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Decentralising environmental public spending: from political platforms to actual policies in the EU countries*

Federica Lanterna† Giovanni Marin‡ Agnese Sacchi§

Abstract

Environmental challenges increasingly shape political discourses across Europe, yet their influence on actual environmental governance remains unclear. This paper examines the political economy mechanisms linking environmental change, party platforms, and the decentralisation of environmental protection expenditure in 27 EU member states from 2002 to 2022. We distinguish between political signalling - the commitments parties make in electoral manifestos - and policy implementation, measured through actual decentralised environmental spending. Our results reveal a sharp asymmetry: while extreme events substantially increase the salience of environmental protection in party platforms, they do not translate into changes in the territorial allocation of environmental expenditure. Instead, decentralisation responds primarily to long-term structural conditions, such as the relative weight of locally versus globally relevant emissions. Political orientations of governing coalitions, whether on environmental issues or decentralisation, show no systematic association with spending outcomes. Taken together, these findings highlight a persistent gap between electoral incentives and policy implementation in multilevel environmental governance, consistent with public-choice theories emphasising institutional inertia and limited political responsiveness beyond the stage of platform competition.

Keywords: Decentralisation; environmental protection; natural disasters; political announcements; voters preferences.

JEL: H70, H72, H77, Q54, Q58

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1 Introduction

The need for measures to mitigate the causes and consequences of climate change and environmental degradation has been recognised as an urgent challenge at the global level and has increased importance in national and international political and economic agendas (OECD, 2020; Fetting, 2020).[1] As for the European Union (EU hereafter), a sense of identity and membership in Europe-wide standards for environmental quality has emerged (Braden et al., 1996) as well as a recent need for fair competition across EU countries (Paleari, 2022). Alongside this context, many advanced economies have experienced a growing process of decentralisation, shifting fiscal, administrative, and political powers to subnational governments (Martinez-Vazquez et al., 2017).

Indeed, although climate change and other environmental threats are global issues and green targets are defined primarily at supranational and national levels, regions and local governments are important actors in the implementation and management of environmental protection policies. As recently documented for OECD countries, public expenditure on environmental protection is handled by local authorities in most cases (Dougherty and Montes Nebreda, 2023; de Mello and Jalles, 2024).

From a political economy perspective, decentralisation and environmental policies are closely interrelated and the former affects the latter through incentives rather than purely technical considerations (see, recently, Dalmazzone, 2015; Martinez-Vazquez, 2021; Cadaval-Sampedro et al., 2025). First, subnational governments are particularly on the frontline in managing climate-related risks and addressing natural disasters, with responsibility closer to voters and affecting their electoral decisions (Sobel and Leeson, 2006; Morvan and Paty, 2024). Second, key environmental policy areas, such as waste and water management and the preservation of ecosystems and natural landscapes, are inherently local in nature (OECD, 2022; European Commission, 2023). Accordingly, the optimal degree of decentralisation is expected to depend on the spatial scale of environmental externalities (Shobe, 2020).

Yet the political mechanisms underlying this complex relationship between decentralisation and environmental policy remain insufficiently explored. In particular, the literature has paid limited attention to the distinction between political commitments expressed in electoral platforms and the policies actually implemented by parties once in office.

[1] For instance, rising environmental pressures have prompted the European Union (EU) to set ambitious climate goals — most notably, the target of carbon neutrality by 2050 as outlined in the European Green Deal.

To address this gap, we provide new empirical evidence on the recent trends in decentralisation of environmental public spending in 27 EU member states over the period 2002-2022 explicitly grounded in a political economy framework. Our approach distinguishes between two stages of the political process. In the first stage, political parties compete for votes by choosing platforms that signal positions on environmental protection and decentralisation. In the second stage, running parties try to translate these commitments into actual spending outcomes, conditional on institutional constraints and the structural characteristics of the environmental problem.

Accordingly, in the first stage we analyse *political discourse* using data from the Manifesto Project (Lehmann et al., 2025). We examine how parties' stated commitments to environmental protection and decentralisation respond to environmental conditions and to voters' preferences for green policies and decentralised governance. By decomposing manifesto positions into within-party and between-party components, we distinguish changes in political platforms driven by shifts in party strategies from those induced by changes in the electoral composition. This allows us to assess whether environmental and decentralisation commitments primarily reflect strategic signalling or genuine changes in political competition.

In the second stage, we turn to *actual policies* and analyse public expenditure on environmental protection using COFOG (Classification of the Functions of Government) classified budgetary data disaggregated by level of government. We combine these data with political indicators from the Manifesto Project and the Comparative Political Dataset (Armingeon et al., 2025) to capture the ideological orientation of governing parties on environmental issues and decentralisation matters. This framework allows us to assess whether the political positions expressed in electoral platforms are systematically reflected in the decentralisation of environmental spending, or whether policy outcomes are instead dominated by structural features of the environmental problem.

Our findings reveal a systematic divergence between political signalling and policy outcomes. Political platforms are highly responsive to extreme events measured by using the Emergency Events Database (EM-DAT): geological and climate-related disasters significantly increase parties' attention on environmental protection, suggesting that such events act as salient shocks shaping political platforms and altering the electoral calculus of political actors. By contrast, actual spending outcomes show little sensitivity to either extreme events or to the environmental and decentralisation stances of governing parties. Instead, the decentralisation of environmental expenditure is systematically related to structural environmental characteristics. Countries in which locally harmful pollution is relatively more important - proxied by a higher ratio of $PM_{2.5}$ to CO_2 emissions - allocate a larger share of environmental spending to subnational governments.

Our paper contributes to the public choice and environmental federalism literature in three main respects. First, we strengthen the political economy perspective in environmental federalism by providing cross-country evidence on the limits of political responsiveness to extreme events (Cooperman, 2022), showing that electoral incentives affect political discourse more strongly than policy implementation. Second, we link the decentralisation of environmental spending to the spatial characteristics of environmental externalities, i.e., local versus supra-regional. While existing studies have examined how fiscal decentralisation affects carbon footprints and aggregate environmental outcomes (Shahzad, 2025), much less attention has been paid to the reverse relationship. Namely, how the local versus supra-regional nature of pollution shapes the territorial allocation of environmental public expenditure across levels of government. Finally, we introduce party manifestos as systematic indicators of political commitment and, to the best of our knowledge, as a novel application in the field of environmental federalism (Oates, 2002; Shobe, 2020), highlighting the usefulness for analysing strategic political behaviour in multi-level governance settings.

The remainder of the paper is organised as follows. Section 2 presents the related literature and the conceptual framework, focusing on the mechanisms of environmental federalism. Section 3 describes the model and the results on the determinants of politicians' announcements on both decentralisation and environmental protection issues. Section 4 focuses on the actual policies implemented in the EU countries by investigating the determinants of decentralised environmental spending. Finally, Section 5 concludes and provides some policy implications.

2 Related literature: theory and empirics on environmental federalism

In recent years, the principles of decentralisation have increasingly been applied to the field of environmental policy, giving rise to a growing body of literature on environmental federalism (Oates, 2002; Dalmazzone, 2006). This strand of research addresses the specific complexities of environmental governance, considering both the public good nature of environmental protection and its multidimensional characteristics.

From a theoretical standpoint, most environmental tasks are more effectively managed at the national or supra-national levels, not only due to the public good characteristics of environmental protection, but also to economies of scale in the provision and coordination of such functions (de Mello, 2021). Moreover, centralisation is often considered necessary to internalise interjurisdictional externalities and to prevent regulatory competition (Gray and Shadbegian, 2004).

However, a growing body of literature highlights the potential advantages of involving subnational governments in the design and implementation of policies aimed at tackling climate

change (Dalmazzone, 2015). Regional and local authorities often have better access to information about local environmental conditions, preferences, and priorities, which enables them to design more context-specific and effective interventions (Wang and Liu, 2006). Unlike national policies, local environmental policies are often more visible to citizens and more directly linked to distributive conflicts (Oates, 1999). In this view, decentralisation can enhance the efficiency and responsiveness of environmental governance, particularly in heterogeneous societies (Oates and Schwab, 1988).

On the empirical ground, subnational governments are found to play a central role in managing environmental risks and climate-related events, such as floods, wildfires, or other natural disasters, and are often at the forefront of both mitigation and adaptation strategies (Tselios, 2021; de Mello and Jalles, 2025; Cadaval-Sampedro et al., 2025). Their proximity to the population and territory allows for faster and more targeted responses, as well as the mobilisation of local stakeholders in policy implementation. In this context, decentralised settings may also foster environmental awareness and civic engagement. When local governments are entrusted with environmental responsibilities, citizens tend to be more informed and involved in sustainability initiatives (Lodi et al., 2025). This, in turn, can strengthen public accountability and support for long-term environmental goals.

On the other hand, some studies show that municipal environmental policies, particularly related to prevention of natural disasters and catastrophic events, can negatively affect voters' support, especially in upcoming elections (Achen and Bartels, 2016; Masiero and Santarossa, 2021; Morvan and Paty, 2024). In other cases, voters' preferences for green policies are not so important due to a low trust in politicians to address, for instance, climate change threats or they prefer to not reveal due to a free rider attitude in the presence of environmental public goods (Fairbrother 2022; De Sario et al. 2023).

