Research on the Influence of Enterprise Productivity on Export Trade under the New Situation

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Abstract: Based on the microscopic statistical data of industrial enterprises from 2010 to 2021, this paper empirically tests the impact of enterprise productivity on export trade under the new situation. The results show that, although export can improve the scale efficiency of Chinese enterprises to a certain extent, its role is negligible. The scale economy effect of export trade can not promote the growth of productivity level because of the low scale efficiency of Chinese enterprises. On the whole, export trade can promote total factor productivity, technical efficiency and technological progress, but the promotion of technological progress is only significant at the level of 10%.

1. Introduction

Since the reform and opening up, China's foreign trade has developed rapidly, especially after China's accession to the World Trade Organization, the export trade scale of China enterprises has continued to expand. Enterprises with relatively high productivity will choose to export, while enterprises with relatively low productivity can only supply the domestic market, resulting in a situation that the productivity level of export enterprises is higher than that of domestic enterprises [1]. With the deepening of international division of labor and the development of multinational companies, enterprises have become the core subject of international economic and trade activities, and the theory of international trade has turned to the study of internationalization behavior of enterprises [2-3]. It is pointed out that [4] if the productivity premium of exports is estimated without considering the import activities of enterprises, it is very likely that the effect of exports on the productivity of enterprises will be overestimated or even distorted. The research puts forward that the difference of productivity among enterprises determines their different extroversion choices, and only when they reach a certain critical point can they export, while enterprises with relatively low productivity choose to supply only the domestic market or even withdraw from the market [5-6]. Since then, scholars have done a lot of theoretical expansion and empirical tests on the basis of Merritz model.

Under the new situation, it is of great theoretical value and practical significance to objectively evaluate the relationship between China's enterprise productivity and export trade, and to discuss the heterogeneous influence of export on different types of enterprises and its reasons. This paper uses econometric model to measure the total factor productivity of heterogeneous enterprises, and studies the influence mechanism of enterprise productivity on export trade under the new situation.

2. Research Method

2.1 Model Design

Enterprise is one of the pillar industries in China, and its productivity directly reflects its development. In this paper, productivity is defined as the value obtained by the ratio of output to input, which is used to measure the output quantity of physical products or services that can be brought by unit input of production factors and reflect the effective utilization of various production factors. Labor productivity reflects the comparative relationship between the labor consumption and production results of a single worker in an enterprise in a certain period. It is an important indicator used to measure and evaluate the development of enterprises, and the level of labor productivity has an important impact on economic growth [7].

The macro-mechanism of enterprise export trade affecting productivity, the core content of which lies in the influence of enterprise export trade on regional macro-economy and society, thus affecting productivity. The effect of resource redistribution means that export trade can optimize the allocation of resources, make more resources flow to enterprises with higher productivity, improve the utilization efficiency of resources, and thus improve the overall productivity of the region; Economies of scale are also closely related to increasing returns to scale's economic concept, while benefits of scale mean that the growth of production scale is faster than that of factor input, that is, the same input produces higher products, while economies of scale mean that the expansion of production scale reduces the unit production cost, thus improving productivity.

ATFP method is essentially an approximation of Solow residual method in parameter method, which can reflect the relationship between input and output of various factors in enterprises, and it is convenient to calculate and integrates the advantages of parameter method, so this paper chooses this method to measure enterprise productivity [8]. Its calculation formula is:

$$ATFP = \frac{\ln Q}{L} - \frac{s \ln K}{L} \quad (1)$$

Among them, Q --Output;

L --Input of labor factors;

K --Capital factor input;

s --The contribution degree of capital in the production function, that is, the output elasticity of capital, is between [0,1]. If $s = 0$, the productivity is labor productivity; If $s = 1$, the productivity is the capital productivity.

For export-oriented enterprises, they will invest in productivity only if and only if the productivity growth obtained through investment is higher than a certain critical value [9]. Based on the above theoretical model and research questions, this paper constructs an econometric model, with enterprise productivity as the explained variable and export volume as the core explanatory variable, so the basic structure of the model is as follows:

$$ltfp_{it} = \beta_0 + \beta_1 lEXV_{it} + \beta_2 X_{it} + \beta_3 Z_{it} + \varepsilon_{it} \quad (2)$$

$ltfp_{it}$ --Logarithm of productivity of enterprise i in t period;

$lEXV_{it}$ --Logarithm of the export value of enterprise i in t period;

X_{it} --Characteristic variables of enterprise i in t period, such as human capital investment, capital intensity, profitability and enterprise scale;

Z_{it} --External control virtual variables of enterprise i in t period, including time, region, industry and ownership factors;

ε_{it} --Error term.

