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Transportation Demand Management In A Deprived Territory: A Case Study In The North Of France

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Abstract

In this paper, we study the modal choice in an ex-mining area in the North of France. It is a deprived area under many regeneration strategies focusing on urban projects, such as a new public transportation infrastructure. Urban public transport accounts for 3% against the national French average of 10%. Surprisingly, this share does not proportionally change according to urban or rural context. This territory also presents particular socio-economic and land-use characteristics. In this particular territory, is there a potential for guiding transport demand management towards lower carbon mobility? If so, which strategy to implement? We estimate a mode choice model with a nested logit specification for four modes: car driver, car passenger, public transport and walking. Then, we compute demand elasticies to price and time to analyse mobility solutions. We simulate the impact of different transport policies to shift mobility behaviors towards more sustainable ones. The results show a strong inertia in the demand for car use. Only extreme mobility policies lead to a significant increase of the share of public transport. Conventional economic variables are not sufficient to increase the demand for public transport. Other tools need to be implemented. Social tariffs seem to be a relevant solution.

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Introduction

The aim of the paper is to study the determinants of the modal choice, in order to promote a more sustainable mobility, in the former coal mining area of the North of France. This territory corresponds to one urban transport perimeter also called the Syndicat Mixte des Transports (SMT) Artois-Gohelle. This territory has received little attention. The mining history of this zone has a strong influence on current mobility behaviors. This territory presents some special features. Since the decline of the mining era in the 1990's, this area has been the subject of several regeneration strategies. One of them is focused on a new transport infrastructure which aims to promote a new culture of mobility on this particular territory where car use is dominant (around 67% of modal share). After a quantitative analysis of the data from the two available Household Travel Surveys (HTS) on our case study, we have identified two strategies for promoting a more sustainable mobility: reducing the number of car jouneys and encouraging public transport use. By a more sutainable motiblity we refer to a decrease in the share of car and an increase in the share of public transport. The most important result of these two HTS analyses is the 3% share of urban public transport observed regardless the residential location. To better understand this major result, a qualitative analysis has been jointly made (Mahieux and Mejia-Dorantes, 2013). The focus groups methodology has been used to better understand certain groups, especially the most vulnerable ones, in order to inform suggest and offer possible policy recommendations to improve their situation in terms of social exclusion and transport disadvantages. The focus groups have highlighted some mobility problems. Timetables do not seem appropriate. The bus tickets price appears too expensive. Travel times by bus are perceived as too long, sometimes longer than by car. The most vulnerable people walk a lot and do not know about the special reduced fares implemented by the local transport authority. Simply put, there is no culture of public transport in this territory and people are very focused on car to realize their trips. According to this work, if some improvements were made on the public transport network, people would use their car less and rely more on the bus. In fact, the integration of quantitative and qualitative methodologies has been highlighted in many studies (Sale et al., 2002, Bryman, 2006, Pronello and Rappazzo, 2014). The transport authority thinks about the implementation of new public transport infrastructures, e.g. the Bus with a High Level of Service (BHLS) line, in order to promote a more sustainable mobility less focused on car use. In this specific territory and in a sustainable mobility context, is there a case for scaling-up public transport service and decreasing the share of car use? If so, which one? To answer these questions, we develop the analysis in 3 parts. First, we describe the quality of the public transport system on the territory to identify its lacks for meeting travelers' needs; then we measure the potential changes in transport demand when socioeconomic characteristics and/or transport policy control variables (time, cost, frequency, etc.) change. Finally, we simulate the effect of implementing specific transport policies on modal shift.

This paper is divided into four sections. The first section presents a brief review of the literature on the determinants of modal choice, the effects of the implementation of a new transport infrastructure (or the improvement of the existing one) on mode choice, and the effects of different transport policies, other than infrastructural investments, on modal shift. The second section discusses the methodology of disaggregate choice modeling approach and the multinomial logit model. Section 3 describes the studied area and the data used in the model. Before conclusions and some policy implications, Section 4 presents estimation results in terms of time, price and frequency elasticities and simulation results.

1. Literature overview

Our paper investigates the literature on the determinants of modal choice (De Witte et al., 2013) and the impacts on this choice of network improvement or new transport infrastructure (Shen et al., 2009; Hensher and Rose, 2007), in a territory where car use clearly dominates (Hensher, 1998).

To take adequate measures on the studied area, it is important to have a strong understanding of travel behavior and modal choice. Travel behavior is complex. Modal choices are determined by several factors. De Witte et al. (2013) present a review of the literature on different key determinants. They can be resumed in three families: socioeconomic variables, spatial indicators and journey characteristic indicators. According to the spatial and historical characteristics of the studied territory, the required transport policies are different (Buehler, 2011). The same policy carried out in two different countries can lead to different results in terms of modal shift. Also the characteristics of the land-use