Transport tax reform, commuting, and endogenous values of time

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Abstract

We consider a model of urban transport with two trip purposes, commuting (assumed perfectly complementary to labour supply) and noncommuting, to analyse the effects of transport tax reform on the value of time and marginal external congestion costs. Higher commuting taxes plausibly reduce time values, but higher noncommuting transport prices will typically raise the value of time. The intuition for this latter finding is that the reduction in congestion that follows from the tax increase itself raises net wages per hour of work (inclusive of commuting time). Empirical illustrations with Belgian data show a potentially large effect of transport tax reform on time values. In quite a few of the tax reforms studied traffic levels are reduced, but the increase in time values implies that marginal external congestion costs actually increase.
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1. Introduction

The increase in transport demand over the past few decades has substantially raised congestion in major conurbations around the world. The social costs associated with the time losses in traffic are known to be substantial. A recent US-study of 75 areas estimates that in 2000 the average peak period traveller lost 62 hours per year due to congestion; the corresponding figure for 1982 was 16 hours (Texas Transportation Institute [31]). The same

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study points out that the average commuter in Washington, DC spends approximately two weeks per year stuck in traffic. In European cities a similar evolution is observed. Estimates for Brussels, reported in Van Dender [34], suggest that overall traffic volumes in 2005 are 22% higher than in 1991, leading to a decline in average speed of some 34%. Finally, a comparative study for five large European cities (De Borger and Proost [8]) estimates that by 2005 marginal congestion costs will exceed one Euro per passenger–kilometre in the most congested cities, such as Amsterdam and Brussels.

The concern about congestion and other transport externalities (pollution, noise, accident risks, etc.) has generated a large literature on economic instruments to reduce these effects. Realising that increasing road capacity may not be an effective long-run policy due to latent demand (see, e.g., Small [29]), economists have long advocated the use of pricing instruments to tackle transport externalities. The large number of studies on optimal externality taxes in the transport sector include, among many others, Keeler and Small [19], Glaister and Lewis [12], Small [28], Viton [35], Kraus [20], Arnott et al. [1], De Borger et al. [7], Proost and Van Dender [27], and Small and Yan [30]. Despite economists' focus on pricing as a solution to congestion externalities, policy makers have only recently started to implement road pricing in practice; the best-known examples are Singapore and the Norwegian cities Trondheim and Oslo (see, e.g., Johansson and Mattson [17]). It is likely that more cities will introduce some form of road pricing in the near future. For example, cordon pricing has long been considered in the Netherlands, although its actual implementation has been postponed several times. In London, cordon pricing was implemented in February 2003. The idea is also gaining support in the USA, as witnessed by value pricing projects in California, Florida, New Jersey, and Texas.

This paper contributes to the growing literature on congestion pricing by focusing on the impact of transport tax changes on consumer's time valuation, within the framework of a model with multiple trip purposes.[1] Interestingly, all studies listed above implicitly or explicitly assume that the value of time is unaffected by the proposed tax changes. Moreover, although some studies take account of different transport markets (according to mode, time of day, car type, etc.), they do not distinguish between trip purposes, such as commuting and noncommuting.[2] We consider the implications of relaxing these two assumptions. Specifically, we look at the implications of transport taxes for the value of time in a model with both noncommuting and commuting (directly related to labour supply) transport. It is shown that transport policies may have nonnegligible effects on the value of time. As a consequence, realising that in most countries commuting is indeed an important trip purpose during peak hours, the welfare effects suggested by models assuming either constant values of time or single trip purposes may be inaccurate.

Since the seminal papers by Becker [2] and Gronau [13], economists have devoted attention to the determinants of the value of time (for a recent survey, see Jara-Diaz, [16]). Theoretical research and empirical analysis of large-scale surveys suggest that the value consumers place on time savings not only depends on income or wage levels, but also

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[1] Other externalities could be easily incorporated into the model. However, as will become clear below, the focus is on congestion.

[2] The few models that do allow for endogenous values of time (Mayeres and Proost [22], with explicit endogeneity, and Parry and Bento [25], where it is implicit) are based on a single trip purpose.