WEP Warwick Evans Publishing

Transactions on Economics, Business and Management Research
ISSN: 2960-1789, eISSN: 2960-2254 | Volume 15
MEEA 2025

Impacts of Digital Finance on International Trade Competitiveness

Chenxue Zhang *

School of Economics and Management, Nanjing University of Science and Technology, Nanjing210000, Jiangsu, China

* Corresponding Author Email: 1437151583@qq.com

Abstract. Digital inclusive finance utilizes digital technology and financial innovation to provide financial services for enterprises, and competitiveness is the embodiment of a country's comprehensive national power such as the level of technology and innovation. This paper selects the panel data of 31 provinces in China from 2011 to 2020 to explore the impact of digital finance on international trade competitiveness. It is found that digital finance and international trade competitiveness show a positive correlation, i.e., the development of digital finance is conducive to the improvement of international trade competitiveness. The level of technological innovation and industrial structure shows a positive correlation with international trade competitiveness, which is conducive to the improvement of the country's trade competitiveness, but the level of development of the domestic market and the level of urbanization shows a negative correlation with international trade competitiveness, which is not conducive to the enhancement of international trade competitiveness to a certain extent, but the degree of negative influence is relatively weak. Finally, this paper puts forward relevant suggestions from the aspects of promoting the development of digital finance, encouraging scientific and technological innovation and promoting industrial advancedization to promote the development of digital finance, so as to enhance China's international trade competitiveness.

Keywords: Digital finance; International trade competitiveness; Technological innovation.

1. Introduction

Since the reform and opening up, international trade exports have played a crucial role in economic development. In today's context of globalization, international trade exports have become an important engine of economic development for all countries. During the 14th Five-Year Plan period, improving the competitiveness of international trade is an important way to improve the quality of opening up to the outside world. "The 14th Five-Year Plan states that it is necessary to accelerate the construction of a new development pattern, synergistically promote the construction of a strong domestic market and a trade powerhouse, optimize the layout of the international market, stabilize the international market share, cultivate modern enterprises with global competitiveness, promote the competitiveness of industries, and enhance the international competitiveness of a high-level talent pool, various types of enterprises, and mega-cities. In 2022, the 20th Party Congress re-emphasized the need to accelerate the construction of a domestic and international double-cycle development pattern, and to improve the quality and level of international circulation. According to data from the National Bureau of Statistics, in the first half of 2023, China's half-yearly total import and export of goods exceeded the milestone of 20 trillion yuan for the first time, and the total amount of import and export hit a record high in the same period in history, reaching 20.1 trillion yuan, a year-on-year increase of 2.1 percent. Among them, total exports reached RMB 11.46 trillion, up 3.7% year-on-year.

With the acceleration of globalization and the development of information technology, digital finance, as a new type of financial model, is gradually becoming an important influence on international trade export competitiveness. By utilizing digital technology and financial innovation, digital inclusive finance provides more convenient, flexible and low-cost financial services for small, medium and micro enterprises, thus helping them to improve production efficiency, reduce costs, expand markets, and thus improve the competitiveness of international trade exports.2021, the "14th Five-Year Plan"

pointed out that it is necessary to strengthen financial inclusion and reform, accelerate the digital transformation of finance, and improve the ability of financial services to the real economy. In 2021, the 14th Five-Year Plan states that it is necessary to strengthen the reform of financial inclusion, accelerate the digital transformation of finance, and improve the capacity of financial services for the real economy. At the same time, the "14th Five-Year Plan" for the development of the digital economy clearly points out the need to increase the synergistic development of finance and e-commerce and model innovation, and effectively expand the digital economy in the field of international trade cooperation. The standardized development of digital finance can help to serve the transformation and development of the real economy, and provide financial services to promote the rapid development of new modes and new forms of international trade.

However, empirical studies related to the impact of digital finance on international trade competitiveness are still relatively effective. This paper explores the impact relationship between digital finance and international trade competitiveness with panel data of 31 provinces and administrative regions in China (except Hong Kong, Macao and Taiwan) from 2011 to 2020 in the hope of contributing to an in-depth understanding of the role of digital finance on national trade.