As for the political orientation on local environmental issues, the literature argues that subnational governments led by progressive or green parties tend to focus on environmental protection and sustainability in urban and territorial planning (Kahn, 2007). More generally, Bulkeley and Betsill (2005) show that cities with supportive political leadership are more likely to engage in transnational climate networks and adopt innovative climate policies. Likewise, Walker and Devine-Wright (2008) highlight the importance of local political commitment for the success of community energy projects. Municipalities with different political leadership can display markedly different approaches, for instance, to land use, environmental regulation, and sustainability, even within the same national framework. In short, political orientation at the local level is a decisive factor in shaping environmental outcomes. Hence, local political preferences, institutional settings, and territorial features play a role for the environmental policy.

3 Political platforms for decentralisation and environmental protection support

3.1 The empirical model and main variables

To quantify political platforms, we consider data from the Manifesto Project by Lehmann et al. (2025). The Manifesto Project systematically collects and codes party manifestos presented in conjunction with national elections, providing a comprehensive dataset on policy positions across countries and over time. This database includes information on support for environmental protection policies and decentralisation policies.

We construct two dependent variables from these data. The former captures the support for environmental-related issues in the political platform of parties and is calculated as the weighted average of party support for environmental policies, weighted by the percentage of votes each party received in the election (see, for instance, Lo Prete and Sacchi, 2025). The latter considers the support for decentralisation settings in the political platform of parties and is obtained as the weighted average of party support for decentralisation policies, also weighted by the percentage of votes obtained by each party in the election.

In addition, we construct two additional dependent variables for each dimension (environmental and decentralisation platforms), using alternative weighting schemes that isolate different sources of variation. The first set of variables shuts down party weights, capturing variation in the stated positions of parties across time, independently of their electoral success (*within*). This measure reflects the average stance expressed in party manifestos, considering the relative weight of each party (i.e. their votes share) as time-invariant (average between two consecutive elections). The second set of variables exploits the between-party dimensions, where the time-varying party-specific dimension of platforms is shut down and variation is driven solely by the variation in the electoral strength of each party (*between*). Respectively, the within dimension captures ideological variation within parties over time, and between dimensions reflects shifts in voter support across the political spectrum. This distinction allows us to disentangle whether environmental and decentralisation commitments originate primarily from shifts in political discourse or from changes in the electoral base.

The estimation model is based on equation (1).

$$Platform_{i,t} = \alpha_i + \tau \times t + \beta \frac{PM_{<2.5,i,t-1}}{CO_{2,i,t-1}} + \eta\, N\_extr\_ev_{i,t-1} + X'_{i,t-1}\delta + \varepsilon_{i,t} \quad (1)$$

The dependent variable $Platform_{i,t}$ considers, one at a time, the political announcements for environmental topics, decentralisation issues and their interaction. We estimate Equation (1) using the baseline measures, as well as alternative specifications that decompose platforms into

their within-party and between-party components. We consider a fixed-effect specification to account for time-invariant country-specific characteristics in a flexible way (α_i). As the year of elections is country-specific, we cannot include year dummies. To account for trends common to all countries we instead add a linear trend ($\tau \times t$)

As for the key independent variables, we consider environment-related factors that could drive the announcements by politicians. First, we focus on the distinction between pollutant emissions with a global or national impact, such as greenhouse gases (i.e. CO_2), and those with a local impact, such as $PM_{<2.5}$ (particulate matter <2.5 micron). In countries where local emissions predominate (e.g due to geographical, technological and structural reasons), greater (de)centralisation of environmental spending may be justified, and vice versa. $PM_{<2.5}$ emissions generate their damage near to where they are released: depending on the geographical features, about half of damages happen within 16km (Goodkind et al., 2019) and their concentration has a high decay rate (few days). CO_2 emissions, instead, have global and long term impacts, as the average global concentration of carbon in the atmosphere matters. Some policies (e.g. those aimed at improving energy efficiency) contribute to reducing both emissions sources, while other actions are much more specific in reducing either CO_2 or $PM_{<2.5}$ (e.g. fuel switch, filters end-of-pipe, technology standards, etc.). A greater relevance of local-to-global externalities is expected to require more location-specific actions. Therefore, we consider the ratio of $PM_{<2.5}$ emissions to CO_2 emissions. Air emissions by resident units for $PM_{<2.5}$ and CO_2 are obtained from Eurostat at the country level.

As discussed in the theoretical background, (de)centralisation may play a significant role in the prevention, management, and outcomes associated with natural disasters (de Mello and Jalles, 2024). Extreme events generate very localised effects. Local governments are those more directly involved in dealing with the emergency and reconstruction. If the event is particularly severe, however, the central governments should intervene to provide support and direct financing of event-related responses. Both climate-related and non-climate extreme events are considered. Specifically, using the information from the Emergency Events Database (EM-DAT), we focus on the total number of geological events (volcanic eruptions and earthquakes), as well as on the total number of climate-related events (drought and wildfire). [2]

3.2 Control variables

Following the existing literature (Panizza, 1999; Letelier, 2005; Sacchi and Salotti, 2014; Cadaval-Sampedro et al., 2025) we group the control variables into three main categories. The

[2] Available at https://www.emdat.be/.

first group includes variables directly related to decentralisation: i) the Regional Authority Index (RAI) computed by Hooghe et al. (2016), and updated by Schakel et al. (2018); ii) the ratio of local revenue to general government revenue, as an indicator of fiscal autonomy, reflecting the ability of local governments to independently finance their expenditures; iii) a variable reflecting the implementation of reforms in favour of decentralisation which equals 1 from the year the reform is implemented onward, from the Division of Powers data source.[3] The second group includes variables that reflect national economic conditions: i) the unemployment rate, to capture the effect of inequalities on the decentralisation; ii) the logarithm of the gross value added, as a measure of overall economic output; iii) the ratio of gross value added in sectors B–E to total gross value added, to account for the structural weight of manufacturing and industrial activities in the economy. The third group covers demographic characteristics including: i) the ratio of elderly individuals (65+ years) to the total population, and ii) the ratio of the working-age population (14-65 years) to the total population.

Finally, we also examine how individual preferences for environmental protection may influence the policy announcements made by national parties. To this end, we draw on microdata from the Eurobarometer Survey, conducted by the European Commission since 1974. Specifically, we use data for the EU-27 countries based on the following question: "*I am going to read out a list of actions that the European Union could undertake. For each one, please tell me if, in your opinion, it should be a priority or not – Protecting the environment*" Since the wording of the question varies over the 2002–2022 period of analysis, we first harmonise both the question formulation and the response categories to ensure consistency across years. We then aggregate the harmonised responses at the country level by calculating the share of individuals who identify environmental protection as a priority. Based on this, we construct a variable that represents the share of respondents in each country who identify environmental protection as a policy priority, based on harmonised Eurobarometer microdata.

In Appendix A, we report the variables' definitions and sources (Table A1), and their summary statistics (Table A2).

3.3 Endogeneity concerns

A key issue in our empirical strategy concerns the potential endogeneity of some focal explanatory variables.[4] First, the measure of extreme events used here relies on reporting

[3] Available at https://portal.cor.europa.eu/divisionpowers/Pages/All-countries.aspx.

[4] The discussion about endogeneity concerns regarding political platform (Section 3) mostly applies, with a similar rationale, to Section 4 where the relative decentralisation of environmental expenditure is considered as a dependent variable.

thresholds, based on the consequences of disasters. Events are reported in EM-DAT if at least one of the following criteria is satisfied: i) at least 10 fatalities; ii) at least 100 people affected; iii) declaration of a state of emergency; iv. request for international assistance. While the occurrence of an extreme event is genuinely exogenous, its classification as a "disaster" depends on the level of vulnerability and exposure of the affected area (Hallegatte, 2014). Vulnerability, in turn, is influenced by risk management policies aimed at reducing impacts through prevention and mitigation measures. These policies may be correlated both with the likelihood that an event exceeds the defined thresholds (negatively) and with decisions about political platforms or regarding the (de)centralisation of environmental public spending (in an ambiguous way). As a result, the variable capturing the number of extreme events may reflect not only natural shocks but also structural differences in risk management capacity. To mitigate this concern, our model includes country fixed effects that capture the long-term dimension of risk-reduction policies.

A second source of potential bias relates to the variable measuring local-to-global externalities, proxied by the ratio of $PM_{<2.5}$ to CO_2 emissions. Local environmental policies aimed at reducing specific pollutants – even without implications for public budgets (e.g., regulatory standards or technology requirements) - may be negatively correlated with the $PM_{<2.5}/CO_2$ ratio while being positively associated with a higher degree of decentralisation in environmental spending. This mechanism introduces the risk of a downward bias in estimating the effect of local externalities on decentralisation. Although the inclusion of structural controls and fixed effects helps to attenuate this issue, it cannot fully eliminate it.

In summary, despite adopting strategies to reduce endogeneity, such as lagging explanatory variables to limit reverse causality, controlling for institutional and socio-economic characteristics, and using fixed effects, the relationship between environmental shocks, risk management policies, and governance choices remains complex and not entirely interpretable as causal.

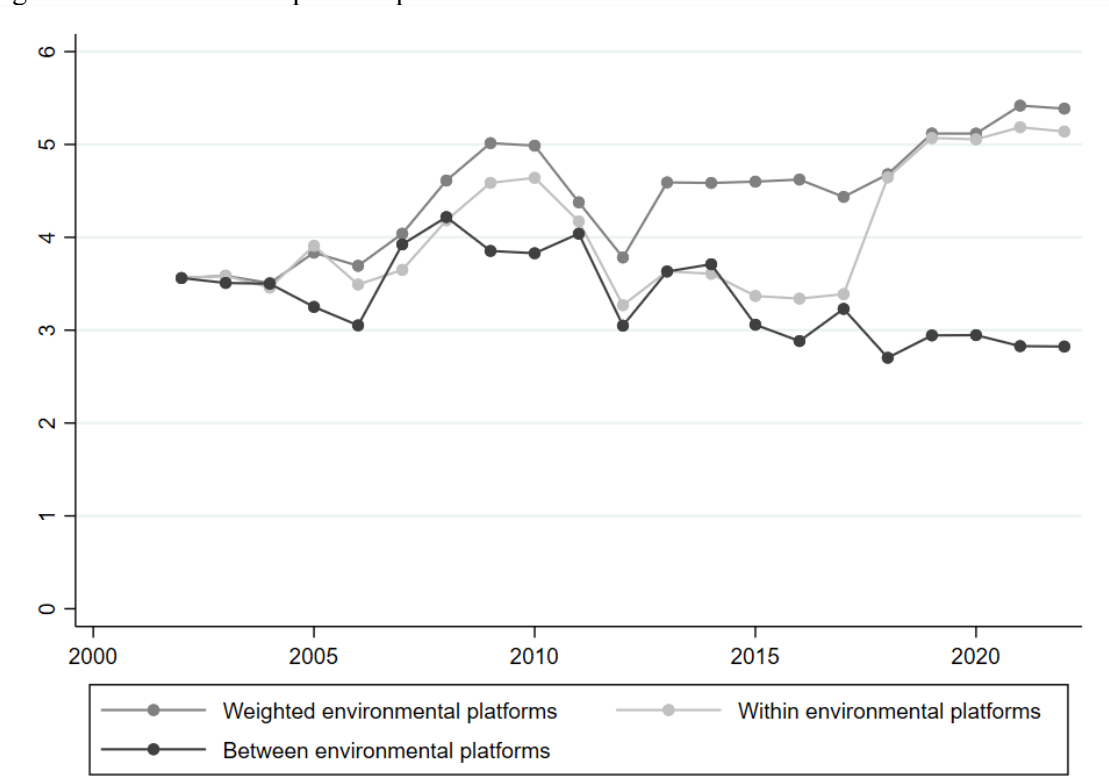
3.4 Descriptive evidence

Before presenting the estimation results, we provide a descriptive analysis to examine the trends of the main variables. Figures 1 and 2 show, respectively, the evolution of politicians' environmental and decentralisation stated announcements across their three components: weighted, within-party, and between-party platforms.

Environmental platforms show an upward trend in both the weighted and within-party components, reflecting increasing political attention to environmental issues across party platforms. In contrast, the between-party component remains relatively flat during the period analysed.

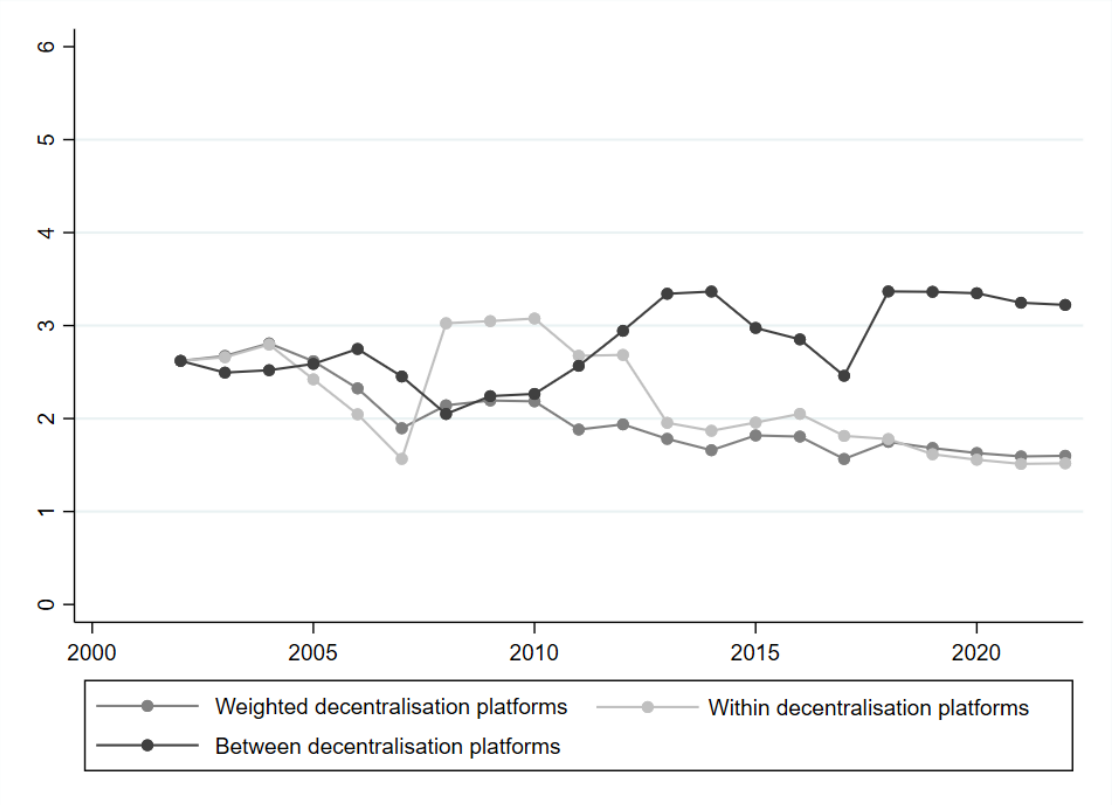
In contrast, decentralisation platforms exhibit a decline over time, particularly in the weighted and within-party components, suggesting a reduced emphasis on decentralisation on party platforms. The between-party component shows a temporary increase around 2016, indicating a short-lived rise in voter support for pro-decentralisation parties. The convergence of all components in recent years points to a broad political de-prioritisation of decentralisation.

Figure 1 - Environmental political platforms



Notes: Authors' elaborations on Manifesto Data Project. Country-level scores weighted by country's population.

Figure 2 - Decentralisation political platforms



Notes: Authors' elaborations on Manifesto Data Project. Country-level scores weighted by country's population.

3.5 Results and discussion

In Table 1 we report our results regarding the political platforms and their within-between components. Overall, environmental determinants have a key role in shaping the salience of environmental protection in party manifestos (columns 1, 3, 5). A higher ratio of local to global pollutant emissions ($PM_{<2.5}/CO_2$) is positively associated with greener platforms, although the effect is statistically significant only in the *between* components. In this case, a 1 per cent increase in the relative prevalence of locally relevant pollutants is associated with an increase in environmental salience of about 0.037 index points. This suggests that the composition of emissions across scales influenced more strongly the electoral demand than intra-party shifts in discourse.

Table 1 - Political platforms

Dependent variable: political platform	(1) Envir.	(2) Decentr.	(3) Envir.: within	(4) Decentr.: within	(5) Envir.: between	(6) Decentr.: between
$PM_{<2.5}/CO_2$	2.031	-0.857	2.243	0.552	3.720*	-0.807
	(1.493)	(1.303)	(1.794)	(2.263)	(1.854)	(0.982)
N. climate-related events	0.221*	0.0850	0.333	0.191*	0.325**	-0.169
	(0.117)	(0.0971)	(0.199)	(0.0962)	(0.119)	(0.208)
N. geological events	2.355**	-0.173	2.370***	-0.844	-0.159	1.556**
	(0.917)	(0.299)	(0.662)	(0.624)	(0.284)	(0.689)

Environmental preferences	-0.195	0.203	0.136	1.029	0.765	-0.352
	(0.772)	(0.831)	(0.917)	(1.024)	(1.092)	(1.007)
Unemp rate	-0.151*	0.0357	-0.134	0.0288	-0.0346	-0.128
	(0.0874)	(0.0625)	(0.0992)	(0.0802)	(0.0544)	(0.0808)
Local revenue ratio	15.22	1.086	14.20	-2.499	10.03	24.79***
	(10.96)	(6.140)	(12.01)	(7.073)	(8.530)	(8.713)
Decentralisation reform	0.704**	-0.0374	0.811	-0.144	0.211	0.379
	(0.332)	(0.271)	(0.483)	(0.313)	(0.302)	(0.524)
Elderly ratio	1.991***	-1.006	2.983***	-2.141**	-1.082	0.125
	(0.594)	(0.774)	(0.968)	(0.944)	(0.818)	(1.440)
Working age ratio	1.058*	-0.999	1.337	-1.317	0.259	0.549
	(0.599)	(0.814)	(1.118)	(1.111)	(0.867)	(0.882)
RAI	0.239	-0.0849	0.327	0.0332	0.00285	-0.162
	(0.185)	(0.108)	(0.195)	(0.141)	(0.104)	(0.173)
log(GVA)	1.621	1.018	2.920	1.313	1.154	-1.823
	(2.601)	(2.225)	(3.141)	(3.446)	(3.846)	(4.446)
Industrial GVA share	-10.72	6.372	-23.49	-6.692	-5.829	7.881
	(12.87)	(10.16)	(14.50)	(12.72)	(7.670)	(11.57)
N countries	26	26	25	25	25	25
Observations	126	126	121	121	121	121

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Linear trend included. All independent variables are lagged by one year. Sample: election years in 2002-2022.

