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Unpacking the role of lobbies in shaping EU Member States' regional cooperation on climate and forests

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Abstract

This study aims to analyse the influence of combinations of forest lobby strength - from the forest industry and forest conservation lobbies - on state participation in multilateral regional governance arrangements on climate and forests. To this end, we focus on European Union Member States (EU MS). We used quantitative methods to cluster EU MS according to the combinations of forest lobby strengths they present, measured participation of EU MS in regional governance arrangements on climate and forests, and assessed the association between the combinations of forest lobby strengths and the different levels of state participation in such arrangements. Our findings reveal that EU MS can be clustered in three combinations of forest lobby strengths: (1) strong forest industry lobby but weak forest conservation lobby; (2) weak forest industry and forest conservation lobbies; and (3) weak forest industry lobby but strong forest conservation lobby. Our quantitative analysis suggests that EU MS with stronger forest conservation lobby groups participate more in centralised as well as non-co-extensive regional cooperation on climate and forests. We conclude that the forest conservation lobby is more determinant for the participation of EU MS in regional climate and forest cooperation than the forest industry lobby, as it promotes state participation in centralised as well as non-co-extensive governance arrangements.

Key policy insights

- EU Member states present three combinations of forest lobby strengths: strong forest industry lobby but weak forest conservation lobby, weak forest industry and forest conservation lobbies, and weak forest industry lobby but strong forest conservation lobby**.**
- The forest conservation lobby is more determinant for the participation of EU MS in regional climate and forest cooperation than the forest industry lobby.
- The forest conservation lobby promotes participation of EU MS in centralised as well as non-co-extensive regional cooperation on climate and forests.

1. Introduction

As a result of the 1992 United Nations Conference on Environment and Development, a growing number of regional governance arrangements that aim to jointly govern climate and forests have emerged (Polo-Villanueva et al., 2024). Such a phenomenon raises the question of what drives states to participate in such arrangements (Polo-Villanueva et al., 2024). This question is relevant from a theoretical point of view, as its exploration can both test and inform the development of theories on the inception and design of international environmental institutions (Koremenos et al., 2001). From a practical perspective, the exploration of such drivers can inform policy practitioners on the identification of states that are most likely to participate in governance initiatives that address climate and forest issues, such as the Paris Agreement (UNFCCC, 2022)

State participation in multilateral environmental arrangements can be explained by domestic variables, the institutional design of the arrangements, and the international connectivity between states (Bellelli, Aftab, et al., 2023). One of the most relevant domestic variables is the influence of interest or lobby groups (Bernauer et al., 2010b; Berning & Sotirov, 2024; Hagen et al. (2021)). However, while a number of quantitative studies have found evidence of the influence of such groups on state participation, very few have distinguished in their analyses between their effects on the participation in global and regional governance arrangements (Bellelli, Aftab, et al., 2023; Bellelli, Scarpa, et al., 2023; Bernauer et al., 2010b, 2010a, 2013; Mohrenberg et al., 2019; Polo-Villanueva et al., 2025; Seelarbokus, 2014). Moreover, almost all studies have focused on analysing the influence of lobby groups on state participation in highly formal institutions, leaving aside the study of less formalised ones (for an exception, see Polo-Villanueva et al., 2024). To the best of our knowledge, no quantitative study has analysed the influence of the combined effect of lobby groups (i.e., combinations of lobby strength) on state participation in regional governance arrangements.

Against this framework, this study aims to address existing knowledge gaps by conducting a quantitative analysis of the influence of combinations of forest lobby strength —from the forest industry and forest conservation lobbies—on the level of state participation in Multilateral Regional Governance Arrangements at the Climate-Forest Interface (MRGA-CFI). To this end, we focus on the case study of the European Union Member States (EU MS) for two reasons. First, despite their diversity, EU MS share relatively homogeneous domestic characteristics as a result of their integration into the European Union. (EU) (Bottaro et al., 2024; Savelyev, 2012; Siljak & Nagy, 2021). Second, a previous study showed that EU MS have a high but heterogeneous participation in MRGA-CFI, which leads us to presume that the influence of lobby groups could be the cause of such heterogeneity (Polo-Villanueva et al., 2024). In sum, EU MS are an ideal case study for examining the influence of lobby groups on state participation, as they minimize variability from various domestic factors and present high but heterogeneous levels of participation in MRGA-CFI.

