



Income distribution impacts of climate change mitigation policy in the Susquehanna River Basin Economy

Gbadebo Oladosu^a, Adam Rose^{b,*}

^a *Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, United States*

^b *Department of Geography, The Pennsylvania State University, University Park, PA 16802, United States*

Accepted 29 September 2005

Available online 3 March 2006

Abstract

We examine the cost-side income distribution impacts of a carbon tax in the Susquehanna River Basin (SRB) Region of the United States utilizing a computable general equilibrium model. We find the aggregate impacts of a \$25/ton carbon tax on the SRB economy are likely to be negative but modest—an approximately one-third of 1% reduction in Gross Regional Product (GRP) in the short-run and double that amount in the long-run. However, unlike many previous studies, we find that the carbon tax is mildly progressive as measured by income bracket changes, per capita equivalent variation, and Gini coefficient changes based on expenditure patterns. The dominant factors affecting the distributional impacts are the pattern of output, income and consumption impacts that affect lower income groups relatively less than higher income ones, an increase in transfer payments favoring lower income groups, and decreased corporate profits absorbed primarily by higher income groups.

© 2006 Elsevier B.V. All rights reserved.

JEL classification: Q58; Q54; R79

Keywords: Carbon tax; Distributional impacts; Computable general equilibrium; Regional economic analysis; Climate change policy

* Corresponding author. Tel.: +1 814 863 0179; fax: +1 814 863 7433.

E-mail address: azr1@psu.edu (A. Rose).

1. Introduction

Mitigating the potentially dramatic impacts of climate change is one of the leading environmental policy concerns of the 21st Century. Since the combustion of fossil fuels is the largest single source of greenhouse gases in industrialized countries, carbon taxes and carbon emission permits are at the forefront of instrument design in this era of incentive-based policies (Weyant and Hill, 1999; Rose and Oladosu, 2002). While promising a cost-effective solution, the macroeconomic impact of implementing these instruments is, however, predicted to be negative for most policy designs. For example, the latest Intergovernmental Panel on Climate Change Report (IPCC, 2001) identifies a likely range of impacts from -0.2% to -2.0% of GDP to meet Kyoto emission targets.¹

The distribution of the cost burden of climate change mitigation policies, like that of nearly all environmental and energy policies, will inevitably be uneven within and across the categories of households and businesses (Rose et al., 1988). The benefits of these policies (avoided damages of climate change) are distributed unevenly as well, and in a different manner than the cost (see, e.g., Oladosu, 2000). Although dozens of studies have investigated potential aggregate economic impacts of climate change policy (see, e.g., Weyant and Hill, 1999; IPCC, 2001), very few have examined their distributional impacts.

The purpose of this paper is to analyze the cost-side income distribution impacts of a carbon tax in the Susquehanna River Basin (SRB) Region of the United States. We utilize a computable general equilibrium (CGE) model specially constructed for this purpose in terms of conceptual design and detailed empirical specification of income and consumption relationships (see Oladosu, 2000). The analysis is undertaken at the regional level for two major reasons. First, climate change impacts, a major driver of the pace and shape of mitigation policy, are likely to vary by region in a large country such as the U.S. Moreover, climate impacts are not likely to conform to sub-national political boundaries but rather to major ecosystems, a notable example being a watershed. Second, implementation of climate change mitigation policy will take place at the regional and local levels. In any effort to match remedies to problems in general, and to match beneficiaries to cost-payers in particular, a regional approach will be necessary and will likely shift attention away from artificial boundaries like political jurisdictions (see, e.g., Easterling, 1997).^{2,3}

¹ The Kyoto Protocol allows for trading of individual country emission quotas to implement its overall target. From a business decision and tax revenue standpoint, a carbon tax and carbon emission permits are equivalent when the latter are auctioned (see Pezzey, 1992). For a discussion of other aspects of these policy instruments relating to policy design and enforcement (e.g., enactment, information requirements, uncertainty) (see Kerr, 2000). Note also that although President Bush has deemed Kyoto to be “dead,” state and local governments throughout the U.S. are making commitments to reduce greenhouse gases (CCAP, 2000; Peterson and Rose, 2006). This includes a recent agreement by the New England Governors, which provides for emissions trading between the states to meet their targets.

² Very few studies of climate change policy have been undertaken at the regional level and even fewer along natural boundaries, exceptions being the MINK Study of the Midwestern U.S. (Rosenberg, 1993) and the McKenzie (Canada) River Basin Study (Cohen, 1993). Neither of these analyses evaluated income distribution impacts to any significant extent. Aggregate impacts of a carbon tax on the SRB Region can be found in Kamat et al. (1999) and Oladosu (2000).

³ The Susquehanna River Basin (SRB) is located in south central New York, nearly all of central Pennsylvania, and a small portion of north central Maryland. An economic trading area, consisting of 68 counties in these three states, conforms roughly to the SRB. Total population of the Region is about 8 million and Gross Regional Product about 200 million. The Susquehanna River flows 444 miles from Lake Otsego near Cooperstown in New York into the Chesapeake Bay and drains 27,500 square miles. The SRB accounts for 43% of the Chesapeake Bay’s drainage area and is made up of 60% forest land. The Susquehanna River is the longest commercially non-navigable river in North America.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ 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