

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Transportation Research Part A

journal homepage: www.elsevier.com/locate/tra

Does growth follow the rail? The potential impact of high-speed rail on the economic geography of China

Mi Diao

Department of Real Estate, National University of Singapore, Singapore



ARTICLE INFO

Keywords:

High-speed rail
 Accessibility
 Fixed asset investment
 Economic geography
 China

ABSTRACT

The rapidly expanding high-speed rail (HSR) network in China has produced and will continue to produce a progressive contraction of space by significantly shortening the rail travel time among major Chinese cities. Does economic growth follow the extension of HSR as a result of improved accessibility? This study investigates the impact of HSR on the economic geography of China. We find that HSR has improved the accessibility (as measured by weighted average travel time) of Chinese cities by 12.11% at the national level from 2009 to 2013. However, the accessibility benefit of HSR is not distributed evenly over space. Cities in the wealthy eastern region and with HSR access enjoy higher accessibility benefit compared with cities in the hinterland and without direct HSR access. Using a difference-in-differences analysis and an instrumental variable strategy to address the non-random placement of HSR stations, we also find that on average, HSR cities have experienced a significant increase in fixed asset investment after the inauguration of HSR service, which could stimulate future economic growth. The treatment effect of HSR on investment varies with city size. Second-tier cities with relatively large population bases benefit more from HSR in attracting investment compared with small cities and mega cities, which could experience marginal or negative investment growth.

1. Introduction

China's economy has experienced dramatic growth in the last three decades, accompanied by rapid urbanization process. In an attempt to meet the increasing demand for inter-city travel and promote economic growth, the Chinese State Council approved the "Mid-to-Long Term Railway Network Plan" in 2004 to connect major cities across the country with bullet trains. The plan sets the target at a total of 100,000 kilometer (km) of railroads by the year 2020, of which 12,000 km will be high-speed rail (HSR) lines with an operating speed of 200 km per hour (km/h) and faster.¹ HSR construction in China has accelerated since 2008, in part because of the aggressive fiscal policies to stimulate economy in response to the global economic recession. The target set by the plan was revised upward to 120,000 km of railroads by 2020, of which 16,000 km will be HSR lines.² It is estimated that the total investment on the HSR system during the 12th five-year plan of China (2011–2015) only was over 1.8 trillion RMB Yuan (approximately 300 billion US Dollars).³ With the ongoing HSR construction projects, China already has the longest HSR network in the world, which is more than the rest of the world's HSR tracks combined.⁴ China is now making even more ambitious plans to extend the HSR

E-mail address: rstdm@nus.edu.sg.

¹ State Council, 2004, http://www.gov.cn/ztl/2005-09/16/content_64413.htm.

² State Council, 2008, http://www.nra.gov.cn/zggstl/wggstlghqk/2008/201312/t20131227_4084.html.

³ <http://finance.sina.com.cn/roll/20110121/23069293769.shtml>.

⁴ Official website of the Central Government of China, http://www.gov.cn/xinwen/2016-09/10/content_5107333.htm.

network to reach Europe as well as Singapore.⁵ Fig. 1(a) plots the proposed national grid of passenger-dedicated lines (PDL), which forms the skeleton of the HSR network in China.

The expansion of HSR network has produced and will continue to produce a progressive contraction of space by significantly improving the accessibility by rail among major Chinese cities (Zhu et al., 2016). For example, the travel time between Beijing and Shanghai has been shortened from approximately 10 h with the conventional rail service to 4.5 h with the Beijing-Shanghai HSR line. Despite the measurable gains in rail travel time across cities, whether and to what extent the huge investment in HSR can stimulate economic growth and reshape the economic geography of China is still unclear.

Transport infrastructure is often considered a key to promote economic growth and development by reducing the time cost of travel and shipping. There is a rich body of literature that investigates the relationship between transport infrastructure investment and various aspects of economic development, for example, long term GDP effects (Banerjee et al., 2012; Faber, 2013; Qin, 2017), gains from trade (Donaldson, 2018), agricultural land value (Donaldson and Hornbeck, 2013), real estate price (Zheng and Kahn, 2013; Diao et al., 2017b), skill premium in local markets (Michaels, 2008), employment (Duranton and Turner, 2012), population growth and urbanization (Atach et al., 2010), and suburbanization and urban form (Baum-Snow, 2007; Baum-Snow et al., 2012; Zhu and Diao, 2016). These studies mainly investigate two fundamental issues. The first major concern is on the causality between transport infrastructure investment and economic growth: does transport infrastructure investment induce or follow economic growth? The second issue is concerned with the distributional effects of transport infrastructure investment: does the subsequent transportation cost reduction lead to the diffusion of economic activities to peripheral regions, or does it reinforce the concentration of production in existing urban centers? The empirical work has mainly focused on assessing the economic impacts of the railway network (Atach et al., 2010; Donaldson and Hornbeck, 2013) and the interstate highway system (Baum-Snow, 2007; Michaels, 2008) in the United States, the railway and highway networks in modern China (Banerjee et al., 2012; Baum-Snow et al., 2012; Faber, 2013; Qin, 2017), the railway network in colonial India (Donaldson, 2018) or the intra-city rail transit systems in cities all over the world (Diao, 2015; Diao et al., 2017b).

