



Study on the Impact of Cross-Border e-Commerce on the Competitiveness of Small and Medium-Sized Enterprises

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Abstract. Cross-border e-commerce is a new type of transaction that upgrades the Internet + international trade. In this paper, a research model is constructed with cross-border e-commerce as the independent variable and the competitiveness of small and medium-sized enterprises as the outcome variable, to explore the influence mechanism between the two. This article uses the regression analysis algorithm in the e-commerce data mining algorithm to analyze the data. The conclusions drawn in this paper are as follows: cross-border e-commerce positively promotes the competitiveness of SMEs, and the positive promotion effect of cross-border e-commerce on SMEs is stronger in regions with better economic levels.

Keywords: Cross-border e-commerce · SME competitiveness · Data mining algorithms · Word cloud analysis

1 Introduction

In recent years, with the widespread popularization of digital technology, cross-border e-commerce has become a new format in the foreign trade industry. Cross-border e-commerce provides new growth points for SMEs and improves their competitiveness. Cross-border e-commerce can bridge the gap between time and space and enable long-distance transactions between people. Therefore, the impact mechanism of cross-border e-commerce on the competitiveness of SMEs is worth further exploring.

2 Word Cloud Analysis of Cross-Border e-Commerce

As shown in Fig. 1, word cloud is a visual method for summarizing and summarizing text by filtering and analyzing the text to highlight words that appear frequently in the text. This paper collects 500 papers on cross-border e-commerce in recent years from the database, and then uses Python program to extract preliminary keywords from text data, and draws the word cloud as follows.

Table 1. Model selection

Variables	BP Y	Hausman Y	F Y
EDI	0.0013*** (0.000122)	0.000667*** (0.000173)	0.0005310*** 0.000146
GDP	0.114*** (0.0327)	0.178** (0.0825)	0.0959** (0.0386)
LE	1.059*** 0.239	0.548 (0.478)	1.046*** (0.359)
FR	0.00453*** (0.00654)	0.00531*** (0.11101)	0.00397*** (0.00799)
CQ	0.00355*** (0.00101)	0.00201*** (0.00413)	0.00499*** (0.00102)
AL	0.0699** (0.0219)	0.119** (0.0399)	0.0612** (0.0211)
TW	1.39*** (0.179)	1.29*** (0.399)	1.389*** (0.234)
Constants	0.531*** (0.012)	0.267 (0,217)	0.551**** (0.0421)
Observations	70	70	
R2	0.916	0.531	
Number of cities		14	14
P	0.0000	0.0000	0.0000

where $x_1 - x_k$ are predictors; $c_1 - c_k$ is the overall regression coefficient; e is the random error, which is an indicator for judging the quality of the simulation, and the model parameters are obtained using the least squares method. The accuracy of the regression equation is an important indicator used to indicate the fit of the actual observation point and the regression equation, measured by the judgment coefficient.

$$R = ESS/TSS = 1 - [RSS/(n - k - 1)]/[TSS/(n - 1)] \tag{2}$$

5.2 Model Building

The research model in this paper is as follows:

$$Y_{it}Q_{iongoEDkt} + BiGDRt +'' ji + p4CQit + p5TWit + p6Alit + zhi \tag{3}$$

5.3 Model Selection

As shown in Table 1, in this paper, the model is selected by BP test, F test, and Hausman test. The results are shown in the table below, and the fixed-effect model was finally selected [6].

6 Empirical Analysis

6.1 Descriptive Statistics

As shown in Table 2, this paper analyzes the statistical data by regression analysis algorithm, and the results are as follows: the variables selected in this paper show that the economic development of Liaoning Province is relatively healthy.

Table 2. Descriptive statistics

Variable	N	Minimum value	Maximum value	Average value	Standard deviation
EDI	70	3.94	19.68	9.64	3.26
GDP	70	1866.5	16060.3	4896.2	3077
TW	70	1002.8	6099.1	2216.7	1334.8
FR	70	174.8	1999.3	539	387.9
LE	70	10289	487960	13670	89667
AI	70	1178	6298	35490	1489.2
CQ	70	189.1	678.3	347.2	124.9

6.2 Regression Analysis Algorithms

As shown in Table 3, in this paper, the regression analysis algorithm is used to analyze the data, and the results are as follows: cross-border e-commerce has a positive impact on the competitiveness of small and medium-sized enterprises.

Table 3. Regression analysis

Variables	Y1	Y2	Y3	Y4	Y5
EDI	0.00697*** (0.000912)	0.000541*** (0.00101)	0.00521*** (0.00104)	0.00509*** (0.00108)	0.00599*** (0.00202)
GDP		0.699*** (0.0213)	-0.0378 (0.0399)	0.0299 (0.0414)	0.0215*** (0.0713)
CQ					0.00203*** (0.000333)
AI					131*** (0.0312)
LE			0.00111*** (0.000312)	0.00113*** (0.00299)	0.00401*** (0.00099)
TW					0.717*** (0.233)
Observed value	70	70	70	70	70
R2	0.346	0.419	0.435	0.516	0.631
Number of cities	14	14	14	14	14

Table 4. Regional heterogeneity analysis of cross-border e-commerce

Variables	Y1	Y2
EDI	0.00823*** (0.000233)	0.000398*** (0.00109)
GDP	0.207 (0.121)	0.0109 (0.112)
CQ	0.00327*** (0.000688)	7.01e-04 (0.00414)
AI	0.212*** (0.721)	0.012 (0.0432)
LE	0.00653*** (0.00216)	-0.00499 (0.00101)
TW	-1.314* (0.653)	0.211 (0.533)
Observed value	33	37
R2	0.739	0.799
Number of cities	6	8

6.3 Regional Heterogeneity Analysis of Cross-Border e-Commerce

As shown in Table 4, the results of the following table show that in regions with better economic levels, the stronger the impact of cross-border e-commerce on the competitiveness of SMEs.

7 Conclusions

This paper takes various cities in Liaoning Province as the research object to explore the influence mechanism of cross-border e-commerce on the competitiveness of small and medium-sized enterprises. By analyzing the data collected in Liaoning Province from 2015 to 2020 and using the method of regression data analysis, this paper finds that cross-border e-commerce has a role in promoting the competitiveness of small and medium-sized enterprises. And cross-border e-commerce has different effects on the competitiveness of SMEs in different regions of Liaoning Province, which is heterogeneous.

References

1. McFarlan. F. Information Technology Changes the Way You Compete[J].HBR, 1984(1):98–104.
2. Jin Bei. Theory and Method of Enterprise Competitiveness Evaluation [J]. China Industrial Economics,2003(3):5-13.
3. Ni Jia, Sun Jianjun. Research on the Influence of cross-border E-commerce on the competitiveness of small and medium-sized enterprises [J]. Modern, 2017, No. 842 (5): 68–69.
4. Shi. The contribution of leadership and strategic planning to electronic commerce applications in federal agencies[J]. Dissertation Abstracts International,2001(A): 193–197.

5. Qin Yan. Basic algorithm and application analysis of data mining in e-commerce[J]. Computer Knowledge and Technology,2011,7(10):2318-2319.
6. Wang Qi. The development form, obstacles and next steps of cross-border e-commerce in China[J].Science and Technology and Enterprise,2016,No.299(02):2-3.

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