From Streets to Ballots: The Impact of Climate Protests on Public Awareness and Electoral Outcomes*

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Climate-related protests have become increasingly widespread across the world. This paper empirically investigates the impact of climate protests on public awareness and subsequent political behavior. First, we document that such protests significantly elevate climate change awareness, as evidenced by increased Google search intensity for climate-related topics and heightened media coverage in both the United States and Europe. We then demonstrate that this surge in public interest translates into tangible political action. Specifically, we observe that the widespread *Fridays for Future* protests in Europe increased support for Green parties in the 2019 European Parliamentary elections. Additionally, we employ textual analysis to present suggestive evidence of the protests' influence on the prioritization of climate issues in UK Parliamentary speeches. Our findings suggest that climate protests have the potential to shape policy discourse.

I Introduction

Environmental protests have become more frequent and widespread globally, as depicted in Figure I. These protests appear to coincide with the growing public interest in climate change and corresponding media coverage. Specifically, Figure II demonstrates a clear comovement between key environmental events and the frequency of Google searches, US news media coverage, and TV airtime focused on climate change. While a correlation is evident, establishing a causal link between protest, public attitudes, and policy preferences remains elusive for

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researchers. Moreover, evidence on the ability of climate protests to engender any form of climate action is particularly limited. Identifying a causal relationship between protests and these outcomes would pave the way for exploring the conditions, forms, and channels through which protests might effectively raise public awareness and influence policy-making. This paper delves into these questions.

We first examine whether environmental protests in a given location increase climate awareness among individuals who live in that location using instances of several thousand protests across the United States. We utilize data on search queries from Google Trends and media coverage from the Global Database of Events, Language, and Tone (GDELT) project to construct measures of climate awareness and activism. Our findings suggest that following a climate-related protest, there is a significant increase in search queries and media attention on climate change-related topics. This finding suggests protests can elevate climate change as a salient public issue and raise awareness. However, the short-term nature of these outcome variables raises questions about the lasting impact of the heightened awareness and its potential to translate into concrete policy changes.

To address this limitation, we next present evidence suggesting that climate-related protests influence citizens' electoral voting decisions (Fabel et al. 2022). More precisely, in the wake of the widespread *Fridays for Future* protests in March of 2019, voters in Europe showed more support for the local Green parties in their respective regions during the European Parliamentary (EP) elections held in May of 2019. Interestingly, we also observe a rise in support for the radical-right parties, aligning with the notion that protests, while raising awareness and support for climate concerns, can simultaneously polarize opinions (Djourelova et al. 2024). The support could come from individuals who oppose the protesters' methods and demands or those whose daily lives are directly affected by the protests, thereby potentially deepening societal divisions over climate issues.

Finally, we investigate the impact of protests on policymaking. Through textual analysis of speeches by elected UK Members of Parliament (MPs), we reveal a positive correlation between protest frequency and the intensity of climate-related discussions among MPs. This finding underscores the power of protests to elevate climate issues on the legislative agenda, ensuring they receive due attention from policymakers. By bringing public pressure to the forefront, protests can encourage legislators to address previously neglected environmental concerns.

Protests are coordinated expressions of dissatisfaction with certain elements or phenomena in society, but they are also costly due to economic losses caused by disruptions. Previous research in this vein has found that political protests are instrumental in reforming policies (see for example, Madestam et al. (2013); Gethin and Pons (2024)). We complement these studies by exploiting rich media coverage databases available now to draw more robust inferences. Moreover, our focus is on climate-related protests, which are different from general protests, in the sense that the rank-and-file opinion is still not fully geared towards pro-environment policies (Besley and Hussain 2023). The research is also related to the work on understanding the importance of electronic media in changing social outcomes (Kearney and Levine 2015). In addition, papers highlighting issue attention on climate action across geography and culture suggest that a one-size-fits-all policy is neither optimal nor feasible for tackling climate change (Hase et al. 2021). The findings in this paper shed some light on this point also by exploiting media attention measures.

Numerous global movements that have sparked political change seem to occur in tandem with protests, yet it remains initially unclear whether these protests merely mirror broader societal unrest or actively contribute to instigating change. In this paper, we demonstrate the efficacy of climate activism, particularly protests, in eliciting tangible climate action. We examine diverse indicators, including heightened civil society response (reflected in media and internet activity), increased support for pro-environment parties, and even potential backlash in the form of support for the radical-right groups. Additionally, we analyze parliamentary speeches, revealing a greater likelihood of legislators addressing climate-related topics after protests occur.

The remainder of the paper is organized as follows. In the next section, we discuss the data that we use. In Section III, we establish a robust empirical link between awareness about climate change and protests. The implications on voting and policy discussions are developed in Sections IV and V respectively. Section VI offers some concluding remarks.

II Data

This section outlines the datasets used in the analysis, which focuses on climate protests within the US and Europe, where climate issues are particularly prominent.

Climate Protests: We utilize several datasets on climate protests, each with its own strengths and limitations:

- *CountLove:* This dataset is a comprehensive record of protests across the United States, providing details such as date, location, cause, and estimated number of attendees for each event. It spans from January 20, 2017, to January 31, 2021, providing a broad temporal window to analyze protest activities and their implications on public engagement with various causes, including climate change.

- *ACLED:* The Armed Conflict Location and Event Data (ACLED) project database covers a wider geographical area, covering both the United States and Europe, from January 2020 to the present. It tracks a variety of political violence and protest events, offering detailed information, such as date, location, participating group, and type of each event. One limitation of this database is that the attendance figures are not reported, thereby inhibiting any analysis using this margin.

- *Fridays for Future (FFF) Protests:* In the latter part of our analysis, particularly when examining the influence of protests on voting behavior, we focus on worldwide climate protests organized under the Fridays for Future (FFF) movement on March 15, 2019.[1] Covering 131 countries and 2350 cities, it is a rich source of data on climate protests held about two months before the 2019 EP elections voting. The reporting rate on protest intensity (the number of attendees gathered at each protest location), however, is low (less than 38%). We aggregate this protest occurrence data at the EU NUTS 3 region level. Out of 12,955 NUTS 3 regions, 6,967 had at least one protest organized in one of their constituent towns.

