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Environmental taxation, tax competition, and harmonization

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Abstract

This paper studies the tax competition problem in the presence of transboundary pollution. It shows that economic integration causes the firms to adopt the same or less polluting technologies, but it nevertheless increases aggregate emissions and lowers welfare. Second, the paper examines the ramifications of partial tax harmonization policies. It shows that harmonizing commodity taxes above their unrestricted Nash equilibrium value may either increase or lower the equilibrium emission tax. Under the former, firms opt for less polluting technologies, aggregate emissions decrease and welfare improves. On the other hand, if emission tax goes down, firms will choose more polluting technologies, aggregate emissions will increase and welfare deteriorates. Finally, harmonizing the emission tax above its unrestricted Nash equilibrium value, which leads the firms to adopt a less polluting technology, also causes aggregate emissions to decline and overall welfare to increase.

Keywords: Environmental taxation; Tax competition; Partial harmonization; Polluting technology; Emissions

JEL classification: H21; H23; H73; H87; F15

1. Introduction

A major theme of the tax competition literature, and the earlier fiscal federalism literature on which it is based, has been the potential loss in tax revenues as a result of tax competition. It is generally believed that the integration process will exert a negative influence on the ability of the member states to generate an "adequate" level of tax revenues

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to finance their social policies. This paper takes a fresh look at the tax competition issue, and the effectiveness of partial fiscal coordination policies, in the presence of another source of economic inefficiency in the economy. In particular, we have in mind cases where, because of transboundary pollution, resource allocation is inefficient even when the economies are closed.

The underlying reasons for the "race to the bottom" concern are simple to grasp. Economic integration entails the dismantling of barriers to free movements of people, capital and goods among states (or countries as the case may be). From the perspective of state governments, this increased mobility may be viewed as an opportunity to move other states' tax bases into one's own. Each state will then try to compete with the others in order to attract the tax bases that are being made mobile. A simple and effective way to achieve this is by lowering one's tax rates. As states try to undercut one another's tax rates, it is not difficult to envisage an end result in which the tax rates, and the corresponding levels of local government services, will be less than optimal.[1]

Applying the logic of tax competition to polluting activities, it is natural to expect some degree of strategic interaction between the states with regards to environmental policies. Fredriksson and Millimet [6] have recently tested this proposition empirically for the neighboring states in the US. Their results suggest that there is indeed a positive relationship between states' environmental policies. The interesting question, from our perspective, is the form that this interaction takes and its impact on aggregate emissions and welfare. In particular, if the state governments are armed with both emission and output taxes, what role they assign to each instrument. Will it be the case that they will use output taxes for tax competition, keeping emission taxes for the control of emissions?[2] Under this circumstance, there is no a priori reason to suspect that tax competition per se should necessarily lead to more pollution. It is true that cutting output taxes (to foster tax competition) tends to lower the consumer price of polluting goods, leading to an increase in their consumption and with it the aggregate emission levels as well. It is equally true, however, that increasing emission taxes to combat pollution would push the consumer prices up, curtail consumption and lower aggregate emissions. This ameliorating effect on aggregate emissions is further enhanced if an increase in emission taxes induces the firms to switch to less polluting techniques of production. The final outcome will ultimately depend on the balance of these conflicting forces.

We consider a simple setting with two identical regions whose inhabitants consume two goods: a non-polluting numeraire good and a polluting consumption good. Every consumer has an endowment of the numeraire good, some of which he consumes, spending the rest to purchase the polluting good and to pay taxes. Production technologies are identical in both regions. Pollution (CO_2, SO_2, etc.) is global and a by-product of production. The polluting

[1] There is also the possibility of "excessive" tax rates due to tax exporting effect. However, it is the less-than-optimal-tax-rates result which has received the greatest share of attention. See, e.g., Sinn [10], and Edwards and Keen [5]. For recent surveys of the tax competition literature, see Cremer et al. [4], Wilson [12], Wellisch [11] and Haufler [7].

[2] In a companion paper, Cremer and Gahvari [3], we show that such a targeting property depends on whether border taxes are origin- or destination-based. For an analysis of this question within the framework of a closed economy, see Cremer and Gahvari [2].