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Strategic decentralization and the provision of global public goods

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ABSTRACT

We study strategic decentralization in the provision of a global public good. A federation, with the aim of maximizing the aggregate utility of its members, may find it advantageous to decentralize the decision-making, so that its members act autonomously to maximize their own utility. If utility is fully transferable within a federation, the larger a federation is or the more sensitive it is to the public good, the more it has incentives to remain centralized. If an overall increase in the sensitivity to the public good induces some federation (s) to decentralize, it may lead to a decrease in the aggregate provision. With non-transferable utility within a federation, those members that are smaller or less sensitive to the public good are more likely to prefer decentralization. Some members within a federation becoming more sensitive to the public good may thus lead to a lower aggregate provision, because the increased heterogeneity of the federation makes it more inclined to decentralize.

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Introduction

Contribution to global public goods, such as mitigation of climate change, production of scientific knowledge, international security or preservation of natural resources, is one of the domains where international cooperation matters the most. Yet, on many of these issues, even existing federations of states or countries often choose to act in a decentralized way, such as for military interventions in the European Union or climate policy in the United States.

In this paper, we study the causes and consequences of strategic decentralization. We set up a model where pre-existing federations non-cooperatively contribute to a global public good. The game takes place over two stages. In the second stage, centralized federations and individual countries play a non-cooperative global public goods game. In the first stage, the members of each federation jointly choose a political structure, according to which the decision of the provision of the public good is then made within the federations. If the members of a federation choose to provide the good in a centralized way, they delegate the voluntary provision to a centralized level, which maximizes their total surplus. If they choose to provide the good in a decentralized way, each member maximizes its own surplus independently by choosing its contribution. The choice of the political structure generates a trade-off. Being centralized, a federation internalizes the externalities caused by the public good production within the federation. Being decentralized, a federation commits itself to free riding on the other one.

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First, we study the impact of different political structures on the provision of the public good, as well as the factors that make unilateral decentralization beneficial to a federation. Secondly, we solve a game where federations simultaneously choose their political structure with fully transferable utility within each federation (TU). We show that federations which are larger or more sensitive to the public good have stronger incentives to remain centralized. An overall increase in the sensitivity to the public good may however lead to a lower total production of public good, because it influences the players' strategic incentives to decentralize. Thirdly, we compare these results with a setup characterized by non-transferable utility (NTU). While the trade-offs identified in the TU case remain, sensitivity to the public good now plays an additional role, since smaller and less sensitive members are more likely to prefer decentralization. All other things equal, a more heterogeneous federation is thus more prone to decentralize. Being a heterogeneous federation may therefore be a strategic advantage if utility is non-transferable.

Our modeling approach differs from the traditional view of coalition formation according to which individual actors seek to cooperate with each other on a single issue (see, for instance, d'Aspremont et al., 1983; Bloch, 1996; Ray and Vohra, 1997).¹ In contrast, we start by assuming that countries belong to pre-existing federations – bounded by a common history of cooperation, shared interest, or mutual trust – and are able to choose the institutional design to maximize their combined surplus. For instance, member states of the European Union have to agree with each other on which institutional level should be in charge of determining the amount of military contributions or pollution abatements within the union. But we assume each of these issues alone does not determine which countries leave or join the European Union. In this sense, our approach adds an additional layer to the literature on coalition formation, by understanding and modeling how single players (that are exogenously given in most of the coalition-formation models) come about.

Once an institution exists, and the mutual trust between its members is present, nothing prevents them from voting unanimously to extend the scope of the institution's intervention. When a federation can truthfully design transfers among its members (TU), it is possible to centralize on an issue that would otherwise create winners and losers (see Kosfeld et al., 2009). For instance, the common agricultural policy was a unanimous choice to extend the scope of the European Union, while the British government managed to receive a rebate on its contribution to the European Union budget as a compensation.² Enforcement of an agreement outside a federation is however particularly complicated. The absence of enforcement is often described as the main weakness of global international environmental agreements (see for instance Chapter 15 of Barrett (2003), and Nordhaus (2015)).

Although federations exist and are relatively stable over time, it is a striking fact that they often act in a decentralized way on specific global issues. For instance, the United States is a federal country whose centralized level of government takes decisions on several global issues, such as national defense. However, regarding global climate change, the policy of the United States has always been “bottom up,” in that the central government delegates to states the choice of taking constraining decisions on abatement targets (Lutsey and Sperling, 2008).³ A consequence is the refusal of the United States administration to commit on abatements, making the European Union complain about the “lack of American Leadership.”⁴

Similarly, individual member countries of the European Union have long acted in a decentralized way on most military interventions (Howorth, 2001; Kirchner, 2006). These include conflicts on the European continent such as the Balkan wars in the 1990s, where most of the leadership was left to the United States Gordon (1997), p.74. Since the early 2000s, some smaller-scale military interventions have been made on behalf of the European Union's Common Security and Defense Policy (CSDP) (Kaldor and Salmon, 2006). But when the 2011 crisis in Libya escalated, “no one apparently seriously considered intervention under the framework of the CSDP” and “the European Union stood on the sidelines and watched as France and the United Kingdom, acting within a NATO framework, intervened militarily on the Union's doorstep” (Menon, 2011, p.75).

We review the relevant literature in *Related literature*. Focusing on subgame perfect Nash equilibria, we start by solving the second stage in *Last stage: Voluntary provision of public goods* and then solve the first stage in *Simultaneous choice of political structure with transferable utility*. We discuss the case of NTU and that of partial decentralization in *Additional results* and conclude in *Conclusion*.

Related literature

In this paper, we claim that decentralization can be strategic if it is in the joint interest of the federation members. Decentralization as a means to free ride is derived from the fact that smaller players have fewer incentives to contribute in a

¹ Yi (1997) presents number of properties of those different coalition-formation rules, in the presence of either positive or negative externalities. Belleflamme (2000) allows for asymmetric countries in an open membership game with negative externalities and McGinty (2007) for one with positive externalities. Some of these models have been applied to the context of climate change and global pollution (see for instance Carraro et al. (1993); Barrett (1994) or Barrett (2005)). In a cooperative game setting, Basile et al. (2016) give sufficient conditions for the equivalence between the core and the set of competitive allocations in a mixed market with both individual agents and coalitions, who choose among public projects as well as their contribution to it.

² In 1984, the UK negotiated a mechanism (the “Fontainebleau agreement”) wherein it automatically gets back about two-thirds of the difference between what it contributes to and what it receives from the EU budget at the end of each year (Lowe et al., 2002).

³ The US government seems, however, able to deal in an efficient and centralized way on environmental issues with a national impact only, such as acid rains, as shown by the Bush senior administration in the early 1990s (Joskow et al., 1998).

⁴ Andreas Carlgren, Sweden's Environment Minister talking on behalf of the EU presidency (Copenhagen talks, 2009, cited by The Guardian, November 2, 2009).

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