Google Trends: We leverage Google Trends, a tool that tracks the popularity of Google search queries across different regions and languages over time. We use the daily and weekly search intensity for the 'climate change' topic[2] to gauge public interest and concerns regarding environmental issues. Using this footprint of the populace's environmental concerns, we can look at how societal interest in this area fluctuates in response to environmental protests and broader environmental movements.

GDELT Media Coverage: The Global Database of Events, Language, and Tone (GDELT) is a comprehensive archive, cataloging a vast spectrum of media outputs worldwide to track events, linguistic patterns, and emotional tones across many languages. Leveraging this resource, we craft two specific indicators to assess climate salience, awareness, and activism within the US. Firstly, we develop a measure of the presence of 'climate change' and 'global warming' terms in print media by using the proportion of news articles that address these topics; we call this "coverage". Secondly, we use television news broadcasts, measuring the percentage of airtime devoted to these issues, with the GDELT data allowing for a precise breakdown into 15-second intervals, we call this "airtime". These measures collectively offer a granular view of the media engagement with climate change issues.

1. A youth-led, global climate-strike movement, Fridays for Future organizes climate strikes across the world to put moral pressure on policymakers to take action against global warming.

2. Google Trends offers two distinct search options: topic and keyword. A keyword search targets exact matches within search queries, focusing on the specific word or phrase as it appears. In contrast, a topic search interprets the keyword as a broader concept, capturing related terms, synonyms, and relevant queries that fall under the same general subject.

Parliamentary Speeches: To analyze parliamentary discourse on climate change, we utilize the Hansard records, which are the official transcripts of UK parliamentary debates available on the Hansard website (https://hansard.parliament.uk). We use the complete set of these records as collected, harmonized, and compiled by Shamsi (2024). Hansard provides a near-verbatim account of parliamentary discussions, with minor edits for clarity and accuracy. Through textual analysis of these records, we aim to uncover the prominence and evolution of climate change discussions among policymakers.

European Parliamentary Elections Voting: Data on vote shares for different political parties and voter turnout in the 2019 European Parliamentary elections comes from the European NUTS level Election Dataset (EU-NED).[3] This dataset contains reports on the national parliamentary elections in all current EU member-states, the UK, Norway, Turkey, and Switzerland over the period 1990-2020. It also includes coverage of the European parliamentary elections for all the EU member states and the UK. Election results are reported at the lowest level of aggregation (i.e., NUTS 3) wherever possible. We construct vote shares obtained by 300 political parties across 1085 NUTS 3 regions.

Precipitation: We obtain the data on precipitation from the ERA5-Land dataset, which is a *gridded* reanalysis product and records hourly precipitation at a spatial resolution of 0.1° × 0.1°.[4] To construct the rainfall variable used in the analysis, we compute the average precipitation between 12 noon and 4 pm local time on the day of the Fridays For Future protest i.e., March 15, 2019, two months before the EP election voting dates i.e., May 23-26, 2019. We also construct a long-run average precipitation variable by computing the average monthly precipitation in March through the years 2005 to 2018.

III Awareness and Attitudes

This section explores whether protest events are associated with increased online search activity and media coverage related to climate change. We begin by examining potential comovement at the national level between protest dates and measures of public awareness of climate change. Specifically, we estimate the following econometric relationship for protests in the US:

$$y_t = \alpha + \beta Protest_t + \gamma X_t + \varepsilon_t \tag{1}$$

3. The European NUTS Level Election Database provides national and European parliamentary election results on the level of Eurostat's NUTS 2 and NUTS 3 administrative units. It is optimized for combination with Eurostat's Regional Database. *Source:* EU-NED.

4. Data can be accessed here.

where, y_t is either Google search intensity or media coverage outcome variables in week t. $Protest_t$ is either the number of climate-related protests or the number of attendees in climate-related protests in week t across the US. X_t are controls, which include linear and quadratic time trends, and seasonal effects captured by month-fixed effects. Data on protests is from CountLove. The findings are presented in Table I.

The outcome variable in the first two columns is the Google search intensity for the climate change topic. Columns 3-4 and 5-6 look at the print media coverage and television news airtime respectively of climate change-related news. The outcome variable for the final four columns assesses the coverage in print media and television news without reference to "protests" or similar events. This distinction aims to determine if increases in news or TV coverage are attributable solely to reporting on protests or if they transcend beyond those news stories. The analysis reveals that protests, measured by the total number of protests or attendee counts, are strongly associated with various indicators of climate change awareness, even when excluding direct protest coverage news.

Additionally, we examine the responsiveness of media to protests broken down by various media outlets. As depicted in Figure III, outlets with a more liberal editorial stance, such as the BBC, MSNBC, and Al Jazeera, appear more inclined to cover these events. These analyses suggest that climate protests lead to increased public awareness of the climate change phenomenon.

However, this relationship is not necessarily causal, as both protests and coverage could be driven by a third variable such as broader political, social, or environmental events (e.g., natural disasters, policy changes) that independently increase both the likelihood of protests and public interest in climate change. Alternatively, it is possible that heightened public awareness and concern about climate change might lead to the organization of environmental protests. In this reverse causality scenario, increased media coverage could signal a growing public concern, which motivates activists to stage protests.

To better identify a causal link and address some of these concerns, we refine our analysis by shifting from the national level to a more granular geographical level, specifically the Designated Market Area (DMA) in the US. A DMA is a region where the population has access to the same set of television and radio stations, thereby forming a distinct media market.[5] This approach enables controlling for time fixed effects and location fixed effects. The time fixed effects account for national-level shocks, such as macroeconomic shocks and federal policy changes that could simultaneously influence both the occurrence of protests and the outcome

5. Defined by Nielsen, DMAs categorize specific areas where individuals receive identical media content, which is crucial for television advertising and audience measurement. Advertisers and marketers leverage DMAs to tailor their advertising campaigns to specific geographic locales, ensuring that messages reach the designated audience within those areas. The United States comprises over 200 DMAs, ranging from small rural communities to extensive metropolitan areas.

variables, while the location fixed effects control for time-invariant characteristics specific to a location, such as long-standing political preferences, socio-economic status, and cultural forces in place. By doing so, the analysis facilitates a "within" region and "across" time comparison, thereby addressing some of the potential "confoundedness" in the previous analysis.

