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High-speed rail and office location choices. A stated choice experiment for the Netherlands

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ABSTRACT

High-speed rail is seen as a factor contributing to the attractiveness of a location for economic activities. This paper focuses on how the level-of-service characteristics of railway stations, and in particular the presence of high-speed train services, influence the attractiveness of locations for specific types of offices. The results are presented for a stated choice experiment for location choices of offices in the Netherlands. It is concluded that the availability of high-speed train services contributes to the attractiveness of a location for offices. For internationally-oriented offices the areas around stations with international high-speed train services are attractive because of their good international accessibility. We also found an indication that high-speed train services can raise the status of an office site. In the Netherlands, the domestic high-speed train services are less relevant for location choices, because of the small domestic distances. Besides high-speed train services, other location characteristics that determine how well a site is connected to the railway network are also found to be important for location choices. Thereby differences between offices occur, which can partly be explained by the number of trips to/from an office.

1. Introduction

The European high-speed railway (HSR) network is expanding to become an extensive network interconnecting the major Western-European agglomerations. Also in the Netherlands new HSR lines are being developed for both domestic and international passenger transport. This has resulted in an increased interest in the appraisal of new railway infrastructure. Thereby special attention is given to the indirect effects of the infrastructure, particularly spatial-economic effects. Several studies (e.g. Sands, 1993) suggest that a large part of the high-speed train's spatial-economic effect takes place at a regional scale, due to the relocation of economic activities already present in the region. This strengthens the case for studying the location of firms and institutions at this spatial scale.

However, empirical researches that study the impact of railway infrastructure on the location choices of firms and institutions at a regional level often deal with the railway infrastructure in a rather crude way, by only considering the presence of a railway station within a certain proximity. We argue that not only the presence of a railway station but also the 'level-of-service' provided by the station is of importance. The term 'level-of-service' comprises many aspects of the train services, such as the frequency and type of services. Furthermore, most quantitative empirical research gives little detail about the characteristics of the firms and institutions. Typically segmentation takes place on the basis of the branch of industry. However, other characteristics might be just as important for decision-makers rating the different facets of a location's accessibility. For example, a firm or institution's spatial orientation (the spatial extent of its target market) and the number of visits made to and from the location may also be important factors.

The current paper focuses on whether and how the level-of-service of railway stations, and in particular the presence of high-speed train (HST) services, has an effect on the office location preferences of firms and institutions. The paper addresses this question by presenting the results of a stated choice experiment that includes respondent heterogeneity and interaction effects. An innovative element thereby is that we include both commuting and business trips. As a result, it was possible to study how these trip motives related to the importance of accessibility for an office's location choice.

The study area of the research is the highly urbanized Randstad region in the Netherlands (see Fig. 1). It was only in September 2009 that the first domestic HST services in the Netherlands using HSR track came into use, and even that service uses some conventional track. At the time of doing the empirical research for this paper, the HSR services used only conventional track. At this point these services were still rather infrequent and did not yet significantly improve travel times within the Netherlands. Therefore the study has the character of an ex ante research. Current HST

