Research on the Influence of Import Trade on China's Employment: Empirical Analysis Based on Provincial Panel Data

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Abstract. With the opening up of foreign trade, various economic issues have become obvious. In addition, due to the impact of the COVID-19 in 2020, the dilemma of 'difficult employment' has a certain impact on China's economic development. In the context of internationalization, import trade has a significant impact on the employment level of different countries through a variety of mechanisms. As a developing country and a big trading country, the study on the impact of import trade on the level of labor in China has a strong practical guiding significance. By empirical analysis, we reached the conclusion that import has a restraining effect on employment of the whole country and the eastern, central and western regions; import has restrained the total employment in the three industries as well.

1 Introduction

The sudden outbreak of COVID-19 in 2020 caused a severe recession of the world economy, a sharp contraction in international trade and many major difficulties in global financial development [1]. As a populous country, the impact on our country brought by this whole series of problems shall not be underestimated. In the post-pandemic era, many countries have taken measures to restrict social distance which has led to mass unemployment. The sudden outbreak of the epidemic crisis has caused a huge impact on China's economic development and production as well as public health, brought a series of challenges to domestic employment. Along with the sustained development of our economy and the continuous enhancement of our comprehensive national strength, actively expanding imports becomes a major measure to expand our opening to the outside world. Therefore, we should pay great attention to the impact of import trade on the employment.

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2 Empirical analysis

2.1 National employment effect

2.1.1 Research design

Based on Cobb-Douglas production function model and the research of Greenaway et al[2], we selected relevant data of 31 provinces and cities in China from 2005 to 2020. The data were obtained from China Statistical Yearbook and local statistical yearbooks. Table 1 shows the variable declaration. The resulting econometric model is as follows (the value of each variable is the logarithm of the actual value) :

$$\ln L_{it} = \varphi_0 + \varphi_1 \ln IM_{it} + \varphi_2 \ln w_{it} + \varphi_3 \ln Q_{it} + \varphi_4 \ln EX_{it} + \varphi_5 \ln EDU_{it} + \varphi_6 \ln TE_{it} + \varepsilon_{it} \quad (1)$$

Table 1. Variable declaration

Types	Variables	Symbolic representation	Variable definitions
Explained variable	Employment level	$\ln L_{it}$	Year-end Employment/10,000people
Explanatory variables	Total import	$\ln IM_{it}$	Total import/100 million Yuan
	Wage	$\ln w_{it}$	Average wages of employees in urban non-private sector/Yuan
	Output	$\ln Q_{it}$	Gross domestic product/100 million Yuan
Control variables	Total export	$\ln EX_{it}$	Total export/100 million Yuan
	Education level	$\ln EDU_{it}$	students in regular junior college/people
	Technical level	$\ln TE_{it}$	Number of domestic patents granted

2.1.2 Stationary test

By doing ADF unit root test, the result shows that all series are stationary at a significant level of 0.01; by doing co-integration test, the Pedroni test result shows that there is co-integration relationship between these variables. So regression models can be built.
This part uses stepwise regression analysis to explore the impact of import trade on overall national employment.

From table 2, the national employment level is negatively correlated with total import and wage. Both the level of output and the three control variables promote the level of employment.

Table 2. Basic regression results

Explanatory variables	1	2	3	4
lnIM	-0.1444851***	-0.140156***	-0.1532842***	-0.1547049***
	(-12.78)	(-8.99)	(-10.92)	(-11.00)
lnw	-0.8450326***	-0.8459044***	-0.5776406***	-0.6087407***
	(-37.03)	(-36.88)	(-18.06)	(-15.59)
lnQ	1.028078***	1.031356***	0.5776639***	0.5588497***
	(51.01)	(47.42)	(12.62)	(11.71)
lnEX		-0.0069794	0.0415742**	0.0324096*
		(-0.40)	(2.57)	(1.86)
lnEDU			0.4393056***	0.4208857***
			(10.95)	(9.97)
lnTE				0.0351313
				(1.39)
C	7.872267***	7.870577***	3.189735***	3.688481***
	(33.95)	(33.90)	(6.71)	(6.19)

t statistics in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3 Regional Employment Effect

3.1 Research design

Thirty-one provinces and cities in China are divided into three parts: east, middle and west. The model construction and data selection in this section are the same as those in the previous section.

3.2 Regression analysis

By doing ADF unit root test, the result shows that all series are stationary at a significant level of 0.01; by doing co-integration test, the Pedroni test result shows that there is co-integration relationship between these variables. So regression models can be built.
As we can see from table 3, import trade has a negative effect on employment in the three regions of China. The increase of wages significantly restrains the growth of employment in the three regions; the enhance of output level has a significant promotion on the employment of the whole country and three regions. Then comes to the three control variables. The increase of exports greatly restrains the improvement of the employment level in the eastern region; for the central and western regions, the negative or positive effects are not significant. The improvement of education level plays a positive role in promoting the employment of the three regions, but the effect in promoting the employment of the eastern region is not obvious. The development of technology has promoted the employment of the eastern and central regions of our country, but the positive effect of the eastern region is not significant. However, it has a restraining effect on the employment of the western region.

Table 3. Regression results

Variables	Nationwide	East	Central	West
lnIM	-0.1547049***	-0.0633195*	-0.1733852***	-0.0461894
	(-11.00)	(-2.80)	(-3.66)	(-1.39)
lnw	-0.6087407***	-0.8850871***	-0.7830106***	-0.3986368***
	(-15.59)	(-14.45)	(-8.38)	(-6.66)
lnQ	0.5588497***	1.100629***	0.4286047***	0.2586925***
	(11.71)	(13.66)	(3.91)	(3.62)
lnEX	0.0324096*	-0.0873333**	-0.0013364	0.0026523
	(1.86)	(-2.88)	(-0.03)	(0.10)
lnEDU	0.4208857***	0.0146665	0.5570064***	0.7175212***
	(9.97)	(0.19)	(4.32)	(9.71)
lnTE	0.0351313	0.0109443	0.180859***	-0.0707566*
	(1.39)	(0.30)	(3.26)	(-1.74)
C	3.688481***	7.282495***	3.81866**	0.8391407
	(6.19)	(7.48)	(2.31)	(0.85)
R^2	0.9318	0.9665	0.8468	0.9345
A^2-R^2	0.9309	0.9653	0.8392	0.9324
Likelihood Ratio Test	110.74***	12.55***	45.82***	92.59***
Huasman Test	189.92***	238.61***	117.24***	65.01***
Sample size	496	176	128	192

t statistics in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4 Industrial Employment Effect

4.1 Research design

The explained variables are the labor force of the three industries, denoted as L1, L2 and L3. Take the logarithm of the year-end employment of the three industries.
The econometric model is as follows:

$$\ln L1_{it} = \varphi_0 + \varphi_1 \ln IM_{it} + \varphi_2 \ln w_{it} + \varphi_3 \ln Q_{it} + \varphi_4 \ln EX_{it} + \varphi_5 \ln EDU_{it} + \varphi_6 \ln TE_{it} + \varepsilon_{it} \quad (2)$$

$$\ln L2_{it} = \varphi_0 + \varphi_1 \ln IM_{it} + \varphi_2 \ln w_{it} + \varphi_3 \ln Q_{it} + \varphi_4 \ln EX_{it} + \varphi_5 \ln EDU_{it} + \varphi_6 \ln TE_{it} + \varepsilon_{it} \quad (3)$$

$$\ln L3_{it} = \varphi_0 + \varphi_1 \ln IM_{it} + \varphi_2 \ln w_{it} + \varphi_3 \ln Q_{it} + \varphi_4 \ln EX_{it} + \varphi_5 \ln EDU_{it} + \varphi_6 \ln TE_{it} + \varepsilon_{it} \quad (4)$$

4.2 Regression analysis

By doing ADF unit root test, the result shows that all series are stationary at a significant level of 0.01; by doing co-integration test, the Pedroni test result shows that there is co-integration relationship between these variables. So regression models can be built.
Table 4 shows that the increase of import has a significant negative effect on the employment of the three industries. While restraining the employment in the primary industry, technological progress promotes the growth of employment in the secondary and tertiary industries. Since the secondary industry contains a lot of industries that require high technical level such as manufacturing, the development of technology has a certain driving effect on the employment of the secondary industry [3].

Table 4. Regression results

Variables	L1	L2	L3
lnIM	-0.4498108***	-0.2120566***	-0.0546133***
	(-15.70)	(-12.08)	(-4.27)
lnw	-0.8842031***	-0.8220819***	-0.2810227***
	(-11.11)	(-16.87)	(-7.92)
lnQ	1.011102***	0.7412152***	0.3009647***
	(10.40)	(12.45)	(6.94)
lnEX	-0.005804	0.1838621***	0.0419733***
	(-1.14)	(8.45)	(2.65)
lnEDU	0.74527347***	0.1960349***	0.4472441***
	(8.67)	(3.72)	(11.65)
lnTE	-0.2206429***	0.1226272***	0.086448***
	(-4.27)	(3.88)	(3.75)
C	1.790083	4.287242***	0.0547168
	(1.47)	(5.77)	(0.10)
R^2	0.8240	0.9324	0.9415
A^2-R^2	0.8218	0.9315	0.9408
Likelihood Ratio Test	97.25***	112.40***	168.23***
Hausman Test	224.68***	43.37***	76.43***
Sample size	496	496	496

t statistics in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5 Conclusions and recommendations