What are the different combinations of (forest) lobby strength presented by EU MS? What is the combined influence of forest lobbies on the participation of EU MS in MRGA-CFI? These two questions guide our study, which unfolds as follows. The next section presents our conceptualization of lobby strength. We then present our theory and methods, followed by our results. Finally, we discuss our findings and draw some conclusions.

2. Lobby strength

Interest groups or lobby groups are “organisations that make policy suggestions to governments so that public policies conform to the interests of their members” (Knill & Tosun, 2020:62). Their leverage can be exerted in three ways: inside advocacy, providing information to actors within the policy-making process; outside advocacy, communicating information to actors outside the policy-making process; and/or grassroots advocacy, leveraging political pressure through mass mobilisation (Knill & Tosun, 2020). In addition, the success of such influence is associated with various intrinsic factors such as the amount of

resources the groups have available for lobbying; the frequency to which the groups are consulted by decision-makers; and the membership and support base of such groups. (Bruycker & Beyers, 2019). We therefore conceptualise lobby strength as *the capacity of a lobby group, based on the amount of resources, access to decision-makers and support base, to make policies align with the interests of its members.*

Lobby groups rarely work in isolation, but rather in parallel with other groups with similar or opposing interests (Berning & Sotirov, 2024, 2024; Knill & Tosun, 2020). Although qualitative studies highlight that such interactions are determinant in defining the outcomes of the policy process, we have not identified any quantitative studies that analyse the influence of more than one lobby group on state participation (Berning & Sotirov, 2024, 2024; Burns & Giessen, 2016; Giessen et al., 2016). Thus, this study contributes to fill this knowledge gap by theorizing and quantitatively analysing the influence of the combination of (forest) lobby strengths on state participation in regional cooperation on climate and forests.

3. Theory and hypothesis

MRGA-CFI are "multilateral institutions that seek to jointly govern climate and forest issues at the regional level" (Polo-Villanueva et al., 2024:2). Importantly, multilateral institutions should be understood here as formal and informal bundles of rules, roles and relationships that define and regulate social practices of three or more state actors in international affairs (based on Abbott & Snidal, 2009). MRGA-CFI mainly focus on conserving the carbon stored in standing forests (i.e., forest sinks), leaving aside the carbon stored in timber (i.e., timber sinks) (Creutzburg & Lieberherr, 2021; Fan et al., 2024; Holland-Cunz & Baatz, 2025). Therefore, such arrangements tend to adopt and implement conservation policies, such as strict forest regulations, that increase the burden on forestry firms (Polo-Villanueva et al., 2023; Polo-Villanueva et al., 2024).

Two forest lobby groups influence the outcomes of forest-climate policy processes: the forest industry and forest conservation lobbies (Berning & Sotirov, 2024, 2024; Burns & Giessen, 2016; Giessen et al., 2016). While the forest industry lobby represents the interests of actors involved in the value chain of forest products —from forest owners to organisations involved in forest management, processing and marketing of forest products —, the forest conservation lobby represents the interests of environmental non-governmental organisations (ENGOs) (Sotirov et al., 2021). Thus, the former prioritises economic development over conservation, while the latter prioritises the opposite (Sotirov et al., 2021). Given that both lobby groups coexist, we theorise below on the influence of the combination of forest lobby strengths on the participation of EU MS in MRGA-CFI.

Since MRGA-CFI are inclined to implement conservation forest policies that often translate into a higher economic and bureaucratic burden on forest industries, we expect the forest industry to lobby to hinder state participation in such arrangements (Acheampong & Maryudi, 2020; Neupane et al., 2019; Polo Villanueva et al., 2023). On the other hand, because ENGOs often benefit from being involved in the

implementation of conservation policies, we expect them to lobby to promote state participation in these arrangements (Laraswati et al., 2022; Maryudi et al., 2020). We thus hypothesize that:

H1.1: EU MS with **strong forest industry** lobby but **weak forest conservation** lobby **participate less in MRGA-CFI** than those with different combinations of forest lobbying strength.