One potential concern with this new two-way fixed effects approach is the presence of transient, unobserved regional shocks, which could simultaneously drive the likelihood of protests in a region and affect the outcome variable. To tackle this issue, we draw from the methodology proposed by Madestam et al. (2013), which utilizes variations in rainfall intensity on protest days as a source of exogenous variation affecting protest attendance. The underlying premise is that, given an expected probability of rainfall, the actual occurrence of rain acts as an external factor that likely diminishes protest attendance.

The CountLove dataset, however, is unsuitable for this type of analysis for two main reasons. First, it lacks attendance data, i.e., the number of people attending the protest, for most protests. Second, it does not provide precise location data, preventing us from accurately determining whether it rained at the protest site on the day of the protest. Despite these limitations, we can still validate the negative correlation between rainfall and attendance, which is the key idea behind this identification strategy, using a subset of the *Fridays for Future* protests that report attendance (Figure A.1). This correlation suggests that rainfall could serve as a viable instrument for measuring attendance.

Given the limitations of the CountLove dataset, we turn to the ACLED dataset, which, although it does not provide attendance figures, employs a more systematic data collection methodology and includes geolocation information. The geolocation allows us to match protest events with rainfall data. While the absence of attendance data precludes a direct instrumental variables (IV) approach, we can instead examine whether protests that occur on rainy days have a different impact compared to those on non-rainy days. This approach treats rainfall as a quasi-experimental instrument to induce variation in protest intensity, allowing us to explore its causal effect even without directly observing attendance. This alternative approach maintains the core logic of the original method but limits our ability to precisely interpret the coefficient magnitudes. We estimate the following econometric specification for DMA i in day t:

$$y_{it} = \alpha_i + \eta_t + \beta Protest_{it} + \delta Protest_{it} \times Precipitation_{it} + \varepsilon_{it} \quad (2)$$

Results are reported in Table II. The regression analysis is conducted on a daily basis. The dependent variable is akin to the Google search intensity defined in the previous analysis but this time it is constructed at the daily frequency. Similar to the previous specification, the treatment variable, $Protest_{it}$, could either be the number of environmental protests or the number of attendees in the environmental protests during day t in location i. The results reveal a diminished effect of protests on search intensity during increased rainfall, as evidenced by a negative coefficient for the interaction between precipitation and the occurrence of protests. This finding supports the hypothesis that protests significantly affect public interest in climate change-related information.

Our analysis thus far emphasizes the immediate impact of protests on public awareness and attitudes. However, a more critical question remains: do protests ultimately influence policy? On one hand, protests that garner significant public interest and media coverage can exert pressure on policymakers and corporations, potentially leading to meaningful outcomes, such as new legislation, regulatory changes, or corporate commitments to sustainability. On the other hand, while protests may raise public engagement with climate-related issues, they do not always translate into concrete actions or policy shifts, particularly when political will is lacking, the protests are not sustained, or they face strong opposition from powerful interests. The effectiveness of protests in driving policy change often hinges on a complex interplay of factors, including the political context, the responsiveness of institutions, and the strategic actions of the protestors.

The next section examines whether protests influence citizens' voting decisions and policy discussions. This analysis will help determine whether protests can move beyond generating short-term public interest to drive long-term policy changes.

IV Election Voting

This section investigates the effect of protests on voting behavior. To conduct this analysis, our previous research design requires some modification. While the hypothesis that rainfall reduces protest attendance is logical and supported by our previous findings, it presents a challenge when examining longer-term outcomes or those that are averaged over a longer time frame. While rainfall may affect the likelihood of a specific protest, but over a longer time frame it could also influence the likelihood and timing of subsequent protests. That is, if sudden rain leads to low attendance, organizers may reschedule the protest for a later date. In an extreme case, every rainfall-hampered protest is offset by another one later in time, thereby challenging the use of rainfall as a reliable instrumental variable for protests. To overcome this problem, we concentrate on protests that were pre-announced at the national level and were shortly followed by an election. This approach ensures that rainfall will not affect the probability of future protests, thereby strengthening our results.

In line with this approach, we use the widespread protests organized under FFF across all of Europe. These were a set of international demonstrations to demand action from political leaders to prevent climate change and to phase out subsidies for fossil fuel industries. The largest set of protests on March 15, 2019 gathered over one million protesters in 2,200 strike instances organised in major cities across 125 countries.[6] Conveniently for our analysis, the timing of these demonstrations aligned with the 2019 EP elections. This presents a unique opportunity to investigate whether these climate-related protests, which engulfed the whole of Europe, had any tangible effect on the electoral performance of pro-environment political parties. The act of voting is a citizen-driven expression of definitive action with significant implications for both present and future policy-making. Therefore, this offers us an opportunity to estimate the effects of protests on a more substantive indicator of public activism.

Using voting data at the level of NUTS 3 regions, we estimate the effect of climate protests on the vote shares of different political parties. In particular, we estimate the following econometric specification:

$$y_i = \alpha + \beta Protest_i + \delta Protest_i \times Precipitation_i + \gamma X_i + \varepsilon_i \tag{3}$$

Results are reported in Table III. Firstly, the estimate of β aligns with our expectations. Climate protests are more likely in areas with strong Green Party support, as these regions typically share the environmental focus of the protests. They are less common in Conservative or Christian Democrat areas, where priorities may differ or focus on other social issues. Conversely, in liberal regions, the alignment with progressive environmental policies encourages such activism. Interestingly, areas with higher radical-right support might also see more climate protests, plausibly as expressions of retaliation to the radical right's strong stance against pro-environment policies.

However, the focal point of our analysis is the interaction coefficient, δ, which shows a negative value for both Green and radical-right parties. This implies that in regions with less rain, where protests are likely to have higher attendance, support for these groups tends to increase. This trend might be explained by the direct emphasis on environmental issues in such protests, which aligns with and bolsters support for Green parties. Conversely, increased backing for radical right parties could be due to a perception of these protests as disruptive and a challenge to the social order and traditional values, resonating with the radical right's focus on stability and nationalism. Radical right parties leverage these protests to highlight issues of national sovereignty and traditional values, aligning with their agenda and possibly increasing their vote share. This interplay illustrates the dual impact of environmental activism — it can galvanize support for pro-environment policy but simultaneously polarize other voters, something that is also highlighted in Djourelova et al. (2024). In addition, the data indicates that protests also increase overall voter turnout.

