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Competition for environmental aid and aid fungibility

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ABSTRACT

Aid from environmentally conscious donors to developing recipients has long been thought of as a very promising way of preserving the global environment. However, aid is fungible and recipients cannot commit to using it for the purpose it was intended. We analyze competition for aid games with aid fungibility and cross-border pollution to gain insights on how to allocate environmental aid more efficiently. We set up a two stage game of two recipients receiving aid from a donor interested in minimizing pollution. Recipients cannot commit on the use of aid but they can commit on the infrastructure necessary to use aid for pollution abatement. We find that the success of competition for aid games depends critically on the degree of cross-border pollution. This determines whether it is more efficient to set up such games between recipients with little (or a lot of) cross-border pollution between them.

1. Introduction

The climate conference in Cancun in 2010 established the "Green Climate Fund". By 2020, the fund is intended to manage the $100 billion a year pledged by developed countries in Copenhagen in 2009, as aid to developing countries to reduce emissions to combat climate change. This is just one recent example of aid being used to encourage environmentally friendly policies. Of course, this is not restricted to environmental policies and there is a voluminous literature on aid directed at other objectives and especially the eradication of poverty in the Third World.

One of the well established stylized facts of the literature on aid is that it is fungible and cannot be conditioned on its use. In other words, recipients do not spend it the way the donors intended. This is true even if aid is earmarked (or tied) for specific purposes. In that case, recipients can reduce their own expenditures for that purpose. The overall effect is that a fraction of the aid is allocated to other uses. Putting it another way, aid recipients cannot credibly commit to using aid in the way the donor wishes. This of course, is known by potential donors who are for this reason reluctant to give aid, a phenomenon usually referred to as "aid fatigue". Pack and Pack [11] and Feyzioglu et al. [4] provide empirical evidence on aid fungibility. Lahiri and Raimondos-Møller [10]model aid fungibility explicitly in a political economy model of pressure groups with political contributions along the lines of Grossman and Helpman [3]. They find that donors reduce the amount of aid due to aid fungibility.

Another branch of the literature examines distributing aid by setting up competition for aid games. Lahiri and Raimondos-Møller [8] develop a framework in which two recipients compete for aid from a donor interested in liberalizing trade. Svensson [13] argues that in many cases there is ex post pressure on donors to disburse the full amount of aid

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irrespective of the degree of compliance of the recipient. It is shown that, from the point of view of the donor, it is more efficient to commit a fixed amount of aid to a group of countries and decide on how to distribute it between them ex post.

There are also a number of papers addressing the interaction of aid and environmental policies. Chao and Yu [1] find that aid tied to environmental policies can be welfare improving. Hatzipanayotou et al. [6] conclude that higher cross-border pollution can lead to increased aid and reduced total pollution. Schweinberger and Woodland [12] show that tied foreign aid crowds out private pollution abatement in the short run, rendering it completely ineffective. In the long run however, it even increases pollution.

The goal of this paper is to model competition for environmental aid games and aid fungibility explicitly, to gain insights on how to overcome the commitment problems associated with aid directed at preserving the environment. We set up a two stage game with two recipient countries, suffering from two-way cross-border pollution, and receiving aid from a donor. In the first stage, recipients choose their investments in pollution abatement infrastructure and technology and the donor decides on the amount of aid to be allocated to the recipients. In the second stage, recipients decide on pollution taxes and the fraction of aid they allocate to public pollution abatement and the donor decides on the distribution of aid between the two countries. Pollution is abated by the private sector in response to pollution taxes and by the public sector by the provision of a public pollution abatement good.

We utilize the fact that in some cases it may be possible to condition aid on the ability of the recipients to use aid in its intended use. The donor can observe the institutional and legal framework, as well as, public pollution abatement technology of each country. In other words, the donor can observe the efficiency of each country in public pollution abatement. The key insight is that as a country becomes more efficient, it will choose to allocate more aid to public pollution abatement, since the marginal return to that use is high. Therefore, distributing aid conditional on the recipients' investments in public pollution abatement may induce an increase in pollution abatement.

We find that the success of such games depends critically on the degree of cross-border pollution. Recipients have an incentive to increase investments in infrastructure and technology to attract more aid. This reduces aid fungibility since it increases the marginal benefit of public pollution abatement and recipients optimally divert less of the aid to consumption and allocate more to pollution abatement. However, in some cases, this is mitigated by the fact that an increase in infrastructure by one recipient reduces cross-border emissions to the other, and thus the latter's willingness to pay for pollution abatement. This increases cross-border pollution into the former, reducing its willingness to invest in infrastructure. Therefore, it is more efficient to set up such games between countries that are far away from each other (i.e. the degree of cross-border pollution is low). The possibility that, in some cases, competition for aid may be counter-productive and lead to a decrease in investment in infrastructure cannot be ruled out. In other cases, cross-border pollution increases the incentives to invest in abatement technology and such games are more efficient between countries with high degrees of cross-border pollution.

The plan of the paper is as follows. Section 2 sets up the model and Section 3 solves the second stage of the game and analyzes the comparative statics of the solution. Section 4 provides the solution to the whole game while Section 5 discusses the conclusions.

2. The model

We construct a two stage game theoretic model of two countries, Home and Foreign,[1] competing for untied aid from a donor. The recipient countries can be interpreted as developing countries and the donor either as a rich developed country or an international organization such as the UNEP, the OECD or the World Bank. One example could be the establishment of the "Green Climate Fund" by the Cancun Agreements in 2010. The fund is intended to manage the $100 billion a year pledged by developed countries in Copenhagen in 2009 as aid to developing countries to reduce emissions. Pollution is generated by production in both recipients and is abated partly by the private sector in response to pollution taxes and partly by the public sector through the provision of a public good. Pollution generated in either recipient affects welfare negatively in both countries. In other words there is two-way cross-border pollution. The recipients use part of the aid and pollution tax revenue to finance investment in "green" technology and the provision of public pollution abatement. The rest of the aid is lump-sum distributed to households for consumption and from the point of view of the donor is wasted. To capture and explicitly model aid fungibility, we assume that recipients cannot credibly commit to using aid in accordance with the preferences of the donor reflecting the problem of aid fungibility.[2]

Our definition of public sector pollution abatement technology includes anything that is observable and affects the quantity of pollution abated per dollar spent on public pollution abatement. Therefore, in addition to the usual interpretation of technology it includes the institutional and legal framework (e.g. the Environmental Protection Agency in the US) required for the implementation of public pollution abatement.

In stage 1 the recipient countries invest in pollution abatement technology. Such investment, financed by pollution tax revenues and aid, makes government spending on public pollution abatement more effective. Abatement technology is

[1] Foreign's variables are denoted by asterisks.

[2] The key assumption is that even if aid is earmarked or tied, the recipients can still divert aid to other uses, by reducing what they would spend on public pollution abatement without aid.