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Evaluation of External Costs Change Due to High Speed Rail in Italy



Martina Farsi, Mario Tartaglia, and Lorenzo Vannacci

Abstract The evaluation of the external costs of transport has become increasingly relevant and fundamental, as much as the growing interest and concern about climate change; even if these costs involve aspects beyond environmental ones, like accidents and congestion, they allow the environmental impacts of people's transport choices to be determined and represented, transforming them in monetary costs. The EU Commission has been debating these topics for almost 20 years, and DG Move has covered this topic in the Handbook on the External Costs of Transport; moreover, during this period (2022–2024), the European Commission has been organising a fitness check to prepare a recommendation on how to better implement the polluter pays principle, which could balance the costs perceived by the polluters and those borne by the community. In this context, railways can play a key role in reducing the impact of Transport. It is well-known that train transport is one of the least impactful modes of transport, as showed by several studies, like that conducted by UIC “Greening Transport” (Domergue & Markovic-Chénais, *Greening transport—Reduce external costs*, 2012); it could be improved by new technologies, but it is already less impactful than air and road transport. The problem is encouraging its use by passengers and freight carriers. For instance, users of the roads don't perceive all of the effects and the relative costs that they produce: for them, travel by car remains the most convenient mode in terms of money, comfort, and (perhaps even) time. Only major events, like an economic crisis or a pandemic, can change people's mobility habits, and this change will not always favour less impactful modes of travel, as we saw during the COVID-19 pandemic. Some governments have sought to resolve this through modal choice: France, for example, has sought to reduce its environmental impacts (namely CO₂ emissions) by banning air connections where comparable train services exist, and take less than two and a half hours to cover the OD distance. Despite the foregoing, and even if modal choices in Italy haven't

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How Competition on HSR Services Could Generate Social and Economic Benefits: The Case of Italy



Mauro Capurso and Mario Tartaglia

Abstract Competition on HSR services has had major social and economic effects, including an improvement in the quality and variety of the services (at lower costs), improved accessibility, and an increase in the overall demand. These effects coincide in part with the advent of HSR itself, and in part with those observed with the opening of other transport markets. However, the latter effect (i.e. increase in demand) appears particularly amplified here, since it has positive implications not only for individual travellers, but also for society as a whole: in fact, a significant part of the increase in HSR demand has been diverted away from less environmentally friendly modes (e.g. air, long-distance bus, and car), thus leading to a reduction in CO₂ and other pollutant emissions. In order to explore the full range of positive effects of HSR competition, this paper specifically investigates the unique case of Italy, where the opening of this market segment has been effective for more than ten years now.

Keywords High-speed rail competition · Italy

1 Introduction

Italy was the first, and for a long time the only, European country to have opened up its domestic high-speed railway (HSR) network to competition, with HSR open access services in operation since April of 2012. The Italian HSR market can therefore be considered a mature “laboratory” for what the European Union envisioned for itself, with the creation of a single open rail market, as well as for its Member States within their respective domestic markets (through the adoption of the so-called IV railway package).

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Transport Accessibility and Demographic Vibrancy: Evidence from the High-Speed Railways in Italy



Gianluigi Cisco, Andrea Fiduccia, Ilaria Lopresti, and Mario Tartaglia

Abstract The socio-economic implications of high-speed rail (HSR) systems have been widely studied. However, a research gap exists regarding the influence of HSR on changes in demographic composition. This study aims to address this gap by investigating the introduction of HSR and its effects on demographics in Italy. By conducting a fixed effect panel regression analysis, we assess the impact of HSR on demographic indicators in 70 catchment areas based on HSR stations, comparing data from two sample periods, 2008 and 2019, to analyze pre- and post-HSR differences. Our study focuses on five demographic indicators, including population ages, migration patterns, and working-age population, as dependent variables. Additionally, we employ an accessibility index based on travel time to measure the improvements in accessibility resulting from HSR. Preliminary analysis suggests a correlation between HSR and demographic vibrancy indexes, although it may not be sufficient to reverse the current demographic trends.

Keywords High speed rail · Accessibility · Demography · Italy

1 Introduction

In recent years, high-speed rail (HSR) systems have garnered considerable global attention due to their socio-economic implications. Existing literature has primarily examined the relationship between transportation and economic development (Chen et al., 2016; Pagliara & Di Ruocco, 2018; Vickerman, 2018), the impact on tourism (Delaplace et al., 2016; Guirao & Campa, 2015; Pagliara et al., 2017; Yin et al., 2019), effects on conventional rail transport and changes in accessibility patterns (Chang & Lee, 2008; Shaw et al., 2014; Tartaglia et al., 2022). Additionally, there is a growing

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Can HSR Services Increase Regional Economic Integration? Evidence from the Italian Case



Leonardo Piccini and Mario Tartaglia

Abstract As High-speed rail networks have been developed both nationally and internationally as a successful alternative to both air and road over medium-long distances. Inter-city and inter regional traffic, especially between the major metropolitan areas has benefitted greatly from the investment in this network. HSR infrastructure investments are also often viewed by governments in many countries as effective tools to stimulate economic growth. Economic literature has analyzed in many studies the magnitude of the impact of HSR investments. On economic growth, employment, and transportation efficiency. Less studied is the impact of HSR services on economic integration: by improving connectivity and reducing travel time between regions, HSR services can enhance the flow of people, goods, and services between regions, leading to increase trade and investment. This effect can be observed through the lens of Multi Regional Input–Output Tables, a tool used to analyze the interdependence of economic activities between different regions and sectors. The scope of this paper is to assess the effect of HSR connection and passenger flows between regions on their trade integration across different sectors, using Italian regions as case studies. HSR network connects major cities throughout Italy, and, by extensions, their surrounding regional economic systems. After carrying out a descriptive analysis of the major trend in HSR in Italy (both from a passenger and a service perspective), we define potential catchment areas of HSR services and operationalize their evolution since 2010. Then we put this evolution in correlation with a sectorial disaggregated index of economic integration between regions computed on Multi Regional Input–Output Tables, in a quasi-counterfactual setting. We compare pairwise combination of regions with a direct HSR connection with unconnected similar pairs of regions and evaluate if their economic integration indexes are significantly different.

