Research on the Influence of the Development of Digital Economy on Export Trade—— Based on the Inter-Provincial Panel Data of China

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Abstract: The purpose of this study is to explore the influence of digital economy on the development level of China's export trade under the background of rapid global economic development, and to analyze the process of this influence. It is found that the development level of digital economy has no significant negative impact on the development of export trade. In terms of regional heterogeneity, the development of digital economy has a stronger and positive impact on the development of export trade in western China than in central and eastern China. This paper puts forward some targeted policy suggestions.

Keywords: Digital Economy; Export Trade; Fixed Effect Model

1. Introduction

In March 2015, Premier Li Keqiang put forward the "internet plus" action plan, which aims to promote the integrated development of the Internet and various traditional industries. As the second largest economy in the world, China is actively promoting the development of digital economy to achieve the goal of economic transformation and sustainable development. Therefore, it is of great significance to deeply explore the development of digital economy. The purpose of this study is to explore the correlation and influence degree between digital economy and export trade, select a series of key variables, build relevant index models and use economic model analysis methods, and provide reference for local governments to formulate targeted policies from different perspectives of China provinces to further realize the goal of sustainable economic development.

The innovation of this study is mainly reflected in many aspects: 1. Comprehensively consider multiple influencing factors and comprehensively evaluate the impact of digital economy on export trade; 2. Using the data of provincial units to investigate the differences and development potential of different regions; 3. In-depth analysis of the impact of the development of digital economy on export trade.

2. Literature review

Manuel Castells thinks that an economy with the characteristics of "globalization, informationization and networking" emerged in the 20th century, which is called "new economy"[1]. OECD(2020) found that the number of enterprises using big data for decision-making increased year by year, and the proportion of American manufacturing plants using data tripled between 2005 and 2010[2]. In the related research of digital economy, scholars have expounded the definition and characteristics of digital economy in the above-mentioned documents[3,4]. However, there are still some shortcomings in the current research, more in-depth research is needed to understand how digital technology changes the mode and effect of export business.

3. Research design

3.1 Data source and processing

This paper uses the statistical yearbook of China, the statistical yearbook of provinces and the statistical data of provinces from 2011 to 2020 of the National Bureau of Statistics, these data count the core explanatory variable and the control variables, covering 20 provincial units. The data was preprocessed before analysis.

3.2 Selection and construction of main indexes

The explained variable in this study is the development of export (EXP), and the core explanatory variable is the Index of digital economy (DECI). Select the following indicators as the control variables of the model: Expenditure on new product (NDP), Expenditure on technology (TIE), Technical transformation (TTE), Total population in China (POP), GDP of provinces (GDP), Internal expenditure (RD), Number of Web pages (WEB), Foreign direct investment (FDI), Level of FDI (FDIL). The original data of the above indicators are from the National Bureau of Statistics, and the China Digital inclusive finance Index is from the Digital Finance Index Report. The data of each index is dimensionless by averaging method, the weight is determined by principal component analysis, and the covariance matrix of the basic index is used as input. Finally, the comprehensive index score of the principal component is calculated according to the index weight.

By controlling these factors, this study can more accurately study the influence of digital economy on the development level of export trade, exclude other possible interference factors, and draw more reliable conclusions.

3.3 Descriptive statistic

Descriptive statistical results of the indicators show that the development level of export trade in the sample changes in a relatively small range; the average value of the comprehensive index of digital economy is close to 1. The sample data of NDP, TIE, TTE, GDP, RD, Web and FDI have a large range of values and a large standard deviation, which shows that the differences between samples are very significant. The values of other control variables tend to be stable.

3.4 Benchmark model

Model setting:

$$EXP = \beta_0 + \beta_1 DECI + \beta_2 NDP + \beta_3 TIE + \beta_4 TTE + \beta_5 POP + \beta_6 GDP + \beta_7 RD + \beta_8 WEB + \beta_9 FDI + \beta_{10} FDIL + \varepsilon$$

Among them, exp represents the development level of export trade, and DECI, NDP, TIE, TTE, POP, GDP, RD, WEB, FDI and FDIL are independent variables. $\beta_{0\text{-}10}$ are the parameters of the model, indicating the influence of independent variables on dependent variables. ε is an error term, which indicates the random error that the model cannot explain.

Estimation method

In this study, according to the Hausmann test of the model, the results show that Hausmann test value is greater than the critical value of significance level (5%), P value is 0, and chi2=0.7658 is large enough. Therefore, the h_0 is rejected and the fixed effect model is selected as the benchmark model for estimation.

4. Empirical analysis

4.1 Analysis of benchmark regression results

Before the benchmark regression, the houseman test of fixed effect and random effect was carried out in this study, and the test results supported the benchmark regression analysis with fixed effect model. The benchmark regression results considering control variables showed that the coefficient of the comprehensive index of digital economy is negative at the level of 5%, which shows that the development of digital economy is not sufficient. At the same time, the coefficient is only -0.00721, and the effect is not significant, which shows that its influence on the development level of export trade is negligible.

From the control variables, only RD has a significant effect on the development of export trade, which shows that R&D innovation is an important factor affecting the export trade.

4.2 Robustness test

In this study, the method of sub-sample regression is combined with the method of eliminating special samples, 30 provinces are divided into eastern, central and western according to official standards, and then one province in the eastern, central and western regions is eliminated respectively.

Our results show that all the data have passed the significance test, and the two groups of comprehensive index coefficients of digital economy in the western region are opposite to the total and the five groups of coefficients in the eastern and central regions. This test result shows that the development of digital economy has little impact on the development level of export trade at present. Therefore, the empirical results are robust.

5. Policy advice

This study puts forward the following suggestions: China should continue to increase its support for the digital economy, which has the potential to become a strong influencing factor. The government can optimize laws and regulations, strengthen the construction of digital infrastructure, and promote the application of digital technology in various industries to improve the level of comprehensive index and related indicators of digital economy. Specific measures include improving the ability of new product development, focusing on promoting balanced development among regions and introducing differentiated policies to enhance the attractiveness of foreign direct investment.

To sum up, the government can accelerate the process of digital economy from weak influence to strong influence through the above measures, and promote its development of export trade.

References

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