These regressions also control for the probability of rainfall in NUTS 3 regions. This is to exploit weather variation across counties with similar baseline likelihoods of rainfall on the

6. The set of protests is available https://fridaysforfuture.org/what-we-do/strike-statistics/.

protest day. We can control for the rainfall probability flexibly by including dummy variables corresponding to the deciles in the historical rainfall probability distribution. Employing rainfall percentiles as a measure instead of absolute rainfall in millimeters yields results that are qualitatively consistent with our primary findings. Results are reported in Table A.1 in the Appendix. One potential concern might be that the results are driven by compositional changes across parties i.e., due to different NUTS3 regions used in each analysis. To address this concern, we rerun the analysis with only those NUTS3 regions that consists of candidates from all the three major parties: Green, Radical Left, and Radical Right. Results reported in Table A.2 in the Appendix show that the findings hold even in this balanced case.[7]

The findings thus far suggest that climate protests have the potential to generate public interest on climate issues. In the long run, protests affect the vote shares of political parties, particularly increasing those of the Green parties. Nevertheless, protest advocates often theorize that protests can also directly pressure policymakers – an aspect we have yet to examine. Demonstrating how protests can directly impact of the supply of politics would provide a more comprehensive understanding of their impact. We explore this in the following section, while acknowledging that the relationship between voters and policymakers is inherently intertwined: voters influence policymakers through electoral pressure, while policymakers shape voter preferences through their policy choices and the options they present.

V Parliamentary Discussions

In this section, we explore the relationship between the occurrence of protests in a constituency and the degree to which its MP discusses climate-related issues in the legislature. To implement this, we leverage textual analysis on the speeches made by MPs within the UK Parliament by creating two indicators for each constituency, which shed light on the nuances of political rhetoric circulating in policy circles regarding climate change issues.

Discussion density: This indicator measures the frequency of climate-related keywords in MPs' parliamentary speeches, capturing the focus on environmental issues. Keywords and bigrams are selected to cover a wide range of climate terms [8]. Their occurrences are counted and normalized against the total word count of the MP's annual speeches, creating a standardized

7. The number of observations across the columns in Table A.2 varies due to multiple candidates from the same party type in each NUTS3 region. We address this concern by using the average vote share across all candidates for each party type. Results reported in Table A.3 suggest that the results are robust to this change.

8. Keywords include environment, climate change, global warming, biodiversity, carbon footprint, sustainability, greenhouse effect, carbon emissions, climate policy, fossil fuels, energy efficiency, renewable energy, carbon neutral, and paris agreement.

frequency measure. This metric objectively assesses MPs' emphasis on climate topics in their legislative discussions, acting as a gauge for thematic focus.

Valence measure: This metric evaluates the sentiment in parliamentary discourse by analyzing the context around relevant keywords and bigrams in MPs' speeches. Using the `NLTK` library's `SentimentIntensityAnalyzer`, each identified segment — 10 words before and after a keyword or a bigram — is scored for sentiment, ranging from -1 (negative) to +1 (positive). This approach provides a nuanced understanding of the emotional and evaluative tones in parliamentary discussions on climate, offering an aggregate sentiment score that reflects MPs' attitudes towards climate issues.

Upon constructing these indicators, we proceed to perform regression analysis, employing these metrics as dependent variables against the annual count of protests in the constituency, with a focus on data post-2019, the period for which protest data is available. We also incorporate a control for the baseline average discussion density measure. This adjustment is made to account for the pre-existing levels of awareness and interest in climate-related issues within a constituency, acknowledging that such a baseline could influence both the occurrence of protests and the frequency of parliamentary discussions on environmental issues (for instance, by leading to the election of MPs with a stronger environmental agenda). We estimate the following econometric specification:

$$y_i = \alpha + \beta \cdot \text{Protest count}_i + \gamma X_i + \varepsilon_i \tag{4}$$

Results are reported in Table IV. Column 1 suggests a strong positive impact of protests on the discussion density of climate-related issues. The subsequent Columns 2-4 report disaggregated results by the MPs' party affiliation, and reveal that Labour MPs exhibit the highest level of responsiveness towards protests. Columns 5-8 extend this examination to the valence measure, analyzing the emotional and evaluative tone of MPs' discussions on climate issues. A clear pattern emerges here, suggesting a positive shift in the sentiment surrounding climate discussions in correlation with increased protest activity, with Labour MPs again showing a more pronounced reaction compared to others.

These results suggest that protests can serve as a vital mechanism for elevating climate issues on the political agenda, particularly within parties and regions more predisposed to environmental activism. Such findings underscore the potential of grassroots activism to shape political discourse and action on climate change, influencing political agenda and priorities. The differential responsiveness highlights the importance of understanding party-specific dynamics when assessing responsiveness within this party to public demands for action on environmental issues.

However, these findings should be interpreted with caution, as the analysis lacks a robust method to isolate exogenous variation in the frequency of protests at the constituency level. In this context, the use of exogenous variation, such as rainfall shocks, is not feasible. While rainfall may influence immediate protest turnout, its broader impact on protest dynamics and the number of protests over an extended period is less certain and could introduce confounding variables into the analysis.

VI Conclusion

The frequency of protests against climate change and human-induced environmental damages has been rising in both the US and Europe. However, it is far from clear whether this form of climate activism could induce or aid pro-environmental policy reforms. In this paper, using Google Trends search intensity and GDELT media coverage measures, we first document that protests generate significant public engagement and media attention in the short-run. Then, to look at more long-run effects, we leverage the exogenous variation induced by rainfall shocks around Fridays for Future strikes and see their impact on the vote shares of different political parties in the 2019 European Parliamentary elections. We find that vote shares of Green parties in different NUTS 3 regions saw a significant increase following the strikes. Furthermore, we provide suggestive evidence that these protests influence policy discussions at the constituency level in the UK Parliament, as reflected in the content of speeches by Members of Parliament.

The findings underscore the potent role of climate protests in not only elevating public awareness and media discourse on climate issues but also in influencing tangible political outcomes. The observed increase in Green Party vote shares following the Fridays for Future strikes indicates a shift in voter preferences towards environmental priorities, driven by grassroots activism. However, the concurrent rise in support for radical right parties suggests that these movements may also provoke a backlash among certain segments of the electorate, highlighting the importance for organizers to consider strategies that mitigate potential counterproductive effects. Additionally, the observable shift in parliamentary discussions towards more climate-focused narratives suggests that the echoes of the streets are reaching the halls of power, potentially paving the way for more robust climate policies.