Geological disasters exert a positive and significant effect in the total and within specifications, indicating that such shocks push parties—independently of their electoral weight—to emphasise environmental issues more strongly. By contrast, climate-related disasters display a positive and a stronger significant effect in the *between* components, which is consistent with the interpretation that voters react more strongly to climatic shocks, while parties are slower to adapt their political supply. Generally, these findings are consistent with the literature showing that extreme events, broadly defined, increase the political salience by acting as focal shocks that attract voters' attention and reshape political agendas, even when they do not translate into lasting policy changes (Achen and Bartels, 2016; Cooperman, 2022; Morvan and Paty, 2024). Among socio-demographic controls, the share of elderly population is positively associated with environmental platforms, while higher unemployment reduces their salience, reflecting the trade-off between economic hardship and environmental concerns often emphasised in the literature. Decentralisation reforms also reinforce the environmental commitments, while the RAI and the local revenue ratio do not show statistically significant coefficients.

Results regarding the importance of decentralisation issues in political platforms (columns 2, 4, 6) are less clearcut. Local versus global emissions are not significantly associated with decentralisation political platforms. Geological events matter primarily through the *between* component, suggesting that voters exposed to such shocks tend to support parties advocating stronger decentralisation, while party-level discourse is less directly affected. Climate-related disasters exert a modest but positive impact in the *within* component, pointing to a limited

adjustment of party programmes in response to climate shocks. This weak and unstable relationship echoes previous findings in the fiscal federalism literature, which emphasise that political support for decentralisation is shaped more by institutional and fiscal arrangements than by issue-specific shocks, including environmental ones (Panizza, 1999; Letelier, 2005; Martinez-Vazquez et al., 2017). Among institutional and fiscal variables, local revenue autonomy is strongly and positively associated with decentralisation platforms in the *between* specification, supporting the idea that voters reward parties advocating decentralisation in contexts where subnational governments already show substantial financial capacity (see also Liberati and Sacchi, 2013). Demographic characteristics display weaker effects, with some evidence that ageing societies are less inclined towards decentralisation within party programmes.

Finally, when environmental and decentralisation commitments are jointly considered and measured as the product of the two platforms' scores (Table B1 in Appendix B), the results confirm the role of environmental shocks. Both geological and climate-related disasters are positively associated with the combined salience of environmental protection and decentralisation, albeit with variation across specifications. Geological disasters show consistently positive effects, with coefficients of 3.93 in the total model and 3.57 in the between specification. This means that a one-unit increase in the number of geological damages is associated with an increase of nearly four index points in the joint salience of environmental and decentralisation platforms, suggesting that extreme events simultaneously strengthen both dimensions of political discourse. Climate-related disasters also exert a positive effect in the total specification (0.84), although this evidence is weaker and does not hold across all components. This result supports the view that extreme events can simultaneously strengthen environmental concerns and demands for multilevel governance solutions, reinforcing the political narrative that local governments play a crucial role in managing environmental risks (Dalmazzone, 2015). Among the controls, fiscal autonomy again emerges as a significant determinant in the between specification, reinforcing the idea that robust local revenue bases underpin the credibility of linking environmental protection with decentralisation reforms. Other variables, including demographic structure and RAI, do not display significant effects.

Overall, these findings reveal a nuanced picture: environmental platforms are mainly driven by environmental shocks and demographic pressures, decentralisation platforms by fiscal autonomy and, to a lesser extent, natural disasters. The joint analysis shows that alignment between environmental and decentralisation agendas does not happen automatically but emerges primarily in contexts characterised by external shocks related to the environment, emphasising as the

occurrence of extreme events shapes political platforms to align voters' expectations and needs (Masiero and Santarossa, 2021).

Finally, we further explore the role of emissions by decomposing the ratio of local ($PM_{<2.5}$) to global (CO_2) emissions. This decomposition does not reveal statistically significant effects of emissions even when considered separately, while the overall results regarding the role of extreme events in shaping environmental platforms and their interaction remain broadly confirmed, as shown in Table B2 in Appendix B.

As for robustness purposes, we re-estimate Equation (1) using alternative measures of the extreme events. In particular, we employ the number of deaths and the number of people affected from natural extreme events, from the EM-DAT database, and the number of floods from the Historical Analysis of Natural Hazard in Europe (HANZE).[5] The results are reported in Appendix B, in Tables B3, B4, and B5 and are generally consistent with the baseline findings.

4 Actual policies: the determinants of decentralised environmental spending

4.1 New approach to environmental decentralisation: The Balassa index

In the second part of the analysis, we aim to assess actual decentralisation outcomes by estimating a second model where the dependent variable is derived from the relative amount spent in environmental protection tasks by national and subnational governments. In detail, we use the concept of the Balassa index, as expressed in the following equation:

$$RDE_{i,t} = \frac{\frac{Env_{it}^{loc\ gov}}{Env_{it}^{all\ gov}}}{\frac{Tot_{it}^{loc\ gov}}{Tot_{it}^{all\ gov}}} \quad (2)$$

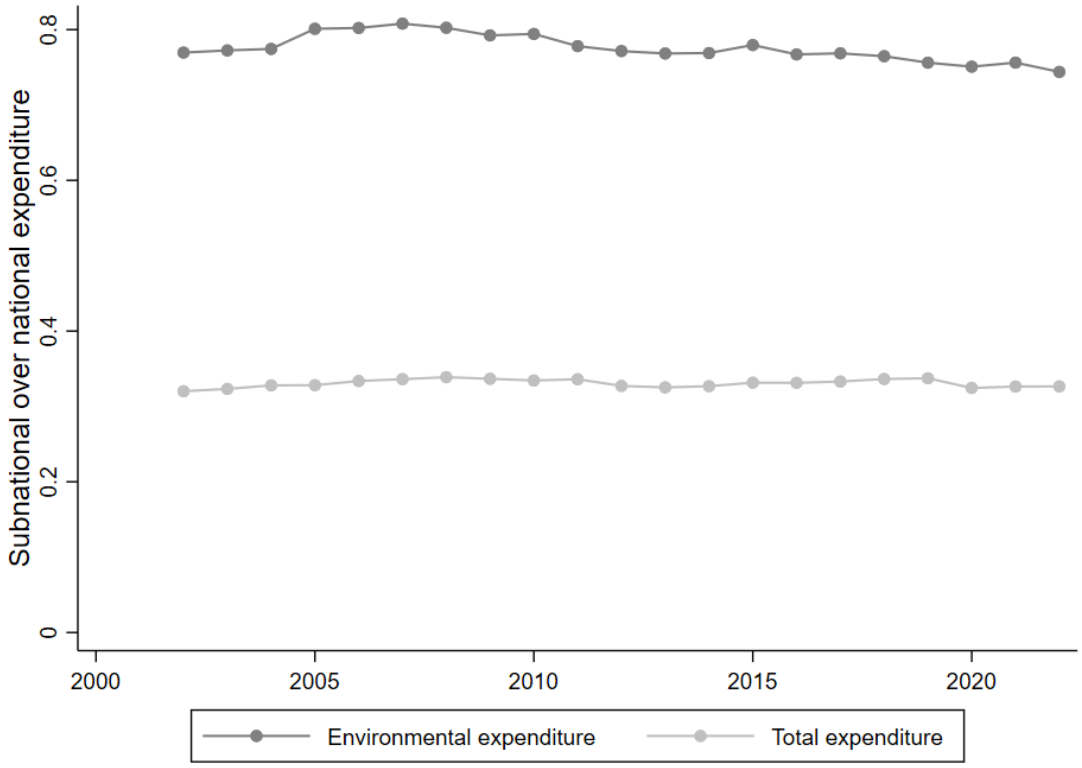
Where our indicator of relative decentralisation of environmental protection expenditure (*RDE* in short) is the ratio of environmental expenditure at the local level ($Env_{it}^{loc\ gov}$) to environmental expenditure at the central level ($Env_{it}^{all\ gov}$), relative to the ratio of total expenditure at the local level ($Tot_{it}^{loc\ gov}$) to total expenditure at the central level ($Tot_{it}^{all\ gov}$). The local level is defined as the sum of the state level, where applicable, and the local level in a strict sense. We adopt a Balassa-type index in order to mitigate potential scale-related issues. Indeed, the decentralisation of environmental expenditure, the numerator of *RDE* can vary substantially across European countries. To limit this heterogeneity, as well as the generally higher volatility of environmental

[5] Available at: https://naturalhazards.eu/.

expenditure decentralisation compared with total expenditure, we measure the decentralisation of environmental spending relative to the decentralisation of total public expenditure. To construct the index, detailed harmonized data from Eurostat on public expenditure, classified by the Functions of Government (COFOG) and the governmental sector (i.e., central, local, and state), are used for the 27 EU countries from 2002 to 2022.

Figure 3 illustrates the trend of the dependent variable, structured into its two components: the numerator, which represents the ratio of subnational environmental expenditure to the national one, and the denominator, which reflects the ratio of total subnational expenditure to the national one. Thus, on average, over the analysed period, it is possible to observe the level of decentralisation of both environmental and total expenditure.