2.2 Selection of Data and Screening of Samples

This section uses the data reported in the Annual Statistical Report of Industrial Enterprises (2010-2021) of the National Bureau of Statistics. In terms of measuring the output level of enterprises, the ex-factory price index of industrial products by industry in China Statistical Yearbook is used, and the price of industrial added value in each year is reduced based on 2010. We divide enterprises into three types: large enterprises, medium enterprises and small enterprises. At the beginning of the sample, non-exporting enterprises choose to enter the export market at or before the end of the period.

3. Result Analysis

3.1 Correlation Analysis between Export Trade and Scale Efficiency

In order to analyze the quantitative relationship between export trade and scale efficiency, the correlation between export dependence and scale efficiency will be tested next. In this paper, Eviews6.0 software is used to draw the scatter diagram of export dependence and scale efficiency, as shown in Figure 1.
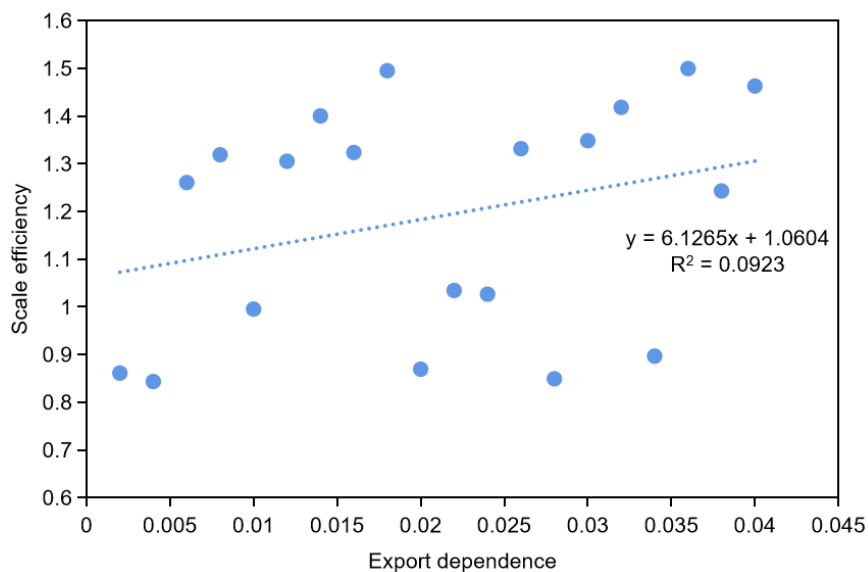

Fig.1 Scatter Chart of Export Dependence and Scale Efficiency Average

It can be seen that there is no obvious linear correlation between export dependence and average scale efficiency. In order to describe the correlation between export dependence and the average scale efficiency more accurately, the correlation coefficient of the two is calculated to be 0.09, which shows that there is basically no correlation between them, which is consistent with the conclusion presented by the scatter chart. Although export can improve the scale efficiency of Chinese enterprises to a certain extent, its role is so small that it can be ignored.

3.2 Test Result

For the measurement of enterprise scale, we can adopt the indicators such as the number of labor force, operating income and total capital. In this paper, the total assets are used as the standard of enterprise scale grouping, and three groups of enterprise data are used as samples for regression, and the results are shown in Table 1.

Table 1. Regression Result

Variable	large scale industry	medium-lot producer	small enterprise
$lEXV_{it}$	0.0153**	0.0061***	0.0871***
X_{it}	-0.00362	-0.0017**	-0.0214***
Z_{it}	0.0266	-0.01621	0.1638
Adjust R 2	0.563	0.558	0.359
D-W	1.804	1.861	1.775
F test	4756.08	2860.49	5874.16

Note: "* * *" and "* *" are significant at the level of 1% and 5% respectively.

It can be seen that the adjusted R 2 values of the three groups of samples are 0.563, 0.558 and 0.359, respectively, and the overall fitting degree of the equation is good. From the F value, it can be seen that the equation is significant, and the D-W values are 1.861, 1.861 and 1.775, respectively, and there is no autocorrelation.

For industrial enterprises of different scales, the relationship between export and productivity is different. Exports have a significant positive effect on the productivity of large enterprises, while the export scale of small and medium-sized enterprises is negatively related to productivity. There is a positive correlation between enterprise scale and productivity, which shows that even in groups with different scales, the larger the scale, the higher the productivity level.

