The Impact of Specific Mode of Transportation Infrastructure on Return Value Added

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Abstract: From the perspective of return value added and combined with specific mode of transportation infrastructure, this paper uses the world input-output table from WIOD to calculate the impact of specific mode of transportation infrastructure on return value added of China's export. The results show that: (1) the infrastructure construction of road, railway, sea and air transportation all have significant influence on the value added of return in export. (2) After distinguishing the quality and quantity indicators, it is found that the quantity indicators of highway, railway and marine infrastructure have a significant impact on the returned value added in exports; however, the quality and quantity indexes of air transport have a negative effect on the value added returned from exports. (3) After distinguishing export target countries, it is found that the improvement of transportation infrastructure quality in high-income countries has a significant effect on the added value returned, while the improvement of transportation infrastructure quantity in middle-income countries has a significant effect on the added value returned.

1. Introduction

Satisfactory infrastructure has many advantages and can promote the economic prosperity and development of a region. From the perspective of economic theory, the promotion of infrastructure construction to economic development is generally attributed to the multiplier effect, that is, a certain scale of government investment, through the amplification of investment multiplier, can promote the development of relevant industrial chains, thereby promoting economic growth. Vertical specialization in global value chains determines that countries need to import some or all of their intermediate inputs, and then combine them with domestic production to produce final products or intermediate inputs used in the next stage of production for re-export. Since intermediate products in international trade need to cross borders many times, it puts forward more stringent requirements for the road, port, railway, aviation and other infrastructure in a country. In this context, for China, which mainly processes and exports intermediate goods, strengthening infrastructure construction has an important impact on promoting the total volume of trade and the ability to gain added value of trade.

However, specific modes of infrastructure have different impacts on trade. Therefore, in this paper, the impact of specific modes of infrastructure on trade value-added, especially the return value added in export value-added, is emphatically studied. Through experiments on different dimensions of infrastructure modes, whether the impact of infrastructure quality and quantity on trade added value is the same or which one of them has the greater impact is tested, thus pointing out the direction of future infrastructure construction in China.

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2. Literature review

The role of infrastructure in economy has been studied for a long time, and its scope is quite extensive, which can be divided into two categories: One is to study the role of infrastructure in promoting the economy, including increasing productivity [1-3] reducing production costs,[4] increasing output levels,[5] and promoting international trade flows.[6] Empirically, Lakshmanan [7]provided a theoretical basis for the positive impact of transportation infrastructure construction on international trade flows. He believed that infrastructure construction will improve the freight and service markets by reducing costs and transport time or improving transport reliability and service quality, on which basis, total factor productivity and gross domestic product will be ultimately increased as investment improves international trade flows. At the same time, Bougheas et al. [8] emphasized the impact of infrastructure on bilateral trade. By constructing theoretical models, they proved that there is a positive correlation between infrastructure stock and bilateral trade volume. The other is the negative impact of infrastructure construction on the economy. Puga [9] once pointed out that investment in infrastructure may lead to greater inequality among regions within a country, resulting in a serious central-periphery structure. It is thus clear that the discussion and research on the economic effects of transportation infrastructure are still open, so it is necessary to further analyze the relationship between transportation infrastructure and international trade.

Various studies have also shown that international trade itself is an important driver of economic performance and can benefit countries, enterprises and individuals. Relevant theoretical studies have found that international trade can increase average productivity and reduce the average premium level of companies [13]from the perspectives of economic growth rate[10][11]and national income level.[12] Although the enterprises with low production efficiency are eventually eliminated by the market, the size of the remaining companies in the market is increasing, and the types of products are also increasing. However, from the point of view of import, a large number of imports of a country can bring about technology spillover effect,[14] and then improve its total factor productivity and overall productivity level through the technology spillover absorption effect of the importing country.[15]

