Strategic Complementarity in NGO Advocacy: Evidence from the European Commission*

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Abstract

This article analyzes the advocacy strategies of environmental non-governmental organizations (ENGOs). I develop a model in which ENGOs can engage in costly advocacy activities to foster pro-environmental policy changes on different dimensions. The model gives insights on their optimal advocacy strategies, and their reaction functions to lobbying from other actors. Combining data on meetings with European Commission members and textual analysis to measure lobbying efforts on different topics, I find support for strategic complementarity of ENGOs efforts. ENGOs also seem to drive the lobbying agenda of the business sector on environmental topics.

Keywords: Nonprofit Organizations, NGOs, Environmental Policy, Lobbying, Advocacy, Interest Groups

JEL classifications: L31, D72, Q50, H7

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1 Introduction

Non-governmental organizations (NGOs) play a critical role in the policy-making process. In the particular case of environmental regulation, they identify and raise awareness on environmental issues, to mobilize public support for political action. They also advocate for environmental issues in front of the different legislative institutions. Members of the European Parliament report more that they are frequently contacted by NGOs than they report for other types of interest groups (Coen et al., 2020). It suggests that NGOs are involved in substantial advocacy work and are active in the long run. This advocacy work is called *informational lobbying*. It consists in giving policy-relevant information to policy-makers to try to influence them when they design policies. While climate change is a crucial issue, the necessary regulations and legislation are not always implemented. Understanding the policy-making process and the role of the different actors is key to identifying how the necessary policies could be adopted.

This paper studies environmental NGOs' advocacy behavior, both theoretically and empirically. While ENGOs share the common goal of improving the average environmental quality, they focus on different topics (*e.g.* air quality, ocean conservation) and use different methods[1]. I develop a model of two ENGOs engaging in advocacy activities over two topics to obtain pro-environment policy changes, in the presence of counter-lobbying. I study the way they allocate their lobbying efforts on both topics, taking into account that part of their effort is transferable from one topic to the other.

Studying the strategic interactions of ENGOs, I derive the condition under which they would advocate together, *i.e.* on the same topic at the same time, or separately, each following its own agenda. The latter can be explained by different intrinsic preferences on topics, by a differentiation strategy[2], by free-riding in collective actions, or by a coordinated decision to split up their efforts and to specialize. This is the strategic decision to make if too many messages cloud the minds of policy-makers because of potential information aggregation costs. In this case, it would not be efficient to allocate additional resources to advocacy over a topic because of the confusion effect it would create.

On the other hand, ENGOs might strategically decide to advocate together and multiply the number of messages sent to the policy-makers if it creates a confirmation effect and reinforces their credibility. The literature on collective action shows that free-riding incentives can be offset when there are efforts complementarity in the outcome function (Cheikbossian and Fayat, 2018; Cheikbossian, 2021), and that group cooperation can be an equilibrium (Cheikbossian, 2020). As public attention is limited (Heyes et al., 2018), it might bring efficiency gains to crowd in, to concentrate advocacy efforts on the same

[1] See Longhofer and Schofer (2010) on the exponential increase in the number of environmental organizations.

[2] NGOs tend to "compete with collaborators" (Curley et al., 2021): they differentiate to get financed (Aldashev and Verdier, 2009, 2010) and compete to sell labels (Poret, 2019).

topics. The political agenda can also play an important role, and all actors would lobby on the same topic at the same time in a ripple effect. In this case, ENGOs would lobby in the same fashion as the business sector.

The condition of this strategic complementarity or substitutability is based on the sign of the cross-derivatives of the pro-environment policy change function. As I do not impose restrictive hypotheses on the form of this function, I complement the theoretical model with an empirical study of the strategic interactions of ENGOs in their advocacy activities toward the European Union. I introduce a novel dataset on lobbying efforts at the entity-topic-month level to estimate these strategic interactions.

In the European Union (EU), the Commission is the institution in charge of proposing regulation. Any legal act adopted in the EU originally came from a proposal made by the Commission. The agenda-setting power of the Commission contributes to making it a relevant target for lobbying (Skodvin et al., 2010). Understanding lobbying at this stage is key as it determines the legislative agenda and the content of the initial proposals. Environmental NGOs try to exert influence on the Commission to steer the ban of toxic products, to foster practices that are better for the environment and that mitigate climate change but also to ensure that regulation in any other field accounts for the potential environmental damages. To make their views considered by the Commission, they can meet with Commission members. I collect the list of the 39,019 meetings of the Juncker Commission (November 1, 2014 - November 30, 2019) and of most of the first Von der Leyen Commission mandate (December 1, 2019 - December 31, 2023). I combine it with data from the EU Transparency Register and the use of textual analysis. From the subjects of meetings, I categorize meetings into nine environmental topics. I obtain a granular measure of lobbying efforts at the entity-topic-month level.

The empirical analysis of ENGOs' strategic interactions indicates that ENGOs tend to lobby together. This is not driven by a political agenda effect, as ENGOs do not broach topics with the Commission at the same time as the business sector does, or any other actors. This is surprising as the business sector is represented at least twice more than ENGOs in meetings on environmental topics. With a symmetric analysis of the business sector, I find that business actors follow the topic and timing of ENGOs in their lobbying activities on environmental topics. It suggests that the business sector only mentions environmental topics when pushed by ENGOs, while ENGOs follow a common agenda. ENGOs lobbying is key for environmental topics to be discussed.

This paper relates to the literature on NGOs. A wide range of the theoretical literature on NGOs focuses on their role in what Baron (2001, 2003) defines as private politics, *i.e.* their behaviors toward corporations. NGOs can adopt confrontational strategies with firms to improve the average environmental quality (Baron and Diermeier, 2007; Daubanes and Rochet, 2019; Chiroleu-Assouline and Lambert-Mogiliansky, 2023; Brécard and Chiroleu-Assouline, 2024), or they can cooperate with firms in their labeling strategies

(Bottega and De Freitas, 2009; Brécard, 2014), in their information disclosure strategies (Delmas et al., 2019) or in the context of the corporate social responsibility (Lyon and Maxwell, 2008). In an empirical study on the impact of NGOs actions, Pacheco-Vega and Murdie (2020) find that, in non-OECD countries, the impact on CO_2 emissions reduction is conditional on local citizens being involved and on the state being vulnerable to external pressure. However, NGOs' lobbying behaviors are little addressed in this literature[3]. Brulle (2018) estimates lobbying expenditure in the US and highlights that climate lobbying varies significantly over time, with the climate legislation agenda and the probability of climate policies' enactment.

Studying lobbying activities of NGOs, I also relate to the lobbying literature, which aims at better understanding the policy-making process. Theoretically, quid-pro-quo lobbying[4] is represented in common agency models, where the regulator cares about the lobbyists' contributions (Grossman and Helpman, 1994, 2001). On the other hand, informational lobbying is modeled as signaling games with asymmetric information (Potters and Van Winden, 1992; Austen-Smith, 1993; Crombez, 2002). Some papers account for both monetary contributions and information transmissions (Austen-Smith, 1995; Lohmann, 1995; Bennedsen and Feldmann, 2006). In the political science literature, Hall and Deardorff (2006) presents lobbying as a legislative subsidy: lobbying does not aim at changing legislators' minds but rather aims at assisting legislators to achieve their own objectives. Since lobbying is costly for both policy-makers and interest groups, they strategically select natural allies with coincident objectives. To maximize their utility, they meet only when supply and demand preferences correspond. It follows that interest groups mobilize more when their information is in greater demand (greater potential influence) and that policy-makers primarily interact with groups that legitimately supply relevant information. Baron (2019) generalizes and defines lobbying as involving "the provision of politically beneficial resources to legislators".

The empirical literature on lobbying often suffers from the lack of reliable data on the lobbying itself, but also on its potential consequences[5]. Nonetheless, recent literature is flourishing on the impact of lobbying on the political process. For the EU, Anger et al. (2015, 2016) study the impact of corporate lobbying, respectively on the energy tax and the allocation of free allowances under the EU Emission Trading Scheme (ETS) for German firms. They use a common agency setting and find a substantial impact of lobbying in both studies. Using the EU Transparency Register database and considering a signaling game setting, Burghaus et al. (2019) find a positive impact of corporate lobbying on the allocation of free allowances in the EU ETS, for all the EU countries. For the US, Bertrand et al. (2018, 2020) study the role of corporate philanthropy in the political process with in-

[3]See Heyes and King (2020) for a review of the literature on green activism in economics and sociology.

[4]Quid-pro-quo lobbying implies a monetary exchange between special interest and politics. It is opposed to informational lobbying, which reflects an exchange of information.

[5]See Bombardini and Trebbi (2019) for a review of the empirical literature on lobbying.

novative data processing techniques. They use Latent Semantic Indexing (LSI) and make profit from textual documents from corporations, nonprofits, and policy-makers. They compute similarity indices between these documents to estimate the influence firms have through corporate philanthropy in the US legislative process. Meng and Rode (2019) use US firms' stock price data as a proxy for their value gains or losses linked to the implementation of a new regulation. They infer the firms' returns to scale to lobbying and they find an asymmetry of lobbying efficiency, depending on the lobbying direction. About cooperation issues, Bombardini and Trebbi (2012) find that sectors characterized by a higher degree of competition (more substitutable products and a lower concentration of production) tend to lobby more together (through a sector-wide trade association), while sectors with higher concentration and more differentiated products lobby more individually. Moreover, Baumgartner and Leech (2001) study interest groups in the US and find that their behaviors on a given issue are determined by the scope and size of the issue, and by the lobbying behaviors of the other groups. Studying corporate lobbying, Blanga-Gubbay et al. (2020) looks at the determinants of lobbying expenditures on free trade agreements and finds that lobbying firms are larger than non-lobbying ones. The majority of the literature studies exclusively corporate lobbyists and little is known about nonprofits' lobbying. Yet, NGOs are involved in the policy-making process through their advocacy activities. I aim at filling this gap, by analyzing how NGOs organize themselves in the political landscape.

In the following section, I build a theoretical model analyzing ENGOs' lobbying efforts. I then describe the data sources and present some stylized facts in Section 3. Section 4 complements the theoretical analysis with an empirical analysis of lobbying efforts. Section 5 discusses the results and Section 6 concludes.

2 Theoretical analysis

In this section, I model the behavior of environmental non-governmental organizations (ENGOs), who undertake advocacy activities to make policies more pro-environment. I analyze the strategic interactions of multiple ENGOs, advocating over multiple topics. I consider that they make their decisions individually and that their decisions are simultaneous and independent, in a strategic non-cooperative game.

2.1 Two ENGOs, two topics model

I consider a framework with two different ENGOs that advocate over two different topics. Advocacy effort of NGO i over topic j is denoted e_{ij}, with $i \in \{1, 2\}$ and $j \in \{A, B\}$. Advocacy efforts are costly, as they require employees to meet with policy-makers or to be able to write notes to them for instance. I assume that advocacy effort over a topic

induces pro-environment policy change over this topic, at least to some degree.