These results contribute to a better understanding of the relationship between public mobilization, grassroots activism, and policy formation, emphasizing the role of civic engagement in addressing global climate challenges.

References

Besley, Tim, and Azhar Hussain. 2023. "Global Gains from a Green Energy Transition: Evidence on Coal-Fired Power and Air Quality Dissatisfaction." *CEPR Discussion Paper* 18046.

Djourelova, Milena, Ruben Durante, Elliot Motte, and Eleonora Patacchini. 2024. "Experience, narratives, and climate change beliefs." *SSRN Electron. J.*

Fabel, Marc, Matthias Flückiger, Markus Ludwig, Helmut Rainer, Maria Waldinger, and Sebastian Wichert. 2022. *The Power of Youth: Did the "Fridays for Future" Climate Movement Trickle-Up to Influence, Voters, Politicians, and the Media?* CESifo Working Paper Series 9742. CESifo.

Gethin, Amory, and Vincent Pons. 2024. *Social Movements and Public Opinion in the United States.* Working Paper, Working Paper Series 32342. National Bureau of Economic Research.

Hase, Valerie, Daniela Mahl, Mike S. Schäfer, and Tobias R. Keller. 2021. "Climate change in news media across the globe: An automated analysis of issue attention and themes in climate change coverage in 10 countries (2006–2018)." *Global Environmental Change* 70:102353.

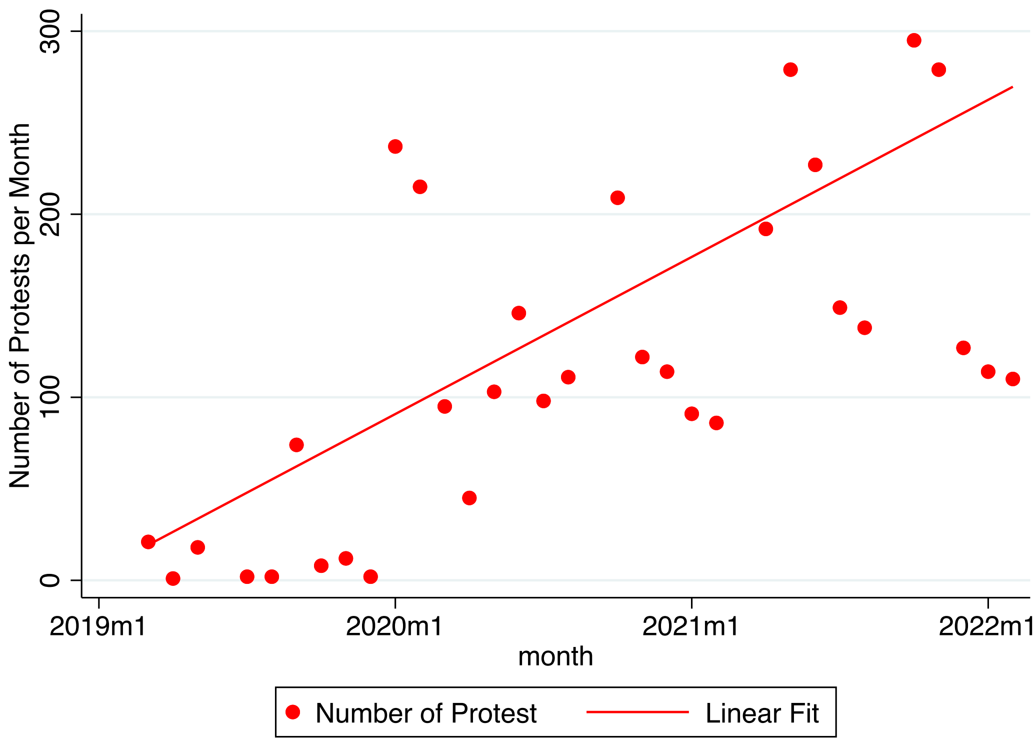
Kearney, Melissa S, and Phillip B Levine. 2015. "Media influences on social outcomes: The impact of MTV's 16 and pregnant on teen childbearing." *American Economic Review* 105 (12): 3597–3632.

Madestam, Andreas, Daniel Shoag, Stan Veuger, and David Yanagizawa-Drott. 2013. "Do political protests matter? evidence from the tea party movement." *The Quarterly Journal of Economics* 128 (4): 1633–1685.

Shamsi, Javad. 2024. "Immigration and political realignment." *Available at SSRN 4748438.*