H1.2: EU MS with **strong forest conservation** lobby but **weak forest industry** lobby **participate more in MRGA-CFI** than those with different combinations of forest lobbying strength.

Rational design theory posits that international institutions are created by states to advance their own interests in the international arena (Koremenos et al., 2001). We thus contend that the influence of forest lobbies on state participation in MRGA-CFI will differ based on the institutional features of these arrangements. Given that formality and non-co-extensivity are important yet underexplored institutional features, we theorize not only on how forest lobbies affect overall state participation in MRGA-CFI, but also their influence on participation in both centralized and non-co-extensive MRGA-CFI (Balsiger & Prys, 2016; Vabulas & Snidal, 2013).

Centralisation refers to the presence of a single entity within an arrangement's organizational structure that is responsible for key institutional tasks (i.e., secretariat) which is both independent and permanent. MRGA-CFI can therefore be classified as centralised if they have independent and permanent secretariats, or as non-centralised if they lack a secretariat or have one that is not permanently based in a state or depends on an external organization (Koremenos et al., 2001; Vabulas & Snidal, 2021). Membership in centralised MRGA-CFI often raises concerns due to significant sovereignty costs, as member states have to cede part of their sovereignty to the bureaucracy of these institutions (Westerwinter, 2021). Consequently, it is reasonable to expect centralised MRGA-CFI to be more likely than their non-centralized counterparts to enforce forest conservation policies that could harm forest companies and benefit ENGOs (Vabulas & Snidal, 2013). Therefore, we hypothesise that:

H2.1: EU MS with a **strong forest industry** lobby, but **weak forest conservation** lobby **participate less in centralized MRGA-CFI** than those with different combinations of forest lobbying strength.

H2.2: EU MS with a **strong forest conservation** lobby, but **weak forest industry** lobby **participate more in centralized MRGA-CFI** than those with different combinations of forest lobbying strength.

Non-co-extensivity, as opposed to co-extensivity, refers to the lack of overlap between the territory of application of an agreement (i.e. the spatial ambit) and the territory of its member states (based on Balsiger & Prys, 2016). While co-extensivity can be partial or total between both territories, non-co-extensivity emphasises the lack of overlap between them. In this sense, this feature is related to sovereignty issues that resemble European states' (former) control over their colonies (Balsiger & Prys, 2016). In this context, since European ENGOs are often promoting as well as benefiting from the implementation of North-South cooperation on climate and forest issues, we expect the forest conservation lobby to promote state participation in non-co-extensive MRGA-CFI (Gallemore et al., 2024;

Giessen et al., 2016; Laraswati et al., 2022; Polo Villanueva et al., 2023). We have no specific expectations regarding the forest industry lobby. Therefore, we hypothesise that:

H3: EU MS with **strong forest conservation lobby** participate more in **non-co-extensive MRGA-CFI** than those with weak forest conservation lobby

4. Methods

Our methodological approach consists of three steps. First, we measure our independent variable by clustering EU MS according to the combinations of forest lobby strengths that they present. Second, we measure our outcome variable, participation of EU MS in MRGA-CFI. Third, we assess the association between the combinations of forest lobby strengths and the levels of state participation in MRGA-CFI that EU MS present. Each step is explained in more detail below.

4.1. Clustering EU Member States based on their combinations of forest lobby strengths

Our main independent variable is the category of combination of forest lobby strength to which EU MS belong. However, data on forest lobby strength is not readily available. Thus, to capture the strength of the forest industry and forest conservation lobbies, we use various proxies. As indicators of the strength of the forest industry lobby, we used the percentage of voluntarily certified forest as a proportion of the total land area (PERTerry_CertFor), as well as the ratio of the value of forest products exports and total value of internationally traded forest products, including both exports and imports (ExpFor). We argue that these indicators provide an approximation of the relative amount of resources available to the forest industry lobby for lobbying. Similarly, as indicators of the strength of the forest conservation lobby, we used the number of international ENGOs (Nr_IENGOs) and the number of national ENGOs (Nr_NENGOs) present in each country. Both indicators aim to provide an approximation of the amount of international and national resources available to the forest conservation lobby.