2.1.1 Pro-environment policy change functions

Pro-environment policy change over topic j is denoted ΔP_j and measures the evolution of policies on the environmental angle. Taking the ban of a harmful phytosanitary product as an example, ΔP_j is positive if the ban is implemented at an earlier date, if the scope of banned usage is larger, or if the threshold for quantity allowed is smaller.

The pro-environment policy change function for topic j is a function of the two ENGOs' advocacy efforts on this topic (e_{1j} and e_{2j}), and of the counter-lobbying efforts from other actors on this topic (E_j).

$$\Delta P_j \equiv \Delta P_j(e_{1j}, e_{2j}, E_j) \tag{1}$$

This function is assumed to be continuous, and twice differentiable.

The marginal impact of an ENGO's effort on pro-environment policy change over a topic is assumed to decrease with the level of effort, meaning that the function is increasing and concave in ENGOs' advocacy efforts.

$$\frac{\partial \Delta P_j}{\partial e_{ij}} > 0, \ \frac{\partial^2 \Delta P_j}{\partial e_{ij}^2} < 0, \ \forall i, j \tag{2}$$

I assume that efforts from different ENGOs are not perfectly substitutable. ENGOs have different marginal impacts. One ENGO can be more efficient than another, depending on the knowledge of their employees or their political connections for instance.

$$\frac{\partial \Delta P_j}{\partial e_{1j}} \neq \frac{\partial \Delta P_j}{\partial e_{2j}}, \ \forall j \tag{3}$$

Lastly, I assume that efforts over a topic do not directly impact policy change on other topics: there are no advocacy spillovers. However, efforts on a given topic make efforts on the other topic cheaper, thanks to the transferability of efforts - which is introduced in the ENGO's efforts cost function. It follows that an action undertaken by an ENGO can enter as lobbying efforts over the other topic, for a small marginal cost. This way, the absence of advocacy spillover *per se* becomes more realistic.

$$\frac{\partial \Delta P_j}{\partial e_{i,-j}} = 0, \ \forall i, j \tag{4}$$

2.1.2 ENGOs' cost function and budget

ENGO i incurs a cost C_i for its advocacy activities, which depends on its level of effort on the two topics (e_{iA} and e_{iB}). This cost is to be understood as the resources needed

to bring information to policy-makers, such as the cost of producing reports or the travel expense to go meet policy-makers. I assume the marginal cost of effort over a topic to be increasing, as it becomes more complicated to create new information on the same topic, and as policy-makers' attention to a given topic is limited. It follows that C_i has to be strictly convex in efforts $\left(\frac{\partial^2 C_i}{\partial e_{ij}^2} > 0, \forall i, j\right)$. The second assumption made over this cost function is that the marginal cost of effort over a topic decreases with effort over the other topic $\left(\frac{\partial^2 C_i}{\partial e_{ij}\, \partial e_{i,-j}} \leqslant 0,\ \forall i, j\right)$. It reflects the fact that some efforts are transferable from one topic to the other, especially as a report or a meeting over a topic can also be used to mention a second topic.

Given these assumptions, C_i is represented by the following quadratic function.

$$C_i(e_{iA}, e_{iB}) = e_{iA}^2 + e_{iB}^2 - c_i \cdot e_{iA} \cdot e_{iB} \tag{5}$$

where $c_i \in [0, 2[$ represents the degree of transferability of efforts from one topic to another. If effort on one topic does not impact the marginal cost of effort on the other topic, c_i equals zero. Otherwise, c_i is strictly positive. Note that C_i is increasing in effort as long as $c_i \leqslant 2\frac{e_{ij}}{e_{i,-j}}, \forall j$.

ENGO i has an exogenous budget devoted to its advocacy activities, denoted B_i. Costs incurred by advocacy activities cannot exceed this amount: $C_i(e_{iA}, e_{iB}) \leqslant B_i$.

2.1.3 ENGOs' utility function

NGOs are non-profit and mission-oriented entities (Besley and Ghatak, 2005). In this setting, they care about pro-environment policy change, which they seek to maximize through their advocacy activities. Each ENGO has its discretionary preferences about the different topics. The relative preference parameter of ENGO i for topic j is denoted γ_{ij}, with $\gamma_{ij} > 0$.

The utility ENGO i gets from pro-environment policy change is represented by an additive function of pro-environment policy change over the different topics, weighted by the corresponding preference parameter:

$$\gamma_{iA}\, \Delta P_A + \gamma_{iB}\, \Delta P_B \tag{6}$$

2.2 Solving the program of one ENGO

In this part, I solve the program of ENGO 1. Given the symmetry of ENGOs' program, results hold also for ENGO 2, replacing parameters of ENGO 1 with those of ENGO 2.

First, advocacy effort over one topic can be expressed as a function of the effort over

the other topic. The binding budget constraint the ENGO faces can be rewritten[6]:

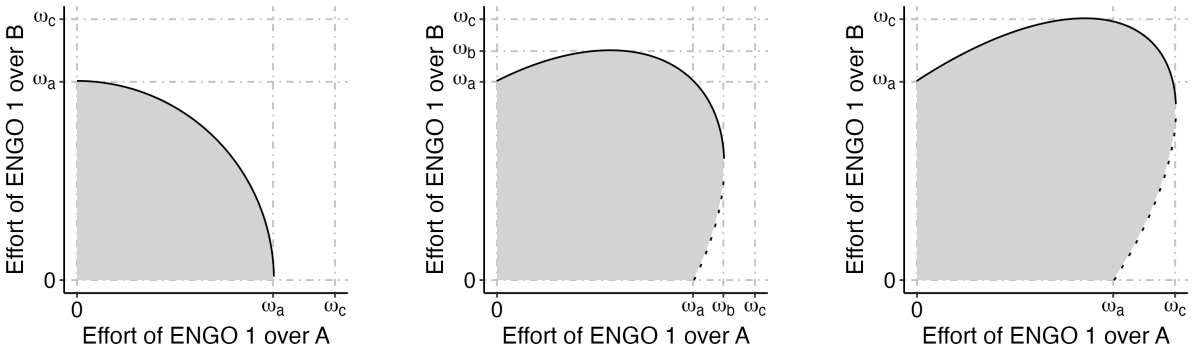
$$e_{1B} = \frac{c_1 \cdot e_{1A} \pm \sqrt{4B_1 - (4 - c_1^2)e_{1A}^2}}{2} \tag{7}$$

with $e_{1A} \leqslant 2\sqrt{\frac{B_1}{4-c_1^2}} \equiv \omega$.

Figure 1 draws this budget constraint, for different values of c_1. It represents the frontier of possible advocacy efforts for ENGO 1. As Equation 7 takes two forms, the solid line represents the case $e_{1B} = \frac{c_1 \cdot e_{1A} + \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$ and the dotted line the case $e_{1B} = \frac{c_1 \cdot e_{1A} - \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$, with $e_{1A} \geqslant \sqrt{B_1}$. The shaded areas represent the definition domain of efforts.

ω is defined as the maximum level of effort that can be made over a topic. It increases with the degree of transferability of effort c_1. If efforts are not transferable from one topic to the other ($c_1 = 0$, Figure 1a), the maximum level of effort ω_a is $\sqrt{B_1}$. The more transferable efforts from ENGO 1 are (c_1 larger), the larger the definition domain of efforts is. The ENGO can afford higher levels of effort on both topics when its efforts are transferable.

Figure 1: Budget constraint for advocacy efforts of ENGO 1



(a) $c_1 = 0$ (b) $c_1 = 1$ (c) $c_1 = 1.3$

with $\omega = \sqrt{\frac{4B_1}{4-c_1^2}}$. For $c_1 = 0$, I define $\omega_a \equiv \sqrt{B_1}$. For $c_1 = 1$, $\omega_b \equiv \sqrt{\frac{4B_1}{3}}$. For $c_1 = 1.3$, I denote ω as ω_c. The lines correspond to Equation 7, the solid line represents the case $e_{1B} = \frac{c_1 \cdot e_{1A} + \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$ and the dotted line the case $e_{1B} = \frac{c_1 \cdot e_{1A} - \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$. The shaded areas correspond to the definition domain of effort levels.

Incorporating this budget constraint into the utility function, ENGO 1 finds its optimal

[6]The calculation is developed in Appendix A.1.

lobbying effort over topic A with the following first-order condition[7].

$$\gamma_{1A}\frac{\partial \Delta P_A}{\partial e_{1A}} = -\gamma_{1B}\left(\frac{c_1}{2} \pm \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} \tag{8}$$

The left-hand side of Equation 8 represents the utility gain due to marginal advocacy effort over topic A. It corresponds to the pro-environment policy change obtained on topic A due to the marginal effort on A of ENGO 1, weighted by the preference parameter of ENGO 1 for this topic. The right-hand side represents the opportunity cost of a marginal increase in e_{1A}. It is measured by the loss in policy change on topic B due to smaller ENGO 1's advocacy effort over topic B following the marginal increase in its effort over A, weighted by the preference parameter of ENGO 1 for topic B. At the optimum, the weighted pro-environment policy change on one topic just offsets the weighted pro-environment policy change loss on the other topic.

Equation 8 admits a solution if and only if the term in brackets is negative. This term corresponds to the derivative of e_{1B} with respect to e_{1A}: this relationship between advocacy efforts must be negative at the optimum. It restricts the optimal efforts to the case

$$e_{1B} = \frac{c_1 \cdot e_{1A} + \sqrt{4B_1-(4-c_1^2)e_{1A}^2}}{2} \tag{9}$$

which is represented by the solid lines in Figure 1.

The first-order condition rewrites

$$\gamma_{1A}\frac{\partial \Delta P_A}{\partial e_{1A}} = -\gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} \tag{10}$$

and admits a solution when e_{1A} exceeds $c_1\sqrt{\frac{B_1}{4-c_1^2}} \equiv \alpha$. **At the optimum, the utility gains an ENGO derives from its effort on a topic equalizes the opportunity cost associated with this effort.**

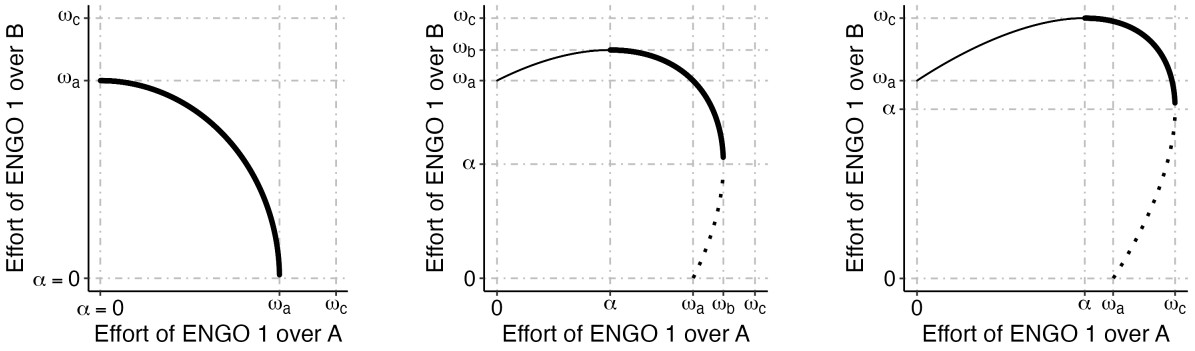
It follows that optimal efforts (Equation 9) lie within the interval $]\alpha;\omega]$, on the binding budget constraint. The exact solution depends on the form of the policy change function and the value of the parameters.

Figure 2 displays the optimal solutions for different values of the parameter c_1. Optimal solutions are represented by the thick part of the budget constraint. **It draws a decreasing and convex relationship between optimal efforts over topic A and topic B**, on a continuous interval $]\alpha;\omega]$. Increasing efforts over a topic implies increasingly reducing efforts over the other topic.

The optimal efforts also depend on the transferability of efforts, c_1. The higher c_1

[7]The calculation is developed in Appendix A.2.

Figure 2: Optimal advocacy efforts of ENGO 1



(a) $c_1 = 0$ (b) $c_1 = 1$ (c) $c_1 = 1.3$

with $\alpha = c_1\sqrt{\frac{B_1}{4-c_1^2}}$ and $\omega = 2\sqrt{\frac{B_1}{4-c_1^2}}$. For $c_1 = 0$, I define $\omega_a \equiv \sqrt{B_1}$. For $c_1 = 1$, $\omega_b \equiv \sqrt{\frac{4B_1}{3}}$. For $c_1 = 1.3$, I denote ω as ω_c. The lines correspond to Equation 7, the solid line represents the case $e_{1B} = \frac{c_1 \cdot e_{1A} + \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$ and the dotted line the case $e_{1B} = \frac{c_1 \cdot e_{1A} - \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$. The thick part of the line corresponds to the possible optimal effort levels.

is, the higher are both the lower and the upper bounds: the interval for optimal efforts is higher. The lower bound, α, increases faster, implying that a higher c_1 is associated with a smaller interval $]\alpha;\omega]$. It follows that getting involved in only one topic (full specialization) is not optimal. Even for ENGOs whose efforts cannot be transferred to the other topic ($c_1 = 0$), *i.e.* whose effort over one topic does not affect the marginal cost of efforts over the other topic, should not fully specialize. As c_1 increases, the interval $]\alpha;\omega]$ boils down to fewer possible solutions. Having different levels of effort on each topic becomes sub-optimal. A higher level of transferability of efforts makes the relationship between optimal e_{1A} and optimal e_{1B} more linear, as the relative marginal cost of effort is almost constant. Higher transferability makes efforts more efficient.

The exogenous budget B_1 of an ENGO also determines the possible optimal lobbying efforts. The higher the budget of an ENGO is, the higher the interval of optimal lobbying efforts $]\alpha;\omega[$. As the upper bound of the interval increases faster, a higher budget implies a broader interval of optimal efforts. This widened interval of optimal efforts allows the ENGO to have an optimal strategy with different levels of effort on each topic. Note that a change in budget translates the interval, it changes the scale but does not affect the graphical representation.

The second order condition associated with the program of ENGO 1 is

$$SOC_1 = \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} - \gamma_{1B}\left(\frac{2(4-c_1^2)B_1}{(4B_1 - (4-c_1^2)e_{1A}^2)^{3/2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}\right)^2 \frac{\partial^2 \Delta P_B}{\partial e_{1B}^2} \tag{11}$$

As $\frac{\partial^2 \Delta P_j}{\partial e_{ij}^2} < 0, \ \forall i, j$, SOC_1 is strictly negative[8].

The first term of the right-hand side of Equation 11 corresponds to the decrease in the marginal utility gain of e_{1A}: when e_{1A} increases, the marginal pro-environment policy change due to e_{1A} decrease. The second and third terms represent the higher loss in marginal utility due to smaller efforts on the other topic because of the budget constraint. When e_{1A} increases, a larger decrease in e_{1B} is necessary to increase e_{1A} further. This leads to a higher loss in pro-environment policy change over topic B as e_{1B} decreases. Moreover, this loss in pro-environment policy change over B increases when e_{1B} decreases. As marginal pro-environment policy change decreases with e_{1B}, the lower e_{1B} gets, the higher the marginal pro-environment policy change would have been if efforts had been allocated to topic B rather than topic A.

SOC_1 being strictly negative means that the ENGO's program is strictly convex and that the solution of Equation 10 is a maximum and is unique.

2.3 ENGOs' reaction functions

Pro-environment policy change is determined by advocacy or lobbying efforts of several actors. A modification of efforts from other actors might affect an ENGO's effort decision. This subsection studies ENGOs' best response functions to lobbying from other entities.

A change in the level of effort towards topic A from ENGO 2 (e_{2A}) affects policy change over A and hence is likely to change ENGO 1's behavior e_{1A}. Different levels of lobbying effort from the business sector towards topic A (E_A) impact policy change as well, and thus the effort decision on ENGO 1.

The pro-environment policy change function is defined without explicit functional form, in order not to restrict it. It follows that ENGO 1's reaction function e_{1A} cannot be directly derived from Equation 10. I use the implicit function theorem[9] to derive how the lobbying effort of a given ENGO over a given topic is affected by the lobbying of other actors (e_{2A} and E_A).

ENGOs' strategic interactions. ENGO 1's optimal level of effort e_{1A} is determined by Equation 10, in which the marginal impact of effort on pro-environment policy change enters. The latter is likely to be affected by ENGO 2's lobbying e_{2A}. The reaction function

[8]The calculation is developed in Appendix A.3.

[9]Calculation details are available in Appendix A.4.

of e_{1A} to e_{2A} writes[10]

$$\frac{\partial e_{1A}}{\partial e_{2A}} = -\frac{\gamma_{1A} \cdot \dfrac{\partial^2 \Delta P_A}{\partial e_{1A} \partial e_{2A}}}{2 \cdot SOC_1 - \gamma_{1A} \cdot \dfrac{\partial^2 \Delta P_A}{\partial e_{1A}^2}} \tag{12}$$

$$= -\frac{\gamma_{1A} \cdot \frac{\partial^2 \Delta P_A}{\partial e_{1A} \partial e_{2A}}}{\gamma_{1A} \frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} - 2\gamma_{1B} \left(\frac{2(4-c_1^2)B_1}{\left(4B_1 - (4-c_1^2)e_{1A}^2\right)^{\frac{3}{2}}} \right) \frac{\partial \Delta P_B}{\partial e_{1B}} + 2\gamma_{1B} \left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}} \right)^2 \frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}}$$

The numerator represents the change in marginal impact of e_{1A} provoked by e_{2A}, weighted by 1's preference parameter for topic A. One could assume the cross-derivative of the pro-environment policy change function with respect to both ENGO's efforts to be positive, thinking that their efforts are partial complements and reinforce each other. This is the case when assuming that policy-makers will be more inclined to implement pro-environment policy changes when hearing pro-environment arguments from different actors. Another assumption could be that ENGOs' efforts are partial substitutes in the policy change function, and that the cross-derivative is negative, as marginal impact of lobbying efforts is decreasing $\left(\frac{\partial^2 \Delta P_j}{\partial e_{ij}^2}, \forall i \in \{1,2\}, j \in \{A,B\}\right)$.

The denominator is negative, as each of the three terms is negative. It is composed of the same elements as SOC_1 (see Equation 11 and its interpretation), with a larger weight on the loss in marginal utility due to smaller efforts on B.

It follows that the sign of the cross-derivative of the policy change function determines the sign of Equation 12. ENGOs' efforts are strategic complements when they reinforce each other in the policy change function (partial complements) and are strategic substitutes when they are partial substitutes within the policy change function.

Computing the sign and magnitude of the strategic complementarity or substitutability of ENGOs' efforts would require to introduce a number of restrictive assumptions in the model. In the next sections, I instead introduce and analyze new data to inform us on these srategic interactions.

ENGOs' response to counter-lobbying. Applying the same formula (see Appendix A.4), the response of ENGO 1 to counter-lobbying E_A is given by

$$\frac{\partial e_{1A}}{\partial E_A} = -\frac{\gamma_{1A} \cdot \dfrac{\partial^2 \Delta P_A}{\partial e_{1A} \partial E_A}}{2 \cdot SOC_1 - \gamma_{1A} \cdot \dfrac{\partial^2 \Delta P_A}{\partial e_{1A}^2}} \tag{13}$$

The denominator is the same as in Equation 12, it is negative. The sign of the response of ENGO 1 to lobbying from the business sector is thus determined by the sign of the

[10] See Appendix A.4 for details.

cross-derivative of the pro-environment policy change function with respect to e_{1A} and E_A. One could assume that increased lobbying from the business sector contributes to raising attention toward a topic, making the issue more salient to policy-makers and hence making the ENGO's effort more efficient (positive cross-derivative). The ENGO would then increase its effort with lobbying from the business sector as it is when they are more efficient, and reduce it otherwise. In other words, they would follow the business sector lobbying agenda. On the other hand, lobbying from the business sector might oppose the pro-environment policy changes pushed by ENGOs and decrease the chances of ENGOs observing the changes they ask for (negative cross-derivative assumption). As effort is costly, the ENGO would reduce its effort as it becomes less efficient.

The rest of the paper proposes an empirical analysis of environmental NGOs' advocacy efforts in the European Union. This empirical analysis sheds light on the ENGOs' reaction functions. Measuring overall pro-environmental policy changes is challenging[11] and studies focusing on changes within a specific bill[12] do not permit understanding this effort allocation across multiple topics. I focus on the observed lobbying effort by topic and ENGO to inform on the shape of the reaction functions to get information on the shape of the policy change function. I measure ENGOs' advocacy efforts and counter-lobbying from data on meetings held with European Commission members.

3 Data

This section describes the data used in this paper. I use data from the EU Transparency Register and from the list of meetings held with European Commission members.

3.1 The European Union Transparency Register

The European Union created its transparency register in 2011 to make the EU policy-making process more transparent and improve the accountability of EU institutions. In principle, this register aims at covering all activities "carried out with the objective of directly or indirectly influencing the formulation or implementation of policy and the decision-making processes of the EU institutions" (European Parliament, 2014). In practice, registration is voluntary, but required to undertake specific lobbying activities. In particular, registration is required to hold a meeting with high-officials of the European Commission (Commissioners, their cabinet members or Directors-General), since 2014 and start of meetings public disclosure.

[11] See the EPS indicator for OECD countries by Botta and Koźluk (2014) and Kruse et al. (2022) on 13 policy instruments.

[12] See Meng and Rode (2019) and Logeart (2014).

