

THE IMPACT OF DOMESTIC LOBBYING ON INTERNATIONAL ENVIRONMENTAL AGREEMENTS

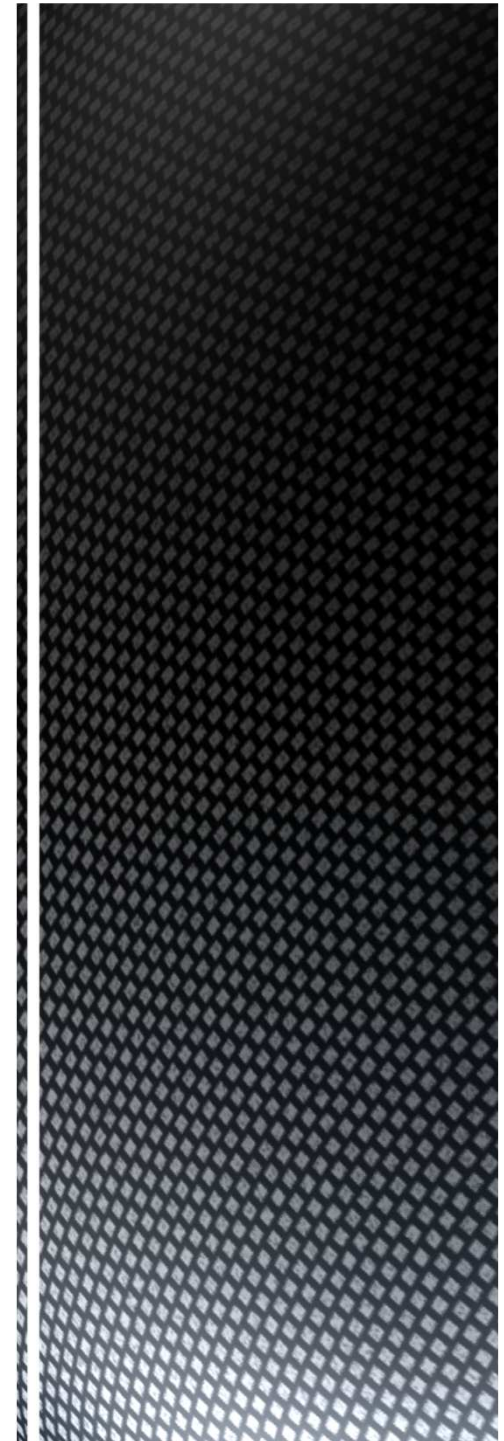
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Outline

1. Aim of the paper
2. Related literature and rationale
3. The model
4. Analytical and numerical results
5. Conclusions

This paper

- Aims to contribute to the theory of IEA formation, by introducing to a classic model something that has tended to be ignored, but that is potentially important
 - Domestic politics (i.e. lobbying)
- Identifies circumstances in which modelling the process of lobbying results in different outcomes (both in terms of accession and total abatement) compared with the standard, 'a-political' case

Our starting point

- Although IEA theory has been developed in many directions, most papers retain the assumption that governments make choices based on benefits and costs that are simple national aggregates, and on a single set of public interests motivations
 - E.g. Barrett (1994): $B_i(Q) = b(aQ - Q^2/2)/N$; $C_i(q_i) = cq_i^2/2$
- Experimental work allows for a wider set of motivations
 - But, insofar as this is relevant for understanding how IEAs form, the nation-state must be analogous to an individual experimental subject

Our starting point (cont.)

- Both the empirical evidence and the contemporary literature on political economy suggest that public officials may not be *solely* motivated by the public interest (e.g. Persson and Tabellini, 2000; Grossman and Helpman, 2001; Besley, 2006)
- If they are at least in part motivated by private interests, then there are opportunities for lobby groups to influence policy
- The role of lobby group in environmental policy making has been emphasized by political scientists and scholars in related fields (e.g., Bryner, 2008; Kamieniecki, 2006; Markussen and Svendsen, 2005)

What is lobbying?

