

Study on Whether International Trade Has Increased the Inequality in China's Domestic Income Distribution

Xueqin Long

Ji'nan University, Guangzhou, China

llongxueqin@163.com

Abstract. Inequality in income distribution is a major problem faced in China's and even global development, and has traditionally attracted much academic attention. How to reduce the income distribution gap and achieve common prosperity has also been an important concern of the government for a long time. Meanwhile, foreign trade plays a pivotal role in China's economic development, and along with the changes in the external trade environment and internal economic policies, the country is witnessing a new situation of full openness in all regions. Based on the above background, this paper investigates whether there is an impact of foreign trade on China's income distribution. The empirical results show that foreign trade has increased the income distribution inequality in China, and the impact of export trade on intra-regional income inequality is greater than that of import trade on intra-regional income inequality; the impact of export trade on income inequality in coastal cities is greater than that in inland cities, when viewed by coastal and inland. Finally, based on the empirical results, this paper puts forward three suggestions on narrowing the inequality of domestic income distribution: reasonable guidance of foreign investment, optimization of industrial structure, and increasing the cultivation of talents.

Keywords: Income Distribution; Foreign Trade; Impact Differences.

1. Introduction

In today's economic globalization, the influence of foreign trade on a country's economy has been deepening. Since the reform and opening up, China has also accelerated the pace of foreign trade and gradually formed an open economy with Chinese characteristics. At present, China has jumped to become the world's largest trading country and the second largest economy. In 2021, the total import and export of goods in China reached 3,910.9 billion yuan, accounting for 34.3% of the annual GDP. In the face of the poor global trade environment and the threat of U.S. trade protectionism, Xi Jinping proposed in his 19th National Congress report that "China's open door will not be closed, but will only be opened wider and wider".

However, along with the process of foreign trade, the phenomenon of excessive wealth disparity and unequal income distribution in China has become increasingly prominent, mainly between industries, regions, urban and rural areas. According to the data of National Bureau of Statistics, the Gini coefficient of China was 0.317 in 1978, which was a relatively reasonable level of income disparity. However, since 1994, China's Gini coefficient has exceeded the internationally recognized warning line of 0.4 and reached a peak of 0.491 in 2008. although it has fallen in the following decade, it was still as high as 0.466 in 2021, and has been located in the ranks of countries with large income disparities.

So, has openness to foreign trade increased income inequality across regions? Does the difference in openness to trade affect the inequality of income distribution in different regions? Based on this, this paper investigates the relationship between the opening up of China's regions to foreign trade and income distribution inequality in the context of excessive disparity in the level of income distribution internally and comprehensive opening up externally.

2. Literature Review

2.1 Theoretical Studies on the Impact of International Trade on Income Distribution

The theoretical studies on the impact of international trade on income distribution at home and abroad are mainly divided into two kinds. One is that international trade has increased the income distribution gap. Among them, Heckscher and Ohlin were the first economists who linked income distribution (factor prices) with international trade. The H-O model they proposed not only advanced the development of neoclassical trade theory, but also laid the foundation for later scholars' research on international trade, income distribution and international income gap. Later, the S-S theorem (Stoper-Samuelson theorem) and the H-O-S theorem (factor price equalization theorem) became the credo for the study of international trade and income distribution. That is, international trade increases the prices of labor-intensive products in developing countries, which leads to an increase in the relative wages of unskilled workers, a decrease in the relative wages of skilled workers, and a decrease in the income gap. Krugman and Elizondo's (1996) model shows that when a country engages in foreign trade, firms redirect their production base in marginal regions to avoid cost congestion. Jian, Sacks, and Warnerl (1996) analysed the effect of outsourcing on income inequality using a search unemployment model, they found that outsourcing in a given industry reduces domestic unemployment in that industry. Outsourcing reduces income inequality by increasing the productivity of domestic workers, creating more domestic jobs and reducing unemployment.

Another category, which is also the view of most scholars, argues that international trade exacerbates income inequality. A representative one is the heterogeneous firm model proposed by Meliz (2003), which opens the way to analyse the relationship between trade and income inequality in a comprehensive examination from the perspective of heterogeneous firms. Yeaple (2005) argues that because firms are heterogeneous, they differ in their choice of technology and labor, and that exporting firms have higher productivity levels than non-exporting firms, are more inclined to hire more skilled labor and accordingly will pay higher wages. When the decline in trade barriers, firms will change technologically in order to expand their trade volume, and the increased demand for highly skilled workers will lead to an increase in the wages of highly skilled workers, which in turn will reduce the wages of middle-skilled workers, then the income gap between high- and low-skilled workers widens. Dinopoulos (2001) analyses on the basis of a monopolistic competition model and concludes that North-North trade can promote the expansion of high-skilled labor-intensive firms, which causes an increase in the demand for high-skilled workers, which may similarly widen the wage gap between high- and low-skilled workers.

