Research on the Impact of China's Fixed Asset Investment on Import and Export Trade

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ABSTRACT
Import and export trading can boost gross domestic product and is a major factor of long-term economic growth. Based on the data of fixed asset investment in China from 1997 to 2017, this paper adopts the unitary linear regression model to conduct heterogeneity analysis from the perspectives of trade, region and time to explore the impact of investment on the total amount and scale of import and export. This paper concludes that China's fixed asset investment has a positive impact on the total import and export; based on different types of trade, the promotion effect of investment on import is higher than that of export; based on different regions, investment plays the most important role in increasing import and export sales in eastern China, followed by central China, and the weakest role in western China and northeast China; based on different time intervals, the increasing effect of investment on import and export was the largest before China's participation to the WTO. Since then, the effect has steadily declined. After the outbreak of the financial crisis in 2008, the lifting effect has further decreased.

Keywords: *Fixed assets investment, Import and export trade, Linear regression, Heterogeneity analysis, The financial crisis*

1.INTRODUCTION

Import and export commence can alter the utility of domestic factors of production, improve the international supply and demand, adjust the economic structure and increase fiscal revenue. It is a significant engine of the world economic growth and the driving force of globalization. The investment in fixed assets of the whole society is expressed in monetary terms, which refers to the amount of effort done by enterprises to construct and purchase fixed assets through time, as well as the associated cost changes. China is an investment-driven economy in the traditional sense. Fixed asset investment, which is an important driver force for national economic growth, has long been a key economic variable for macroeconomic management departments to monitor. With the gradual realization of economic globalization, the economic exchanges between countries are getting closer and the scale of international investment and trade is expanding. Faced with the rapid and aggressive expansion of economic globalization and regional integration, an important research question is, what is the relationship between China's fixed asset investment and international trade? In order to address the above question, this paper provides an empirical investigation of the relationship between China's fixed asset investment and import as well as export trade. The unitary linear regression model is used to provide Chinese cases and experience for the relative research on investment and international trade development based on the data from the National Bureau of Statistics of China from 1997 to 2017.

2.LITERATURE REVIEW

Among the researches related to this paper, the relationship between OFDI and FDI as well as the growth of import and export has become a hot topic for domestic and foreign scholars. Some literatures discuss the effect of OFDI on international trade. The test results of Chen Juncong and Huang Fenghua [1] showed that OFDI significantly promoted the export of China's intermediate products such as parts, machinery and equipment, and such export leading effect was obvious for both developed and developing countries; at the same time, OFDI had an obvious export creation effect

on the development of China's overall export. While Wang Shuli and Xiang Jiaojiao [2] considered that China's OFDI could produce drastic creative effect on import and export, and the reverse import effect was larger than the export-induced effect. Wang Shuli and Xiang Jiaojiao [3] further pointed out that OFDI had a greater impact on the reverse import effect of developing countries and a huger impact on the exports of developed countries. Besides, Zhou Xin and Niu Rui [4] believed that China's OFDI and trade were both complementary and substitution, and the influence of OFDI on the trade of parts and components was very obvious. However, the research results of Lang Lihua and Liu Xinyu [5] demonstrated that for every 1% increase in China's OFDI, the export scale can increase by 0.435%, indicating that OFDI and the export scale generally presented a complementary relationship. Lin Chuangwei et al. [6] found that China's direct investment in ASEAN countries had obvious trade creation effect through research. The study results of Sun Sui and Zhu Shunhe [7] revealed that China's direct investment in ASEAN promoted the trade between China and ASEAN countries; In addition, information and communication technology played an important role in moderating, China's OFDI and information and communication technology had a significant impact on the rate of export growth as well as trade growth in ASEAN countries, while the impact on the rate of import growth had a lag. Ren Zhicheng and Zhu Wenbo [8] used the bilateral trade data between China and 55 countries along the Belt and Road initiative from 2003 to 2016, based on the expanded trade gravity model, and empirically analyzed the impact of OFDI on the international trade between China and countries along the Belt and Road initiative from the total sample level and sub-sample level. Hu Zhaoling and Song Ping [9] implied that there was a two-way Granger causality relationship between China's OFDI and exports as well as imports, and OFDI was trade creative, but the effect was still relatively limited.