- Educating/informing government officials, the lobby group's own members, or citizens more widely
- Giving resources
 - What do these 'buy'?
 - *Access, according to a model in which government officials' time is scarce and allocated to the highest bidder*
 - *Credibility, in the sense that money is a signal of the strength of a lobby group's preferences, in situation where it is hard for officials to know*
 - *Influence, via supporting those politicians whose policies best advance the group's interests (NB: this does not imply corruption)*
- Our model is consistent with lobbying for influence

How we introduce lobbying

STANDARD COALITION THEORY APPROACH

(Barrett 1997; Carraro & Siniscalco 1993; Hoel 1992; Rubio & Ulph 2001)

Two stage coalition formation game

POLITICAL ECONOMY LITERATURE

Grossman and Helpman (2001)'s model of political lobbying



How domestic politics might affect governments' decisions to contribute to global environmental protection

Multiple stage game

I. Membership stage

II. Lobbying stage

III. Abatement policy stage

IV. Firm stage

Firm stage

- N symmetric countries and N symmetric firms (industries), one in each country.
- Firm j in country j produces a homogeneous good x_j for its domestic market and generates transboundary pollution.
- Firm j 's optimization problem:

$$\max_{x_j} \Pi_j = (p(x_j) - a(q_j))x_j \quad [1]$$

- FOC:

$$\frac{\partial p(x_j)}{\partial x_j} x_j + p(x_j) - a(q_j) = 0 \quad [2]$$

A common agency problem

- Lobby groups => principals
 - *They have preferences over alternative abatement policy levels, but lack the authority to set the policy themselves and thus need the policy maker to act on their behalf.*
- Policymaker => agent
 - *Her actions directly affect the principals' well-being (as well as her own).*
- The groups must design their contribution schedules with an eye toward the incentives that other groups might be offering, while bearing in mind that the policymaker herself has preferences over alternative abatement policies and cannot be made to accept an offer that leaves her with a lower utility than she could achieve otherwise.

Abatement policy stage (unilateral)

- Government j 's utility (political welfare):

$$G_j = \gamma W_j(q_j, q_{-j}) + (1 - \gamma) \sum_{l=1}^L C_j^l(q_j) \quad [3]$$

with:

$$W_j(q_j, q_{-j}) = \Pi_j(q_j) + S_j(q_j) - D(q_j, q_{-j}) \quad [4]$$

- Each government chooses q_j to maximise [3] subject to [2], and taking the abatement standards of other countries as given. The FOC is:

$$\gamma \nabla W_j(q_j, \overline{q_{-j}}) + (1 - \gamma) \sum_{l=1}^L \nabla C_j^l(q_j) = 0 \quad [5]$$

Lobbying stage

- Utility of lobby group l in country j :

$$U_j^l = W_j^l(q_j, \overline{q_{-j}}) - C_j^l(q_j) \quad [6]$$

- Assumptions:
 - i. $W_j^l(\cdot)$ and $C_j^l(\cdot)$ are continuous and differentiable at the equilibrium;
 - ii. The contributions are non-negative.

Lobbying stage (cont.)

Maximisation problem facing lobby group l :

$$\begin{aligned} \max_{q_j} \quad & U_j^l = W_j^l(q_j, \overline{q_{-j}}) - C_j^l(q_j) \\ \text{s.t.} \quad & G_j \geq \widehat{G}_j \end{aligned} \quad [7]$$

and given [5], where $\widehat{G}_j = G_j(\widehat{q}_j, C_j^{-l}(\widehat{q}_j))$ the level of utility that the government could achieve by selecting a best response to the set of offers from the groups other than l .

Lobbying stage (cont.)