Figure 3 – Decentralisation of environmental and total expenditure



Notes: Authors' elaborations on Eurostat data. Country-level values weighted by country's population.

Figure 3 indicates that the degree of decentralisation is systematically higher for environmental expenditure, which remains above 70 per cent, than for total expenditure, whose level remains relatively stable at around 30 per cent throughout the period analysed.

4.2 The baseline model

It is worth noting that the data used include both total expenditure and environmental expenditure, based on the first-level COFOG classification. Therefore, the results would be interpreted as the effect of the explanatory variable on the level of decentralisation of environmental expenditure compared to the decentralisation of total expenditure. Alongside the change in the dependent variable relative to equation (1), the analysis shifts the perspective from political platforms to actual policy stance of governments.

As a first step, we estimate the following equation:

$$RDE_{i,t} = \alpha_i + \tau_t + \beta \frac{PM_{<2.5,i,t-1}}{CO_{2,i,t-1}} + \eta\, N\_extr\_ev_{i,t-1} + X'_{i,t-1}\delta + \varepsilon_{i,t} \quad (3)$$

where independent variables (including controls) are the same as those discussed for equation 1 in section 3.1. The only difference here is that we can account for flexible time trends by means of year dummies (τ_t). Unlike equation (1), the model is estimated over the full sample period, thus removing the restriction to election years. The dummy variable indicating election years is included among the controls to capture potential electoral-cycle effects. The rationale of the key environment-related variables here is the same as the one discussed when estimating equation (1) as well as the endogeneity concerns.

In addition to estimating the average effect of environmental drivers of *RDE*, we also consider the role played by the political platform of governing coalitions. These variables are derived from the Comparative Political Data Set by the Government (Armingeon et al., 2025) merged with the Manifesto Project Database (Odermatt, 2025). In particular, we rely on the government's weighted position, where weights correspond to the parliamentary seats held by the governing parties, on both environmental issues and decentralisation. These specifications allow us to test whether the impact of environmental pressures on decentralisation varies depending on the political orientation of the executive.

4.3 Results and discussion

The results in Table 2 offer an informative contrast with the patterns identified in the first part of the analysis. We showed that political support for environmental policies in party platforms, both on its own and when considered jointly with the decentralisation platform, was influenced by the occurrence of extreme events, both climatic and geological. These shocks increased the salience of environmental protection in political discourse, suggesting that parties respond to environmental pressures when formulating their programmes. When we turn to actual policies, however, a different picture emerges. The only variable displaying a robust and statistically significant association with the decentralisation of the environmental expenditure compared to

the decentralisation of the total expenditure is the ratio of locally to globally relevant emissions ($PM_{<2.5}/CO_2$). The coefficient is positive, indicating that a higher ratio of locally to globally relevant emissions is associated with greater decentralisation of environmental expenditure. This suggests that structural environmental conditions, rather than extreme events such as natural disasters, are what ultimately drive the territorial organisation of environmental spending.

Indeed, regarding the role of extreme events, geological shocks are never statistically significant, indicating that these events, while relevant for shaping political platforms, do not translate into changes in actual spending responsibilities. Climate-related events, on the other hand, become significant only in the last two specifications, and the coefficient is negative, indicating that an increase in the number of geological shocks is associated with lower decentralisation of environmental expenditure compared to the total expenditure. This suggests that, to some extent, central governments respond to severe, sudden, and spatially concentrated disasters by re-centralising control over environmental spending, likely to ensure coordination and capacity during crisis conditions.

Table 2 – Relative decentralisation of environmental expenditure – baseline results

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)	(3)	(4)
$PM_{<2.5}/CO_2$	1.242*	1.437**	1.431**	1.428**
	(0.630)	(0.555)	(0.561)	(0.549)
N. climate-related events	0.0536	0.0483	0.0514*	0.0528*
	(0.0338)	(0.0291)	(0.0284)	(0.0303)
N. geological events	-0.0164	-0.0909	-0.108	-0.106
	(0.0629)	(0.0642)	(0.0672)	(0.0680)
Environmental preferences	-0.403	-0.303	-0.290	-0.239
	(0.659)	(0.575)	(0.571)	(0.623)
Decentralisation reform	0.0196	0.0275	0.0292	0.0186
	(0.141)	(0.103)	(0.104)	(0.111)
RAI	0.0944**	0.0994**	0.100**	0.0962**
	(0.0456)	(0.0473)	(0.0467)	(0.0412)
Local revenue ratio	-0.346	-0.481*	-0.482*	-0.485*
	(0.288)	(0.251)	(0.251)	(0.257)
Unemp rate		0.0990***	0.100***	0.101***
		(0.0328)	(0.0330)	(0.0333)
log(GVA)		2.938***	2.980***	3.099***
		(0.847)	(0.856)	(0.946)
Industrial GVA share		-5.899*	-5.952**	-6.073*
		(2.906)	(2.892)	(3.203)
Election year			-0.127*	-0.129**
			(0.0622)	(0.0625)
Elderly ratio				-0.0837
				(0.512)
Working age ratio				-0.140
				(0.520)
N countries	27	27	27	27
Observations	484	482	482	482

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Year dummies included. Sample: years 2002-2022.

In Tables 3 and 4 we interact our environmental stressors with the political platform of governments in terms of environmental protection and decentralisation, respectively. The aim is to understand whether the position of government makes them more responsive in decentralising (or centralising) environmental protection expenditure in presence of locally-relevant environmental issues. We do so by interacting with environmental stressors with the stance of governments for environmental protection or decentralisation. The patterns observed in the first part of the analysis, where political platforms on decentralisation do not exhibit stable or systematic relationships with environmental drivers, are broadly confirmed when we turn to actual policies. In particular, when examining the relative decentralisation of environmental expenditure and conditioning on the government's position on decentralisation (Table 3, marginal effects in Figure 4), we again find no consistent or statistically significant differential effects associated with the government's stance. A similar result is found when considering the platform of governments in terms of environmental protection (Table 4, marginal effects in Figure 5).

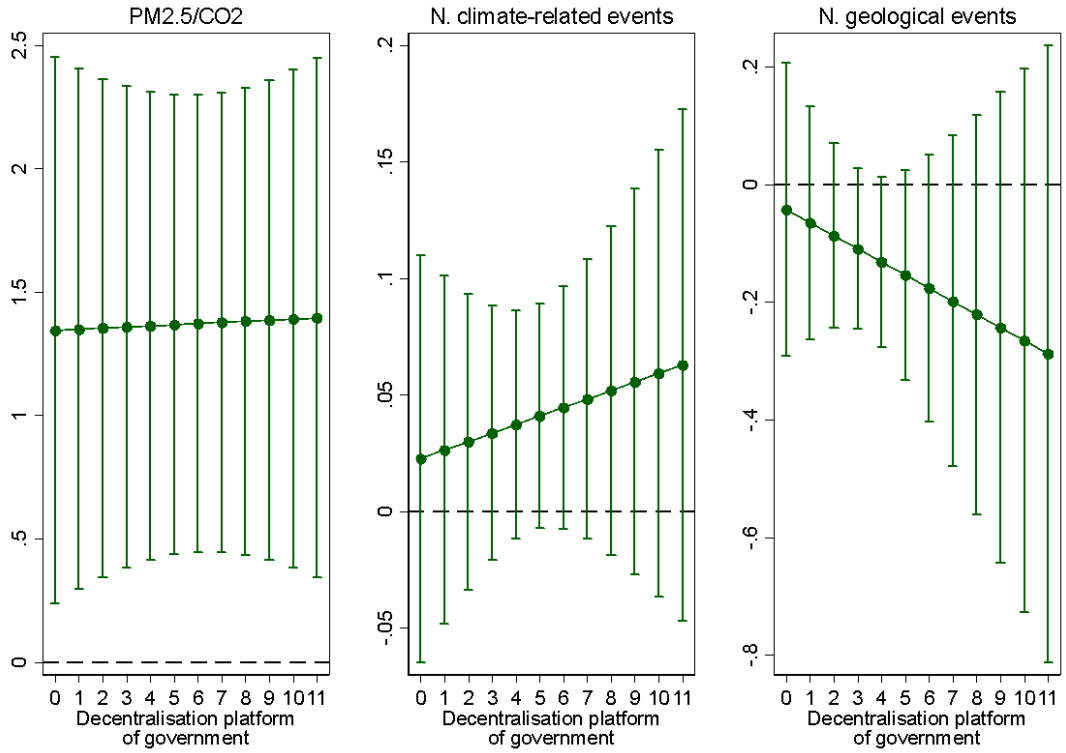
Table 3 – Relative decentralisation of environmental expenditure - the government stance on decentralisation