Another part of the literatures focuses on the research of the impact of FDI on import and export trade. Jiang Wei and Fu Yubin [10] conducted an empirical test on the trade effect of two-way FDI in China from 1982 to 2012 by using co-integration analysis and error correction model methods. Hu Hengsong and Li Rongjian [11] analyzed the relationship between FDI and China's import and export trade by using the economic data of China in 30 years and the state space model, the research found that FDI was the Granger cause of import and export after co-integration test and Granger test. In the short term, the increase in FDI flows may replace China's import trade from Africa and promote China's export trade to Africa; in the long run, the increase of FDI stock created China's import and export trade with Africa; compared with North and East Africa, the unpredictable factors in West Africa, Central Africa and South Africa had a greater positive impact on China's import and export trade [12]. Zhang Chunyu et al. [13] used a panel model to empirically analyze the relationship between China and Latin America in terms of direct investment and trade by combing the existing literatures in detail and the data of bilateral trade and direct investment between China and eight Latin American countries from 2003 to 2014.

Based on the existing literatures mentioned above, there are four possible contributions of this paper. First, most literatures focus on the study ofOFDI and FDI on import and export trade, while few literatures focus on the impact of domestic fixed asset investment on international trade. This paper discusses the impact of domestic fixed asset investment on import and export. Secondly, this paper uses rich heterogeneity analysis from the perspectives of trade, region and time based on the characteristics of international trade in China and proposes targeted and personalized policy recommendations. Thirdly, this paper adopts the latest and most complete statistical data from the National Bureau of Statistics of China, which is close to the reality and helpful to draw more accurate economic conclusions. Last but not least, given that China is a large import and export trading country, it is particularly important to study the factors influencing the total import and export volume. The conclusions of this paper have important theoretical significance and practical value, and can also provide China's experience and China's case for relevant researches of other countries.

3.RESEARCH DESIGN

3.1. Variable Selection

3.1.1. Explained Variable

The explained variable in this paper is import and export trade. Based on existing studies, the domestic destination and source of import and export volume (IEV) is used as a proxy variable to reflect the total import and export volume and scale in China.

3.1.2. Explanatory Variable

This paper adopts social fixed asset investment (FAI) as the core explanatory variable to measure the scale and degree of domestic investment in China. At the same time, total import volume (IV) and total export volume (EV) are selected as explanatory variables to represent the degree of import and export respectively, and then the heterogeneity analysis is carried out.

Table 1. Descriptive statistics

Variable	Unit	Obs	Mean	Std.Dev.	Min	Max
FAI	100 million yuan	651	7248	9361	34.55	55203
IEV	100 million yuan	651	4768	10639	7.477	79347
IV	100 million yuan	651	2175	4604	1.492	34027
EV	100 million yuan	651	2594	6168	1.888	45783

3.2. Data Sources

In the empirical part of this paper, 31 provinces, municipalities or autonomous regions in China are selected as the empirical analysis objects, and the observation period is from 1997 to 2017. The sample data used is from the National Bureau of Statistics (NBS). In this paper, a statistical analysis of the variables is carried out and the results are shown in Table 1. In the empirical analysis, the data of import and export trade as well as fixed asset investment are processed logarithmically, and in order to eliminate the influence of exchange rate, the import and export value denominated in US dollars is processed by the average exchange rate of the current year to obtain the data in RMB.

3.3. Model setting

The research model of this paper is unitary linear regression with one variable, which is as follows:

$$IEV = \beta_0 + \beta_1 FAI + \varepsilon \quad (1)$$

Among them, IEV is the import and export volume of the explained variable, FAI is the core explanatory variable, fixed asset investment in the whole society, and ε is the random error term.

4.EMPIRICAL ANALYSIS

4.1. Correlation Analysis

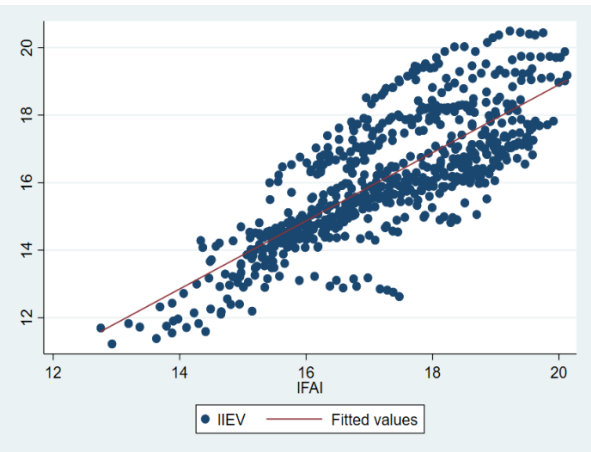

Figure 1 Correlation between import and export volume and investment

Figure 1 depicts the relationship between China's fixed asset investment and import and export trade, where IFAI is the logarithmic fixed asset investment of the whole society, and IIEV is the logarithmic total import and export of domestic destinations and source places. According to the trend in the chart, the total amount of imports and exports increased along with the growth of investment in fixed assets. The relationship between international trade and fixed asset investment needs to be further confirmed by regression analysis in the paper.

4.2. Baseline Regression

Table 2 Model (1) reports the main regression results of the total amount of imports and exports affected by fixed asset investment in the whole society. Specifically, the estimated coefficient of the core explanatory variable of the model is 0.7008, which is significantly positive at the 1% significance level. The regression results preliminarily show that for the total volume and scale of China's import and export, the current domestic investment has a positive impact on the international trade.

Table 2. Baseline regression results

	(1) IEV	(2) IV	(3) EV
FAI	0.7008***	0.7210***	0.6653***
	(58.0475)	(51.1313)	(49.1654)
_cons	4.0364***	2.8747***	3.9827***
	(14.8787)	(9.3345)	(13.8735)
N	651	651	651
R^2	0.8470	0.8106	0.7990

Note: ***, **, * indicate that the statistical value is significant at the significance level of 1%, 5%, and 10%, and the z value is in parentheses. The same below.

4.3. Heterogeneity Analysis

4.3.1. Analysis Of Trade Heterogeneity

Model (2) and Model (3) in Table 2 report the regression results of fixed asset investment affecting China's total import and export respectively. The estimated coefficients of the explanatory variables are 0.7210 and 0.6653, which are both significantly positive at the significance level of 1%. The regression results show that in terms of China's import and export trade,

fixed asset investment of the whole society enables to prosper the international trade, but fixed asset investment has a stronger promoting effect on import trade. Therefore, increasing China's domestic fixed asset investment is conducive to the trade deficit. This is mainly because many key components and materials needed by China are heavily dependent on imports, when domestic investment rises, the increase in imports even exceeds that of exports.

4.3.2. Analysis Of Regional Heterogeneity

According to the 2011 classification method of the National Bureau of Statistics, this paper divides all provinces in China into four regions, namely the eastern, central, western and northeastern regions in order to reveal the regional characteristics of the impact of China's fixed asset investment on imports and exports (The eastern region consists of 10 provinces, including Beijing, Hebei, Tianjin, Shandong, Shanghai, Jiangsu, Zhejiang, Guangdong, Hainan and Fujian provinces. The central region includes Inner Mongolia Autonomous Region, Shanxi, Henan, Anhui, Jiangxi, Hubei and Hunan provinces; The western region consists of 11 provinces, including Xinjiang Uygur Autonomous Region, Tibet Autonomous Region, Gansu Province, Qinghai Province, Sichuan Province, Yunnan Province, Guangxi Zhuang Autonomous Region, Ningxia Hui Autonomous Region, Guizhou Province, Chongqing and Shanxi Province. Northeast China consists of Heilongjiang, Jilin and Liaoning provinces.). Table 3 models (1), (2), (3) and (4) respectively report the regression results of the impact of fixed asset investment on the import and export volume in eastern, central, western and northeastern China. The estimated coefficients of explanatory variables are 0.7965, 0.7148, 0.6802 and 0.6813, the regression results are all significantly positive at the significance level of 1%. The regression results show that, in terms of China's import and export trade, the domestic investment plays the most significant role in promoting the import and export volume in eastern China, followed by the central region. China's western and northeastern regions are less affected by fixed asset investment. Therefore, increasing the scale and total amount of investment in the eastern and central regions will help maximize the increase of imports and exports. The economic development of eastern China is basically in the late stage of industrialization, and attributes to its superior economic location, it can access to abundant overseas trade resources, and the regional fixed asset investment have the greatest boost to import and export trade. After the implementation of "Rise of Central China" and Belt and Road initiative strategies successively, international trade in central China has entered a new period of rapid development, and the regional fixed asset investment also plays a great role in promoting the import and export trade. However, in comparison, the increasing effect of fixed asset investment in western China and northeast China is relatively weak.

