

Does China-Europe Railway Express promote the growth of foreign trade in China?

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Abstract

Transportation infrastructure has a significant impact on the trade growth. The improvement of traffic infrastructure is conducive to saving transport cost and shortening temporal and spatial distance. China-Europe Railway Express, born to promote trade communication between China and countries along the Silk Road Economic Belt in 2011, provides a new international transportation corridor to opening wider to the outside world. I adopt DID method and uses the panel data of China from 2004-2017 to examine the impact of CR-Express on the trade growth. The result shows that CR-Express significantly stimulates the trade growth and in analysis of regional heterogeneity I find that the impact is greater in coastal regions and in places with free trade zone.

1 Introduction

CR-Express train, as the important infrastructure construction project in One Belt One Road initiative, creates west, middle, east three routes for international trade. In the past, 90 percent of the cargo transport in China-Europe trade relied on the ocean shipping. But CR-Express makes use of the land ports' geographical advantages, and greatly shorten the transport time from 40-45 days by ship to 12-15 days by train from Chinese central cities to West European central cities (Wang, 2015). According to the trade gravitation model, the distance between two countries will affect the trade volume. The closer the distance is, the larger the trade volume. Efficient and sustainable rail transport shortens the spatial and temporal distance between China and Europe.

Based on these theories, I raise the assumption that the CR-Express will promote the foreign trade growth in China. This effect will be more significant in inland area compared with the coastal areas.

2 Data Description and Model Setting

This paper uses Difference-in-Difference to examine the effect of CR-Express. I set the cities inaugurating CR-Express and achieving normal operation(with CR-Express running every week) as the treated group, the cities without it as control group. The cities that achieve normal operation are Zhengzhou, Suzhou, Wuhan, Dongguan, Jinhua, Chongqing, Changsha, Tianjing, Changchun, Hefei, Chengdu, 14cities. This paper uses data of 285 cities in China from 2004-2017 to evaluate the trade growth effect of CR-Express train. The data mainly comes from the China Statistical yearbook, statistical yearbooks of provinces, one belt one road official website. Based on DID method, the basic model is:

$$\text{trade}_{it} = \beta_0 + \beta_1 \text{treat}_{it} \times \text{time}_{it} + \gamma Z_{it} + v_t + u_i + \varepsilon_{it} \quad (1)$$

The main explained variable, trade_{it} is the export and import trade volume of region i during time t . The main explanatory variable is $\text{treat}_{it} \times \text{time}_{it}$; treat_{it} is a policy dummy variable: the region where the CE-Express is opened is 1, and it is 0 in region without CR-Express; time_{it} is a time dummy variable: the year after the opening of CR-Express is 1, and the year before the opening is 0.

As there may be other factors influencing the location choice of CR-Express and the trade volume, I control some of the variables. (1) The logarithm of GDP per capita($\ln \text{gdp}$) is used to reflect the level of regional economic development. (2) The logarithm of FDI($\ln \text{fdi}$) reflects the attraction to the foreign investment. (3) The market size of one region is shown as the logarithm of permanent residents. (4) The share of government spending in GDP.

3 Empirical Analysis

I use Stata to do regression on equation (1). From column(1) to (5), it's the regression result. The result shows that as the number of control variables increases, the coefficient of the core explanatory variable, $textttreat_{it} \times time_{it}$ is positive at the 1% significance level. It means that controlling the market size(lngdp, market), inward FDI(FDI), industry development conditions(industry), CR-Express has a significant trade promotion effect. The (6) column is the final regression result, which shows that given other conditions, compared with regions without CR-Express, the regions with normal operation of CR-Express increase the trade volume significantly. The run of CR-Express not only reduce the transport cost, promoting foreign trade, but expand the economic hinterland of node cities, and gathering the goods in the surrounding cities

Table 1: basic regression

Variables	(1) trade	(2) trade	(3) trade	(4) trade	(5) trade	(6) trade
treat*time	2.612*** (0.424)	1.634*** (0.296)	1.329*** (0.257)	1.323*** (0.253)	0.879*** (0.242)	0.731*** (0.218)
lngdp		1.614*** (0.151)	2.037*** (0.169)	1.970*** (0.171)	2.115*** (0.154)	1.589*** (0.137)
industry			-0.037*** (0.009)	-0.037*** (0.009)	-0.015* (0.008)	-0.017** (0.007)
fiscal				0.325* (0.188)	0.484*** (0.167)	0.256* (0.142)
market					1.225*** (0.098)	0.910*** (0.100)
lnfdi						0.279*** (0.038)
Constant	20.204*** (0.079)	3.811** (1.516)	1.333 (1.499)	2.900* (1.724)	-6.363*** (1.930)	-2.351 (1.585)
Time fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,998	3,701	3,700	3,699	3,699	3,514
R-squared	0.576	0.703	0.719	0.721	0.797	0.824

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4 Robustness Test

4.1 Parallel Trend Hypothesis Test

An important prerequisite for DID estimation is the parallel trend of trade volume of cities with China-Europe freight trains and cities without China-Europe freight trains. Based on the equation (1), I refer to the method used by Wei et al.(2021), adding the dummy variable of preceding and lagging terms. D_{it}^a is the current dummy variable of the implementation of the CR-Express. And the econometric model is set as below:

$$trade_{it} = \beta_0 + \sum_{a=-5}^5 \beta_a D_{it}^a + \gamma Z_{it} + u_i + v_t + \varepsilon_{it} \quad (2)$$

Figure (1) is the result of event study. The result shows that the coefficients of the preceding terms(pre5 to pre1) is not significantly different from 0, and the lagging terms(post1 to post5) is significantly positive under 5% significance level. There is no prior correlation, and the trade volumn increases with the implementation of CR-Express. The result assembles the basic regression result.