The register conveys a large database and represents a substantial improvement to get the picture of the entities involved in lobbying at the EU. Yet self-reported information on entities' budget or lobbying costs are often non satisfying. In 2018, 3,963 quality controls were carried out by the Register's Secretariat. 48.52% were deemed satisfactory and among the others, 1,110 were removed from the Transparency Register (High Authority for transparency in public life, 2020). This information has to be considered into perspective. In this paper, I measure lobbying or advocacy efforts based on the number of meetings held with officials from the European Commission rather than self-declared lobbying expenditures for this reason. The meeting records are published by the Commission itself and is assumed to be more reliable.

3.2 The European Commission Meetings Lists

The European Commission is one of the three institutions involved in the European Union policy-making process, with the European Parliament and the Council of the EU. The European Commission is in charge of making new legislative proposals. Any proposal voted at the Parliament, and then at the Council, comes from the Commission. It makes Commission members relevant targets for lobbying (Skodvin et al., 2010; Laurens, 2015).

Information on meetings held by Commission members has to be published since 2014. It concerns both the meetings held between Directors-General of the Commission and organizations or self-employed individuals (European Commission, 2014a) and the meetings held between Members of the Commission and organizations or self-employed individuals (European Commission, 2014b). I create a database with all the meetings declared by members of the Commission[13] during the Juncker Commission (November 1, 2014 - November 30, 2019), during the beginning of the Von der Leyen Commission mandate (December 1, 2019 - December 31, 2023) and all the meetings held by Directors-Generals over the whole period (November 1, 2014 - December 31, 2023). For each of the 39,018 meetings, I trace its exact date, the concerned portfolio, the declared subject for the meeting, and the entities that met. I connect this database to the EU Transparency Register to get the characteristics of these entities.

To categorize precisely the meetings according to their specific environmental subfield(s), I create a classification system for meetings, based on textual analysis. It contains nine categories: "Air", "Chemicals", "Climate", "Energy", "Policies and Finance", "Oceans and Water", "Nature and Biodiversity", "Soil and Land", and "Waste, Circular Economy and Plastics". Meetings can belong to several categories, which corresponds to the transferability of effort introduced in Section 2.1.2. The numerous typos and mix of languages, as well as the nature of the text (short and not structured into sentences) make it impossible to apply existing classifiers or to rely on machine learning approaches.

[13]It includes the President, the First Vice-President, the Vice-Presidents, the High-Representatives, the Commissioners, and their Cabinet.

Appendix B presents in details the methodology I use. I then construct lobbying effort variables at the entity-topic-month level from the number of meetings an entity has on a topic.

3.3 Descriptive statistics

This part aims at making the reader familiar with the data, particularly meeting data that have never been used in the literature. I present some stylized facts and representations of the advocacy network within the European Commission.

Time distribution of meetings. The data I collected covers meetings from November 1, 2014[14] to December 31, 2023. It is spread over two different Commissions: the Juncker Commission took up its post on November 1, 2014, and stayed until the beginning of the von der Leyen Commission mandate, on December 1, 2019. Figure 3 presents the quarterly distribution of meetings over this period. The Juncker Commission displays a decreasing activity throughout its mandate: reported meetings are more numerous at the beginning of the term. It corresponds to the activity at the beginning of a mandate: interest groups present themselves to the legislators and bring up issues to be tackled during the mandate. The Von der Leyen Commission does not exhibit the same trend, probably because Covid-19 prevented the spike of meetings at the beginning of its term. Meeting distribution shows seasonality, with less activity in the summer. The same trend and seasonality apply when looking only at meetings on environmental topics, represented by the green line. These meetings on environmental topics represent a strikingly constant share of the total number of meetings during the Juncker Commission (about 20%). The Von der Leyen Commission meets relatively more on environmental topics.

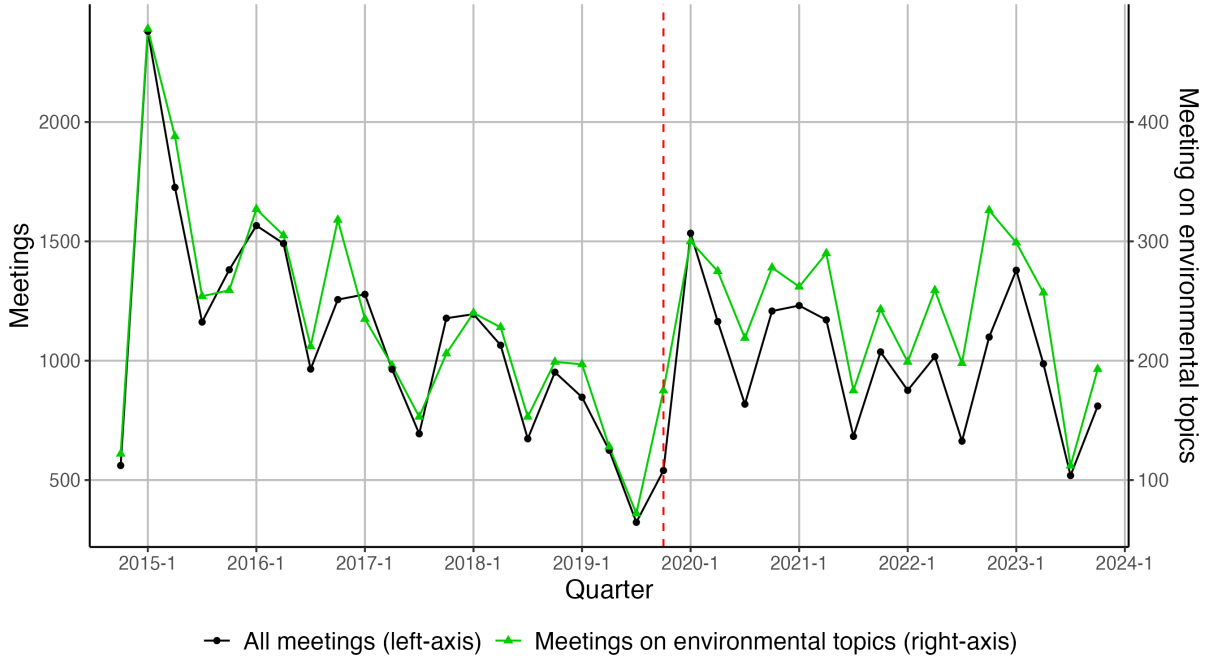
Category of meetings. I classify 8,730 meetings in the nine environment-related topics[15]. 1,601 of these meetings (18.34%) involve at least one environmental NGO. The other meetings remain unclassified either because the description was too succinct to enable classification or because it was not a meeting with an environment-related topic. Appendix Figure A.1 presents the relative attention topics get in Commission meetings over time. Energy-related meetings represent a substantial share of the Commission's meetings, with 3,361 meetings. It represents 50% of the meetings at the beginning of the Juncker Commission.

Type of actors. Figure 4 presents the quarterly distribution of the different type of actors attending meetings with European Commission members. All types display consistent

[14] Some November 2014 meetings might be unpublished and thus missing to our database as the Commission Decision on the publication of meetings information (European Commission, 2014a,b) dates back to November 25, 2014 and applies from December 1, 2014 onwards.

[15] "Air", "Chemicals", "Climate", "Energy", "Policies and Finance", "Oceans and Water", "Nature and Biodiversity", "Soil and Land", and "Waste, Circular Economy and Plastics".

Figure 3: Distribution of meetings



Note: The dashed red line represents the December 2019 change of Commission. The total number of meetings at the entity level is represented by the black line (left axis), and the green line represents the number of meetings categorized as environmental (right axis).

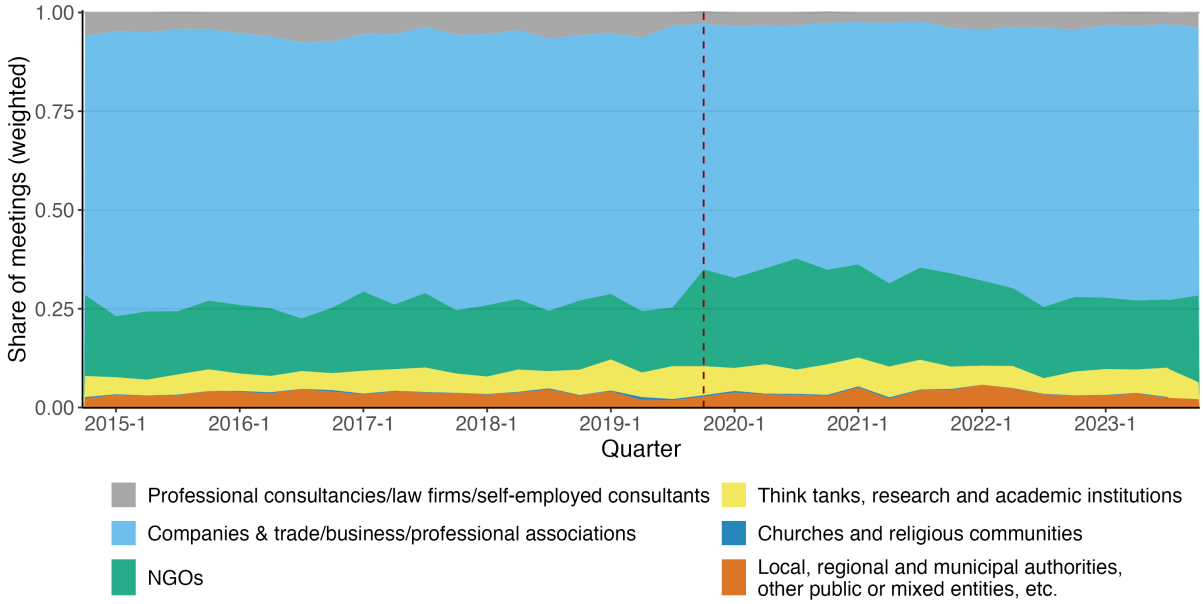
shares of the Commission's attention over time, though unequal. The business sector is the most represented type of actors, with about 66% of meetings. The second main type -NGOs- represents less than a third of it (about 19%). It reflects the fact that Commission members seek to meet regularly with the different actors, to stay accountable to the citizens. The actor distribution in meetings on environmental topics reflects the overall distribution, with more variation (see Appendix Figure A.2). Beyond the fact that the business sector as a group gets more meetings than other types of actors, they also get more meetings per entity, as shown in Figure 5. They represent 55.87% of entities having meetings with the European Commission, but 65.81% of meetings. On the other hand, the NGOs represent a smaller share of meetings (19.43%) than the share of entities having meetings they represent (24.81%).

4 Empirical analysis of strategic interactions

I use the data described in the previous sections to empirically analyze the lobbying decisions of environmental NGOs. I investigate ENGOs' strategic interactions in the topics they broach with Commission members.

