

Analysis of the Impact of International Talent Inflow on China's Export Trade Based on OLS Data

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Abstract

Based on the mixed panel data of 31 provinces and cities in China from 2002 to 2017, this paper uses OLS model to study the impact of international talent inflow on China's export trade. The research shows that the inflow of international talents will significantly promote China's export trade. The government must attach great importance to the introduction of international talents, strengthen the construction of international talent network, actively introduce various kinds of international talents on a large scale, promote export trade through the introduction of international talents, and change the mode of China's participation in international economic cooperation. This study has a certain reference value for the government to make full use of the technical resources and trade information brought by the inflow of international talents, strengthen the connection between China and other countries, especially the developed countries' technical activities, and accelerate the transformation and upgrading of China's industrial structure under the background of actively expanding export trade.

Keywords

OLS Data; talent inflow; export trade; International Talent Network.

1. INTRODUCTION

Under the background of economic globalization, the international flow of talents is becoming more and more frequent. With the gradual improvement of the economic strength and system of developing countries, the mode of international talent flow is a one-way flow from the original developing countries to the developed countries and the sub developed countries to the major developed countries, and it tends to the two-way or multi-directional flow of talent circulation and return between the developing countries and the developed countries. [1] As a representative of developing countries, China regards talents as a strategic resource to realize national rejuvenation and win international competition initiative, and constantly promotes new measures to attract international talents.

At the same time, international trade plays a more and more important role in the national economy. China is actively expanding its export trade and increasing its share in the international market.

To study the effect of international talent inflow on the export trade of China's provinces and cities, it can provide theoretical basis and policy guidance for the formulation and adjustment and implementation of export policies.

2. JOURNALS REVIEWED

The research on transnational labor flow and foreign trade can be traced back to the 1990s. Gould first proposed that the inflow of immigrants has trade creation effect from both theoretical and empirical aspects in 1994.

Scholars mainly explain the mechanism of migration effect from two aspects. The first is the reduction of transaction cost. Gabriel J quantified the data of foreign-born individuals by skill category in 2012, and found that the presence of international migrants reduced the cost of information and contributed to the creation of bilateral trade, and the trade cost channels was the most important for homogeneous goods and highly skilled migrants. The second is the channel of preference diffusion. In 2005, Combes et al. believed that many consumers have a "local bias", which makes them have a higher value judgment of real estate goods.[2] A large number of immigrants will increase the import of products from the source countries, on the one hand, because of the "local bias" of immigrants, on the other hand, because other people may get new tastes from these products, forming a diversified preference.

Since Gould, there have been a lot of empirical studies on the relationship between migration and national trade, most of which focus on the developed countries. Head and Ries (1998) [3] used the data of Canada from 1980 to 1992, using the expanded gravity model, found that for every 10% increase in immigration, Canada's export to the home country of immigrants increased by 1% and its import increased by 3%. Coetal. (2004) [4] studied the export data and immigration data of 48 states in the United States in 1993, and divided the export destinations into developed countries and developing countries. The study found that the average elasticity of immigrants in the two groups was very close. Bryant et al. (2004) [5] studied the trade and migration data of New Zealand with more than 170 countries from 1981 to 2001, and the results showed that the elasticity of import and export of different products was significantly different. There is relatively little research on developing countries, Tan Chui Hong and Santhapparaj (2006) [6] used gravity model to analyze the relationship between immigration and trade in Malaysia, especially emphasizing the impact of skilled personnel migration from ASEAN and non ASEAN on bilateral trade in Malaysia. The results showed that immigration had a positive effect on both import and export, but the elasticity to export was greater than that to import.

The research on China's international migration and trade is mainly analyzed from the perspective of migration outflow.

The study of Meng Yinghua and Kong Lingqiang (2007) [7] found that Chinese networks have an overall promoting effect on China's foreign trade, but there are also obvious differences between countries. For emerging economies, the cost overcoming effect is more significant, while the migration preference effect is more prominent in Asia and North America. Zhao Yongliang (2012) [8] points out that economic integration weakens the dependence of foreign trade on migration network and the substitution of FDI for migration network, and the effectiveness of overseas Chinese network will weaken with time.

To sum up, the existing literature is mainly based on the research of developed countries, and studies the trade-creating effect of international migration inflow on bilateral trade between host country and source country. The main contribution of this paper is that, Firstly, from the perspective of research, this paper studies the impact of talent inflow on China's export trade due to the uniqueness of China's economic system and the background of two-way flow of talents. Secondly, in terms of research methods and data, this paper makes a research on China's provincial level, which is a supplement to the existing literature. Thirdly, based on the research conclusion and policy significance, this paper concludes that the inflow of international talents can significantly promote the export trade. At the same time, promoting the policy of introducing talents can become a new way to promote the growth of China's export.