- It can be shown that this is equivalent to solving the following unconstrained maximisation problem:

$$\max_{q_j} (1 - \gamma)W_j^l + \gamma W_j + (1 - \gamma) \sum_{\theta \neq l} C_j^\theta \quad [8]$$

- The FOCs, once combined with [5], are:

$$\nabla W_l^j(q_j, \overline{q_{-j}}) = \nabla C_l^j(q_j) \quad \forall l = 1, \dots, L. \quad [9]$$

- The equilibrium abatement policy (and associated contributions) are jointly efficient for all lobby groups and for the government

Contribution function

In a similar vein to Grossman and Helpman (2001), we will use the following expression for the contribution function:

$$C_j^l(q_j) = \max \left[0, W_j^l(q_j, \bar{q}_{-j}) - \overline{W}_j^l(\bar{q}_j^{-l}, \bar{q}_{-j}^{-l}) \right] \quad [10]$$

where \overline{W}_j^l denotes the utility of lobby group l in the absence of any political contribution of its own.

Notice that [10] satisfies our initial assumptions - i.e., it is continuous and differentiable (except possibly where the contribution becomes nil).

Lobbying scenarios

- Remember, we specify social welfare function as

$$W_j(q_j, q_{-j}) = \Pi_j(q_j) + S_j(q_j) - D(q_j, q_{-j})$$

- Therefore, we could have a business lobby, a consumer lobby, and an environmental lobby, so 2^L combinations where $L=3$
- We focus on four cases:
 1. No lobbying (baseline scenario)
 2. Business lobbying
 3. Environmental lobbying
 4. Business *and* environmental lobbying

The effect of lobbying on unilateral policy

- **Lemma 1:** *Lobbying by a (strict) subset of groups results in the government down-weighting by the factor $\gamma \in (0, 1)$ the effect of a marginal change in the abatement standard on the utility of the unorganised group(s).*
- E.g.: Two rival lobbies, business and environmentalists. The equilibrium abatement policy satisfies the following FOC

$$\nabla \Pi_j(q_j) + \gamma \nabla S_j(q_j) - \nabla D_j(q_j, \bar{q}_{-j}) = 0$$

- Notice that, in the absence of lobbying (i.e. $\gamma=1$), $G_j = W_j$. Hence, the equilibrium abatement policy is the solution to

$$\nabla \Pi_j(q_j) + \nabla S_j(q_j) - \nabla D_j(q_j, \bar{q}_{-j}) = 0$$

The effect of lobbying on unilateral policy (cont.)

- As expected, the equilibrium abatement policy selected by a government acting unilaterally is:
 - At least as high when it is lobbied solely by environmental advocacy groups as it would be in the absence of lobbying (i.e. $q_u^D \geq q_u^0$);
 - At least as low when it is lobbied solely by business (i.e. $q_u^\pi \leq q_u^0$).
- Perhaps more surprising is that, with rival business and environmental lobbying, unilateral abatement in equilibrium is weakly larger than in the absence of lobbying (i.e., $q_u^{\pi,D} \geq q_u^0$).

Abatement policy stage (IEA)

- Let k be the (endogenously determined) subset of countries that decide to take part in the IEA, while the remaining $(N-k)$ choose to be outsiders.
- Each non-signatory government behaves non-cooperatively, taking the abatement of other countries as given

$$\max_{q_n} G_n = \gamma W_n(q_n, \overline{(N-k-1)q_n}, \overline{kq_s}) + (1-\gamma) \sum_{l=1}^L C_n^l(q_n)$$

- The remaining k countries choose their abatement level so as to maximise their joint payoff

$$\max_{q_s} kG_s = k \left[\gamma W_s(q_s, (k-1)q_s, \overline{(N-k)q_n}) + (1-\gamma) \sum_{l=1}^L C_s^l(q_s) \right]$$

Lobbying stage (IEA)

- Similar in nature to what we described earlier
- Leads to...
- **...Proposition 3.** Consider the following configurations: (i) no lobby ($\mathbf{L}=0$); (ii) business lobby alone ($\mathbf{L}=\pi$); (iii) environmental lobby alone ($\mathbf{L}=D$); and (iv) business and environmental lobbies ($\mathbf{L}=\pi, D$). For a given k , the order of signatories' level of abatement under partial cooperation is as follows:

$$q_s^D(k)|k \geq q_s^{\pi, D}(k)|k \geq q_s^0(k)|k \geq q_s^\pi(k)|k.$$

- But of course k is endogenously determined...

