



## 1. Project Data

<b>Project ID</b> P122319	<b>Project Name</b> CN-Zhangjiakou-Hohhot Railway	
<b>Country</b> China	<b>Practice Area(Lead)</b> Transport	
<b>L/C/TF Number(s)</b> IBRD-81310	<b>Closing Date (Original)</b> 30-Jun-2018	<b>Total Project Cost (USD)</b> 192,577,450.35
<b>Bank Approval Date</b> 15-Mar-2012	<b>Closing Date (Actual)</b> 30-Jun-2020	
	<b>IBRD/IDA (USD)</b>	<b>Grants (USD)</b>
Original Commitment	200,000,000.00	0.00
Revised Commitment	192,577,450.35	0.00
Actual	192,577,450.35	0.00

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## 2. Project Objectives and Components

### a. Objectives

According to the Loan Agreement (LA, page 5) and the Project Appraisal Document (PAD, para 20), the project development objective (PDO) was to improve accessibility and mobility by responding to existing and anticipated transport demand along the Hohhot-Zhangjiakou (to Beijing) corridor through the provision of additional railway capacity and reduction of transport time for passengers and freight.

In this review, the PDO is assessed in two parts, namely "to improve accessibility by responding to existing and anticipated transport demand along the Hohhot-Zhangjiakou (to Beijing) corridor for passengers and



freight" and "to improve mobility by responding to existing and anticipated transport demand along the Hohhot-Zhangjiakou (to Beijing) corridor for passengers and freight". These two separate parts of the PDO are referred to as Objectives 1 and 2 in Section 4 below. This is in line with the approach used in the ICR.

**b. Were the project objectives/key associated outcome targets revised during implementation?**

No

**c. Will a split evaluation be undertaken?**

No

**d. Components**

The project had the following single component:

Construction of Zhanghu Railway Line (estimated costs US\$4.682 billion, including contingencies; actual cost US\$4.722 billion): To construct a 286 kilometers double-track, electrified, passenger high-speed rail line between the northern Chinese cities of Zhangjiakou and Hohhot, including the construction, renovation or rehabilitation of stations, acquisition and installation of rails, signaling equipment, systems, maintenance equipment, rolling stock, and land acquisition and resettlement. Of the six railway stations on this line, three were to be newly constructed, two existing stations were to be renovated, and one existing station was to be used without additional works. The Bank loan was to finance the procurement of materials and equipment for the construction of the line and its electrification, signaling, and communication systems, operation and maintenance equipment, and possibly technical assistance on policy aspects. The scope of such technical assistance (e.g. consultant services, training, and study tours), if any, was to be identified during project implementation (PAD, paras 23 and 24).

The project activities were not revised during implementation.

**e. Comments on Project Cost, Financing, Borrower Contribution, and Dates**

**Project Cost:**

The actual total project cost was US\$4.722 billion, which was almost the same as the appraisal cost estimate of US\$4.682 billion (ICR, Annex 3). The ICR datasheet records that total disbursement was US\$4.715 billion. According to the Bank task team the difference is due to the exchange rate used in determining the actual project cost.

**Financing:**

The Bank's contribution to the cost of the project was US\$200 million financed through an IBRD loan. The Bank disbursed US\$192.58 million, which was 96.3 percent of the loan amount.

**Borrower Contribution:**



The expected borrower contribution at appraisal was US\$4.482 billion. The actual contribution was US\$4.522 billion, which was 100.9 percent of the appraisal estimate.

### Dates and Project Restructuring:

The project was approved on March 15, 2012, became effective on August 3, 2012, and was expected to close on June 30, 2018. On May 9, 2018, the closing date was extended for two years, to June 30, 2020. The extension was necessary for two reasons. First, to complete construction under the project, which was delayed by one year because of the need for design modifications, a supplementary environmental assessment, and delays in land acquisition and resettlement due to lack of counterpart funds (ICR, para 30). Second, to complete the construction of the adjacent Beijing-Zhangjiakou Railway line and the Zhangjiakou Station (both not part of the project), which were delayed by two years. This was necessary to enable the project line to connect to the high-speed rail system at Zhangjiakou Station and the Beijing-Zhangjiakou Railway line, which links Hohhot and Ulanqab to Beijing.

## 3. Relevance of Objectives

### Rationale

**Context at Appraisal.** By 2010, China had experienced substantial economic growth over several decades. To maintain this growth, balance its distribution, and promote trade, China made transport investments, particularly in railways, a centerpiece of its development strategy. The higher investment in railways recognized this mode's importance in passenger and freight transport, its higher energy efficiency, and its lower carbon emissions compared to road and air transport. The existing railway connection from Hohhot to Beijing was not direct and travel times were long. Both, passenger and freight transport on the Hohhot-Zhangjiakou-Beijing corridor suffered from congestion, which hampered the economic development of Inner Mongolia.

**Previous Sector Experience.** This was the fifth high-speed project that the Bank supported in China since 2008. Although the project activities in previous high-speed projects were nearly identical, the objectives were formulated differently. For instance, the ShiZheng Railway project (P099062), the first of the six projects, aimed at "meeting growing freight and passenger market demand in the railway corridor between Shijiazhuang and Zhengzhou, while substantially improving the level of service offered to customers and the maintenance of the catenary system on high-speed rail lines." The objective of the fourth Jilin-Hunchun Railway project (P122321) was "to respond to existing and anticipated transport demand along the Jilin- Hunchun corridor by providing increased capacity for freight and passengers, and faster travel time, and increased frequency of services for passengers." In parallel to the railway investment projects, the Bank engaged in a continuous, high-level dialogue on railways and transport policies with the China Railways Corporation (CR) and the Government of China through which it provided advice and technical assistance.

**Relevance to Government Strategies.** At appraisal, the PDO was in line with the 2008 update of the Mid- and Long-Term Railway Development Plan and China's 11th 2006-2010 Five Year Plan, in which the Government set forth a policy to promote railway development (PAD, para 4). At completion, the PDO remained in line with China's 13th 2016-2020 Five Year Plan, which focused on promoting low carbon transport and developing intercity railways to connect cities within a city cluster. It is also aligned with



China's new rail sector strategy in the areas of building national high-speed rail corridors supplemented by regional high-speed rail corridors, developing intercity rail networks and multimodal transport hubs, and increasing the mode share of rail passenger transport (ICR, para 15).

**Relevance to Bank Assistance Strategies.** At appraisal, the PDO was in line with Bank's FY11-FY15 Country Partnership Strategy for China, which focused on promoting more inclusive development, for which both accessibility and mobility are important. At completion, the PDO remained in line with Bank's FY20-FY25 Country Partnership Framework for China. It contributed to engagement Area 3 "Sharing the benefits of growth" by shortening the economic distances between the northern inland regions and Beijing through better mobility and access to more economic opportunities. Indirectly, railway transport also contributes to engagement area 2 "Supporting greener growth", which among includes a strives towards low-carbon transport. However, the "greening" objective was neither spelled out in the PDO nor measured during implementation.

The PDO statement was outcome-oriented and clear, but the PAD lacks definitions of "accessibility" and "mobility" and an indicator to measure the project's achievement with respect to freight transport. The PDO was also not "novel" in its ambitions considering that this was the fifth large high-speed project in China.

On balance, **relevance of objectives is rated substantial**. This rating reflects the PDO's high relevance in the country context and the Government's railway transport priorities and the full alignment with Bank priorities on the one hand, and its limited novelty and the lack of an outcome indicator for freight, on the other hand.

## Rating

Substantial

## 4. Achievement of Objectives (Efficacy)

### OBJECTIVE 1

#### Objective

To improve accessibility by responding to existing and anticipated transport demand along the Hohhot-Zhangjiakou (to Beijing) corridor for passengers and freight

#### Rationale

The theory of change for Objective 1 was that the activities to construct a 286 kilometers double-track, electrified, passenger high-speed railway between Zhangjiakou and Hohhot (Zhanghu railway) would have as outputs the completed and operational Zhanghu railway. In terms of outcomes, there would be improved accessibility for passengers, measured by the number of train pairs operating on the Zhanghu railway and the number of passengers using them, and improved accessibility for freight because the freed up capacity on the conventional train line on the corridor, which was to be used by freight services. In the long run, together with improved mobility, it was expected to support spatial, economic, and social integration, encourage economic



diversification in Inner Mongolia, and reduced damaging externalities from transport, such as carbon emissions, traffic accidents, and air pollution (PAD, paras 12, 13, 14, 21 and 36).

Accessibility in transport is generally understood as (i) the ease of reaching destinations or (ii) inclusive access for people with disabilities. Because the PAD and ICR do not provide a definition of accessibility and the PAD does not refer to people with disabilities, in this review, accessibility is mainly understood as the ease of reaching destinations in line with the main literature\*.

### **Outputs:**

The output of this project is the fully operational Zhanghu passenger high-speed rail line, consisting of 286 kilometers double-track, electrification, rolling stock, and maintenance equipment.

### **Outcomes:**

The main cities on the high-speed line, enhanced or are planning to enhance accessibility for passengers through auxiliary infrastructure and services. Hohhot connected its subway system to the high-speed line and operates connecting bus lines. Ulangab provided free shuttle services from the new railway station to major outdoor attractions. It also included in its long-term urban transport plan two new bus lines to serve the high-speed rail station and a bus service to connect suburban and rural population to the high-speed rail. Similarly, Zhangjiakou's comprehensive transport plan envisions to develop the city as a rail hub for multimodal connectivity, including bus and light rail services connecting the high-speed rail station with employment centers and recreation hubs (ICR, para 23 and 37).

In the beginning of 2021, the passenger high-speed rail line operated daily, an average of, 25 train pairs (i.e. return train services, which according to the Bank task team, consist of eight coaches each), exactly meeting the target. The Bank task team, in discussion with IEG, clarified that with the construction of the high-speed line, the conventional passenger service on the existing railway line was expected to be significantly reduced. This did not happen. On the contrary, the conventional passenger rail service remained important and the new capacity created by the high-speed line absorbed the growth in rail passengers. The ICR, para 25, points out that the same happened for the other high-speed rail projects supported by the Bank. Therefore, by adding significant passenger rail capacity, the project enhanced the ability of people to reach destinations along the line and at both ends, particularly in Beijing. In addition, the new high-speed line allows for the integration with the national high-speed network at Zhangjiakou, hence provides access to destinations in other parts of the country.

Accessibility for passengers was also enhanced through the drastic decrease in travel time, from about 6 hours to 1 hour and 26 minutes, exceeding the target of 100 minutes (the trip by car takes about 3.5 hours). To put this in context, the Bank task team mentioned that if a person from Hohhot takes the conventional train at 9.30 am, she or he arrives in Beijing at 6.30 pm. If a person takes the high-speed train at 8.30 am, she or he arrives in Beijing at 10.50 am. This puts services, activities, goods, and jobs in Beijing at the daily reach of people along the high-speed line. The ICR, para 24, points out that the significant travel time reductions bring residents and businesses in Zhangjiakou and the cities to the North within less than two hours from the national capital region and the resources and opportunities it offers. Conversely, it provides residents and businesses in the national capital region easy access to many cultural, outdoor recreational areas, and a lower cost of doing business in the North.



The Bank task team clarified that a ticket from Hohhot to Beijing on the conventional train costs 86 RMB, and on the high-speed train it costs 218 RMB. In terms of affordability, this means that not everybody will be able to use the high-speed train all the time. According to the Bank task team, a cleaning lady in Beijing earns about 3,000 RMB per month, so she might be able to use the high-speed train only exceptionally. However, the high-speed train is affordable for a large part of the population. The report on China's High-Speed Rail Development (2019 World Bank) finds that based on on-board surveys in 2014 to 2016, 40 to 60 percent of high-speed rail passenger were travelling on business. The monthly self-reported income in 2014 to 2016 of high-speed passengers ranged from 4,300 RMB for Changchun–Jilin to 6,700 RMB for Tianjin–Jilin. On the conventional trains the self-reported income was about 65 to 75 percent that of high-speed rail passengers (pages 36 and 37).

The Bank task team pointed out to IEG that stations on the high-speed lines/ in China are like modern airports, with accessibility features, such as elevators and ramps. The high-speed trains are also modern, air conditioned, and provide an excellent service.

However, in 2020, fewer passengers used the new high-speed line than expected, which the ICR attributes to the Covid-19 pandemic. The annual number of passengers traveling on the Zhanghu high speed line was 6.4 million. This was only 71 percent of the target of 9 million. The ICR (para 20) points out that Covid-19 related strict travel restrictions and service reductions reduced the passenger numbers in 2020 and that when Covid-19 related restrictions are fully removed, the target value is likely to be achieved due to underlying strong demand. To support this, the ICR argues as follows:

- The railway passenger numbers at national level in 2020 were 60 percent of the ones in 2019, therefore 71 percent on the new high-speed line in the first year of operation makes it likely that the target would have been achieved in the absence of Covid-19 (ICR, paras 20 and 21).
- The initial demand on new high-speed lines in China picked up quickly before the pandemic. For instance, the ridership on the section from Hohhot to Ulanqab (123 km, which started operations in August 2017) grew at a significantly stronger rate than for other high-speed lines. The ridership grew three-fold from 49,000 monthly passengers in August 2017 to 145,000 in December 2019. The previous four high-speed railway projects supported by the Bank had a ramp-up of 27.5 percent in the first year and 11 percent in the second year. The ICR (para 22) points out that this demonstrates strong latent demand that materialized because of improved accessibility under the project, i.e., additional capacity.
- The high-speed line directly connects more remote regions to Beijing, the capital, hence a strong demand can be expected (ICR, paras 20 and 26).

The Bank task team did not have data on the high-speed line ridership in the first semester of 2021. Although a strong ridership could be a sign of greater ease of access, it might also be caused by other reasons. Therefore, as discussed in Section 9 of this review, this is not the best indicator to measure accessibility.

The ICR did not provide any data on the project's contribution to improved accessibility for transporting freight along the Hohhot-Zhangjiakou corridor. The ICR (para 25) only mentions that the capacity freed up on the conventional rail line due to the shift of passengers from that line to the new high-speed line on the corridor was used to increase conventional passenger services rather than freight services as expected at appraisal.

Evidence in the ICR shows that the project enhanced accessibility for rail passengers along the Hohhot-Zhangjiakou corridor, but there is no evidence in the ICR on whether the project contributed directly or



indirectly to enhanced accessibility for freight transport. Therefore, **the efficacy with which Objective 1 has been achieved is rated modest.**

**Rating**  
Modest

## **OBJECTIVE 2**

### **Objective**

To improve mobility by responding to existing and anticipated transport demand along the Hohhot-Zhangjiakou (to Beijing) corridor for passengers and freight

### **Rationale**

The theory of change for Objective 2 was that the activities to construct a 286 kilometers double-track, electrified, passenger high-speed railway between Zhangjiakou and Hohhot would have as outputs the completed and operational Zhanghu railway line. In terms of outcomes, this was to lead to improved mobility for passengers, measured by the reduced travel time from Zhangjiakou to Hohhot, and improved mobility for freight because the freed up capacity on the conventional train line on the corridor, which was to be used by freight services. In the long run, together with improved accessibility, it was expected to support spatial, economic, and social integration, encourage economic diversification in Inner Mongolia, and reduced damaging externalities from transport, such as carbon emissions, traffic accidents, and air pollution (PAD, paras 12, 13, 14, 21 and 36).

In this review, mobility is defined as the ability and ease to move people and freight in line with literature\*.

### **Outputs:**

The output is the same as under Objective 1.

### **Outcomes:**

The new passenger high-speed rail line enhanced the ability of people to move by adding additional passenger transport capacity to the corridor. According to the task team, before the construction of the high-speed line it was difficult to get on the train on this corridor. Now, the seat availability is higher and it is possible to conveniently buy a ticket on the internet. The ICR, annex 4, footnote 10, points out that, for instance, of the 24 high-speed services scheduled for November 24, 2020, nine were sold out by November 20, 2020. The Bank task team was not able to obtain data on the number of annual conventional passenger services on the corridor, but confirmed that the original services were not or not significantly reduced. According to the above-mentioned report (2019 World Bank), "high-speed rail services have not yet led to a reduction in overall conventional train traffic. Rather, they have created an accelerated growth in overall rail traffic, which the previous network, close to full capacity, was unable to achieve."

The high-speed line enhanced the ease for passengers to move using modern infrastructure and trains, and achieve significantly shorter travel times. It is affordable for many; those who cannot afford the high-speed train can continue to use the conventional railway service. On-board surveys carried out under the other Bank-financed high-speed rail projects in China have shown that high-speed rail services have drawn about



half their passengers from conventional rail services (World Bank, 2019). This is likely to mean that conventional passenger services have become less congested, i.e., provide better mobility.

As mentioned under Objective 1, there is no evidence that the project contributed to improve the mobility of freight transport on the corridor because the capacity freed up on the conventional rail line due to the shift of passengers to the new high-speed line on the corridor was not used to increase freight services as expected at appraisal.

This review concluded that the evidence in the ICR shows the project enhanced mobility for rail passengers, but there is no evidence whether it contributed to enhancing the mobility for freight transport. Therefore, **the efficacy with which Objective 2 has been achieved is rated modest.**

\* Reference: "How to get there? A critical assessment of accessibility objectives and indicators in metropolitan transportation plans", [https://drive.google.com/file/d/1p24v-aik\\_lfwDKTYC5mn4Ld6A7ijYH4u/view](https://drive.google.com/file/d/1p24v-aik_lfwDKTYC5mn4Ld6A7ijYH4u/view); Sustainable Transportation: Accessibility, Mobility, and Derived Demand <https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/sustainable-transportation-accessibility-mobility-and-derived-demand/>; What are the Differences between Mobility, Accessibility, and Connectivity in Transportation Planning? July 25, 2019 <https://community-planning.extension.org/what-are-the-differences-between-mobility-accessibility-and-connectivity-in-transportation-planning/>; Measuring Transportation Traffic, Mobility and Accessibility, 1 March 2011, Todd Litman, Victoria Transport Policy Institute, <https://www.vtpi.org/measure.pdf>; "How to get there? A critical assessment of accessibility objectives and indicators in metropolitan transportation plans", [https://drive.google.com/file/d/1p24v-aik\\_lfwDKTYC5mn4Ld6A7ijYH4u/view](https://drive.google.com/file/d/1p24v-aik_lfwDKTYC5mn4Ld6A7ijYH4u/view) .

**Rating**  
Modest

## OVERALL EFFICACY

### Rationale

The project investments were successfully implemented, and accessibility and mobility for passengers were improved. The capacity freed up on the conventional rail line due the shift of passengers to the new high-speed line was, according to the ICR, not used to increase freight services. There is also no other evidence whether or not the project contributed to enhance accessibility and mobility for freight transport. Therefore, the project's overall efficacy is rated modest.

**Overall Efficacy Rating**  
Modest

**Primary Reason**  
Low achievement





## 5. Efficiency

### Economic Analysis:

**At appraisal**, the project carried out a cost benefit analysis based on without and with project scenarios. The analysis used a 30-year time horizon and a 12 percent discount rate to assess the project's present net value. The benefits derived from (i) reduced travel time, expressed in the value of time for passenger traffic diverted to the new line; (ii) the value of freed up capacity on the conventional rail line in the corridor, allowing for an increase in freight services, avoiding congestion, and reducing accidents on the road network; (iii) the value of reduced greenhouse gas emissions through the transfer of passengers from other more energy-intensive modes to rail, and (iv) the value of wider economic, social and environmental impacts associated with the improvement in accessibility for Hohhot and Baotou.

This yielded an economic internal rate of return (EIRR) of 15 per cent and a net present value (NPV) of RMB6.0 billion (US\$962 million). Without the wider economic benefits arising from the improvement in accessibility between the main regional centers served by the line (agglomeration benefits), the analysis still showed an EIRR of 9 percent. The PAD (para 42) clarifies that this is at least in part because of the substantial distance saving from the project of about 200 kilometers.

**By project close**, the ex-post cost benefit analysis covered 100 percent of total project costs. The analysis replicated the appraisal analysis whenever possible (the ICR, annex 4, para 18, for instance, points out that the precise methodology to assess passenger benefits could not be replicated and had to be approximated. The analysis also used a time horizon of 30 years and a discount rate of 12 percent. The following main adjustments were made to the analysis: (i) shift in the project's operational period to account for the later start of operations; (ii) exclusion of freight related benefits because they did not materialize; (iii) exclusion of wider economic benefits (agglomeration benefits) because the Bank task team was not able to confirm the agglomeration benefits in the first years of operation. Due to Covid-19 travel restrictions, the Bank task team could not carry out the planned onboard surveys to gather anecdotal evidence on these benefits (ICR, para 70); (iv) update of project costs to reflect actual cost; (v) update of other data and parameters, mainly based on literature from previous high-speed rail experience in China. The ex-post analysis showed an EIRR of 8 percent and an NPV of RMB-18.4 billion (US\$-3 billion). The lower EIRR compared with the one at appraisal is explained in the ICR by the lower passenger demand caused by Covid-19 (Annex 4). It is also due to the exclusion of the benefits mentioned in points (ii) and (iii) above.

The ICR, para 28, points out that the EIRR of 8 percent compares with the situation in France, a country with a long history of high-speed rail, where the ex-post EIRRs range from 4 to 15 percent. However, the EIRRs of three of the four Bank financed high-speed rail projects in China were significantly higher at 15, 16 and 18 percent (World Bank, 2019).

The ex-post analysis in the ICR identified uncertainties which had implications for the economic analysis. First, the base demand in 2020 is unclear because of the Covid-19 related passenger demand reductions. Second, also because of Covid-19, the Bank task team was not able to carry out ex-post onboard surveys to collect actual data from passengers for the project's high-speed line. This meant, for instance, that the proportion of business and leisure travelers, who place different values on time. The implications of these different values (e.g., transfers from air travel to high speed rail) were estimated based on patterns observed in other projects.

### Cost Effectiveness, Administrative and Operational Efficiency:



The high-speed railway design in this project was cost effective. The capital cost per kilometer was RMB83 million, excluding the cost of rolling stock, land acquisition, and resettlement. This is slightly below the cost of the Bank-financed Guiguang Railway and Jituhun Railway implemented only a few years earlier, with a cost of RMB93 and RMB85 million per kilometer. The ICR (para 29) clarifies that all three projects had the same maximum design speed of 250 km/h, but that the two earlier projects had a higher proportion of elevated structures and tunnels, which increased the unit cost.

This project had a two-year delay in implementation for the reasons pointed out in Section 2, but the total actual project cost was still in line with the cost estimated at appraisal.

Despite the implementation delays (some of which were beyond the project's control), the project's investment in the high speed tracks was cost effective. Although the ex-post EIRR was lower than estimated at appraisal, an EIRR of 8 percent is creditable considering the lower than expected passenger numbers because of various factors including Covid-19. Also, based on experience in France, with a long history of high speed rail, an EIRR of 8 percent is not unreasonable for a large railway infrastructure project. Therefore, **the efficiency of project implementation is rated substantial.**

### Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	15.00	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	8.00	100.00 <input type="checkbox"/> Not Applicable

\* Refers to percent of total project cost for which ERR/FRR was calculated.

### 6. Outcome

The project constructed a technically complex high-speed line with limited problems and delays. The relevance of the project's objectives and its efficiency are rated substantial. Although the project improved the accessibility and mobility for passengers, there is no evidence that it contributed to enhanced accessibility and mobility for freight transport. This caused the project's efficacy to be rated modest. Consequently, given the lack of evidence on the achievement of the freight-related part of the PDO, **the project's overall outcome is rated moderately unsatisfactory.**

#### a. Outcome Rating

Moderately Unsatisfactory



## 7. Risk to Development Outcome

The ICR (para 67), identifies the following risks to development outcomes:

- **Macroeconomic situation.** The ICR flagged a moderate macroeconomic risk. The Bank task team pointed out to IEG that a worsening of the macroeconomic situation in China is possible and, if it happens, it could negatively impact high speed railway ridership.
- **Reduced travel demand and operation of line at lower than planned service levels because of Covid19.** The Bank task team also pointed out that during Covid19-related lockdowns, the China Railways Corporation immediately adjusted service level in the area of the lockdown. This helped reduce financial losses. The ICR also makes a reasonable case to show that it is likely that the travel demand will bounce back once the pandemic is under control (see Section 4).

Based on the discussions with the Bank task team, IEG highlights the following additional risks:

- **Financial sustainability of the Zhanghu high-speed line, especially during this period of low demand.** China Railways cross-subsidizes loss making services from resources of profit making ones, so the financial sustainability risk for this line in the short run, even with Covid19, is limited.
- **System maintenance.** The PAD, para 38, notes that the risk that the Ministry of Railways is not able to maintain the infrastructure after services have started seems negligible because the project was expected to be “cash positive” and generate sufficient income for its own operation immediately after the opening of the line. The Bank task team, in discussion with IEG, added that China Railways has good maintenance and safety practices, hence this risk of inadequate maintenance is negligible in the short run.
- **Oversupply of freight capacity because of the drop in coal demand mentioned in the ICR.** The Bank task team explained to IEG that there is no oversupply of rail freight transport capacity on the corridor because as the demand for coal transport goes up and down, other commodities use the existing freight transport capacity on the corridor.

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The Bank task team intervened in areas highly relevant to achieve green growth and inclusive development, which are a key focus in the 2012-2015 CPS. The task team benefited from an extensive experience and solid knowledge in implementing high-speed rail projects, this being the fifth project in China. According to the PAD (para 39), the project design reflected the lessons learned from previous railway projects in terms of design and institutional arrangements. The Bank task team hired international advisors in railways engineering and management, economic and financial evaluation, and environmental aspects working on both investment lending and analytical and advisory activities.

The project design was simple, which was justified given the technical complexity of a high-speed rail project and the parallel dialogue and technical assistance ongoing with the China Railways throughout



the implementation of the past Bank-assisted high-speed railway projects. The project alignment was carefully evaluated and included consultation with officials at the local levels. According to the ICR, the design was readily implementable, even though design changes occurred. This showed that the project design also allowed for the necessary flexibility.

As shown in Section 10 of this review, the Bank task team paid adequate attention to the social, environmental, and fiduciary aspects and provided guidance and support to the Borrower during project preparation.

The PAD (paras 38 to 40 and Annex 4) mentions many risks that could realistically occur and includes mitigation measures. The PAD rated the overall project risk as moderate, which was appropriate given the long experience in the sector in China. Nevertheless, the measure to mitigate the risk of delays in counterparts for resettlement compensation was not sufficient and delays took place. The Bank task team verified the feasibility study forecasts with an independent network model to mitigate the traffic forecast risk, but the appraisal's passenger forecast was still overoptimistic. The task team did not identify the risk associated with the construction and commercial operation of the adjacent Beijing-Zhangjiakou Railway, for which delays materialized and negatively impacted this project's implementation schedule (ICR, para 43). The Beijing-Zhangjiakou Railway was to connect the project line to Beijing and the national high-speed rail network. Without this connection, the project would have made little financial and economic sense.

The M&E framework had shortcomings (see Section 9), especially because it did not include indicators to measure the impact of the new high-speed line on freight services.

The Bank task team adequately supported project preparation and appraisal, but the project design had moderate shortcoming mainly in risk identification and M&E. Therefore, **the project's quality at entry is rated moderately satisfactory.**

### Quality-at-Entry Rating

Moderately Satisfactory

#### b. Quality of supervision

The Bank team worked closely with the government and the implementing agencies to ensure that this large railway project was completed to high quality standards and in compliance with Bank policies despite financing only four percent of the project cost (ICR, para 65). The Bank task team regularly monitored the project implementation progress and ensured compliance with financial management, procurement, and safeguards procedures. In addition, the task team carried out a complete social safeguard mission annually to address issues related to land acquisition, resettlement, and social safeguard monitoring. The Bank team provided additional technical guidance on social safeguards monitoring to the third-party social safeguard monitoring agency when the quality of the monitoring reports was deficient. According to the ICR (para 65) the task team prepared regular ISRs and the progress ratings were appropriate. IEG's discussion with the Bank task team showed that they are still following up with the Borrower on the outstanding resettlement compensation payments even though the project closed more than a year ago.



The Bank task team provided implementation support with the necessary expertise, which the Borrower appreciated (ICR, Annex 5). The Bank task team also provided broader technical assistance and knowledge products on railway transport in the framework of a separate and longer-term engagement.

However, the Bank task team did not restructure the project to include indicators to measure the impact of the passenger high-speed line on freight transport in the corridor or change the PDO to exclude the reference to freight transport.

The Bank task team did not travel to the project site to carry out the ICR preparation mission because of Covid-19. Instead, the task team conducted the mission virtually, which negatively impacted the quality of the evidence on project impacts (see Section 14). Discussions between IEG and the Bank task team revealed that supervision teams made huge efforts to obtain data on indicators and information for the economic analysis in the ICR (see Sections 9 and 14 of this review).

In summary, the Bank task team adequately supported the implementation of this technically complex project and made huge efforts to collect data for ICR preparation. However, the Bank did not restructure the project to correct the design shortcoming related to the inclusion of freight transport in the PDO or include indicators to measure freight transport. Consequently **Bank performance in supervision is rated moderately satisfactory**.

### Quality of Supervision Rating

Moderately Satisfactory

### Overall Bank Performance Rating

Moderately Satisfactory

## 9. M&E Design, Implementation, & Utilization

### a. M&E Design

The Project Company, i.e., HuZhang Company, was to be responsible for monitoring and evaluation. It was expected to monitor the project implementation progress and collect data to monitor the extent to which the project's indicators were achieved (PAD, paras 34 and 35).

The results framework included three PDO and two intermediate indicators. The PDO indicators had limitations. The number of annual passengers is neither a good and direct measure of accessibility, understood as ease of reaching destinations, nor for mobility, understood as the ability and ease to move people and goods. In terms of accessibility, the project could have measured which destinations are easier to access for whom. As for mobility, since enhanced mobility in this project was necessary because of inadequate capacity and service quality on the corridor (PAD, para 14), the project could have measured the increase in capacity or service quality on the corridor for both passengers and freight transport. The indicators measuring the reduction in travel time and the increase in train pairs could indicate both easier access and greater mobility, hence they do not distinguish between the achievement of Objectives 1 and



2. Also, the PDO indicators defined in the PAD only measured what happens on the project line and not on the corridor as a whole even if the PDO explicitly refers to the corridor.

The PDO indicator targets were conservative. Nine million annual high-speed rail passengers on this 286 kilometers line compares favorably with the ridership of the Thalys, the high-speed line that mainly connects Paris with Brussels (about 300 kilometers) and cities in the Netherlands and in Germany, which in 2019 carried 7.85 million passengers (<https://en.wikipedia.org/wiki/Thalys>). However, the passenger number estimated in the appraisal's economic analysis for 2020, about two years after the original opening date of the line, was 18.3 million (ICR, annex 4, table 1). This much higher estimate of the annual passengers shows that the target used was not ambitious. The train pairs target was also not ambitious because it was significantly lower than the estimate for 2020 in the appraisal's economic analysis. The travel time reduction target of 100 minutes was also conservative for two reasons. First, because the actual travel time was 14 percent lower than the target, i.e. 86 minutes versus a target of 100 minutes. This time can be precisely calculated in advance based on distance and the train speed, and there is no reason for a large discrepancy. In addition, the ICR, para 29, mentions that the design speed was reduced from 350 to 250 km/hour. With a design speed of 350 km/hour, the expected travel time to cover 286 kilometers would have been less than an hour. Therefore, an ambitious or even realistic target would have been much lower than 100 minutes.

The M&E design also lacked definitions. For instance, the PAD (Annex 1) does not mention the number of coaches a train pair is composed of, therefore, it does not provide any information on the capacity of a train pair.

The most important shortcoming of the M&E framework, however, is the absence of PDO indicators for freight transport, in particular on freight transport time reductions, which was part of the PDO statement. The ICR, para 49, points out that a PDO indicator on freight volumes on the existing conventional railway line would have been helpful to gauge improved freight rail capacity on the conventional railway line due to shifting of passenger traffic to the high-speed line.

## **b. M&E Implementation**

According to the ICR (para 50), the Project Company collected and reported the M&E data in the semi-annual progress reports. However, the interview with the Bank task team showed that the Borrower only provided limited data for ICR preparation and the team had to make a considerable effort to collect data from alternative sources. IEG experienced similar difficulties in obtaining data from China Railways when preparing a Project Performance Assessment Report for two previous railway projects in 2018.

The ICR (para 49) mentions that the definition of indicators were added during the 2018 restructuring, but those definitions were already in the PAD (Annex 1, footnotes). As mentioned earlier, the Bank task team did not restructure the project to retrofit the M&E design with freight transport related PDO indicators or change the PDO.

## **c. M&E Utilization**

According to the ICR (paras 50 and 51), the Bank team and the Project Company used the M&E data to closely monitor project progress against targets, flag delay in project implementation, and take actions to



address arising problems, including the May 2018 level two restructuring to ensure achievement of the PDO. During implementation, the analysis of the M&E data helped identify the slow implementation and enabled the Bank team and the Project Company to take timely actions to identify the problems and address them. Given the difficulties in obtaining data on project achievements at the ICR stage, this statement must necessarily only apply to the intermediate indicators that measured the completion rate of civil works and the delivery of Bank-financed goods.

## M&E Quality Rating

Modest

## 10. Other Issues

### a. Safeguards

The project was classified as category A for environmental assessment purposes. The main environmental concerns identified included (i) crossing sensitive sites, such as a nature reserve and water resource protection areas; (ii) construction impacts, such as noise, dust, soil erosion and social disturbance; and (iii) operational related impacts such as noise, vibration, safety and community severance (PAD, para 28). The project was also expected to have large land acquisition and resettlement implications, impacting 7,500 people, with the relocation of 3,600 people from 1,078 households (PAD, para 49). The following safeguards policies were triggered: Environmental Assessment OP/BP4.01, Natural Habitats OP/BP 4.04, Physical Cultural Resources OP/BP 4.11, and Involuntary Resettlement OP/BP4.12.

The Borrower prepared an environment impact assessment, an environment management plan, ecological and biodiversity study, archeological survey, a resettlement action plan, a resettlement framework, and social assessment.

**In terms of environmental performance**, according to the ICR (paras 53 and 54), the HuZhang Company diligently implemented the environmental management plan. They adopted good environmental protection measures, including clean site management, proper wastewater treatment and recycling, retaining walls at disposal sites, avoidance of disturbance beyond the right-of-way, and good quality of slope protection. The project's independent external environmental monitoring agency and Bank supervision missions confirmed the project's environmental compliance and its satisfactory performance. The last six ISRs consistently rated the project's environmental performance as satisfactory.

**With respect to social safeguards**, the project affected 7,416 households and 168 firms, including 1,879 employees in the Inner Mongolia and Hebei provinces. It required the acquisition of 14,867 mu\* of land, of which 57 percent was farmland. During construction, 6,717 mu of land was temporarily occupied and later restored. By project end, the Borrower completed the compensation payments of RMB2,156 million (about US\$317 million) in Inner Mongolia. In the Hebei province, the Borrower paid 96 percent of the compensation payments (RMB1,664 million, about US\$245 million). The remaining payment of RMB67 million in Hebei Province was still outstanding by ICR submission because of a funding shortage of RMB57 million and unresolved compensation disputes. The Bank task team agreed on the following steps to ensure that the issues will be satisfactorily resolved: (i) the Zhangjiakou Municipality applied for a loan to cover the funding gap of RMB 56 million; (ii) the Wanquan District Government retained replacement apartments and the compensation funds for the three households that refused to accept the compensation amount were



deposited in an escrow account in line with the resettlement action plan; (iii) the compensation funds for the three firms that rejected the compensation amount were also deposited in an escrow account in line with the resettlement action plan, (iv) the Huzhang Company agreed to retain the external monitoring company to monitor and prepare external monitoring reports on compensation payments, and (v) the Bank task team continues to monitor the final compensation payment. The ICR, para 61, points out that, overall, the Huzhang Company carried out land acquisition and resettlement in a moderately satisfactory way in compliance with local regulations and the resettlement action plan and with minor issues in completing compensation payments. The last six ISRs consistently rated the social safeguard performance as satisfactory.

\*Chinese unit of land measurement that varies with location but is commonly 806.65 square yards, 0.165 acre, or 666.5 square meters.

**b. Fiduciary Compliance**

**As for procurement**, the World Bank financed bridge bearings, sleepers, fasteners, telecommunication equipment, signaling equipment, information system equipment, catenary equipment, electric equipment, traction equipment, and maintenance equipment, which the Borrower procured through international competitive bidding in line with Bank rules and procedures. The Borrower financed the civil works and consultancy services contracts and procured them in accordance with China Tendering and Bidding Law. The ICR does not mention any procurement problems. The last six ISRs rated procurement as satisfactory.

**In terms of financial management**, the respective institutional and operational arrangements were satisfactory throughout the project. According to the ICR (para 62), the financial management system provided, with reasonable assurance, accurate and timely information that the Bank loan proceeds were used for the intended purposes. The Borrower submitted the interim unaudited financial reports. The annual financial reports had “unqualified” opinions. The ICR does not mention any financial management problems. The last six ISRs rated the financial management performance of the project as satisfactory.

**c. Unintended impacts (Positive or Negative)**

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**d. Other**

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**11. Ratings**

Ratings	ICR	IEG	Reason for Disagreements/Comment
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Outcome	Satisfactory	Moderately Unsatisfactory	The project did not achieve improved accessibility and mobility of freight transport and therefore only partly achieved the PDO. Since there were significant shortcomings in the achievement of the project's objectives its outcome has been rated moderately unsatisfactory.
Bank Performance	Satisfactory	Moderately Satisfactory	Because of the shortcomings in risk identification and mitigation, passenger demand estimates, and M&E design as well as the failure to restructure the project, adjust the PDO, or include indicators to measure freight transport, quality at entry and supervision were rated moderately satisfactory
Quality of M&E	Modest	Modest	
Quality of ICR	---	Substantial	

## 12. Lessons

The following lessons have mostly been derived and summarized from the ICR, with minor additions by IEG after discussions with the Bank task team:

**Limited Bank financing can provide project stakeholders with confidence that economic, fiduciary, and safeguard aspects of large infrastructure projects are adequately carried out.** This and the other four high-speed rail projects financed by the Bank in China followed the World Bank's policies and procedures in financial management, procurement, environmental and social safeguard despite the Bank's small financing contribution, i.e. two to five percent of project costs. Capacity assessments, trainings, establishment of proper management arrangements, and preparation of adequate financial management, procurement, environmental, and social documents were carried out and prepared. In addition, the Bank task team reviewed the Borrower's economic assessment and carried out its own assessment. All this gave project stakeholders confidence that these aspects of project implementation were properly taken care of.

**For a railway or any other large infrastructure to be successful (and cost-effective) long-term planning, strong government commitment, and an experienced implementation agency are essential.** The Chinese government played a key role in putting a comprehensive system in place to enable the impressive creation, galvanization, and implementation of the railway program development. According to the Bank task team, the Chinese government made a long-term commitment and invested in everything necessary, such as the creation of engineering capacity and rolling stock development. This enabled the contractors to make long-term commitments, hence invest in human capital and equipment, and brought costs down. The China Railways Corporation



took on the main responsibility for planning, financing, and implementing individual projects. It created the infrastructure delivery mechanisms, such as the joint venture companies with local governments. It was responsible for collaboration and coordination with local governments, and for the delivery of China's national railway services. This, combined with legal and institutional powers, strong technical capacity, access to the operating cash flows of the railways and the ability to borrow, gave China Railways the agility to plan and deliver projects very quickly. Cooperation between national and local authorities, a unified control over the project by China Railways, as well as the overall commitment of the government and the implementing agencies, enabled the project to be a technical and environmental success.

**Although agglomeration benefits are important, they can only be partially assessed by project end.** The quantification of agglomeration benefits is important in evaluating the benefits of passenger railway projects. At appraisal, the agglomeration benefit model developed for the project captured the benefits to companies from direct cost and time savings as the project's connectivity enhancements enable companies to locate or expand in the region. Although agglomeration benefits are recognized at a theoretical level in China, there are only few quantitative studies on the topic. The agglomeration benefit model provided a comprehensive analysis and indicated meaningful benefits of the project's agglomeration impacts. However, at project close, the Bank could not confirm the agglomeration benefits in the first years of operation because the planned onboard survey could not be carried out due to Covid-19 disruptions. These onboard surveys would at least have provided the project with qualitative data on early impacts. Given that it usually takes about 10 years for agglomeration benefits to be fully realized, an assessment should be carried out in later years to evaluate the agglomeration benefits. This could be done by IEG through project performance assessment reports.

**Good project preparation is an element for the success of large and technically complex infrastructure investment projects.** In this project, an early and good preliminary project design was the basis of the feasibility report and initial cost estimates. The subsequent detailed design did not deviate significantly from the preliminary design. In addition, applicable standards and technical specifications for railway construction and material inputs were formulated and adhered to strictly. The project had an effective quality control system both for contractors and project management, and as a result no significant problems occurred during testing and commissioning of the railway line. All construction and supply activities were identified, and their inter-dependence was established. Meticulous planning and control of critical activities prevented delays during construction. Red flags on lagging activities were acted on quickly. Qualifications and experience of contractors were defined carefully, so that only those with credible past performance and with adequate resources were able to bid for contracts. An efficient procurement team ensured on-time availability of materials. Timely land acquisition was another critical factor since for a linear project any break in land availability is very disruptive. All this eventually ensured the success of the project.

### 13. Assessment Recommended?

Yes

Please Explain



IEG could undertake a project performance assessment of agglomeration benefits generated by railway or metro projects financed by the Bank because these benefits only materialize in the long run.

## 14. Comments on Quality of ICR

The ICR is very well written, concise, and complies with Bank guidelines. It includes a particularly useful graph with the gradual opening of the high-speed line. The ICR is relatively candid, but sometimes uses a slightly "defensive tone" or "embellishing language". For instance, it uses adjectives, such as "minor", even if the context does not justify it (e.g. "minor" shortcoming in risk assessment when the oversight was relatively serious (ICR, para 64) and "minor" shortcomings in the results framework even if the ICR identifies several shortcomings (ICR, paras 42 and 49). Another example is in the ICR, para 49, which states that the M&E system was comprehensive and effective in monitoring and evaluating the project progress when the ICR later recognizes several shortcomings and the difficulties to gather data for the ICR preparation.

The quality of evidence suffered because of the impossibility to carry out on-board surveys because of Covid-19, which did not enable the task team to collect evidence from the project passenger high-speed line, and the general reluctance of the Borrower to share data. The Bank task team pointed out that they looked everywhere for data. This is confirmed in the ICR, which includes many references to websites as alternative sources of evidence.

The ICR is results-orientated even if it presents the achievement of the outcomes largely in terms of compliance with indicators. For Objective 1, the ICR presents additional outputs/outcomes to supplement the evidence on accessibility from indicators. The evidence provided to make the case that the Covid-19-related reduced passenger demand is likely to bounce back is reasonable. These are important efforts considering the Bank task team's difficulties in collecting data for the ICR preparation.

Because of the lack of data, an immense and creative effort went into the preparation of the ex-post economic analysis, which draws heavily on the recent literature on high-speed railways in China. It also refers to high-speed development in France. The presentation of some of the tables in Annex 4 in the ICR, though, could have been clearer. The Bank task team pointed out that they did not prepare a sensitivity analysis because this is not required for an ex-post analysis, which should be based as much as possible on actual data. However, the uncertainties in terms of demand mainly because of Covid-19 and in other parameters would have justified it in this case.

The lessons are largely based on evidence, but the key message is sometimes buried in the text.

The ICR does not mention how the pandemic impacted due diligence in project supervision and provides limited information on the ICR mission/data collection to assess the performance of the project.

On balance, given the great effort by the Bank team and despite some shortcomings, **the quality of the ICR is rated substantial.**

### a. Quality of ICR Rating Substantial