3. CONSTRUCTION OF ECONOMETRIC MODEL AND DATA DESCRIPTION

3.1. The Construction of Econometric Model

According to the reality of economic development and the practice of relevant researches, this paper constructs the following econometric model:

$$\text{loutput} = \beta_0 + \beta_1 \text{lstudent} + \beta_2 \text{lstudentsq} + \beta_3 \text{lwage} + \beta_4 \text{lcapital} + \beta_5 \text{IRD} + \beta_6 \text{lcontract} + \beta_7 \text{lproperty} + \beta_8 \text{lopen} + \beta_9 \text{lfdi} + \delta_i + \lambda_t + u$$

Where, "i" means the "i" province, "t" means the "t" year, is the time dummy variable, and "u" is the disturbance term.

The specific situation of each variable is as follows:

(1) Explained variable

This paper takes the output of each province as the explained variable.

(2) Explanatory variables

Based on the quantitative method of Wei hao et al. (2012) [9] on the variables of international talent inflow, this paper takes the number of students of foreign students in various provinces as the explained variable. Moreover, the quadratic term *lstudentsq* was added to explore the non-linear relationship between export and talent flow.

(3) Other control variables

① Factor endowment

According to the traditional trade theory, the essence of international trade is the exchange of goods and services based on resource endowment and comparative advantage (Pei changhong, 2013) [10]. Therefore, factor endowment is an important factor affecting the export trade of a country or region. Based on the factor aggregation evaluation system proposed by Zhang yongheng (2019) [11], this paper measures the factor endowment of each province from three aspects: human capital endowment, material capital endowment and technical endowment. From the Angle of output efficiency, the average wage is used to measure the human capital endowment of each region in China. From the perspective of capital input, the total fixed capital of the region is used to measure the physical capital endowment of the region. From the perspective of input and output of science and technology, R&D internal expenditure (RD) and technology contract turnover are selected to measure technology endowment.

② Regional policy

It mainly includes the protection of intellectual property rights, trade openness and foreign investment policies. By referring to Dai zhongqiang (2014) [12], this paper quantifies the level of intellectual property protection in each province. The calculation method is as follows:

$$\text{property}_{it} = 1 + \left(\frac{\text{crime}_{it}}{\text{adpatent}_{it}} \div \frac{\sum \text{crime}_{it}}{\sum \text{adpatent}_{it}} \right)$$

In the formula, *crime_{it}* represents the total number of IPR enforcement cases of "I" province in year t, including infringement disputes and counterfeit patents and other disputes; *adpatent_{it}* represents the number of patents granted by "I" provinces in year t. In this paper, trade openness is measured by the proportion of total import and export trade in GDP of each province. FDI is measured by the flow of foreign direct investment to each province.

3.2. Data Description

The data used in this study mainly come from the statistical yearbook of each province and the statistical annual report of the State Property Office. The former contains most variables, while the latter contains data related to the protection of intellectual property rights. In this paper, a total of 152 mixed panel data of 31 provinces, municipalities and autonomous regions

were finally obtained from 2002 to 2017. Detailed description of statistical information is shown in table 1:

Table 1. Variable Statistics

Variable	The variable name	Observation	The mean	The standard deviation	The minimum	The maximum
loutput	Export trade volume	152	6.8353	1.9899	2.3580	10.2504
lstudent	Number of international students in school	152	7.6670	1.7626	3.1781	11.1022
lstudentsq	Number of international students in school ²	152	61.8698	26.0696	10.1000	123.2585
lwage	The average salary	152	10.0378	0.6704	6.7274	11.5288
lcapital	Total fixed capital of the region	152	8.0926	1.1382	5.4195	10.6895
IRD	Internal expenditure on R&D	127	4.5110	1.8026	-0.5798	7.3650
lcontract	Technical contract turnover	119	3.9451	1.8919	-0.5798	8.4086
lproperty	Level of intellectual property protection	152	0.7299	0.7051	0	2.9616
lopen	Trade openness	152	-1.5068	1.1961	-4.0960	0.5371
lfdi	Flow of foreign direct investment	150	5.074	1.7323	0.4318	7.9510

According to the data collected, we can respectively make the trend of the national export trade volume and the number of foreign students in school over time. Although both are on the rise (Figure 1), no causal analysis can be made.

