period from COP26 to COP29 (from Glasgow to Baku) on the market value of BSE 500 listed corporations, with regard for the role of company-specific variables through cross-sectional examination. Being an emerging economy with a large carbon footprint, India's status as a co-signer of the agreements indicates that the adoption of the commitments could have a direct effect on domestic businesses. The Bombay Stock Exchange (BSE), one of the

biggest and most influential exchanges in India, provides a significant framework in which to measure the economic and financial implications of the climate-related policies for Indian corporations. The global literature on climate policies is growing; however, there is limited literature available concerning emerging economies. Thus, this study will address the knowledge gap and provide information for decision makers, investors, and businesses to identify potential climate-related risk, opportunity and pathways to develop sustainable business practices.

2. Review of Literature

2.1 Climate Change Events and Market reactions

Prior to conducting this study, an extensive review of event studies was carried out, examining how key climate – related events such as environmental policy announcements, carbon policies, disclosure initiatives and divestment campaigns have influenced various sectors including energy sector, cross country industries and firms operating in environmentally sensitive areas. Antoniuk & Leirvik (2024), in analysing the effects of the Paris Agreement, concluded that climate related developments provide advantages to the clean energy sector. (Qian et al., 2020) examined climate policy changes in Australia and found that stronger carbon performance resulted in higher market returns after the carbon tax repeal. Berkman et al. (2019) examined the influence of climate change policies on the valuation of both U.S and non – U.S. firms, highlighting that investor's perception of a company's environmental commitment can elevate regulatory compliance costs and prompt adverse market responses for firms with significant exposure to climate related risks. Ramiah et al. (2016) examined the effects of 75 environment policy announcements in the United Kingdom on the equity portfolios and reveals that stock returns respond significantly to the domestic, international and nuclear – related announcements. Birindelli & Chiappini (2021) examined the effects of climate change events, particularly the Paris Agreement, on firms within the European Union. The study found that environmentally committed firms initially experienced significant positive impacts, which turned negative following the Paris Agreement, suggesting that investors view larger firms as more likely to incur the costs associated with climate change policies. Rogova & Aprelkova (2020) analysed the impact of Intergovernmental Panel on Climate Change (IPCC) announcements on publicly listed firms within the United Nations framework and find that these firms display abnormal performance regardless of their carbon emission levels.

2.2 Environmental Sensitive sectors and Firm Valuation

Environmental responsibility was once voluntary but has gradually evolved into a requirement for business in one way or other. Studies have demonstrated that investors tend to penalise to firms that show a lack of commitment to addressing climate change. Adverse developments for the climate tend to create favourable outcomes for firms with low carbon emissions (Pástor et al., 2019). Rising climate concerns enhance the value of green stocks while exerting a negative impact on brown stocks (Ardia et al., 2023). Despite being a major source of emissions, the electricity sector shows insignificant abnormal returns following the announcement of environment policies in the United Kingdom. Han et al. (2019) found that the Australian carbon pricing scheme exerts a negative impact on firms with high carbon intensity. Despite the government's stance on climate change was favourable, the introduction of the carbon tax eroded the market value of Australian firms. Dordi & Weber (2019) investigated the impact of fossil – fuel divestment on the returns of divesting firms and report substantial negative consequences for fossil fuel companies. Jiang & Luo (2018) studied the effects of four events on Exchange traded Funds (ETFs) in the fossil fuel and renewable energy sector, highlighting that investors rapidly incorporate new climate related information. Additionally, the renewable energy sector gained from these events as heightened climate change awareness prompted the implementation of policies aimed at mitigating environmental impacts. Aklin (2018) assessed the effects of the U.S. 2016 presidential election on the renewable energy sector revealing that Donald Trump's election led to a decline in sector returns, with non-U.S. firms experiencing the greatest negative impact. Xu et al. (2021) investigated the impact of Sino – U.S trade tensions

on Chinese energy firms and concluded that companies with overseas operations face adverse impacts stemming from heightened uncertainties in international trade. H. Liu et al. (2021) assessed the effects of hurricanes on energy firm's returns and revealed that renewable energy companies benefitted positively. Although the magnitude of these effects is modest, the analysis shows they are statistically significant and vary among energy firms as per their carbon intensity.

2.3 Investors reaction to Carbon policies, Disclosures and Policy Announcements

Investors are increasingly aware of climate change and demonstrate a preference for sustainable investment opportunities and also engage with the companies that maintain low carbon emissions. Anttila-Hughes (2016) observed in their study that climate – change related news leads investors to reduce the valuations of S&P 500 energy companies as a form of market punishment. As highlighted by Lee et al. (2015) investors respond negatively to a firm's carbon disclosure, though regular and consistent reporting can partially offset this impact. C. Liu et al. (2021) explored the effects of policy shocks on Chinese solar photovoltaic companies and revealed that government subsidies and policy support significantly influence their stock returns, with firms receiving higher subsidies showing greater sensitivity to changes in subsidy policies.

The methodology applied in this study aligns closely with approaches adopted in previous researches (Antoniuk & Leirvik, 2024; C. Liu et al., 2021; Pandey et al., 2024; Xu et al., 2021). While Antoniuk & Leirvik (2024) employed the Paris Agreement, resulting from the 2015 United Nations Climate Change Conference (COP21) whereas Pandey et al. (2024) incorporated both GCP (COP26) and SSIP (COP27) as the key events for analysis. Therefore, the present study builds upon their findings by examining the series of climate agreements from the Glasgow Climate Pact to Baku Climate Pact i.e. COP26 to COP29 as the focal events. Furthermore, for conducting cross – sectional analysis, variables such as firm size, firm leverage, Book to Market (B-T-M) ratio, historical returns and volatility, following the methodology used by (Pandey et al., 2024). Drawing on existing literature, it is evident that climate change events can exert both positive and negative effects on stock returns. Whilst Ramiah et al. (2016) observed insignificant results, Anttila-Hughes (2016), Rogova & Aprelkova (2020), Birindelli & Chiappini (2021), C. Liu et al. (2021) and Antoniuk & Leirvik (2024) stated significant results on the market valuation of the firms. These results indicate support for our hypothesis, specifically that:

NH_1: The climate change events have no significant impact on the market valuation of the firms.