2. Literature References

Changes in digital finance, including technological advances in financial services, have significantly transformed the world of global business transactions. Scholars have studied the transformative nature of digital finance in corporate trade and investment activities, such as digital finance helping to improve efficiency, reduce transaction costs, and develop cross-border business. The development of digital payment platforms has simplified financial transactions and enabled businesses to trade around the world more smoothly[1,2,3]. The research of Yu and Yan revealed a positive relationship between the application of digital payment solutions and international trade, which emphasized that digital finance is an instrumental factor that determines enterprises' participation in global trade activities[4]. The high and fast rise of digital finance is at the forefront of this financial revolution, which brings together technologies with traditional financial services to ensure effective and efficient services in China[4,5]. The Chinese economy has experienced rapid transformation as a result of technological advancements, the evolution of consumer choices, and friendly regulatory environments that have put it at the forefront of global financial digitization[1,4]. For example, Alibaba's Ant Group and Tencent's WeChat Pay are at the center of China's digital finance revolution. These companies still play an important role in promoting the widespread adoption of digital financial services across the country[5]. Alipay and WeChat Pay are now deeply embedded in daily life, enabling online purchases as well as peer-to-peer transfers[7,8]. Kim explores how mobile payment solutions have changed the way individuals and financial institutions operate[5]. It is worth noting that digital finance not only digs deeper into payment solutions but also includes a range of services such as digital banking and lending[9]. Digital banks, with their virtual operations and innovative customer interfaces, have become an important alternative model that challenges traditional banks. In addition, the rise of P2P lending platforms has democratized financing channels and provided new capital channels for individuals and small businesses[9,10]. China has also been actively exploring the application of blockchain technology as the infrastructure of cryptocurrency.

From the viewpoint of various research literature, most of the current scholars have conducted empirical research on digital finance on real activities, and there is less research literature related to the competitiveness of digital finance and national trade import and export. However, in the study of the correlation between the two, most scholars believe that the development of digital finance has a facilitating effect on the development of international trade, and most scholars study from the specific activities of digital finance and national trade import and export, and there are fewer empirical studies analyzing the competitiveness of digital finance and national trade export from a quantitative point of view. Based on this, this paper combines various types of literature to explore the impact of digital finance and international trade competitiveness from a quantitative perspective.

3. Variable Selection and Modeling

3.1. Variable selection

Core Explanatory Variables: this paper selects the digital financial inclusion index as an explanatory variable, denoted as DIFI. Referring to the existing literature, this paper adopts the digital inclusive finance index of 31 provinces in China from 2011 to 2020 to measure the level of digital finance development in each region. The relevant data mainly come from the Digital Inclusive Finance Development Index measured by the Financial Research Center of Peking University.

Explanatory variables: This paper selects international trade competitiveness as the explanatory variable, which is labeled as TC. This paper refers to the existing literature, and adopts the trade competitiveness TC index to measure international trade competitiveness. The size of the TC index is equal to the ratio of the import and export trade surplus to the total amount of imports and exports. The TC index includes both total imports and total exports, which to a certain extent can measure the development of the domestic market and international market side by side, that is, to a certain extent can effectively reflect the development trend of international trade competitiveness.

Control Variables: Based on a large amount of literature, this paper selects scientific and technological innovation (RD), domestic market development (DM), urbanization level (UR), foreign direct investment level (FDI), industrial structure level (IS) and financial support level (GOV) as control variables. Among them, the value of scientific and technological innovation is the proportion of R＆D investment to GDP in each region to measure the level of scientific and technological innovation. Generally speaking, the higher the level of scientific and technological innovation, the higher the technological value-added of products and the stronger the competitiveness of international trade. The value of domestic market development is measured by the total retail sales of consumer goods to GDP in each region as a percentage of the size of the domestic market. Generally speaking, the larger the size of the domestic market, the easier it is to attract global resources and factors to enter the local market, so as to better connect the domestic market with the international market, and thus improve the competitiveness of international trade. The value of urbanization is measured by the proportion of urban population to the total population in each region; the value of foreign direct investment is measured by the proportion of foreign direct investment to regional GDP in each region; the value of industrial structure is measured by the proportion of value added of the secondary and tertiary industries to regional GDP; and the value of financial support is measured by the proportion of financial expenditures of regional governments to regional GDP in each region.