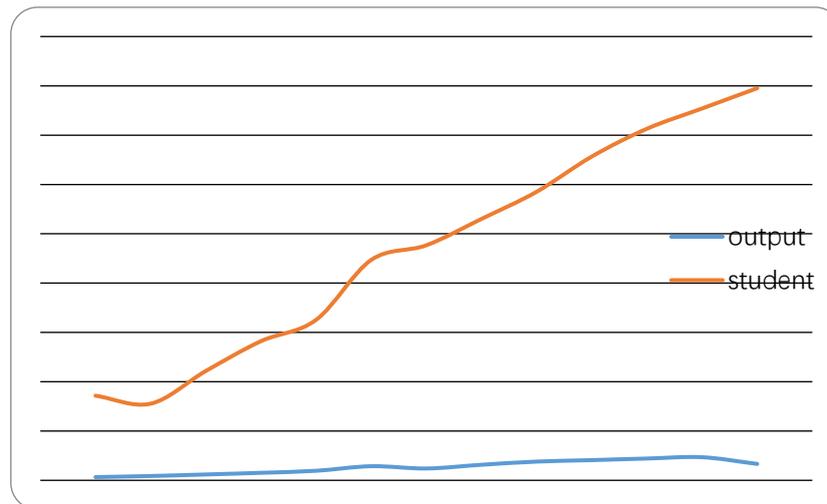


Figure 1. Trend chart

4. EMPIRICAL RESULTS AND ANALYSIS

4.1. The Impact of International Talents on the Overall Export Volume

Table 2. Empirical Results

Explanator y variables	loutput							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
lstudent	0.833** *	0.777** *	0.586** *	0.567** *	0.229** *	0.089	0.063	0.011
	(0.067)	(0.069)	(0.083)	(0.088)	(0.067)	(0.066)	(0.088)	(0.089)
lwage		0.509** (0.205)	0.286 (0.203)	0.291 (0.204)	0.030 (0.142)	0.112 (0.137)	0.114 (0.137)	0.044 (0.177)
lcapital			0.484** * (0.132)	0.508** * (0.134)	0.595** * (0.092)	0.364** * (0.090)	0.125 (0.104)	-0.018 (0.094)
lproperty				-0.104 (0.149)	-0.033 (0.103)	0.041 (0.093)	0.284** (0.104)	0.267** * (0.095)
lopen					0.942** * (0.083)	0.742** * (0.081)	0.731** * (0.087)	0.843** * (0.082)
lfdi						0.390** * (0.065)	0.378** * (0.071)	0.423** * (0.075)
IRD							0.286** * (0.095)	0.414** * (0.097)
lcontract								-0.093 (0.072)
Constant term	2.817** * (0.281)	-4.396* (1.911)	-4.683* (1.813)	- 4.615** (1.820)	1.448 (1.361)	1.235 (1.229)	2.035 (1.422)	3.992** (1.723)
sample size	118	118	118	118	118	116	91	73
R ²	0.5717	0.5935	0.6377	0.6393	0.8312	0.8680	0.8960	0.9309

Note: ***, **, * indicate that under the significance level of 1%, 5% and 10%, the original hypothesis of "regression coefficient is significantly zero" is rejected, and the value in brackets is the standard error.

Compared with the mixture of ordinary least squares estimate, despite the fixed effect model to control the observation of individual effect, can get more consistent parameter estimation, but the fixed effect model to estimate the effectiveness of the dependent on the hypothesis that has nothing to do with the random error term between variables, which are exogenous variables, and in fact generally endogenous problems between economic variables, which will result in biased estimation results and inconsistent, but difficult to control the endogenous.

Therefore, the OLS model is adopted in this paper. Table 2 lists the empirical results of the impact of international talent inflow on China's overall export trade. From model 1 to model 8, explanatory variables and control variables were added in turn. With the increasing number of variables in the model, the goodness of model fitting increased from 0.5717 to 0.9309, indicating that the fitting effect was gradually enhanced, but it was not excluded that this was the result of increasing the number of variables. In model 1 to 5, the regression coefficient of foreign students (Istudents) is significantly positive, and can pass the test at the significance level of 1%, indicating that the international talent flow membership has a very significant promoting effect on China's import trade. The insignificance of models 6 to 8 May be caused by the reduction of sample size.