Xu et al. (2021), C. Liu et al. (2021), Birindelli & Chiappini (2021), Naseer et al. (2024) and Pandey et al. (2024) demonstrates that firm – specific characteristics significantly influence the abnormal returns of the companies and supporting the study's hypothesis as:

NH_2: Firm specific variables exert a significant influence on the cumulative abnormal returns of the sample firms.

3. Research Methodology

3.1 Event date, Event window and Window estimation

New works of literature demonstrate that the event study approach accurately measures the short – term market reactions to the key events (Boubaker et al., 2015; Maurya et al., 2023; Rai et al., 2022; Yousaf & Goodell, 2023). The current study employs event study framework (Brown & Warner, 1980, 1985) to investigate how these events influence stock returns. Meanwhile, the Conferences of Parties (COP) were convened as follows: COP26 took place spanning from 31 October to 13 November 2021, COP27 spanning from 6 November to 20 November 2022, COP28 from 30 November to 12 December and COP29 from 11 to 22 November 2024. The formal agreements were signed on 13 November 2021 for COP26, 20 November 2022 for COP27, 12 December 2023 for COP28 and 22 November 2024 for COP29. The aforementioned dates serve as the event dates for the analysis, with the next

trading day used if a market holiday is coincided. The event window spanning 31 days extends from t_{-15} to t_{+15}, while the 180- day window estimation extends from t_{-195} to t_{-16}.

3.2 Data and Sample

The study sample comprises of firms included in the BSE500 index as of 31st March 2025 in India. The present study spans a four- year period, covering fiscal years 2021-22 through 2024-25, corresponding to the timeline of the series of events analysed. First of all, companies from BSE500 have been classified into multiple sectors as per SASB SICS industry classification as presented in Table 1, so that the results of companies with similar characteristics can be compared.

Table 1. Sector Classification

SICS sector group	NIC Codes	Count	(%)
Consumer Goods	13, 14, 15, 16, 20, 22, 23, 27, 28, 46, 47	30	7.95
Extractives & Mineral Processing	19, 22, 23, 24, 32, 43, 46, 56, 71	33	8.75
Financials	64	64	16.97
Food & Beverage	1, 10, 11, 12, 20, 46	17	4.50
Healthcare	21	38	10.07
Infrastructure	22, 23, 24, 27, 28, 41, 42, 46	34	9.01
Renewable resources & Alternate energy	25, 27, 28, 35	12	3.18
Resource Transformation	20, 22, 23, 25, 26, 27, 28, 29, 42	88	23.34
Services	55, 58, 59, 60, 70, 73	13	3.44
Technology & Communication	46, 61, 62, 63	29	7.69
Transportation	22, 29, 30, 49, 50, 51, 52	19	5.03
Total		**377**	**100**

Source: (Kalia & Gill, 2023).

Note: The SASB's Sustainable Industry Classification System® (SICS) employs an impact -oriented framework that classifies companies through a sustainability perspective, whereas the NIC codes are defined by the Central Statistical Organisation under the MoSPI, Government of India.

The sectoral classification of the sample companies was determined using the SASB Sustainability Industry Classification System ® (SICS) and the National Industrial Classification (NIC) Codes as followed by (Kalia & Gill, 2023). Unlike conventional industry classification systems, SICS categorises companies based on their sustainability profiles, grouping firms with similar environmental and social characteristics within industries and sectors. Using the NIC code, each industry was aligned with its corresponding to SICS sector to integrate sustainability information with financial data.

As per the SASB classification, a total of 11 sectors has been identified as: Consumer goods, Extractives & Minerals Processing, Financials, Food & Beverage, Healthcare, Infrastructure, Renewable resources, Resource Transformation, Services, Technology & Communication and Transportation sector. Out of these 11 sectors, the present study focuses only on 5 industries that are inherently more exposed to environmental risk as outlined in Table 2.

Table 2. Classification of sectors inherent to Environmental Exposure

*Environmentally sensitive sectors**	*Low – Environmentally sensitive sectors*
Extractives & Mineral Processing	Consumer Goods
Infrastructure	Financials
Renewable resources & Alternate energy	Food & Beverage
Resource Transformation	Healthcare
Transportation	Services
	Technology & Communication

As presented in Table 3, the sample was drawn based on multiple criteria, resulting in a final dataset of 186 companies comprising of 744 company- year observations. The data of daily closing share prices and firm specific characteristics of the sample companies were obtained from the CMIE Prowess IQ database.

Table 3. Sample development criteria

Sample selection criteria	No. of companies
Initial sample of BSE 500 companies as of 31st March 2025	500
Deductions:	
Companies not consistent in BSE500 index from 2021- 2025	123
Companies with Low Environmental Sensitivity	191
Sample finalised for analysis purpose	**186**

Source: Authors own creation

Note: Sample comprises of 744 company- year observations spanning fiscal year 2021 – 2025.

3.3 Normal and Abnormal returns

The most extensively implemented framework for event study analysis is market model (Boubaker et al., 2015; Kumari et al., 2024; Pandey et al., 2023; Wang, C., Zhang, Y., Ding, H., 2023). In addition, the market model yields outcomes similar to those of advanced approaches (Brown & Warner, 1985; Dyckman et al., 1984). Therefore, the market model is employed in this study. The analysis initially employed an Ordinary Least Square (OLS) regression to assess the association between the sample firm's logarithmic returns and the BSE500 benchmark index. This approach allows for the estimation of the α and β coefficients. Normal returns ($NR_{i,t}$) are calculated using equation (1) as follows:

$$(NR_{i,t}) = \propto + \beta\, R_{BSE,t'} \qquad (1)$$

where α and β are the predictors of the OLS regression model; $R_{BSE,t}$ denotes the log returns from the BSE500 index on day t. Further for calculating the abnormal return by subtracting the normal return from the actual log return, following equation (2) will be employed to estimate the abnormal returns ($AR_{i,t}$).

$$AR_{i,t} = R_{i,t} - NR_{i,t} \qquad (2)$$

where $R_{i,t}$ is the actual log return for the stock i on day t; and $NR_{i,t}$

3.4 Consolidating abnormal returns across the event period and across the sample firms

To evaluate the effect of the event, abnormal returns are aggregated across both time and firms. The aggregation among the sample firms yields the Average Abnormal Returns (AAR), calculated using equation (3):

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AAR_{i,t} \quad (3)$$

Where N denotes the total number of companies included in the sample. Subsequently, the AARs are summed up across the event to derive the Cumulative Average Abnormal Returns (CAARs) as computed using the equation (4):

$$CAAR_{t,\ r1\text{-}r2} = \sum_{t=r1}^{r2} AAR_t \quad (4)$$

Where, $CAAR_{t,\ r1\text{-}r2}$ is the CAAR for the event window (r1 − r2).