We retrieved the data for the calculations of the percentage of voluntarily certified forest as a proportion of the total area from the World Development Indicators database[1], and the data to calculate the ratio of the value of forest products exports and the total value of traded forest products from the FAO Forest Resource Assessment database[2]. The data on the number of international ENGOs and national ENGOs was retrieved from the IUCN members database[3], which has been used by previous research on environmental governance (e.g., Tosun & Levario Saad, 2023). We use the mean values between 2010 and 2020 for the indicators of all our proxies. This was done to minimise the effects on our variable from major events after 2020, such as the Brexit, the Coronavirus Pandemic and the Russian invasion of Ukraine.

To determine representativeness of our proxies and the number of clusters that can be drawn from our data, we first performed a Principal Component Analysis (PCA). The PCA reduces the dimension of a

multivariate dataset by producing a linear combination (i.e., principal components) of the original variables that summarise the predominant patterns in the data (Peres-Neto et al., 2003). We first plotted the proxies for the strength of the forest industry and forest conservation lobbies in a PCA biplot to explore how much of the variability in the data was explained by the first two dimensions (i.e., principal components). Next, we added all EU MS to the biplot in order to visually determine the number of clusters that could be formed based on their location. Based on this, we proceed to cluster EU MS using k-means clustering. K-mean clustering is an unsupervised machine learning algorithm that groups data into a number of predetermined clusters with the objective of minimising the variance within each cluster and maximising the variance between clusters.

4.2. Measuring state participation in regional cooperation on climate and forests

To measure our outcome variable, level of participation of EU MS in MRGA-CFI, we first had to identify all MRGA-CFI. To do so, we relied on the database of Multilateral Regional Governance Arrangements at the Climate-Forest Interface from Polo-Villanueva et al. (2024). This database contains a comprehensive list of MRGA-CFI that draw upon four datasets: the Yearbook of International Organizations[4], the Commonwealth of Independent States Legislation Database[5], the International Environmental Agreements database[6], and the Directory of Commonwealth NGOs related to forestry[7] as well as other data sources. All 21 MRGA-CFI in this database share the following characteristics: (i) display a minimum level of salience, as they publicly state their goals and/or mission; (ii) are multilateral, as they include three or more states among their members; (iii) are regional, as. their membership and/or geographical scope is limited by contiguity or other functional criteria; and (iv) mention keywords related to climate (i. i.e. clima*, greenhouse gas* and/or carbon) and forest (i.e. forest*, deforest*, silvi* and/or trees) in their main objectives, mission statements, project objectives and/or list of main activities (Jeon et al., 2019; Polo-Villanueva et al., 2024).

Our main outcome variable is the participation of EU MS in MRGA-CFI (Part_Total). To capture this variable, we referenced the 2020 EU membership list, which included the UK. We measured participation by counting the total number of MRGA-CFI in which each EU MS held both membership and decision-making power. Data to measure this variable was extracted from the inception documents, the rules of procedures, as well as the websites of the arrangements. As with our independent variable, to minimise the effects of major world events that could influence our outcome variable, we limited data collection to the year 2020.

In order to analyse how two institutional features of governance arrangements, namely centralisation and non-co-extensivity, influenced the relationship between the combination of forest lobby strength and different levels of state participation in MRGA-CFI, we developed alternative versions of our outcome variable: participation of EU MS in *centralised* MRGA-CFI (Part_Cent), and participation of EU MS in *non-co-extensive* MRGA-CFI (Part_OutEU). To assess both variables we first needed to identify all *centralised* and *non-co-extensive* MRGA-CFI respectively. We used the presence of an independent and permanent

secretariat as an indicator centralisation. While our indicator for non-co-extensivity was the absence of overlap between the area of implementation of the arrangement (i.e., spatial ambit) and the territories of its member states. Evidence for this categorization was gathered from official documents and websites of the arrangements. Having identified both types of arrangements, we proceeded to carry out a simple count of the participation of EU MS in each of them.

