A Note of how Re-elections Affect Climate Negotiations[*]

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Abstract

As Schelling conjectured, domestic political constraints affect the outcomes of negotiations over international public goods, e.g., greenhouse gas mitigation. Current literature suggests both total contributions (home plus foreign country) and home country contributions in a Presidential system subject to a Senate ratification constraint (e.g., U.S.) never exceed those under a home country without domestic constraints (e.g., authoritarian regime like China). Herein we show how this result is reversed by adding another realistic constraint to the Presidential system—a re-election constraint. We find that total contributions and home country contributions with both constraints can exceed those under a system without any domestic constraints.

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1. INTRODUCTION

How do political systems affect the negotiations over carbon emission reductions? For instance, China and the US—the two biggest carbon emitters on the globe—have very distinct systems based on the role of checks and balances and popular elections. Using a two-level strategic game model, Kroll and Shogren (2008) show that the differences in the two systems matter when a home country negotiates with a foreign country over total emission reductions. They show that if the home country has a presidential system subject to a Senate ratification constraint (e.g., the US), then the total level of contributions of emission reductions and emissions reductions from the home country will never exceed those relative to the case if the home government operated without domestic constraints (e.g., an authoritarian regime like China). This ratification constraint effectively blocks deeper emission cuts, suggesting a rationale as to why U.S. cannot do much in an international climate agreement whereas China could. Their results support the Schelling Conjecture (see Schelling (1980)) that the bargainer with the most pressing domestic constraints has the most power in negotiations.

Herein we examine the robustness of this result by considering a key additional constraint in the Presidential system—the re-election constraint (see e.g., Besley and Persson (2023)). The government in the presidential regime must consider how the international agreement affects the odds of reelection. Now the home country's leaders must balance the impacts of this new electability constraint with the impacts of the ratification constraint. Our results now suggest that in rather realistic cases, the U.S. could make greater contributions than China could. Even if the U.S. is subject to ratification constraints, the international negotiation could result in more overall contributions to emission reductions and greater contributions from the U.S. than those if the home country is China.

One of these realistic cases is that the executive in the presidential system prefers less emissions reductions than the median legislator in the Senate and the median voters prefer more emissions reductions than the executive. If the executive and the median legislator in the Senate belong to two different parties competing for office, the incumbent might try to secure reelection by proposing more emissions reductions than it initially wanted such that it

appeals to median voters' preference. Also, the Senate would be likely to ratify the proposal since they are better off than without the proposal (i.e., the status quo).

2. Baseline model: without domestic constraints

Except as noted, the analysis below uses notations and assumptions of Kroll and Shogren (2008). The governments of two countries, home and foreign, negotiate an agreement about their respective national contributions A_i, $i = H, F$, to the abatement of CO_2 emissions. In this section, we analyze the case where the home country faces no domestic constraints. This case can be thought of as an authoritarian regime.

Each government draws benefits $B_i(A_H + A_F)$ from the total abatement of CO_2 emissions from both countries and incurs costs $C_i(A_i)$ as a result of reducing its emissions. The benefits are assumed to be increasing and weakly concave ($B_i' > 0$, $B_i'' \leq 0$) and costs are increasing and strictly convex ($C_i' > 0$, $C_i'' > 0$). The benefit functions are normalized to be the same for both countries ($B = B_H = B_F$). The payoff for government i is:

$$U_i(A_H, A_F) = B(A_H + A_F) - C_i(A_i). \tag{1}$$

The Nash equilibrium (NE) (A_H^N, A_F^N) is the contribution levels that maximize the utility for each country given the other country's contribution level. (A_H^N, A_F^N) solves the first-order conditions $B' = C_i'$. Kroll and Shogren (2008) illustrate the pareto improvement over the NE in Figure 1. They prove that the Pareto optimal points must be on the tangency points between the two indifference curves. PO represents the set of Pareto optimal points. Any points between the two indifference curves are Pareto improvements over the Nash equilibrium. Both governments intend to negotiate a combination of contributions that lie on the segment AB. Intuitively, the home (foreign) government would propose contributions that make its utility as high as possible but do not make the foreign (home) government's utility worse than that at the NE. Point A(B) would be the proposal of the home (foreign) government.
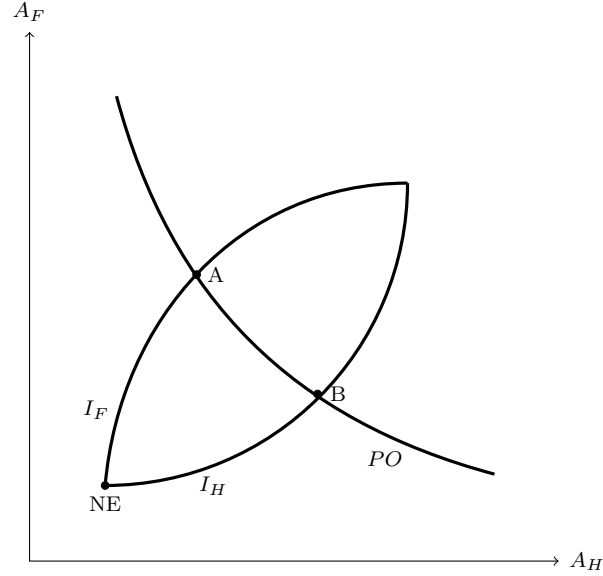
FIGURE 1. Model without domestic constraints

3. THE MODEL WITH ONLY A RATIFICATION CONSTRAINT

A ratification constraint implies that the agreement negotiated with a foreign government has to be ratified by the home country's median legislator. Kroll and Shogren (2008) argue this constraint characterizes a presidential system like the one in the U.S. When the home government proposes contributions, it concerns about whether the proposal would be accepted by the median legislator, or else it is left with the NE. The median legislator is assumed to have a utility function:

$$U_L(A_H, A_F) = B(A_H + A_F) - \gamma C_H(A_H), \tag{2}$$

where $\gamma > 0$ is a cost parameter that can differ from 1.

If the ultimatum game is such that the home government makes the proposal, then the home government solves

$$\max_{A_H, A_F} \ U_H(A_H, A_F) \quad s.t. \ U_F(A_H, A_F) \geq U_F(A_H^N, A_F^N)$$

$$U_L(A_H, A_F) \geq U_L(A_H^N, A_F^N). \tag{3}$$

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At least one constraint in (3) is binding, because otherwise the home government could propose a lower A_H and a higher A_F to make H better off. Kroll and Shogren (2008) show that in all three cases where at least one constraint is binding, the resulting contributions from the home country and the total contributions cannot exceed those in a game without domestic constraints. In addition, Kroll and Shogren (2008) show that a similar result applies to an ultimatum game where the foreign government is the proposer.

4. The model with both ratification and election constraints

In this paper, we view that a presidential system could contain both a ratification and an election constraint. This is because the home government when negotiating the contributions concerns about (1) whether the agreement negotiated will be ratified by the median legislator (i.e. the ratification constraint), and (2) how the median voter perceives the agreement and how s/he will react in the next election (i.e. the election constraint), especially when the election is approaching.

We assume the home country with the presidential system consists of a government, a median legislator who decides on the ratification of the international agreements, an opposition party or politician, and a median voter who will determine whether the incumbent or the opposition party takes office in the next general election. Here we also assume that when the general election is approaching, the objective of the government and the opposition party is to take office. In addition, following Kroll and Shogren (2008), we assume the voters only care about one issue when they vote — the agreement on the contributions to the international public good.

Assume the median voter and the opposition party have the payoff functions:

$$U_V(A_H, A_F) = B(A_H + A_F) - \theta C_H(A_H), \tag{4}$$

and

$$U_O(A_H, A_F) = B(A_H + A_F) - \delta C_H(A_H), \tag{5}$$

where $\theta > 0$ and $\delta > 0$ are cost parameters that can both differ from 1. For simplicity and without loss of generality, we assume the median legislator has the same cost parameter as either the executive or the median voter, or the opposition party. In the U.S., this assumption reflects the fact that the median legislator could either be a Republican or a Democrat, or an Independent. The difference in cost parameters can reflect the difference in the pecuniary cost of a contribution to the international public good. For example, Republicans and Democrats are captured by different special-interest groups, specifically the fossil fuel industry and clean energy industry respectively. These industries bear different costs of climate change mitigation.