3.5 Cross sectional Analysis

In line with earlier studies (Abbass et al., 2022; Boubaker et al., 2015; Pandey et al., 2024; Xu et al., 2021) the study employs multivariate cross – sectional regression analysis to assess whether firm – specific variables influence the observed impacts. To facilitate this, abnormal returns for individual firms are aggregated throughout the observation window. Accordingly, the cumulative abnormal returns are computed by following equation (5):

$$CAR_{\{i,r_1-r_2\}} = \sum_{t=r1}^{r2} AR_{i\,t'} \quad (5)$$

where, $CAR_{i,r1-r2}$ is the CAR for firm i for the event window (r1 − r2).

Table 4. Variable Description based on the analysis

Variables	Acronyms	Measure	Source
Cumulative abnormal returns	CARs	The abnormal returns aggregated over the duration of the respective event window (in days)	Equation 5.
Firm leverage	TDTA	Ratio of Total Debt to Total Assets	Prowess Database
Firm size	LnTA	Natural logarithmic of Total Assets	Prowess Database
Book to Market ratio	BTM	Ratio of Book to Market value	Prowess Database
Past returns	PAST	Average returns during the 30 days preceding the event window	Prowess Database
Past volatility	VOL	S.D of returns over the estimation window	Prowess Database

Source: Author's own creation

Financial Leverage amplified exposure to Financial Risk (Bae Choi et al., 2013). Therefore, this research predicted a negative reaction in the market from the signing of the pacts, because of the possibility of signalling that firms with greater financial leverage would have difficulty in fulfilling their debt obligations due to additional regulatory compliance or costs (Xu et al., 2021), (Kumari et al., 2024). However, although leverage has significance, the firm's size also has significance. Larger firms typically are able to generate larger amounts of revenue, engage in a broader scope of activities, and hold a strong position within the industry. Consequently, they may have an easier time adapting to the changing environment, possibly leading to a more favourable market response to the

firm's agreement with the climate agreements than smaller firms (Kumari et al., 2024). In addition, higher levels of volatility can signal increased uncertainty and risk by investors' perspectives (Pandey et al., 2023). In conclusion, Book-to-Market ratios may inversely impact on CARs, as larger ratios indicate that the stock is overvalued and that the price may correct itself (Pandey et al., 2023). Therefore, the model applied in this research is described by the following formula:

$$CAR_i = \alpha i + \beta_1 TDTA_i + \beta_2 LnTA_i + \beta_3 BTM_i + \beta_4 PAST_i + \beta_5 VOL_i + E_i$$

where CAR_i is the cumulative abnormal return of firm *i*; $TDTA_i$ is a proxy for firm leverage; $LnTA_i$ is the natural logarithm of total assets and represents a proxy for firm size; BTM_i is the book-to-market ratio; $PAST_i$ indicates past returns as a proxy for historical volatility; and β s the sensitivity coefficient. The details of the variables. A detailed description of variables is provided in the Table (4) while empirical model is illustrated in Figure 1.

4. Empirical Results

4.1 Statistical Description

As illustrated by Table (6), there are moderate levels of variation within Cumulative Abnormal Returns (CARs) for each of the four COP events as well as moderate levels of stability in firm characteristics throughout time. The declining leverage and volatility of the firms in addition to increasing firm size demonstrates an improvement in financial stability and in the development of markets for these sample firms.

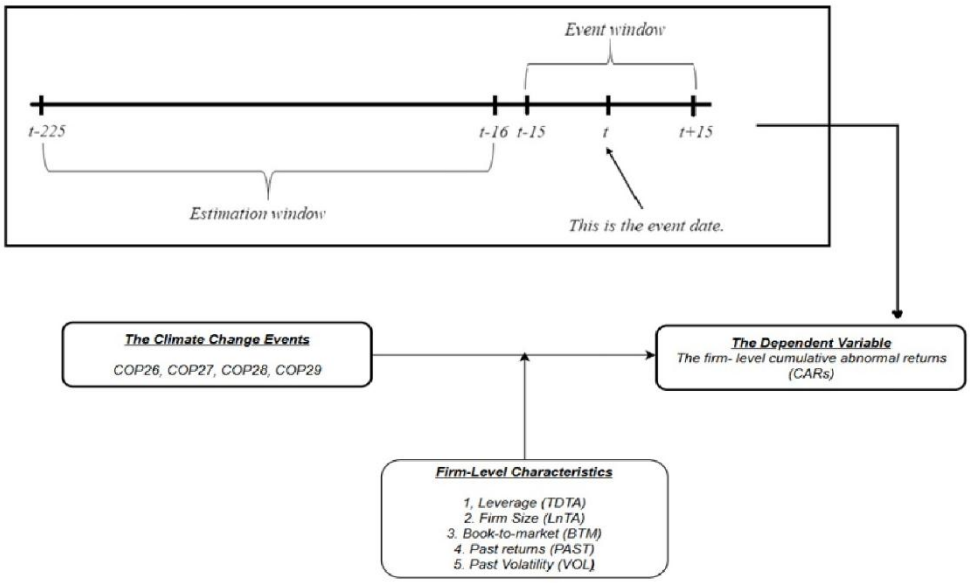

FIGURE 1. CONCEPTUAL FRAMEWORK

Source: Pandey et al. (2024)

Table 6. Statistical Description of CARs and Variables used in the study for all the events.