4.3. **Assessing the association of combinations of forest lobby strength with state participation of EU Member States in regional cooperation on climate and forests**

Since correlations between our independent and outcome variables are not possible given the small number of observations (i.e., EU MS), we opted for an alternative method. First, we constructed boxplots that allowed us to visualise the median and ranges of values of our outcome variables (i.e., participation of EU MS in all, centralised, and non-co-extensive MRGA-CFI) across clusters of EU MS based on combinations of forest lobby strength. We then used the Kruskal-Wallis test to assess whether at least one mean of the response variables was significantly different between clusters. If the test confirmed this, then we proceeded to perform a Dunn test to identify which clusters were significantly different from each other. It is also important to consider that although these analyses allowed us to achieve our goals and test our hypotheses, they also have limitations, mainly associated with the possibility of increased error rates in multiple comparisons.

5. Results

5.1. Clusters of EU Member States based on combinations of forest lobby strengths

The quantitative results of the PCA indicate that the four proxies of forest lobby strengths are well represented in the first two principal components and that these components, in turn, explain 90% of the variance of the data. Both results validate the selection of the four proxies. The PCA biplot, which shows the distribution of EU MS along its four quadrants, allowed us to determine that EU MS could be clustered in three different combinations of forest lobby strengths. Thus, by assuming that the strength of a forest lobby can only be binary (i.e., strong or weak), we grouped EU MS based on the following combinations of forest lobby strengths: weak forest industry lobby but strong forest conservation lobby (Cluster 1), weak forest industry and forest conservation lobbies (Cluster 2), and strong forest industry but weak forest conservation lobby (Cluster 3). This categorisation led to no EU MS being classified as having a strong forest industry lobby and a strong forest conservation lobby. For a graphic depiction of the three clusters on the PCA biplot, see Fig. 1.

Descriptive statistics on the four proxies on forest lobby strength showed that Cluster 1, composed of states with a weak forest industry lobby but a strong forest conservation lobby, displays mean values for the percentage of the territory under voluntary forest certification and the percentage of international traded forest products that are exports of 0.95 and 0.45, respectively, and a mean number of IENGOs

and NENGOs of 4.3 and 24 respectively, both values above the EU average. Cluster 2, consisting of countries with weak forest industry and forest conservation lobbies, shows mean values for the percentage of the territory under voluntary forest certification and the percentage of international traded forest products that are exports of 0.93 and 0.37, respectively, and a mean number of IENGOs and NENGOs of 0.21 and 2.36, respectively. All four values are below the EU average. Lastly, Cluster 3, consisting of countries with a strong forest industry lobby but a weak forest conservation lobby presents mean values for the percentage of the territory under voluntary forest certification and the percentage of internationally traded forest products that are exports of 3.45 and 0.69, respectively, both values above the EU average, and a mean number of IENGOs and NENGOs of 0.25 and 2.62 respectively. For more descriptive statistics of our four proxies, see Annex 2.

5.2. **Association between the combinations of forest lobby strength and state participation of EU Member states in regional cooperation on climate and forests**

The three box plots, one for each outcome variable, allow us to make three main observations (Fig. 2). First, we observe that the median state participation of EU MS with a weak forest industry lobby, but a strong forest conservation lobby (cluster 1) is above the other two clusters for all three outcome variables. Second, the other two clusters, EU MS with a weak forest industry and forest conservation lobbies (cluster 2) and EU MS with a strong forest industry lobby but a weak forest conservation lobby (cluster 3), show equal medians for all outcome variables. Third, there are different degrees of overlap between the levels of state participation shown by the different clusters. While there is considerable overlap between the values of state participation in *centralised* MRGA-CFI shown by all clusters, the values of state participation in all and *non-co-extensive* MRGA-CFI only overlap between the EU MS with weak forest industry and forest conservation lobbies (Cluster 2), and EU MS with strong forest lobby but weak forest conservation lobby (Cluster 3). Due to the above, we presume that EU MS with weak forest industry lobby but strong forest conservation lobby (Cluster 1) present higher levels of state participation in all and non-co-extensive MRGA-CFI than the other combinations of forest lobby strengths. Thus, to test these assumptions, we carried out two tests.

The Kruskal-Wallis test allows us to identify whether at least one of the medians of various clusters is significantly different from those of the others. By performing three of these tests, one for each outcome variable, we find that at least one of the clusters, based on combinations of forest lobby strengths, presents a different median for both participation in all (Part_Total, p-value = 0.0132) and *non-co-extensive* (Part_OutEU, p-value = 0.0017) MRGA-CFI. Since we did not find significant differences between the clusters with respect to state participation in *centralised* MRGA-CFI (Part_Cent), we reject our hypotheses H2.1 and H2.2 on the effect of combinations of forest lobby strengths on participation of EU MS in *centralised* MRGA-CFI.

We performed a Dunn's test to compare each possible pair of clusters and detect between which clusters there is a significant difference (p-value less than 0.05) between the medians of state participation in all and *non-co-extensive* MRGA-CFI. Regarding the participation of EU MS in all MRGA-CFI

(Part_Total), we find only a significant difference (p-value 1 vs 2 = 0.0049) between EU MS with weak forest industry lobby but strong forest conservation lobby (Cluster 1) and EU MS with weak forest industry and forest conservation lobbies (Cluster 2). This evidence lead us to reject our hypothesis H1.1, which states that EU MS with strong forest industry lobby, but weak forest conservation lobby (cluster 3) participate less in MRGA-CFI than the other cluster. However, the same finding partially supports H1.2, which indicates that EU MS with strong forest conservation lobby, but weak forest industry lobby participate more in MRGA-CFI. Regarding state participation in non-co-extensive MRGA-CFI (Part_OutEU), we found two significant differences. These were between EU MS with weak forest industry lobby but strong forest conservation lobby (Cluster 1), and the rest (p-value Cluster 1 vs Cluster 2 = 0.0007; p-value Cluster 1 vs Cluster 3 = 0.0085). This finding fully supports our H3, which states that EU MS with a strong forest conservation lobby participate more in *non-co-extensive* MRGA-CFI than the rest.

6. Discussion

Multiple qualitative studies have explored the influence of forest lobby groups on both domestic and foreign policymaking of EU MS (e.g., Pülzl et al., 2018; Sotirov et al., 2021). However, this is the first to propose a quantitative methodology for clustering EU MS based on the combined strengths of the two main forest lobbies: forest industry and forest conservation lobbies. We found that EU MS can present three distinct combinations of forest lobby strengths: strong forest industry lobby but weak forest conservation lobby, weak forest industry and forest conservation lobbies, and weak forest industry lobby but strong forest conservation lobby. This aligns with previous studies on forest governance, which indicate that in countries where the industrial forestry sector is economically significant—such as Sweden and Finland—industrial lobbies are highly effective, while environmental lobbies face considerable challenges to leverage governments (Andersson & Keskitalo, 2018; Kotilainen & Rytteri, 2011). Conversely, previous studies found that in economically prosperous states dominated by non-forest industries, like Germany and France, the influence of the forestry industry is limited, whereas forest conservation lobbies wield greater influence over policy processes (Schulz et al., 2014; Sotirov & Arts, 2018). Additionally, academics have also identified small states with minimal forest cover, such as Cyprus and Malta, where neither the forest industry nor environmental organizations significantly impact governmental decision-making (Sotirov & Arts, 2018).

Our empirical analysis shows that the strength of the forest industry lobby groups in a given EU MS is not determinant for the states' level of participation in all, *centralised* and *non-co-extensive* MRGA-CFI. While this finding resonates with previous environmental governance studies (Bellelli, Aftab, et al., 2023; Bernauer et al., 2013; Fredriksson et al., 2007), it contrasts with the conclusion of a recent global analysis which argues that forest industry lobby groups promote state participation in MRGA-CFI (Polo Villanueva et al., 2023). However, this can be explained by the peculiarities of the European Union context. These include the fact that the influence of forest industry lobbies may have been masked by both the existence of other, more economically important industries in EU MS and the saturation of EU environmental governance (Hammond & Knott, 1988; Pülzl et al., 2018).

