Transport Policy 18 (2011) 745–754

Contents lists available at ScienceDirect

Transport Policy

journal homepage: www.elsevier.com/locate/tranpol

Distributional effects of public transport policies in the Paris Region

Benjamin Bureau*, Matthieu Glachant

MINES ParisTech, CERNA, 60 Boulevard Saint Michel, 75006 Paris, France

ARTICLE INFO

Available online 22 February 2011

Keywords:
Public transport policies
Distributional effects
Equity

ABSTRACT

This paper examines the distributional effects of alternative scenarios of urban public transport policies in the Paris Region using disaggregated data from the Global Transport Survey 2001–2002. We study two types of scenarios: fare adjustments, as in previous work, but also speed increase scenarios. We find that reducing public transport fares is progressive. Increasing the speed of public transport is also progressive whatever the mode. The most progressive option is to increase the speed of buses in the suburbs, while targeting the metro or the suburban rail are the least progressive alternatives. More generally, low-income individuals benefit more from fare reductions than from increases in public transport speed.

1. Introduction

The promotion of public transport is increasingly considered as a key instrument to tackle externalities associated with automobile use (e.g., local and global pollution, congestion, accidents). Offering appealing fares, increasing the frequency of service or building new infrastructures, enhance the attractiveness of public transportation and then create an incentive for motorists to switch to buses or rail.

The improvement of public transport services is also supported on social grounds, with the argument that it will first benefit the poorest households that cannot afford driving a car. However, arguments leading to opposite conclusions are also available. For instance, high property prices force the poorest households to settle in the suburbs where the supply of public transport is scarcer than in the city centre. Poor households may thus be excluded from improvements in public transport services. Also, high-income travellers have generally higher values of travel time. Accordingly, they may benefit the most from increased frequencies of service. In the end, the distributional impact of improving public transport services is not clear-cut. Since distributional concerns are often central to policy discussions, the incidence of public transport policies warrants rigorous examination.

This paper examines the distributional impacts of various urban public transport policies in the Paris Region. Enhancing the attractiveness of public transportation can be achieved through different channels. The options that are usually considered in real-world policy discussions can be classified into two broad categories: reducing the financial cost of trips or reducing trip duration.[1] Under the first category, the Paris Region has, for instance plans to reduce transit fares for long trips. Under the second category fall many projects of new tramway lines, the extension of existing metro lines, the creation of bus lanes, etc.

In this paper, we do not examine the precise policy options in discussion in the Paris region. We seek to derive more general results on the comparative distributional impacts of the two broad policy approaches. This leads us to analyse five simple scenarios which capture the generic features of both approaches. The first is a scenario in which all fares are uniformly cut by 10%. The other four scenarios consist of speed increases for various modes: bus in the city centre, bus in the suburbs, Metro, and suburban rail.[2] We use disaggregated data from the 2001–2002 Paris Region Global Transport Survey matched with fare data from the Paris Region Public Transport Authority (STIF). Values of travel times that vary with income are also used to monetise time savings. By identifying the mechanisms which drive distributional patterns in simplified scenarios, our ultimate goal is to derive results which could apply to more specific real-world scenarios.

As compared to the extensive literature dealing with the distributional effects of car taxation,[3] much less is known about

[1] Another option consists in improving comfort—for instance, via more spacious buses or air-conditioned trains. This is not seen as a priority in French cities.

[2] We deliberately choose to focus on the distributive impacts of public transport policies prized by policymakers without exploring the question of their economic efficiency. Although a major issue, a rigorous treatment of that question would require another study on its own.

[3] In particular, two policies have received great attention: fuel taxation (e.g., Bento et al., 2009, Blow and Crawford, 1997, Poterba, 1991, Røed Larsen, 2006, Santos and Catchesides, 2005) and road pricing (e.g., Bureau and Glachant, 2008, Eliasson and Mattsson, 2006, Karlström and Franklin, 2009, Maruyama and Sumalee, 2007, Raux and Souche, 2004).

* Corresponding author. Tel.: +33 6 30 90 49 31; fax: +33 1 40 51 91 45.
E-mail addresses: benjamin.bureau@mines-paristech.fr (B. Bureau), matthieu.glachant@mines-paristech.fr (M. Glachant).

0967-070X/$ - see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.tranpol.2011.01.010

the equity of public transport policies. Some papers that analyse car taxation also consider public transport. This is the case of Berri (2005) and Purwanto (2004) for France, Aasness and Røed Larsen (2003) for Norway, and Røed Larsen (2006) for the US. Another paper by Asensio et al. (2003) is dedicated to the distributive effects of subsidies to public transport services in Spain. Because these studies rely on consumer expenditure surveys, they are only able to consider the distributional effects of fare adjustments (induced by subsidies in Asensio et al., 2003, or taxes in the other four studies). Another study by Nuworsoo et al. (2009) uses an on-board rider survey but focuses also on bus fare changes in the US. Note that the analysis of scenarios in which trip duration is cut is particularly relevant when dealing with distributional effects: it is well established in transport economics that value of time increases with income. One can thus expect that these scenarios yield higher benefits to high-income commuters. A further difference with earlier work is that we do not restrict the analysis to the distribution of benefits across income groups. We explore also how the benefits are distributed across households that differ by residential location.