Based on the data completeness and continuity of this paper, this paper excludes Hong Kong, Macao and Taiwan for the time being and selects the panel data of 31 provinces in China from 2011 to 2020. The data are from the China Statistical Yearbook of the National Bureau of Statistics.

3.2. Modeling

In this paper, the international trade competitiveness TC index of 31 provinces and administrative regions in China (except Hong Kong Special Administrative Region, Macao Special Administrative Region and Taiwan Province) in the past years is used as the explanatory variable, and the control variables are controlled to study the impact of digital finance on international trade competitiveness. The benchmark regression model is as follows:

$$TC_{it} = \beta_0 + \beta_1 DIFI_{it} + \sum_{i=2}^{7} \beta_i Control_{it} + \mu_{it} + \varepsilon_{it} \quad (1)$$

Where, TC is the international trade competitiveness index; DIFI is the digital financial inclusion index; scientific and technological innovation (RD), domestic market development (DM),

urbanization level (UR), foreign direct investment level (FDI), industrial structure level (IS) and financial support level (GOV) as the control variables.

4. Empirical analysis

4.1. Descriptive statistics

In this paper, the international trade competitiveness index (TC) is used as an explanatory variable, the digital inclusive finance index (DIFI) is used as an explanatory variable, and scientific and technological innovation (RD), domestic market development (DM), urbanization level (UR), foreign direct investment level (FDI), industrial structure level (IS) and financial support level (GOV) are used as control variables. Utilizing Stata software, the descriptive statistical results of each variable were obtained, as shown in Table 1.

Table 1. Descriptive statistics of variables

Variables	Obs	Mean	Std.Dev	Min	Max
the international trade competitiveness index (TC)	310	216.2350	0.34221	-0.71	0.97
the digital inclusive finance index (DIFI)	310	0.0101	97.03041	16.22	431.93
scientific and technological innovation (RD)	310	0.3830	0.00580	0.00	0.02
domestic market development (DM)	310	0.5805	0.06873	0.20	0.60
urbanization level (UR)	310	0.0743	0.13142	0.23	0.90
foreign direct investment level (FDI)	310	0.9027	0.28412	0.01	4.96
industrial structure level (IS)	310	0.2579	0.05075	0.28412	1.00
financial support level (GOV)	310	0.1154	0.21458	0.01	1.49

According to Table 1, the mean value of the international trade competitiveness of China's provinces in 2011-2020 is 0.1154, which can be considered that the overall international trade competitiveness level of the provinces is at the equilibrium level compared with the minimum and maximum values. The standard deviation is 0.34221, which is larger than the mean level, indicating that the gap between the provinces in international trade competitiveness is larger, and the competitiveness improvement speed is faster. The mean and standard deviation of digital finance are 216.235 and 97.03041 respectively, indicating that the overall digital finance of China's provinces is developing rapidly. The mean value of the ratio of science and technology innovation investment to GDP is 0.0101, and the intensity of science and technology innovation investment is relatively low. In the level of domestic market development, the mean value of the ratio of total retail sales of consumer goods to GDP is 0.3830, and the overall domestic market needs to be further expanded. The standard deviation is 0.06873, indicating that the overall domestic market is developing fast. The mean and standard deviation of the domestic urbanization level are 0.5805 and 0.13142 respectively, indicating that the overall urbanization level of China's provinces is relatively fast. The mean and standard deviation of the level of foreign direct investment show that the overall foreign investment attraction capacity of China's provinces is relatively balanced and the overall foreign investment attraction capacity is relatively strong. The mean value of the industrial structure of the domestic market is 0.9027, and the standard deviation is 0.05075, indicating that the overall scale of the second and third industries in China's provinces is relatively large, and the level of advanced industrial structure is rapidly increasing. The mean and standard deviation of the domestic government support level are 0.2579 and 0.21458 respectively, indicating that the government support level of our provinces is relatively high.