IEA membership stage

- The equilibrium coalition size is determined by applying the concepts of *internal* and *external stability*
 - No signatory is better off leaving the coalition
 - There is no incentive for a non-signatory to join the coalition
- **Proposition 4.** *In the presence of lobbying by L special-interest groups, the equilibrium coalition size k^L of an IEA is weakly larger (smaller) than the equilibrium coalition size k^0 in the absence of lobbying, provided $\sum_{l=1}^L (C_n^l(k^L - 1, \gamma) - C_s^l(k^L, \gamma))$ is weakly smaller (larger) than zero.*

Example: Environmental lobby

- Proposition 4 becomes

*If $C_n^D(k^D - 1, \gamma) - C_s^D(k^D, \gamma) \leq 0 \Rightarrow k^D \geq k^0$;
otherwise $k^D < k^0$*

- Using [10] and recalling that $D(\cdot)$ is a function of total abatement, we have

$$C_n^D(k^D, \gamma) = C_s^D(k^D, \gamma) = \max \left\{ 0, -D(Q(k^D, \gamma)) + D(\overline{Q(k^0)}) \right\}$$

- Hence

$$C_n^D(k^D - 1, \gamma) = \max \left\{ 0, -D(Q(k^D - 1, \gamma)) + D(\overline{Q(k^0)}) \right\}$$

- Since $Q(\cdot)$ is increasing in k , and $D(\cdot)$ is decreasing in $Q \Rightarrow C_n^D(k^D - 1, \gamma)$ is always (weakly) smaller than $C_s^D(k^D, \gamma) \Rightarrow k^D \geq k^0$

An application of the model

- Our functional specification:
 - Similar to Barrett (1997)
 - Firm j 's profits: $\Pi_j = (1 - x_j - \sigma q_j)x_j$
 - Consumer surplus: $S_j = (x_j)^2 / 2$
 - Environmental damage: $D = \omega \left[\sum_{j=1}^N x_j (1 - q_j) \right]$
- We solve analytically the last three stages (firm, abatement policy and lobbying stage), and use numerical simulations to derive the equilibrium coalition size and total level of abatement