Variables	N	Mean	Std. Dev	Min	Max
Panel A: COP26 Event					
CAR (-15 to +15)	176	0.007741	0.099553	-0.26501	0.290004
FIRM LEVERAGE	176	0.149175	0.158596	0	0.75347

FIRM SIZE	176	9.230228	1.361556	5.985547	13.64112
B-T-M	176	0.424356	0.421143	0.001033	2.822594
PAST RETURNS	176	0.001164	0.006725	-0.04996	0.018443
VOLATILITY	176	0.026021	0.014008	0.012917	0.124531
Panel B: COP27 Event					
CAR (-15 to +15)	181	0.016942	0.121697	-0.33174	0.32737
FIRM LEVERAGE	181	0.13648	0.154315	0	0.748712
FIRM SIZE	181	9.301472	1.333252	6.102581	13.68672
B-T-M	181	0.380183	0.381363	0	2.210184
PAST RETURNS	181	-0.00163	0.00439	-0.03786	0.013074
VOLATILITY	181	0.026086	0.013627	0.013147	0.123508
Panel C: COP28 Event					
CAR (-15 to +15)	178	-0.00079	0.111166	-0.28639	0.288127
FIRM LEVERAGE	178	0.131503	0.14535	0	0.744192
FIRM SIZE	178	9.416491	1.339497	6.18192	13.73544
B-T-M	178	0.390928	0.334428	0.047814	1.775341
PAST RETURNS	178	0.000902	0.003519	-0.01143	0.012266
VOLATILITY	178	0.019349	0.006833	0.010219	0.055712
Panel D: COP29 Event					
CAR (-15 to +15)	182	0.008438	0.101177	-0.26259	0.27547
FIRM LEVERAGE	182	0.122917	0.138226	0	0.764643
FIRM SIZE	182	9.511184	1.315808	6.339106	13.77483
B-T-M	182	0.249615	0.20775	0.026564	1.547961
PAST RETURNS	182	-0.00325	0.004593	-0.0294	0.010661
VOLATILITY	182	0.025402	0.008242	0.012257	0.057814

Source: Author's own creation based on results

4.2 Event Study Analysis

The cumulative average abnormal returns (CAARs) and cumulative average abnormal returns t-statistics ($CAAR_t$) for the extractive and mineral processing (E & MP) sector and renewable energy (REN.ENE) sector, as well as the transport sector during the COP26 are reported in Table 7. There is evidence of variation across each of the industry sectors, as well as within the industries themselves, with some industries experiencing positive abnormal returns during the event window, while others experienced large negative abnormal returns. First, the extractive and mineral processing (E & MP) sector exhibited declines in CAAR from (t-1 through t+5), and then at (t+9). This indicates that there was a strong negative abnormal return in this sector for the duration of the event. Second, the renewable energy (REN.ENE) sector also experienced a negative response, specifically evidenced by

a negative impact between (t+13 and t+15) after the signing of the agreement. While, abnormal returns were initially observed close to the event date, they were not immediately significant but become more pronounced in the subsequent period. The Transport sector, however was the most severely affected exhibiting a sustained negative trend in the abnormal returns throughout an extended event window spanning (t-11 to t+15), reflecting a near- month long term adverse market reaction.

Table 7. Sector wise CAARs and $CAAR_t$ around the COP26 Event

SEC	E&MP		INFRA		REN. ENE		RES. TRANS		TRANSPORT	
DAY	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$
t - 11	-0.026	-0.879	0.002	0.072	-0.020	-0.573	0.005	0.243	-0.081	-3.72*
t - 10	-0.022	-0.791	0.006	0.183	-0.015	-0.458	0.014	0.686	-0.067	-3.20*
t - 9	-0.023	-0.866	0.009	0.301	-0.011	-0.366	0.013	0.713	-0.067	-3.39*
t - 8	-0.028	-1.143	0.022	0.753	-0.013	-0.463	0.019	1.077	-0.060	-3.23*
t - 7	-0.029	-1.256	0.029	1.079	-0.020	-0.721	0.022	1.313	-0.058	-3.31*
t - 6	-0.027	-1.247	0.033	1.316	-0.012	-0.491	0.026	1.685	-0.052	-3.20*
t - 5	-0.027	-1.351	0.033	1.436	-0.009	-0.389	0.027	1.949	-0.053	-3.63*
t - 4	-0.021	-1.192	0.041	2.010*	-0.008	-0.385	0.032	2.539*	-0.046	-3.52*
t - 3	-0.024	-1.578	0.035	1.966*	-0.014	-0.766	0.032	2.933*	-0.048	-4.17*
t - 2	-0.023	-1.828	0.034	2.369*	-0.007	-0.515	0.034	3.852*	-0.046	-4.98*
t - 1	-0.031	-3.54*	0.028	2.747*	-0.018	-1.721	0.026	4.200*	-0.051	-7.80*
t	-0.032	0.000	0.019	0.000	-0.026	0.000	0.019	0.000	-0.044	0.000
t + 1	-0.031	-3.53*	0.019	1.916	-0.020	-1.906	0.022	3.55*	-0.038	-5.81*
t +2	-0.036	-2.92*	0.013	0.935	-0.022	-1.516	0.025	2.86*	-0.041	-4.37*
t + 3	-0.044	-2.88*	0.013	0.767	-0.030	-1.677	0.018	1.609	-0.046	-4.01*
t + 4	-0.052	-2.95*	0.011	0.551	-0.029	-1.422	0.013	0.998	-0.051	-3.85*
t + 5	-0.043	-2.16*	0.021	0.923	-0.014	-0.600	0.020	1.427	-0.045	-3.04*
t + 6	-0.034	-1.556	0.022	0.900	-0.010	-0.408	0.024	1.558	-0.043	-2.69*
t + 7	-0.034	-1.469	0.027	1.017	-0.015	-0.542	0.021	1.283	-0.054	-3.08*
t + 8	-0.037	-1.489	0.021	0.744	-0.017	-0.567	0.020	1.125	-0.055	-2.96*
t + 9	-0.053	-2.010*	0.002	0.073	-0.038	-1.240	0.010	0.528	-0.066	-3.33*
t + 10	-0.041	-1.472	0.017	0.537	-0.030	-0.921	0.023	1.154	-0.075	-3.60*
t + 11	-0.039	-1.332	0.013	0.381	-0.025	-0.728	0.016	0.792	-0.074	-3.394*
t + 12	-0.040	-1.312	0.012	0.343	-0.028	-0.786	0.016	0.719	-0.078	-3.407*
t + 13	-0.029	-0.917	0.021	0.581	-0.102	-2.73*	0.020	0.899	-0.073	-3.091*
t + 14	-0.031	-0.934	0.026	0.695	-0.099	-2.56*	0.023	0.999	-0.070	-2.836*
t + 15	-0.027	-0.792	0.025	0.627	-0.106	-2.66*	0.022	0.903	-0.070	-2.745*

Source: Author's own creation, p = <0.05* is considered as statistically significant

Turning to the sectors, that exhibited a positive market response, the infrastructure (INFRA) sector displayed strong favourable movements even prior to the official signing of the COP26 pact. The market appeared to have

anticipated the event's implications as reflected by the significant positive CAARs observed during the pre – event signing from (t-4 to t-1). Following the event, the performance for sector was stabilised, suggesting that the positive sentiment was largely priced in before the announcement. In addition, the Resource Transformation (RES.TRANS.) sector had significant positive abnormal returns for the days leading up to and the few days following the signing of the agreement (days t-4 through t+2). This is somewhat similar to Pandey et al. (2024) who found negative effects related to the COP26 agreement; however, the current study showed both positive and negative effects for various sectors.

Secondly, for the COP27 agreement, there were fewer sectors experiencing statistically significant responses than compared to the COP26 agreement. For those sectors that were negatively impacted by the agreement, once again, the E&MP sector demonstrated an unfavourable reaction within the window of the event (t-2 to t+1). It has been previously determined that this sector is sensitive to global environmental policy and regulatory changes. Similarly, the Renewable Energy sector experienced a negative effect for the same time frame (t-2 to t+2) as it did when responding to the COP26 agreement announcement.

Table 8. Sector wise CAARs and $CAAR_t$ around the COP27 Event

SEC	E&MP*		INFRA*		REN. ENE*		RES. TRANS		TRANSPORT	
DAY	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$
t - 5	-0.021	-1.153	0.013	0.897	-0.010	-0.433	0.000	0.028	0.007	0.499
t - 4	-0.022	-1.310	0.018	1.357	-0.012	-0.610	-0.001	-0.127	0.012	0.873
t - 3	-0.025	-1.709	0.026	2.260*	-0.026	-1.542	-0.003	-0.265	0.011	0.949
t - 2	-0.025	-2.131*	0.029	3.132*	-0.033	-2.33*	-0.001	-0.150	0.010	1.039
t - 1	-0.030	-3.627*	0.029	4.410*	-0.036	-3.64*	0.002	0.363	0.001	0.157
t	-0.020	0.000	0.031	0.000	-0.014	0.000	0.008	0.000	0.000	0.000
t + 1	-0.026	-3.105*	0.023	3.486*	-0.029	-2.93*	0.006	1.081	0.011	1.636
t +2	-0.016	-1.381	0.036	3.869*	-0.029	-2.08*	0.006	0.728	0.013	1.426
t + 3	-0.014	-0.985	0.028	2.429*	-0.025	-1.457	-0.001	-0.083	0.005	0.433
t + 4	-0.008	-0.485	0.034	2.589*	-0.014	-0.707	0.004	0.325	0.008	0.583
t + 5	0.004	0.216	0.040	2.700*	-0.012	-0.562	0.005	0.365	0.018	1.206
t + 6	-0.001	-0.072	0.032	1.954	-0.014	-0.587	0.005	0.334	0.012	0.721
t + 7	-0.001	-0.040	0.033	1.910	-0.009	-0.351	0.005	0.353	0.014	0.813
t + 8	-0.004	-0.150	0.035	1.892	-0.014	-0.505	0.009	0.558	0.011	0.599
t + 9	0.006	0.234	0.042	2.114*	-0.006	-0.187	0.019	1.067	0.012	0.594
t + 10	0.010	0.364	0.036	1.706	0.010	0.308	0.021	1.113	0.009	0.426

Source: Author's own creation, p = <0.05* is considered as statistically significant

In contrast, the infrastructure sector produced a second round of significantly large and positive abnormal returns (from t – 3 through t + 5) that also resurfaced at (t + 9), as illustrated by Table (8). This indicates a consistent favourable perception of the sector in relation to climate policy announcements. In contrast with findings of Pandey et al. (2024) of overall positive post -event sentiment during the COP27 event, some sector specific variations have been observed in the current study where Extractives & Mineral Processing and

Renewable Sector experienced negative market reactions while Infra sector reveals a positive response around the event, which suggests a different investor perception across industries towards climate related developments. Furthermore, no statistically significant impact was observed for Transport and Resource Transformation sector, suggesting a relatively neutral market stance towards COP27 developments.

Thirdly, COP28 event marked a period of considerable volatility compared to the preceding COP26 & COP27 events. Unlike the earlier conferences, where sectoral reactions follow more predictable patterns, COP28 exhibited contrasting outcomes across industries. Focusing first on the sectors that exhibited positive market reactions during the COP28 event, the E&MP sector recorded significant positive abnormal returns over (t+8 to t+15) within the event window i.e. 8 days after the signing of the pact. Additionally, the Renewable Energy sector produced a positive response in the time frame between (t-4 and t+4), relative to their respective time frames during COP26 and COP27. The positive responses produced by these sectors during COP28 were particularly notable as they represent a reversal in investor sentiment toward both E&MP and Renewable Energy sectors that occurred during the previous two COPs, likely resulting from increased policy clarity and a greater commitment to invest globally in clean energy and technology. Finally, the Infrastructure sector continued to produce positive returns; it has demonstrated a consistent favourable response throughout all three COP events, and is indicative of investors' long term expectations of growth of this sector under policies designed to address climate change.

