

Effect of high speed rail on regional development in China--Based on spatial transaction cost

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Abstract: Since 2008, the first standard of high speed railway- Opening of Beijing-Tianjin intercity railway, China's high-speed railway (HSR) construction entered the stage of rapid development. HSR as a modern form of transport with reducing space transaction cost, compressing space and time distance and other positive effects. With the opening of high-speed rail, large flow of people, goods, information flow in the regional space agglomeration and diffusion, reconstruction of spatial patterns in the region. Based on spatial transaction cost, by analyzing the mechanism of HSR on regional and social development to explore the improvement of social welfare and the hinterland economy. Also explains the negative effects generated by the HSR operating, with a view to fully and accurately reveal high speed rail on regional development impact.

Keywords: HSR, regional development, spatial transaction cost, social welfare, economic hinterland, the siphon effect.

INTRODUCTION

Along with China's rapid economic and social development, industrialization, urbanization and the integration of information technology, the city stock exchange, as well as transport new requirements. Four vertical and four horizontal rail strategy is to adapt to the rapid economic development in the new normal. By high-speed rail in China: by region into the overall, good for the country, overall coordination development of eastern, middle and Western. With high-speed mass building, studying its effects on interregional mechanism is particularly necessary, can not only provide theoretical support for regional development, but also provide the basis for policy makers to make scientific judgment, improve the efficiency of decision-making.

DOMESTIC HIGH-SPEED RAILWAY STUDY FOCUSED ON

10 Years, with the rapid development of high-speed rail in China. Trains operating on the economic, social and cultural life of our country and other areas have had a significant impact; study high-speed rail generated by the positive and negative effects to better guide the construction of high-speed rail has great practical significance.



Fig-1: Four vertical and four horizontal rail strategy
Source: China Transportation and Communications Yearbooks, China Railway Yearbooks, and Planning & Statistics Department of CRC

Currently the academic impact of high-speed rail is more concentrated in the urban, economic, regional, and even national level research. Like Yin Bing, LvChengwen, Chen Zhao from the viewpoint of Spatial Economics analyzes the effects of urban development along the railway, elaboration of Beijing-Tianjin Intercity opening year, along the region's urban population distribution, mobility of factors of production, industrial distribution, such as a series of changes, reveal the important role of high-speed railway in China's urbanization process [1]. Dai Shuai, and

Cheng Nan believe that high-speed rail is a effective way to solve the problem of heavy passenger rapid transit, driving along, and the development and evolvement of the spatial structure of the city plays an important role. High-speed rail can for along city of traffic location, and space layout and industry structure brings obviously changes, on city competitiveness of effect exists zoom law, its along city of traffic development strategy needed focus consider supporting, and mining and more mode traffic integration, various type city needed play itself Professional Division advantage, change original city development mode, and can prompted itself produced strong development power of factors phase combined, right adjustment and developed city development strategy[2] Luo Ling using the theory of regional economy, transport and economy, and learn the experience of urbanization in developed and, the system analyzes the impact of high-speed railway construction on urban development. He believes that high-speed rail on the accelerating process of urbanization, cities and towns along economies of scale expansion, TOD -oriented town development and reconstruction of the urban pattern has important influence [3]. Jiang Xiulan, Liu Jinfang, and Zhu Tao XING believe that transportation for urban competitiveness upgrading and urban integration plays an important role in the urban agglomeration. Analyzing traffic from the relations between urban competitiveness and urban agglomerations, combined with the empirical analysis of Beijing-Tianjin-Hebei urban agglomeration competitiveness, that high-speed rail network to form urban fusion, will inject new vitality into the cities in the region, formed a new round of resource integration, improve the competitiveness of Beijing-Tianjin-Hebei urban agglomeration. Of course there are also scholars from sociology analysis of high-speed impact on society in terms of [4]. As Zhu Qiu poems from high-speed rail bus of times of social network restructuring phenomenon (based on Shanghai Ning high-speed corridor area of typical research) starting, analysis has high-speed rail times of comes, greatly upgrade has the city and urban and rural Zhijian of people, and logistics, and funds flow, and flow and technology flow, elements of flow strength, and speed, and promoted elements of relationship network in across city regional of space scale occurred restructuring, gave birth to has "migratory birds family", and "pendulum family "And a number of typical groups [5]. These scholars mainly from the perspective of geographic entity--and fewer scholars from the angle of transaction cost of space to study the effects of high-speed rail, so I will start from this point, its economic and social impact.