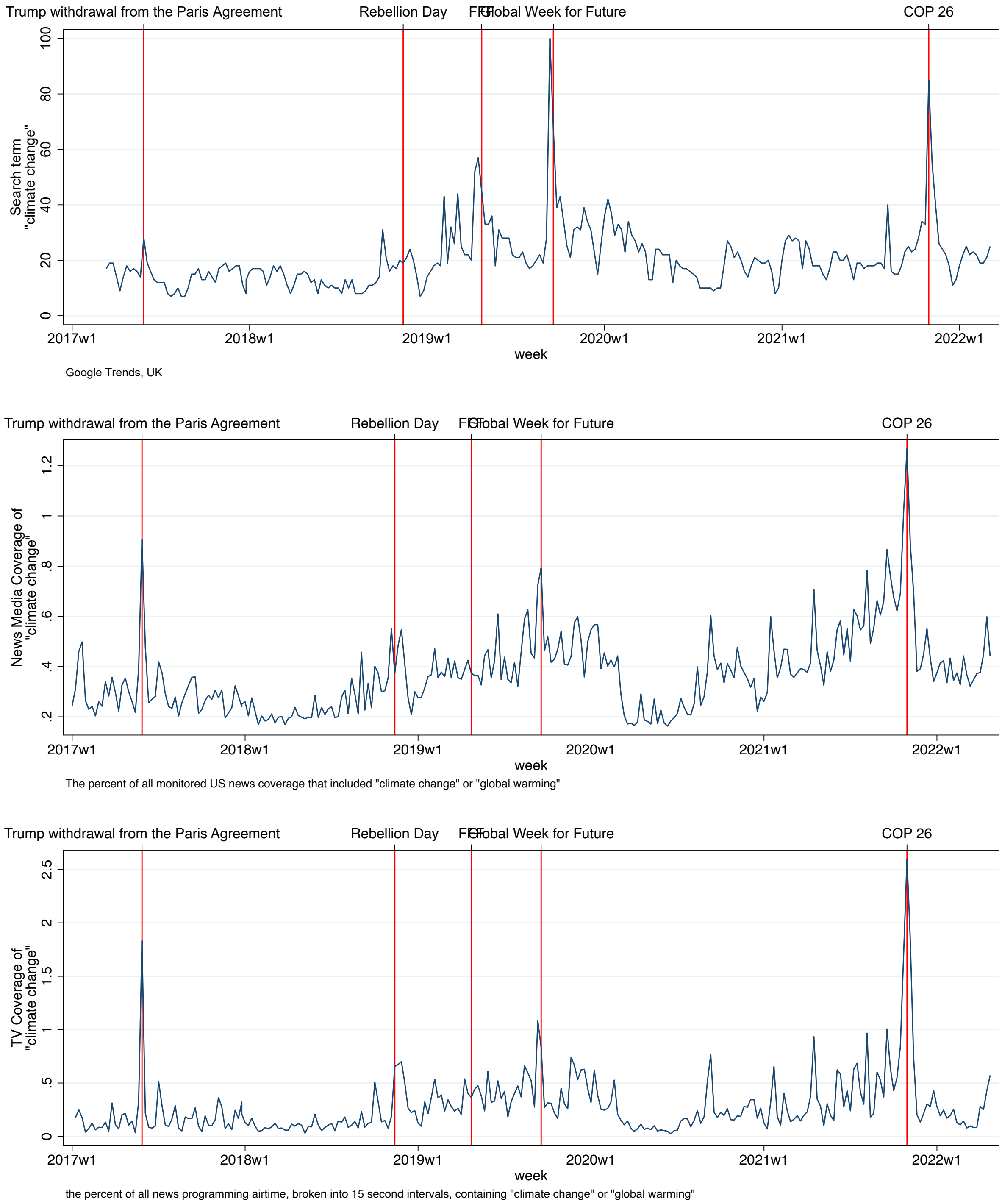
Main Tables and Figures

Figure I: **Monthly Count of Protests in Europe and North America.**



Notes: This graph, derived from ACLED dataset, displays the count of protests per month. Each point represents the total number of protests in a given month, with those exceeding 300 protests omitted for clarity. The scatter plot points depict monthly protest frequencies, while the line illustrates the linear fit, indicating the overall trend.

Figure II: **Climate Change Engagement in Google Trends, Print Media, and TV**



Notes: Panel A illustrates trends in Google search intensity for the term 'climate change' in the UK, extracted from Google Trends. Key events, such as Trump's withdrawal from the Paris Agreement and COP 26, are marked, indicating their potential influence on public interest. Panel B focuses on news media coverage in the US, showing the proportion of news items featuring 'climate change' or 'global warming', with data sourced from the GDELT project. Panel C explores television news coverage, showing the percentage of airtime allocated to discussing these issues, also based on the GDELT data.

Table I: **US national-level weekly analysis**

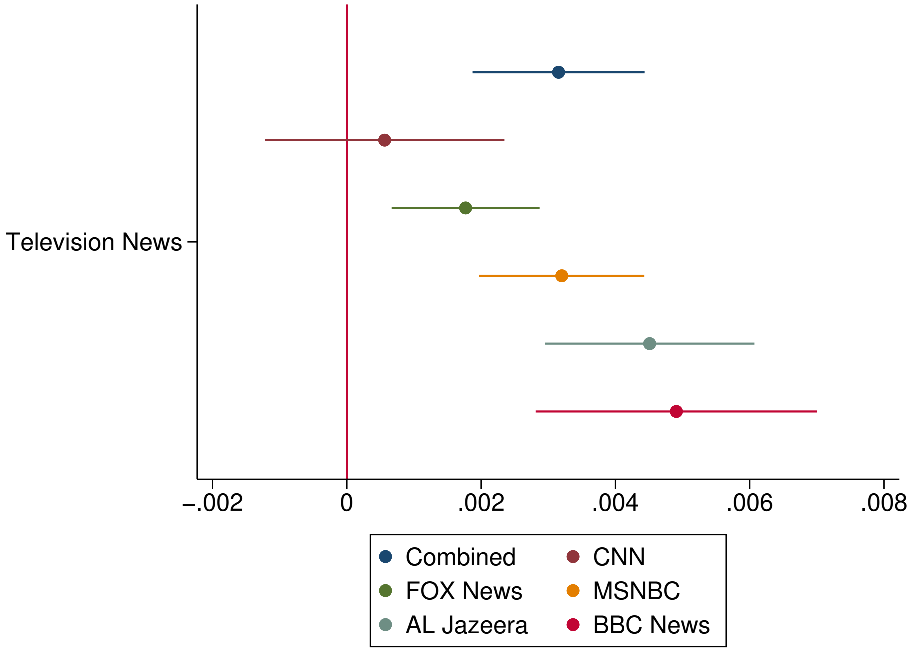
	Search Intensity		News Climate		TV Climate		News Climate Exc. Protest		TV Climate Exc. Protest	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
No. Protests	.022***		.013***		.015***		.0083***		.013***	
	(.0025)		(.003)		(.003)		(.0031)		(.0031)	
No. Attendees		.16***		.076***		.094***		.04		.08***
		(.023)		(.027)		(.027)		(.027)		(.027)
N	199	199	212	212	212	212	212	212	212	212
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	.487	.423	.236	.196	.23	.189	.212	.193	.215	.178

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table presents findings from eleven regression analyses utilizing weekly data from CountLove to examine the impact of protests on various indicators of public engagement with climate change. The regressions correlate national-level metrics for a given week with the quantity of protests or participants during that week. Models 1-2 analyze Google Trends search intensity for 'climate change', Models 3-4 and 7-8 examine the percentage of news coverage on 'climate change' and 'climate change excluding protests' respectively, while Models 5-6 and 9-10 focus on the same metrics in TV coverage. The dependent variables in columns 3 to 10 are sourced from GDELT. All dependent variables are standardised to have a mean of zero and a variance of one. The primary independent variables are the number of protests and attendees. The first column sources data from the ACLED and encompasses the period from January 1, 2020, to May 1, 2022, while subsequent columns draw on data from CountLove and cover from April 1, 2017, to January 31, 2021. Each model controls for linear and quadratic time trends, and seasonal effects captured by month fixed effects.