4.2. Correlation analysis

This paper uses the Pearson correlation test to investigate the correlation between the international trade competitiveness index, the digital financial inclusion index, scientific and technological

innovation, the development of the domestic market, the level of urbanization, the level of foreign direct investment, the level of industrial structure and the level of financial support, and the results of the correlation test are shown in Table 2.

Table 2. Correlation test

Variables	TC	DIFI	RD	DM	UR	IS	FDI	GOV
TC	1							
DIFI	-0.086	1						
RD	0.069	0.281**	1					
DM	-0.203**	0.358**	0.249**	1				
UR	-0.426**	0.472**	0.622**	0.157**	1			
IS	-0.007	0.275**	0.660**	0.117*	0.667**	1		
FDI	0.150**	0.158**	0.021	-0.009	0.162**	-0.023	1	
GOV	0.184**	-0.073	-0.513**	-0.176**	-0.454**	-0.174**	-0.016	1

Note: * indicates $p < 0.1$, ** indicates $p < 0.05$, and *** indicates $p < 0.01$.

According to Table 2, it can be seen that the Pearson coefficient of the level of foreign direct investment, the level of financial support and international trade competitiveness is significantly positive, indicating that there is a significant positive correlation between the level of foreign direct investment, the level of financial support and international trade competitiveness, which means that with the level of foreign direct investment and the level of financial support continue to improve, in favor of international trade competitiveness continues to strengthen. Moreover, according to the size of the Pearson coefficient of the above variables and international trade competitiveness, it can be initially considered that the correlation between the level of financial support and international trade competitiveness is stronger, and the correlation between the level of foreign direct investment and international trade competitiveness is weaker. At the same time, the Pearson coefficient of the level of domestic market development and urbanization and international trade competitiveness is significantly negative, indicating that the level of domestic market development and urbanization and international trade competitiveness have a significant negative correlation, which means that with the increasing level of domestic development and urbanization, it may be detrimental to the enhancement of international trade competitiveness to a certain extent, but the extent of this negative influence is relatively weak.

4.3. Multicollinearity test

In this paper, the tolerance and VIF covariance tests are applied to investigate whether there is multicollinearity between the international trade competitiveness index, digital financial inclusion index, scientific and technological innovation, domestic market development, the level of urbanization, the level of foreign direct investment, the level of industrial structure, and the level of financial support, and the results of multicollinearity are shown in Table 3.

Table 3. Multicollinearity test

Variables	Tolerance	VIF
DIFI	0.641	1.559
RD	0.384	2.602
DM	0.817	1.225
UR	0.331	3.018
IS	0.370	2.706
FDI	0.926	1.079
GOV	0.559	1.789

Based on the results of the test for multicollinearity in Table 3, it can be seen that the tolerances of all the study variables are greater than 0.1 and the VIF values are less than 10, which indicates that there is no serious multicollinearity between the variables, and they can be included in the model at the same time for the regression analysis.

4.4. Regression

This paper conducts a linear regression of digital financial development and international trade export competitiveness by gradually adding the control variables of scientific and technological innovation, domestic market development, level of urbanization, level of foreign direct investment, level of industrial structure, level of financial support, and its benchmark regression results are shown in Table 4.