FROM THE PERSPECTIVE OF TRANSACTION COST OF SPACE OF HSR

Transaction cost concept is the core of the new institutional economics. Space transaction costs refer to spatial or spatial factors acting on the transactions costs incurred [6]. Transaction costs are Kos as "costs of using the price mechanism", including the use of market mechanisms to obtain information, negotiation and ongoing contracts and other expenses. Effect of high-speed space transaction costs including transport costs, time costs, information costs, social costs of four aspects.

The cost of transportation-It refers

- To as the distances between the different regions of space or the cost of moving in space. Because of the existence of distance in space, various exchanges and economic cooperation between the two places must rely on transport, flow; logistics movement depends on a certain amount of traffic, transport costs generated by this concept. Guangdong Railway Administration disclosed last year from Guangzhou to Changsha, using car transport costs of about 0.3-0.4/kg, the cost of air transport is used about 2 Yuan/ kg, and rail transportation costs for 1.5/Kg, cost lower than that of air 25%.Data shows that domestic express mail shipping 80% were transported by steam, 15% air, relying on the railways and other forms of less than 5%, which leads to high logistics costs and consumers ' interests. So, high-speed rail network improvement and more connected to the national rail network will show the power of high speed rail in the logistics industry to reduce transportation costs, so as to lay a solid foundation for healthy and rapid development of the logistics industry. Not only that, due to the opening of the high-speed rail, you can split a large amount of traffic, making space for freight rail transport, thereby indirectly facilitating goods transport cost reductions. In addition to the cost benefits, but rail traffic advantages are obvious. According to initial projections, a rail carriage of cargo capacity equal to a Boeing 737 aircraft carrying capacity, and a high-speed at least 6 above the carriage, a train can transport of goods far above the plane, this unit transport costs will be greatly reduced.

Time costs

- It is due to HSR time reduction per unit distance, regional accessibility improved, reducing passengers (business people, time is more valuable) time. Characteristics of high-speed railway services determine the direction of its lead role in the development of an area.

High-speed rail closest distance is about 500 to 600 kilometers; the best time is 2 to 3 hours. Japan construction the first Shinkansen from Tokyo to Osaka line, about 550 km; France is the first line from Paris to Lyon line, about 500 km. 2 hours is the business day (day return) the most appropriate time. High speed railway station on the city's impact is mainly business passengers, caused by urban growth in business activity, which derives support functions such as retail, leisure and entertainment. Japan Shinkansen to strengthen coastal industrial zone in three connections, through significant economic corridor, to alleviate traffic pressure [7]. As table 1 shows the best traveling business time.

Table-1: Shows the best traveling business time.

High-speed running time	Business travel market share
Less than 2 hours	More than 90%
2-3hours	50%
3-6hours	Less than 30%

Source: Ministry of transport Union real estate

Table-1 clearly reflects the importance of high-speed rail business, shortening the distance between the two places, significantly reducing business costs, while many potential business activity benefited from the opening of the high-speed rail may be multiplied, thus promoting interaction between the different regions, further enhancing the level of regional development. France Statistics Department data showed that all high-speed lines accessible places, commercial centers and residential centers have been significant development, real estate prices are also rising rapidly. The two cities or regions more passengers of high-speed trains between 7% and its economic and social interactions will increase 14%.

- The cost of information. Information and physical assets, human assets, technology, knowledge and financial resources, have become essential factors of production in economic development. Information cost refers to the cost of access to information resources, the price contains the search information takes costs, including the cost of access to market information, analysis and processing of market information, finding the cost of trading costs, each transaction and the market price of the negotiation and contract costs, bargaining and other expenses. It is because of the emergence of high-speed railway, from the distance between the space and time zone closer to, and connectivity between regions, between accessibility

enhancements, personnel exchanges, the transfer and exchange of information between the costs significantly reduced, costs such as costs of searching for information would be greatly reduced. As mentioned above, cost reduction, can significantly reduce the information asymmetry caused by the lack of credit, fraud against commercial prosperity of the region, such as events, purifying the regional business investment environment, and further speed up the interaction between the two places, thus demonstrating more business ideas and thoughts.

