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The European Union's potential for strategic emissions trading through permit sales contracts[☆]

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ABSTRACT

Strategic market behavior by permit sellers will harm the European Union (EU) as it is expected to become a large net buyer of permits in a follow-up agreement to the Kyoto Protocol. In this paper, we explore how the EU could benefit from making permit trade agreements with non-EU countries. These trade agreements involve permit sales requirement, complemented by a financial transfer from the EU to the other contract party. Such agreements would enable the EU to act strategically in the permit market on behalf of its member states, although each member state is assumed to behave as a price taker in the permit market. Using a stylized numerical simulation model, we show that an appropriately designed permit trade agreement between the EU and China could significantly cut the EU's total compliance cost. This result is robust for a wide range of parameterizations of the simulation model.

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1. Introduction

Reaching an international agreement on climate policy for the post-Kyoto period after 2012 is proving to be difficult. The latest Conference of the Parties (CoP) meeting in Copenhagen in 2009 did not succeed in reaching a consensus on global emission reduction targets, let alone a distribution of

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emission targets across countries. However, the negotiation process is continuing along different tracks in 2010. The starting assumption for our analysis is that these negotiations will result in the future in some form of a climate agreement, including provisions for flexible instruments that are similar to the emissions trading and project-based mechanisms in the current Kyoto Protocol. The purpose of this paper is to study the optimal strategy of a group of net buyers of emission permits (for instance, the European Union (EU)) under such a future follow-up agreement to the Kyoto Protocol, taking into account possible noncompetitive behavior by some of the market participants.

In 1997, the Kyoto Protocol was signed during the third CoP of the United Nations Framework Convention on Climate Change (UNFCCC). The 39 signatories of the Protocol – listed in the so-called Annex-B, and representing about two thirds of global emissions in 1990 – promised to reduce their emissions of six greenhouse gases by 5.2%, compared with 1990 levels, by 2008–2012 (the so-called first commitment period). Each Annex-B country has been allocated an initial amount of emission permits corresponding to their quantitative emissions limits. The permits can be traded with other Annex-B countries. Furthermore, Annex-B countries are allowed to meet part of their reduction commitments through investment in emission-reducing projects in developing countries (the Clean Development Mechanism (CDM)), or in other industrialized countries (Joint Implementation (JI)). The Protocol does not impose binding emission targets on developing countries signatories.¹ Despite persistent refusal by the USA to ratify it, the Kyoto Protocol came into force in 2005.

It is well recognized that there are at least two important shortcomings of the original Kyoto agreement.² First, the global emission reduction achieved by the Kyoto Protocol will be very limited.³ Second, this global emission reduction will not be produced in a cost-efficient manner for two reasons: first, the number of countries participating is limited, meaning that many low-cost abatement options in developing countries cannot be fully exploited (see, among others, *Stewart and Wiener (2003)*);⁴ and second, a number of studies concluded that Russia and other former Soviet republics and Eastern European countries will become large sellers of permits (see *Criqui et al., 1999; Weyant and Hill, 1999; Weyant, 1999; Sager, 2003*). If large permit traders exploit their market power in the permit market, cost effectiveness is no longer achieved; see *Hahn (1984)* and *Westskog (1996)*.⁵

Böhringer (2002) concluded that the Former Soviet Union can significantly increase its benefit from the Kyoto agreement by exploiting its market power in the permit market, which implies that marginal abatement costs are not equalized across the participating countries and, hence, the permit price will become higher than would occur under perfectly competitive permit market conditions. As a result, the total emission reduction will be produced at an excessively high cost compared with the ideal cost-efficient burden sharing. It is possible that the prospect of high compliance costs is making countries reluctant to accept ambitious emission reduction targets for a future climate agreement. In the current Kyoto Protocol, the only policy instrument for distributing costs between participants is the initial allocation of tradable permits across countries. As long as burden-sharing considerations are only taken care of through the initial distribution of permits, it is likely that some countries will become large traders and will benefit from exercising market power also in the post-Kyoto emissions permits market.⁶ Furthermore, if a future follow-up agreement does not specify any minimal levels of some particular domestic climate policy instruments, as was the case under the original Kyoto

¹ The explanations for the Kyoto protocol's inability to deter free riding are provided in *Barrett (1999)*.

² Another important shortcoming is the lack of incentives for investment in R&D. This problem is addressed in *Golombek and Hoel (2006)*.

³ The share of the ratifying Annex-B countries in global emissions is projected to decrease to about one-third by 2012 because of rapidly growing emissions in non-Annex-B countries. The modest global emission reduction achieved by the Kyoto Protocol is discussed in *Böhringer (2002)*, *Den Elzen and de Moor (2002)*, and *Eyckmans et al. (2005)*, and *Hagem and Holtmark (2001)*.

⁴ The CDM is a project-based mechanism that cannot ensure that all low-cost options can be exploited as there are several abatement options that cannot be attributed to any specific investment project (for instance in the transport sector). See http://unfccc.int/kyoto_protocol/mechanisms/items/1673.php for guidelines for validation of CDM projects.

⁵ There is a substantial theoretical literature studying market power in the permit market; see, e.g., *Liski and Montero (2006)*, *Hagem and Westskog (2008, 2009)*, *Wirl (2009)*, and *Godal and Meland (2010)*. However, we are not aware of any studies that consider the type of permit sales contract analyzed in this paper.

⁶ *Hahn (1984)* showed that opportunities for an agent to exercise market power could be undermined (i.e., the cost-effective outcome would be achieved) by the appropriate distribution of permits between agents. However, burden-sharing considerations may prevent a distribution of permits that undermines market power.

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