Table 9. Sector wise CAARs and $CAAR_t$ around the COP28 Event

SEC	E&MP*		INFRA		REN. ENE		RES. TRANS		TRANSPORT	
DAY	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$
t - 5	0.014	1.117	0.026	1.566	0.033	1.688	-0.017	-1.830	0.010	0.693
t - 4	0.020	1.714	0.037	2.434*	0.076	4.296*	-0.016	-1.905	0.016	1.250
t - 3	0.012	1.217	0.028	2.165*	0.059	3.849*	-0.020	-2.745*	0.009	0.774
t - 2	0.012	1.479	0.031	2.933*	0.063	5.007*	-0.016	-2.678*	0.007	0.799
t - 1	0.009	1.555	0.027	3.630*	0.055	6.226*	-0.013	-3.204*	0.011	1.698
t	0.013	0.000	0.025	0.000	0.056	0.000	-0.014	0.000	0.015	0.000
t + 1	0.006	0.986	0.030	3.943*	0.052	5.904*	-0.020	-4.843*	0.005	0.754
t +2	0.003	0.360	0.013	1.206	0.041	3.306*	-0.021	-3.664*	-0.009	-0.929
t + 3	0.006	0.620	0.012	0.908	0.042	2.744*	-0.017	-2.378*	0.007	0.605
t + 4	0.012	1.062	0.006	0.369	0.038	2.158*	-0.018	-2.194*	0.009	0.657
t + 5	0.001	0.087	-0.018	-1.075	0.014	0.731	-0.026	-2.839*	-0.008	-0.533
t + 6	0.012	0.875	-0.013	-0.680	0.030	1.363	-0.024	-2.393*	-0.003	-0.165
t + 7	0.023	1.508	-0.012	-0.616	0.031	1.341	-0.021	-1.938	-0.005	-0.279
t + 8	0.034	2.079*	-0.013	-0.618	0.033	1.305	-0.017	-1.437	0.004	0.197
t + 9	0.024	1.414	-0.016	-0.697	0.018	0.679	-0.017	-1.380	-0.005	-0.246
t + 10	0.037	2.054*	-0.016	-0.689	0.018	0.639	-0.020	-1.551	-0.010	-0.487
t + 11	0.035	1.821	-0.012	-0.486	0.019	0.645	-0.015	-1.065	-0.003	-0.143

t + 12	0.041	2.087*	-0.005	-0.203	0.021	0.686	-0.010	-0.672	-0.004	-0.198
t + 13	0.047	2.280*	-0.006	-0.222	0.021	0.656	-0.012	-0.797	-0.011	-0.458
t + 14	0.047	2.210*	0.017	0.618	0.025	0.765	-0.014	-0.895	-0.001	-0.041
t + 15	0.047	2.123*	0.032	1.108	0.037	1.076	-0.016	-1.022	-0.012	-0.461

Source: Author's own creation, p = <0.05* is considered as statistically significant

On the contrary, the Resource transformation sector demonstrated negative abnormal returns for all of the time span (t-3 to t+6) in the event window, most likely due to increased policy uncertainty and new regulatory requirements imposed by COP28 that caused investor's concerns about costs, transition risk and compliance burden. As such, the temporary loss of investor confidence in the Resource transformation sector was experienced, while the Transport sector remained relatively unaffected.

Finally, at COP29, there were some unusual results. While previous meetings have generated broad-based market responses, only a few sectors responded with primarily negative returns. Resource Transformation sector showed negative abnormal returns on the first trading day after the agreement had been signed; Renewable Energy sector demonstrated a decline over the period (t-1 to t+3), but other sectors generally demonstrated little or no reaction. It appears that the market's reaction to COP29 was significantly less robust than those to prior events indicating that investors viewed the policy changes made at COP29 as transitional/ incremental and not strategic, indicative of a stabilization of policy commitment rather than new long-term commitments.

Table 10. Sector wise CAARs and $CAAR_t$ around the COP29 Event

SEC	E&MP		INFRA		REN. ENE*		RES. TRANS*		TRANSPORT	
DAY	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$	CAARs	$CAAR_t$
t - 5	0.013	0.458	0.010	0.336	-0.023	-0.773	-0.011	-0.660	0.000	0.015
t - 4	0.015	0.629	0.011	0.405	-0.025	-0.959	-0.010	-0.668	0.008	0.429
t - 3	-0.001	-0.029	0.014	0.606	-0.021	-0.927	-0.013	-0.960	0.010	0.614
t - 2	-0.003	-0.193	0.016	0.858	-0.023	-1.222	-0.011	-0.997	0.014	1.022
t - 1	-0.006	-0.493	0.008	0.618	-0.033	-2.46*	-0.014	-1.813	0.003	0.296
t	-0.012	0.000	-0.002	0.000	-0.050	0.000	-0.019	0.000	0.001	0.000
t + 1	-0.008	-0.645	0.005	0.351	-0.059	-4.411*	-0.015	-1.98*	0.004	0.408
t +2	-0.010	-0.599	-0.001	-0.042	-0.073	-3.89*	-0.011	-1.022	0.002	0.154
t + 3	-0.008	-0.385	0.019	0.833	-0.061	-2.637*	-0.009	-0.658	0.011	0.679
t + 4	0.004	0.152	0.043	1.637	-0.044	-1.668	-0.001	-0.055	0.016	0.854
t + 5	0.005	0.183	0.041	1.403	-0.043	-1.445	0.001	0.080	0.014	0.688

Source: Author's own creation, p = <0.05* is considered as statistically significant

4.3 Multivariate Cross – sectional Regression Analysis

Stock market reaction variability based on event type as illustrated by the previous sections' description of the event study methodology, was analysed through a multi-variety cross-sectional regression analysis of the CARs (cumulative abnormal returns) for each of the four events listed above. Using this method, we were able to determine if the firm-specific attributes of the firms influenced their respective CARs during the four events

listed. The use of a cross-sectional regression model allowed us to identify which of the firm attributes examined in the prior research literature would also significantly impact CARs during the four events.

4.3.1 Validation of Regression Model Assumptions

Multiple Linear Regression Analysis was performed on the Data Set once it was determined that all assumptions necessary to perform this type of analysis had been met. A normal Distribution was established with the Dependent Variable after Outliers were removed (i.e. 10 at COP26; 5 at COP27; 8 at COP28; 4 at COP29). The linearity between the independent and dependent variables was verified through the Normal P-P Plot, confirming the adequacy of the model structure. Additionally, no multi-collinearity issues were detected, as the correlation coefficients among the explanatory variables remained below 0.7. Furthermore, the Durbin -Watson statistic was greater than 0.05 confirming the independence of residuals and absence of autocorrelation. Cooks distance value ranged between 0 to 1, indicating that no influential data points were present in the model. Lastly, the assumption of homoscedasticity was satisfied as evidenced by the uniform dispersion of residuals across the fitted values. Collectively, these diagnostic checks validated the robustness of the dataset of all the four climate events and confirmed its appropriateness for conducting multiple linear regression analysis.

