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Transaction costs, institutional rigidities and the size of the clean development mechanism

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Abstract

Transaction costs and institutional rigidities will reduce the attractiveness of the Kyoto Protocol flexibility mechanisms compared to domestic greenhouse gas abatement options. The clean development mechanism (CDM) in particular is likely to entail considerable costs of baseline development, project registration, verification and certification. The activities implemented jointly pilot phase and the prototype carbon fund programme give indications about these costs. There is evidence that projects with high implementation costs have high transaction costs as well. Moreover, CDM projects have to be approved by host country institutions, and so far only a small share of host countries has been able to set up these institutions. Several of the larger host countries intend to only approve projects if the market price is above a certain threshold. Some governments will also levy fees to finance costs of approval bodies. We assess these issues using a quantitative model of the Kyoto Protocol permit market. We conclude that while changes in demand from Annex B countries remain the crucial factor, the size of the CDM will depend to a significant degree on transaction costs and institutional barriers in host countries.

Keywords: Clean development mechanism; Transaction costs; Institutions; Permit market modelling

1. Introduction

The Kyoto Protocol allows industrialised countries and countries in transition (Annex B countries) to generate greenhouse gas emission credits through investment in emission reduction projects in countries without emission targets. This instrument is called the "clean development mechanism" (CDM), and the emission credits are called "certified emission reductions" (CERs). Theoretically the CDM will lead to an equalisation of marginal abatement costs throughout the world. A number of modelling exercises have calculated a global market price assuming friction-free trading of emission credits (Weyant, 1999; Springer, 2003).

However, it is becoming increasingly clear that there will be substantial transaction costs and other institutional barriers that could considerably reduce the size and change the distribution of the CDM. So far, they have been addressed only in a few models, usually by shifting marginal abatement costs curves vertically (e.g. Böhringer and Löschel, 2002, p. 152ff). We investigate the emerging evidence on CDM transaction costs, incorporate the findings in a simple model of the global market for greenhouse gas permits, and analyse a range of scenarios.

2. CDM transaction costs and institutional barriers

For most Annex B countries the emission targets under the Kyoto Protocol are below their business-as-usual emissions path. They thus have a net demand for emission reduction permits. Only some Annex B countries are expected to have a net supply of permits, mainly due to the availability of excess permits ("hot air") as economic recession has led to a reduction in greenhouse gas emissions, and from joint implementation (JI) projects. The remaining source of permit supply in the international market is the CDM.

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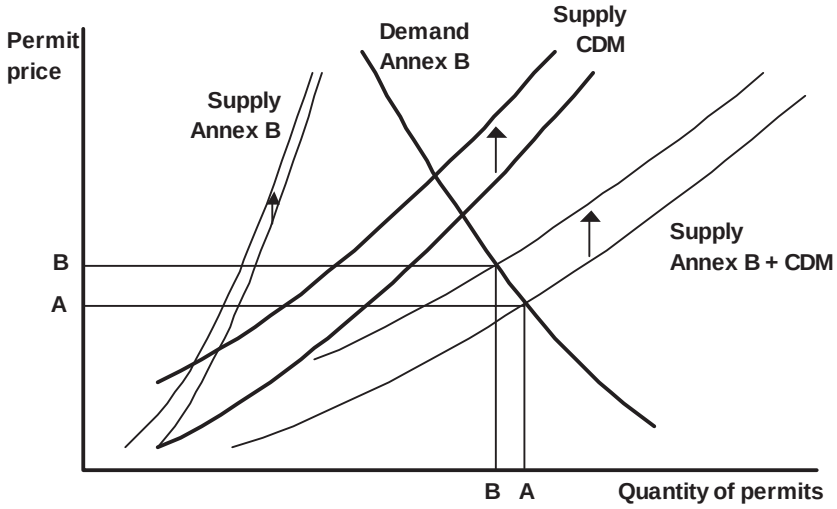

Fig. 1. How transaction costs influence the use of the Kyoto Mechanisms.

The supply curve for CERs from CDM will start at zero if additionality tests exclude projects with negative costs (as in Fig. 1); otherwise it will have a negative cost segment. The summation of the CDM and Annex B supply curves leads to the world supply curve, and the demand curve derives from emission reduction requirements in net permit buying countries and their cost schedules of domestic abatement.

Transaction costs shift the supply curves upward and lead to a reduction of quantities traded and a rise in the equilibrium price. In Fig. 1, point A represent the market equilibrium without transaction costs, and B with transaction costs.[1] The lower trading volume indicates that countries will abate more domestically compared to a situation without transaction costs.

A critical question is whether transaction costs will remain constant over the whole range of abatement or whether they change. Here it is useful to look at the different categories of transaction costs, which we define in Table 1.

Heller (1999) rightly argues that transaction costs strongly depend on the institutional framework. The situation may differ considerably between host countries and this influences the negotiation of all mechanisms, as well as the approval costs of the project-based CDM and JI. Transaction costs will be higher in countries with an inefficient regulatory framework and lead to a competitive disadvantage vis-à-vis other countries.

An elaborate project cycle may increase up-front transaction costs but reduce them ex-post. Rules that enhance transparency will be crucial to reduce search costs even if they entail ex-ante costs. Funds such as the prototype carbon fund (PCF) can reduce transaction costs by developing generic procedures such as standardised contracts. They can also specialise in specific project types.

3. Empirical evidence for CDM transaction costs[2]

There is not much experience with project-based environmental policy mechanisms. Harrison and Schatzki (2000) have looked at transaction costs of different US environment policy mechanisms. For the project-based mechanisms "Offsets" and "Netting" they were 10–15,000€ per transaction.[3] The UNFCCC launched a pilot phase of activities implemented jointly (AIJ) in 1995—prior to the proposed implementation of the Kyoto Protocol—in order to learn more about the possible operation of projects under international flexibility mechanisms. So far, 152 projects have been reported, of which approximately 70 quantify transaction costs. However, the definitions used vary considerably, so that these numbers have to be used with caution and we thus do not list them here. The Swedish AIJ programme in the Baltic states is the only AIJ programme with a consistent reporting of transaction costs in four categories (technical assistance, follow-up, reporting and administration) over time. It includes 51 projects that have been strongly standardised. The Swedish data can be analysed concerning:

- Impacts of project categories. One would expect that transaction costs of renewable energy projects are

[1] In our example, transaction costs are applied to the supply curve. If transaction costs have to be borne by the demand side, the demand curve is shifted to the left, which also leads to an increased permit price. Furthermore, at this stage for simplicity reasons we assume constant marginal transaction costs. This assumption will be compared to empirical data and relaxed accordingly below.

[2] See Michaelowa et al. (2003) for a comprehensive review of transaction costs of the Kyoto Protocol flexibility mechanisms.

[3] We use € throughout the paper assuming a 1:1 exchange rate with US$.