Chapter 12
Diffusion of the Clean Development Mechanism

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ABSTRACT

The Clean Development Mechanism (CDM) of the Kyoto Protocol is an innovation that combines greenhouse gas abatement targets with sustainable development objectives. This chapter provides an estimate of the overall growth pattern of the CDM and makes projections about CDM activity during and beyond the first commitment period of the Kyoto Protocol commitments under current rules. The results imply that if the emission reduction targets remain unchanged beyond the first commitment period, further expansion of the CDM pipeline is unlikely.

INTRODUCTION

Under the Kyoto Protocol, the Clean Development Mechanism (CDM) is the only formal way for the 39 countries that have pledged to reduce greenhouse gas emissions, known as Annex B countries, to tap potential sources of mitigation in countries that have not. For the most part developing countries comprise the second group and are known, in Protocol parlance, as non-Annex B countries. There are two project-based mechanisms under the Protocol, both in terms of the scale of current investments under the program and in terms of its mitigation potential. The CDM is by far the larger of the two.[1]

Briefly, a CDM project is an investment hosted by a non-Annex B country that is intended to reduce greenhouse gas emissions or speed the removal of greenhouse gases from the atmosphere relative to a business-as-usual baseline.[2] The projects are reviewed individually by a CDM Board prior to implementation and are subject to continuous monitoring and a verification process. If successful, the projects generate offsets, known as Certified Emission Reductions (CERs) that Annex B countries can use to meet their Kyoto obliga-

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tions. Overall, the CDM is expected to lower the cost of meeting the environmental goals of the Kyoto Protocol by encouraging investments in low-cost abatement efforts wherever they can be found. Another stated objective of the CDM is to assist the host developing countries achieve sustainable development through the mobilization of direct private foreign investment and technology transfer.[3]

With its dual objectives, the CDM attracts both Annex B and non-Annex B parties to the convention. Since its inception in 2003, Greenhouse Gases (GHG) abatement activity under the CDM has increased rapidly. By December 2007, 2,966 CDM projects were submitted to the UNFCCC for validation that are expected to generate 441 million CERs annually from 2008-2012, the first commitment period of the Kyoto Protocol (UNEP Risoe, 2008). Moreover, many investors expect the CDM or some similar mechanism to continue beyond the first commitment period and many CDM projects currently underway will generate emission reductions well beyond 2012.

Nevertheless, the scope for additional CDM projects is limited by the fundamental components of demand and supply, which are in turn, determined by the rate and composition of global economic growth; current Kyoto targets and expectations about future regulations; domestic mitigation efforts in Annex B countries; and JI efforts among Annex B countries.

As is discussed later, there are a variety of predictions about the size of the eventual CDM market that take these fundamentals into account. In this chapter, we look to see if these predictions are consistent with the historic pattern of growth in CDM projects and conceptual models of technology diffusion. In particular, we test whether the predicted size of the CDM market will be exceeded, based on a sigmoid expansion path that is often associated with the diffusion of new ideas and technologies.

The remainder of the chapter is organized as follows. The next section describes the incidence and extent of participation in the CDM process–which we refer to as adoption–globally and in individual countries. Section 3 discusses how the conventional logistic (epidemic) model can be applied to analyze global CDM adoption. Using data on observed CDM activity during 2003-07 and considering several alternative scenarios, the estimated parameters of the global CDM adoption model are presented in Section 4 along with projections of CDM activity during and beyond the first commitment period of the Kyoto Protocol. The last section discusses the policy implications of the empirical results, indicates areas of future research, and concludes.

GROWTH OF CDM IN THE WORLD AND INDIVIDUAL COUNTRIES

The CDM/JI Pipeline Analysis and Database of the United Nations Environment Programme (UNEP) Risoe Center constructs and maintains an up-to-date dataset consisting of all CDM projects that have been sent to the CDM Board for validation. The dataset includes information about each individual CDM project, such as project name, type, registration/validation status, baseline and monitoring methodologies, involved host country and credit buyers, expected annual and total CERs to be generated in each year during the life of the project, potential power generation capacity, etc. In order to analyze the CDM adoption process, information about all CDM projects that have been sent to UNFCCC for validation up until December 2007 are extracted from that dataset.

The dataset shows that, the CDM portfolio has been growing very rapidly since its inception in 2003. As of 31 December 2007, 2,966 CDM projects have been submitted to UNFCCC for validation. Only 805 of these projects have been registered, 36 rejected, 6 withdrawn, and the rest are in the process of registration or validation (UNEP Risoe, 2008). The 2,924 CDM projects (excluding the 36 rejected and 6 withdrawn

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