The scale economy effect of export trade not only failed to promote, but hindered the growth of productivity, mainly due to the low scale efficiency of Chinese enterprises themselves; The technology spillover effect of export trade can significantly improve the total factor productivity, technical efficiency and technical progress, and the impact of foreign R&D investment from exports on productivity is greater than that of domestic R&D investment. On the whole, export trade can promote total factor productivity, technical efficiency and technological progress, but the promotion of technological progress is only significant at the level of 10%. The scale economy effect of export trade can not promote the growth of productivity level because of the low scale efficiency of Chinese enterprises.

The development of enterprises plays an important role in the long-term development of China's economy. In order to further improve the productivity level of Chinese enterprises and promote their better and faster development, this paper puts forward policy suggestions from the following aspects in combination with its existing problems.

Increase investment in research and development, and enhance the technological innovation ability of enterprises. The empirical research results show that the domestic R&D investment of enterprises has a lower promotion effect on productivity than the foreign R&D investment originating from exports, indicating that there is insufficient R&D investment in Chinese enterprises [10]. Therefore, it is necessary to increase R&D investment, enhance the technological innovation ability of enterprises, and further promote the improvement of their productivity.

Create a good export environment and business environment. The research in this paper shows that non-economic factors such as the nature of enterprise ownership and the location of the enterprise will influence the export behavior of the enterprise, which shows that the export environment in China is not completely fair. At present, the competition faced by enterprises in

China is global, and this unfair export environment is not conducive to China's export enterprises to enhance their long-term competitiveness. Therefore, the China government needs to take active measures to improve the export environment and create a good business environment.

Strengthen international economic and trade cooperation with developed countries and regions to improve the quality of export products. Enterprises often have a sense of crisis in the face of fierce competition, which becomes their motivation to pay attention to the technical level of products and reduce manufacturing costs. Moreover, the high-tech level of enterprises in developed countries and regions can affect other enterprises that produce similar products through technology spillover because of the partial sharing of technology. Therefore, although the country has paid more and more attention to trade with developing countries and regions in recent years, enterprises should not despise the markets of developed countries and regions, but should learn advanced production and management technologies from exports to improve their competitiveness.

4. Conclusions

Based on the relevant data of Chinese enterprises from 2010 to 2021, this paper examines the influence of enterprise productivity on export trade from an empirical perspective, and draws some important conclusions: although export can improve the scale efficiency of Chinese enterprises to a certain extent, its role is so small that it can be ignored. The scale economy effect of export trade can not promote the growth of productivity level because of the low scale efficiency of Chinese enterprises. For industrial enterprises of different scales, the relationship between export and productivity is different. Exports have a significant positive effect on the productivity of large enterprises, while the export scale of small and medium-sized enterprises is negatively related to productivity. On the whole, export trade can promote total factor productivity, technical efficiency and technological progress, but the promotion of technological progress is only significant at the level of 10%.

References

[1] Maican F, Orth M. A Dynamic Analysis of Entry Regulations and Productivity in Retail Trade. International Journal of Industrial Organization, vol. 40, no. 8, pp. 67-80, 2015.

[2] Cui J, Lapan H, Moschini G C. Productivity, Export, and Environmental Performance: Air Pollutants in the United States. American Journal of Agricultural Economics, vol. 98, no. 2, pp. 66, 2015.

[3] Rijesh R. International Trade and Productivity Growth in Indian Industry: Evidence from the Organized Manufacturing Sector. Journal of South Asian Development, vol. 14, no. 1, pp. 1-39, 2019.

[4] Duch-Brown N, Martens B. A new perspective on the exporter productivity premium: online trade. Applied economics letters, vol. 25, no. 13-15, pp. 989-993, 2018

[5] Ju J, Yu X. Productivity, profitability, production and export structures along the value chain in China. Journal of Comparative Economics, vol. 43, no. 1, pp. 33-54, 2015.

[6] Qiu B, Yan Z. Market Efficiency, Heterogeneous Trade Costs and Export-Only Firms. Pacific economic review, vol. 2017, no. 1, pp. 22, 2017.

[7] Shapiro J S, Walker R. Why Is Pollution from US Manufacturing Declining? The Roles of Environmental Regulation, Productivity, and Trade. American Economic Review, vol. 108, no. 12, pp. 3814-3854, 2018.

[8] Ottaviano G, Peri G, Wright G C. Immigration, Trade and Productivity in Services: Evidence from U.K. Firms. Journal of International Economics, vol. 112, no. 7, pp. 88-108, 2018.

[9] Jaewon, Jung. Openness, productivity and welfare with heterogeneous firms. Journal of Korea Trade, vol. 21, no. 4, pp. 349-365, 2017.

[10] Hoekman B, Shepherd B. Services Productivity, Trade Policy and Manufacturing Exports. Social Science Electronic Publishing, vol. 40, no. 3, pp. 499-516, 2015.