It is found that the measurement of transportation infrastructure is an overall indicator, lacking of sub-indicators both in the literature review of research on the transportation infrastructure construction and in the international trade theory. Therefore, there is a lack of comprehensiveness and accuracy in measuring the impact of specific transportation infrastructure construction. Moreover, the study of international trade only stays in the field of total trade, and can not accurately measure the actual trade profitability level in a country. In order to further reveal the impact of specific modes of transportation infrastructure construction on a country's actual trade benefit level, the impact of different types of transportation infrastructure changes on a country's trade added value will be the focus in the study in this paper. Research on the impact of specific modes of infrastructure construction at home and abroad is relatively simple, most of which focus on one or two of them. Duranton, Morrow and Turner (2014) assessed the U.S. road network and found that for every 1% reduction in road mileage distance between two cities, trade between these cities will increase by 1.4%. Duranton [16] also found that trade flows are less sensitive to road mileage distance which has a negative effect on trade value. Lin Mengyao and Zhang Zhongyuan (2019) empirically tested the impact of the quality of logistics facilities on the trade of China's industrial sectors by constructing the index of the degree of participation of China and its trading partners in the global value chain in the primary industry and manufacturing sectors. The results show that the quality of logistics facilities has a significant role in promoting the trade of primary industries and manufacturing sectors in China. Specifically, at the national level, Volpe, Martincus, Carballo and Cusolito (2017) found that Peru's road construction can boost the export of domestic companies. Cosar and Demir [17]found that the increase of road capacity has a significant effect on trade flows. As far as China is concerned, Liu Binglian, Wu Peng and Liu Yuhai (2010) studied the relationship between China's transportation infrastructure and total factor productivity growth by using spatial panel measurement method. The results show that transportation infrastructure has a significant positive impact on China's total factor productivity. The value-added decomposition of trade can be traced back to the concept of "vertical specialization" put forward by Bela Balassa in the 1960s. Later, Hummels [18] further improved the quantification of vertical specialization, using VS (imports included in one country's exports) and VS1 (the part used for export by other countries as intermediate input) as measurement indicators. Koopman [19] then supplemented Hummels' vertical specialization measurement method, proposed a decomposition method of a country's total exports, and decomposed the exports into nine parts. However, Koopman's method can not reflect the heterogeneity of various exports during decomposition, so Wang Zhi et al. (2015) expanded Koopman's method and proposed a decomposition method of total trade flow at various levels, thus establishing a complete set of trade accounting system.

3. Influencing mechanism and theoretical hypothesis

Aschauer (1989) argued that infrastructure investment can boost output and productivity. By estimating the total production function, he believed that infrastructure capital financed by the public sector increases private sector productivity, while public infrastructure investment stimulates private sector investment by increasing the return on private sector investment. Subsequently, Munnell (1990) extended this argument and concluded that the decline in labor productivity was not due to the decline in some multifactor productivity or technological progress, but rather to the slowdown in public infrastructure growth.

Since this infrastructure capital is available to all companies in a region or even a country, it is regarded as a production function of all companies entering the region and a public factor besides individual factors. Therefore, the total production function is:

$$Y = Y\left(\overline{X}, PK\right) \tag{1}$$

Where, Y represents the total output of the economy, X represents the vector of private factors of production, usually labour (L), capital (K), and PK is the vector of public capital (such as transportation infrastructure).

If the relationship between infrastructure capital growth and economic output is positive and significant, it can be concluded that infrastructure investment is an important determinant of economic output. The output elasticity of transportation infrastructure, a typical formula estimated from the production function (1), reveals that public capital can stimulate economic output and productivity to a certain extent. The percentage of output change when the stock of output elastic public transport capital changes by 1%. The formula is as follows:

$$\mathrm{e}_{PK} = \frac{PK}{Y}\frac{\partial Y}{\partial PK} \tag{2}$$

In the formula above, e_{PK} is the output elasticity of infrastructure capital.