Our results further show that while the strength of the forest conservation lobby groups in EU MS seems to not influence the states' level of participation in all MRGA-CFI, it seems to increase the level of participation of EU MS in centralised and non-co-extensive MRGA-CFI. This is in line with previous research indicating that ENGOs lobby states to participate in centralised international environmental arrangements in order to benefit from the implementation of their forest conservation policies (Bellelli, Aftab, et al., 2023; Bernauer et al., 2010b; Mohrenberg et al., 2019; Seelarbokus, 2014). Likewise, previous studies have shown how environmental NGOs promote participation in non-co-extensive regional environmental cooperation, especially in the global south (Chorito & Assefa, 2024; Langan, 2018; Pülzl et al., 2018). Although this has mainly been observed in the case of climate regimes, our study shows that this also occurs in regional forest-climate cooperation. Thus, we argue that regional climate forest cooperation is being used by EU Member States to govern forests in territories outside the EU, mainly in the tropics.

7. Conclusion

Our findings led us to important theoretical and practical conclusions. First, regarding the combinations of forest lobby strengths, we conclude that EU MS can be categorized into three groups: states with a strong forest industry lobby but a weak forest conservation lobby; states with weak forest industry and forest conservation lobby; and states with a weak forest industry lobby but a strong forest conservation lobby. Second, regarding the influence of combinations of forest lobbies on state participation, we conclude that the strength of the forest conservation lobby is a determinant factor for the context of EU MS, especially by promoting state participation in *centralised* and *non-co-extensive* regional cooperation on climate and forest issues. While this study could inform the development of theories on the design of international institutions, it also has practical value for policy practitioners. In this sense, our conclusions could help decision-makers to both map states that share common interests in forest climate issues, and design governance arrangements that could be attractive for specific groups of EU MS.

Finally, it is important to consider these insights against the methodological limitations of our study. First, given the descriptive, non-probabilistic nature of our analysis and the fact that our data on state participation is only a snapshot of 2020, we have not been able to control for various variables that may influence state participation in international environmental cooperation. Moreover, although we relied on a comprehensive mapping of MRGA-CFI, it is possible that some of them may have slipped under our radar as they have a high formality graph. Furthermore, we compiled our proxies of forest lobby strengths from FAO and IUCN. While the former relies on self-reporting, the latter is subject to various biases. We therefore invite academics to expand our dataset to construct a time series that allows for a more robust statistical analysis of the association between our independent variables and outcomes. We further consider that the exploration of alternative proxies for the strength of forest lobbies, a more comprehensive mapping of MRGA-CFI, and probabilistic statistical analysis can complement our study quite well and inform the development of theories on regional environmental cooperation.

Declarations

Author Contribution

FDPV conducted the data collection, performed the analysis, prepared the figures, and wrote the main manuscript text. AAOT contributed to the writing and revision of the manuscript. SB contributed to the conceptualization of the study and analysis. LG acquired the funding. SLB supervised the overall study and contributed to its conceptualization, research design, interpretation of the results, and critical revision of the manuscript. All authors reviewed and approved the final manuscript.

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Data Availability

All data supporting the findings of this study are available within the paper and its Supplementary Information.

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Footnotes

1. https://databank.worldbank.org/source/world-development-indicators
2. https://fra-data.fao.org/assessments/fra/2020
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Figures

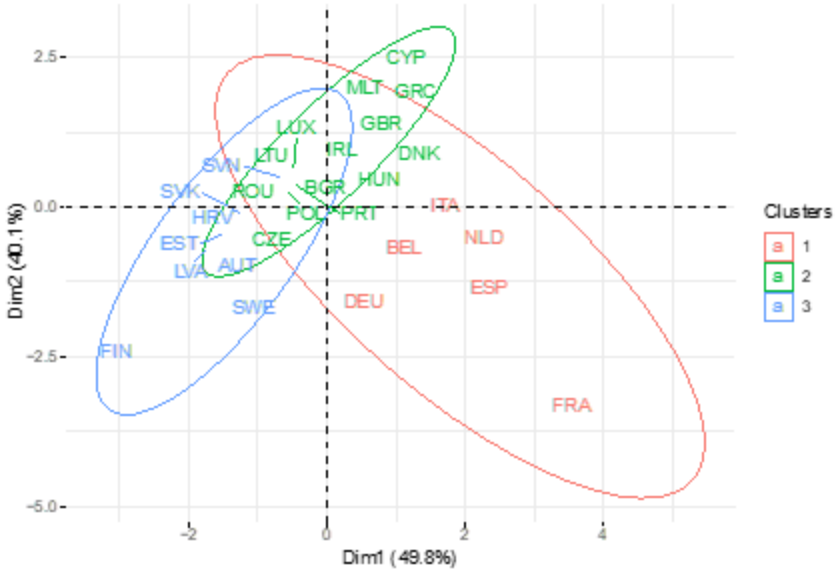


Figure 1

Clusters of EU Member States based on combinations of forest lobby strength.

