

International Cooperation and National Elections

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Abstract

We analyze the effect of international cooperation between representative democracies in a simple two country model with two possible types of externalities: public good spillovers and coordination costs. Political representation allows sophisticated voters to manipulate the policy of the other country by electing a representative with less intense or more extreme preferences at the national level. We show that cooperation between national representatives exacerbate these detrimental incentives at the electoral stage. Because of this effect, in the public good case, cooperation has no net effect while in the coordination case, cooperation is actually detrimental.

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1 Introduction

The main rationale for international policy coordination is that cross-border externalities make non-cooperative decision making inefficient. Each country distorts its policy so as to make externalities work in its advantage, be it by lowering its capital tax rate in order to attract investment (Wilson 1986, Zodrow and Mieszkowski 1986), by free-riding on the environmental effort of other countries (Oates 1972, Revesz 1996) or by manipulating the terms of trade (Tabellini 1990). As all countries do so, these attempts are self-defeating and result in a Pareto inferior outcome.

This game theoretic insight rests on the assumption that countries act as rational, single decision makers some function of the welfare of its inhabitants. As the political economy literature has highlighted (e.g. Putnam 88, Persson and Tabellini 95), such an assumption may be inappropriate for democratic countries. This paper considers a simple model of policy coordination among representative democracies in the presence of cross-border externalities. Within each country, the national policy is under the control of a national leader who is elected by majority rule. The main result is that even if elections are open and competitive and agency costs are assumed away, cooperation can be counter productive. The intuition is that cooperation at the international level distorts the incentives of voters at the electoral level and favors the elections of candidates with extreme or opportunistic preferences.

The model is composed of two countries inhabited by a continuum of heterogeneous voters. We consider two different classes of externalities. We first analyze a standard model of *public goods with spillovers* in which the welfare of voters of each country is increasing in the public good provision of the other country. Typical examples include environmental policies, fiscal stimulus during a recession or counter-terrorism. We then analyze a model of *coordination costs* wherein each voter's welfare depends on how far the policy of her country is from her ideal point, but also how similar and compatible the policy of the two countries are: median voters in each country may have different ideal policy but they all suffer from policy discrepancies. Examples of coordination costs include compliance costs due to heterogeneous regulations, inconsistent foreign policies (e.g. negotiation strategy with a common supplier of natural resources or a country with nuclear ambition) or conflicting diplomatic posture (e.g. official recognition of historical events, territorial claims).

For each type of external effect, we first derive the equilibrium of a voting game in which national policies are set by direct democracy: the citizens of each country vote directly on their respective policy taking the other policy as given. In line with the aforementioned game-theoretic intuition, the corresponding *direct democracy equilibrium* is inefficient because citizens in each country do not internalize the effect of their vote on the welfare of the inhabitants of the other country. Specifically, public goods are under-provided – the usual free-riding problem – while in the coordination case, policies are too polarized.

We then analyze a citizen-candidate model in which national policies are under the control of democratically elected representatives: each country first chooses a national representative by majority rule on the basis of her preferences and beliefs. Depending on the type of public good considered, the preferences of a candidate can be interpreted as her belief on how anthropomorphic global warming is, how effective preventive wars are to fight terrorism, or how large a fiscal stimulus should be. In the coordination case, the preferences of a candidate can be interpreted as her position on a territorial/historical dispute with the other country, or her view on what the best strategy is to deal with another country’s nuclear program. Once elected, the two national representatives choose their respective policy simultaneously and non-cooperatively. A *representative democracy equilibrium* is a pair of representatives who are majority-preferred to any other candidate in their respective country taking into account the subsequent policy equilibrium. We show that when representatives elected by sophisticated voters, representative democracy exacerbates free-riding and coordination failures. In the public good case, voters engage in an electoral race to the bottom: each country appoints a policy maker with a lower willingness to pay than its median voter in order to force the leader of the other country to make a greater contribution. In the coordination case, voters engage in an electoral race to the extreme: each country appoints a candidate with more extreme preferences than its median voter in order to force the policy maker of the other country to choose a more conciliatory policy. As both countries elect opportunistic or hard-liner candidates, a majority of voters in both countries are worse-off under representative democracy than under direct democracy.

Finally, we analyze the effect of international cooperation. One of the main advantages of political representation is that it allows countries to speak with a single voice, which greatly reduces bargaining costs. A credible and mutually profitable agreement to coordinate policies is arguably easier

to reach between two policy makers than between two heterogeneous electorates. To take into account the possibility of cooperation between national leaders, we modify the electoral game previously described: policy makers keep the control of their respective policy but mutually agree to take into account (to some degree) the views and preferences of their foreign counterpart. This cooperation can be thought of as a deliberate effort of policy makers to coordinate their policies, the intervention of supra-national institutions (or federal institutions if jurisdictions are member states or districts) or a negotiation imposed by a third country in the case of a diplomatic dispute. Cooperation obviously improves policy coordination between elected representatives but it also distorts the incentives of the voters at the electoral stage. More precisely, political representation allows sophisticated voters to exploit international cooperation by further under-reporting or exaggerating their preferences during elections. This electoral effect is socially detrimental. In the public good case, we show that it exactly offsets the direct effect of cooperation at the policy making stage: international cooperation has no effect on policies. In the coordination case, the electoral effect dominates the direct effect: a deeper cooperation between national leaders actually reduces policy coordination at the representative voting equilibrium.

Contrary to the literature on international cooperation (which we review in the next subsection), we assume away electoral imperfections, agency costs between voters and politicians or commitment problems. This model shows that even when office holders are policy motivated and democratically elected by informed voters in open and neutral elections, cooperation between representative democracies can still be counter productive. The reason is that sophisticated voters can use elections as a commitment strategy to a particular bargaining posture. The resulting electoral race to the bottom or to the extreme exacerbates the coordination failure that would arise in the absence of cooperation.

The rest of this section describes the related literature and introduces some notations. Section 2 analyzes the public good model and section 3 the coordination model. Section 4 concludes.