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An Integrated Approach for the Territorial Impact Assessment of High-Speed Railways



Chiara Ravagnan, Arianna Fittipaldi, Franco Stivali, and Mario Tartaglia

Abstract The growing attention to the impacts that transports policies and infrastructure projects have on sustainability and territorial cohesion has been strengthened by the progressive inclusion of these goals among the main objectives of the European Union. In particular, as stated by the Green Paper on Territorial Cohesion, the concept of territorial cohesion “builds bridges between economic effectiveness, social cohesion and ecological balance, putting sustainable development at the heart of policy design.” These goals have been fostering research and experimentation paths for the many companies of the Italian Railways Group (FS Group); in this framework, territorial cohesion and sustainability are the topics of a partnership between the FS Research Centre and the Italferr Sustainability Unit, with the aim of updating the methodological frameworks for the assessment of the territorial impacts of railways. The study is rooted in the institutional and scientific debate on territorial cohesion, interpreted as the “territorial dimension of sustainability” (Camagni, *Rivista di Economia e statistica del Territorio* 3:37–62, 2006a), and is anchored to the methodological references developed for the evaluation of economic, cultural, social, environmental, and governance impacts. To this end, the paper proposes a theoretical and methodological framework of indicators to assess the territorial impacts of high-speed railway projects, arising from a research pathway consisting of 4 phases: the illustration of the literature review on territorial cohesion; the focus on Territorial Impact Assessment methods and indicators; a comparison of the indicators with the Envision Protocol for infrastructures; the proposal of a multidimensional framework of indicators for the territorial impact assessment related to High-Speed Rail.

Keywords High speed rail • Territorial impact assessment • Territorial cohesion

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The Relationship Between High-Speed Rail Accessibility and Tourism Demand: The Case Study of Italy



Ilaria Lopresti and Mario Tartaglia

Abstract Transport infrastructure is of fundamental importance for tourism development and reinforcement. The relationship between transport and tourism is complex, as one affects the other and various features of transport can influence tourist choices. The operation of high-speed rail offers a faster mode of transport, which is supposed to improve tourism flows and shape tourism characteristics. This is particularly true for leisure and business tourism in urban areas. The availability of high-speed rail connections, the frequency of the services, and the reduced journey times are relevant transport factors whose relationship to tourism are worthy of investigation. In the literature, the impact of high-speed rail on tourism has been explored using qualitative methods and statistical models. In the latter, the relationship is usually studied based on the presence of high-speed railway stations or the frequency of the services. Little empirical analysis has been focused on the reduced journey times as a measure of accessibility. This paper presents an empirical analysis of the impact that the improved accessibility of major Italian locations served by the high-speed railway has had on tourism flows, and on specific aspects of tourism, such as length of stay. The applied methodology is based on the panel data approach, using both open official statistical data on the tourism supply and demand and railway market data. An accessibility indicator based on journey times is used for measuring high speed rail accessibility.

Keywords Tourism • Accessibility • High Speed Rail • Italy

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Wider Effects of Railways: The Palermo–Catania High-Speed Line, Italy



Chiara Chinzari, Enrico Cieri, Mara Radicioni, Sarah Ravà, Michele Cerullo, and Mario Tartaglia

Abstract Wider Effects are impacts that the realisation of new infrastructures have on the development of the economic and social framework.

In Italy, the evaluation of railway investments is governed by the guidelines entitled “Linee guida per la valutazione degli investimenti in opere pubbliche”, published by the Ministry of Infrastructure and Transport (2017). In this context, the main methodology used to measure the soundness of an investment is cost–benefit analysis, which focuses on the transport benefits generated by the project, such as travel time, fuel and operating cost savings, environmental benefits, and so on.

The guidelines consider wider effects that go beyond the impacts analysed by the CBA, which, although not recognised as key elements in the investment decision-making process, are nevertheless seen as essential community benefits.

These latter effects can be estimated through the interaction between the transportation infrastructure and the territory.

In particular, the guidelines define the indirect wider impacts of transport investment as those arising from other macroeconomic sectors and different markets that might result from a new transport supply (e.g. impacts on employment, international trade, demographic developments, and so on). It is well known that these impacts are extremely important, and can significantly influence the social return on an investment, especially in times of crisis.

In order to estimate the indirect macroeconomic effects, it is possible to construct a model based on relationships between sectors, at the national (or regional) scale. This model measures the economic impacts (i.e. on labour market supply and demand, imports and exports, trade, productivity, etc.), based on the effects (both short/medium term, related to increased expenditure during the construction phase, and long term, linked to a change in accessibility and transport costs) resulting from the use of the new transport infrastructure.

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