4.2 Based on transportation mode

It's possible that the trade promotion effect is due to the improvement of other transportation infrastructure. In order to exclude the trade promotion impacts of improvement in other transportation construction, I add the transportation mode variables into the control variables respectively. I control the development of other transportation mode, air transport, water transport, rail transport, and road transport. I use the cargo volume of each transport

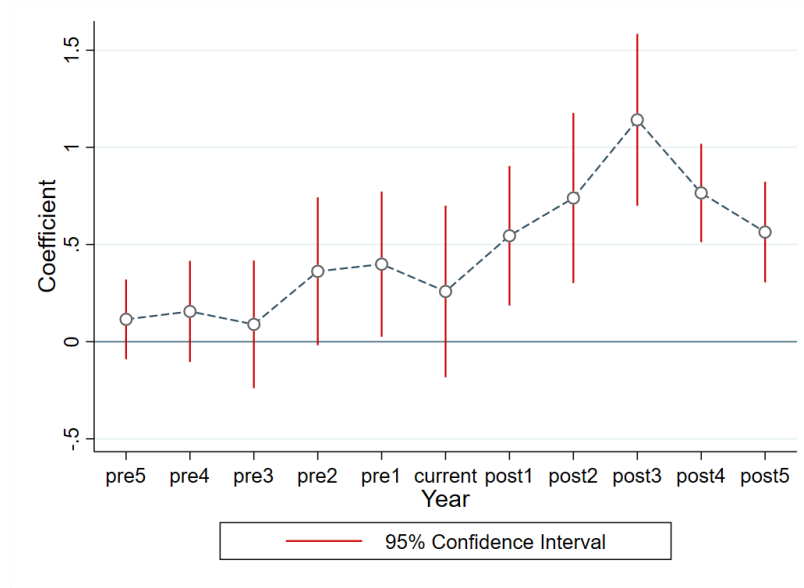


Figure 1: Parallel Trend Hypothesis Test

mode to measure the development. The result shows that the coefficients of the main explanatory variable remain significantly positive, so the impact of CR-Express on trade growth is significant.

Table 2: Robustness Check II

VARIABLES	(1)air trade	(2)road trade	(3)water trade	(4)rail trade
open	0.600*** (0.213)	0.744*** (0.220)	0.615*** (0.209)	0.736*** (0.195)
lngdp	1.210*** (0.231)	1.507*** (0.146)	1.410*** (0.141)	1.507*** (0.137)
industry	-0.020** (0.009)	-0.016** (0.007)	-0.011 (0.008)	-0.020** (0.008)
fiscal	0.055 (0.173)	0.219 (0.140)	0.229 (0.163)	0.320** (0.151)
mark	0.607*** (0.158)	0.817*** (0.116)	0.638*** (0.117)	0.844*** (0.114)
lnfdi	0.321*** (0.059)	0.280*** (0.038)	0.351*** (0.047)	0.334*** (0.040)
air	0.120*** (0.029)			
road		0.117* (0.061)		
water			0.041* (0.024)	
rail				-0.060* (0.033)
Constant	1.755 (2.428)	-2.099 (1.586)	0.018 (1.747)	-0.898 (1.628)
Observations	1,311	3,506	2,318	2,637
R-squared	0.882	0.825	0.861	0.815
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

5 Heterogeneity Analysis

I did heterogeneity analysis based on the regional difference. The column 1 to 4 in table 3 show the trade promotion effect in coastal areas and inland areas, provinces with free trade zone and without free trade zone respectively. Comparing column 1 and 2, the impact is significant in coastal areas while insignificant in inland areas.

The marginal improvement impact is larger in eastern area, which may due to the inherent economic advantages. Comparing column 3 and 4, in provinces with free trade zone, the trade promotion effect is significantly larger. Provinces with free trade zone may provide more policy supporting opening-up and facilitate the flow of cargo, fund, human capital and so on.

Table 3: Heterogeneity Analysis

VARIABLES	(1) inland trade	(2) coastal trade	(3) with FTZ trade	(4) without FTZ trade
open	0.548 (0.341)	0.839*** (0.175)	0.747*** (0.269)	0.656** (0.307)
lngdp	1.687*** (0.216)	1.421*** (0.150)	1.492*** (0.198)	1.722*** (0.178)
industry	-0.021** (0.010)	-0.001 (0.008)	-0.006 (0.008)	-0.025** (0.010)
fiscal	0.261 (0.174)	0.351 (0.248)	0.168 (0.206)	0.297 (0.191)
mark	1.099*** (0.129)	0.610*** (0.123)	0.843*** (0.155)	0.993*** (0.127)
lnfdi	0.240*** (0.050)	0.339*** (0.054)	0.310*** (0.064)	0.244*** (0.046)
Constant	-4.316* (2.310)	0.704 (1.857)	-1.782 (2.260)	-3.538* (2.003)
Observations	2,041	1,473	1,467	2,047
R-squared	0.707	0.851	0.876	0.774
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

6 Conclusion

I use 285 cities' data from 2004 to 2017 to examine the trade promotion effect of the implementation of CR-Express. The result shows that the CR-Express significantly promotes the trade in the cities with CR-Express and especially the coastal areas and provinces with free trade zone. As the important infrastructure project in One Belt One Road, CR-Express is expected to open the door to increased international trade.

References

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