The limited availability of studies on the equity of public transport policies compared to car taxation is surprising as the impact of public transportation on individual welfares is far from being negligible. In the whole Paris Region, around 30% of the households do not own a car, implying that they rely exclusively on public transportation (source: STIF, 2005).[4] The percentage is even 55% for households living in central Paris. The average annual expenditures per household having at least one member using public transit to commute is 514€, which represents about 3% of the average income, or even 8% for the poorest households of the first quintile. We use two indicators to assess the distributional properties of the scenarios. First we explore how the gains, expressed in euros, are distributed across individuals who differ by income and/or residential location (city centre, inner suburbs, and outer suburbs). The aim is to identify the magnitude of the potential redistribution between income groups or residential locations. Second, we study the relationship between the individual benefits, expressed as a percentage of income, and income. The second indicator is usually referred to as regressiveness in public economics.

The rest of the paper is organised as follows. Section 2 presents the case-study area and the scenarios considered. Section 3 describes the methodology we use to simulate the different scenarios. Section 4 discusses the data. Section 5 presents and interprets the results. The last Section concludes.

2. Case-study area and scenarios considered

2.1. The Paris Region

The Paris Region (or *Ile-de-France*) is a vast area of 12,011 sq km and 11.3 million inhabitants. Fig. 1 shows that the city of Paris (or Paris *intra-muros*) is only a small part of that area with a surface of 105 sq km and 2.1 million inhabitants. The suburbs surrounding Paris are generally divided in two parts: the "inner suburbs" (or *Petite Couronne*) with a surface of 657 sq km and 4.2 million inhabitants, and the "outer suburbs" (or *Grande Couronne*) with a surface of 11,249 sq km and 5.0 million inhabitants.

[4] The share of non-motorised households is obviously less in North America. But still the share is 54% in New York City or 35% in Washington DC (American Community Survey, 2004).

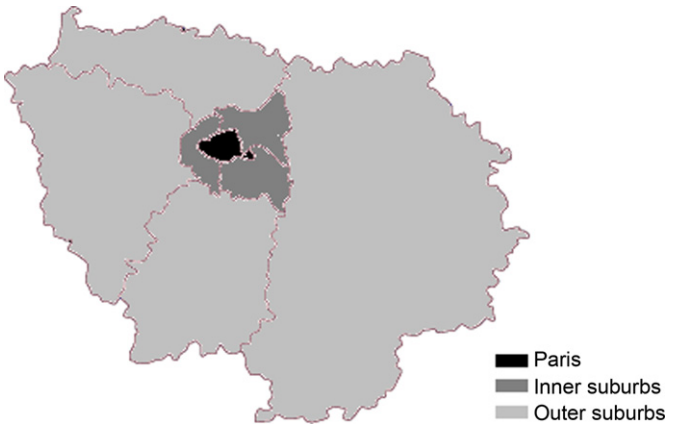

Fig. 1. The Paris Region.

The Paris Region accounts for 19% of the French population, 29% of GDP, 27% of higher education students, and 39% of R&D staff. The region accounts for 4% of the EU27 GDP.[5]

Table 1 gives an overview of the use of public transport in the Paris Region for different income groups and residential locations. Public transportation is clearly an important policy issue as 31% of individuals in the Paris Region use public transport to travel on a typical weekday. This figure is fairly stable across income groups but varies considerably according to location of residence: 52% for Parisians, 33% for the inhabitants of the inner suburbs, and 20% for the inhabitants of the outer suburbs. Rail modes are used more than bus whatever the income group or the residential location. These patterns will have crucial consequences on our results.

Finally, Table 1 shows that walking and driving are the most used travel modes in the Paris Region. As expected, car use increases with income and is more important in the suburbs. Conversely, walking decreases with income and is more important in Paris.

2.2. Scenarios considered

Improving public transportation is the main instrument used in the Paris Region to tackle automobile externalities. For instance, an on-going 610-million-euros programme, supported by the national government and local authorities, aims at creating dedicated bus lanes and preferential treatment of buses at intersections ("Mobilien" programme). In March 2009, President Sarkozy also announced an investment plan of 35 billions euros in the next decades to improve public transport in the Region. Among other projects, this budget would be used to build a new orbital line in the suburbs.

As mentioned in Introduction, we do not analyse the precise projects that are currently debated. We consider five simple scenarios which capture the generic features of two broad policy approaches: reducing transit fares and increasing travel speed. By identifying the mechanisms which drive distributional patterns in simplified scenarios, our ultimate goal is to derive general results which could apply to more specific real-world scenarios.[6] The first scenario simulates a 10% reduction for all public transport fares, i.e., single journey fares and passes.[7] The other four scenarios are described in Table 2. We consider successively an increase of 10%

[5] Mid-2000s figures from the National Institute of Statistics and Economic Studies (INSEE) website (www.insee.fr).

[6] In conclusion, we also try to identify the findings which could be extrapolated to other cities.

[7] It is not possible to discriminate price cuts by mode of transportation since most tickets and passes allow the use of different modes.