1.1 Related Literature

Several authors have argued that international cooperation can be counter-productive. The argument is based on the suboptimality of policy making at the national level. A first strand of literature has shown that cooperation can

worsen the commitment problem faced by national policy maker: cooperation exacerbates the time inconsistency problem of central bankers (Rogoff 1986) and facilitates the expropriation of capital holder once capital has been allocated (Kehoe 89, Edwards and Keen 1993, Hatfield and Padro-i-Miquel 2009). Another strand of literature has proposed a similar argument based on political agency costs. Buchanan and Faith (87) and Tabellini (90) have shown that in dysfunctional democracies in which the incentives of politicians are not aligned with the preferences of the voters, inter-jurisdictional cooperation allows office holder to extract more rent at the expense of the population at large.

The negative impact of cooperation in two aforementioned papers rests on the assumption that policy makers do not represent the preferences of the median voter. In this paper, political representation is not modelled as a common agency problem between voters and politicians.¹ The median voter is always pivotal and policy makers have no rent-seeking motives. Nevertheless, we show that the conjunction of international conflict of interests (driven by cross-border externalities) and national conflict of interests (driven by preferences heterogeneity) can make international cooperation undesirable.

Technically, our paper is related to Persson and Tabellini (1992) and Besley and Coate (2003) who also consider the effect of strategic delegation in citizen candidate models. Persson and Tabellini do not allow for cooperation and show that in the case of fiscal externalities (capital taxation), strategic delegation can mitigate the race to the bottom. Besley and Coate show that when preferences over public good levels are separable (and in particular, free-riding incentives are absent), the benefits of cross-border cooperation are mitigated by strategic delegation, but cooperation is still desirable. Our model shows that in two arguably standard type of externalities, cooperation can be unproductive or even counter productive.

1.2 Notations

Throughout the paper, we consider two countries labelled d and f . For any $c \in \{d, f\}$, $-c$ refers to the other country. Each country c is inhabited by

¹Of course, agency costs could affect the provision of public goods. For instance, if public good provision requires tax collection, a portion of which can be diverted for private purposes, a Leviathan government might actually offset the free-riding problem. If public good provision requires managerial effort or reduced political support from powerful interest groups, agency costs might compound the free-riding problem.

a continuum of residents indexed by a set I_c which size is normalized to 1. For all $i \in I_c$, (i, c) refers to voter i in country c . The policy of country c is denoted x_c . The individual preferences of voter (i, c) are parametrized by a type $\theta_{i,c}$. The mean of $\theta_{i,c}$ in country c is denoted $\bar{\theta}_c$ while the median is denoted θ_c^m .

2 A Model of Public Goods

In this section, $x_c \geq 0$ denotes the level of provision of some national public good in country c with cross-border spillovers. The public good is financed at the national level. The preferences of voter (i, c) are given by:

$$U_{i,c}(x) = \theta_{i,c}H((1 - \beta_c)x_c + \beta_c x_{-c}) - x_c. \quad (1)$$

The first term in (1) corresponds to the utility derived by the level of public good $(1 - \beta_c)x_c + \beta_c x_{-c}$ in country c . The second term corresponds to her contribution to the national public good x_c . Throughout, we will assume that H is smooth, strictly concave and with a slight abuse of notation, $H'(0) = \infty$ and $H'(\infty) = 0$. The type $\theta_{i,c} > 0$ of voter (i, c) is her willingness to pay for the public good, or her belief about the effect of the public intervention on the public good (e.g. forest protection on global warming or preventive wars on counter terrorism). Modulo an appropriate rescaling of utilities, $\theta_{i,c}$ can also be interpreted as well as (i, c) 's marginal contribution to the national public good. The parameter β_c determines the level of cross-border spillover in country c . Throughout this section, we will assume that the distribution of types within each country $\{\theta_{i,c} : i \in I_c\}$ admits a density μ_c with full support and $0 < \beta_c < 1/2$.

For the sake of brevity, we assume that the distribution of preferences is such that no country will completely free-ride on the other in any of the equilibrium we will analyze. As we shall see, this is true whenever the following holds:

Assumption 1 *The median types (θ_d^m, θ_f^m) are such that:*

$$\begin{aligned} \frac{1 - \beta_f}{\beta_d} (H')^{-1} \left(\frac{1}{(1 - \beta_d) \theta_d^m} \right) &\geq \\ (H')^{-1} \left(\frac{1}{(1 - \beta_f) \theta_f^m} \right) &\geq \frac{\beta_f}{1 - \beta_d} (H')^{-1} \left(\frac{1}{(1 - \beta_d) \theta_d^m} \right), \\ \frac{1 - \beta_f}{\beta_d} (H')^{-1} \left(\frac{1 - \beta_f - \beta_d \beta_f}{(1 - \beta_d) (1 - \beta_f) \theta_d^m} \right) &\geq \\ (H')^{-1} \left(\frac{1 - \beta_d - \beta_d \beta_f}{(1 - \beta_f) (1 - \beta_d) \theta_f^m} \right) &\geq \frac{\beta_f}{1 - \beta_d} (H')^{-1} \left(\frac{1 - \beta_f - \beta_d \beta_f}{(1 - \beta_d) (1 - \beta_f) \theta_d^m} \right). \end{aligned}$$

In words, assumption 1 means that the median voters in each country have sufficiently similar preferences or that spillovers are not too large.

2.1 The Benchmark Case: Direct Democracy

In this subsection, we consider the case in which national policies are under the direct control of voters in each country. A direct democracy equilibrium is a pair of policy such that in each country c , x_c is a Condorcet winner taking the policy of the other country x_{-c} as given.