2.2 Empirical Studies on the Impact of International Trade on Income Distribution

Empirical studies on the impact of international trade on income distribution are much richer than theoretical studies. Ades and Glaeserl (1994) empirical study on 85 countries showed that trade opening is beneficial to reduce regional income disparity. Jian, Sacks and Warnerl (1996) reanalysed the neoclassical economic growth convergence model and used China interprovincial GDP per capita data for the period 1952-1993 and found that coastal regions have an innate advantage in participating in foreign trade, and this advantage is an important reason for the widening gap between coastal and inland regions. Jaumotte et al. (2008) take the structure of trade as the main object of study and define it as agriculture, industrial manufactures, and services exports as a share of GDP, they found that trade in agricultural products has a significant effect on reducing inequality, and in many developing countries a large number of poor people are employed in the agricultural sector, so the increase in exports in this sector tends to reduce inequality, however, the effect of industrial and services exports is not significant. Lu (2008) investigates the effect of factor endowments and trade openness on income distribution using inter-provincial panel data for China. The results show that: factor endowment characteristics are the cause of income disparity even without trade; foreign trade causes the overall income gap to widen; the combination of foreign trade and different factor endowments produces effects on income distribution with regional differences, and such effects widen the income

gap in the eastern region and alleviate the income gap in the central and western regions. Using empirical analysis, Wen Juan and Sun Churin (2009) also confirmed the relationship between foreign trade and inter-regional Gini coefficient in China, and found that conducting foreign trade and would reduce the inter-regional income gap, and also showed that the structure of export commodities is significantly negatively related to the Gini coefficient, which can also improve the regional income gap. Using Chinese inter-provincial panel data from 2002-2008, Li Zhen et al. (2015) demonstrated that an increase in trade openness deepens income inequality under the condition that both trade openness and labor migration are taken into account.

In summary, scholars at home and abroad have now conducted a large number of studies on the relationship between international trade and income distribution. However, due to the different research perspectives and research objects, no uniform conclusion has been reached. Therefore, on this basis, this paper makes an empirical test on the extent to which regional trade openness affects income distribution inequality, and proposes optimized policy recommendations accordingly.

3. Empirical Analysis

3.1 Data Sources

The data in paper are macro data from 2010 to 2019 for 31 provinces across China. The data of Thiel Index, openness to foreign trade, regional GDP, and urbanization rate are obtained from the National Statistical Yearbook and Local Statistical Yearbooks, and are calculated and compiled.

3.2 Selection of Indicators and Metrics

3.2.1 Thiel's Index

The Thiel index, which indicates the inequality of income distribution, is the explanatory variable in this paper. A large number of scholars have stated that a large part of income inequality in China is due to urban-rural income inequality. Therefore, this paper uses the urban-rural Thayer index of each province to indicate the degree of urban-rural income distribution inequality. Its calculation formula is as follows:

$$T = \sum_{i=1}^2 \left(\frac{I_i}{I} \right) \ln \left(\frac{\frac{I_i}{I}}{\frac{P_i}{P}} \right) \quad (1)$$

where $\frac{I_i}{I}$ denotes the income share of rural or urban situation and $\frac{P_i}{P}$ denotes the population share of rural or urban situation.

3.2.2 Trade Openness

Trade openness is the core explanatory variable in this paper. In order to specifically analyze the impact of imports and exports on consumption, this paper introduces three variables: total trade openness, import trade openness and export trade openness. Based on previous experience, this paper chooses to use the ratio of China's total annual imports and exports to GDP to represent total trade openness (trade), the ratio of imports to GDP to represent import openness (im_trade) and the ratio of exports to GDP to represent export openness (ex_trade). The expressions are as follows:

$$\begin{aligned} trade_{p,t} &= \frac{X_{p,t} + M_{p,t}}{GDP_{p,t}} \\ im_trade_{p,t} &= \frac{M_{p,t}}{GDP_{p,t}} \\ ex_trade_{p,t} &= \frac{X_{p,t}}{GDP_{p,t}} \end{aligned} \quad (2)$$

where $trade_{p,t}$ denotes the total trade openness of region p in time period t , $im_trade_{p,t}$ denotes the import trade openness of region p in time period t , $ex_trade_{p,t}$ denotes the export trade openness of region p in time period t , $X_{p,t}$ denotes the foreign exports of region p in time period t , $M_{p,t}$ denotes the foreign imports of region p in time period t , and $GDP_{p,t}$ denotes the gross product of region p in time period t .

