



# Transport infrastructures and employment growth in the Paris metropolitan margins



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## ABSTRACT

The role played by transport infrastructures such as motorways, railway stations and airports on local employment growth remains debated and partially inconclusive, especially for small municipalities located in metropolitan margins. This paper examines the case of the Paris region. Based on a logistic regression model using municipal-level employment data (1993–2008), it aims at assessing whether municipalities with small amounts of employment are likely to experience high employment growth depending on their location vis-à-vis transport infrastructures. Motorways are found to have an influence for very small areas and airports for bigger ones. However, the role of transport infrastructures is rather limited when the analysis is differentiated according to economic sectors.

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## 1. Introduction

The role of transport in local employment growth has been widely discussed in recent decades (Blumenberg and Ong, 2001; Boarnet, 1995; de Vor and de Groot, 2010; Giuliano et al., 2011, 2007; Hoogstra and van Dijk, 2004; Redfean and Giuliano, 2008; Zhang and Guldmann, 2010). Jobs have become more decentralised, cities have undergone a polycentric-based expansion rather than a random sprawling, with face-to-face contacts and agglomeration externalities remaining predominant. Beyond some main determinants such as specialisation (Henderson, 2003; Marshall, 1920) and diversity (Glaeser, 1999; Jacobs, 1969), the role played by transport infrastructures has remained controversial, largely because it raises problems of endogeneity in urban areas (Chandra and Thompson, 2000; Turner, 2009). Endogeneity is a major concern when a predictor (like the existence of an infrastructure) is a consequence of the phenomenon it is supposed to explain.

This debate, however, does not affect metropolitan margins, which have been rather overlooked by the research community. Most metropolitan jobs are usually located in the major centres, and the most common concern of metropolitan authorities is not to let employment scatter in sparsely populated areas. Yet there are several reasons to focus on this subject, even though small numbers of jobs are involved. First, understanding employment growth in metropolitan margins may allow for a better knowledge of the suburbanisation process, and for more adequate decisions in terms of local economic development (Baum-Snow, 2007). Second,

it is useful to know whether the existing infrastructure (motorways, regional express trains, airports) provides opportunities for job creation in unlikely geographical areas. On this matter, a lively debate has emerged recently in Paris about the location of the future bypass mass rapid transit. The future stations might partly be built in almost empty areas: the main opposing arguments have focused on the possible creation of new real estate opportunities or, conversely, to the futility of stations located in “potatoes fields”.<sup>1</sup> However, the debate has remained fairly ideological and poorly informed by scientific findings. Third, metropolitan margins are an excellent study area to clarify the role of transport infrastructures in an environment where endogeneity cannot be highlighted, for infrastructure is usually received as an exogenous event (Chandra and Thompson, 2000), rather than a response to local previous growth. Moreover, externalities related to the concentration of activities, to their diversity or to specialisation are not likely to be explanatory factors, since few firms (if any) are located there. As such, measuring the benefits of transport infrastructures in places where urban advantages are missing may provide a clearer view on specific transport effects. A fourth and specifically European reason involves the diversity of existing transport modes: while the North-American literature focuses largely on motorways (Baum-Snow, 2007; Boarnet, 1995; Boarnet and Haughwout, 2000; Ewing, 2008a; Rothenberg, 2009; Ryan, 2005), it is worth questioning the role of regional rail

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<sup>1</sup> This term was used by the President of the Ile-de-France Region, Jean-Paul Huchon, for criticising the National Government's draft of the project (<http://www.lagazettedescommunes.com/43232/deux-projets-de-transport-deux-conceptions-de-l%E2%80%99amenagement/>).

networks that have been highly developed in European conurbations.

Focusing on peripheral areas with small numbers of jobs, this paper aims to test the assumption that the areas located near transportation infrastructures were more likely to undergo employment growth over a 15-year period (1993–2008). Section 2 presents a brief literature review on this issue. Section 3 includes a presentation of data and method. Results are shown in Section 4. Section 5 concludes.

## 2. Linking transport infrastructures to employment growth

Transport cost is at the heart of all location theories (Glaeser and Kohlhase, 2004; Krugman, 1991b; McCann and Shefer, 2004; Rietveld and Vickerman, 2004). It is a convergence point of Weberian theory (McCann and van Oort, 2009; Weber, 1909), the neo-classical approach (Boarnet and Haughwout, 2000), and New Geographical Economics that emphasise the role of resource pooling in firm agglomeration (Fujita and Thisse, 2002; Krugman, 1991a, 1991b; Polèse and Shearmur, 2009). Among a large range of determinants, the location choice of firms might reflect the non-ubiquity of transport infrastructures (Ryan, 2005). Firms may take advantage of clustering near an infrastructure, even when they have no particular interest to agglomerate (Anas et al., 1998; McMillen and McDonald, 1998; White, 1976). For instance, manufacturing, wholesale trade and logistics activities seek after motorway interchanges (Bowen, 2008; Cidell, 2010; Hoover and Giarratani, 1985; Michaels, 2008).