4.2. Empirical Result Analysis

The above empirical results show that the inflow of international talents has a positive effect on export, which can be explained from the two aspects of information connection and industrial transfer. The purpose of international student flow is to make transnational investment in human capital. The human capital obtained by studying abroad will enter the labor market of its source country, host country or other countries, thus promoting the circular flow of human resources around the world (Marina Murat, 2014) [13]; For the destination country, international talents have a natural connection and understanding with their home country, which is conducive to the development of foreign trade between the destination country and their home country. The cross-border flow of talents changes the flow of goods in international trade: since the development of various industries is not synchronized, countries with a late start tend to become the talent exporting countries with an early start in terms of the same industry. When the industry becomes a sunset industry or an obsolete industry in the country with an early start, the industry focus will shift to the country with a late start, and such commodities will be exported instead of imported.

5. CONCLUSIONS, SUGGESTIONS AND RESEARCH DIRECTIONS

Based on the background of economic globalization, this paper expounds the phenomenon of international talent flow and analyzes the impact of international talent inflow on China's export. It is found that the inflow of international talents in China is increasing, and the inflow of international talents is an important factor affecting the export trade.

In order to increase China's export trade, the government must attach great importance to the inflow of international talents. In the context of fierce competition for international talents, in order to attract international talents to study and work in China on a large scale and promote the development of China's export trade, the following issues should be attached great importance.

First, we should attach great importance to the role of international talents in export trade. In the past, China attached great importance to the influence of international capital factors. In the future, while improving the quality of foreign capital utilization, China should attach great

importance to the role of international talents, give full play to the role of international talent flow in promoting the flow of business information and international trade in goods, and ensure the sustained and stable growth of export.

Second, China must develop effective strategies to attract international talent with international students. Increase the investment of higher education, build the curriculum system for foreign students, and improve the internationalization of higher education; We will revise and improve the relevant rules and regulations so that more outstanding students will have the opportunity to work in China after graduation.

Third, we should attach great importance to the introduction of non international talents. Due to the limitation of data acquisition, this paper only studies the role of international students. In fact, the inflow of various kinds of high-end international talents such as academic workers, managers, administrators, engineers, technicians and entrepreneurs will also promote the development of export trade. Therefore, we will actively introduce talents from developed and emerging developing countries on a large scale, especially high-end talents.

The future research direction can consider the influence of the introduction of international talents on the trade of different industries and the trade of different regions. For the modification of the model, we can find an instrumental variable that is closely related to the flow of transnational talents and independent of the disturbance term for the estimation of instrumental variable method, so as to reduce the estimation bias of the model, we need to control the endogenous problem, and try the fixed effect model.

REFERENCES

- [1] Xiong ying, Tang zhimin. International flow trend and enlightenment of foreign high-level talents [J]. China personnel science, 2018, (Z1) : 60-64.
- [2] Combes-Pierre Philippe, Lafourcade Miren, Mayer Thierry. The Trade Creating Effects of Business and Social Networks: Evidence from France[J]. Journal of International Economics, 2005.
- [3] HeadKeith, Ries John. Immigration and Trade Creation:Econometric Evidence from Canada [J]. Canadian Journal of Economics, 1998, 31(1): 47- 62.
- [4] COCATHERINEY, Euzent Patricia, Martin Thomas. The export Effect of Immigration into the USA[J]. Applied Economics, 2004,36(6):573- 583.
- [5] Bryant John, Gen Murat, Law David. Trade and Migration to New Zealand[R].New Zealand Treasury Working Paper, 2004.
- [6] TanChuieHong, Santhapparaj SolucisA. Skilled laborimmigra-Tion and external trade in Malaysia: A pooled data analysis[J]. Perspectives on Global Development and Technology, 2006, 5(4): 351-366.
- [7] Meng yinghua, Kong lingqiang. Panel data analysis on the influence of overseas Chinese network on China's foreign trade [J]. Contemporary finance and economics, 2007, 9
- [8] Zhao yongliang, Zhao deyu. Boundary effect between market acquisition and labor migration in China [J]. Southern population, 2012, 5.
- [9] Wei hao et al. Empirical analysis of international talent flow and its influencing factors [J]. Management, 2012, 1:58-70.
- [10] Pei changhong. Analysis and prospect of international trade development [J]. International economic analysis and prospect, 2013.
- [11] Zhang yongheng. Empirical analysis of the relationship between factor endowment and regional economic growth drivers [J]. Economic empirical study, 2019.

- [12] Dai zhongqiang. Does intellectual property protection increase the technical complexity of export? -- empirical research from the inter-provincial level in China [J]. Research in science of science, 2014, 12:847-1858.
- [13] Marina Murat Out of Sight, Not Out of Mind. Education Networks and International Trade World Development, Vol.58, No.6, 2014, pp.53-66.