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)	(3)	(4)
$PM_{<2.5}/CO_2$	1.064	1.357**	1.355**	1.345**
	(0.665)	(0.533)	(0.604)	(0.564)
N. geological events	0.083	-0.031	-0.047	-0.042
	(0.109)	(0.239)	(0.127)	(0.127)
N. climate-related events	0.029	0.017	0.022	0.023
	(0.049)	(0.052)	(0.045)	(0.045)
Decentr platform of government	0.039	0.053	0.053	0.053
	(0.082)	(0.049)	(0.076)	(0.063)
$PM_{<2.5}/CO_2$ x Decentr platform of government	0.039	0.004	0.003	0.005
	(0.068)	(0.066)	(0.064)	(0.051)
N. geological events x Decentr platform of government	-0.037	-0.022	-0.023	-0.022
	(0.025)	(0.071)	(0.033)	(0.033)
N. climate-related events x Decentr platform of government	0.002	0.004	0.004	0.004
	(0.009)	(0.010)	(0.009)	(0.008)
Environmental preferences	-0.380	-0.276	-0.265	-0.234
	(0.633)	(0.335)	(0.565)	(0.623)
RAI	0.093**	0.096**	0.097**	0.094**
	(0.037)	(0.040)	(0.042)	(0.039)
Local revenues ratio	-0.339	-0.473	-0.479*	-0.479*
	(0.293)	(0.338)	(0.265)	(0.262)
Decentralisation reform	-0.031	-0.026	-0.024	-0.039
	(0.137)	(0.134)	(0.102)	(0.107)

Unempl. Rate		0.099***	0.101***	0.103***
		(0.020)	(0.032)	(0.032)
log(GVA)		2.831***	2.872***	2.991***
		(0.791)	(0.889)	(0.932)
Industrial GVA share		-5.616*	-5.665*	-5.707
		(3.132)	(3.223)	(3.472)
Election years			-0.114*	-0.115*
			(0.064)	(0.064)
Elderly ratio				-0.007
				(0.444)
Working age ratio				-0.130
				(0.476)
Observations	482	480	480	480
Number of countries	27	27	27	27

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Year dummies included. Sample: years 2002-2022.

Figure 4 – Marginal effects of environmental variables for different values of government's decentralisation stance (results from column 4 of Table 3)



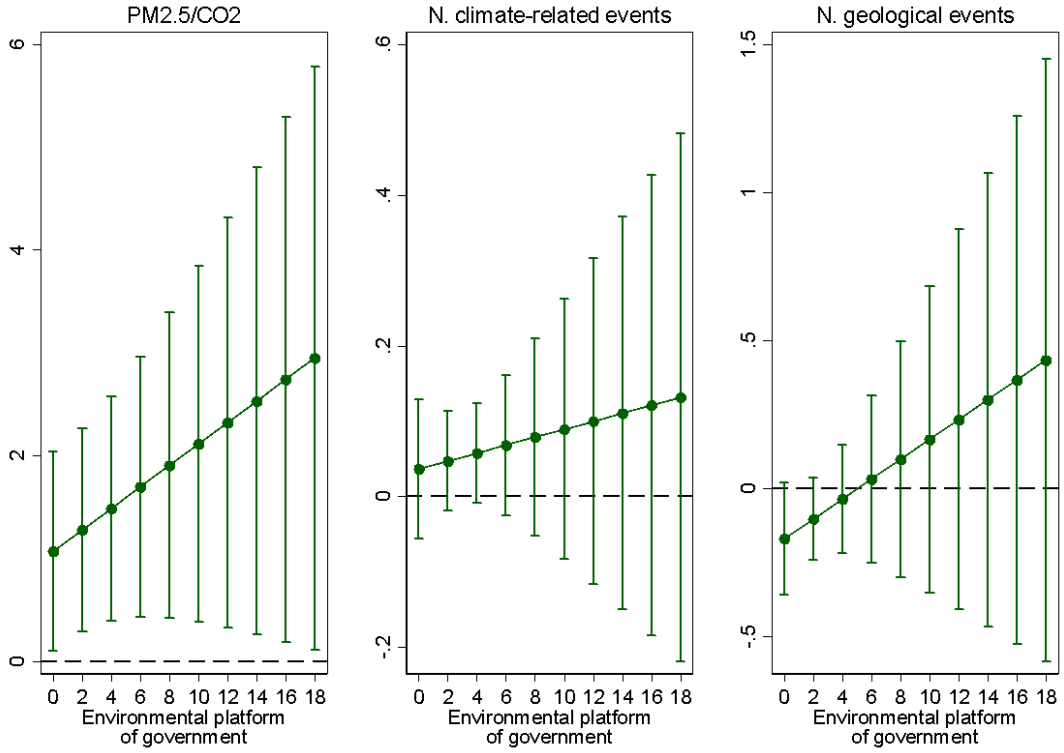
Notes: Authors' elaborations.

Table 4 – Relative decentralisation of environmental expenditure - the government stance on environmental support

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)	(3)	(4)
$PM_{<2.5}/CO_2$	0.882	1.105**	1.086**	1.067**
	(0.567)	(0.554)	(0.508)	(0.493)
N. geological events	-0.141	-0.153	-0.171*	-0.170*
	(0.092)	(0.188)	(0.098)	(0.097)
N. climate-related events	0.031	0.038	0.037	0.036
	(0.050)	(0.060)	(0.047)	(0.047)
Env platform of government	-0.109*	-0.062	-0.063	-0.067
	(0.063)	(0.044)	(0.050)	(0.058)
$PM_{<2.5}/CO_2$ x Env platform of government	0.106	0.098	0.100	0.104
	(0.087)	(0.077)	(0.073)	(0.078)
N. geological events x Env platform of government	0.057	0.033	0.033	0.034
	(0.045)	(0.054)	(0.033)	(0.032)
N. climate-related events x Env platform of government	0.006	0.003	0.005	0.005
	(0.010)	(0.014)	(0.010)	(0.012)
Environmental preferences	-0.441	-0.361	-0.348	-0.278
	(0.685)	(0.337)	(0.592)	(0.624)
RAI	0.094*	0.097**	0.098**	0.092**
	(0.048)	(0.041)	(0.045)	(0.040)
Local revenues ratio	-0.264	-0.487	-0.496*	-0.498*
	(0.299)	(0.343)	(0.277)	(0.277)
Decentralisation reform	0.049	0.061	0.064	0.052
	(0.132)	(0.135)	(0.101)	(0.106)
Unempl. Rate		0.094***	0.096***	0.096***
		(0.021)	(0.033)	(0.033)
log(GVA)		2.934***	2.982***	3.141***
		(0.788)	(0.889)	(0.967)
Industrial GVA share		-6.016*	-6.082**	-6.251*
		(3.183)	(2.906)	(3.197)
Election years			-0.138*	-0.136*
			(0.068)	(0.068)
Elderly ratio				-0.126
				(0.534)
Working age ratio				-0.194
				(0.540)
Observations	482	480	480	480
Number of countries	27	27	27	27

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Year dummies included. Sample: years 2002-2022.

Figure 5 – Marginal effects of environmental variables for different values of government's environmental stance (results from column 4 of Table 4)



Notes: Authors' elaborations.

Overall, the main findings of this analysis indicate that the actual decentralisation of environmental expenditure, relative to total public spending, is primarily shaped by structural country characteristics, such as the composition of pollutant emissions, rather than by extreme events, that are episodic shocks. While natural disasters attract substantial public and media attention and were shown in the first part of the analysis to strengthen the orientation of party manifestos, particularly regarding environmental commitment, they do not appear to play a decisive role in shaping the decentralisation of environmental spending in practice. These findings should be interpreted in relation to a literature in which direct comparisons are not always straightforward, as studies often rely on different measures of decentralisation and alternative definitions of extreme events, a source of heterogeneity that has been explicitly highlighted in previous contributions. Within this framework, our results are broadly consistent with those of Cadaval-Sampedro et al. (2025), who find no evidence of a short-run effect of natural disasters on decentralisation when measured using the Regional Authority Index, regardless of whether disasters are proxied by dummy variables or damage-based indicators. Differences with other

strands of the literature can be traced back to the object and measurement of decentralisation. De Mello and Jalles (2025), for instance, focus on aggregate fiscal and institutional decentralisation rather than policy-specific expenditure, and identify short- to medium-term adjustments in intergovernmental relations following natural disasters. These effects are temporary and context-dependent, and do not necessarily imply systematic changes in specific policy domains.

Finally, as in the first part of the analysis, we further investigate the role of emissions by splitting the ratio of local ($PM_{<2.5}$) to global (CO_2) emissions. This decomposition shows that, as reported in Table B6 in Appendix B, only the CO_2 component is statistically significant and negatively associated with the relative decentralisation of environmental expenditure, suggesting that higher levels of global emissions are linked to a more centralised allocation of environmental spending, in line with theoretical expectations.

We then assess the robustness of the results by re-estimating the models with interaction terms with the political platforms of government, employing the alternative measures for capturing extreme events presented in Section 3.4. The results, reported in Tables B7, B8 and B9 in Appendix B, remain broadly consistent with the baseline findings, particularly in terms of the sign and statistical significance of the emissions ratio across both the environmental and decentralisation specifications.

5. Concluding remarks

This paper has investigated the relationship between environmental factors and the degree of decentralisation of environmental protection expenditure across the 27 EU Member States over the period 2002–2022, adopting a political economy perspective. Drawing on the theoretical framework of fiscal and environmental federalism, the study sheds light on how environmental pressures and institutional settings shape the dynamics of multilevel governance, considering decentralisation and environmental protection issues.

