The Impact of Speed up on the Economy of Cities along the Beijing-Shanghai High-Speed Railway

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Abstract: Against the background of high-speed rail acceleration, this paper expounds the mechanism of the effect of high-speed rail acceleration on urban economic development through constructing trade models between different cities. At the same time, using data from cities along the Beijing-Shanghai railway from 2007 to 2018, the impact of speed increases in different periods of high-speed rail on the economic development of cities along the line is empirically tested. The empirical results show that during the overall acceleration of the Beijing-Shanghai high-speed railway, the speed increase had a significant promoting effect on the economic growth of cities along the line. At the same time, further research found that the acceleration of the Beijing-Shanghai high-speed rail had a more significant impact on the economic growth of prefecture-level cities than provincial capitals and municipalities; the intensity of impact on the urban economy was positively related to the level of economic development of the city. Finally, based on the research results, this paper believes that in order to more effectively promote the economic development of cities along the Beijing-Shanghai high-speed railway, railway transport enterprises should adopt different speed increase strategies according to the different levels of economic development and administrative levels of cities.

Keywords: High-Speed Rail; Speed Upgrade; Economic Growth; Market Access

1. Introduction

In recent years, the large-scale construction of high-speed rail has played an important role in promoting China's rapid economic growth. From the completion of China's first 250 km/h high-speed railway, the Qin-Shen Passenger Railway, in 2003, to the opening of China's first 350 km/h Beijing-Tianjin Intercity High-speed Railway in 2008, and to the current "eight vertical and eight horizontal" high-speed rail network that is basically formed, the high-speed rail network already covers 92% of cities with a population of over 50,000 across the country. The opening of high-speed rail has greatly facilitated people's travel, effectively improved the accessibility of regions, shortened people's travel time, improved the efficiency of labor spatial allocation, reduced labor mobility costs, promoted the flow of production factors such as population, capital and information between different regions, strengthened the connection between cities, promoted industrial agglomeration and the level of urbanization, increased market potential, and played a role in promoting regional economic development.

Because China has a vast territory, and the population scale and economic development level between different regions in the east, central and western regions are quite different, the operating speeds of high-speed rail in different regions were also somewhat different. The economic development level in the western region is lower and the population scale is relatively small, the operating speed of high-speed rail is generally around 200-250 km/h; while the economic development level in the eastern and central regions is higher, the population density is large, and the operating speed of high-speed rail is also higher, generally around 300-350 km/h. The Opinions on Further Improving Railway Planning and Construction issued by the National Development and Reform Commission in 2022 lowered the speed standards for high-speed rail construction in some regions. This means that the speed levels of high-speed rail should be consistent with the level of economic development in the region. Regions with lower levels of economic development adopt the construction of

low-speed high-speed rail to achieve consistency between the two, while regions with higher levels of economic development need to adopt speed-increasing measures to achieve coordinated development between the two. The impact of high-speed rail speed increases on the economic development of cities along the line has become an issue of widespread concern in the academic community and the focus of controversy.