According to duality theory, the parameters of production function can be obtained from cost function. The same principle can also be applied to substitute infrastructure variables into production functions as unpaid inputs. The output cost of an enterprise is determined by the following factors: the cost of different input factors such as labor force and capital, the output level of the enterprise and the stock of infrastructure capital. In the cost function, enterprises choose the amount of private investment (such as labor, capital, etc.) to minimize the individual cost of Y production.

$$C = C\left(Y, \overline{P_X} PK\right) \tag{3}$$

In Formula (3), C is the total cost of output Y, vector P_X is the price of input of various private factors such as labor and capital, and PK serves public capital. Conditional input needs are:

$$X_i\left(Y, \overline{P_X}, PK\right) = \frac{\partial C}{\partial P_i} \tag{4}$$

For the purpose of this paper, the relative cost elasticity calculated by Formula (3) is that the output cost will be reduced by one percentage point when the infrastructure stock increases by one percentage point.

Therefore, on this basis, the value-added of trade is used as a measure of output to analyze the different impacts of different modes of infrastructure on it. Based on this, the following proposition is put forward in this paper: specific mode of infrastructure construction can significantly promote the added value of trade in a country.

4. Conclusion

4.1 Decomposition of added value of trade

The method of measuring trade added value originated from the input-output equation put forward by Leontief in 1936. However, the basic Leontief input-output method can only be applied to calculate the implied domestic added value in a country's total exports, because it can only be decomposed into the composition of domestic and foreign added value, and can not get the composition of the added value of intermediate trade between different countries. With the gradual rise of intermediary trade, more detailed decomposition of intermediary trade has become the key to the construction of a new accounting method for added value of trade, which is specific to different countries and sectors. In this paper, a simple three-country model is used to illustrate. Table 1 shows the relationship between input and output among three countries of S, R and T.

Table 1 Input and output model of three countries.

Output / Input		Intermediate use			Final use			Gross output
		S	R	T	S	R	T	
Intermediate input	S	Z^{ss}	Z^{sr}	Z^{st}	Y^{ss}	Y^{sr}	Y^{st}	X^{s}
	R	Z^{rs}	Z^{rr}	Z^{rt}	Y^{rs}	Y^{rr}	Y^{rt}	X^{r}
	T	Z^{ts}	Z^{tr}	Z^{tt}	Y^{ts}	Y^{tr}	Y^{tt}	X^{t}
Value added		VAs	VAr	VAt				
Total input		$(X^s)^T$	$(X^r)^T$	$(X^t)^T$				

In Table 1, superscripts s, r and t represent three countries of S, R and T, respectively. Z and Y represent the parts of products produced by three countries that are used as intermediate inputs and final products by other countries, and VA and X represent the added value and output of three countries respectively. The superscript T represents the transposed matrix of the corresponding matrix. Given the number of sectors in each country of three countries is n, the matrix of Z is n*n, the column vectors of X and Y are n*1, and the row vectors of V are 1*n in Table 1.

From a row perspective, there is an equilibrium formula as below:

$$Z + Y = X \qquad (5)$$

Where, Z= the column vector of the sum of intermediate inputs; Y=the column vector of the sum of final products and; X=the column vector of total inputs. According to the input-output relationship in Table 1, the direct consumption coefficient $A \equiv Z(X)^{-1}$ is defined, and the following formula can be obtained:

$$AX + Y = X \qquad (6)$$

The classical Leontief formula can be obtained by combining Formula (6) with the same term:

$$X = (I - A)^{-1} Y \qquad (7)$$

The $(I - A)^{-1}$ in Formula (7) is Leontief inverse matrix which is replaced by B matrix in this paper.

By decomposing the export of intermediate goods, the total export can be completely decomposed into different parts of added value from different sources and final consumption.

