



## Market area of intermodal rail-road container terminals embedded in a hub-and-spoke network\*

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**Abstract.** This paper presents a methodology able to compare road and rail-road intermodal market areas that takes the network structures, the operation costs and the location of the rail-road terminals into account. A particular way to model rail-road transport on hub-and-spoke networks is outlined and illustrated on the trans-European networks. The market area of an optimal eight hubs network configuration is presented both for the  $p$ -hub median and the  $p$ -hub centre problem. This is followed by a discussion about the evolution of the market area according to the number and locations of the implemented hubs.

**JEL classification:** R48

**Key words:** Market area, terminals, hub-and-spoke, intermodal, transport

### 1 Introduction

One of the objectives of the European Common Policy for freight transport is to restore the balance between modes and to develop intermodality. However, the structures of the modal networks and the operation costs are not similar. Consequently, the market areas can be very different from mode to mode. Among the various types of intermodal transports, Niérat (1997) compared road and rail-road intermodal transport and identified the market area of container terminals, and was so able to define the zones for which each mode is the most competitive.

This paper is focused on the market area of intermodal rail-road container terminals embedded in a hub-and-spoke network. These terminals will further be referred to as hubs. In some circumstances, this kind of network topology can indeed reduce transportation costs by consolidating shipments at the hubs. The market area of these terminals can be determined by means of a comparison of the road only transport and the rail-road intermodal transport costs.

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