Figure 1. Potential gains to cooperation

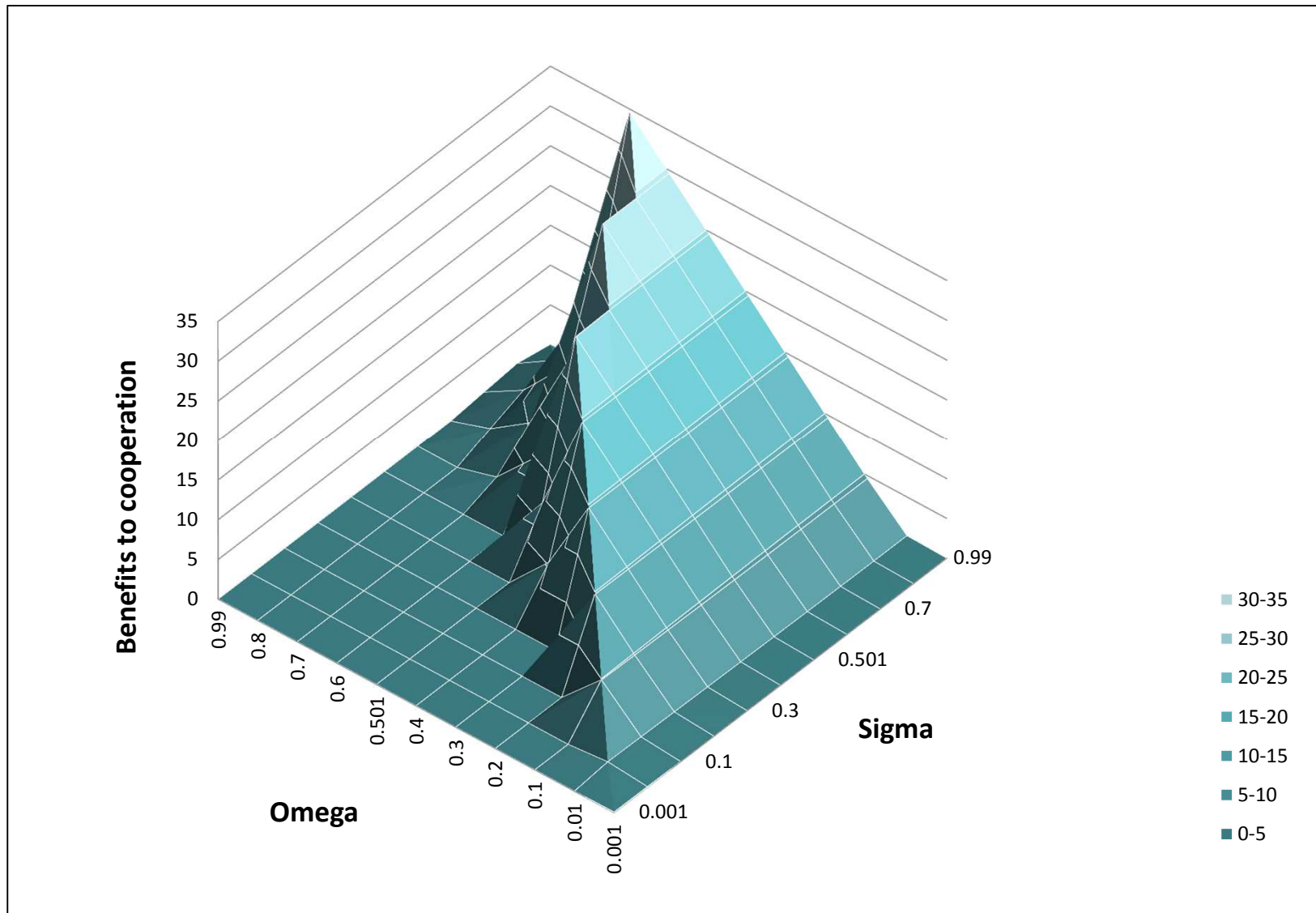