An extensive empirical literature has been developed on this topic for 30 years, focusing on the role of public capital in private sector productivity (Aschauer, 1989; Boarnet and Haughwout, 2000; Fernald, 1999; Fox and Smith, 1990; Garcia-Mila and McGuire, 1987; Gramlich, 1994; Haughwout, 2002). In fact, transport infrastructures can be viewed as intermediate goods between production and final consumption. Attention has been particularly focused on the effect of motorways on suburbanisation (Baum-Snow, 2007; Giuliano et al., 2011; Redfean and Giuliano, 2008) and economic development (Banister and Berechman, 2001; Funderburg et al., 2010; Holl, 2004a, 2004b). The advent of a dematerialised economy and an increase in commuting speed have induced a sharp decentralisation of high order services (Anderson and Bogart, 2001; Glaeser and Kahn, 2001). Interactions between firms and decision making processes have partially moved away from central areas. In association with deregulation and increased competition, growing flexibility in firms' spatial organisation, the rise of just-in-time management, information-intensive activities and task outsourcing, urban structures have been sharply affected (Anas et al., 1998; Ewing, 2008b; Shearmur et al., 2007). In parallel, despite the increased use of information and telecommunication technologies in economic activity, the role of face-to-face contacts has remained important (Gaspar and Glaeser, 1998; Hoogstra and van Dijk, 2004; Krugman, 1991b), as both are complementary to one another. The resulting changes in the spatial organisation of cities have tended to produce both multicentric structures (Anderson and Bogart, 2001; Boiteux-Orain and Guillain, 2004; Cervero and Wu, 1997; Forstall and Greene, 1997) and patterns of dispersion (Fujii and Hartshorn, 1995; Gong and Wheeler, 2002), depending on the regional context, scale and data (Shearmur et al., 2007).

Regarding local employment growth, less attention has been paid to the specific role of transportation (Andersson and Karlsson, 2004; Rietveld, 1994; Shearmur, 2010) than to access to labour force (Aji, 1995; Redfean and Giuliano, 2008), and to innovation and knowledge transfers (Britton, 2004; Porter, 2003). The assumption that specialised services may develop specifically around infrastructure has been validated empirically less

frequently (Gong and Wheeler, 2002; Ihlanfeldt and Raper, 1990). Literature results are therefore rather divergent. In some cases, no relationship was found between job location (or employment growth) and the presence of motorways and railway lines (Arauzo-Carod, 2007; Deitz, 1998). In other cases, transport infrastructures impacted on service jobs development (Carlino and Mills, 1987; Gong and Wheeler, 2002), on employment growth (de Vor and de Groot, 2008, 2010), or on labour productivity (Hensher et al., 2012; Hoogstra and van Dijk, 2004), and was sometimes associated with employment redistribution (Forkenbrock and Foster, 1990; Hensher et al., 2012; Meijers et al., 2012; Mejia-Dorantes et al., 2012). Results generally vary across industrial sectors, as direct access to transportation is more important for manufacturing and trade sectors than for business services for which location is more agglomeration-based (Hoogstra and van Dijk, 2004). It may also depend on the mode of transport (McMillen and McDonald, 1998), since each transport system has its own performance patterns, territorial scope and functions.

Despite the importance of both employment growth and suburbanisation from a transportation perspective, metropolitan margins have been surprisingly absent from the recent literature. Employment growth in city hinterlands is frequently viewed as a simple core-periphery process associated with local characteristics such as workforce and land-use (Boarnet, 1994; Henry et al., 1999). Since infrastructures may affect employment levels in rural areas (Chandra and Thompson, 2000; Goode and Hastings, 1989; Rephann and Isserman, 1994), it can be assumed that proximity to a transportation node is likely to do the same in metropolitan margins. In this view, even in the supposed absence of agglomeration-based attractiveness, network expansion would induce employment sprawl.

## 3. Data and methods

### 3.1. Unistatis database and study area

In order to analyse the role of transport infrastructure in local employment growth in urban margins, a municipal-level annual inventory of private sector jobs and establishments (not firms) in the Île-de-France region was used. Called Unistatis, it does not include public employment, which represents about 1.5 million jobs. Our analysis was therefore confined to the so-called productive sectors, which accounted for 74% of regional employment in 2008 (INSEE data). This was not problematic, since proximity to infrastructure is not expected to attract public activities, whose geographic distribution is usually rather redistributive-, optimal- or equitable-based (Drezner and Hamacher, 2004; Raze, 2004; Şahin and Süral, 2007).

Unistatis data ranges from 1993 to 2008 and provides several economic classifications (732, 88, 38 and 17 industries). Here, the 38-industry NAF-2 European nomenclature was considered sufficient, and was divided into 13 economic sectors quite similar to those used in recent works (de Vor and de Groot, 2010; Hoogstra and van Dijk, 2004). The population census (RGP-1990, INSEE) was also used to calculate several variables, such as secondary employment centres and population variables. During the 1993–2008 period, the most dynamic industries were Transport and Warehousing (+3.96% per year), Telecommunications, Computing and Information (+5.80), Accommodation and Food Services (+2.24), Specialised Services (+3.17), and Other Specialised Services (+2.84). Manufacturing, Construction and Retail suffered great losses, from –0.37% per year to –2.62% (Table 1).

The study area included all municipalities with less than 1000 jobs at the beginning of the period (Fig. 1). The Île-de-France region accounts for 1300 municipalities ("communes"), in which local

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