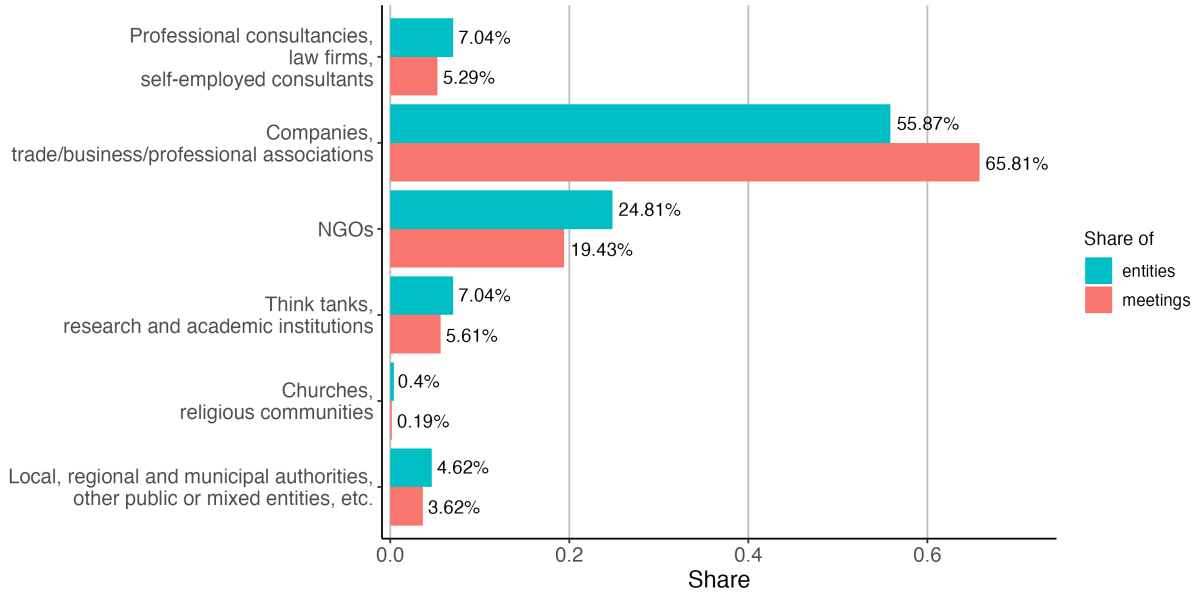
I compute lobbying effort of an ENGO at the topic-month level, as the number of meetings it has on a given topic and in a given month. Following the notation used in

Figure 4: Quarterly distribution of the types of actors meeting with the Commission



Notes. The NGOs category here includes both ENGOs and other NGOs. The dashed vertical line stands for the December 2019 Commission change.

Figure 5: Concentration of entities and meetings per type of actors



Notes. The NGOs category here includes both ENGOs and other NGOs.

the theoretical model (see Section 2) and introducing month subscript t, I denote e_{ijt} the lobbying effort of ENGO i on topic j in month t. One meeting can be about several topics and appear several times in an ENGO's lobbying effort. It corresponds to the transferability of effort introduced in Section 2.1.2.

I relate this lobbying effort to the lobbying effort of the other ENGOs, taken as a group $\left(e_{-i,j,t} = \sum_{k \neq i} e_{k,j,t}\right)$. When several entities go to the same meeting, I count this

meeting once per entity[16].

Environmental NGOs' lobbying efforts decisions are also likely to be impacted by lobbying activities of the business sector over the same topics (see Section 2.3). I compute the total effort variable for the type "in-house lobbyists and trade/business/professional associations" of the Transparency Register and denote it e_{ct}^{business}.

Due to the count nature of the outcome variable, I estimate the following Poisson pseudo-maximum-likelihood (PPML) model at the ENGO-topic-month level.

$$e_{ijt} = \exp\big(\alpha + \beta_1\ e_{-i,jt} + \beta_2\ e_{jt}^{\text{business}} + \beta_3\ e_{it} + \gamma_i + \delta_j + \mu_t\big) + u_{ijt} \tag{14}$$

where e_{it} controls for i's overall effort in t, γ_i represents ENGO fixed-effects, δ_j category fixed-effects, and μ_t month fixed-effects. u_{ijt} is an unobserved error term.

In an alternative specification, I consider all the types of actors present in the EU Transparency Register, although these categories are much smaller (see Figure 4). I denote e_{ct}^{consult} the effort from the group "Professional consultancies/law firms/self-employed consultants" on category c in period t; e_{ct}^{NGOs} the effort from non-governmental organizations that are not ENGOs; e_{ct}^{research} the effort from the group "Think tanks, research and academic institutions"; $e_{ct}^{\text{religious}}$ the effort from the group "Organisations representing churches and religious communities"; e_{ct}^{public} the effort from the group "Organisations representing local, regional and municipal authorities, other public or mixed entities, etc.". This model writes:

$$\begin{aligned} e_{ijt} = \exp\big(\ \alpha + \beta_1\ e_{-i,jt} + \beta_2\ e_{jt}^{\text{business}} + \beta_3\ e_{jt}^{\text{consult}} + \beta_4\ e_{jt}^{\text{NGOs}} + \beta_5\ e_{jt}^{\text{research}} \\ + \beta_6\ e_{jt}^{\text{religious}} + \beta_7\ e_{jt}^{\text{public}} + \beta_8\ e_{it} + \gamma_i + \delta_j + \mu_t\big) + u_{ijt} \end{aligned} \tag{15}$$

In these four models, the coefficient β_1 reflects the complementarity degree of ENGOs' lobbying efforts. A positive β_1 would indicate that ENGOs move together. The stronger the coefficient, the larger the reaction of ENGOs to the rest of their group is. In the same way, β_2 reflects the reaction function of ENGOs to lobbying from the business sector.

Table 1 reports the results of these two models, respectively in columns (1) and (2). Estimations are based on ENGOs having at least one categorized meeting in the whole sample.

Both columns consistently report a statistically significant and positive β_1. They correspond to a semi-elasticity of respectively 11.63% and 10.85%. It indicates that **lobbying efforts from ENGOs are strategic complements.** ENGOs are aligned together in their lobbying efforts: they bring up the same topics at the same time. This is consistent with ENGOs' efforts being partial complements in the pro-environmental policy change function (see Section 2.3). ENGOs' efforts reinforce each other and seem to create a

[16] Appendix Table A.6 presents a robustness test discarding such meetings.

Table 1: ENGOs Strategic Interactions

Dependent variable:	Effort of ENGO i on c in t	
	(1)	(2)
Effort of ENGOs w/o i	.110***	.103***
	(.00489)	(.00535)
Effort of business sector	.00248	-.000850
	(.00246)	(.00276)
Effort of consultants		.0255
		(.0273)
Effort of other NGOs		.0594*
		(.0269)
Effort of think tanks & research		.0478*
		(.0243)
Effort of religious groups		-.500
		(.473)
Effort of public actors		.0312
		(.0360)
Effort of i in t	.649***	.647***
	(.0212)	(.0213)
ENGO FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	388,800	388,800
Pseudo R^2	.347	.347
Dep. Var. Mean	.00745	.00745
Dep. Var. SD	.104	.104

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

confirmation effect for the policy-makers.

In contrast, β_2 being null indicates that ENGOs do not seem to lobby on topics at the same time as the business sector. On the one hand, this result contradicts the hypothesis that ENGOs' lobbying effort decisions are driven by opportunism or political agenda effects, which would lead all actors to lobby on the same topic at the same time (see Section 2.3). On the other hand, it also contradicts the hypothesis that ENGOs reduce their lobbying efforts because counter-lobbying would decrease their efficiency. Instead, ENGOs appear to be independent of business sector lobbying efforts on environmental topics. I investigate the symmetrical model in Table 2 by looking at the way the business

sector interacts with ENGOs, to understand whether business sector lobbying efforts on environmental topics are also independent of ENGOs' efforts.

The results of column (2) further show that none of the other actors' efforts seem to interact with ENGOs' decisions over their lobbying efforts.

Appendix Tables A.2, A.3 and A.4 present the results including 1- and 2-month lags for each effort variable. Results are robust to the inclusion of lags and show that the timing within a given month matters the most. It further gives insight into the high responsiveness and the importance of timing in lobbying activities, as the coefficients for the efforts of other ENGOs in the last two months are null, or slightly negative.

Business sector response to ENGOs lobbying. Symmetrically, I investigate how the business sector reacts to ENGOs lobbying, and lobbying from other actors. The models estimated are similar to the ones in Equations 14 and 15, where instead of other ENGOs, I consider other business actors for $e_{-i,jt}$. Moreover, I consider the effort of ENGOs as a group, instead of the effort of business actors.

The results are displayed in Table 2. First, they indicate that lobbying efforts within the business sector are strategic complements, as is the case for ENGOs - although to a smaller extent. Second, the business sector actors tend to follow ENGOs' -and more generally NGOs'- allocation of effort on environmental topics, while the reverse is not true (see Table 1).

Appendix Table A.5 presents the results when adding lag efforts to the model. They indicate that efforts over a topic mostly happen during the same month. They also seem to indicate that actors from the business sector tend to increase their efforts on a topic broached more by ENGOs in the previous month.

Putting these results together gives information on the dynamics at play. ENGOs seem to impose their agenda on the business sector when it comes to environmental topics. It is surprising as meetings involving the business sector are more than twice as numerous as those involving ENGOs, even on environmental topics (see Appendix Figure A.2).

5 Discussion

The results presented in Section 4 indicate that (1) ENGOs tend to lobby on the same topic at the same time, (2) ENGOs' lobbying effort do not follow those of other actors, and (3) the business sector follow the topic and timing of ENGO when it comes to lobbying over environmental topics.

I measure lobbying efforts as having meetings with members of the European Commission on environmental topics. As indicated above, several entities sometimes attend meetings together. Although most of the meetings (91.12%) are individual meetings[17], the

[17]I define individual meetings as meetings in which a single entity meets with members of the European

Table 2: Business Sector Strategic Interactions

Dependent variable:	Effort of enity i on c in t	
	(1)	(2)
Effort of business w/o i	.0260***	.0235***
	(.00131)	(.00145)
Effort of ENGOs	.0242***	.0174***
	(.00374)	(.00421)
Effort of consultants		.0336*
		(.0135)
Effort of other NGOs		.0674***
		(.0173)
Effort of think tanks & research		.00459
		(.0136)
Effort of religious groups		.588***
		(.170)
Effort of public actors		.0379*
		(.0192)
Effort of i in t	.920***	.920***
	(.0141)	(.0141)
Entity FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	1,727,550	1,727,550
Pseudo R^2	.321	.321
Dep. Var. Mean	.00518	.00518
Dep. Var. SD	.0843	.0843

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

meetings held together could drive the results found. Indeed, 7.63% of ENGOs meetings involve several entities while meetings with several entities represent 3.13% of the business sector meetings. This difference could explain part of the results, and bias them upwards. I thus estimate Equations 14 and 15 with all variables computed only on individual meetings. Results are available in Appendix Table A.6 for ENGOs and in Appendix Table A.7 for the business sector. They display smaller coefficients for the complementarity of ENGOs than the models computed with all meetings. The order of magnitude remains

Commission. The rest of the meetings involve several entities, with up to 37 entities attending the same meeting.

similar, with a semi-elasticity as high as 9%. With this set of results, ENGOs are still found to be independent of the business sector's behavior. The results of the reaction of the business sector to ENGOs behavior becomes noisier, but if anything higher. Overall, removing meetings held together does not affect significantly the results.

These results give information about the form of the pro-environmental policy change function. Efforts from different ENGOs are partial complements, they reinforce one another. Due to data limitations, I can not observe the pro-environmental policy changes in the European Union, on the topics I define and at the month-level. The pro-environment policy change function can as well be interpreted as the beliefs ENGOs hold over it, which they base their decisions on.

6 Conclusion

Environmental non-governmental organizations (ENGOs) play a key role in the defense of the environment. They engage in several activities to protect the environment, such as advocacy activities to foster pro-environment policy changes. While the literature on policy-making processes accounts for lobbying from industrial actors and while NGOs represent the second major actor in lobbying activities, NGOs are under-studied.

In this paper, I design a model of two ENGOs, advocating over two topics to generate pro-environmental policy changes, in the presence of counter-lobbying. I study their optimal strategies and their strategic interactions, both among themselves and with other actors such as the business sector. Without imposing a functional form to the pro-environmental policy change function, I derive the reaction function of ENGOs' lobbying effort to the lobbying effort of the other ENGO and of the other actor. To get information on the sign and magnitude of these strategic interactions, I build a novel dataset on lobbying efforts at the entity-topic-month level, based on the list of meetings held with members of the European Commission or Directors-General. I classify meetings into topics based on the meetings' declared subject.

I find that ENGOs tend to follow a common political agenda in their advocacy activities, even though other actors do not lobby on these topics at the same time. On the contrary, the business sector appears to exert more effort on a topic once this topic receives attention from ENGOs. ENGOs impose their agenda on the business sector for environmental topics. While the business sector has more than twice as many meetings on environmental topics than ENGOs, the business sector does not move first, it reacts to ENGOs' lobbying.

These results shed light on the dynamics at play among different actors involved in lobbying activities. Understanding how lobbying works is key to designing policies that can be implemented. This study highlights the key role of environmental NGOs' lobbying for environmental topics to be discussed.

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A Appendix: Calculation

A.1 Equation 7: Budget constraint

From Equation 5 and from the binding budget constraint $C_1(e_{1A}, e_{1B}) = B_1$:

$$\begin{aligned} & e_{1A}^2 + e_{1B}^2 - c_1 \cdot e_{1A} \cdot e_{1B} = B_1 \\ \iff & e_{1A}^2 + e_{1B}^2 - c_1 \cdot e_{1A} \cdot e_{1B} - B_1 = 0 \end{aligned}$$

which is a quadratic equation in e_{1B} and can be solved with the quadratic formula.

$$\begin{aligned} e_{1B} &= \frac{-\left(-c_1 \cdot e_{1A}\right) \pm \sqrt{\left(-c_1 \cdot e_{1A}\right)^2 - 4 \cdot (e_{1A}^2 - B_1)}}{2} \\ &= \frac{c_1 \cdot e_{1A} \pm \sqrt{c_1^2 \cdot e_{1A}^2 - 4 \cdot e_{1A}^2 + 4 \cdot B_1}}{2} \\ &= \frac{c_1 \cdot e_{1A} \pm \sqrt{4B_1 - (4 - c_1^2) e_{1A}^2}}{2} \end{aligned}$$

This corresponds to Equation 7.

For this equation to be defined, one needs the square root to be defined, meaning

$4B_1 - (4 - c_1^2)e_{1A}^2$ has to be non-negative:

$$
\begin{aligned}
& 4B_1 - (4 - c_1^2)e_{1A}^2 \geqslant 0 \\
\iff & 4B_1 \geqslant (4 - c_1^2)e_{1A}^2 \\
\iff & \frac{4B_1}{4 - c_1^2} \geqslant e_{1A}^2 && \text{as } 4 - c_1^2 \text{ is positive with } c_1 \in [0, 2[\\
\iff & \sqrt{\frac{4B_1}{4 - c_1^2}} \geqslant e_{1A} \\
\iff & e_{1A} \leqslant 2\sqrt{\frac{B_1}{4 - c_1^2}}
\end{aligned}
$$

which corresponds to the condition associated with Equation 7.

Let's check the condition for e_{1B} to be non-negative.

The case $\frac{c_1 \cdot e_{1A} + \sqrt{4B_1 - (4 - c_1^2)e_{1A}^2}}{2}$ is always positive, by construction.

For $\frac{c_1 \cdot e_{1A} - \sqrt{4B_1 - (4 - c_1^2)e_{1A}^2}}{2}$ to be positive, one should have:

$$
\begin{aligned}
& c_1 \cdot e_{1A} - \sqrt{4B_1 - (4 - c_1^2)e_{1A}^2} \geqslant 0 \\
\iff & c_1 \cdot e_{1A} \geqslant \sqrt{4B_1 - (4 - c_1^2)e_{1A}^2} \\
\iff & c_1^2 \cdot e_{1A}^2 \geqslant 4B_1 - (4 - c_1^2)e_{1A}^2 \\
\iff & c_1^2 \cdot e_{1A}^2 + (4 - c_1^2) \cdot e_{1A}^2 \geqslant 4B_1 \\
\iff & 4e_{1A}^2 \geqslant 4B_1 \\
\iff & e_{1A} \geqslant \sqrt{B_1}
\end{aligned}
$$

A.2 Equation 8: First order condition

The budget constraint (Equation 7) included in the utility function of ENGO 1 (Equation 6) gives a utility function depending only on e_{1A}:

$$
\begin{aligned}
& \gamma_{1A}\ \Delta P_A(e_{1A}, e_{2A}, E_A) + \gamma_{1B}\ \Delta P_B(e_{1B}, e_{2B}, E_B) \\
= & \gamma_{1A}\ \Delta P_A(e_{1A}, e_{2A}, E_A) + \gamma_{1B}\ \Delta P_B\left(\frac{c_1 \cdot e_{1A} \pm \sqrt{4B_1 - (4 - c_1^2)e_{1A}^2}}{2}, e_{2B}, E_B\right) \qquad (16)
\end{aligned}
$$

Equating its first derivative to zero:

$$
\begin{aligned}
& \gamma_{1A}\,\frac{\partial \Delta P_A}{\partial e_{1A}} + \gamma_{1B}\,\frac{\partial \frac{c_1 \cdot e_{1A} \pm \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}}{\partial e_{1A}}\,\frac{\partial \Delta P_B}{\partial e_{1B}} = 0 \\
\iff & \gamma_{1A}\,\frac{\partial \Delta P_A}{\partial e_{1A}} + \gamma_{1B}\left(\frac{c_1}{2} \pm \frac{-2(4-c_1^2)e_{1A}}{2 \cdot 2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} = 0 \\
\iff & \gamma_{1A}\,\frac{\partial \Delta P_A}{\partial e_{1A}} + \gamma_{1B}\left(\frac{c_1}{2} \pm \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} = 0 \\
\iff & \gamma_{1A}\frac{\partial \Delta P_A}{\partial e_{1A}} = -\gamma_{1B}\left(\frac{c_1}{2} \pm \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}}
\end{aligned}
$$

which corresponds to Equation 8.

The right-hand side $\gamma_{1A}\frac{\partial \Delta P_A}{\partial e_{1A}}$ is strictly positive by definition. For the equation to admit a solution, the left-hand side must be strictly positive too, which is only possible when the term in brackets is negative, meaning in the case $\pm$ is a minus (Equation 10). This corresponds to the case $e_{1B} = \frac{c_1 \cdot e_{1A} + \sqrt{4B_1 - (4-c_1^2)e_{1A}^2}}{2}$ of Equation 7, graphically represented by the solid lines in Figure 1.

The left-hand side is negative when:

$$
\begin{aligned}
& \frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}} < 0 \\
\iff & \frac{c_1}{2} < \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1 - (4-c_1^2)e_{1A}^2}} \\
\iff & c_1 \cdot \sqrt{4B_1 - (4-c_1^2)e_{1A}^2} < (4-c_1^2)e_{1A} \\
\iff & c_1^2 \cdot \left(4B_1 - (4-c_1^2)\cdot e_{1A}^2\right) < (4-c_1^2)^2 \cdot e_{1A}^2 \\
\iff & 4B_1 \cdot c_1^2 < \left((4-c_1^2)^2 + c_1^2(4-c_1^2)\right) \cdot e_{1A}^2 \\
\iff & 4B_1 \cdot c_1^2 < \left(4^2 - 2\cdot 4c_1^2 + c_1^4 + 4c_1^2 - c_1^4\right) \cdot e_{1A}^2 \\
\iff & 4B_1 \cdot c_1^2 < \left(4^2 - 4c_1^2\right) \cdot e_{1A}^2 \\
\iff & B_1 \cdot c_1^2 < \left(4 - c_1^2\right) \cdot e_{1A}^2 \\
\iff & \sqrt{B_1} \cdot c_1 < \sqrt{4 - c_1^2} \cdot e_{1A} \\
\iff & e_{1A} > c_1\sqrt{\frac{B_1}{4-c_1^2}}
\end{aligned}
$$

This is the condition indicated after Equation 10.

