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SURVEY

Environmental tax reform: does it work? A survey of the empirical evidence

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Abstract

Environmental tax reform is the process of shifting the tax burden from employment, income and investment, to pollution, resource depletion and waste. Can environmental tax reform produce a double dividend — help the environment without hurting the economy? This paper reviews the practical experience and available modeling studies. It concludes that when environmental tax revenues are used to reduce payroll taxes, and if wage-price inflation is prevented, significant reductions in pollution, small gains in employment, and marginal gains or losses in production are likely in the short to medium term, while investments fall back and prices increase. Results are less certain in the long term. They might be more positive if models selected welfare instead of production indicators for the second dividend, and if several important variables, such as wage rigidities and the feedback of environmental quality on production, were factored into simulations.

Keywords: Environmental tax reform; Modeling studies; Double dividend

1. Introduction

Environmental tax reform (ETR) represents an important development in environmental policy and public finance reform. ETR 'entails a reconsideration of the present tax system. The present system is aimed predominantly at taxing factors of production such as labor and capital. The basic idea of ecological taxation is a shift of tax burden from these factors towards pollution and the use of natural resources' (European Commission, 1997b). ETR shifts the tax burden from economic 'goods' to environmental 'bads', from what is socially desirable, such as employment, income and investment, to what is socially undesirable, such as pollution, resource depletion and waste. ETR is also called ecological tax reform, green tax reform, environmental fiscal reform, green tax swap, or green tax shifting (von Weizsäcker and Jesinghaus, 1992; Goulder, 1995; Carraro and Siniscalco, 1996; Hamond et al., 1997; European Commission, 1997b; OECD, 1997b).

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Revenue recycling allows the government to carry out the operation in a revenue-neutral way, i.e. leaving total tax revenues unchanged. However, ETR can be revenue-positive or revenue-negative, depending on how much tax revenue is recycled. In Europe, ETR is usually advertised under the banner of revenue neutrality, as the overall tax burden in these countries is already high, and additional taxation is economically damaging and politically unpalatable. However, Finland, Sweden, and to a lesser degree Germany, have launched a revenue-negative ETR, thus reducing the overall tax burden on the economy.

In any case, the intention is to alter the system of incentives through lower taxes on 'goods', such as labor and capital, and higher taxes on 'bads'. ETR, thus, creates the potential for a 'double dividend', i.e. an environmental improvement coupled with an economic benefit: revenues of environmental taxes could be used to cut distorting taxes on capital and labor and thus reduce the excess burden of the tax system, with positive consequences for employment and investment. This double dividend hypothesis has been the cause of intense academic and political controversy in recent years.

The enviromnental goal (first dividend) pursued by most governments consists of reducing carbon emissions. Among various measures to achieve these objectives, several European countries have adopted a carbon/energy tax. Such a tax discourages the use of fossil fuels that release carbon dioxide.

Different directions than energy taxation are possible, however. Taxes on resource use, resource rents, or the removal of environmentally harmful subsidies can also be used to finance an ETR.

On the tax reduction side, most countries have chosen to reduce employers' social security contributions (SSC), one of the non-wage labor taxes paid by firms for each worker employed, because this tax directly affects the cost of labor.

The theoretical literature on ETR centers on the debate around the double dividend hypothesis. It tends to conclude that although a double dividend is possible, under neutral assumptions about preferences and the structure of the tax system, it does not arise. For the double dividend to arise, the tax system must be inefficient in a way that fully compensates for what otherwise would be the relative inefficiency of green taxes as a means of raising revenue.[1] From a review of the theoretical literature, it also appears that each ETR needs to be studied independently in order to determine the likelihood of a positive second dividend. A critical discussion of the theoretical arguments surrounding ETR can be found elsewhere (Goulder, 1995; Parry and Oates, 1998; Bosquet, 2000; Eissa et al., 2000).

Most of the empirical literature to date has focused on carbon and energy taxation (Pezzey and Park, 1998). It consists of ex ante modeling studies of the economic and environmental impact of ETR. These studies are ex ante insofar as they attempt to predict the impact ETR will have and not, in what would be ex post fashion, the impact ETR has had. Several reviews of these studies exist, including European Commission (1992b), Goulder (1995), Mors (1995), Bruce et al. (1996), INFRAS and ECOPLAN (1996), Majocchi (1996), Baranzini et al. (2000), European Commission (2000a,b). These studies and reviews have concluded, with various degrees of assuredness, that ETR can, in certain conditions, achieve both environmental and economic improvements. However, most of these studies reviewed only a limited number of simulations.

This paper expands the scope of investigation by synthesizing the results of 139 simulations from 56 studies on the impact of ETR on CO_2 emissions, employment, economic activity, investments and consumer prices. In addition, several specific issues are addressed, including the distributional and sectoral impacts, and practical implementation of ETR.

The paper is organized as follows: Section 2 briefly describes the various explicit ETR packages in existence, Section 3 summarizes the modeling evidence on the environmental and economic impacts of ETR, and Section 4 concludes.

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[1] I owe this formulation to Lawrence Goulder.