5.1 Conclusions

5.1.1 The employment effect of import and export trade has regional differences.

Export is positively correlated with overall national employment and employment in the western region, while negatively correlated with employment in the eastern and central regions. Due to differences of the geographical location, economic development level and cultural environment amount the three regions, import trade has different effects on employment in different regions. The negative effect import plays on the whole country and the central region is more obvious than that on the eastern and western regions.

5.1.2 Import trade restrains the employment of the three industries.

Import trade development restrains the three industry employment growth in different degrees, this phenomenon reflects that excessive imports would bring import competition and market selection effect, have an impact on the original products industry, manufacturing and service industries, weaken the domestic product demand, resulting in the decrease of employment.

5.1.3 The Import and export trade greatly promote the technological progress.

Active participation in foreign trade not only promotes rapid economic growth and reduces the distance between China and developed countries, but also makes a strong contribution to the development of China's advanced technology [4] : Firstly, the increase in the number of imported products would make domestic enterprises producing such products have a sense of competition. In order to occupy a place in the competitive market, these enterprises are bound to imitate the imported competitive products and make innovation, in this process; their own technological level could be improved. Secondly, in the international market, with the increasingly close trade between countries in the world, export enterprises would also face more competitors. In order to improve the market competitiveness of products, enterprises will intensify efforts to develop new technologies. Thirdly, importing advanced technology and production equipment from developed countries will bring technological spillover effect, thus promoting our technological progress to a great extent.

6 Recommendations

6.1 Actively participate in international trade and give full play to the positive effect of import and export on employment in china.

In the future foreign trade, China should continue to make use of exports to promote the employment. To make full use of trade exchanges with developed countries to develop advanced technology, increase research and development, export products with more technical content, adjust and perfect the employment structure of our country. In terms of imports, while importing new technologies such as digital information and intelligent manufacturing from developed countries, raise the technical level of our country, to drive the employment of high-tech labor forces.

6.2 Pay attention to balance the regional economic development.

The key to balancing employment among different regions and reducing labor transfer costs is to achieve a balance of participation in foreign trade and technological development among regions. Firstly, it is necessary to strengthen the leading role of the eastern region. Through counterpart support and cooperation, the economic development of the central and western regions can be driven, and the construction of the 'Belt and Road' can be used to connect the east and the west, so that the resources can flow orderly and reasonably between regions. Secondly, the central and western regions should also make full use of their regional advantages such as superior climate and geographical conditions, vigorously develop local characteristic industries such as catering and tourism, to provide more employment opportunities for local labor force, try to balance the employment in different regions.

6.3 Optimize and upgrade the industrial employment structure.

Nowadays, the application of advanced technology and new equipment in the primary industry has brought crowding-out effect and reduced employment opportunities for low-skilled labor. In the industrial upgrading process, we should energetically develop the secondary industry and the third industry, which can absorb some employment of the original product industry, in order to improve the industrial employment structure to some extent. Connecting trade in goods and services to promote the coordinated development

between the primary, secondary industries and the service industry, stimulate the growth in labor demand, and continuously optimize the trade structure [5].

6.4 Give full play to the role of technological innovation in promoting employment.

Technological innovation brings about both job creation and job destruction mechanisms. On the one hand, technological innovation will lead to the development and application of new technologies, thus increasing the demand for high-tech labor, creating new industries and more job opportunities. On the other hand, the development of technology would also promote the development of digitization and intelligence. To a certain extent, the large number of high-tech and advanced equipment will reduce the demand for traditional labor, and accelerate the replacement of labor force by technology and capital. Therefore, we have to develop new technology and advanced equipment, at the same time, try to reduce the employment substitution effect brought by the advanced technology.

6.5 Optimize the labor supply structure.

Firstly, raise the educational level of the workforce, improve the quality of education, the domestic key universities should pay more attention to training students' employment skills and practical abilities. To expand the scale of graduate education, at the same time, increase the proportion of professional master and professional doctor. Secondly, for on-the-job employees, strengthen their vocational ability training, so that they can better adapt to the development of technology and the new economic situation. Finally, for unemployed employees, encourage them to get re-employment and participate in vocational training, so as to help them find new jobs faster. For retired employees, improve their pension security system.

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