Introduction and a reader's guide

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Nearly everyone is confronted with traffic problems today. We all know what it is like to be stuck in a traffic jam, many people feel dissatisfied with public transport services or complain about excessive pollution generated by traffic. Moreover, almost each of us has a relative, friend or acquaintance who has been injured or even killed in a traffic accident. The problem is a complex one and there are conflicting interests at stake. Not surprisingly, every interest group has advanced its own remedy.

The economic diagnosis of the transport problem is quite clear, however. Congestion, pollution and accident risks are typical examples of what economists call external costs. These costs are insufficiently captured in the prices paid for the different transport services, so that the users do not pay the full social cost of transport. In this sense, prices are 'wrong' from an economic viewpoint. The European Commission has, in its recent Green Paper on Fair and Efficient Pricing, underwritten this basic principle. Although the idea of marginal social cost pricing has been accepted in the economics profession for a long time, there have been very few attempts to study its implementation. This book is the result of a European research action that aims to fill part of the large gap between textbook prescriptions and real world policy.¹ It was the first to study, on a European scale, the difference between current transport prices and 'optimal' transport prices that correctly charge marginal external costs. In addition, the project analysed which pricing reforms are most needed for economic efficiency reasons, taking into account restrictions on pricing instruments that governments are facing. Economic efficiency is taken here in its broad sense, including concerns for excessive congestion and environmental and safety objectives.

Of course, there have been several previous evaluations of transport pricing reforms. However, the research project out of which this book grew was rather unique for at least three reasons. First, it systematically tried to compute the best pricing reform given the available pricing instruments, using numerical optimisation models especially designed for this purpose. This type of second-best optimisation may give challenging results, because the mathematical optimisation of pricing reforms balances many different

objectives and constraints. Second, the analysis allowed for a very large number of transport markets and takes into account their interactions. Third, we used the same model to analyse optimal transport prices in many different European countries. This strongly improves the comparability of the different case studies.

STRUCTURE OF THE BOOK

The book is divided into four major parts. In the introductory chapters (Part I), we explain the principles underlying the models used and we discuss the various pricing policies that were analysed in the applications later in the book. Part II provides more details about the theoretical structure of the models used. The computation of all external and internal costs of the different transport services is dealt with in Part III. Finally, Part IV contains the case studies, applying the model to different European cities and regions.

A brief overview of the book is as follows. Part I consists of three chapters. In Chapter 1 (by De Borger and Proost) a simple graphical economic model is presented to explain the basic economic concepts used. It shows the motivation for marginal social cost pricing, and it compares pricing as a policy instrument with environmental regulations and investment in infrastructure. Chapter 2 (by De Borger, Peirson and Vickerman) surveys the different policy instruments – including pricing instruments – that can be used to correct for the external costs of transport services. A third chapter (by De Borger, Peirson and Vickerman) specifies the common pricing scenarios that are used in the different case studies later in the book. A certain commonality in the reform scenarios is necessary to be able to compare pricing reforms and their implications between different countries and cities.

The structure of the models used is detailed in Part II. Chapter 4 (by Proost and Van Dender) deals with the model used to study optimal pricing in an urban environment. This model has been calibrated to the local conditions in different European cities, and optimal pricing policies have been determined. Similarly, Chapter 5 (by De Borger) explains the working of the interregional model. The interregional and urban models have similar structures, but the interregional version includes an international dimension and places more emphasis on freight transport. Finally, Chapter 6 (by Verhoef, Bal and Van den Bergh) presents an experimental version of the urban model that has been used to compute optimal prices in a network representation of the urban area.

In order to make the pricing models operational, different types of data

are needed. The data common to all case studies and the procedures used to estimate internal and external costs are discussed in the four chapters of Part III. Chapter 7 (by Mayeres and Van Dender) presents the computation of the different external costs that are included in the optimal pricing exercises. The chapter deals with external congestion costs, accident costs, air pollution and noise costs. The estimates put forward in this chapter are useful for other studies as well. In Chapter 8 Dickinson, Peirson and Vickerman consider in more detail the estimation of the relation between accident rates and the volume of traffic. The empirical study that is reported here is an important input in the estimation of the external accident cost. Chapter 9 (by Peirson and Vickerman) deals with the different problems in estimating the resource cost of different transport modes. Finally, in Chapter 10, O'Mahony and Kirwan discuss the speed-flow relationship used to estimate marginal external congestion costs. Moreover, they briefly explain some technical problems involved in road pricing.

Part IV consists of six chapters. It mainly contains the different case studies on optimal pricing in Europe. Importantly, the chapters are written in such a way that they can be read independently. Each chapter starts from the main transport problems that the city or region under consideration has been facing, and it examines how these problems will develop up to the year 2005 with unchanged policies. This is then the background to study different pricing alternatives for the year 2005, assuming different types of restrictions on the policy instruments (for example, is electronic road pricing feasible, can parking be appropriately priced, and so on).

The first four chapters deal with the urban case studies. In Chapter 11 Van Dender discusses the results of different transport pricing policies for Brussels. Similarly, Chapters 12 and 13 contain case studies for Amsterdam (by van den Bergh and Verhoef) and Dublin (by Gibbons and O'Mahony). Finally, Peirson, Sharp and Vickerman tackle transport pricing issues in London. The last two chapters in Part IV deal with non-urban transport. Chapter 15 (by De Borger) deals with optimal pricing of transport services in Belgium. Compared to the urban chapters, freight transport and the international coördination of freight pricing policies become important issues. In Chapter 16, Heaney, O'Mahony and Gibbons examine transport pricing in Ireland.

Finally, in the concluding Chapter 17 all results of this volume are summed up and compared. The chapter summarises the main findings and presents some caveats of our analysis. For example, since the analysis was the first of its kind it is obvious that more detailed models, using a similar methodology, are needed to confirm the results that are presented here. Moreover, the models used in this book are based on a number of assumptions, some of which may be relaxed in future work.

A READER'S GUIDE

This book is an edited volume that is not necessarily to be read from the beginning chapter straight through to the end. For example, professional transport economists with a good understanding of external transport costs and optimal pricing as applied to the sector may be most interested in the structure of the models used and in the empirical results. Other readers may be much more interested in the underlying theory and in the procedures to determine external costs. The following guide may therefore help the reader to decide which chapters are relevant to her interests:

- A non-economist without technical interest could start out by reading Chapters 1, 2 and 3 as well as the summarising Chapter 17. If there is an interest in urban applications she could pick in addition one or more of the chapters 11, 12, 13 or 14; if she is more interested in interurban transport problems she could instead look at Chapters 15 and 16.
- A non-economist with a more technical interest in the structure of the models will benefit from adding Chapters 4, 5, 6 and 10.
- A transport economist with little technical interest could drop Chapter 1 and may be especially interested in Chapters 2, 3, 7, 9 and 17, to which she can add some of the case studies.
- Transport economists with more technical interests may include the more technically challenging Chapters 4, 5 and 6.
- Readers specifically interested in the external costs of transport may benefit from reading Chapters 7 and 8.

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