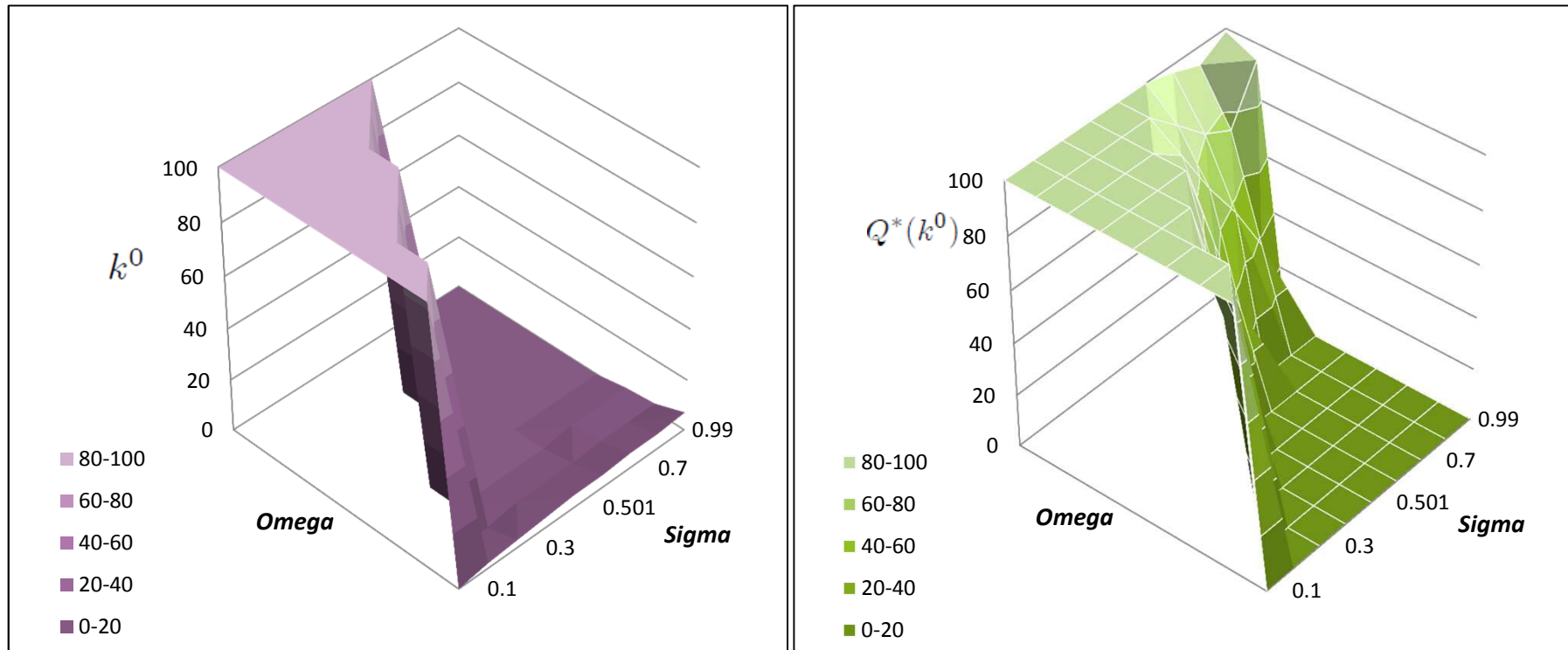