Three main conclusions emerge. First, extreme events, both geological and climate-related, significantly increase the salience of environmental protection in parties' manifestos. This underlines that natural disasters act as strong political signals and shape the supply of political platforms. Second, the determinants of actual environmental decentralisation differ from those influencing political platforms. Extreme events, despite their importance in shaping political discourse, do not affect the territorial allocation of environmental expenditure once governments take office. Similarly, the environmental and decentralisation orientations of governing coalitions do not exhibit systematic effects on decentralisation outcomes. These results indicate that the translation of political commitments into policy is not straightforward in the domain of multilevel environmental governance. Third, actual decentralisation is driven primarily by structural

environmental characteristics. The ratio of locally to globally relevant emissions ($PM_{<2.5}/CO_2$) is the only variable that consistently and robustly explains higher decentralisation of environmental expenditure compared to the decentralisation of total expenditure.

Overall, the results point to a fundamental asymmetry between political supply and policy implementation. While environmental shocks shape political attention and platform commitments, the territorial organisation of environmental spending responds instead to the underlying structural characteristics. Indeed, governments organise environmental spending across levels of administration not in response to episodic shocks or electoral incentives, but according to the long-term spatial distribution of environmental externalities. These findings contribute to the literature on fiscal and environmental federalism by showing that environmental decentralisation is shaped by a complex interplay between shocks, institutions, and political commitments.

Our findings point to a divergence between political responsiveness, which is highly related with the salience of environmental extreme events, and bureaucratic inertia, which constrains changes in expenditure responsibilities. Parties adjust their platforms in response to extreme events, but this is confronted with rigid administrative structures, legacy rules and mechanical allocation mechanisms. A policy implication of this evidence is the need for automatic adjustment rules (e.g. formula-based allocations or predefined triggers for revising environmental responsibilities) that reduce reliance on discretionary administrative reform in response to extreme events. This type of rule-based mechanism can translate shifts in public priorities into policy updates without requiring costly renegotiation of intergovernmental arrangements.

Future research could build on these findings by examining in more detail how different types of environmental policies—such as mitigation versus adaptation strategies—interact with decentralised governance, and by exploring the role of new institutional arrangements, such as green fiscal pacts, in the evolving architecture of multilevel environmental governance.

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Appendix A – Definition of variables and descriptive statistics

Table A1 - Variables: definitions and sources

Variable	Definition	Source
Environmental platform	Green policies platforms - Weighted average of the support expressed for environmental policies, weighted by the percentage of votes obtained by the party	Elaborations on Manifesto Data Project
Decentralisation platform	Decentralisation platforms - Weighted average of the support expressed for decentralisation policies, weighted by the percentage of votes obtained by the party	Elaborations on Manifesto Data Project
$PM_{<2.5}/CO_2$	Ratio of $PM_{<2.5}$ emissions to CO_2 emissions	Eurostat
N. geological events	Total number of non-climatic extreme events (volcanic eruptions, earthquakes)	Emergency Events Database (EM-DAT)
N. climate-related events	Total number of climatic events	Emergency Events Database (EM-DAT)
Environmental preferences	Share of respondents in each country who identify environmental protection as a policy priority,	Elaborations on Eurobarometer
RAI	Regional Authority index – measures the extent to which regions have policy-making and implementation powers compared to the central/federal government	Hooghe et al. (2016)
Local revenues ratio	Ratio between the local revenue and the general government revenue	Eurostat
Decentralisation reform	Dummy equal to 1 from the year the reform is implemented onward	Division of Powers (European Commitee of the Regions)
Unempl. Rate	Rate of unemployment	Eurostat
log(GVA)	Logarithm of the total gross value added	
Industrial GVA share	Ratio between the gross valued added of sectors B-E over the total gross value added	ARDECO
Elderly ratio	Ratio of elderly population (+ 65y) to total population	ARDECO
Working age ratio	Ratio of working-age population to total population	ARDECO
Relative decentralisation of environmental expenditure (Balassa)	Ratio of local-to-central environmental spending relative to local-to-central total spending	Elaborations on Eurostat
Center-left government	Dummy equal to 1 if the political party in power is centre-left	Comparative Political Dataset
Election year	Dummy equal to 1 in the election's year	Manifesto Data Project

Table A2 – Descriptive statistics

Variable	N	Mean	Sd	Min	Max
Environmental platform	565	4.243	2.227	0.712	11.761
Decentralisation platform	565	1.985	1.331	0.000	6.184
$PM_{<2.5}/CO_2$	567	0.493	0.395	0.081	2.760
N. geological events	567	0.056	0.309	0.000	3.000
N. climate-related events	567	1.252	1.592	0.000	9.000
Environmental preferences	567	0.281	0.195	0.000	0.955
RAI	459	11.932	10.874	0.000	37.72
Local revenues ratio	567	0.351	0.146	0.003	0.714
Decentralisation reform	567	1.190	0.899	0.000	3.000
Unempl. Rate	566	0.084	0.042	0.02	0.275
log(GVA)	567	11.839	1.517	8.568	14.890
Industrial GVA share	567	0.205	0.063	0.058	0.463
Elderly ratio	567	0.172	0.028	0.108	0.238
Working age ratio	567	0.662	0.035	0.511	0.722
Relative decentralisation of environmental expenditure (Balassa)	565	3.485	3.807	0.000	27.563
Center-left government	567	0.455	0.498	0	1
Election year	567	0.238	0.426	0	1

Appendix B – Robustness checks

Table B1 - Political platform: environment and decentralisation platforms combined

Dependent variable: components of the product between environmental political platform score and decentralisation political platform score	(1) Total	(2) Within	(3) Between
$PM_{<2.5}/CO_2$	1.339	-6.829	8.764
	(6.942)	(8.062)	(10.816)
N. geological events	3.929*	2.110	3.565*
	(2.117)	(2.510)	(2.013)
N. climate-related events	0.838*	3.457	-1.341
	(0.477)	(2.074)	(1.583)
Environmental preferences	4.592	7.975	1.839
	(5.706)	(6.102)	(6.051)
RAI	0.104	0.196	-1.092
	(0.607)	(0.897)	(1.064)
Local revenue ratio	-10.101	-12.772	125.689*
	(40.860)	(43.351)	(69.281)
Decentralisation reform	1.527	2.659	1.437
	(1.400)	(1.946)	(2.564)
Unempl. Rate	-0.105	0.071	-0.359
	(0.321)	(0.434)	(0.307)
log(GVA)	8.531	13.577	-0.357
	(9.938)	(16.395)	(19.421)
Industrial GVA share	2.630	-68.671	120.299
	(50.537)	(64.446)	(98.785)
Elderly ratio	-3.591	-4.513	-2.518
	(4.283)	(5.207)	(4.632)
Working age ratio	-1.714	0.937	4.244
	(3.400)	(7.099)	(6.451)
Observations	126	121	121
Number of countries	26	25	25

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Linear trend included. All independent variables are lagged by one year. Sample: election years in 2002-2022.

Table B2 – Political Platform: the different role of PM2.5 and CO2 emissions

Dependent variable (weighted components)	Environmental Political Platform	Decentralisation Political Platform	Combination of Environmental and Decentralisation Platform
log($PM_{<2.5}$)	2.042	-0.009	2.859
	(1.250)	(1.021)	(5.202)
log(CO_2)	-1.003	2.555	6.584
	(2.130)	(2.256)	(11.896)
N. geological events	2.282**	-0.125	4.013*
	(0.900)	(0.288)	(2.161)
N. climate-related events	0.218*	0.056	0.749
	(0.127)	(0.095)	(0.504)
Environmental preferences	-0.303	0.286	4.613
	(0.739)	(0.795)	(5.369)
RAI	0.228	-0.072	0.093
	(0.169)	(0.095)	(0.546)
Local revenue ratio	15.850	-0.159	-11.689
	(10.663)	(5.632)	(36.522)
Decentralisation reform	0.698*	-0.063	1.418
	(0.343)	(0.262)	(1.431)
Unempl. Rate	-0.159*	0.040	-0.099
	(0.088)	(0.064)	(0.316)
log(GVA)	0.721	0.199	4.592
	(2.451)	(2.561)	(11.623)
Industrial GVA share	-10.134	5.246	2.218
	(12.356)	(9.248)	(47.073)
Elderly ratio	1.958***	-0.9804	-3.5738
	(0.609)	(0.799)	(4.401)
Working age ratio	1.169**	-0.944	-1.453
	(0.533)	(0.712)	(3.152)
Observations	126	126	126
Number of countries	26	26	26

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Linear trend included. All independent variables are lagged by one year. Sample: election years in 2002-2022.

Table B3 - Political Platform: Alternative measures for natural disasters: number of affected people

Dependent variable (weighted components)	Environmental Political Platform	Decentralisation Political Platform	Combination of Environmental and Decentralisation Platform
$PM_{<2.5}/CO_2$	2.982	-0.647	4.227
	(2.169)	(1.382)	(8.367)
N. people affected from geological events	-0.031	-0.045	-0.588
	(0.128)	(0.108)	(0.510)
N. people affected from climate-related events	0.977*	-0.924***	-2.070
	(0.478)	(0.245)	(1.400)
Environmental preferences	0.320	0.182	5.594
	(0.987)	(0.819)	(5.905)
RAI	0.244	-0.091	0.082
	(0.203)	(0.112)	(0.620)
Local revenue ratio	12.421	-0.289	-23.068
	(11.595)	(6.354)	(44.583)
Decentralisation reform	0.729	0.015	1.907
	(0.464)	(0.314)	(1.628)
Unempl. Rate	-0.102	0.031	-0.006
	(0.077)	(0.066)	(0.331)
log(GVA)	2.16	0.915	9.217
	(3.920)	(2.238)	(11.526)
Industrial GVA share	-13.394	7.170	1.661
	(14.281)	(10.688)	(53.065)
Elderly ratio	1.853**	-1.015	-3.865
	(0.806)	(0.738)	(4.118)
Working age ratio	0.993	-0.779	-0.911
	(0.697)	(0.819)	(3.494)
Observations	126	126	126
Number of countries	26	26	26

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Linear trend included. All independent variables are lagged by one year. Sample: election years in 2002-2022.

