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Transaction costs of unilateral CDM projects in India–results from an empirical survey

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Abstract

Recently, transaction costs in the context of the Clean Development Mechanism (CDM) gained considerable attention as they were generally perceived to be significantly higher than for the other Kyoto Mechanisms. However, empirical evidence on the amount of transaction costs of CDM projects is very scarce. This paper presents the results from an empirical survey designed to quantify transaction costs of potential non-sink CDM projects in India. The definition of transaction costs of CDM projects was derived from recent literature and observations made in the current market for Certified Emission Reductions (CERs). During the survey, parts of transaction costs of 15 projects were quantified. An assessment of the results showed that specific transaction costs depend, to a large extent, on economies of scale in terms of total amount of CERs generated over the crediting period. Total transaction costs were quantified for seven projects. The costs range from 0.07 to 0.47 $US/t CO_2. As the projects have an emission reduction between 0.24 Mt CO_2 and 5.00 Mt CO_2 over the crediting period, the results support the assumption of Michaelowa et al. (Climate Policy 3 (2003) 273) that projects with emission reductions smaller than 0.20 Mt CO_2 are not economically viable at current CER prices.

Keywords: Clean development mechanism (CDM); Transaction costs; India

1. Introduction

CDM is one of the Kyoto Mechanisms that allows the Annex B countries of the Kyoto Protocol (developed countries) to meet their internationally agreed greenhouse gas (GHG) emission targets in a cost-effective manner.[1] The CDM provides for the transfer of Certified Emission Reductions (CERs)[2] from potentially low-cost GHG mitigation projects in Non-Annex I countries (developing countries) to Annex B countries. Such projects are called CDM projects once they are registered by the Executive Board (EB) of the CDM.[3] Annex B countries can use CERs for compliance with their emission targets.

In a perfect CER market, the CER price would equal marginal abatement costs of GHG mitigation projects in Non-Annex I countries. However, the use of the Kyoto Mechanisms is associated with transaction costs. In the CER market, transaction costs lead to a CER price increase[4] compared to the situation without transaction costs (Michaelowa et al., 2003).

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[1]Other Kyoto Mechanisms are International Emissions Trading (IET) and Joint Implementation (JI). All Kyoto Mechanisms are based on the concept of permit trading that theoretically allows the achievement of any emissions target at lowest costs for society by equilibrating marginal GHG abatement costs among GHG emitters (Montgomery, 1972).

[2]A CER is the permit traded under the CDM and is equivalent to a metric tonne of CO_2-equivalent. In the following, GHG emission reductions are expressed in t CO_2.

[3]By definition there does not exist a CDM project yet as no project has been registered by the EB. However, for reasons of simplicity, the term CDM project is used for GHG mitigation projects that aim to be registered as CDM projects.

[4]Coase (1937) found that every transaction is associated with costs that are omitted by the neo-classical model of price mechanism. Such omitted costs were later defined by Arrow (1969) as transaction costs,

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It is widely argued that transaction costs would be higher for CDM than for IET and JI because of the detailed regulations of the CDM (Bohm, 1999; Grubb et al., 1999; Vrolijk and Grubb, 2000). However, empirical evidence is very scarce (Fichtner et al., 2003; Michaelowa et al. 2003).

As India is perceived to be among the most attractive Non-Annex I countries for CDM project development (Buen, 2002; Point Carbon, 2003), I conducted a survey on the transaction costs of CDM projects that are currently developed in India.

The paper is structured as follows: Chapter 2 illustrates how the concept of transaction costs can be applied to unilateral CDM projects. Chapter 3 describes the strategy used to quantify transaction costs of CDM projects in India. Chapter 4 presents the results of the survey. Chapter 5 discusses the results. Chapter 6 summarises the findings and puts them into the context of the international debate on transaction costs of CDM projects.

2. Transaction costs of CDM projects

2.1. Relevance of empirical data on transaction costs of CDM projects

In recent carbon market models, transaction costs of CDM projects have been assumed to lie between 0.25 \$US/t CO_2 and 4.00 \$US/t CO_2 plus 2% of CERs generated over the crediting period for the adaptation fund[5] (Chen, 2003; Michaelowa and Jotzo, 2004). In the models, the effect of rising transaction costs was a significant drop in CER sales, especially in a low price market around 3 \$US/t CO_2. Empirical data to support assumptions on the scale of transaction costs are very scarce because no CDM project has been registered so far.[6]

A first idea of the potential magnitude of transaction costs of CDM projects and an understanding on which factors they might depend on has been gained by assessments of the transaction costs involved in Activities Implemented Jointly (AIJ) projects (Michaelowa et al., 2003; Fichtner et al., 2003). Transaction costs were found to range from 1.3–123.9 \$US/t CO_2. This was 7% to more than 100% of the AIJ project's GHG abatement costs. However, an application of the results to CDM projects is problematic. First, the reporting of costs has been incomplete and the quantification methods unclear. Second, monitoring and independent third party verification of emission reductions has usually not been carried out as emission reductions were not allowed to be sold (Michaelowa et al., 2003; Fichtner et al., 2003).

Michaelowa et al. (2003) have estimated specific transaction costs of four CDM projects in the pipeline of the Prototype Carbon Fund (PCF). The costs have been derived from empirical data from PCF staff and CDM consultant's assumptions, ranging from 0.19 to 0.71 \$US/t CO_2. The authors state that the costs are relatively low due to the large emission reduction of the evaluated projects. They estimated that for projects with a significantly lower emission reduction, e.g. photovoltaics (PV), transaction costs could be as high as 1000 \$US/t CO_2 as shown in Table 1 because most costs are independent of the project's emission reduction (Michaelowa et al., 2003). They conclude that further empirical research is needed to come up with better data.

2.2. Important considerations for defining transaction costs of CDM projects

New institutional economics (NIE)[7] subdivide transaction costs in market transaction costs, political transaction costs and corporate transaction costs (Richter and Furubotn, 1999). In the literature, approaches to apply the economic concept of transaction costs to CDM projects vary. The relevance of political transaction costs in international climate policy has been discussed by Woerdman (2002). For the private actors in CDM, political transaction costs will be regarded as sunk costs, which should be considered as *transaction costs of the CDM* and are therefore ignored in this paper. An exemption is the registration fee for CDM projects. The fee passes political transaction costs on to the private actors. Corporate transaction costs can also be ignored as they accrue from setting up, maintaining and changing a company, as well as from running it (Richter and Furubotn, 1999).

Dudek and Wiener (1996) were the first to methodologically apply the concept of transaction costs to the project-based mechanism Joint Implementation (JI).[8] The authors defined transaction costs to consist of

(*footnote continued*)
which are the "*costs of running an economic system*" (Arrow, 1969, p. 48). Stavins identified *three potential sources of transaction costs in tradable permit markets:* (1) *search and information;* (2) *bargaining and decision; and* (3) *monitoring and enforcement* (Stavins, 1995, p. 134). He showed that instead of equilibrating marginal abatement costs, the sum of both marginal abatement and marginal transaction costs is equilibrated in a permit trading system. Transaction costs decrease the volume of permit trading and lead to a permit price increase, no matter which party to the trade bears the transaction costs (Stavins, 1995).

[5]The amount of transaction costs that result from the adaptation fee come in the form of loss in revenue and therefore depend on the CER price.

[6]This paper was written in January 2004 and revised in May 2004.

[7]NIE is rooted on Coase (1937) and Arrow (1969), which deals with the positive and normative analysis of institutions.

[8]Dudek and Wiener (1996) elaborate on the concept of " pre-Kyoto" -JI, from which later emerged " post-Kyoto" -JI and CDM.