Table 4. Regression results

TC	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DIFI	-0.000304 (0.000200)	-0.000404* (0.000208)	-0.000161 (0.000214)	0.000964*** (0.000178)	0.000996*** (0.000171)	0.00101*** (0.000172)	0.00101*** (0.000178)
RD		5.961* (3.480)	8.058** (3.459)	36.99*** (3.230)	29.62*** (3.424)	29.56*** (3.425)	29.45*** (3.840)
DM			-1.099*** (0.300)	-1.572*** (0.229)	-1.509*** (0.220)	-1.520*** (0.221)	-1.522*** (0.222)
UR				-2.330*** (0.153)	-2.675*** (0.162)	-2.648*** (0.165)	-2.653*** (0.183)
IS					2.059*** (0.403)	2.004*** (0.408)	2.016*** (0.448)
FDI						-0.0451 (0.0503)	-0.0448 (0.0505)
GOV							-0.00554 (0.0861)
Cons	0.181*** (0.0474)	0.142*** (0.0524)	0.490*** (0.108)	1.487*** (0.104)	-0.128 (0.332)	-0.0894 (0.335)	-0.0946 (0.345)
N	310	310	310	310	310	310	310
R^2	0.007	0.017	0.058	0.465	0.507	0.508	0.508

Note: * indicates $p < 0.1$, ** indicates $p < 0.05$, and *** indicates $p < 0.01$.

According to the regression results in Table 4, it can be seen that after gradually adding each control variable, it is found that there is a significant positive correlation between the Digital Financial Inclusion Index and the International Trade Competitiveness Index, that is, the Digital Financial Inclusion Index has a significant positive impact on the international trade export competitiveness. From column (7) of the data, it can be seen that the coefficient of Digital Financial Inclusion Index is 0.00101 and it is significant at 1% level of significance. This indicates that when the digital financial inclusion index grows by 1%, the international trade export competitiveness index will grow by 0.00101%, indicating that the development of digital financial inclusion index can effectively promote the enhancement of international trade export competitiveness. Scientific and technological innovation and international trade competitiveness There is a significant positive correlation between the index, that is, scientific and technological innovation on international trade export competitiveness has a significant positive impact. From column (7) of the data, it can be seen that the coefficient of science and technology innovation is 29.45, and it is significant at the 1% level of significance. This indicates that when science and technology innovation increase by 1%, the

international trade export competitiveness index will increase by 29.45%, indicating that the progress of science and technology innovation can effectively promote the enhancement of international trade export competitiveness. The level of domestic market development and international trade competitiveness Index has a significant negative correlation, that is, the level of domestic market development on international trade export competitiveness has a significant negative impact. From the data in column (7) can be seen, the coefficient of the level of development of the domestic market is -1.522, and is significant at the 1% significance level. This indicates that when the level of development of the domestic market increases by 1%, the international trade export competitiveness index will decrease by 1.522%, indicating that the level of development of the domestic market is not able to effectively promote the enhancement of the international trade export competitiveness, but the degree of this negative impact is relatively weak. The level of urbanization and international trade competitiveness Index has a significant negative correlation, that is, the level of urbanization on international trade export competitiveness has a significant negative impact. As can be seen from column (7) of the data, the coefficient of urbanization level is -2.653, and it is significant at 1% significance level. This indicates that when the level of urbanization increases by 1%, the international trade export competitiveness index will decrease by 2.653%, indicating that the development of urbanization level cannot effectively promote the enhancement of international trade export competitiveness, but the degree of this negative influence is relatively weak. The level of industrial structure and international trade competitiveness Index has a significant positive correlation, that is, the level of industrial structure on international trade export competitiveness has a significant positive impact. As can be seen from column (7) of the data, the coefficient of industrial structure level is 2.016, and it is significant at 1% significance level. This indicates that when the level of industrial structure increases by 1%, the index of international trade export competitiveness will increase by 2.016%, indicating that the improvement of the level of industrial structure can effectively promote the enhancement of international trade export competitiveness. The level of foreign direct investment and the level of financial support and international trade export competitiveness have a negative impact, but the correlation is not significant, which indicates that although the level of foreign direct investment and the level of financial support cannot effectively promote international trade export competitiveness, but the degree of this negative impact is relatively weak.