Figure 2. Equilibrium coalition size and total abatement with *no lobbying*



- Consistently with the predictions of the standard literature, we find that in the absence of lobbying ‘*cooperation tends to emerge when it is least needed*’.
- How does lobbying affect the results?

Figure 3. Equilibrium coalition size with alternative lobbying settings

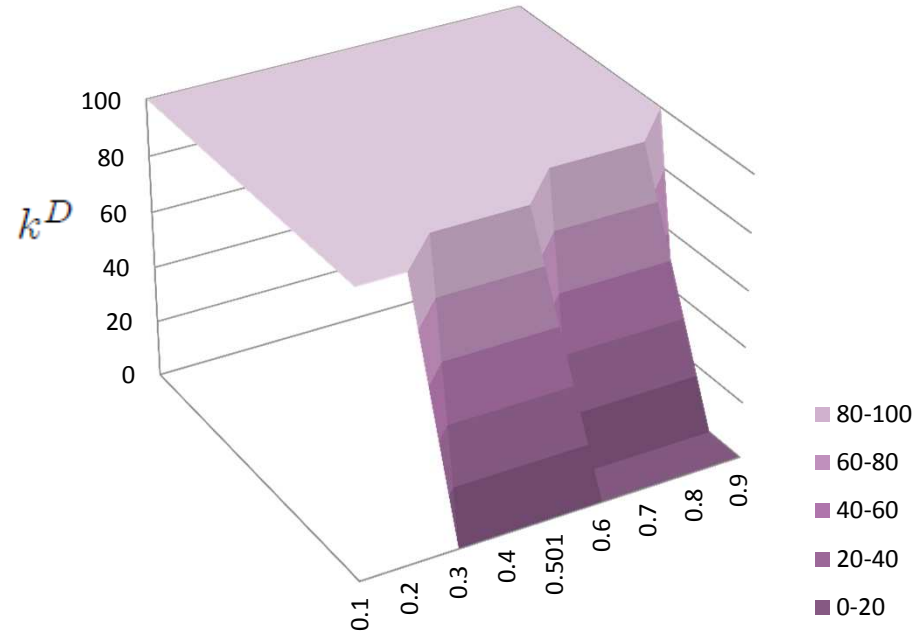
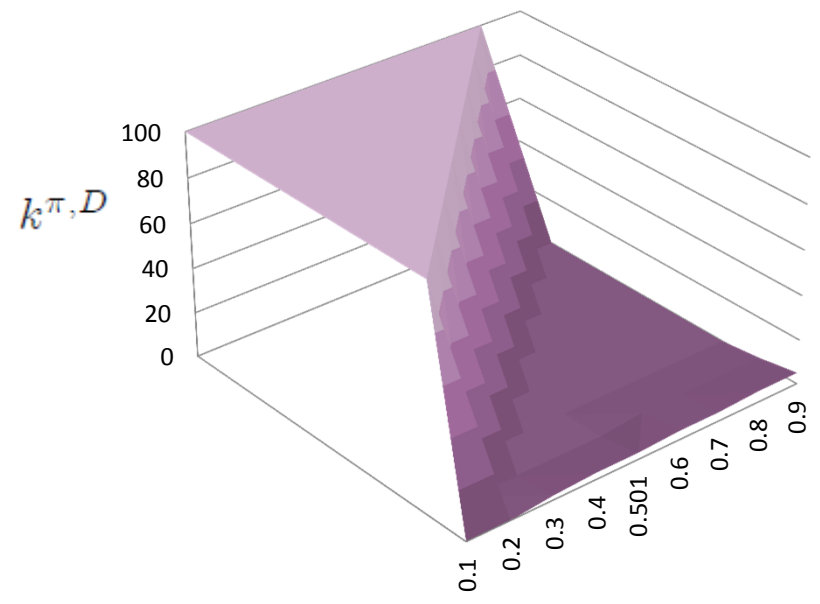
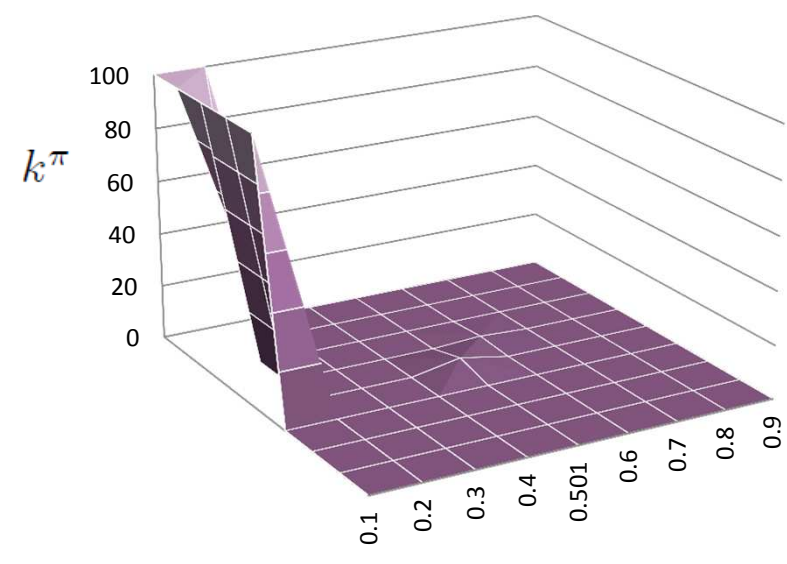
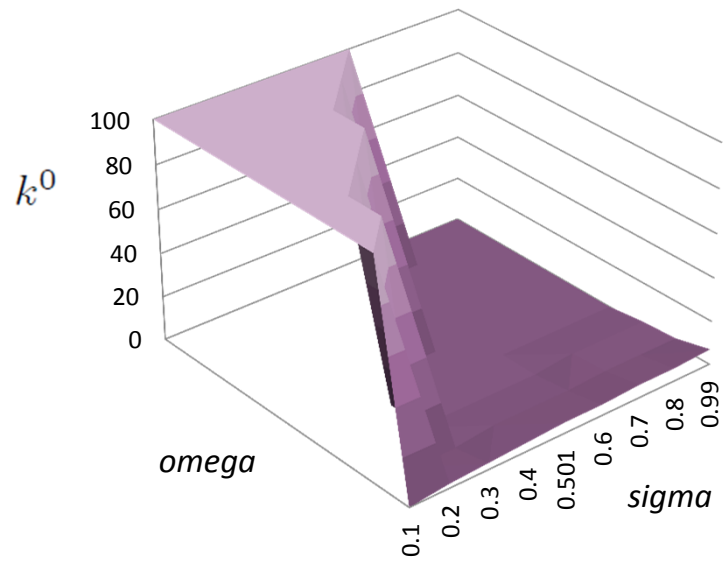


Table 1. Simulation results under different configurations of lobbying and values of gamma.

		No lobbies	Business lobby	Env. Lobby	Both lobbies	
γ	0.25	k^*	0	4	100	0
		Q^*	0.3	3.4	100	85.8
		qn^*	0.003	0	1	0.858
		qs^*	1	0.035	1	1
	0.5	k^*	0	2	100	0
		Q^*	0.3	1.3	100	66.8
		qn^*	0.003	0	1	0.668
		qs^*	1	0.013	1	1
	0.75	k^*	0	0	0	0
		Q^*	0.3	0	85.8	40.2
		qn^*	0.003	0	0.858	0.402
		qs^*	1	0	1	1

$\sigma = \omega = 0.5; N = 100.$

Comments on simulation results:

- i. Rival lobbying by environmentalists and business groups can translate into higher total abatement than in the absence of lobbying
 - *But this is largely done **unilaterally***
- ii. In the case of environmental lobbying alone, the grand coalition may form; yet this is a coalition which codifies maximum unilateral actions (same as above)
- iii. In some instances, higher total abatement may emerge also with business lobbying alone.
 - *Business pressure waters down the terms of the agreement and therefore the benefits to cooperation => reduced incentives to free-ride => an agreement may form in which signatories do little individually, but the # of signatories is sufficiently large to result in higher total abatement.*

Recap and conclusions

- Our aim has been to enrich the theory of providing international environmental goods, by considering the role played by special-interest groups in shaping policy.
- We did so by combining two fundamental strands of literature: (i) game-theoretic literature on IEAs; and (ii) the economic literature on political lobbying.
- The influence of lobbying on policy stringency depends on which groups are organised, but the preferences of the interest group(s) which do not self-organise have a bearing on the relative success of the organised groups
 - *Policy/politics is 'made' not only by those who show up, but also by those who do not.*

Recap and conclusions (cont.)

- Under partial cooperation, the equilibrium coalition size depends on the relative magnitude of lobby groups' contributions in signatory and non-signatory countries, and on governments' taste for money.
- Using simulations, we could further show that the combined presence of national interests and lobbying pressure may create *more scope for unilateral action* than previously thought.
- This may be a step towards reconciling the theory with empirical evidence
 - *“There is a number of disconnects between what the standard theory predicts and what we see in the world...One such issue is the apparent willingness of a number of countries/political jurisdictions to unilaterally reduce CO2 emissions in the absence of an effective multilateral agreement.”* (Kolstad, 2012, p.62)

Recap and conclusions (cont.)

- Our findings should not be interpreted negatively with respect to the usefulness of international environmental treaties.
 - Indeed, IEAs can be seen as a public good in themselves, with benefits relating to the ability of participating countries to win trust and establish profitable relations. These benefits are not modelled here.
- *'Polycentric approach'*, where top-down international treaties are complemented by efforts directed towards leveraging unilateral action (Ostrom, 2009)

Thank you!



Several possible extensions

- International lobby groups => 'multi-level governance'
- Trade => 'California effect': will the threat of trade sanctions to a firm exporting a polluting good to a regulated market trigger lobbying for a more stringent domestic policy?
- Complement the theoretical analysis with laboratory experiments/empirical analyses