Definition 1 *A policy vector x is a direct democracy equilibrium (henceforth DDE) if x is majority preferred in country d to (x'_d, x_f) for any x'_d and (x_d, x_f) is majority preferred in country f to (x_d, x'_f) for any x'_f .*

Since in each country c , voters differ only through their preferences for the public good $\theta_{i,c}$ and $U_{i,c}$ depends linearly on $\theta_{i,c}$, the set of admissible preferences satisfies the intermediate preferences property (Grandmont 1978) and majority preferences in each country c coincide with the preferences of the voter with median type θ_c^m . Hence, the DDE are the Nash equilibria of a game in which each median voter θ_c^m controls its policy x_c . The corresponding F.O.C. is:

$$x_c = \max \left\{ 0, \frac{(H')^{-1} \left(\frac{1}{(1 - \beta_c) \theta_c^m} \right) - \beta_c x_{-c}}{1 - \beta_c} \right\}. \quad (2)$$

Provided the constraint $x_c \geq 0$ is not binding, the unique equilibrium is given by

$$x_c(\theta^m) = \frac{(1 - \beta_{-c})(H')^{-1}\left(\frac{1}{(1-\beta_c)\theta_c^m}\right) - \beta_c(H')^{-1}\left(\frac{1}{(1-\beta_{-c})\theta_{-c}^m}\right)}{1 - \beta_d - \beta_f}. \quad (3)$$

Proposition 1 *There exists a unique DDE which is given by (3). It is sub-optimal in the sense that there exists a policy vector in which both countries provide more public good which is preferred by a majority of voters in both countries.*

Proof. Observe that as a function of x_{-c} , the right hand-side of (2) is a contraction, which proves that there exists a unique DDE. One can easily check that from assumption 1, the policy vector defined in (3) satisfies (2).

If both countries increase the level of public good by some $\varepsilon > 0$, by definition of a DDE, the first order effect on the welfare of the median voter of country c of an increase of x_c is null while the first order effect of an increase in x_{-c} is positive. Therefore, for ε not too large, both median voters will be strictly better-off. From what precedes, so do a majority of voters in both countries. ■

The rationale for the inefficiency of the DDE is the traditional free-riding problem: when casting their vote, citizens in each country do not internalize the benefit of their public good contribution on the residents of the other country.

2.2 Representative Democracy and Strategic Delegation

We now consider the case in which national policies are set by national representatives elected by majority rule within each country. We model election through a “citizen-candidate” model (see e.g. Persson Tabellini 1992, Besley and Coate 1997, 2003) in which representatives are chosen from the set of voters and once elected, have complete discretion on the policy choice. More formally, the game proceeds as follows: at the first stage, each country choose by majority rule a local representative among its residents, taking the representative in the other country as given. At the second stage, elected national representatives choose simultaneously their respective policy taking the policy of the other country as given. As argued in the introduction, depending

on the kind of public good considered, voting on the type of the representative can be interpreted as choosing a representative with a particular ideology or belief, for instance on how anthropomorphic global warming is, how effective preventive wars are to fight terrorism, or whether fiscal policies can stimulate the economy.

We first consider the case in which countries do not cooperate and national policy makers choose the policy solely on the basis of the preferences and political views for which they have been elected at the national level. Therefore, for any pair of representative $\theta^r = (\theta_d^r, \theta_f^r)$, provided the constraint $x_c \geq 0$ is not binding, the corresponding second stage subgame equilibrium is $x(\theta^r)$ as defined in (3). Solving by backward induction, an electoral equilibrium is a pair of representatives θ^r such that in each country, no majority of voters can benefit from electing a different representative.

Definition 2 *A policy vector x is a representative democracy equilibrium (RDE) if there exists a profile of type θ^r such that $x = x(\theta^r)$, x is majority preferred in country d to $x(\theta'_d, \theta_f^r)$ for all $\theta'_d \in \mathbb{R}^+$ and x is majority preferred in country d to $x(\theta_d^r, \theta'_f)$ for all $\theta'_f \in \mathbb{R}^+$.*

As argued earlier, majority preferences in each country coincide with the preferences of the national median voter. Hence, the RDEs are the Nash equilibria of a delegation game in which each median voter θ_c^m controls the type of its representative θ_c^r and the outcome is given by $x(\theta_d^r, \theta_f^r)$ as defined in (3). So the F.O.C. at the first stage of a RDE is given by:

$$\left((1 - \beta_c) \frac{\partial x_c}{\partial \theta_c^r} + \beta_c \frac{\partial x_{-c}}{\partial \theta_c^r} \right) \theta_c^m H'((1 - \beta_c) x_c + \beta_c x_{-c}) - \frac{\partial x_c}{\partial \theta_c^r} = 0.$$

Differentiating (3), we get $\frac{\partial x_{-c}}{\partial \theta_c^r} / \frac{\partial x_c}{\partial \theta_c^r} = -\frac{\beta_{-c}}{1 - \beta_{-c}}$. Substituting in the F.O.C. above, we get

$$\left(1 - \frac{\beta_c \beta_{-c}}{1 - \beta_{-c}} \right) \theta_c^m H'((1 - \beta_c) x_c(\theta^r) + \beta_c x_{-c}(\theta^r)) - 1 = 0. \quad (4)$$

By analogy with (2), one can see from (4) that at the RDE, the type of elected representative in country c will be $\theta_c^r = \left(1 - \frac{\beta_c \beta_{-c}}{1 - \beta_{-c}} \right) \theta_c^m$: the median voters strategically “under-report” their willingness to pay for the public good by appointing a policy maker who care less about the public good than themselves.

Proposition 2 *There exists a unique RDE. It is characterized by (4). It is lower than the DDE and a majority of voters in both countries are strictly better-off at the DDE than at the RDE.*

Proof. Substituting (3) in $U_d(x(\theta_d^r, \theta_f^r))$, one can see that the induced preferences of the median voter of each country is quasi-concave in the type of her representative. To take into account the constraint $x_c \geq 0$ in the game between median voters, we add the constraint $\theta_c^r \geq \underline{\theta}_c^r(\theta_{-c}^r)$ where $\underline{\theta}_c^r(\theta_{-c}^r)$ is such that $x_c(\theta_c^r, \underline{\theta}_c^r(\theta_{-c}^r)) = 0$. The best response of each median voter is then given by $\max\{\theta_c^r(\theta_{-c}^r), \underline{\theta}_c^r(\theta_{-c}^r)\}$ where $\theta_c^r(\theta_{-c}^r)$ is defined by (4).