Considering an ultimatum game with the home government as the proposer, if the election is approaching, H now proposes contributions that solve the maximization problem:

$$\begin{gathered} \max_{A_H, A_F} \ U_H(A_H, A_F) \quad s.t. \ U_F(A_H, A_F) \geq U_F(A_H^N, A_F^N), \\ U_L(A_H, A_F) \geq U_L(A_H^N, A_F^N), \ \ and \ \ U_V(A_H, A_F) \geq U_V(A_H^O, A_F^O). \end{gathered} \tag{6}$$

Compared to the optimization problem with only the ratification constraint, (3), there is an additional constraint that the negotiated agreement must give the median voter at least the same utility as what s/he would have received had the opposition party been in the office and reached an agreement of contributions (A_H^O, A_F^O). Following Kroll and Shogren (2008), we assume the voter is retrospective in his/her voting decision, that is, the voter compares the utility from the agreement reached by the incumbent government with what s/he thinks s/he would have received had the opposition party been in the office. The voter calculates the utility s/he would have received had the opposition party been in power by utilizing the information of the historical cost parameter of the opposition party, δ. In this case, the opposition party is passive in the sense that it cannot propose anything (they can talk but not act) to change the median voter's voting plan. The median voter perceives (A_H^O, A_F^O) to be the solution of

$$\max_{A_H, A_F} \quad U_O(A_H^O, A_F^O)$$

$$s.t. \quad U_F(A_H, A_F) \geq U_F(A_H^N, A_F^N). \tag{7}$$

The constraint binds, i.e., the opposition party would propose a combination that lies on one of F's indifference curves that goes through NE.

The overall contributions now depend on which party's preferences are closer to the median voters' preferences. If the home government's preferences are closer, then the home government would propose point A in figure 1, that is, the same combination as the one in the system without domestic constraints. If the opposition party's preferences are closer, then the home government would propose higher contributions than point A if the opposition party prefers higher contributions. Proposition 1 describes conditions under which the overall contributions under a regime with both election and ratification constraints are unambiguously higher than those under a regime without domestic constraints.

Proposition 1: If the next general election is upcoming, when $1 > \delta > \theta$ or $1 > \theta > \bar{\theta} > \delta$ ($\bar{\theta}$ is a fixed number that is less than 1, different benefit and cost functions lead to different $\bar{\theta}$), the overall contributions in the ultimatum game with both ratification and election constraints (as in the presidential system) will be higher than that without domestic constraints (as in the authoritarian regime).

Proof: As in figure 2, point A is the set of contributions the incumbent government would propose without domestic constraints. When $1 > \delta > \theta$, the opposition party's preferences are closer to the median voters' preferences than the home government's preferences are.[1] I_O is closer to I_V than I_H is. The median voter perceives that had the opposition party been in the office, it would reach an agreement at point D (the tangential point between one of O's indifference curves and F's indifference curve that goes through NE). This point gives the median voter higher utility than that at point A. The incumbent government recognizes this and thereby also proposes point D (not A) since this set of contributions gives the highest utility to the home government while securing the office in the next election. In

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[1] In all cases, "closer" is in terms of the distance in utility.

this case, the median legislator also would not veto the proposal no matter whose preference (the incumbent party, the opposition party, or the median voter) is assigned to the median legislator. This is because point D yields a higher utility for the median legislator than that at the NE.