5. Summary

Based on the panel data of 31 provinces in China from 2011 to 2020, this paper uses the digital financial inclusion index measured by the Financial Research Center of Peking University as the core explanatory variable, and the international trade competitiveness index as the explanatory variable, and applies the benchmark regression model to explore whether there is an impact of digital finance on international trade competitiveness. It is found that digital finance and international trade competitiveness show a positive correlation, that is, the development of digital finance is conducive to the improvement of international trade competitiveness. Technological innovation and international trade competitiveness show a positive correlation, that is, the continuous innovation of science and technology is conducive to the enhancement of international trade competitiveness. The level of domestic market development and international trade competitiveness shows a negative correlation, that is, the continuous development of the domestic market to a certain extent is not conducive to the enhancement of international trade competitiveness. The level of urbanization and international trade competitiveness shows a negative correlation, that is, the increase in the level of urbanization to a certain extent is not conducive to the enhancement of international trade competitiveness. However, the level of domestic market and the level of urbanization has a relatively weak negative influence. The level of industrial structure and international trade competitiveness show a positive correlation, i.e., the continuous improvement of industrial structure is conducive to the enhancement of international trade competitiveness.

Based on the conclusions of the empirical analysis, this paper puts forward the following suggestions:

First, accelerate the promotion of digital financial development to promote the upgrading of industrial structure and improve international competitiveness with the digitalization and informatization of financial services.

Second, encourage scientific and technological innovation, improve the scientific and technological added value of export commodities or services, and improve the competitiveness of international trade with the competitive advantages of high quality and high technology content.

Third, accelerating the development of the advanced industrial structure, supporting high-tech industries, and improving the comprehensive competitive advantages of goods or services, so as to comprehensively improve international trade competitiveness.

References

[1] Dai Y, Lu Z. Regional Digital Finance and Corporate Financial Risk: Based on Chinese Listed Companies[J]. Emerging Markets Finance and Trade,2023,59(2): 296-311.DOI:10.1080/1540496X.2022.2099268.

[2] Guanglin S, Ting L, Yongfang A, et al.Digital finance and corporate financial fraud[J].International Review of Financial Analysis,2023,87DOI:10.1016/J.IRFA.2023.102566.

[3] Guangning T, Bo L, Yue C. Does digital transformation matter for corporate risk-taking?[J]. Finance Research Letters,2022,49DOI: 10.1016/J.FRL.2022.103107.

[4] Mingtao Y, Aiguo Y. Can Digital Finance Accelerate the Digital Transformation of Companies? From the Perspective of M&A[J]. Sustainability,2022,14(21): 14281-14281.DOI:10.3390/SU142114281.

[5] Kim, G., 2020. Why is China going to issue CBDC (Central Bank Digital Currency)? 20(4), pp.161–177.

[6] Jing H, Mengzu P, Wenjia H. Digital finance development and bank liquidity creation[J]. International Review of Financial Analysis,2023,90DOI: 10.1016/J.IRFA.2023.102839.

[7] Ma, L., Su, X., Yu, Y., Wang, C., Lin, K., Lin, M., 2018. What drives the use of M-Payment? An empirical study about Alipay and WeChat payment. In: 2018 15th International Conference on Service Systems and Service Management (ICSSSM). IEEE, pp. 1–6.

[8] Linjiang Z, Xiaochuan S, Yaxiong B, et al.Explainable artificial intelligence for digital finance and consumption upgrading[J].Finance Research Letters,2023,58(PC):DOI:10.1016/J.FRL.2023.104489.

[9] Ning Y, Zhang Y. Does Digital Finance Improve Corporate ESG Performance? An Intermediary Role Based on Financing Constraints[J]. Sustainability,2023,15(13): DOI:10.3390/SU151310685.

[10] Lianying Y, Xiaoli Y. Can digitally finance boost SME innovation by easing financing constraints: Evidence from Chinese GEM-listed companies. [J]. PloS one,2022,17(3): e0264647-e0264647.DOI: 10.1371/JOURNAL.PONE.0264647.