Firstly, the value-added coefficient is defined as $V^s \equiv VA^s(X^s)^{-1}$, and the definitions of V^r and V^t are similar. Then the value-added coefficient can be obtained as follows:

$$VB = \begin{bmatrix} V^s & V^r & V^t \end{bmatrix} \begin{bmatrix} B^{ss} & B^{sr} & B^{st} \\ B^{rs} & B^{rr} & B^{rt} \\ B^{ts} & B^{tr} & B^{tt} \end{bmatrix} = \begin{bmatrix} V^sB^{ss}+V^rB^{rs}+V^tB^{ts}, V^sB^{sr}+V^rB^{rr}+V^tB^{tr}, V^sB^{st}+V^rB^{rt}+V^tB^{tt} \end{bmatrix} \quad (8)$$

Each element in Formula (8) is equal to 1, that is, the final product output can be decomposed into the added value of each country and each sector, which is also a method of decomposing the final product according to the direction of value source and the backward link between industries. For Country S, there is:

$$u = V^sB^{ss} + V^rB^{rs} + V^tB^{ts} \quad (9)$$

If E^{sr} is used to represent the export of S to R, then $E^{sr} = A^{sr}X^r + Y^{sr}$. The total exports of State S can be decomposed into: $E^s = E^{sr} + E^{st} = A^{sr}X^r + A^{st}X^t + Y^{sr} + Y^{st}$. The total export decomposition of R and T refers to the situation of S. So Formula (6) can be transformed into:

$$diagAX + Y + E = X \quad (10)$$

In Formula (10) above, diagA= the direct consumption coefficient diagonal matrix composed of direct consumption coefficients of each country; X= the total output of each country; Y= the final product consumed by each country in its own country and; E= the total export of each country.

From the transformation of Formula (10), the Leontief's formula for the single country model can be obtained.

$$\begin{bmatrix} X^s \\ X^r \\ X^t \end{bmatrix} = \begin{bmatrix} L^{ss}Y^{ss} + L^{ss}E^s \\ L^{rr}Y^{rr} + L^{rr}E^r \\ L^{tt}Y^{tt} + L^{tt}E^t \end{bmatrix} \quad (11)$$

$L = (I - A)^{-1}$ denotes the domestic Leontief inverse matrix of each country. According to Formula (11), the intermediate export of S to R can be decomposed into:

$$Z^{sr} = A^{sr}X^r = A^{sr}L^{rr}Y^{rr} + A^{sr}L^{rr}E^r \quad (12)$$

Combining the above formulas (5) - (11), the total exports of S to R can be decomposed into:

$$\begin{aligned} E^{sr} &= A^{sr}X^r + Y^{sr} \\ &= \left(V^sB^{ss}\right)^T \# Y^{sr} + \left(V^sL^{ss}\right)^T \# \left(A^{sr}B^{rr}Y^{rr}\right) + \left(V^{ss}L^{ss}\right)^T \# \left(A^{sr}B^{rt}Y^{tt}\right) \\ &+ \left(V^sL^{ss}\right)^T \# \left(A^{sr}B^{rr}Y^{rt}\right) + \left(V^sL^{ss}\right)^T \# \left(A^{sr}B^{rt}Y^{tr}\right) + \left(V^sL^{ss}\right)^T \# \left(A^{sr}B^{rr}Y^{rs}\right) \\ &+ \left(V^sL^{ss}\right)^T \# \left(A^{sr}B^{rt}Y^{ts}\right) + \left(V^sL^{ss}\right)^T \# \left(A^{sr}B^{rs}Y^{ss}\right) + \left(V^sL^{ss}\right)^T \# \left[A^{sr}B^{rs}\left(Y^{sr} + Y^{st}\right)\right] \\ &+ \left(V^sB^{ss} - V^sL^{ss}\right)^T \# \left(A^{sr}X^r\right) + \left(V^rB^{rs}\right)^T \# Y^{sr} + \left(V^rB^{rs}\right)^T \# \left(A^{sr}L^{rr}Y^{rr}\right) \\ &+ \left(V^rB^{rs}\right)^T \# \left(A^{sr}L^{rr}E^r\right) + \left(V^tB^{ts}\right)^T \# Y^{sr} + \left(V^tB^{ts}\right)^T \# \left(A^{sr}L^{rr}Y^{rr}\right) + \left(V^tB^{ts}\right)^T \# \left(A^{sr}L^{rr}E^r\right) \end{aligned} \quad (13)$$

