Paving the Way: Investigating the Impact of High-Speed Rail Connectivity and Information Connectivity on Industrial Transfer Between Cities from A Perspective of Multiple Factor Flows

Topic: Regional Input-output Modelling (2)
Author: Shan Wei
Co-Authors: Xiuting Li, Shuqin Liu

Abstract: Under the strategy of building a strong transportation nation, infrastructure exemplified by the high-speed rail (HSR) network has emerged as a fundamental component of physical connectivity between urban centers. Furthermore, advancements in digital technology and the widespread adoption of the Internet have facilitated virtual connections among cities, enabling a significant transition from "delayed" to "real-time" information exchange. As essential conduits for intercity connectivity, both high-speed rail (HSR) and information networks play a crucial role in overcoming spatiotemporal barriers to the flow of factors. This, in turn, facilitates efficient industrial transfer in the digital age.

This study aims to investigate the impact of high-speed rail connectivity and information connectivity on industrial transfer between cities from a perspective of multiple factor flows. Based on the intercity input-output tables of China, socio-economic data, and Baidu search data of prefecture-level cities from 2012, 2015, and 2017, this study employs network analysis methods to measure the strength of HSR connectivity (traditional factors) and information connectivity (new factors) between cities. Furthermore, it identifies the spatiotemporal characteristics of intercity industrial transfer based on intercity input-output data. A panel model is subsequently employed to examine the driving effects and mechanisms associated with multiple factor interactions influencing intercity industrial transfer.

The findings reveal that industrial transfer has exhibited new characteristics such as diversified directions, high-end orientations, interconnected patterns, and integrated collaboration. Intercity connectivity, whether enabled by HSR or information networks, can enhance the scale of intercity industrial transfers. HSR connectivity facilitates smoother channels for factor flows, thereby enabling the cross-regional transfer of factors such as labor and capital. This dynamic makes the transfer of capital-intensive and labor-intensive industries between cities more active. Furthermore, information connectivity optimizes the mechanism for factor sharing and promotes the cross-regional co-creation of technological resources, thus facilitating the transfer of technology-intensive industries among cities, a process further enhanced by advancements in the digital economy. The interplay between HSR connectivity and information connectivity can improve resource allocation efficiency while generating a synergistic effect on intercity industrial transfers. Further research categorizing industrial transfer into two patterns, â€œpolarizationâ€• and â€œdiffusionâ€•, based on the industrial gradient advantages of each city, indicates that the driving effects of high-speed rail (HSR) connectivity and network connectivity on industrial transfers vary with industry type, transfer pattern, and the spatial relationships between cities.

Unlike previous studies that primarily focus on the single-type connectivity, single-factor flow mechanisms and unidirectional industrial transfers between cities, this study adopts a perspective of multiple factor flows that encompasses both traditional and emerging factors to analyze the economic effects of intercity connectivity within the framework of domestic circulation. It investigates the synergistic effects of traffic connectivity and information connectivity, distinguishing between two types of factor flows: "transfer-based" and "shared." Furthermore, it identifies bidirectional industrial transfers among cities and categorizes them into two patterns, â€œpolarizationâ€• and â€œdiffusionâ€•, from the standpoint of industrial gradient advantages. This study deepens our understanding of the economic implications of intercity connectivity as well as the collaborative mechanisms underlying industrial transfer.

Moreover, this study offers a solid theoretical basis for building the "enclave economy" pattern,

clarifies the feasibility and potential advantages of this pattern across varying levels of intercity connectivity, and provides scientific guidance for the cross-regional cooperation between the industrial transfer-out and transfer-in areas. By thoroughly analyzing the mechanism of multiple factor flows driving intercity industrial transfer, the study provides theoretical support for improving the orderly transfer and collaboration mechanism within industries, contributing to breaking regional barriers and achieving optimal resource allocation. Meanwhile, the study also provides a scientific basis for optimizing the industrial layout, helping policy makers to formulate more reasonable industrial layout plans based on the characteristics of intercity factor flows, and promoting coordinated regional economic development.

Keywords: Intercity connectivity; High-speed rail connectivity; Information connectivity; Industrial transfer; Factor flows; Input-output analysis