Table B4 - Political Platform: Alternative measures for natural disasters: number of deaths

Dependent variable (weighted components)	Environmental Political Platform	Decentralisation Political Platform	Combination of Environmental and Decentralisation Platform
$PM_{<2.5}/CO_2$	1.672	-0.758	0.702
	(1.457)	(1.335)	(6.771)
N. people deaths from geological events	0.363***	0.005	0.814***
	(0.030)	(0.016)	(0.092)
N. people deaths from climate-related events	-0.226***	0.181**	0.154
	(0.063)	(0.081)	(0.374)
Environmental preferences	-0.273	0.110	3.993
	(0.772)	(0.841)	(5.812)
RAI	0.206	-0.091	0.001
	(0.180)	(0.109)	(0.606)
Local revenue ratio	16.902	1.382	-3.853
	(10.940)	(6.012)	(39.071)
Decentralisation reform	0.301	0.048	0.981
	(0.344)	(0.326)	(1.616)
Unempl. Rate	-0.101	0.038	-0.001
	(0.065)	(0.059)	(0.298)
log(GVA)	4.137*	1.571	16.069
	(2.373)	(2.270)	(9.419)
Industrial GVA share	-8.516	5.216	3.992
	(12.808)	(10.498)	(53.151)
Elderly ratio	2.607***	-1.206	-2.815
	(0.830)	(0.776)	(4.313)
Working age ratio	1.226*	-1.097	-1.675
	(0.677)	(0.793)	(3.556)
Observations	126	126	126
Number of countries	26	26	26

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Linear trend included. All independent variables are lagged by one year. Sample: election years in 2002-2022.

Table B5 - Political Platform: Alternative measures for natural disasters: number of floods

Dependent variable (weighted components)	Environmental Political Platform	Decentralisation Political Platform	Combination of Environmental and Decentralisation Platform
$PM_{<2.5}/CO_2$	3.203	-0.769	4.179
	(2.241)	(1.252)	(7.859)
N. of floods	0.085	0.174*	1.175**
	(0.094)	(0.092)	(0.461)
Environmental preferences	0.183	-0.048	3.919
	(1.022)	(0.856)	(6.078)
RAI	0.242	-0.098	0.039
	(0.206)	(0.105)	(0.604)
Local revenue ratio	10.242	0.758	-22.687
	(11.495)	(5.751)	(41.166)
Decentralisation reform	0.686	-0.071	1.249
	(0.473)	(0.245)	(1.289)
Unempl. Rate	-0.102	0.042	0.035
	(0.078)	(0.057)	(0.262)
log(GVA)	1.998	1.295	10.743
	(3.884)	(2.059)	(10.445)
Industrial GVA share	-12.769	6.735	0.476
	(14.334)	(9.892)	(50.867)
Elderly ratio	1.079	-1.056	-2.139
	(0.659)	(0.748)	(2.891)
Working age ratio	0.242	-0.098	0.038
	(0.677)	(0.793)	(3.556)
Linear trend	-0.125	-0.026	-0.014
	(0.139)	(0.062)	(0.389)
Observations	126	126	126
Number of countries	26	26	26

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. Linear trend included All independent variables are lagged by one year. Sample: election years in 2002-2022.

Table B6: Actual policies and government stance: the different role of $PM_{<2.5}$ and CO_2 emissions

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)
log ($PM_{<2.5}$)	0.301	0.284
	(0.655)	(0.673)
log (CO_2)	-2.467**	-2.73**
	(1.007)	(1.007)
N. geological events	-0.133	-0.091
	(0.111)	(0.126)
N. climate-related events	0.102*	0.013
	(0.052)	(0.040)
Env platform of government	-0.308	
	(0.186)	
log($PM_{<2.5}$) x Env platform of government	0.082**	
	(0.035)	
log (CO_2) x Env platform of government	-0.048	
	(0.042)	
N. geological events x Env platform of government	0.018	
	(0.036)	
N. climate-related events x Env platform of government	-0.012	
	(0.010)	
Decentr platform of government		0.286
		(0.416)
log ($PM_{<2.5}$) x Decentr platform of government		0.017
		(0.069)
log (CO_2) x Decentr platform of government		-0.036
		(0.049)
N. geological events x Decentr platform of government		-0.014
		(0.036)
N. climate-related events x Decentr platform of government		0.007
		(0.007)
Observations	480	480
Number of countries	27	27

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Sample: election years in 2002-2022. Column (1) considers the government stance on environmental stance; Column (2) the government stance on decentralisation stance. Control variables: year dummies, environmental preferences, RAI, local revenues ratio, decentralisation reform, unemployment rate, log(GVA), industrial GVA share, election year dummy, elderly ratio, working age ratio.

Table B7: Actual policies and government stance: Alternative measures for natural disasters - number of affected people

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)
$PM_{<2.5}/CO_2$	1.131**	1.335**
	(0.481)	(0.559)
N. people affected from geological events	-0.069	-0.058
	(0.057)	(0.045)
N. people affected from climate events	0.161	-0.034
	(0.124)	(0.047)
Env platform of government	-0.050	
	(0.048)	
$PM_{<2.5}/CO_2$ x Env platform of government	0.0930	
	(0.076)	
N. people affected from geological events x	-0.002	
Env platform of government	(0.019)	
N. people affected from climate events x	-0.030	
Env platform of government	(0.002)	
Decentr platform of government		0.058
		(0.057)
$PM_{<2.5}/CO_2$ x Decentr platform of government		0.009
		(0.054)
N. people affected from geological events x		-0.004
Decentr platform of government		(0.007)
N. people affected from climate events x		0.028
Decentr platform of government		(0.035)
Observations	480	480
Number of countries	27	27

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Sample: election years in 2002-2022. Column (1) considers the government stance on environmental stance; Column (2) the government stance on decentralisation stance. Control variables: year dummies, environmental preferences, RAI, local revenues ratio, decentralisation reform, unemployment rate, log(GVA), industrial GVA share, election year dummy, elderly ratio, working age ratio.

Table B8 - Actual policies and government stance: Alternative measures for natural disasters: number of deaths

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)
$PM_{<2.5}/CO_2$	1.115**	1.312**
	(0.482)	(0.527)
N. of deaths from geological events	-0.002	0.025*
	(0.002)	(0.013)
N. of deaths from climate events	-0.154*	0.126**
	(0.087)	(0.059)
Env platform of government	-0.051	
	(0.048)	
$PM_{<2.5}/CO_2$ x Env platform of government	0.093	
	(0.076)	
N. of deaths from geological events x Env platform of government	-0.008	
	(0.005)	
N. of deaths from climate events x Env platform of government	0.051*	
	(0.029)	
Decentr platform of government		0.062
		(0.057)
$PM_{<2.5}/CO_2$ x Decentr platform of government		0.012
		(0.054)
N. of deaths from geological events x Decentr platform of government		-0.007**
		(0.003)
N. of deaths from climate events x Decentr platform of government		-0.027***
		(0.009)
Observations	480	480
Number of countries	27	27

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Sample: election years in 2002-2022. Column (1) considers the government stance on environmental stance; Column (2) the government stance on decentralisation stance. Control variables: year dummies, environmental preferences, RAI, local revenues ratio, decentralisation reform, unemployment rate, log(GVA), industrial GVA share, election year dummy, elderly ratio, working age ratio.

Table B9 - Actual policies and government stance: Alternative measures for natural disasters: number of floods

Dependent variable: relative decentralisation of environmental expenditure (RDE)	(1)	(2)
$PM_{<2.5}/CO_2$	1.063**	1.322**
	(0.476)	(0.553)
N. of floods	0.009	0.034
	(0.029)	(0.034)
Env platform of government	-0.079	
	(0.058)	
$PM_{<2.5}/CO_2$ x Env platform of government	0.112	
	(0.078)	
N. of floods x Env platform of government	0.017	
	(0.010)	
Decentr platform of government		0.049
		(0.062)
$PM_{<2.5}/CO_2$ x Decentr platform of government		0.012
		(0.054)
N. of floods x Decentr platform of government		0.004
		(0.009)
Observations	480	480
Number of countries	27	27

Notes: Fixed effect model. Standard errors clustered by country in parenthesis. * p<0.1, ** p<0.05, *** p<0.01. All independent variables are lagged by one year. Sample: election years in 2002-2022. Column (1) considers the government stance on environmental stance; Column (2) the government stance on decentralisation stance. Control variables: year dummies, environmental preferences, RAI, local revenues ratio, decentralisation reform, unemployment rate, log(GVA), industrial GVA share, election year dummy, elderly ratio, working age ratio.