As an important transport innovation, HSR differs from conventional modes of transport such as highways and conventional railroads in multiple ways, for example, the high construction cost, the high operating speed, and almost exclusively for passenger transport. In the meantime, due to its considerable contribution to accessibility, HSR is likely to have significant implications for nurturing development and driving population agglomeration and urban growth like other transport modes. However, empirical knowledge on the relationship between HSR and economic growth is still limited. In Japan, regions served by the Shinkansen achieved higher growth rates than those without direct Shinkansen service (Sands, 1993), but the impacts exclusively attributable to the presence of the Shinkansen are hard to identify because of the many other confounding factors that could have stimulated economic growth in the region (Givoni, 2006). In France, although the introduction of Train a Grande Vitesse (TGV) services between Paris and Lyon led to significant transport benefits, its economic impacts vary across cities (Banister and Berechman, 2000).

The very recent upsurge of HSR in China offers us an empirical setting to examine the spatial-temporal change because of an extensive HSR network developed over a relatively short time span, and to explore how transportation infrastructure investment will influence the growth of Chinese cities and reshape the economic geography of China. An increasing number of studies have examined the potential impact of HSR in China in multiple aspects, including accessibility (e.g., Shaw et al., 2014; Jiao et al., 2014), regional development (Zhu et al., 2016; Chen and Haynes, 2017), and real estate market (Zheng and Kahn, 2013; Diao et al., 2017a). Shaw et al. (2014), Jiao et al. (2014), and Zhu et al. (2016) find that the HSR could lead to substantial improvement in accessibility for Chinese cities. However, the accessibility benefit of HSR is not distributed evenly over space, thus increasing the inequality between different regions, between cities with different sizes, and between cities with different accessibility levels to HSR stations. HSR could affect real estate markets through facilitating market integration and urban development. At the regional scale, Zheng and Kahn (2013) find that HSR is associated with rising real estate prices in secondary cities connected by HSR, as HSR enables households and firms to enjoy the agglomeration economy of mega city without having to living within its boundary. At the city scale, Diao et al. (2017a) find that intra-city access to inter-city transport nodes such as HSR stations could translate into a price premium in the real estate market, but this premium is affected by the connection between the station and the city. Salzberg et al. (2013) assess the economic development benefit resulting from larger and better connected markets in four cities along a newly-constructed HSR line and find that it is of the same order as the direct transport benefits.

These studies provide important insights into the potential role of HSR in the development of Chinese cities. However, research on how HSR will reshape the economic geography of China while addressing the causality issue and the distributional effect issue in the literature is still limited. This study aims to contribute to the literature on transport infrastructure investment and China's economic growth by: (1) estimating the accessibility gain in China in recent years due to the construction of HSR; (2) assessing the potential impact of HSR on the economic growth of Chinese cities resulting from the changes in accessibility through the channel of fixed asset investment (FAI); and (3) exploring the distributional effects of HSR investment among Chinese cities.

Utilizing a unique dataset, the national train schedules of China at a number of points of time between 2009 and 2013, we construct accessibility measures to quantify the rail accessibility in all prefecture-level Chinese cities connected by railways. We find that the ongoing construction of HSR network has significantly changed the spatial-temporal distance of the country by greatly improving the inter-city accessibility for the connected cities. The weighted average travel time (WATT) by rail in prefecture-level Chinese cities, on average, was reduced by 12.11% from 2009 to 2013. However, the accessibility gain is distributed unevenly in the country. HSR cities experienced higher accessibility gains compared with non-HSR cities and the wealthy eastern region benefited

⁵ Source: A Closer Look at the Chinese High Speed Rail Juggernaut: The Chinese closer to Elon Musk's Hyperloop than the US. Forbes, August 4th, 2014.

Download English Version:

<https://daneshyari.com/en/article/6780140>

Download Persian Version:

<https://daneshyari.com/article/6780140>

[Daneshyari.com](https://daneshyari.com)