Since $\frac{\partial x_{-c}}{\partial \theta_c^r} / \frac{\partial x_c}{\partial \theta_c^r} = -\frac{\beta_{-c}}{1-\beta_{-c}} < 1$, both $\theta_c^r(\theta_{-c}^r)$ and $\underline{\theta}_c^r(\theta_{-c}^r)$ are contraction. So the best response of each median voter is a contraction and there exists a unique equilibrium. One can check that the policy vector defined by (3) where θ_c^m is replaced by $(1 - \frac{\beta_c \beta_{-c}}{1-\beta_{-c}}) \theta_c^m$ is a solution of (4) and under assumption 1, $x_c \geq 0$.

Let y be the DDE and z be the RDE. Since $z_f < y_f$, for any $x_d \geq 0$, the median voter of country d strictly prefers (x_d, y_f) to (x_d, z_f) . Therefore, she strictly prefers $y = (x_d^*(\theta_d^m, y_f), y_f)$ to $(x_d^*(\theta_d^m, z_f), z_f)$ where x_d^* is the best response function defined in (2). By definition of x_d^* , she strictly prefers $(x_d^*(\theta_d^m, z_f), z_f)$ to z . By transitivity, she strictly prefers y to z . As argued earlier, this implies that a majority of voters in country c strictly prefer y to z . ■

The intuition for this result is that since public good levels are strategic substitutes, by voting for a representative who care less about the public good, the pivotal voter of country c forces the representative of the other country to a greater level of provision, which benefits the voters of country c via the spillovers. In equilibrium, the attempts of both electorates to free ride of each other are self defeating and leave both country worse-off than under direct democracy.

Proposition 2 contrasts with the fiscal competition scenario: Persson and Tabellini (1992) have shown in a model of capital taxation that strategic delegation can mitigate the race to the bottom. The discrepancy hinges on the nature of the strategic interactions between jurisdictions. In Persson and Tabellini 1992 as in the public good case, tax rates exerts positive externalities (the capital flight problem) but unlike public good provision levels, they are strategic complements.

2.3 Cooperation and the Electoral Race to the Bottom

In many representative democracies, foreign policy is typically a presidential preserve, the main rationale being that delegating powers to a single decision maker facilitates cross-border coordination and cooperation. It is arguably easier to devise a mutually beneficial cooperative agreement between two national leaders than between two heterogeneous electorates. In this subsection, we allow for the possibility of cross-border coordination and cooperation. We assume that countries are still sovereign in the sense that national policy makers keep the control rights on their respective policy, but they mutually agree to take the views and preferences of their foreign counterpart into consideration. To account for the imperfection of cross-border agreements, we allow for various degrees of cooperation. The latter parametrizes the (in)efficiency of the supra-national institutions which make cooperation possible or the commitment of national leaders to coordinate their policies.

Formally, we modify the previous two stage game as follows: at the first stage, each country elects independently a representative by majority rule. At the second stage, the elected representative θ_c^r of each country c choose her policy x_c so as to maximize:

$$U_c^\gamma(\theta^r, x) = U_c(\theta_c^r, x) + \gamma U_{-c}(\theta_{-c}^r, x), \quad (5)$$

where $\gamma \in [0, 1]$ stands for the degree of cooperation between the two countries. Hence, $\gamma = 0$ corresponds to the previous case of a RDE while $\gamma = 1$ corresponds to complete cooperation. The F.O.C. for each representative is

$$(1 - \beta_c) \theta_c^r H'((1 - \beta_c) x_c + \beta_c x_{-c}) + \gamma \beta_{-c} \theta_{-c}^r H'((1 - \beta_{-c}) x_{-c} + \beta_{-c} x_c) = 1.$$

After some re-arrangement,

$$\left(1 + \gamma \frac{(1 - (1 + \gamma) \beta_c) \beta_{-c}}{(1 - (1 + \gamma) \beta_{-c}) (1 - \beta_c)} \right) (1 - \beta_c) \theta_c^r H'((1 - \beta_c) x_c + \beta_c x_{-c}) = 1. \quad (6)$$

One can easily see that (6) defines a unique subgame equilibrium which we denote $x^\gamma(\theta^r)$. By analogy with (2), (6) shows that $x^\gamma(\theta^r)$ is equivalent to a non cooperative equilibrium (i.e. $\gamma = 0$) with a pair of representatives θ^γ such that

$$\theta_c^\gamma = \left(1 + \gamma \frac{(1 - (1 + \gamma) \beta_c) \beta_{-c}}{(1 - (1 + \gamma) \beta_{-c}) (1 - \beta_c)} \right) \theta_c^r.$$

Hence, $\theta_c^\gamma > \theta_c^r$ so cooperation between policy makers alleviates the free-riding problem. Moreover, it should be clear that for a given pair of representative θ^r , $x^\gamma(\theta^r)$ is increasing in γ .