Figure III: **Protest coverage across different TV stations**



Notes: This graph illustrates the estimated coefficients for protest coverage on various TV news networks, each represented by a distinct regression model. These are Combined (aggregate of all stations), CNN, FOX News, MSNBC, Al Jazeera, and BBC News. The coefficient for each network, depicted on the Y-axis, measures the extent to which protests influenced TV coverage of climate change.

Table II: **US DMA-level daily analysis**

	(1) Search Intensity	(2) Search Intensity	(3) Search Intensity	(4) Search Intensity
Protest × Precip	-4.5081***	-2.6866***	-2.3467***	-0.9595*
	(1.6089)	(0.5286)	(0.4322)	(0.5600)
Protest	26.3063***	1.8394	0.8064	0.5046
	(1.0830)	(1.6634)	(1.4304)	(1.6707)
DMA FE	No	Yes	Yes	Yes
Date FE	No	No	Yes	Yes
Linear Time Trend	No	No	No	Yes
Observations	163876	163876	163876	163876

Robust standard errors clustered at the DMA level in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table displays regression results on the influence of protests and weather on Google Trends search intensity, using data from Google Trends combined with ACLED post-January 1, 2020. It introduces an interaction term for protests in DMAs and rainfall, differentiating the impact of the protest between rainy and dry weather conditions. We compute the average rainfall between 12 noon and 4 pm on the day of the protest to construct the precipitation variable. In cases of multiple protests in the same DMA on the same day, the aggregate number of protests is used. The analysis is conducted at a daily frequency.

Table III: **Protest and vote shares in EP elections**

	Green Party	Conservative	Socialist	Agrarian/Centre	Christian Democrats
Protest × Precip	-0.357***	0.502	-0.144	1.274	-0.145
	(0.125)	(0.413)	(0.134)	(1.032)	(0.292)
Protest	5.208***	-2.128**	1.164	-1.028	-3.209**
	(0.635)	(1.080)	(0.805)	(2.168)	(1.427)
Observations	957	906	1314	113	1067
Mean	6.100	8.854	14.25	8.135	14.92
Standard Deviation	6.989	9.468	10.14	8.652	15.64

	Liberal	Radical Left	Radical Right	Regionalist	Voter Turnout
Protest × Precip	0.161	0.155**	-0.881***	0.0433	-0.744***
	(0.133)	(0.0631)	(0.165)	(0.147)	(0.189)
Protest	2.605***	-0.654	6.243***	-0.738	4.366***
	(0.755)	(0.423)	(1.024)	(1.048)	(1.001)
Observations	1186	1508	1279	680	1064
Mean	9.352	4.676	14.97	3.396	52.57
Standard Deviation	8.906	4.866	14.18	7.438	11.51

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table presents OLS regression results from Europe at the NUTS3 level. The first explanatory variable is an interaction between protest occurrence and average precipitation between 12 noon and 4 p.m. on the day of the protest, i.e., March 15, 2019. Protest is an indicator variable that takes a value of 1 if a Fridays for Future protest was held in the NUTS3 region prior to the EP elections. Different political parties in each country are categorized into party families on the basis of their ideology using data from the Chapel Hill Expert Survey. Controls include the share of population having tertiary education (at the NUTS2 level) and the long-run average precipitation in the month of March, calculated using precipitation data in the years 2005-2018 (at the NUTS3 level).

Table IV: **Hansard textual analysis**

	Discussion Density				Valence Measure			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of Protests	0.0111**	0.0204*	0.0035	0.0262	0.0116***	0.0146**	0.0106**	0.0188**
	(0.0028)	(0.0064)	(0.0026)	(0.0192)	(0.0009)	(0.0042)	(0.0016)	(0.0047)
Constituencies	All	Labour	Conservative	Other	All	Labour	Conservative	Other
Observations	753	253	368	132	753	253	368	132

Robust standard errors in parentheses

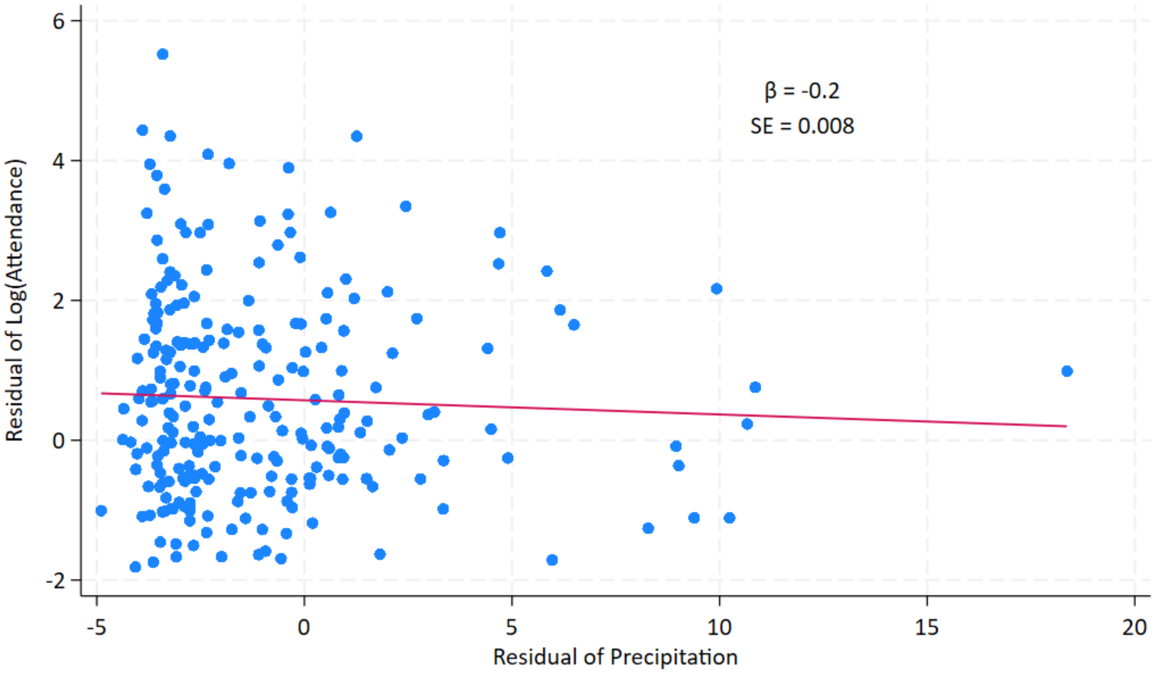
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table was generated using data from the Hansard dataset and the ACLED protest data. The Hansard dataset provides counts of Member of Parliament (MP) mentions of "climate change" or similar words in parliamentary records, while the ACLED dataset offers information on protest events in the UK. The table presents regression results examining the relationship between the number of protests in a constituency and the frequency of MP mentions post-2019 in parliamentary records. The analysis considers different models, including controls for pre-2019 mentions and separate analyses for Conservative and Labour MPs. All regressions control for the level of frequency of mentions of "climate change" and related keywords in the constituency before 2019. Robust standard errors are clustered at the country level.

