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The new public transport pricing in Madrid Metropolitan Area: A welfare analysis

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ABSTRACT

In a context of economic crisis, the amount of the demand public transport subsidies in Madrid has been reduced to control the level of public deficit. This has implied a worsening of public service quality and an increase of public transport prices. Using the Spanish Household Survey, this paper analyses the impact on welfare generated by the increase of public transport prices in 2008–2012. For this price and income elasticities have been computed using an LA/AIDS model. Price public transport elasticities are low (around -0.1%) and only significant for the years of the highest price increase. Fuel is substitutive for public transport with a cross-price elasticity of 0.25% and the other goods consumption is almost independent of the consumption of public transport with a cross-price elasticity of 0.06% . The results of income elasticities prove that public transport is a normal good. Results show that this new policy has harmed with a similar impact, low and medium income households. Those households have supported an average loss of welfare of 3.66% of their income. The welfare loss supported by the richest households is 1.5% of their income, which represents only a 40% of the average costs supported by the rest of households.

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1. Introduction

Regional and local authorities of Madrid have focused their resources toward the supply of an integrated, high-quality public transport system in Madrid Metropolitan Area.¹ Having reached that goal, Madrid City Municipality and Madrid Regional Government presented their public transport policy as one of the main achievements of their administration.

On the one hand, this transport policy has consisted in a strong public investment aimed at expanding public transport infrastructures, especially the underground network. In 1995, Madrid underground had 120 km of tracks and 164 stations. In 2009, 287 km of tracks and 291 stations were reached, which is the current network size. During these 14 years, the underground

network grew 139%. The Madrid underground system is now the second largest in Europe following the London Underground.

On the other hand, the abovementioned policy was focused on subsidization of operational cost via fares. Thus, the price of public transport in Madrid has been traditionally low as a result of the high level of subsidization of fares (Vassallo, Pérez del Villar, Muñoz-Raskin, & Serebrisky, 2009). The only ticket type that covered the operational costs per trip was the single ticket (single ticket use represents approximately 9% of total trips).² Moreover, the fare increase which took place when the network was being expanded proved to be insufficient to cover the ever-increasing operational costs.³

One of the direct consequences of such a public policy is that Madrid had in 2010 the highest public transport usage ratio compared to 21 other European cities, and the degree of satisfaction found among public transport users reached a level of 78% (Muñoz-

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¹ Madrid Metropolitan Area corresponds to Madrid Region, where there are many medium and small towns economically and demographically connected to Madrid city's dynamism.

² Operational costs exclude infrastructure investments.

³ Due to the indirect costs related to the massive investments carried out on the underground network and the increase of labour cost caused by the fast increase of real income.

Miguel, Simón de Blas, & Jiménez Barandalla, 2014, p. 114). From this perspective, Madrid's transport policy has been successful. But the long-term sustainability of such a high subsidization policy, both of infrastructures and fares, has been questioned by academic works such as those of Matas (2004), García-Ferrer et al. (2006), and Vassallo et al. (2009).⁴ Nevertheless, Madrid authorities maintained their public transport policy, in view of user's high appraisal and claiming it would have a positive impact on social welfare and equity. As Serebrisky et al. (2009) pointed out this last argument is one of the two major premises all over the world to implement subsidy policies on public urban transport,⁵ and the aim of this premise is to improve the welfare and the mobility of the poorest.

The economic crisis and its consequences on public budgets forced Madrid authorities to finally cut off public transport subsidies: (i) freezing capital investment, (ii) reducing operational costs. The reduction of operational cost has consisted of: reducing subsidization to fares –public transport prices have strongly increased since 2008 and offering an inferior level of service. For instance, 22 urban bus lines have been cancelled and the frequency of both the underground and urban buses has been reduced.⁶ Then, since 2008, public transport has been the object of lower investments and reduced operational costs with a significant fare increase, thus the level of subsidization has been reduced.

This paper attempts to analyse the impact of public transport price increase (as one of the factors allowing a lower level of public subsidies to public transportation) on household and welfare in Madrid Metropolitan Area. In fact, our work is focused on the increase of prices of urban and interurban transportation means of public property, then our model is estimated using the expenditure in travel pass and multi-ride tickets. The users of these tickets are the frequent and very frequent users of the means of transport subject of this work.⁷ Moreover, this study is focused on welfare costs generated by public transport price increases on households where the breadwinner is under 65 years old. The reason is that public transport fares for the population over 65 had usually been very highly subsidized, and the new public transport price policy implemented has maintained this high level of subsidization.⁸

To the best of our knowledge, there is no academic or institutional research that has analysed the impact of Madrid's public transport policy on welfare,⁹ so this paper addresses this void of knowledge. Moreover, it will shed light on the trade-off between public financing and welfare, even more considering that it focuses on a period of deep economic crisis. From a methodological perspective, this work is carried out in two stages. In the first stage,

⁴ In fact, from 1995 to 2007 the public expenditure of Madrid Region Government in public transport policies was behind this Region public indebtedment, which was growing year by year. For this reason the authors quoted, guessed in their works that this high expenditure policy could not be sustained for a long time.