3.2.3 Control Variables

Gross Local Product (GDP): GDP can reflect the total value of economic development of a region and may also have some impact on income distribution. Since its order of magnitude is too large, it is treated as a logarithm. Local fiscal expenditure level (finance): The level of local fiscal expenditure is expressed as the ratio of local fiscal expenditure to GDP, and the larger the value, the greater the degree of government intervention in the local economy. Tertiary industry ratio (third): The ratio of tertiary industry can reflect the local industrial structure, which is also closely related to the income distribution. Urbanization rate (city rate): Urbanization is the process of transferring rural labor force to cities and towns, and urban residents usually have higher consumption demand, so the increase of urbanization level can also improve the overall consumption level of the region. The urbanization rate in this paper is expressed as the ratio of the urban resident population to the total resident population in the region.

3.3 Model Setting

In the study of the impact of foreign trade on income distribution, the local Thayer index is the explanatory variable and the openness to foreign trade is the core explanatory variable. Based on economic theory and data availability, this paper constructs a multiple linear regression equation of foreign trade openness and income distribution based on the inclusion of a series of control variables:

$$\begin{aligned} inequity_{p,t} &= \beta_0 + \beta_1 trade_{p,t} + \beta_2 K_{p,t} + u_p + \varepsilon_{f,p,t} \\ inequity_{p,t} &= \beta_0 + \beta_1 ex_trade_{p,t} + \beta_2 K_{p,t} + u_p + \varepsilon_{f,p,t} \\ inequity_{p,t} &= \beta_0 + \beta_1 im_trade_{p,t} + \beta_2 K_{p,t} + u_p + \varepsilon_{f,p,t} \end{aligned} \quad (3)$$

where p stands for province, t stands for time, $inequity$ stands for regional Thayer index, $trade$ stands for total trade openness, ex_trade stands for export trade openness, im_trade stands for import trade openness, K stands for other control variables including gross local product ($\log(GDP)$), local fiscal expenditure level (finance), tertiary industry share (third), and urbanization rate ($city_rate$), u stands for explanatory variables that do not vary over time, and ε stands for random disturbance term.

3.4 Analysis of Results

In this paper, the least squares method of regression is used, and the regression results after adding regional fixed effects are shown in Table 1. From the results, it can be seen that the effects of total trade opening, export trade opening and import trade opening on regional income distribution are significant, and the coefficients of total trade opening and export trade opening on regional income distribution are 0.0106 and 0.0224, respectively, with significance levels within 1%; the coefficient of import trade opening on regional income distribution is 0.0103, with significance levels within 10%. It indicates that foreign trade exacerbates regional income distribution inequality, and the impact of export trade on regional income inequality is greater than the impact of import trade on regional income inequality. Possible reasons for this are: first, China conducts export activities (especially exports) that promote employment more significantly in towns than in villages, making the income gap between towns and villages widen. Second, the import and export industries are dominated by manufacturing and have been shifting from low-end to high-end manufacturing in recent years, which has a more pronounced wage boosting effect on high-skilled workers, which in turn increases the income gap.

For the other control variables, the effect of GDP and urbanization rate on income distribution inequality is negative and significant at 1% level of significance, indicating that the higher the level

of regional economy, the more equal its income distribution. The effect of the level of local fiscal expenditure on the inequality of income distribution is not significant. The effect of tertiary industry share on income distribution inequality is significantly positive, and the increase of tertiary industry makes the income distribution more uneven. The reason is that the development of tertiary industry increases the income of some people with high technology and high knowledge level to a certain extent, thus widening the income gap between them and people with low technology level, which is consistent with the reality.

Table 1. Regression results of trade openness on regional income distribution

VARIABLES	(1) inequity	(2) inequity	(3) inequity
trade	0.0106*** (0.00261)		
ex_trade		0.0224*** (0.00438)	
im_trade			0.0103* (0.00553)
lgdp	-0.00984*** (0.00161)	-0.0107*** (0.00171)	-0.00863*** (0.00143)
finance	-0.0274 (0.0171)	-0.0301 (0.0175)	-0.0222 (0.0164)
third	0.109*** (0.0112)	0.114*** (0.0121)	0.106*** (0.0105)
city_rate	-0.336*** (0.0214)	-0.337*** (0.0209)	-0.327*** (0.0209)
Constant	0.337*** (0.0253)	0.343*** (0.0257)	0.321*** (0.0234)
Observations	304	304	304
R-squared	0.764	0.765	0.763
Number of id	31	31	31

Note: Robust standard errors in parentheses, ***, ** and * indicate that the corresponding coefficients are significant at the 1%, 5% and 10% statistical levels, respectively.