4.3.2 Regression estimates from the Multivariate Model

Table (11) reports the empirical results of the regression analysis conducted for the COP26 event. The model shows an R^2 value of 0.078, indicating that approximately 7.8% of the variation in cumulative abnormal return is explained by firm- specific variables, with the overall model being statistically significant (F = 2.884, p = 0.016). Among the explanatory factors, the B-T-M (book to market ratio) in accordance with (Pandey et al., 2023) exhibits a strong inverse relationship with abnormal returns (B = -0.048, p = 0.018) exhibiting that companies with increased book – to – market ratios experienced lower abnormal returns during the COP26 period. This implies that value – oriented firms were more negatively impacted, possibly due to market concerns about their adaptability to sustainability transition. While other variables including firm leverage in accordance with (Pandey et al., 2024), size, past (historical) returns and volatility were found to be statistically insignificant which indicates their immaterial influence to market reactions to the COP26 event. Overall, the findings suggest that investor's responses were primarily driven by valuation related factors than firm size or risk attributes.

Table 11. Empirical results from cross – sectional analysis of COP26 event.

Coefficients [a]				
Model 1	Unstandardised Coefficients			
	B	Std. Error	t	Significant
(Constant)	0.075	0.062	1.202	0.231
FIRM LEVERAGE	0.027	0.054	0.495	0.622
FIRM SIZE	-0.004	0.007	-0.656	0.513
B-T-M	-0.048	0.02	-2.389	0.018
PAST RETURNS	-2.053	1.241	-1.654	0.1
VOLATILITY	-0.281	0.601	-0.467	0.641

Model Summary [b]	
	Change Statistics

R	R Square	Adj. R square	F change	df 1	df 2	Sig. F Change
0.280[a]	0.078	0.051	2.884	5	170	0.016

ANOVA Statistics

	Sum of Squares	df	Mean square	F	Significant
Regression	0.136	5	0.027	2.884	0.016 [b]
Residual	1.599	170	0.009		
Total	1.734	175			

Source: Author's own creation based on results

Table (12) shows the empirical results of the cross – sectional regression analysis for the COP27 event. The model demonstrates a stronger explanatory power compared to COP26, with an R square value of 0.155 which indicates the 15.5% of the variation in CARs is explained by the firm – specific characteristics. The overall model statistically significant ($F = 6.421$, $p < 0.01$) suggesting a meaningful joint influence of the independent variables on firm's abnormal returns during the COP27 event. Among the explanatory variables, the Book – to – market ratio exhibits a positive and highly significant relationship with abnormal returns ($B = 0.121$, $p < 0.01$), implying that firms with higher B-T-M values performed better around COP27. This contrasts with the COP26 results, where B-T-M had a negative and significant impact, indicating a shift in investor perception towards value- oriented firms in the subsequent year. While Chaturvedula et al. (2015) indicated that past returns positively influence CARs in the pre- event period, contrary with results as study observes a weak negative relationship ($p = 0.058$) indicating mean reversion tendencies before the event. Concomitantly, volatility shows a negative association with abnormal returns before and after the event (Chung et al., 2019) but volatility, firm size and leverage remained insignificant. Although, the COP27 results suggest a more pronounced and favourable market reaction, which shows that investors increasingly rewarded value- driven firms during later climate summit, reflecting growing optimism towards evolving sustainability expectations.

Table 12. Empirical results from cross – sectional analysis of COP27 event.

Coefficients [a]

Model 2	Unstandardised Coefficients			
	B	Std. Error	t	Significant
(Constant)	-0.033	0.071	-0.463	0.644
FIRM LEVERAGE	-0.078	0.062	-1.258	0.21
FIRM SIZE	-0.002	0.008	-0.23	0.819
B-T-M	0.121	0.025	4.793	< 0.01
PAST RETURNS	-3.937	2.064	-1.907	0.058
VOLATILITY	0.937	0.658	1.424	0.156

Model Summary [b]

			Change Statistics			
R	R Square	Adj. R square	F change	df 1	df 2	Sig. F Change
0.394[a]	0.155	0.131	6.421	5	175	< 0.01

ANOVA Statistics

	Sum of Squares	df	Mean square	F	Significant
Regression	0.413	5	0.083	6.421	<0.01[b]
Residual	2.253	175	0.013		
Total	2.666	180			

Source: Author's own creation based on results

Table (13) shows the empirical results of the cross – sectional analysis for the COP28 event. The model demonstrates an R^2 value of 0.119, indicating that approximately 11.9% of the variation in CARs across firms is explained by the included firm – specific variables. The overall model is statistically significant (F = 4.634, p < 0.01) confirming that the independent variables jointly influenced firm's abnormal returns during the COP28 period. Among the all variables, past returns emerged as the only significant determinant (B = -7.406, p = 0.002) indicating a strong inverse relationship in line with (Birindelli & Chiappini, 2021), wherein firms that performed well prior to the event tended to experience lower abnormal returns during COP28. This pattern reflects possible profit booking behaviour or market correction effects following the pre – event optimism. Other factors such as firm size, leverage, B-T-M and volatility failed to achieve statistical significance as contrary to the studies (Chaturvedula et al., 2015; Chung et al., 2019) implying limited explanatory relevance in this context.

Table 13. Empirical results of cross – sectional analysis for the COP28 event.

Coefficients [a]

Model 1	Unstandardised Coefficients			
	B	Std. Error	t	Significant
(Constant)	-0.09	0.074	-1.222	0.223
FIRM LEVERAGE	0.059	0.064	0.923	0.357
FIRM SIZE	0.011	0.008	1.458	0.147
B-T-M	0.039	0.028	1.361	0.175
PAST RETURNS	-7.406	2.296	-3.226	0.002
VOLATILITY	-1.604	1.215	-1.32	0.188

Model Summary [b]

			Change Statistics			

R	R Square	Adj. R square	F change	df 1	df 2	Sig. F Change
0.345[a]	0.119	0.093	4.634	5	172	< 0.01

ANOVA Statistics

	Sum of Squares	df	Mean square	F	Significant
Regression	0.260	5	0.052	4.634	<0.01[b]
Residual	1.928	172	0.011		
Total	2.187	177			

Source: Author's own creation based on results.

