Climate change policy, market structure, and carbon leakage

Mustafa H. Babiker\textsuperscript{a,b,*}

\textsuperscript{a}MIT Joint Program on the Science and Policy of Global Change, 1 Amherst Street, Cambridge, MA 02139-4307, USA
\textsuperscript{b}Arab Planning Institute, Kuwait, P.O. Box 5834 Safat, 13059, Kuwait

Received 19 February 1999; received in revised form 27 July 2003; accepted 29 January 2004

Abstract

The 1997 Kyoto Protocol on climate change obliges the industrialized countries to initiate the international effort of abating anthropogenic greenhouse gas (GHG) emissions. If such an initiative is to be taken, the associated competitive effects may lead to significant relocation of developed countries’ energy-intensive production. This paper examines this issue. I adopt an oligopolistic structure combined with increasing returns to scale production technologies to represent the strategic interaction among the firms producing energy-intensive products. This representation is then embedded within a multi-regional computable general equilibrium model, which in turn is used for quantifying these relocational effects. The results suggest that significant relocation of energy-intensive industries away from the OECD may occur, depending on the type of market structure, with leakage rates as high as 130%, in which case GHG control policies in the industrialized countries actually lead to higher global emissions.

\textcopyright{} 2004 Published by Elsevier B.V.

Keywords: CGE model; Leakage; Energy-intensive; Market structure; Oligopoly

JEL classification: C6; D4; F1; L1

1. Introduction

The 1997 Kyoto Protocol obliges developed industrial countries to initiate an international effort to abate anthropogenic greenhouse gas (GHG) emissions (Conference
As only one part of the world would constrain its emissions under this agreement, many concerns are raised about the agreement’s effects on trade and the location of industrial production. One particular effect is that the associated competitive effects may lead to significant offsetting emissions increases in the countries without controls—a phenomenon typically referred to in the literature as carbon leakage. The leakage process may occur through two different but related channels. First, the lower world prices of energy (reduced demand in the constrained economies exerts a downward pressure on energy prices) encourage substitution towards energy in countries without a carbon constraint. Second, energy-intensive industry may relocate from countries with carbon controls to those without, and export its energy-intensive products back to the constrained countries. The existing results on production effects and leakage from a carbon policy in industrialized countries are mainly derived from computable general equilibrium (CGE) models. Though these models treat the first channel relatively well, they fall short of adequately representing the industry relocation channel. For example, some of these models do not even have a separate representation of production and trade in energy-intensive products, whereas others, which include such a representation, suffer from at least three maintained assumptions: constant returns to scale (CRTS) technologies, perfect competition, and an Armington structure characterizing trade in energy-intensive products. Given the restrictive nature of the modeling assumptions, the scope for leakage tends to be quite limited in these models. This paper addresses these shortcomings by exploring more fully the effects of the market structure on the geographic distribution of energy-intensive production, trade, and leakage. In doing so, the paper captures two sources that may contribute significantly to the offshore production and leakage effect: the pro-competitive effect of carbon abatement policies in an initially monopolized industry, and the effect of entry and exit of firms in such an industry. These effects are captured by explicitly modeling the strategic interaction among firms producing energy-intensive products through spatial Cournot oligopolies with free entry and exit in a seven-commodity seven-region applied general equilibrium model of the world economy. With this richer...
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات