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Modal shift and interurban mobility: Environmentally positive, socially regressive

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ABSTRACT

The aim of this article is to conduct an analysis of the consequences of public modal shift policies on interurban journeys in France (people who live and work in two separate functional urban areas). It measures and analyses three facets of these policies: the potential for a modal shift from the car to public transport, the environmental consequences (CO_2 emissions) and the social consequences (transport costs) of such a shift. The increase in travel costs brought about by higher fuel prices or from charges for access to urban centres, together with a reduction in the costs of travelling by public transport, are the three elements which – according to the models – have the biggest influence on modal shift and the reduction in CO_2 emissions. However, our findings also show that these policies are socially regressive in that they financially advantage the higher socio-economic categories.

1. Introduction

Reducing greenhouse gas emissions (GGE) has become a key policy objective for public actors all around the world. The 2015 Paris Agreement, which sets a target of limiting the global increase in temperature to a maximum of 2 °C by 2100 by reducing GGE, is an obvious example of this trend (UN, 2015). In France, reducing greenhouse gas emissions from transport (the sector which emits the most) is a stated goal of public policy. Its implementation takes place at different scales (national, metropolitan and local), and through different measures (e.g. improving public transport provision, restricting the space allocated to the car, lower speed limits).

Among the populations targeted by these measures to reduce CO_2 emissions, people living in low-density areas play an important part (Newman & Kenworthy, 1989; Carl, 2000Wheeler, 2002; Cervero, 2004; Dittmar & Ohland, 2004). The residents of these periurban areas make on average greater use of the car, and over greater distances, than people living in the urban centres. They therefore contribute significantly to greenhouse gas emissions when travelling, by comparison with individuals living in inner-city areas (Desjardins & Llorente, 2009; Calvet, 2010; Levy & Le Jeannic, 2011; Cavailhès & Hilal, 2012).

Urban and spatial planners have numerous theories about how to reduce these emissions. Among them, New Urbanism proposes dense city models, functional diversity in built-up areas, and the promotion of cycling and walking over car use (Carl, 2000; Leccese & McCormick 2000; Wheeler, 2002; Theys & Vidalenc, 2013). Another current, Transit-Oriented Development (TOD), proposes the concentration of urban development along transport axes linked to business corridors and to stations that form the nucleus of urban hub construction (Camagni et al., 2002; Cervero, 2004; Dittmar & Ohland, 2004; Maupu, 2006). Another group encompasses research that promotes the model of the polycentric metropolis (Bertaud, 2004; Charron, 2007). By introducing secondary hubs around historic city centres and developing public transport, the claim is that this urban model would reduce the distances travelled by working people and therefore use of the car (Banister, 2008).

All these approaches concentrate on the scale of mobility specific to the functional spaces around cities. Yet these measures, designed for one scale, can have consequences at other scales. If urban sprawl is restricted to a particular radius, workers may further increase their commuting distance by going to live in another city, thereby promoting interurban travel (Appert, 2004; Ogura, 2010). Unless these commuting distances are covered by public transport, the consequences in terms of CO_2 emissions would seem more negative than positive. So measures designed to enhance conditions that the intraurban scale can have consequences for the interurban scale. For the moment, such multiscale approaches are fairly scarce (Le Néchet, 2011), in particular those that concentrate on interurban commuters in France (Berroir et al., 2012; Drevelle, 2012; Gingembre & Baude, 2014).

This article proposes a change of perspective on such transport and planning policies designed to reduce car use in order to cut CO_2 emissions, by making interurban travel in France the object of its study

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(people who live and work in two separate functional urban areas). Its objective is to answer the following two questions: (i) what is the potential for reducing CO_2 emissions from interurban travel in France? (ii) what are the social consequences of transport policies designed to achieve this reduction, especially in terms of travel costs?

In order to answer these questions, the article is divided into several sections. A literature review will highlight the challenge of reducing CO_2 emissions associated with interurban travel and the need to measure the potential for cutting emissions by implementing different transport policies. The article then goes on to present the method adopted, a national scale discrete choice model constructed using an original distance table as well as different transport policy scenarios. The findings from the model will be used to highlight the multiscale and multisectoral consequences of modal shift policies in terms of their potential to reduce CO_2 emissions and of their social consequences.

2. Issues with the analysis of the environmental and social consequences of transport policies

2.1. The environmental challenge of interurban commuting: A recent priority

In France, measurements of the volume of CO_2 emissions arising from interurban travel tend to be buried in regional scale studies. In one article, Brion and Léger (2012) measure the CO_2 produced by all working people and students in the Burgundy region when commuting to work or their place of study. The authors highlight the role of interurban commuting in total greenhouse gas emissions. “The 5.4% of working people and students in the region who travel between 50 and 200 km a day account for 28% of the total CO_2 emitted” (Brion & Léger, 2012, p.3). The frequent use of the car for these long-distance journeys means that these travellers are responsible for significant emissions relative to their proportion in the population. “Commuters travelling beyond the boundaries of their functional urban area of residence to their place of work or study represent 14% of roundtrips made by residents of the initial functional urban area. These commuters alone generate almost half (49%) of CO_2 emissions” (Tailhades, 2011, p.2). These figures relate to CO_2 emissions associated with commuting trips for work or study in Languedoc-Roussillon and seem to confirm that interurban commuters, though a small section of the working population, travel long distances by car and contribute significantly to CO_2 emissions.

In France, a first quantification of national scale CO_2 emissions was recently developed (Conti, 2016; Conti, 2017).[1] This study reveals that interurban commuters in France are small in number but contribute significantly to CO_2 emissions. Of the total number of working people based in large and medium-sized functional urban areas in France, 9% are interurban (living and working in two distinct functional urban areas). They are responsible for 29% of total travel-related emissions produced by people who live and work in France's large and medium-sized functional urban areas (excluding Paris). The preponderance of car use among these populations (88% of modal share over significant distances – an average of 37 km) is the main factor explaining why interurban travellers are overrepresented in commuting-related CO_2 emissions in France. This finding constitutes an important argument for the need to measure the potential for reducing CO_2 emissions in interurban journeys.

2.2. Cutting CO_2 emissions by encouraging modal shift

At European level, much research is being done to limit CO_2 emissions associated with transport in both the goods and passenger transport sectors (EU, 2007). There is a particularly strong focus among public actors on issues relating to private car use. Numerous measures have been proposed by researchers or implemented by public authorities in order to reduce CO_2 emissions associated with the private car. This work draws firstly on a mass of research in geography, sociology, economics and spatial planning concentrating on the automobile, the factors explaining its level of use and possible alternatives for modal shift (Dupuy, 1995; Cervero, Kockelman, 1997; Newman & Kenworthy, 2000; Kaufmann, 2000; Héran, 2001; Crozet, Marlot, 2001; Crozet, Joly, 2004; Massot, Orfeuil, 2005; Vincent-Geslin, 2008; Lesteven, 2012; Aguiléra et al., 2014; Biotteau, 2014). The other main source is three documents from public institutions in Europe and France: a 2007 document published by the European Commission (EU, 2007), a literature review established by Laugier (2010) on behalf of France's *Centre de Ressources Documentaires Aménagement Logement Nature* (documentary resource centre for planning, housing and nature) and the website of the Ministry of the Environment and the Sea.[2]

Among the measures, some seek to promote a modal shift, defined as “the shift in passenger or freight traffic from one mode of transport, generally the road, to another – more environmentally friendly – mode”.[3] The purpose of this modal shift, therefore, is to promote the use of “altermobilities” (Vincent-Geslin, 2008) such as public transport in order to reduce individual use of internal combustion vehicles. In this article, the focus will be on policies that encourage a modal shift from the car to an alternative transport mode: interurban public rail transport.

2.3. The difficulty of finding a compromise between environmental and social priorities

While reducing the CO_2 emissions associated with interurban travel is one of the priorities of this article, modal shift policies also have consequences in other directions, such as regional economic development or the financial cost to working individuals. Caubel's article (2007) illustrates the difficulty of reconciling environmental and social factors in day-to-day mobility. In his study on ways to improve accessibility for nonmotorised households, the author concludes that it would seem more economically rational to provide subsidies to help households acquire a car, than to develop public transport as a way of enabling the poorest households to improve their access to amenities. Xavier Desjardins (2011) also writes about this difficulty of reconciling environmental and social priorities in his discussion of the role of spatial planning in reducing greenhouse gas emissions.

So financial measures designed to reduce car use can have significant consequences for certain categories of the working population. The literature on energy vulnerability has explored these factors extensively, in particular for the poorest households (Lemaître, Kleinpeter, 2009; Verry, Vanco, 2009; Cochez et al., 2015). What about the impact of CO_2 reduction measures on interurban commuters? This population is also affected by financial constraints associated with the need to travel long distances to work. Executives and unskilled workers no doubt differ in the impact they will experience from measures to reduce the CO_2 emissions produced by interurban commuters.

[1] This study was carried out on people living and working in France's medium-sized and large functional urban areas, excluding the Paris functional urban area, and without taking into account people commuting over distances greater than 200 km as the crow flies. Thus, for the 14.3 million working people in France living in large and medium-sized functional urban areas, i.e. 352 functional urban areas according to the 2010 zoning map, the population of interurban commuters consisted of 1.3 million people.

[2] MEEM website: http://www.developpement-durable.gouv.fr/Transports,34,304.html, consulted 4 July 2016.

[3] Légifrance website: https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000030103736, consulted 16 March 2015.