Existing literature on the speeding up of railways generally believes that railway speeding up has a promoting effect on the economic growth of cities along the route, but the influencing mechanisms are different. Shi et al. (2018) found that railway speeding up has a positive effect on technological progress and efficiency improvement of enterprises along the route, promoting the overall productivity growth [1]. Lu et al. (2018) taking China's seven major railway speed-ups as research objects, believes that railway speeding up saves transportation time and promotes additional growth of per capita GDP in cities. The larger the city's population scale, the greater the growth effect brought by time cost savings. The economic growth of cities with higher economic levels will be slower [2]. Yao et al. (2019) studied the mechanism of railway speeding up on economic growth. The results show that railway speeding up indirectly affects economic growth through intermediary variables such as urbanization, industrial agglomeration and market potential. The impact of industrial agglomeration and urbanization varies with time and region [3]. Yang&Tong (2020) studied the opening and speeding up of the Beijing-Shanghai high-speed rail and its impact on regional fairness of cities along the route. It is found that the speeding up of Beijing-Shanghai high-speed rail shortens the average travel time of cities along the route and promotes the fairness of travel opportunities for cities along the route [4]. Zhou &Yu (2013) found that during the speeding up of the whole railway in China, the speeding up increased the per capita GDP of cities along the route by7.8 percentage points, and the speeding up had a greater role in promoting the secondary industry than the tertiary industry [5]. Yao&Zhao (2022) used the mediating effect method to study the impact of high-speed rail on the spatial spillover effects and factor inflow effects of cities. The results showed that higher administrative levels and large cities rely more on attracting labor factor inflow effects to promote economic development, while the economic development of lower administrative levels and medium-sized cities mainly relies on direct spatial spillover effects [6]. Zhu et al. (2020) used a two-way fixed effect model and instrumental variable method to study the impact of high-speed rail acceleration on residents' income. The study found that high-speed rail acceleration generally curbed the growth of rural and urban residents' income in surrounding cities, which is not conducive to the economic development of surrounding cities [7]. Zhu&Li (2024) found that railway speed up can significantly narrow local fiscal gaps and enhance local governance capabilities [8]. Zhang&Li (2025) conducted a study using balanced panel data from 285 prefecture-level cities in China spanning from 2011 to 2018. The results indicated that railway speed increases significantly enhanced the cities' capital environment, innovation level, and commodity factor flow level, thereby increasing the cities' attractiveness to highly educated entrepreneurial talents[9].Ren et al(2025)constructed a DID panel model for 234 prefecture-level cities in China from 2008 to 2023, and found that railway speed increases are generally conducive to narrowing regional economic disparities[10].Wang(2025) has utilized the Logit model to study the impact of high-speed railway speed increases to 400 kilometers per hour on passenger demand. The research indicates that speed increases on the line have a more pronounced stimulating effect on transferred traffic volume [11].

From the review of existing literature, it can be found that relatively little literature studies the impact of high-speed rail speed increase on regional economic development. Most relevant literature adopts the difference-in-differences method. The main shortcoming of the difference-in-differences method is that it cannot directly reflect the intensity of the impact of speed magnitude on the economy of cities along the high-speed rail. At the same time, because the capacity of different sections of a high-speed rail line is different, the speed changes between different cities will be different. To get closer to reality, this paper introduces the concept of market access (MA) and calculates the market access through the change in the shortest travel time between cities along the high-speed rail at different times, so as to more directly reflect the different effects of high-speed rail speeding up

on the economy of each city along the line.

2 Model of Trade among China Cities

The following two innovations can be found from the above analysis: First, the concept of market access is introduced. By calculating the change in the shortest travel time between cities along the high-speed rail at different times, the impact of high-speed rail speeding up on each city can be directly reflected. This method can make up for the deficiencies of the difference-in-differences method mostly adopted in existing literature and more accurately measure the differences in the impact of high-speed rail speeding up on different cities. Second, considering that the capacity and speed of different sections of high-speed rail lines are different, this paper will calculate the market access of each city to other cities according to the actual situation, so as to avoid errors caused by the line structure and obtain more accurate research results. We assume that there are two different regions o and d, and production in each region uses the Cobb-Douglas production technology. The production factors include only labor (L) and capital (K), and the production function is:

$$Y_o(j) = Z_o(j)(L_o(j))^{\alpha}(K_o(j))^{1-\alpha} \quad (1)$$

Where $Z_o(j)$ is exogenous productivity.

According to the above production function, the marginal cost is:

$$MC_o(j) = \frac{w_o^{\alpha} r_o^{1-\alpha}}{Z_o(j)} \quad (2)$$

Where w_o is the wage rate and r_o is the interest rate.

Suppose initially there is an "iceberg transport cost" in trade between the origin region o and the destination region d. That is, in order to transport 1 unit of product from region o to region d, units of product must be transported from region o, and units of transport cost are lost in the transportation process. Assuming that the selling price of goods in the initial region o is $P_{oo}(j)$, then the selling price in the destination region d is $P_{od}(j)=\tau P_{oo}(j)$.

Assume that there is a perfectly competitive market between the two regions o and d. At equilibrium, the price of the product equals the marginal cost of the product:

$$P_{od}(j) = \tau P_{oo}(j) = \tau MC_o(j) = \tau \frac{w_o^{\alpha} r_o^{1-\alpha}}{Z_o(j)} \quad (3)$$

Consumers will choose the cheapest product in tradable goods to maximize benefits, and the price distribution is affected by the distribution of productivity. According to Eaton & Kortum (2002)[12], the price index satisfies the following equation:

$$P_d^{-\theta} = k\sum_o T_o w_o^{-\alpha\theta}\tau^{-\theta} = CMA_d \quad (4)$$

Where indicates the trend of technological advantage, is a constant called consumer market access, indicating the difficulty for consumers in region d to obtain cheap goods. The higher the consumer market access, the easier it is for consumers to obtain cheap goods.