Definition 3 *A policy vector x is a γ -representative democracy equilibrium (γ -RDE) if there exists a pair of representatives θ^r such that $x = x^\gamma(\theta^r)$, x is majority preferred in country d to $x^\gamma(\theta'_d, \theta_f^r)$ for all $\theta'_d \in \mathbb{R}^+$ and x is majority preferred in country d to $x^\gamma(\theta_d^r, \theta'_f)$ for all $\theta'_f \in \mathbb{R}^+$.*

As argued earlier, the median voter is always pivotal. Hence, the γ -RDE are the Nash equilibria of the delegation game in which each median voter appoints her representative θ_c^r , and the outcome is $x^\gamma(\theta^r)$ as defined in (6). So the F.O.C. at the first stage of a RDE is given by:

$$\left((1 - \beta_c) \frac{\partial x_c^\gamma}{\partial \theta_c^r} + \beta_c \frac{\partial x_{-c}^\gamma}{\partial \theta_c^r} \right) \theta_c^m H'((1 - \beta_c) x_c^\gamma + \beta_c x_{-c}^\gamma) - \frac{\partial x_c^\gamma}{\partial \theta_c^r} = 0.$$

Differentiating (6), we get $\frac{\partial x_{-c}^\gamma}{\partial \theta_c^r} / \frac{\partial x_c^\gamma}{\partial \theta_c^r} = -\frac{\beta_{-c}}{1 - \beta_{-c}}$. Substituting this identity in the F.O.C. above, we get (4), i.e. the same F.O.C. as in the non cooperative case, which proves the following:

Proposition 3 *For all γ , there exists a unique γ -RDE. It is equivalent to the RDE.*

Proposition 3 shows that in the public good case, the gains from international cooperation at the policy making stage are completely offset by strategic delegation at the electoral stage. The reason is that the more cooperative the decision making process at the international level, the more the representative of country c will compensate a low level of public good x_{-c} in the other country by a larger domestic provision x_c . Hence, cooperation reduces the free-riding problem at the policy making stage but triggers a race to the bottom at the electoral stage. In other words, when international interactions become more cooperative, sophisticated voters use political representation as a commitment device to adopt a beneficial bargaining posture and thus pay a smaller share of the public good.

Proposition 3 contrasts with Besley and Coate 2003. In their model, strategic delegation mitigates the benefit of cooperation but does not offset it completely because they consider separable preferences and thus assume away free-riding incentives, which minimizes incentives for strategic delegation.

3 A Model of Policy Coordination

In this section, we depart from the standard public good scenario and consider externalities which are driven by the differences and inconsistencies between national policies. The median voters of each country may have different views on what the ideal policy is but they all suffer from the lack of coherence between national policies. Specifically, the preferences of voter i in country c are given by the following utility function:

$$U_{i,c}(x) = V(x_c - \theta_{i,c}) + W_c(x_c - x_{-c}). \quad (7)$$

The first term $V(x_c - \theta_{i,c})$ corresponds to the idiosyncratic preferences of voter (i, c) on the policy enacted by her own country, i.e. how x_c meets the specific needs and preferences of voter (i, c) . The function V is assumed to be single-peaked with a maximum at 0 so absent any cross-border effect, $\theta_{i,c}$ is the ideal policy of voter (i, c) . The second term embodies the coordination externalities. The function W_c is assumed to be single-peaked with a maximum at 0: the residents of country c prefer the policy x_{-c} of the other country to be as close as possible to their policy x_c .

Examples of such policies include administrative policies (heterogeneous regulations deter trade and economic cooperation, see e.g. Anderson and Wincoop 2004), diplomatic policies (two countries with incoherent diplomatic posture may have less bargaining clout on a third country, as is the case for European countries and Russia), official accounts of common historical events (discrepancies in history textbooks may trigger diplomatic clashes and popular anger, as was the case recently between China and Japan) or frontier disputes (the policy of each country is interpreted as its territorial claim, and the distance between the two policies is the extent of the territorial dispute).

We assume that in each country c , the distribution of $\theta_{i,c}$ has full support and without loss of generality, the median types are such that $\theta_d^m < \theta_f^m$. To guarantee the existence and uniqueness of the voting equilibria under direct and representative democracy, we make the following technical assumptions on Ψ :

Assumption 2 For all $s \in \mathbb{R}$, $V''(s) < 0$, $V'(\pm\infty) = \pm\infty$, $W_d''(s) < 0$ and $W_f''(s) < 0$. For all $\gamma \in [0, 1]$ and c , if we denote

$$\Psi_c(\gamma, s) \equiv \frac{W_c''(s) + \gamma W_{-c}''(-s)}{V''((V')^{-1}(-W_c'(s) + \gamma W_{-c}'(-s)))},$$

then $\frac{W'_d(s)}{1+\Psi_{-c}(\gamma,-s)}$ is decreasing in s and for all $s \in \mathbb{R}$, $\Psi_c(\gamma, s)$ is increasing in γ .

Since W_d and W_f are assumed to be concave, the second part of assumption 2 is satisfied for instance if V'' is U-shaped with a minimum at 0 and W''_d and W''_f are hump-shaped with a maximum at 0.²³ These conditions are not necessary for assumption 2 to hold, the above functions are strictly monotonic even when V'' , W''_d and W''_f are constant. To clarify the exposition of our results, we will occasionally make the following additional assumption:

Definition 4 *The profile of preferences is symmetric if for all $s \in \mathbb{R}$, $V(s) = V(-s)$ and $W_d(s) = W_f(-s)$.*

Finally, the following technical lemma will be useful in the sequel:

Lemma 1 *Let f , g_d and g_f be strictly decreasing functions, $f(0) = g_d(0) = g_f(0) = 0$ and $f(\pm\infty) = \mp\infty$, then the system:*

$$\begin{aligned} f(x_d - \theta_d) + g_d(x_d - x_f) &= 0, \\ f(x_f - \theta_f) + g_f(x_f - x_d) &= 0, \end{aligned}$$

has a unique solution x . If $\theta_d < \theta_f$, then $\theta_d < x_d < x_f < \theta_f$. If for all $s > 0$, $g_d(-s) > h_d(-s) > 0$ while $g_f(s) < h_f(s) < 0$ and if y denotes the solution of the system of equation above in which g is replaced by h , then for all $\theta_d < \theta_f$, $y_f - y_d > x_f - x_d > 0$.

