



High Speed Rail commuting impacts on labour migration: The case of the concentration of metropolis in the Madrid functional area



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ABSTRACT

The relations of dependence between transport accessibility, migration and the regional scope of labour markets have been widely studied in the literature. However little attention has been paid so far to labour migration derived from long-distance commuting favoured by relatively new transport technologies such as High Speed Rail (HSR). Even in France or Spain – both European countries with long experience in HSR commuting and the subject of extensive literature on its impacts–, there has been very little study of the effects on labour markets. The high cost of building and operating HSR lines and the current financial instability point to the advisability of scientifically analysing any HSR spillover impacts.

This paper contributes to the limited existing literature by applying a regression analysis to panel data to model the impact of HSR on labour markets in commuting relations. Considering HSR as a variable and inter-regional labour mobility indicators, the model has been validated using the HSR commuting lines that converge in the Madrid metropolitan area for the period 2004–2015, and reveals that HSR is a key variable for understanding the growth of labour contracts. The results also show how the financial crisis has reduced the role of unemployment rates and housing prices as significant variables due to the high percentage of undeclared work and the fall in housing prices. Further research is needed into the model's limitations, namely the inability to estimate regional disparities derived from the presence of HSR, and the failure to disentangle causes and effects among the variables of HSR commuting mobility, unemployment rates and housing prices.

1. Introduction

In today's climate of continuing financial instability, the selection of the best transport planning methodology to assess new High Speed Rail (HSR) projects is a critical and widely discussed issue. The assessment methodology has traditionally been based on a comparison of the high costs of HSR building and operation, and the total benefit generated by the new investment. In the literature review, the two main frameworks used by planners, CBA (Cost Benefit Analysis) and Multi-Criteria Analysis (MCA), consider all the economic activities reinforced by HSR when estimating its benefits, but tend (even in the case of the new MCA tools) to overlook indirect benefits linked to territorial and regional effects.

Unemployment as a territorial effect has been one of the most salient features of the worldwide economic recession, and all the effects on local labour markets are being analysed in great detail. It is accepted in the literature that labour migration responds to and can reduce

regional disparities (mainly in employment), although this latter fact is more contested. Commuting can be seen as a type of specific migration process in which transport accessibility has been shown to play a key role. The location of the commuters' workplace and residence determines the length of the commute, so the study of the evolution of the housing market must be included in any methodology that aims to determine the effects of commuting on the labour market.

Although there is extensive literature on the relationship between the effects of migration (including commuting migration) on regional labour markets and unemployment rates (see Section 2), little research has been done so far to estimate empirically how labour markets specifically have been affected by HSR implementation. Although many examples of HSR inter-regional commuting can be found in countries like Japan, France, Germany and Spain, only a few complementary studies have been done in Spain, mainly focused on the urban residential changes generated by HSR lines. HSR is a relatively new transportation mode that has emerged in the last thirty years, and most

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of the studies published describe specific HSR experiences (case studies) and some HSR effects observed on labour movements, but do not analyse any systematic patterns and thus lead to no general conclusions.

This paper provides a new analysis of the empirical impact of HSR commuting on regional labour markets based on the limited existing literature. The added value of this research is that it is the first assessment of a multivariate panel data model used for this approach and tested in the main Spanish HSR commuting relations during the period 2004–2015, thus capturing the effect of the financial crisis. The paper is divided into the following sections: Section 2 contains a review of the literature on commuting migration and HSR. Section 3 gives an explanatory description of HSR commuting in Spain and shows the main results derived from preliminary studies. Section 4 includes the model equations and the application to the case study (Madrid commuting relations). Section 5 contains the most important results and a discussion. Finally, the main conclusions are summarised in Section 6.

2. Migration, commuting and HSR: an overview

There is an extensive body of literature on the complex cumulative cause-effect process between regional labour disparities and transport accessibility. Transport accessibility between municipalities conditions travel times and determines the spatial limits of local labour markets (Johansson et al., 2002, 2003; Johansson and Klaesson, 2007; Fujita and Thisse, 2002). The construction or improvement of transport infrastructures (or services) tends to decrease travel times, and as travel times change, so do the spatial limits of the labour market. This usually implies a larger labour market due to the integration of previous markets that were formerly separated spatially but also in terms of accessibility.