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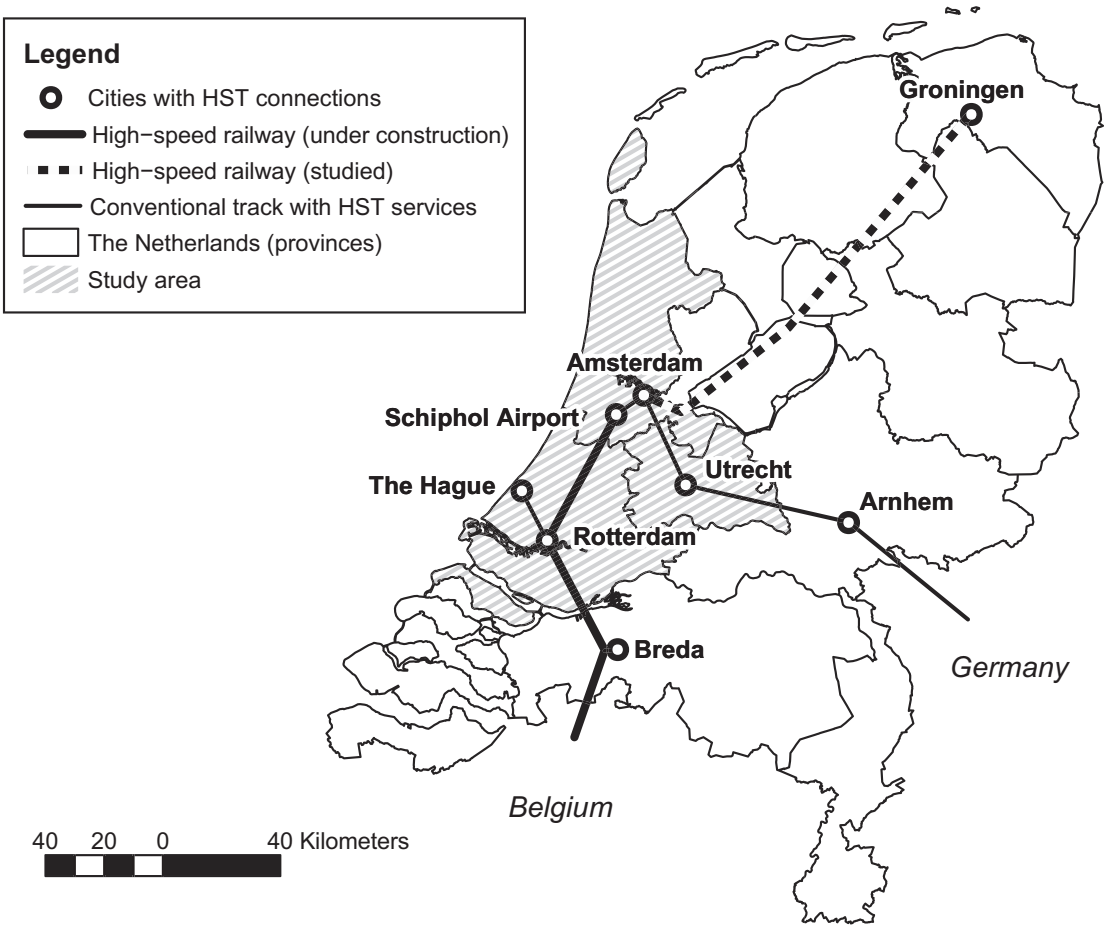

Fig. 1. Location study area within the Netherlands and HSR-lines.

connections in the Netherlands are the Amsterdam–Rotterdam–Brussels–Paris service and the Amsterdam–Arnhem–Cologne–Frankfurt service. For the first service new high-speed infrastructure has been built. Furthermore a new HSR line between Amsterdam and Groningen in the North of the Netherlands has been under discussion for more than a decade, but the current policy is to not construct it.

The rest of this paper is organised as follows. The next section describes how (high-speed) railways can influence the spatial configuration of economic activities, with an emphasis on the regional scale. Section 3 describes the stated choice experiment. The results of the stated choice model are then presented in Section 4. In this Section we discuss how the implementation of HSR in the Netherlands might influence the attractiveness of locations for different types of offices. Finally, Section 5 sets out some concluding remarks.

2. High-speed rail, accessibility and spatial-economic development

In order to understand how changes in the transport system can impact on the spatial configuration of economic activities the concept of accessibility is important: accessibility can influence the location of economic activities. This section discusses the literature focusing on the relevance of HSR accessibility for location choices.

2.1. Accessibility impact on the location of economic activities

Transport infrastructure can influence the location of economic activities because of its impact on the accessibility of locations. A location's accessibility is thereby seen as the ease with which other relevant locations can be reached from this location (and vice versa) via the transport system. A high level of accessibility makes a location more attractive for offices. In the context of location choices, two different forms of accessibility are relevant: centrality and connectivity.

Centrality is concerned with how a potential location is situated within a transport network relative to possible origins and destinations. Usually, an impedance function is applied, making origins and destinations further away weigh less than those near by. Several authors have analysed the impact of HSR in Europe using centrality indicators, including Bruinsma and Rietveld (1993), Spiekermann and Wegener (1996), Gutiérrez et al. (1996) and Gutiérrez (2001). In general, these studies show differences in accessibility *between* regions rather than *within* regions. Where impedance functions are used, steeper impedance functions generally lead to more variation on a lower spatial scale.

The connectivity of a location, on the other hand, relates to how well this location is connected to a certain transport network. Connectivity is normally based on transport nodes, such as a railway station, an airport or a motorway access ramp. A distinction can be made between access (mainly: distance, travel time) to the nearest transport node only versus the quality of this transport node, the latter being the level-of-service in the case of a railway station. Compared to the centrality indicators, connectivity indicators show more variation at smaller spatial scales. Therefore these indicators are better suited to studying the differences in location attractiveness within a region, whereas centrality indicators give more information on the economic potential of a region as a whole. For HSR the presence or absence of a station with HST services is