A.3 Equation 11: Second order condition

The second-order condition is the second derivative of the utility function (Equation 16). Let's derivate the FOC (Equation 10):

$$
\begin{aligned}
& \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} + \gamma_{1B}\left[\frac{\partial\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)}{\partial e_{1A}}\frac{\partial \Delta P_B}{\partial e_{1B}} + \left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)\frac{\partial e_{1B}}{\partial e_{1A}}\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}\right] \\
= \; & \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} + \gamma_{1B}\left(-\frac{(4-c_1^2)\cdot 2\sqrt{4B_1-(4-c_1^2)e_{1A}^2} - (4-c_1^2)e_{1A}\cdot 2\frac{-2(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}}{4\left(4B_1-(4-c_1^2)e_{1A}^2\right)}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} \\
& + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2} \\
= \; & \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} - \gamma_{1B}\left(\frac{(4-c_1^2)\cdot\sqrt{4B_1-(4-c_1^2)e_{1A}^2} + \frac{2(4-c_1^2)^2 e_{1A}^2}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}}{2\left(4B_1-(4-c_1^2)e_{1A}^2\right)}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} \\
& + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2} \\
= \; & \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} - \gamma_{1B}\left(\frac{\frac{(4-c_1^2)\cdot\left(4B_1-(4-c_1^2)e_{1A}^2\right)}{\sqrt{4B_1-(4-c_1^2)e_{1A}^2}} + \frac{(4-c_1^2)^2 e_{1A}^2}{\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}}{2\left(4B_1-(4-c_1^2)e_{1A}^2\right)}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} \\
& + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2} \\
= \; & \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} - \gamma_{1B}\left(\frac{4\cdot(4-c_1^2)\cdot B_1}{2\left(4B_1-(4-c_1^2)e_{1A}^2\right)^{\frac{3}{2}}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} \\
& + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2} \\
= \; & \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2} - \gamma_{1B}\left(\frac{2(4-c_1^2)B_1}{\left(4B_1-(4-c_1^2)e_{1A}^2\right)^{3/2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}} + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}
\end{aligned}
$$

A.4 Equations 12 and 13: Reaction function

Denoting $F = \gamma_{1A}\frac{\partial \Delta P_A}{\partial e_{1A}} + \gamma_{1B}\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)\frac{\partial \Delta P_B}{\partial e_{1B}}$ (Equation 10) and using the implicit function theorem, one can derive the way e_{1A} is affected by parameter $\rho \in \{e_{2A}, E_A\}$ (Equations 12 and 13).

$$
\frac{\partial e_{1A}}{\partial \rho} = -\frac{\frac{\partial F}{\partial \rho}}{\frac{\partial F}{\partial e_{1A}}} = -\frac{\frac{\partial F}{\partial \rho}}{SOC_1}
$$

with

$$\begin{aligned}\frac{\partial F}{\partial \rho} = &\ \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho} + \gamma_{1B}\left[\frac{\partial\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)}{\partial \rho}\frac{\partial \Delta P_B}{\partial e_{1B}} + \left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)\frac{\partial e_{1B}}{\partial \rho}\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}\right] \\ = &\ \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho} + \gamma_{1B}\left[\frac{\partial\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)}{\partial e_{1A}}\frac{\partial e_{1A}}{\partial \rho}\frac{\partial \Delta P_B}{\partial e_{1B}}\right. \\ &\left. + \left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)\frac{\partial e_{1B}}{\partial e_{1A}}\cdot\frac{\partial e_{1A}}{\partial \rho}\cdot\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}\right]\end{aligned}$$

From Appendix A.3, $\frac{\partial\left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)}{\partial e_{1A}} = -\frac{2(4-c_1^2)B_1}{\left(4B_1-(4-c_1^2)e_{1A}^2\right)^{3/2}}$ and

$$\gamma_{1B}\left[-\frac{2(4-c_1^2)B_1}{\left(4B_1-(4-c_1^2)e_{1A}^2\right)^{3/2}}\frac{\partial \Delta P_B}{\partial e_{1B}} + \left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}\right] = SOC_1 - \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2}$$

The derivative rewrites

$$\begin{aligned}\frac{\partial F}{\partial \rho} &= \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho} + \frac{\partial e_{1A}}{\partial \rho}\gamma_{1B}\left[-\frac{2(4-c_1^2)B_1}{\left(4B_1-(4-c_1^2)e_{1A}^2\right)^{3/2}}\frac{\partial \Delta P_B}{\partial e_{1B}}\right. \\ &\qquad \left. + \left(\frac{c_1}{2} - \frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2 \Delta P_B}{\partial e_{1B}^2}\right] \\ &= \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}\,\partial \rho} + \frac{\partial e_{1A}}{\partial \rho}\left(SOC_1 - \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2}\right)\end{aligned}$$

Putting it back into the main equation:

$$\begin{aligned}&\frac{\partial e_{1A}}{\partial \rho} = -\frac{1}{SOC_1}\cdot\left[\gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho} + \frac{\partial e_{1A}}{\partial \rho}\left(SOC_1 - \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2}\right)\right] \\ \iff &\frac{\partial e_{1A}}{\partial \rho} = \frac{-\frac{1}{SOC_1}\cdot\gamma_{1A}\cdot\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho}}{1 + \frac{1}{SOC_1}\cdot\left(SOC_1 - \gamma_{1A}\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2}\right)} \\ &= \frac{-\frac{1}{SOC_1}\cdot\gamma_{1A}\cdot\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho}}{\frac{1}{SOC_1}\left(2\cdot SOC_1 - \gamma_{1A}\cdot\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2}\right)} \\ &= \frac{-\gamma_{1A}\cdot\frac{\partial^2 \Delta P_A}{\partial e_{1A}\partial \rho}}{2\cdot SOC_1 - \gamma_{1A}\cdot\frac{\partial^2 \Delta P_A}{\partial e_{1A}^2}}\end{aligned}$$

The denominator rewrites

$$2\left(\gamma_{1A}\frac{\partial^2\Delta P_A}{\partial e_{1A}^2}+\gamma_{1B}\left[\left(\frac{-2(4-c_1^2)B_1}{(4B_1-(4-c_1^2)e_{1A}^2)^{\frac{3}{2}}}\right)\frac{\partial\Delta P_B}{\partial e_{1B}}-\left(\frac{c_1}{2}-\frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2\Delta P_B}{\partial e_{1B}^2}\right]\right)-\gamma_{1A}\frac{\partial^2\Delta P_A}{\partial e_{1A}^2}$$
$$=\gamma_{1A}\frac{\partial^2\Delta P_A}{\partial e_{1A}^2}-\gamma_{1B}\left(\frac{4(4-c_1^2)B_1}{(4B_1-(4-c_1^2)e_{1A}^2)^{\frac{3}{2}}}\right)\frac{\partial\Delta P_B}{\partial e_{1B}}+2\gamma_{1B}\left(\frac{c_1}{2}-\frac{(4-c_1^2)e_{1A}}{2\sqrt{4B_1-(4-c_1^2)e_{1A}^2}}\right)^2\frac{\partial^2\Delta P_B}{\partial e_{1B}^2}$$

B Appendix: Classification of meetings

To classify meetings into topic, I create a classification system that is specific to and relies on the subjects of meetings held between Commission members and organizations or self-employed individuals. Existing classification systems for NGOs, such as the International Classification of Non-profit and Third Sector Organizations (ICNP/TSO (December 2017)) of the United Nations (Einarsson and Wijkström, 2019) or the National Taxonomy of Exempt Entities (NTEE) Codes made by the National Center for Charitable Statistics (2016), are not focused on environmental NGOs and little adapted to the topics discussed at the European Commission during the period studied. I cannot either adapt to my data the machine learning classifier for the US nonprofit sectors proposed by Ma (2020), which is based on the IRS Activity Codes for nonprofits from National Center for Charitable Statistics (2016).

I perform some text normalization on the subjects the Commission declares. First, I tokenize words from the texts, which means I segment the text into words. Then I remove stop words and punctuation. These are standard steps in natural language processing (Jurafsky and Martin, 2019, chapter 2). I also replace acronyms, initialisms, or any abbreviations by the full phrase it stands for (*e.g.*, I replace "REACH" with "Registration, Evaluation and Authorisation of Chemicals"). I then case fold the words, which means I map every character to lowercase. Once the subjects of meetings are standardized, I need to create the categories of topics and determine to which category(ies) a meeting belongs. To do this, I use the dictionary method, *i.e.* I create a predefined dictionary of words for each category (see Grimmer and Stewart (2013) for an overview of the different automatic content analysis methods). This method is the most appropriate to the context because I do not want to create clusters, a meeting can cover several topics and belong to several categories. Additionally, I need to be able to interpret the classification, which would not be possible with an unsupervised method. I thus create the categories by hand. Moreover, the number of different topics and different words is limited (respectively 1,426 and 1,627) and supervised learning methods are not applicable. The main caveat of the dictionary method is that it can not be transferred to other domains, the classification created is specific to the Juncker Commission framework: I look at the frequency of words and subjects to build categories of topics following the most used words or subjects. The nine categories created are "Air", "Chemicals", "Climate", "Energy",

"Policies and Finance", "Oceans and Water", "Nature and Biodiversity", "Soil and Land", "Waste, Circular Economy and Plastics". The words -or patterns- used to create them are presented in Appendix Table A.1. A meeting enters a given category as soon as a pattern associated with this category is mentioned in its subject. It follows that a meeting can enter several categories.

Table A.1: Patterns - Topic Category correspondence table

Topic Category	Patterns
Air	"air pollution", "air quality", "biofuels", "carbon", "co2", "coal", "effort sharing decision", "emission"
Chemicals	"chemical", "endocrine", "food contact material", "glyphosate", "neonicotinoid", "pharmaceutical"
Climate	"climat"
Energy	""biofuels", "electricity", "energy", "énerg", "euratom", "gas", "renewable"
Policies and finance	"climate change policies", "climate policies", "conferences of the parties", "energy tax", "environmental pol", "environmental council", "environmental tax", "environment pol", "fiscalité", "green finance", "lima ", "sustainable development", "sustainability finance", "sustainable finance"
Oceans and Water	"aquaculture", "fish", "illegal, unreported and unregulated", "marine", "maritime", " sea", "ocean", "water", "waterways"
Nature and Biodiversity	"biodiversity", "biomass", "bird", "ecosystem", "forest", "glyphosate", "hunting", "natura 2000", "neonicotinoid", "palm oil", "Wild Fauna and Flora", "wildlife", "xyllela"
Soil and Land	"agricultur", "farm", "organic", "pesticid"
Waste, Circular Economy and Plastics	"circular", "plastic", "recycl", "sharing economy", "waste"

Note: Categories are not exclusive.