²Since W'_d is decreasing, $\frac{W'_d(x)}{1+\Psi_f(\gamma,x)}$ is decreasing in x if Ψ_f is decreasing in x when $W'_d < 0$ and vice versa. Suppose to fix ideas that $x > 0$. Then $W'_d(x) < 0$. If W''_f and W''_d are hump-shaped with a maximum at 0, the numerator of Ψ_f is negative and decreasing. Moreover, $-W'_f(-x) + \gamma W'_d(x)$ is negative and decreasing, so $(V')^{-1}(-W'_f(-x) + \gamma W'_d(x))$ is positive and increasing. Since V'' is U-shaped with a minimum at 0, the denominator of Ψ_f is negative and increasing. This proves that Ψ_f is decreasing in x .

³Since $W''_d(-x) + \gamma W''_f(x) > 0$ and $V'' > 0$, $\Psi_f(\gamma, x)$ is increasing in γ if the denominator $V'' \left((V')^{-1}(-W'_f(-x) + \gamma W'_d(x)) \right)$ is increasing in γ . Suppose to fix ideas that $x > 0$. Then $-W'_f(-x) + \gamma W'_d(x)$ is negative and decreasing in γ . So $(V')^{-1}(-W'_f(-x) + \gamma W'_d(x))$ is positive and increasing in γ . If V'' is U-shaped with a minimum at 0, the denominator of Ψ_f is negative and increasing in γ .

Proof. By monotonicity of f and g_d and since $f(\pm\infty) = \pm\infty$, for any x_f the first equation defines a unique solution $x_d^*(x_f)$. Moreover, one can easily check that x_d^* is a contraction. Therefore, $x_f - x_d^*(x_f)$ is decreasing and $f(x_f - \theta_f) + g_f(x_f - x_d^*(x_f)) = 0$ admits a unique solution. Suppose $\theta_d < \theta_f$ and $x_d > x_f$. Then the first equation implies that $x_d < \theta_d$ and the second implies $x_f > \theta_f$, which contradicts $x_d > x_f$. Substituting $x_d < x_f$ in the two equations, we get $\theta_d < x_d$ and $x_f < \theta_f$.

To show the second part, suppose $y_f - y_d \leq x_f - x_d$, then from what precedes,

$$g_f(x_f - x_d) \leq g_f(y_f - y_d) < 0 < g_d(y_d - y_f) \leq g_d(x_d - x_f).$$

Under our hypothesis on g and h , this implies that

$$g_f(x_f - x_d) < h_f(y_f - y_d) < 0 < h_d(y_d - y_f) < g_d(x_d - x_f).$$

This implies that

$$f(x_d - \theta_d) < f(y_d - \theta_d) < 0 < f(y_f - \theta_f) < f(x_f - \theta_f),$$

and thus $x_d > y_d$ and $y_f > x_f$, which contradicts the initial assumption that $y_f - y_d \leq x_f - x_d$. ■

3.1 The Benchmark Case: Direct Democracy

We first characterize the equilibrium when national policies are under the direct control of national voters through majority rule. Following definition 1, the direct democracy equilibrium has the following property:

Proposition 4 *There exists a unique DDE which we denote x^{DDE} . It is socially suboptimal in the sense that there exists a policy vector x such that $x_d^{DDE} < x_d \leq x_f < x_f^{DDE}$ which is strictly preferred by a majority of voters in both countries.*

Proof. Since $\frac{\partial^2 U_c}{\partial \theta_c \partial x_c} > 0$, the preferences specified in (7) satisfy the intermediate preferences condition (Grandmont 1978, Gans and Smart 1996). Therefore, within each country, majority preferences coincide with the preferences of the national median voter θ_c^m . Hence, the DDE coincide with the Nash equilibria of the game Γ in which the median voter of country d controls x_d and the median voter in country f controls x_f . Under our assumption, Γ

is concave and the Nash equilibria are characterized by the usual first order condition. Lemma 1 completes the proof of existence and uniqueness.

Consider the policy $x^{DDE} + (\varepsilon, -\varepsilon)$. Since W_c is single-peaked with a peak at 0, from (8), the first-order effect of the change of x_c on the welfare of voter (c, θ_c^m) is null while the first order effect of the change of x_{-c} is positive. Hence, both median voters are strictly better off for ε sufficiently small, and from what precedes, so do a majority of voters in both countries. ■

The rationale for the lack of policy coordination in equilibrium is the gap between private and social coordination costs: when casting their vote, the residents of country c only internalize their coordination cost $W_c(x_c - x_{-c})$ but not the one of the other country $W_{-c}(x_{-c} - x_c)$.

3.2 Representative Democracy, International Cooperation and the Electoral Race to the Extreme

We now turn to the case in which national policies are under the control of elected representatives. As in the public good case, at the policy making stage, we allow national leaders to achieve some degree of cooperation $\gamma \in [0, 1]$ as specified in (5). The corresponding voting equilibrium (γ -RDE) is given by definition 3. For any pair of representatives θ^r elected at the first stage, the subgame policy equilibrium is given by the F.O.C.:

$$V'(x_c - \theta_c^r) + W'_c(x_c - x_{-c}) - \gamma W'_{-c}(x_{-c} - x_c) = 0. \quad (8)$$

Lemma 1 implies that (8) defines a unique subgame equilibrium which we denote $x^\gamma(\theta^r)$. Moreover, lemma 1 implies that for a given pair of representatives θ^r , $x_f^\gamma - x_d^\gamma$ is decreasing in γ : cooperation mitigates the lack of policy coordination. Differentiating (8) and using the notations of assumption 2, we get:

$$\begin{aligned} \frac{\partial x_d^\gamma}{\partial \theta_c^r} &= \frac{1 + \Psi_{-c}(\gamma, x_{-c}^\gamma - x_c^\gamma)}{1 + \Psi_c(\gamma, x_c^\gamma - x_{-c}^\gamma) + \Psi_{-c}(\gamma, x_{-c}^\gamma - x_c^\gamma)}, \\ \frac{\partial x_{-c}^\gamma}{\partial \theta_c^r} &= \frac{\Psi_{-c}(\gamma, x_c^\gamma - x_{-c}^\gamma)}{1 + \Psi_c(\gamma, x_c^\gamma - x_{-c}^\gamma) + \Psi_{-c}(\gamma, x_{-c}^\gamma - x_c^\gamma)}. \end{aligned} \quad (9)$$