Eaton & Kortum (2002) define a region's trade exports to the outside as:

$$X_{od} = kT_o w_o^{-\alpha\theta}\tau^{-\theta} CMA_d^{-1} Y_d \quad (5)$$

Assuming that the product market is cleared, the total income of the initial region o is the sum of the total output of all goods, that is:

$$Y_o = \sum_d X_{od} = kT_o w_o^{-\alpha\theta}\sum_d \tau^{-\theta} CMA_d^{-1} Y_d \quad (6)$$

Define part of $\sum_d \tau^{-\theta} CMA_d^{-1} Y_d$ as the enterprise market access (FMA_o) of region o, and the enterprise's market access depends on the income of other regions.

$$FMA_o = \sum_d \tau^{-\theta} CMA_d^{-1} Y_d \quad (7)$$

Donaldson & Horn beck (2016)[13] proposed the concept of market access (MA) in their analysis of the impact of the US railway network on the US economy. They believe that in the case of symmetric trade costs, it is necessary to satisfy: $FMA_o=\rho CMA_o=MA_o$

$$MA_o = \rho\sum_d \tau^{-\theta} MA_d^{-1} Y_d \quad (8)$$

Then income becomes:

$$Y_o = kT_o w_o^{-\alpha\theta} MA_o \quad (9)$$

The above formula gives the relationship between market access and income. Changes in transportation infrastructure affect changes in transportation costs, and changes in transportation costs lead to changes in regional market access. Market access in turn has a direct impact on changes in regional income. Improved regional market access has a positive role in increasing regional income.

The impact of high-speed rail speeding up on the economy of cities along the route studied in this paper. To further examine the impact of high-speed rail speeding up on actual income, we use actual income to measure the magnitude of the impact of high-speed rail speeding up, $Y_d=P_d Y_d^*$. Where Y_d^* is the actual income.

$$MA_o = \rho^{\frac{1+\theta}{\theta}}\sum_d \tau^{-\theta} MA_d^{-\frac{1+\theta}{\theta}} Y_d^* \quad (10)$$

For convenience of calculation, we use a first-order approximation to represent market access MA

$$MA_o \approx \sum_d \tau^{-\theta} Y_d^* \quad (11)$$

We replace wages in (9) with factor income shares, and then get:

$$Y_o^r = (K_1 T_o)^{\frac{1}{1+\theta\alpha}} \left(\frac{\alpha}{L_o}\right)^{\frac{-\theta\alpha}{1+\theta\alpha}} MA_o^{\frac{1+\theta(1+\alpha)}{(1+\theta\alpha)\theta}} \quad (12)$$

Where, $K_1=K\rho^{\frac{1}{1+\theta\alpha}}$,the above formula shows that there is a logarithmic linear relationship between a city's actual income and market access.

3. Econometric Models and Data Introduction

3.1 Econometric Models Building

Based on the above analysis of the mechanism by which changes in high-speed rail speed affect market access and then affect the actual income of cities along the route, and referring to Dave Donaldson and Richard Horn-beck's (2016) regression model to study the impact of US railways on the US regional economy, we set the econometric regression model of the impact of high-speed rail speeding up on cities along the route in the following form:

$$\ln Y_{ot}^r = \alpha + \beta \ln(MA_{ot}) + \epsilon \quad (13)$$

Where Y_{ot}^r is the actual GDP of the initial region o at time t, MA_{ot} is the market access of the initial region o at time t; α is a constant term, β is a coefficient, and ε is a random disturbance term.

The explanatory variable in the above econometric model is market access, and the explained variable is the actual GDP of each city. Market access is calculated according to formula (11). Before calculating market access, we first measure the transportation costs between two cities. We adopt the method proposed by Roberts et al. (2012)to measure the transportation costs between cities[14]. The transportation costs between cities o and d are:

$$\tau_{od} = 1 + t_{od}^{0.6} \quad (14)$$

Where τ_{od} is the transportation cost between cities o and d, and t_{od} is the shortest rail travel time between cities o and d.

3.2 Data Sources and Descriptions

This paper mainly studies the impact of high-speed rail speeding up on the economic growth of cities along the route. Taking the Beijing-Shanghai high-speed rail as an example, the research data are mainly related data of cities along the Beijing-Shanghai high-speed rail before and after the speeding up. According to the "Medium and Long-term Railway Network Planning" issued by the National Development and Reform Commission, high-speed railways in China are defined as new or existing railway lines with a speed of 250 kilometers per hour or above. Some railway lines with a speed of 200 kilometers per hour are included in the category of high-speed railway network in China. Before the construction of the Beijing-Shanghai high-speed rail, the existing Beijing-Shanghai railway reached a speed of 200 kilometers per hour during China's 6th railway speed increase in 2007, and some sections even reached 250 kilometers per hour, which met the NDRC's definition of high-speed rail. After the completion of the Beijing-Shanghai high-speed rail, the Beijing-Shanghai railway experienced another speed increase. In 2017, the original 300 kilometers per hour was increased to 350 kilometers per hour, an increase of about 50 kilometers per hour.

This paper chooses to use time panel cross-section data. In the study period, it studies three time periods: 2007 after China's 6th major railway speed increase, 2011 when the Beijing-Shanghai high-speed rail was opened, and 2018 after the Beijing-Shanghai high-speed rail was further accelerated. Due to data availability, 18 municipalities, provincial capitals and prefecture-level cities along the Beijing-Shanghai high-speed rail were selected, including Beijing, Tianjin, Shanghai, Jinan, Nanjing, Suzhou, Shuzhou, Xuzhou, Zhenjiang, Wuxi, Langfang, Chuzhou, Dezhou, Tai'an, Zaozhuang, Changzhou, Bengbu and Cangzhou.

In terms of data sources, railway time data mainly comes from 12306 website and Shengming timetable, and city economic data mainly comes from China City Statistical Yearbook. In terms of data processing, in the calculation of actual GDP in various cities, we use the GDP deflator index method to process the nominal GDP of each city year by year with the GDP in 2000 as the base period. In the calculation of market access between cities along the Beijing-Shanghai high-speed rail, choose the shortest rail transportation time between cities along the Beijing-Shanghai high-speed rail to construct an 18×18 time matrix to calculate the changes in market access brought to each city by the speeding up of high-speed rail. The value of parameter θ mainly refers to Tang Yihong (2019), which takes 3.6, 4 and 8.28 respectively[15].

4. Empirical Result Analysis

4.1 Analysis of the Economic Growth Effect of High-speed Rail Speeding up

Between 2007 and 2018, the Beijing-Shanghai high-speed rail was accelerated twice. The first time was in 2011 when the Beijing-Shanghai high-speed rail opened, increasing the speed of the Beijing-Shanghai railway from 200-250 kilometers per hour to 300 kilometers per hour. The second time was in 2017 when the Beijing-Shanghai high-speed rail increased the operating speed of some trains to 350 kilometers per hour. Therefore, in the empirical analysis, we divide the time period into two stages, namely 2007-2011 and 2011-2018.

Table 1. Regression Results of the Economic Impact of High-Speed Rail Speeding up on Cities along the Route during Different Periods

Time period	2007-2018		
	θ=3.6	θ=4	θ=8.28
MA	0.28***	0.26***	0.16***
Constant term	8.87***	9.14***	10.85***
Observation	54	54	54
R^2	0.15	0.16	0.18
Time period	2007-2011		
	θ=3.6	θ=4	θ=8.28
MA	0.22*	0.21*	0.13**
Constant term	9.47***	9.67***	11.03***
Observation	36	36	36
R^2	0.09	0.1	0.13
Time period	2011-2018		
	θ=3.6	θ=4	θ=8.28
MA	0.51	0.53	0.45**
Constant term	5.77	5.92	7.83**
Observation	36	36	36
R^2	0.04	0.05	0.11

Note: ***, **, and * represent significance tests of 1%, 5% and 10% respectively.

Table 1 shows the empirical results of the economic impact of Beijing-Shanghai high-speed rail speeding up on cities along the route. The results show that during the whole period of Beijing-Shanghai high-speed rail speeding up from 2007 to 2018, the improvement of market access brought by railway speeding up can promote regional economic growth. The improvement of market access by one unit can bring about 0.16-0.28 units of GDP growth to the city, and can pass the 1% significance test. The pulling effect on GDP decreases with the increase of θ value. From 2007 to 2011, the improvement of market access brought about by the Beijing-Shanghai high-speed rail speeding up had a pulling effect of 0.13-0.22 units on the GDP of the whole city along the route, and passed the 10% significance test. The pulling effect on GDP also decreases with the increase of θ value. From 2011 to 2018, when θ = 8.28, the improvement of market access to cities along the Beijing-Shanghai high-speed rail brought by the speeding up of Beijing-Shanghai high-speed rail had a pulling effect on the GDP of cities along the route. The improvement of market access by one unit could pull 0.45 units of GDP and passed the 5% significance test. When θ = 3.6 and θ = 4, the overall pulling effect of Beijing-Shanghai high-speed rail speeding up on cities along the route was not significant. This shows that the impact of high-speed rail speeding up on the economy of cities along the route is also related to the distribution of regional productivity.

The main reason for the above phenomenon may be the differences in location conditions of the 18 cities along the Beijing-Shanghai high-speed rail covered in the research sample. The 18 cities in the research sample of this paper include ordinary prefecture-level cities, provincial capitals and municipalities directly under the central government, which have great differences in location conditions. With the continuous expansion of China's high-speed rail construction scale, ordinary prefecture-level cities may only have one high-speed rail line passing through, while municipalities directly under the central government and provincial capital cities may have two or even more high-speed rail lines passing through due to their superior location conditions. For municipalities directly under the central government and provincial capital cities, the role of a high-speed rail line in the city's economy will be much smaller than that of ordinary prefecture-level cities. In order to further analyze the impact of the speeding up of Beijing-Shanghai high-speed rail on the economy of different types of cities along the route, we will empirically analyze the impact of the speeding up of Beijing-Shanghai high-speed rail on the economic growth of prefecture-level cities and provincial capital cities respectively during different periods.

4.2 Analysis of the Impact of High-Speed Rail Speeding Up on the Economic Growth of

Ordinary Prefecture-level Cities

We excluded Beijing, Tianjin, Jinan, Nanjing and Shanghai, the five provincial capital cities and municipalities, and empirically tested the impact of Beijing-Shanghai high-speed rail speeding up on the economic growth of 13 other ordinary prefecture-level cities at different times. The results are shown in Table 2 below.

The empirical results in Table 2 show that, regardless of time period, speed increases on the Beijing-Shanghai high-speed rail have had a significant impact on the economic growth of ordinary prefecture-level cities. The impact in the latter time period was significantly greater than in the former. Meanwhile, the effect weakened with increases in θ. This indicates that whether high-speed rail speed increases can drive urban economic growth and the magnitude of the effect on economic growth are related to the level of economic development in the city to some extent. When the level of urban economic development is not high, the driving effect of high-speed rail speed increases on the urban economy is relatively small. When urban economic development reaches a certain level, the driving effect of high-speed rail speed increases on economic development will be significantly enhanced. Table 3 Regression Results of the Impact of Speed Increases on the Beijing-Shanghai High-Speed Rail on Provincial Capitals and Municipalities at Different Times.

Table 2. Regression Results of the Economic Impact of High-speed Rail Speeding up on Ordinary Prefecture-level Cities along the Route during Different Periods

Time period	2007-2018		
	θ=3.6	θ=4	θ=8.28
MA	0.3^{***}	0.28^{***}	0.15^{***}
Constant term	8.2^{***}	8.54^{***}	10.48^{***}
Observation	39	39	39
R^2	0.3	0.3	0.31
Time period	2007-2011		
	θ=3.6	θ=4	θ=8.28
MA	0.23^{**}	0.22^{**}	0.12^{**}
Constant term	8.87^{***}	9.13^{***}	10.68^{***}
Observation	26	26	26
R^2	0.2	0.21	0.21
Time period	2011-2018		
	θ=3.6	θ=4	θ=8.28
MA	1.3^{***}	1.2^{***}	0.65^{***}
Constant term	-4.89^{***}	-3.25^{***}	5.28^{**}
Observation	26	26	26
R^2	0.41	0.43	0.46

Note: ***, **, and * represent significance tests of 1%, 5% and 10% respectively.