C Appendix: Additional tables and figures

Figure A.1: Relative attention given to topics during Commission meetings

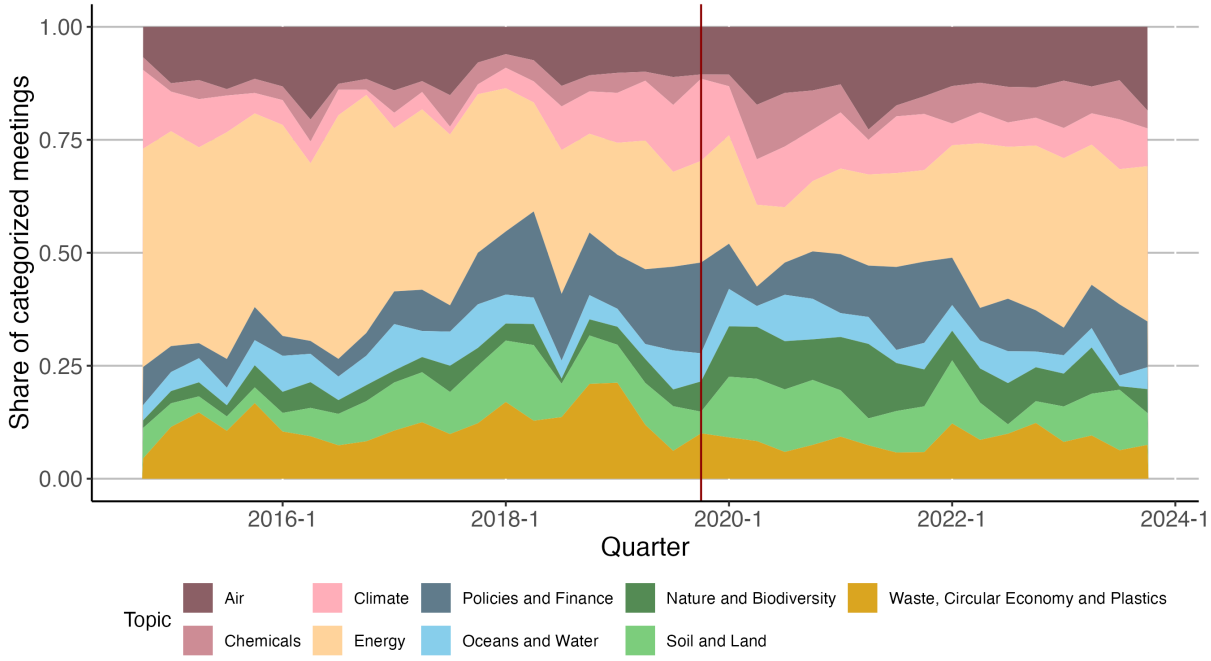
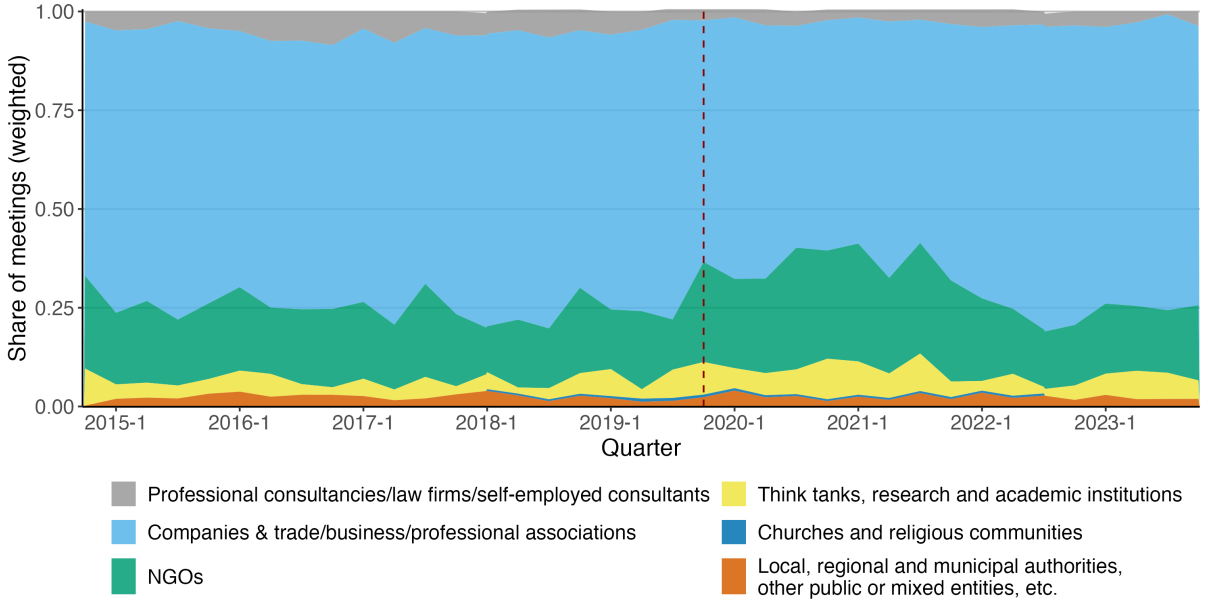


Figure A.2: Distribution of actors meeting with the Commission on environmental topics



Notes. The NGOs category includes both ENGOs and other NGOs. The dashed vertical line stands for the December 2019 Commission change. Only meetings on environmental topics are considered here

Table A.2: ENGOs Strategic Interactions w/ Lag 1

Dependent variable:	Effort of ENGO i on c in t	
	(1)	(2)
Effort of ENGOs w/o i (lag)	.0286***	.0257***
	(.00545)	(.00599)
Effort of business sector (lag)	.00371	.0000483
	(.00236)	(.00274)
Effort of consultants (lag)		.0700**
		(.0266)
Effort of other NGOs (lag)		.0196
		(.0303)
Effort of think tanks & research (lag)		.0227
		(.0239)
Effort of religious groups (lag)		1.098***
		(.240)
Effort of public actors (lag)		.0140
		(.0361)
Effort of i in t	.631***	.631***
	(.0209)	(.0209)
ENGO FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	385,200	385,200
Pseudo R^2	.324	.325

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.3: ENGOs Strategic Interactions + Lag 1

Dependent variable:	Effort of ENGO i on c in t	
	(1)	(2)
Effort of ENGOs w/o i	.113***	.106***
	(.00507)	(.00549)
Effort of ENGOs w/o i (lag)	-.0169**	-.0201**
	(.00618)	(.00657)
Effort of business sector	.00347	.000227
	(.00278)	(.00296)
Effort of business sector (lag)	.00275	.000971
	(.00251)	(.00292)
Effort of consultants		.0301
		(.0275)
Effort of consultants (lag)		.0103
		(.0280)
Effort of other NGOs		.0551*
		(.0263)
Effort of other NGOs (lag)		.0841**
		(.0285)
Effort of think tanks & research		.0479*
		(.0235)
Effort of think tanks & research (lag)		-.0158
		(.0264)
Effort of religious groups		-.508
		(.473)
Effort of religious groups (lag)		.516
		(.264)
Effort of public actors		.0414
		(.0366)
Effort of public actors (lag)		.0243
		(.0411)
Effort of i in t	.652***	.650***
	(.0214)	(.0215)
ENGO FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	385,200	385,200
Pseudo R^2	.346	.347

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.4: ENGOs Strategic Interactions + Lag 1 & 2

Dependent variable:	Effort of ENGO i on c in t	
	(1)	(2)
Effort of ENGOs w/o i	.113***	.105***
	(.00520)	(.00563)
Effort of ENGOs w/o i (lag)	-.0170**	-.0205**
	(.00645)	(.00694)
Effort of ENGOs w/o i (lag2)	.00168	-.00498
	(.00733)	(.00766)
Effort of business sector	.00276	-.000986
	(.00278)	(.00296)
Effort of business sector (lag)	.00164	-.000324
	(.00281)	(.00318)
Effort of business sector (lag2)	.00291	.00249
	(.00258)	(.00303)
Effort of consultants		.0393
		(.0277)
Effort of consultants (lag)		.00842
		(.0284)
Effort of consultants (lag2)		-.0269
		(.0313)
Effort of other NGOs		.0491
		(.0270)
Effort of other NGOs (lag)		.0842**
		(.0290)
Effort of other NGOs (lag2)		.0579*
		(.0274)
Effort of think tanks and research		.0543*
		(.0245)
Effort of think tanks and research (lag)		-.0154
		(.0262)
Effort of think tanks and research (lag2)		.0629*
		(.0269)
Effort of religious groups		-.525
		(.471)
Effort of religious groups (lag)		.529*
		(.267)
Effort of religious groups (lag2)		.0197
		(.278)
Effort of public actors		.0445
		(.0367)
Effort of public actors (lag)		.0258
		(.0406)
Effort of public actors (lag2)		-.0370
		(.0382)
Effort of i in t	.650***	.648***
	(.0216)	(.0216)
ENGO FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	3379,692	379,692
Pseudo R^2	.343	.344

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.5: Business Strategic Interactions + Lag 1 & 2

Dependent variable:	Effort of i on c in t	
	(1)	(2)
Effort of business w/o i	.0233***	.0213***
	(.00137)	(.00153)
Effort of business w/o i (lag)	.00351*	.00337*
	(.00142)	(.00159)
Effort of business w/o i (lag2)	.00329*	.00189
	(.00130)	(.00150)
Effort of ENGOs	.0204***	.0143**
	(.00403)	(.00441)
Effort of ENGOs (lag)	.0125**	.0109*
	(.00390)	(.00435)
Effort of ENGOs (lag2)	.00290	.0000558
	(.00431)	(.00469)
Effort of consultants		.0256
		(.0140)
Effort of consultants (lag)		.00838
		(.0146)
Effort of consultants (lag2)		.0196
		(.0153)
Effort of other NGOs		.0564**
		(.0175)
Effort of other NGOs (lag)		.0125
		(.0177)
Effort of other NGOs (lag2)		.0400*
		(.0168)
Effort of think tanks and research		.00219
		(.0137)
Effort of think tanks and research (lag)		-.00634
		(.0138)
Effort of think tanks and research (lag2)		-.0185
		(.0166)
Effort of religious groups		.529**
		(.172)
Effort of religious groups (lag)		.193
		(.213)
Effort of religious groups (lag2)		.263
		(.200)
Effort of public actors		.0379
		(.0197)
Effort of public actors (lag)		.00532
		(.0228)
Effort of public actors (lag2)		.0413*
		(.0204)
Effort of i in t	.925***	.924***
	(.0144)	(.0144)
Entity FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	1,689,336	1,689,336
Pseudo R^2	.320	.320

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.6: ENGOs Strategic Interactions (only individual meetings)

Dependent variable:	Effort of ENGO i on c in t	
	(1)	(2)
Effort of ENGOs w/o i	.0903***	.0827***
	(.0123)	(.0125)
Effort of business sector	.0114**	.00716
	(.00386)	(.00455)
Effort of consultants		.0425
		(.0482)
Effort of other NGOs		.0756
		(.0457)
Effort of think tanks and research		.0798*
		(.0344)
Effort of religious groups		-.738
		(.597)
Effort of public actors		.0516
		(.0507)
Effort of i in t	.861***	.861***
	(.0435)	(.0435)
ENGO FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	268,074	268,074
Pseudo R^2	.305	.306
Dep. Var. Mean	.00569	.00569
Dep. Var. SD	.0869	.0869

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.7: Business Sector Strategic Interactions (only individual meetings)

Dependent variable:	Effort of entity i on c in t	
	(1)	(2)
Effort of business w/o i	.0210***	.0172***
	(.00202)	(.00227)
Effort of ENGOs	.0320***	.0254**
	(.00898)	(.00921)
Effort of consultants		.0563*
		(.0247)
Effort of other NGOs		.0436
		(.0252)
Effort of think tanks and research		.0236
		(.0196)
Effort of religious groups		.655***
		(.190)
Effort of public actors		.0494*
		(.0238)
Effort of i in t	1.093***	1.093***
	(.0191)	(.0191)
Entity FE	Yes	Yes
Category FE	Yes	Yes
Month FE	Yes	Yes
Observations	1,306,800	1,306,800
Pseudo R^2	.319	.320
Dep. Var. Mean	.00468	.00468
Dep. Var. SD	.0767	.0767

Notes. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$