There is a consensus in the literature regarding labour mobility in response to regional disparities. This is the approach followed by traditional neoclassical models, which also highlight the subsequent decrease in regional disparities as an impact of this labour mobility (Kanbur and Rapoport, 2005). The vast majority of the research on regional disparities focuses on migration impacts rather than the impact of commuting flows (Elhorst, 2003; Patacchini and Zenou, 2007), although *commuting can be considered a specific type of migration* and its role must also be studied. This commuting-centred approach has been supported by some studies on East and West German workers (Burda and Hunt, 2001; Niebuhr et al., 2012). Commuting between East and West Germany, especially for workers living in regions near the former borders, was seen as a way to avoid the mobility cost involved in traditional migration (renting or buying a new house) while benefiting from higher wages. If the wages are high enough, they can offset their commuting costs and substitute commuting for migration. Housing, mobility (migration or commuting) and labour markets cannot be studied independently, although their interactions are very complex (Haas and Osland, 2014). The 2007 financial crisis demonstrated that housing prices are of great significance for many countries' economies, and the decision to commute rather than migrate depends not only on the wages obtained but also on affordable housing. Unfortunately, there is a gap in the literature in detailed studies of the circular cause-effect relation between changes in housing prices, the structure of the labour markets and worker mobility (commuting or migration). The range of unresolved research questions is mainly due to the complex interactions between these three processes.

A similar process has been observed in countries with a HSR network, particularly associated to a new type of HSR mobility. Distances of less than 200 km are equivalent in terms of HSR to a travel time of approximately one hour or less, enabling its use by commuters and generating a new type of migration. However High Speed Rail (HSR), promoted in various countries around the world (Albalade and Bel, 2012), constitutes a technological revolution, and is a relatively new mode of transportation even compared to conventional

rail. Many of the HSR impacts on mobility and on regional and economic development are relatively new topics in the scientific literature (Moyano et al., 2016; Guirao and Campa, 2016; Mohino et al., 2016; Ureña, 2012). Little research has been done so far on the relation between HSR commuting and labour markets, although there are many examples of HSR inter-regional commuting in countries like Japan, France, Germany and Spain. One of the effects of the proliferation of HSR lines in European countries is that medium-sized cities within one hour's distance by HSR have gone from being spatially isolated to becoming integrated in large metropolitan areas (Garmendía et al., 2008), which has implications for labour markets. However, scientific analysis has until now only focused on the urban residential processes generated in these isolated cities by HSR commuting (see Garmendía et al., 2008; Mohino et al., 2016). Whether HSR commuting is facilitating decentralisation or concentration from/to metropolises is a key issue for understanding the long-term benefits of the construction of new HSR. However the labour market must also be addressed, and this approach has not yet been specifically studied. Moreover, the existing studies were conducted (at least in Spain) before the onset of the financial crisis in 2005/2006 and do not reflect the effects of the rise in unemployment rates.

This approach is directly linked to HSR profitability, a controversial topic that is widely debated in the scientific community due to the exorbitant cost of building and operating HSR. Support for new projects is hampered by serious concerns over the extremely high costs of these systems and the ability of today's governments to fund or co-fund them. The positive impact of HSR on labour markets can be seen as an indirect benefit. Despite the lack of specific literature on the topic (with the exception of initial research in the Spanish cities of Ciudad Real and Toledo), some general lessons can be learnt from recent publications on commuting and migration and their empirical relation to different aspects of the labour markets (wages, spatial distribution of labour markets, regional disparities, etc.). The most important results are summarised below.

According to Hunt (2006), commuting and migration are two forms of mobility that are closely linked in the analysis of regional disparities between labour markets, and Elhorst (2003) suggests that if the study of a labour market size is not merely functional and is based on administratively defined regions, it should take commuting behaviour into account. However, *the study of commuting as a type of migration is complex* due to the fact that the commuters do not change their place of residence. While immigrants in the destination region will remain jobless or displace another worker, thus increasing the unemployment rate in the local statistics, commuters have a different effect on labour figures (Elhorst, 2003). Particularly when the commuter comes from another region (as usually occurs when HSR shuttles are used), the effect will be to decrease unemployment rates in the origin region and not to increase unemployment in the destination. The total economic balance is also difficult to estimate when considering where workers spend most of their income. While migrants tend to concentrate their consumption in the destination region (at least they have to spend a large part of their income on food and housing), commuters presumably concentrate their consumption in their city of residence which, in the case of HSR commuting, does not match their workplace city (or even region). All this indicates that HSR commuting effects on labour demand may be less important than those induced by "pure migration". Some authors, like Østbye and Westerlund (2007), recognise the existence of asymmetric effects when analysing in-and out migration (commuting) and the complexity of the study of incoming and out-coming flows.

One of the peculiarities of the HSR commuter profile is that it comprises *highly-skilled workers*. According to traditional neoclassical models, labour mobility reduces regional disparities. However, this result has been widely debated when referring to the selective migration of highly-skilled workers. Some authors have noted that this type of migration may also increase regional disparities (Burda and Wyplosz,

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