IMPACT OF TRANSACTION COSTS OF INTERACTION BETWEEN REGIONAL

The completion of the high-speed railway, along the railway will greatly shorten the travel time between the cities, reduce the cost of travel between the cities, by industry and in particular the tertiary industry specialization changed the way urban expansion in the region. High speed railway along the flow of people, logistics and information exchange between acceleration, Division of functions between the cities also had adjustments, led to changes in urban structures in the region. In the 500~800km range, one-way 1~3 hour traffic from business trips and activities of the day, bringing together vast numbers of people from around the city to the Center, creating huge consumer demand and housing, transport and other consumer behavior to change the original layout of the city as a whole. Due to significant central city location, good economic and social foundations as well as the high level of resources gathered by the city itself makes central cities to produce a centripetal force. In Beijing and Tianjin, for example, because of the Beijing-Tianjin Intercity train only 30 minutes, so fast means of transportation between the two cities of Beijing and Tianjin's traffic rush hour commuter traffic into the city, railway transit operation, greatly reduce the cost of commuting between the two places. Talent, and technology, more of elements resources can in two a King City between shared, prompted originally with quality of of industry to differences of, and professional direction change, special makes Tianjin, and Langfang, to real estate industry, and logistics industry, and tourism, and catering, industry get great development, whole city space layout also by extension type expansion to high-speed rail along layout change (especially real estate, and catering, and exhibition industry, high-end services accelerated along its around distribution). Increase in State-owned enterprises to invest in Tianjin, Hebei, realized the advantages of regional economy, strong boost development of Bohai rim economic and social integration.

High-speed rail opening will have important implications for two regional economic hinterlands. The opening of the Beijing-Shanghai high-speed railway Bohai region and linking two of Yangtze River Delta economic circle to form a "dumbbell" shape of circulatory system. Around Bohai Sea area a large agglomeration of State-owned enterprises and foreign-funded companies and IT industry, the manufacturing industry is also in the national leading level, but compared with the Yangtze River Delta region, its prominent characteristics of resource-intensive and labour-intensive. And the Yangtze

River Delta is one of China's most dynamic economic regions, in the industrial base, technology, labor force quality, consumer demand and market potential of the leading advantages. Beijing-Shanghai high-speed railway will help economic growth pole of the two complement each other. As a national and even global financial and commercial center of Shanghai and the surrounding our economic hinterland, the Yangtze River Delta area has become an international multinational companies, private enterprises, the central gathering place of the giant, foreign-distribution center in the Yangtze River basin, fostering advanced manufacturing, high-tech and service industries. Beijing-Shanghai high-speed railway will be vast economic hinterland connecting two large areas, on

both sides of the economic flow in the hinterland will be activated in high-speed acceleration between the two major regional development potential, boosting its direction toward a higher.

PROMOTING REGIONAL SOCIAL WELFARE

Here we can break down the social welfare, including: improving the utility of consumers, urban accessibility of communication links with the outside world enhanced, due to improved regional conditions arising from investment and other spillover effects (land prices rise, city functions, grade promotion).

(1)Promotion of consumer utility

Utility theory belongs to an important chapter of the Western economics, he said: by buying products to satisfy the various demands of consumers, in order to achieve its own utility upgrade. Here passengers through the consumption of high speed rail mean the utility of self promotion. We make $U=f(x_1, x_2, x_3)-c$. Where u is consumer utility, x_1 time utility for consumers (produced by the high-speed trains greatly compressed time, reduce fatigue long distance by bus). X_2 that the increase is due to improved travelling environment environmental effects (high-speed rail as non-smoking trains are air-conditioned, vehicle environment has significantly improved comfort compared to the fast). X_3 for inner satisfaction or sense of vanity.