Let $U_c^I(\theta^r) = U_c(x^\gamma(\theta^r))$ be the induced utility function of the median voters at the electoral stage. Using (9), we get

$$\begin{aligned} \frac{\partial U_c^I}{\partial \theta_c^r} &= \frac{\partial x_c^\gamma}{\partial \theta_c^r} V'(x_c^\gamma - \theta_c^m) + \left(\frac{\partial x_c^\gamma}{\partial \theta_c^r} - \frac{\partial x_{-c}^\gamma}{\partial \theta_c^r} \right) W'_c(x_c^\gamma - x_{-c}^\gamma) \quad (10) \\ &= \frac{\partial x_c^\gamma}{\partial \theta_c^r} \left(V'(x_c^\gamma - \theta_c^m) + \frac{W'_c(x_c^\gamma - x_{-c}^\gamma)}{1 + \Psi_{-c}(\gamma, x_{-c}^\gamma - x_c^\gamma)} \right). \end{aligned}$$

From (9), $\frac{\partial x_c^\gamma}{\partial \theta_c^r} > 0$ so (10) implies that a γ -RDE must be a solution of

$$V'(x_c - \theta_c^m) + \frac{W'_c(x_c - x_{-c})}{1 + \Psi_{-c}(\gamma, x_{-c} - x_c)} = 0. \quad (11)$$

By comparing (11) and (8), we see that the F.O.C. of the γ -RDE is equivalent to the F.O.C. of the DDE modulo the coordination externality W'_c which is scaled down by a factor $1 + \Psi_{-c} > 1$. Hence, whatever the degree of cooperation between representatives, voters internalize less externality at the γ -RDE than at the DDE so representative democracy exacerbates the coordination failure of direct democracy. Formally, we can show the following:

Proposition 5 *There exists a unique γ -RDE denoted x^{RDE} which is characterized by (11). For all degree of cooperation γ , if θ^r denotes the types of the elected representatives, then*

$$\begin{aligned} \theta_d^r &< \theta_d^m < \theta_f^m < \theta_f^r, \\ x_f^{RDE} - x_d^{RDE} &> x_f^{DDE} - x_d^{DDE}. \end{aligned}$$

In at least one country, a majority of voters are strictly better-off under the DDE than under the γ -RDE. In the symmetric case, this is true in both country.

Proof. From (9), $\frac{\partial x_c^\gamma}{\partial \theta_c^r} > 0$ so from (10), the induced utility of the median voter at the electoral stage U_c^I is quasi-concave in θ_c^r if

$$V'(x_c - \theta_c^m) + \frac{W'_c(x_c - x_{-c})}{1 + \Psi_{-c}(\gamma, x_{-c} - x_c)}$$

is decreasing in θ_c^r . One can see from (9) that x_c , x_{-c} and $x_c - x_{-c}$ are increasing in θ_c^r . So $V'(x_c(\theta^r) - \theta_c^m)$ is decreasing in θ_c^r and under assumption 2, $\frac{W'_c(x_c - x_{-c})}{1 + \Psi_{-c}(\gamma, x_{-c} - x_c)}$ is decreasing as well. Since the payoff function of Γ are quasi-concave, the set of γ -RDE coincides with the solutions of (11). Lemma 1 together with assumption 2 completes the proof of existence and uniqueness.

If x denotes a RDE and θ^r the representatives elected in equilibrium, substituting the F.O.C. of the representative in (11), we have

$$V'(x_c - \theta_c^m) = \frac{V'(x_c - \theta_c^r)}{1 + \Psi_{-c}(\gamma, x_{-c} - x_c)}. \quad (12)$$

Since $\Psi_{-c} > 0$, the above equation shows that necessarily, $\theta_d^r < \theta_d^m$ and $\theta_f^r > \theta_f^m$.

From assumption 2, $W'_c(s) \leq \frac{W'_c(s)}{1 + \Psi_{-c}(\gamma, -s)}$ for $s \leq 0$ so by comparing the F.O.C. of the DDE (i.e. (8) for $\theta^r = \theta^m$ and $\gamma = 0$) and the γ -RDE (i.e. (11)), lemma 1 implies that $x_f^{RDE} - x_d^{RDE} > x_f^{DDE} - x_d^{DDE}$. Therefore, either $x_f^{RDE} > x_f^{DDE}$ or $x_d^{RDE} < x_d^{DDE}$. Suppose to fix ideas that $x_f^{RDE} > x_f^{DDE}$. Since W_d is single-peaked with a peak at 0, the median voter of country d is better-off at (x_d^{RDE}, x_f^{DDE}) than at (x_d^{RDE}, x_f^{RDE}) . Since x_d^{DDE} is the most preferred policy of the median voter given $x_f = x_f^{DDE}$, she is better-off at (x_d^{DDE}, x_f^{DDE}) than at (x_d^{RDE}, x_f^{DDE}) . As argued earlier, at least a majority of voters share the same preferences. In the symmetric case, the welfare of two median voters is the same, both at the DDE and at the γ -RDE, which completes the proof. ■

The intuition for proposition 5 is that the median voter in each country elects a representative which is more extreme than herself in order to force the representative of the other country to choose a more conciliatory policy. This electoral race to the extreme ends up at a policy equilibrium which is more polarized than under direct democracy. Proposition 5 implies in particular that countries involved in a diplomatic dispute tend to appoint representatives with more extreme positions than the one of the respective constituency, which gives a counter argument to the traditional claim that democracies generate less conflicts than dictatorships.