3.5 Heterogeneity Test

The phenomenon of disparity in the impact of foreign trade on the income distribution of different regions exists. For coastal and inland regions, there is a significant difference between the openness of foreign trade in coastal regions and inland regions, is there a link between this and the income distribution gap? Table 2 shows the impact of foreign trade on income distribution in inland and coastal regions. It can be seen that total trade openness increases the income gap in inland regions with a coefficient of 0.12, which is significant at the 1% level of significance. For coastal areas, total trade openness also increases the income gap within the region with a coefficient of 0.064, indicating that for each percentage point increase in trade openness in coastal areas, the urban-rural Thayer index in coastal areas increases by 0.064, given that other factors are comparable. similarly, export trade openness increases the income gap between inland and coastal areas and is significant at the 10% significance level. Import trade increases the income gap in inland areas, but the effect on the income gap in coastal areas is not significant. Overall, the effect of export trade on income distribution is greater than the effect of import trade on income distribution.

For the control variables, GDP is negatively correlated with income distribution inequality; local finance is negatively correlated with income distribution inequality; urbanization rate is negatively correlated with income distribution inequality; and the share of tertiary industry is positively correlated with income distribution inequality. It indicates that the improvement of economic development and government support help reduce the gap between the rich and the poor. The

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Table 2. Regression results of trade openness on income distribution between inland and coastal areas

VARIABLES	Inland	Coastal	Inland	Coastal	Inland	Coastal
trade	0.120*** (0.0223)	0.0642* (0.0303)				
ex_trade			0.0243* (0.0136)	0.414** (0.120)		
im_trade					0.0273* (0.0145)	0.0798 (0.179)
lgdp	-0.0424*** (0.00816)	-0.0577** (0.0197)	-0.0193 (0.0153)	-0.0394** (0.0125)	-0.0208* (0.0103)	-0.0164 (0.0204)
finance	-0.125*** (0.0334)	-0.168** (0.0677)	-0.0902 (0.0539)	-0.141** (0.0430)	-0.0957 (0.0597)	-0.0967* (0.0457)
third	0.108*** (0.0279)	0.0760** (0.0320)	0.0566* (0.0302)	0.0547 (0.0294)	0.0692* (0.0338)	0.0911** (0.0323)
city_rate	-0.259*** (0.0751)	-0.125* (0.0688)	-0.259** (0.0977)	-0.109 (0.0897)	-0.272*** (0.0543)	-0.346* (0.168)
Constant	0.651*** (0.0545)	0.766*** (0.183)	0.429*** (0.109)	0.567*** (0.0890)	0.448*** (0.0768)	0.412** (0.136)
Observations	194	110	194	110	194	110
R-squared	0.836	0.767	0.771	0.824	0.773	0.779
Number of id	20	11	20	11	20	11

Note: Robust standard errors in parentheses, ***, ** and * indicate that the corresponding coefficients are significant at the 1%, 5% and 10% statistical levels, respectively.

4. Conclusion and Suggestion

4.1 Research Conclusion

This article observes the macro data of various provinces in China from 2010 to 2019, and establishes a multi-linear regression model to estimate the impact of foreign trade on regional income inequality. The results show that:

1. Foreign trade has exacerbated the influence of income inequality in various regions, and the impact of export trade on the inequality of income in the region is greater than the influence of import trade in inequality in regional income.

2. From the perspective of coastal and inland, the impact of export trade on the inequality of the income of coastal cities is greater than the influence on the inequality of the income of inland cities.

4.2 Related Suggestions

According to empirical results, foreign trade has exacerbated the inequality of China's income distribution, so should China reduce foreign trade? The answer is no, and foreign trade is obviously not the direct cause of the inequality of income distribution. Therefore, the following suggestions are made in this article:

First, foreign investment should be guided to transfer from cities and towns to rural areas, from coastal areas to inland areas. The introduction of foreign trade has led to regional economic development and benefits to labor. However, the introduction of foreign trade at this stage is still dominated by coastal areas and urban areas. Foreign trade benefits enjoyed by inland and rural areas are insufficient. Therefore, the government should reasonably guide foreign capital from a macro level, drive the balanced development of various regions, and reduce the gap between the rich and the poor.

Second, we should pay attention to the optimization of industrial structure. The development of the tertiary industry is a manifestation of the development of a national level of technology. However, the field of the tertiary industry is mainly based on high-tech talents, and too much attention to its development will inevitably increase the gap between the rich and the poor in the region. Therefore, while developing the tertiary industry, the development of the first and second industries cannot stop. The coordinated development of the three major industries should be done in order to reduce the income gap in the industry.

Finally, the training of talents should be strengthened. The talent training referred to here is not only an increase in the number of overall quantities, but also an increase in the equalization and high quality. It can be seen that foreign trade has increased the income gap between high-tech groups and low-tech groups. Therefore, more people receiving good education and becoming high-tech talents can fundamentally reduce the skills gap in the labor market, thereby reducing the income gap.

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