Table (14) disclosed the outcomes for the COP29 event. The framework demonstrates a robust explanatory capacity with an R^2 value of 0.190 i.e. explaining around 19% of the variation in CARs by firm – specific characteristics. The overall model is significant (F = 8.277, p < 0.01) which confirmed that explanatory variables collectively influenced the firm's abnormal returns during COP29 event. Among the predictors, both the B-T-M ratio and past returns emerged as significant determinants. The positive and significant coefficient of the B-T-M ratio (B = 0.095, p = 0.009) suggesting that firm with higher B-T-M ratio generated superior abnormal returns, implying renewed investor confidence in fundamentally strong or value -oriented firms during COP29, as also suggested by (Pandey et al., 2024). Conversely, past returns exhibit a pronounced negative relationship (B = -7.814, p < 0.01) which signifies that firms with strong pre – event performance experienced notable declines around the event, might be due to market normalisation following the earlier gains. Leverage and firm size show weak significance while volatility remains insignificant.

Table 14. Empirical results of cross – sectional analysis for the COP29 event.

Coefficients [a]

Model 1	Unstandardised Coefficients			
	B	Std. Error	t	Significant
(Constant)	0.038	0.059	0.638	0.525
FIRM LEVERAGE	0.097	0.057	1.697	0.091
FIRM SIZE	-0.012	0.006	-1.829	0.069
B-T-M	0.095	0.036	2.638	0.009
PAST RETURNS	-7.814	1.726	-4.527	< 0.01
VOLATILITY	0.784	0.975	0.803	0.423

Model Summary [b]

			Change Statistics			
R	R Square	Adj. R square	F change	df 1	df 2	Sig. F Change

0.436[a]	0.190	0.167	8.277	5	176	< 0.01

ANOVA Statistics

	Sum of Squares	df	Mean square	F	Significant
Regression	0.353	5	0.071	8.277	< 0.01[b]
Residual	1.500	176	0.009		
Total	1.853	181			

Source: Author's own creation based on results

Consolidating results of cross – sectional regression analysis for all the four COP events revealed the distinct patterns in firm's sensitivity to climate policy announcements. The B-T-M ratio emerged as the most consistent determinant, shifting from a negative association during COP26 to a positive and significant one in subsequent years, particularly in COP27 and COP29 which highlights the evolving investor preference for value- oriented firms. Past returns consistently exhibited a negative and significant indicating mean reversion and profit booking behaviour. In contrast, firm size, leverage and volatility displayed weak and inconsistent significance as contrast to results of (Chaturvedula et al., 2015; Chung et al., 2019) which emphasised their comparatively limited influence relative to valuation and performance driven factors.

5. Conclusion And Implications Of The Study

Drawing upon the event study method, the research examines the reaction of investors to the COPs from 2021–2024, based on a sample of 186 firms, representing 744 firm-year observations, to determine how investor responses changed over time. Investor responses to climate policy development have evolved significantly over time. As can be seen from this data, the market has become increasingly sensitive to both environmental commitments and the policy direction communicated at each successive COP.

Overall, the study found that the first COP events (COP26 and COP27), produced a marked, negative investor response in high-emission sectors, such as extractive/mineral processing and transport. Subsequent COP events (COP28 and COP29), demonstrated a progression towards a more differentiated, and stabilizing, investor behavior. High levels of sensitivity to global environmental regulation, and associated policy uncertainty, were observed in energy-intensive industries, throughout the initial two COP events; however, the positive abnormal returns generated in renewable energy and infrastructure, during COP28, indicate an increasing level of alignment by investors with climate-positive narratives due to enhanced policy certainty, and greater investment incentives for sustainable technology. Additionally, the relatively muted investor response to COP29, indicates an emerging trend of market adaptation, as investors perceive COPs as reinforcing previously committed policies, rather than signaling transformational policy changes. Overall, the findings suggest that market participants are increasingly incorporating climate-related policy developments into their decision-making processes, and subsequently adjusting their expectations, in accordance with the developing maturity and credibility of international climate frameworks.

Based on the data collected in the research, it was evident that corporate entities need to proactively respond to climate-related issues to protect and increase the market value of their shares. Firms may be able to reduce the risk of being affected by climate-related issues, as well as capitalise on new opportunities developing from the emergence of the "green" economy through the inclusion of sustainable development into both their operational and strategic frameworks. A positive market response to environmental responsibility and reducing

investor concerns about climate vulnerability could provide improved stock performance. The findings support that investors should include the climate aspects of firms as well as the unique characteristics of each firm when making investment decisions to assist in assessing the long-term value and resilience of portfolios.

For policymakers, the evidence emphasizes the importance of establishing stable, reliable and predictable climate policies to maintain market stability and investor confidence, policymakers need to use these evidence to develop and implement policies that are intended to enhance climate risk disclosure and assessment processes, as well as provide investment in climate resilient technology and infrastructure through fiscal and regulatory incentives to promote a culture of sustainability in the corporate world; and to also support the development of investor awareness and education regarding the risks and opportunities associated with climate change to facilitate rational and informed decision making by investors, which will collectively help to establish a more resilient financial system that can adapt to the increasing challenges related to global climate change.

Limitations and Future Directions

The findings of this study are useful as they relate to the initial reaction of firms to climate-related events; however, there are several other aspects of the study that require consideration. Firstly, the study has primarily focused on the short-term impacts of climate events on firm performance and strategic response. Therefore, it is important for future studies to consider both behavioural and psychological factors that could impact investor behaviour (i.e., investor reactions) when responding to climate-related news or announcements. In addition, comparative analyses among firms with different climate-related strategies will allow researchers to understand how pre-existing climate strategy and preparedness can moderate or influence the resultant market-based implications from the disclosure of climate-related information. Finally, conducting an examination of various industries that are less dependent upon environmental concerns will help researchers understand if all firms react similarly to climate-related disclosures, or if there are differences in reaction based upon the type of industry, level of dependence on environmental conditions, and/or type of climate-related event. Overall, the incorporation of these additional areas of study will provide researchers with a more complete understanding of the relationship between climate events, firm tactics, financial markets and the development of sustainable corporate practices during increasingly environmentally-challenging times.

6. References

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