As in the public good case, international cooperation has two opposite effects: it improves policy coordination at the policy making stage but it also distorts the incentives of voters at the electoral stage and favors more extreme candidates. It turns out that contrary to the public good case, the

detrimental electoral effect of cooperation more than offsets the beneficial direct effect:

Proposition 6 *Let x be a γ -RDE and x' be a γ' -RDE with $\gamma' > \gamma$, then $x'_f - x'_d > x_f - x_d$ and at least in one country, a majority of voters are worse-off under x' than under x . In the symmetric case, a majority of voters in both country strictly prefer x to x' .*

Proof. Assumption 2 together with lemma 1 implies that $x'_f - x'_d > x_f - x_d$. Therefore, either $x'_f > x_f$ or $x'_d < x_d$. Suppose the earlier, the proof in the later case is symmetric. For any x_f , let $x_d(\gamma, x_f)$ be the (unique) solution of

$$V'(x_d - \theta_d^m) + \frac{W'_d(x_d - x_f)}{1 + \Psi_f(\gamma, x_f - x_d)} = 0. \quad (13)$$

From assumption 2, the left hand-side of (13) is decreasing in x_d and increasing in x_f . Moreover, $x_d(\gamma, \theta_d^m) = \theta_d^m$. Since $\theta_d^m \leq x_f < x'_f$, this implies that $\theta_d^m \leq x_d(\gamma, x_f) < x_d(\gamma, x'_f)$ and $0 \geq x_d(\gamma, x_f) - x_f > x_d(\gamma, x'_f) - x'_f$. Therefore, the median voter in country d strictly prefers $(x_d(\gamma, x_f), x_f)$ to $(x_d(\gamma, x'_f), x'_f)$.

From assumption 2 again, the left hand-side of (13) is increasing in γ so $x_d(\gamma, x_f)$ is decreasing in γ . The most preferred domestic policy x_d^* of the median voter of country d for a given x_f is given by (8) for $\gamma = 0$ and $\theta_d^r = \theta_d^m$. By comparison with (13), one can see that $x_d(\gamma, x_f) < x_d^*$. Since her induced preferences over x_d given x_f are convex, and since $x_d(\gamma', x'_f) < x_d(\gamma, x'_f) < x_d^*$, she strictly prefers $(x_d(\gamma, x_f), x_f)$ to $(x_d(\gamma', x'_f), x'_f)$ for any $\gamma < \gamma'$. By transitivity, she strictly prefers $x = (x_d(\gamma, x_f), x_f)$ to $x' = (x_d(\gamma', x'_f), x'_f)$. ■

The intuition behind proposition 6 is the following. The deeper the cooperation between national policy makers, the greater the weight of the type θ_c^r of the representative of country c on the policy of the other country x_{-c} , and thus the more influential the vote of the residents of country c on x_{-c} . In other words, each voter has a greater say on the policy of his neighbors, and has thus greater incentives to strategically over-report her preferences so as to pull both policies towards her ideal point $\theta_{i,c}$.

Proposition 6 implies for instance that it might be counterproductive for a third country or an international institution to force two countries involved in a dispute to make concessions and harmonize peacefully their position. By

forcing both national leaders to be more conciliatory, cooperation distorts the electoral incentives in each country and favor the election of hard-liner.

In the next proposition, we examine the magnitude of the electoral effect as the importance of policy coordination increases. To do so, we parametrize preferences as follows:

$$U_{i,c}(x) = V(x_c - \theta_{i,c}) + \beta W_c(x_c - x_{-c}).$$

For the next result, we assume furthermore that V'' is bounded.

Proposition 7 *As β tends to $+\infty$, $x_d^{DDE} - x_f^{DDE}$ tends to 0 but $x_d^{RDE} - x_f^{RDE}$ is bounded away from 0.*

Proof. One can see from (8) and (11) that for all β , the DDE and the RDE must belong to $[\theta_d^m, \theta_f^m]^2$. Therefore, if $x(\beta)$ denotes the DDE, $V'(x_c(\beta) - \theta_c^m)$ is bounded as $\beta \rightarrow \infty$. From (8), this implies that

$$\beta W'_c(x_c(\beta) - x_{-c}(\beta))$$

is bounded as $\beta \rightarrow \infty$ so $x_d(\beta) - x_f(\beta) \rightarrow 0$.

Suppose there exists $\beta^n \rightarrow \infty$ and a sequence of RDE x^n such that $x_d^n - x_f^n \rightarrow 0$. As argued earlier, x^n is bounded so under our hypothesis,

$$\Psi_c^n(\gamma, x_c^n - x_{-c}^n) = \frac{\beta^n W_c''(x_c^n - x_{-c}^n) + \gamma \beta^n W_{-c}''(x_{-c}^n - x_c^n)}{V''((V')^{-1}(-\beta^n W'_c(x_c^n - x_{-c}^n) + \gamma \beta^n W'_{-c}(x_{-c}^n - x_c^n)))}$$

is bounded away from 0. Therefore, $\frac{\beta^n W'_f(x_f^n - x_d^n)}{1 + \Psi_d^{\beta^n}(\gamma, x_d^n - x_f^n)}$ and $\frac{\beta^n W'_d(x_d^n - x_f^n)}{1 + \Psi_d^{\beta^n}(\gamma, x_f^n - x_d^n)}$ both tend to 0, which contradicts (11) since $\theta_d^m \neq \theta_f^m$. ■

Proposition 7 shows that the detrimental effect of representative democracy on policy coordination does not vanish as policy heterogeneity becomes increasingly costly. As coordination becomes crucial, decision makers in both countries are more willing to trade-off their diverging views against policy convergence. Under direct democracy, the decision makers are the median voters themselves so national policies converge. However, under representative democracy, as β increases, the type of each policy maker has a greater weight on the policy of the other country, which increases the incentives to appoint extreme representatives.

4 Concluding Remarks

This paper presents a simple model of international cooperation between representative democracies. The main assumption is that cooperation cannot be enforced among millions of voters and thus can only occur between national leaders. Our model shows that cooperation between elected representatives can distort the incentives of voters at the electoral stage. Even if the democratic process is open and neutral and office holder have no incentives to distort policies to extract personal gains, the benefits of cooperation are undone or even reversed by strategic voting.

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