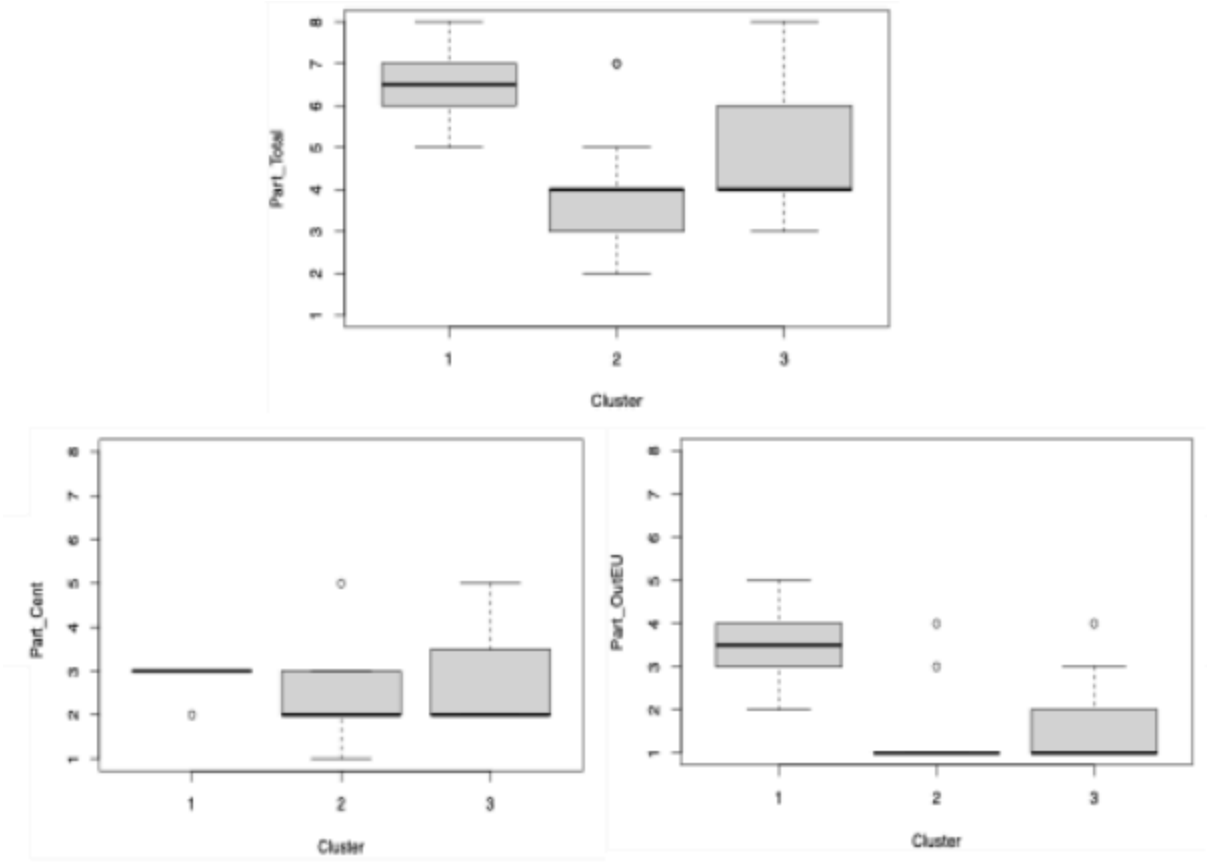


Figure 2

Boxplots of outcome variables across clusters of EU Member States based on combinations of forest lobby strength.

Supplementary Files

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- EUdataFINAL.pdf