Efficiency, Productivity and Regional Impact of Transport Infrastructure Systems in Portugal

Summary

The transport infrastructure network is a central element of any economic system, and it can be a lever for development and competitiveness. The transport system facilitates labour mobility and employers' access to job exchanges and sources of geographically dispersed raw materials. Conversely, it also ensures the distribution of produced goods and access to geographically distant markets and consumers. The (good) functioning of this system is even more critical in a country like Portugal, whose geographical position is far from Europe's economic-financial centre of gravity and, as such, it needs an effective and efficient system to support export activities.

The investment and development of the transport infrastructure network in Portugal has varied according to different public policies and strategies. Some examples of these strategies include decisions to increase or decrease investment; to increase or decrease the supply of the system; to grant parts of the system to the private sector or to maintain public management; among others. It is imperative to understand the effects of public policies related to the transport infrastructure sector, but, above all, to establish a culture of evaluation, transparency and reflection on decision options and their effects.

This project aims to provide an analytical perspective on the efficiency of the sector and contribute to the understanding of the dynamics of the efficiency levels, and the respective influence of political and economic variables. In this regard, the last two decades provide an interesting academic case study, given the variability of economic dynamics (contraction and growth) and the 2008 financial crisis, along with the Troika intervention. From a policy-making perspective, this was also the period when a number of organizational decisions were made (privatizations, mergers, concessions, etc.). It is an important policy analysis contribution to understanding the impact of such decisions on efficiency levels, both operational and economic. The study also addressed the impact of the transportation system on the economy, particularly, on productivity. It intended to grasp the relationship between accessibility and productivity by using a spatial model accounting for spillover effects.

Despite the central role of the transportation system as an enabler of economic, social and environmental development in the country, there is a fundamental lack of data and of a monitoring & assessment strategy that provides data and analysis to enable a data-oriented policy. Taking into account the increasing complexity and interconnectivity of the different systems, it is necessary to continually evaluate the levels of performance, efficiency and impact of the transportation system.

The first part of this research provided a novel perspective on the evolution of the efficiency of the transportation systems in Portugal and, for the first time, a quantitative analysis of public policy options regarding the organization and management of the system. The ex-post evaluation of public policy options is a fundamental requisite for good public governance. Over the last 20 years and, in particular, over the last decade, the transportation system, in its various components, has experienced fundamental changes regarding ownership models, regulation, managerial and strategic decisions, etc. Unfortunately, policy decisions are made considering a number of objectives (generally qualitative) that are rarely verified and assessed. The first part of this research focuses precisely on the evaluation, from an efficiency perspective, of the system, and on the main policy changes that have occurred. It is important to mention that we have used other "lenses" apart from efficiency. An additional perspective is the impact analysis, and the authors of this study have focused on a specific aspect – productivity. Again, this could have been followed by other approaches, and we hope that this study, and the information it provides, can stimulate further studies and the development an ex-post evaluation of the main policies. Over the next few paragraphs, we present and discuss the main conclusions and policy implications of our research study.

The second part focused on the effects of productivity and accessibility. The project has analysed the spatial impact on productivity. Rather than a detailed study on productivity determinants, the project intended to analyse the potential (as)symmetries that the development of the transportation system has developed.

This study had the advantage of considering physical measures of accessibility, rather than investment (as many previous studies have done). The use of investment metrics (overall investment, investment growth, or even infrastructure capital stock) is based on the assumption that higher investment will enable proportionally greater accessibility and mobility. This is not necessarily the case. The average cost per kilometre of transportation infrastructure (road or railway) can change significantly based on the physical characteristics of the region. Therefore, a particular region may benefit from a high level of investment without a necessary proportional improvement in accessibility, or, put differently, the elasticity of accessibility in relation

to investment may be different. Another important factor is related to the overall quality and efficiency of projects. By quality one means the fit between the infrastructure and the demand it serves.

Our results show that accessibility matters, but not just any kind of accessibility. Accessibility was measured through a number of indicators. In terms of road geographic accessibility, the 2019 analysis on Portuguese NUTS 3 indicates that the Metropolitan Area of Oporto (AM do Porto) has the best accessibility and displays the highest increase between 1986 and 2019, with an increase of 29.7. The regions with the lowest roadway geographic accessibility in 2019 were Terras de Trás-os-Montes and the Algarve. Both regions are located near Portuguese borders and, for that reason, the number of long trips between these regions to others is higher than in other regions, which results in decreased accessibility level. Although the Baixo Alentejo region is not the one ranked with the lowest accessibility, it has the smallest historical absolute variation.

On average, road travel times have decreased overall for the road system, as a result of substantial investment in road stock since the 1990s. There was a clear political priority to invest in the development of the road system, particularly in highways. Rail accessibility has displayed a different behaviour. Due to the overall decrease and disinvestment on the network, several regions exhibit an increase in rail travel times. In fact, rail-related variables offer little contribution to the understanding of productivity.

The results show that transportation variables have a high correlation with productivity, although road-related variables are predominant, as are distances to ports and seaports, these latter probably related to proximity to the coast. Railway variables are absent. The analysis showed that sinuosidade, vel_reta and acess_viaria are the only variables that displayed stronger correlation with apparent labour productivity. Furthermore, the analysis has shown that there are relevant spillover effects to take into account when analysing productivity, particularly in the Área Metropolitana de Lisboa.
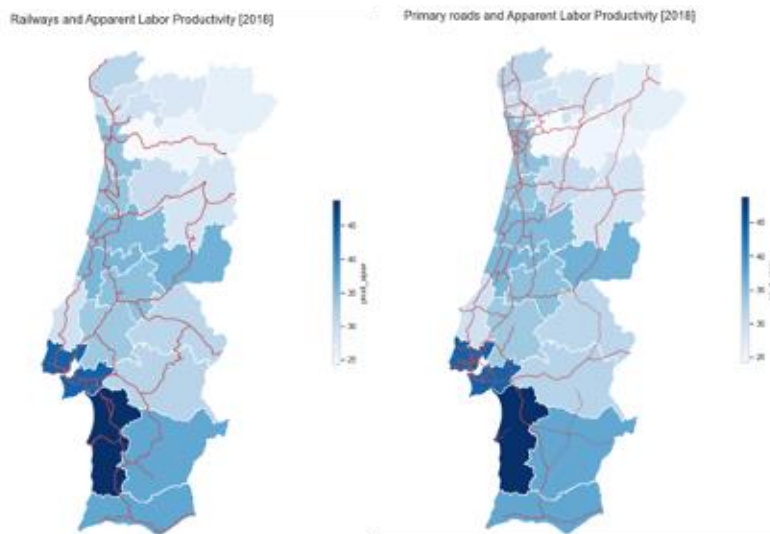

Figure 1. Spatial distribution of primary roads (right) and railway networks (left) and labor productivity.