In Formula (13), total exports at the bilateral level are decomposed into 16 parts according to the source of value of exports and the final consumer country. In this paper, the sum of Part 6, Part 7 and Part 8 is selected, that is, returned domestic added value (RDV). RDV is chosen because it not only has a return-based Global trade flow model of re-import after export, but also takes into account both exports and imports in its participation in global value chains.

4.2 Data related to transportation infrastructure

In this study, trade data are divided according to different countries, so the indicators used in this paper to measure specific model infrastructure are also specific to the national level. In addition, in the process of analysis, the quality and quantity of transportation infrastructure are further specified. Since the improvement of infrastructure quality and the increase of infrastructure quantity may have different impacts on trade, which can provide additional insights for infrastructure planners to guide infrastructure planning more reasonably.

The indicators for measuring the quality of road, rail, sea and air transport are selected from the Global Competitiveness Report issued by the World Economic Forum, which can well reflect the quality of different types of transportation infrastructure in a country. In this paper, the data of International Road Association are used to measure the number of roads; the railway mileage data of each country in WDI database are selected to measure the number of railways; the container port traffic on the UNCTAD website is selected as the index to measure the number of shipping and; WDI air cargo volume data is selected as the index to measure the quality of air transport.

5. Modeling

5.1 Models

Previous analysis shows that the specific mode of transportation infrastructure construction will have an important impact on the return value added of a country. In this paper, a data panel from 2007 to 2014 is established using the return value added of China's exports to other countries in the world input-output table. The econometric model is as follows:

$$RDV_{it} = \beta_0 + \beta_1 Model_{it} + \beta Controls + v_i + v_t + \varepsilon_{it} \qquad (14)$$

Subscripts i and t denote the exporting country and year respectively. The explained variable RDV_{it} represents the return value added of China's exports to other countries. Explanatory variable Model represents the quality or quantity indicators of a particular transportation infrastructure. v_i and v_t represent the fixed effect of exporting country and time, respectively. Besides, in order to reduce the influence of heteroscedasticity, the variables in the model are expressed in logarithmic form.

5.2 Control variables

Referring to the study of Henderson et al. (2002), Shao et al. (2012), Qiu Dongxiao (2011) and Liu Bin et al. (2018), the control variables were selected.

Gravity model variables: (1) the key variable of gravity model is selected: the gross domestic product of trading partners. (2) Geographical distances from trading partners are selected. (3) Signing of FTA: In the variables of FTA, if there is a FTA between the two countries, the variable is defined as 1, and vice versa, 0.

Other control variables: (1) foreign investment: In the mode of division of labour and production in the global value chain, the role of transnational corporations cannot be underestimated. It is the main driving force leading to a large number of outsourcing business and the leading force promoting global division of labour and production. (2) Labour productivity: The level of productivity determines the type of outsourcing production in an economy.

6. Analysis of measurement results

In this paper, the overall regression of different types of transportation infrastructure is carried out, as shown in the following table 2:

The overall impact of road infrastructure on return value added is reported in Table 2 where columns (1) and (2) are regressions without control variables. The estimated coefficients of both quality and quantity indicators of road are significantly positive, which proves that both improving the quality and increasing the number of road infrastructure can significantly increase the return value added. On this basis, control variables of gravity model, economic characteristic variables and trade facilitation indicators are introduced in columns (3), (4) and (5). After adding many control variables, the quality indicator of road infrastructure is no longer significant, but the quantity indicator is still significantly positive.