The empirical results in Table 3 show the impact of speed increases on the Beijing-Shanghai high-speed rail on the economic growth of provincial capitals and municipalities. We can see that over the entire 2007-2018 period, speed increases on the Beijing-Shanghai high-speed rail had a significant impact on the economic growth of provincial capitals and municipalities. A 1-unit increase in market access brought by speed increases could drive GDP growth of 0.16-0.26 units in provincial capitals, and the effect weakened with increases in θ. However, in the separate 2007-2011 and 2011-2018 periods, the driving effect of speed increases on the Beijing-Shanghai high-speed rail on urban GDP was not significant. This may be because these cities are located in areas with multiple high-speed rail lines. If the intensity of speed increases on a single high-speed rail line does not exceed a certain range, the driving effect on the economies of provincial capitals and municipalities will not be significant. Only when it exceeds a certain range can it have a significant impact on the economic growth of these cities. In contrast, non-provincial capital cities may only have one high-speed rail line passing through, so the impact of high-speed rail speed increases on their economies is very significant.

Table 3. Regression Results of the Economic Impact of High-speed Rail Speeding up on Provincial Capitals and Municipalities along the Route during Different Periods

Time period	2007-2018		
	θ=3.6	θ=4	θ=8.28
MA	0.26^{*}	0.25^{*}	0.16^{**}
Constant term	10.14^{***}	10.38^{***}	11.91^{***}
Observation	15	15	15
R^2	0.26	0.26	0.28
Time period	2007-2011		
	θ=3.6	θ=4	θ=8.28
MA	0.19	0.18	0.11
Constant term	10.93	11.09	12.23
Observation	10	10	10
R^2	0.14	0.14	0.15
Time period	2011-2018		
	θ=3.6	θ=4	θ=8.28
MA	0.28	0.34	0.69
Constant term	9.89	9.16	6.59
Observation	10	10	10
R^2	0.02	0.04	0.25

Note: ***, **, and * represent significance tests of 1%, 5% and 10% respectively.

5. Conclusion

As an important transportation infrastructure, high-speed rail has a significant space-time compression effect. It reduces the restrictions of spatial geographic distance on people's economic activities, lowers the cost of communication between people in different regions, and strongly promotes trade development between regions. This effect will be further strengthened in the case of high-speed rail speed increases. This paper focuses on the economic growth effects of speed increases on the Beijing-Shanghai high-speed rail on cities along the line. It explores the impact of increased market access caused by speed increases on the Beijing-Shanghai high-speed rail on the economic growth of cities along the line.

The main conclusions are: Speed increases on the Beijing-Shanghai high-speed rail promote the economic growth of cities along the line. For every 1-unit increase in market access caused by high-speed rail speed increases, GDP along the line will increase by 0.16-0.28 units. The increase varies with and decreases with increases in θ. Overall, the impact of speed increases on the Beijing-Shanghai high-speed rail on the economic growth of provincial capitals and municipalities is less than that on ordinary prefecture-level cities. However, as θ increases, this impact will gradually decrease. By time period, the significance of the impact of speed increases on the Beijing-Shanghai high-speed rail on provincial capitals and municipalities is obviously lower than that on non-provincial capital cities. The impact of speed increases on the Beijing-Shanghai high-speed rail on non-provincial capital cities along the line is related to the level of economic development in the cities. The higher the level of economic development in the cities, the greater the impact. The significance of the impact of speed increases on the Beijing-Shanghai high-speed rail on the economic growth of cities along the line is proportional to the magnitude of the speed increase.

Based on the above research conclusions, the following insights can be drawn: The impact of high-speed rail speed levels on the economic growth of different cities varies with the level of urban development. For regions with higher levels of economic development, operating speed increases can be adopted to promote regional economic development. For regions with lower levels of economic development, there is no need to adopt higher operating speeds. This can effectively reduce the operating costs of railway enterprises and improve the overall social welfare level. When high-speed rail speed increases are not large, priority should be given to shortening transportation times between non-provincial capital cities. Provincial capitals generally have multiple high-speed rail lines passing through, and small speed increases have very limited effects on economic growth. Ordinary prefecture-level cities usually only have one high-speed rail line passing through, and their economic growth is more sensitive to speed increases. In summary, differentiated high-speed rail development strategies should be formulated according to the level of economic development in different cities. For cities with higher levels of economic development, speed increase strategies can be actively adopted to stimulate economic growth. For cities with lower levels of economic development, speed increases strategies are not urgently needed. Priority should be given to shortening transportation times between non-provincial capital cities with lower levels of economic development. This approach can make limited high-speed rail resources benefit more people and promote the coordinated development of regional economies.

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