ELSEVIER

A revenue-neutral tax reform to increase demand for public transport services

Carlos Pestana Barros [a], Juan Prieto-Rodriguez [b],*

[a] *Instituto Superior de Economia e Gestão, Technical University of Lisbon, Rua Miguel Lupi, 20, 1249-068 Lisbon, Portugal*
[b] *Department of Economics, University of Oviedo, Avda. del Cristo s/n, Oviedo, Spain*

Abstract

Transportation, energy and environmental tax reforms represent an ongoing debate in contemporary policy. The main aim of this paper is to shed some light on this debate using micro-simulation tools to analyse consumer response and welfare effects of environmental policy consisting of an increment of the indirect taxes on fuels to finance the elimination of VAT on the public means of transport. In order to do so, we first estimate an Almost Ideal Demand System for 16 different groups of goods in the Spanish economy, for the purpose of evaluating expenditure and price elasticities. Using this information, we then micro-simulate the abolition of VAT on public transport services and a simultaneous increment on fuel taxes, so that total revenue remains unchanged. The welfare effects of this revenue-neutral tax reform are evaluated. The aim of this simulation is to define a public policy that increases public transportation availability and use in order to bring about decreases in pollution and congestion.
© 2008 Elsevier Ltd. All rights reserved.

Keywords: Micro-simulation; Environmental tax; Welfare

1. Introduction

The empirical issue of this research can be encompassed within the increasing interest in environmental taxes which would target the enforcing of significant reductions in the use of private transportation, thereby reducing pollution and congestion (Laird et al., 1999; Oates, 1995). In fact, fiscal policies that attempt to promote public transport can be justified in terms of the externalities that they will induce. If externalities are defined as the benefits and costs that result from unplanned side-effects of economic activities that concern individuals other than the parties involved in the activity, then air pollution and the greenhouse effect are illustrative examples of externalities. Both these examples are negative externalities, of which one of the major

contributory factors is excessive private transport demand. Obviously, they could be reduced by substituting private by public transport services (Emmerink et al., 1994).

In this sense, if, as expected, fuel and public transport services are substitutive goods, one way to increase demand for public transport could be by raising the tax on fuel for private transport. Moreover, to enforce stronger effects, this rise could finance a cut in public transport services taxation. Furthermore, these simultaneous changes could be calculated in order to constitute a revenue-neutral tax reform. The more radical of such a type of fiscal reform is analysed in this paper, since we propose the abolition of Value Added Tax (VAT) on public transport services in Spain,[1] while keeping revenue constant by means of the corresponding increase of fuel taxes. Transport policies involving tax cut proposals are often drawn up without taking into account all their economic effects. That is to say, they generally lack the support provided by empirical evidence. This justifies their approval. However, there are different economic tools which allow us to understand the effects of such proposals. One of these tools is micro-simulation (Alcock and Docwra, 2005; Liu et al., 2006), which enables the assessment of public reforms even before they are passed by Parliament. These techniques are increasingly used in developed countries (Algers et al., 1997; Merz, 1991; O'Donoghue, 2001; Sanz et al., 2003).

The main aim of this paper is to shed some light on this debate using micro-simulation tools to analyse the expected demand shifts and their effects on consumers' welfare. In order to meet this objective, the first stage of this research is to examine consumers' revealed preferences. Thus, we will assess own-price elasticities, cross-elasticities and expenditure elasticities of 16 different groups of consumer goods, including cultural goods. This will allow us to analyse rarely studied issues in economic literature such as the consumers' response to price or income changes, as well as the complementary or substitute nature of the different cultural goods. This type of empirical analysis is uncommon. Nevertheless, it is crucial to understand, from an economic perspective, demand patterns and the effectiveness of public policies which support these goods and services.

The econometric basis for these simulations was the estimation of an Almost Ideal Demand System (AIDS), proposed by Deaton and Muellbauer (1980a,b), which will permit us to control all cross-effects due to any price or real income changes. The data set to estimate this model is the Spanish Continuous Household Expenditure Survey (ECPF).

The paper is organised as follows: in Section 2, we describe the contextual setting; in Section 3, we present the Almost Ideal System; in Section 4, we estimate the elasticities; in Section 5, we estimate the distributive and welfare results; and finally, in Section 6, we discuss the results and present the conclusions.

2. Taxation of transport services in Spain

In Spain, as in other European Union countries, indirect taxation on consumption is concentrated primarily on Value Added Tax (VAT) and the different excise duties imposed on specific consumer goods, such as spirits, beer, hydrocarbons, tobacco, electricity and vehicle registration.

With regard to public transportation services, VAT is the only indirect tax that affects them (i.e. there are no excise duties to be paid). The tax rate levied on these services does not differ across different categories of public transport and is currently fixed at 7%. So, as other members of the EU, Spain applies a reduced rate of VAT to the transport of passengers (European Union, 2005b). However, the Spanish rate is not among the most favourable treatments since other countries, such as The United Kingdom, apply a zero rate on passenger transportation, i.e. an exemption with a refund of the tax paid at the preceding stage. Some member States, like Greece, have fixed exemptions without refund on these services, while others, such as Denmark, apply a combination of both, zero rates and exemptions. Finally, a 3% super-reduced rate is applied in Luxembourg. Hence, there is some margin to implement cuts in the indirect taxation on public transport services in Spain and align its VAT rate more closely with those applied in other member States with more favourable tax regimes in relation to public transport services.

---

[1] For a general analysis of indirect taxes on welfare see Creedy (1999). The impact of indirect taxation on fuels and carburant in Spain has been studied by Romero and Sanz (2003).