When $1 > \theta > \delta$, as shown in figure 3, V's indifference curve that goes through NE is sandwiched between H's and O's indifference curves that go through NE. There exists a fixed value $\bar{\theta}$ so that for $1 > \theta > \bar{\theta} > \delta$, O's preferences are closer to V's preferences than H's preferences are. In this case, V's preferred contributions would be point D (the tangential point between one of I_Vs and the I_F that goes through NE), and it is closer to O's preferred combination "E" (the tangential point between one of I_Os and the I_F that goes through NE) than H's preferred combination A. Therefore, H has to propose a point close to D so that V is indifferent between voting for H and for O. Such point is M, which is one of the intersection points between I_V and I_F. Point M will also be accepted by the median legislator because s/he obtains higher utility at point M than that in NE no matter whose preference (the incumbent party, the opposition party, or the median voter) is assigned to the median legislator. Because point D in figure 2 and point M in figure 3 indicate higher overall contributions than point A (which is true because all foreign indifference curves are concave and increasing in A_H given our assumptions about cost and benefit functions), the Proposition holds.

The intuition behind this Proposition is perhaps best illustrated by an example: Suppose in the U.S., George W. Bush is the president, and the median legislator in the Senate is either a Democrat, a Republican, or an Independent. Suppose also the median voter is an Independent. S/he perceives climate change as a serious issue and would like the government to contribute more to climate change mitigation. Since the Democratic party's position on climate change issues is closer to the position of the median voter than the Republican party's position is, to be reelected in the next general election, the Bush administration may propose higher contributions than the case without domestic constraints.
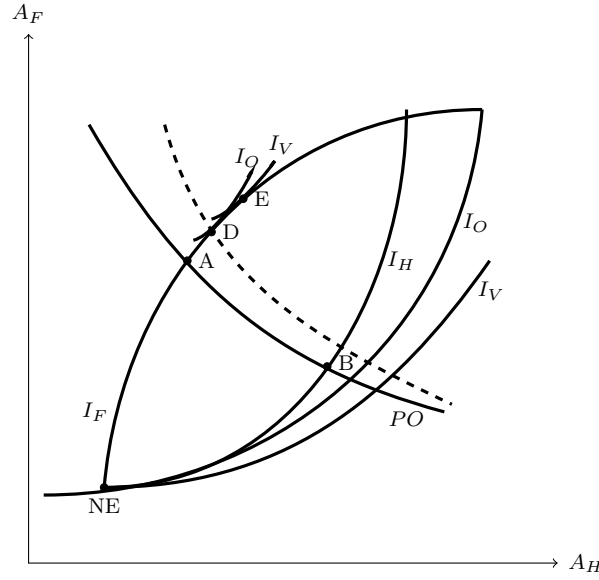
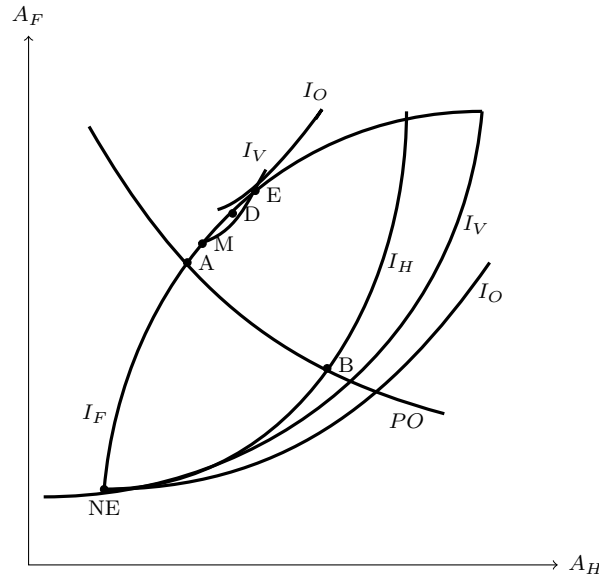FIGURE 2. The ultimatum game when $1 > \delta > \theta$

FIGURE 3. The ultimatum game when $1 > \delta > \theta$

5. CONCLUSION

Any home government with a Presidential system must consider how an international agreement over global public good provision will affect their odds of reelection. Herein we show

that adding this re-election constraint matters to bilateral bargaining between a home country with a Presidential system with a Senate ratification constraint and a foreign country. In contrast to Kroll and Shogren (2008) we find that the overall contributions and contributions from the home country subject to both ratification and election constraints can exceed those under a system without any domestic constraints. This result can occur when both the median voter and the opposition party have stronger preferences for the public good than the incumbent government does.

References

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