Table3. Regional heterogeneity analysis

	(1)	(2)	(3)	(4)
	IEV	IEV	IEV	IEV
FAI	0.7965***	0.7148***	0.6802***	0.6813***
	(34.9392)	(39.9392)	(31.6825)	(9.7811)
_con	3.7395***	3.3083***	3.4275***	4.5113***
	(7.7149)	(10.3438)	(9.0923)	(3.7191)
N	210	126	252	63
R^2	0.8589	0.9302	0.8101	0.8701

4.3.3. Analysis of time heterogeneity

During the sample period of this paper, China joined the WTO in 2001 and has participated more extensively in international economic activities. The financial crisis broke out in 2008 and the global economy entered a period of "secular stagnation". Therefore, this paper takes 2001 and 2008 as time nodes and divide the sample period into three time periods to conduct time heterogeneity analysis. Table 4 models (1), (2) and (3) respectively report the regression results of the impact of fixed asset investment on China's total import and export volume during 1997 to 2001, 2001 to 2008 and 2008 to 2017. The estimated coefficients of explanatory variables are 0.9770, 0.9435 and 0.4198.

Table 4. Time heterogeneity analysis

	(1)	(2)	(3)
	IEV	IEV	IEV
FAI	0.9770***	0.9435***	0.4198***
	(12.8680)	(37.8054)	(12.5868)
_cons	-0.4784	0.1225	9.1783***
	(-0.3976)	(0.2726)	(14.1739)
N	155	248	310
R^2	0.7610	0.8697	0.5535

The regression results are all significantly positive at the significance level of 1%. The regression results show that fixed asset investment has the biggest effect on China's total import and export during 1997-2001, followed by 2001-2008, and the lowest effect from 2008 to 2017. The increasing effect gradually weakens with

the annual growth. After China joined the WTO in 2001, the positive response to the WTO "market opening, non-discrimination and fair trade" principle, and began to adopt a foreign trade strategy with low import restrictions and low export encouragement, greatly reducing the intervention measures of foreign trade, promoting to realize trade liberalization. As the result, investment in fixed asset has less influence in promoting import and export trade. The outbreak of the financial crisis in 2008 greatly impacted the trade of various countries, so the increasing effect of fixed asset investment on import and export trade was further reduced after 2008.

5.CONCLUSIONS

According to the above empirical results, this paper believes that China's social investment in fixed assets has brought significant improvement to international trade; compared with exports, increasing domestic investment has a stronger impact in promoting the total import, which is conducive to increasing the trade deficit; compared with the western and northeastern regions in China, the improvement of fixed asset investment in the eastern and central regions plays a stronger role in improve the development of import and export trade; the increasing effect of investment on import and export trade was the largest before China's accession to WTO, and then the increasing effect gradually declined, after the outbreak of the financial crisis in 2008, the promotion effect further decreased. The enlightening significance of the above conclusions lies in the following four points. First, with the drive and encouragement of national macroeconomic policies, technical training or low-interest loans should be provided to residents to help them increase their income, thereby expanding domestic demand and increasing fixed asset investment to promote import and export volume and scale. Second, China needs to improve its production capacity of core raw materials and components and reduce its dependence on imports to offset the trade deficit and improve the trade balance. Third, strengthen the impact of investment in the eastern region in stimulating import and export trade, guide the central and western regions as the preferred and important bases for the transfer of international as well as eastern industries and capitals, further enhance the investment in the central and western regions, focus on the revitalization of northeast old industries, promoting the northeast import and export trade level unceasingly. Fourth, we should implement proactive fiscal and monetary policies to stimulate China's investment and ease the continuous impact of the 2008 financial crisis on China's international trade.

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