Table 2 The impact of highway infrastructure on RDV.

	(1)	(2)	(3)	(4)	(5)
lnroadqual	2.0514*** (5.70)		0.3191 (0.75)	0.4771 (1.10)	0.1325 (0.25)
lnroadquan		0.7942*** (8.41)	0.5075*** (4.93)	0.9434*** (7.59)	0.6446* (1.75)
lnpgdp			-0.1658 (-0.36)	1.0170*** (3.39)	1.1804*** (3.96)
lndobusy			0.5036 (0.52)	1.4541 (1.36)	3.1054** (2.43)
lncpi			-0.9620 (-1.20)	0.1132 (0.23)	0.4349 (0.82)
lncustpro			0.9872 (0.74)	-1.5204* (-2.46)	-1.5808** (-2.67)
lnlabpro			0.4611 (0.68)	-0.7002 (-1.16)	-1.9155* (-2.10)
lnfdi			0.4123*** (7.19)	-0.0063 (-0.16)	-0.0886* (-2.19)
lngeodis			-0.6769* (-2.14)	-1.7192*** (-3.55)	
FTA			0.6012 (1.51)	0.4574 (0.64)	
				RE	FE
R2	0.0887	0.3631	0.7965	0.6765	0.3274

Table 3 The impact of railway infrastructure on RDV.

	(1)	(2)	(3)	(4)	(5)
lnrailqual	2.7827** * (8.21)		-0.8250** (-2.61)	-0.2732 (-0.71)	-0.2916 (-0.78)
lnrailroadquan		0.8550*** (12.63)	0.6093*** (4.93)	1.0174*** (8.28)	-0.6610 (-1.06)
lnpgdp			0.2023 (0.68)	0.5600* (1.88)	0.8839*** (3.24)
lndobusy			1.5421* (2.23)	6.7220*** (9.84)	6.4879*** (9.71)
lncpi			-0.7866* (-1.81)	-0.7188* (-1.80)	-0.9441* (-2.43)
lncustpro			2.2353** (2.59)	-0.3626 (-0.63)	-0.6151 (-1.23)
lnlabpro			-0.5303 (-1.19)	0.1062 (0.19)	2.4181*** (3.37)
lnfdi			0.4031*** (12.00)	-0.0314 (-0.95)	-0.0867** (-2.82)
lngeodis			-0.8943*** (-4.56)	-1.5769*** (-3.69)	
FTA			0.6307* (2.29)	0.7596 (1.22)	
				RE	FE
R2	0.1745	0.3419	0.7666	0.5523	0.0163

The overall impact of railway infrastructure on return value added is reported in Table 3 where columns (1) and (2) are regressions without control variables. The results show that the estimated coefficients of both the quality and quantity indicators of railways are significantly positive, which proves that both improving the quality and increasing the number of railway infrastructure will significantly increase the return value added of China. Subsequently, columns (3), (4) and (5) incorporate the same control variables as those in Table 3. The results show that under mixed regression, both the quality and quantity indicators of railway infrastructure are still significant.

Table 4 The impact of port infrastructure on RDV.

	(1)	(2)	(3)	(4)	(5)
lnportqual	1.9857*** (3.77)		-0.4623 (-0.95)	0.0036 (0.01)	-0.0099 (-0.02)
lnportquan		1.0315*** (21.50)	0.6567*** (13.53)	0.8579*** (11.48)	0.4329*** (3.52)
lnpgdp			-0.0312 (-0.11)	0.6475* (2.23)	0.9189*** (3.25)
lndobusy			2.4932*** (3.73)	5.2909*** (6.67)	5.3323*** (6.25)
lncpi			-0.3043 (-0.76)	-1.0754** (-2.66)	-1.3589*** (-3.23)
lncustpro			0.2189 (0.29)	-0.7622 (-1.35)	-0.6858 (-1.32)
lnlabpro			-0.2568 (-0.59)	-0.4136 (-0.71)	2.2184** (2.80)
lnfdi			0.2948*** (9.15)	0.0085 (0.27)	-0.0809* (-2.31)
lngeodis			-0.1902*** (-1.18)	-0.4646* (-1.19)	
FTA			1.0496*** (4.57)	1.3048* (2.22)	
				RE	FE
R2	0.0408	0.6113	0.8384	0.7490	0.1641

