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ANALYSIS

Expected effects of the ecological tax reform for the Polish economy☆

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Abstract

This study presents an assessment of possible consequences of ecological tax reform for the Polish economy. Computable general equilibrium model has been used. The model calibrated for the base year 1995 provides results for the year 2005. Six different scenarios have been considered. Final results confirm both theoretical and practical implications of the ecological tax reforms experiences in Western European countries. The reform is the most favorable when it is based on the concept of shifting tax burden from labor force or households' income to environmental pollution. Long-run effects of the proposed tax reform in Poland would not slow down the economic growth. The reform, however, has to be implemented as a package of changes in the entire tax system. Such comprehensive reform could even contribute to economic growth of the Polish economy.
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1. Introduction

Most of the OECD countries conducted reforms of their tax systems in late seventies. The reforms usually meant lowering tax rates for higher income groups and for firms. During the period 1986–1997 both categories dropped by roughly 10% each. Another common solution was expanding the tax base. Also, the tax burden imposed on consumption was increasing due to the increase in VAT. Proposals of changes aimed at lowering negative environmental pressure were referred to as the "green tax reform" (O'Riordan, 1997).

During the nineties several countries (Denmark, Finland, Germany, the Netherlands, Italy, Norway, Sweden, and United Kingdom) have introduced new solutions in their tax systems, with environmental justification (Bosquet, 2000). In most cases the reforms were undertaken with the motto of not increasing tax burden. Income neutrality was to be achieved through the decrease in the existing taxes. Three groups of goals can be distinguished in the comprehensive approach to ecological tax reform:

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- Decreasing the distortions caused by taxes.
- Changing the structure of the existing taxes.
- Introducing environmental taxes.

The first goal implies removing the tax instruments which were introduced in order to fix a certain economic or social problem, but (for different reasons) generated more losses than benefits. Tax instruments affect the environment negatively in two ways. First, the subsidies, which are a contradiction to the "polluter pays" principle. Second, the various tax rate differentials and exemptions, especially in the situation where the differentiation relates to substitute goods.

The second goal means modifying the existing taxes, with environmental benefit. In principle, this boils down to a more comprehensive internalization of external costs. Restructuring of the tax rates focused on their environmental impact (e.g. based on the content of coal or sulfur in fuels), creates possibilities for improving other tax solutions.

Environmental taxes can be introduced in a variety of ways. They can be imposed on emissions of pollutants into the air or the water. The approach that has become more common recently is imposing them on products. Since the beginning of the nineties many new taxes have been implemented for products such as mineral fertilizers packaging, pesticides, batteries, solvents, oils, tires, razors, disposable cameras. OECD publication lists 51 economic instruments of this type in 11 countries, not including instruments in the power sector (OECD, 2000). This does not preclude that the number of products that are harmful for the environment is still large in many countries immense and these products are not subject to taxation or are not taxed sufficiently high.

In Poland currently more attention is given to modifications of the existing system of fees for the economic use of the environment than to ecological tax reform. On the one hand this is related to the urgent need of gradual replacement of the emission fees with product fees. On the other hand this is motivated by numerous weaknesses of the current tax system, which is in need of major changes, apart from the ambitious attempts of ecological reform.

Ours is the first study that thoroughly analyses the implications of ecological tax reform in Poland using the computable general equilibrium (CGE) modeling. Similar research has already been carried out in the Western European countries (Hansen et al., 1995; Bovenberg and Goulder, 1997; Schlegelmilch, 1999; Bosello et al., 1998; Bosquet, 2000 etc.). The study focuses mainly on potential costs for the economy, which may occur in case of implementation of ecological tax reform in Poland. The year 1995 has been adopted as a benchmark (base year). The choice of the base year has been conditioned by availability of the input–output table for the entire national economy.

Description of the model is presented in the second section. The third section presents the scenarios built for the needs of the model, and the fourth section contains description and conclusions of the simulation outcomes. Section 5 includes the comments on ecological tax reform, which may be important for the Polish environmental protection policy.

2. Characteristics of the model

2.1. Basic assumptions

Our CGE model solves for the neoclassic theory of general equilibrium: it calculates the prices and volumes of production which equalize demand with supply at all markets and make marginal profits equal to zero in all sectors. For each good with established positive price, aggregate demand is equal to aggregate supply. In the situation of excessive supply the equilibrium price is set at zero level. This does not apply to labor market, where we allow for unemployment. Even though all the markets must clear in the CGE by definition, it does not mean that unemployment cannot occur. It is possible that the labor market is "balanced" with a certain level of voluntary or involuntary unemployment in the base year. Then the calculation algorithm would find a solution where all the remaining markets are balanced.

In addition the model assumes that all the sectors can be price-making to a certain extent. In such case, the level of supply is initially

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