Appendix

A Additional Tables and Figures

Figure A.1: **Attendance and precipitation on the day of protest**



Notes: The residuals on y-axis are generated by regressing log of attendance at the protests on March 15, 2019 (as reported on the *Fridays for Future* website) on the long-run average precipitation in each NUTS3 region. Similarly, the residuals on the x-axis are generated by regressing precipitation between 12 noon and 4 pm on the day of the protest on the long-run average precipitation in each NUTS3 region (both obtained from the ERA5-Land dataset). Since the reporting on attendance is incomplete and unreliable, we also restrict the specification to include protests attended by at least 75 people, i.e., protests large enough to gather some attention in the media. Results are qualitatively robust to changing this threshold up and down.

Table A.1: **Protest and vote shares in EP elections**

	Green Party	Conservative	Socialist	Agrarian/Centre	Christian Democrats
Protest × Precip (percentile)	0.0457**	-0.0736**	0.0175	-0.138	0.0155
	(0.0148)	(0.0274)	(0.0205)	(0.0901)	(0.0398)
Protest	1.455*	3.018	-0.438	9.570	-4.293*
	(0.593)	(1.603)	(0.946)	(6.389)	(1.903)
Observations	957	906	1314	113	1067
Mean	6.100	8.854	14.25	8.135	14.92
Standard Deviation	6.989	9.468	10.14	8.652	15.64

	Liberal	Radical Left	Radical Right	Regionalist	Voter Turnout
Protest × Precip (percentile)	-0.0218	-0.0300**	0.178***	-0.00747	0.112***
	(0.0176)	(0.00973)	(0.0256)	(0.0208)	(0.0238)
Protest	4.098***	0.949**	-5.069***	-0.232	-3.004**
	(0.780)	(0.349)	(1.440)	(0.565)	(1.149)
Observations	1186	1508	1279	680	1064
Mean	9.352	4.676	14.97	3.396	52.57
Standard Deviation	8.906	4.866	14.18	7.438	11.51

Robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: This table is similar to Table III but uses inverse percentiles of precipitation instead of continuous values. The first explanatory variable is an interaction between protest occurrence and the inverse of precipitation percentiles between 12 noon and 4 p.m. on the day of the protest, i.e., March 15, 2019. Protest is an indicator variable that takes a value of 1 if an FFF protest was held in the NUTS3 region prior to the EP elections. Different political parties in each country are categorized into party families on the basis of their ideology using data from the Chapel Hill Expert Survey. Controls include the share of population having tertiary education (at the NUTS2 level) and the long-run average precipitation in the month of March, calculated using precipitation data in the years 2005-2018 (at the NUTS3 level).

Table A.2: **Protest and vote shares in EP elections**

	Green Party	Radical Left	Radical Right	Turnout
Protest × Precip	-0.389***	0.270***	-0.428**	-0.700***
	(0.106)	(0.0625)	(0.179)	(0.183)
Protest	4.972***	-1.765***	5.006***	3.499***
	(0.642)	(0.437)	(1.130)	(1.008)
Observations	677	1312	929	677
Mean	4.872	4.490	12.65	55.82
Standard Deviation	5.723	4.815	10.96	8.633

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table is similar to Table III but looks at the subset of NUTS3 regions that have a Green party, a Radical Left party, and a Radical Right party. The first explanatory variable is an interaction between protest occurrence and the inverse of precipitation percentiles between 12 noon and 4 p.m. on the day of the protest, i.e., March 15, 2019. Protest is an indicator variable that takes a value of 1 if an FFF protest was held in the NUTS3 region prior to the EP elections. Different political parties in each country are categorized into party families on the basis of their ideology using data from the Chapel Hill Expert Survey. Controls include the share of population having tertiary education (at the NUTS2 level) and the long-run average precipitation in the month of March, calculated using precipitation data in the years 2005-2018 (at the NUTS3 level).

Table A.3: **Protest and vote shares in EP elections**

	Green Party	Radical Left	Radical Right	Turnout
Protest × Precip	-0.389***	0.260***	-0.567***	-0.700***
	(0.106)	(0.0530)	(0.131)	(0.183)
Protest	4.972***	-1.366***	5.083***	3.499***
	(0.642)	(0.316)	(0.947)	(1.008)
Observations	677	677	677	677
Mean	4.872	4.237	12.82	55.82
Standard Deviation	5.723	2.535	7.619	8.633

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table is similar to Table A.2 but takes the average of the vote shares of Radical Left and Radical Right parties if more than one contested the election from that NUTS3 region. The first explanatory variable is an interaction between protest occurrence and the inverse of precipitation percentiles between 12 noon and 4 p.m. on the day of the protest, i.e., March 15, 2019. Protest is an indicator variable that takes a value of 1 if an FFF protest was held in the local authority prior to the EP elections. Different political parties in each country are categorized into party families on the basis of their ideology using data from the Chapel Hill Expert Survey. Controls include the share of population having tertiary education (at the NUTS2 level) and the long-run average precipitation in the month of March, calculated using precipitation data in the years 2005-2018 (at the NUTS3 level).