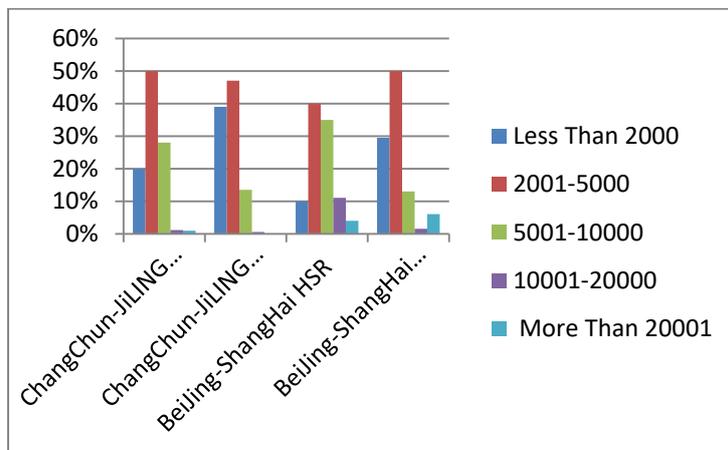


Fig-2: Visitors monthly income (Yuan)

Source: according to the World Bank's East Asia and Pacific area China and Mongolia sustainable development compiled

Information can be seen, nearly half of the passengers on the Beijing-Shanghai high-speed railway is in the higher income groups (> 5000), While high-speed rail is compared high grade of transport, such is easy let passengers produced a self superiority (around most are is in the produced class), to meet himself of vanity; then improve consumers of subjective utility; due to high-speed rail of fast transport capacity, makes in spring during a votes difficult seeking of status get obviously changed, makes more of consumers without

for tickets and worry; while with Yu automatically ticket machine and online booking means of using, consumers spent in queued tickets of time greatly reduced Its opportunity costs have significantly decreased, and improving the effectiveness of the objective of consumer and environment change, dramatic improvements in comfort, reduce the fatigue of the long journey, which significantly improve the consumer's utility. C the costs for consumers, compared with trains, high-speed rail costs more expensive. There

is a problem, consumers gained effect effects can offset the negative effects of due to the high cost, and data from Beijing-Shanghai high-speed railway, this assumption is tenable. All of our costs are converted into time costs; calculate the generalized cost of each mode of transport: there are four main mode of

transport between Tianjin and Qufu (car, bus, non-rail train, and rail). Generalized cost calculation, as shown in table 4, in time units. The generalized cost of high-speed rail can be found is the lowest. This way, you can see the total utility of consumers is increasing, social welfare is increasing.

Table-2: The generalized cost of each mode of transport

Traffic pattern	Distance (km)	Service times	In-car		In Qufu		In Tianjin		Total door to door		Penalty factor	General costs (minutes)
			Costs (RMB)	Time (in minutes)	Costs (RMB)	Time (in minutes)	Costs (RMB)	Time (in minutes)	Costs (RMB)	Time (in minutes)		
Car	448	999	194	384	3	15	0	30	200	474	-100	1471
Long-distance bus	448	2	132	420	0	10	5	45	142	530	-100	1828
General fast trains	448	1	75	408	5	30	5	45	95	558	86	1794
High speed train	448	5	199	120	3	23	5	45	215	256	0	1340

Source: the World Bank East Asia and Pacific area China and Mongolia sustainable development

- The accessibility of urban communication links with the outside world to enhance Accessibility (accessibility) Says people generally rely on the ease with which a vehicle moves to the destination. His values were directly depends on the mobility of people, and is closely related to the

improvement of mobility and transport. Hefei below to access time around a few central cities, for example, illustrates the construction of high-speed rail on the relationship of accessibility of contact with the outside world.

Table-3: the accessibility to nearby central city, Hefei city

Line	Before the completion of	When completed (200km/h)	When completed (350km/h)
Hefei —— Wuhan	4h12min	2h13min	No
Hefei —— Xuzhou	5h49min	No direct train	1h30min
Hefei —— Nanjing	2h14min	1h08min	No
Hefei —— Shanghai	7h01min	3h16min	2h48min
Hefei —— Beijing	13h27min	No direct train	4h02min
Hefei —— Fuzhou	20h32min	7h56min	Is expected to 3h

Source: China National Railway Corporation (part of the line has not been fully completed 350km/h Green, the fraction is the total distance divided by the train number. And do not include transfer time)

From the table 5 Clear line distance between the construction of the compression area, travel time dropped significantly improved and improving regional accessibility. Due to the opening of the high-speed rail will commute between the two places down to 4 hours, it will greatly enhance the expanded exchanges between the regional cities, and connectivity between cities will be greatly enhanced. Interregional travel time greatly compressed at the same time, traveler time utility to get a huge promotion, regional links between increased, residents living along the entire utility, social welfare is generally higher than non-residents living along the rail.

- Increasing House prices in cities along the

Some scholars believe that the completion of the high-speed rail will accelerate the migration, employment and economic growth, increased economic concentration in major cities, along the bidding cities.

In particular, the high-speed train stations around the city will attract urban population, population growth is the fundamental factor driving economic and housing market heating up; for construction high-speed rail, along city construction first was pull, built input using Hou, around industrial, and real estate, and wholesale retail industry will has accelerated performance, so construction process in the will produced temporary employment, operation will be gave birth to large related employment, especially business clothing and the real estate brokers industry, in high-speed rail along city in the, Big city and surrounding cities transportation accessibility improved, enhanced economic agglomeration effect in big cities. Therefore, in promoting the economic development of big cities, plus stronger; along the city's home prices have driven by high-speed rail, the node cities (Regional Center) is more obvious [8].

Some analysts believe that the real estate sector, the high-speed effect would have two possible results: one is the polarization of the central city, that is, growth poles Regional Centre for urban development, and promoting regional economic development; the second is the integration of the city, is composed of several large cities relatively compact and have close linkages. These metropolitan regions "powerful alliances" the formation of the urban, urban agglomeration on the region will play a major role in the development of [9].

Construction of the HSR railway may have negative impacts on regional development

Developing high-speed rail in China at the same time, we should sober sees high-speed rail as an important infrastructure of modern society, have an important role in promoting development in the region, but in the case of actual survey, we are still found in some areas in the years after high-speed rail opening,

the development speed and so far so good as we like. The main reason is that high-speed rail is a double-edged sword, while bringing development opportunities and good, it also brings certain risks and challenges. Foster a "sense of crisis" is to our proactive, anticipatory, carefully evaluate the negative effects, fully prepared, avoid being jilted the high-speed economic fast lane. Major risks and challenges in the following four aspects:

One is "siphonage effect". High-speed trains will speed up the free flow of resources, could make relatively under-developed area Resource Center City "sucks", resulting in large scale production elements flow to the first-tier cities, that's high-speed economy "siphonage effect". For example, Japan and France's high-speed rail is completed, the radiation RADIUS expansion of large cities such as Tokyo, Paris, development compacts in some smaller cities, and gradually marginalized situation [10].

Second is the "Hall effect". "Hall effect" refers to the flow of people, logistics, capital flow, information flow, only crossing the site, resources in the run over the track, did not bring real benefits to local phenomena. Hunan Zhuzhou city "Wuhan" opened, tourism has appeared cold and "useless" [8].

Third is the increased competition. High-speed rail between cities only "one step". It can be foreseen that sites bound to fire a high-speed rail between cities brought about by the limited resources of "race". Jinhua, Wenzhou and other developed areas have to build high-speed rail economy accumulated a certain amount of experience, and the city's "high-speed rail bonus" or face competition from these areas and crushing.

Four, causing congestion at the central city, due to agglomeration effects of the high-speed rail link in central city quickly emerged, along with the rapid population agglomeration, rapid growth in logistics, urban public services to meet the growing consumer demand for (the city's roads, car parking spaces, and so on), this will lead to "the big city" the emergence of urban jams, pollution, urban operating inefficiencies. To Beijing for cases, in Beijing Shanghai, and Beijing wide, and Beijing Qin, and Beijing-Tianjin inter, more article high iron repair pass Hou, Beijing foreign population rendering accelerated rose trend, certainly due to Beijing is China of capital, itself by has of resources on foreign population has powerful of attraction, but not denied, due to this several of high-speed rail opened Hou, spatio-temporal distance shortened, commuter cost declined, location conditions of further optimization, makes its on around range of

population produced more strong of attraction, population rendering accelerated gathered phenomenon.

CONCLUSION

Construction of the high-speed railway will promote economic ties between the city and complement each other, conducive to the rapid flow of capital, technology and human resources in the region, regional space transaction costs will go down, along the social welfare of the population will be promoted, so as to promote economic and urban agglomeration areas along links, promote mutual economic development. Meanwhile, we focus on the siphon effect, urban congestion, and other potential negative effects, seek advantages and avoid disadvantages, and high-speed railway construction and promote regional economic development.

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