⁵ The other premise is to subsidize public transport as a way to internalize private transport externalities, and so to make transport sector more efficient.

⁶ For example, in the case of the underground the average frequency has been reduced by 14% and as much as 50% night, and closing time from Monday to Friday has been shortened from 2.00AM to midnight.

⁷ Moreover, the survey used to estimate public transport demand in Madrid region doesn't offer disaggregated data for the single ticket.

⁸ A person aged over 65 could in 2008 travel all around the Madrid Metropolitan area for 10.5 Euros per month, since to do so people under 65 had to pay 76.6 Euros. In 2012 these fares were respectively 11.8 and 94.9 Euros. So in fact, the relative price of public transport for older of 65 has been reduced in the period analysed representing 13.85% of the normal price in 2008 and 12.4% of it in 2012. Others authors follow a similar methodological approach, for example, West and Williams (2004).

⁹ The only work focused on measuring equity impacts of public transport subsidies for several Spanish cities is the paper by Asensio et al. (2003). Using data for the period 1990–1991, they found that subsidies were progressive.

we use an Almost Ideal Demand System (AIDS) model to compute household's behaviour on consumption of public transport, automotive fuel (as a measure of private car usage) and the rest of goods. From there we estimate own-price, income and cross elasticities of the demand of such goods. In the second stage, we use those elasticities to compute the impact that the increase of public transport prices has had on welfare year by year from 2008 to 2012.

This paper is structured as follows. The next section is dedicated to the Madrid Metropolitan Area Public Transport System and its new pricing policy. A review of the existing literature on public transport demand estimation is presented in section 3. The specification of the model and data are shown in the fourth section. The estimation and discussion of the results of the first-stage analysis, then transport demand estimation, are shown in section 5. The sixth section focuses on the results of the second-stage analysis, thus on the impact of public prices increase on welfare. Conclusions are presented in the last section.

2. Description of Madrid Region public transportation system and its new pricing policy

2.1. Characteristics of the public transport system in the Madrid Metropolitan Area

Following the example of other European cities, Madrid authorities decided in 1985 to implement an integrated public transportation system. The result of this decision widely reached its main objective: to boost the use of public transport. In fact, the number of passengers using public transport in Madrid has grown from 951 million in 1986 to 1.429 billion in 2012, this means an increase by 50.3% (Consorcio Regional de Transportes de Madrid, 2013a). At the same time, the total populations increased from 4.879 to 6.495 million of persons, so by 33.1%.

The new public transport system was based on fostering integration in three levels: public authorities, fare and modal (Vassallo et al., 2009, p. 264). The first level of integration resulted in the creation of a public entity called “Consorcio Regional de Transportes de Madrid” (CRTM) that is owned by the regional government. This new entity assumed many of the roles assigned to public transport that were dispersed in a set of public institutions. The second level of integration supposed the most significant change introduced by the new policy strategy. It consisted of an integrated fare system for the whole public transport network in the form of a travel pass (there is a normal travel pass, and specific ones for population under 26 and over 65). The third level was the physical integration of transport modes. Large infrastructure investments have been carried out to improve the physical connection between modes and extend the bus, underground and rail networks. In this respect, during the years prior to the economic crisis the improvement to the underground infrastructure was remarkable.

The public transport system of Madrid is based on four transportation modes: urban buses and underground that serve basically the city centre (ring A) and, in the case of the underground, also some suburban towns (located in ring B); commuter trains and interurban buses serving the entire region. Underground and urban buses are public companies controlled by local authorities. Urban buses are 100% managed by Madrid municipality, whereas the underground is managed by Madrid municipality (75%) and by Madrid regional government (25%). Commuter railways are property of the Spanish Railway Company (RENFE) owned by the central government. Interurban buses are mostly privately owned. The operation of each interurban bus line is conducted independently under an exclusive concession contract with the CRTM.

In order to establish different transport fares, the CRTM has divided the region in 6 areas shown in Fig. 1: ring A, ring B divided

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