The overall impact of port infrastructure construction on return value added is reported in Table 4. Similarly, columns (1) and (2) are regressions without control variables. According to the results of Table 4, improving the quality and increasing the quantity of port infrastructure has a significant positive impact on increasing the value added of return. Subsequently, columns (3), (4) and (5) incorporate corresponding control variables, and the quality indicators of ports become less significant, while the quantity indicators are still very significant.

The overall impact of air transportation infrastructure on return value added is reported in Table 5 where columns (1) and (2) are regressions without control variables. The data in Table 5 show that improving the quality and increasing the quantity of air transportation infrastructure has a significant positive effect on increasing return value added. Subsequently, the quality of air transportation infrastructure is no longer significant, but quantity is still significant when the control variables are included in the mixed regression results. After adding the national fixed effect, the estimated coefficients of the quality and quantity indicators of air transportation infrastructure are significantly positive. The result of stochastic effect model analysis is different from that of mixed regression. The quality indicator of air transportation infrastructure is still significant, but the quantity indicator is no longer significant. The results of Hausman test show that the fixed effect model should be used to strongly reject the original hypothesis.

7. Conclusions and suggestions

Policymakers should take into account the trade effect gap between these different modes when making policies on transportation infrastructure. For China:

(1) Attention should be paid to the construction of road, railway and port infrastructure, which have a relatively significant effect on the return value added.

(2) Corresponding policies and measures should be formulated to speed up the upgrading of the infrastructure of roads, railways and ports.

(3) Technological innovation and R&D should be accelerated so as to reduce the cost of infrastructure construction in all kinds of transportation modes through the effect of high-tech promoting production, which can not only increase the number of infrastructure rapidly, but also improve the quality of infrastructure to a certain extent, thus ultimately increasing the return value added in China.

(4) A prudent attitude should be taken towards the construction of air transportation infrastructure. According to the data analysis between countries, air transport is not the most popular mode of transportation. Therefore, in the further development of air transportation infrastructure, Chinese policy makers should take into account the profitability of their trade, fully compare their benefits and costs, and make correct and reasonable policy choices, only in which can the rational use of financial funds be realized and the country be benefited.

Table 5 The impact of air transport infrastructure on RDV.

	(1)	(2)	(3)	(4)	(5)
lnairqual	3.2821*** (5.23)		-0.9438 (-1.58)	-2.5459*** (-4.54)	-2.3465*** (-4.53)
lnairquan		0.5588*** (21.85)	0.3500*** (8.10)	0.2187*** (4.78)	-0.0039 (-0.08)
lnpgdp			-0.3679 (-1.13)	0.3833 (1.28)	0.7255** (2.69)
lndobusy			4.5283*** (6.24)	7.5364*** (10.84)	6.2494*** (9.45)
lncpi			-0.8832* (-1.81)	-1.0914** (-2.61)	-0.9092** (-2.35)
lncustpro			0.1210 (0.14)	-0.0218 (-0.04)	0.1340 (0.27)
lnlabpro			-0.3953 (-0.83)	0.0932 (0.16)	2.2037*** (3.09)
lnfdi			0.2788*** (5.72)	-0.0342 (-0.96)	-0.0850** (-2.60)
lngeodis			-0.2449 (-1.20)	-0.8978 (-1.64)	
FTA			0.6788* (2.27)	1.0280 (1.24)	
				RE	FE
R2	0.0758	0.6181	0.7541	0.3936	0.0030

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