Digital Finance, E-Commerce and Tea Export Trade

Jiayuan Zheng

anhui agricultural university

jyzheng2002@163.com

Abstract: The tea trade has always been an important export trade product in China. With the continuous development of digital inclusive finance, it also plays an important role in the tea export trade. This paper empirically studies the positive effect of the development of digital inclusive finance from 2017 to 2021 and the tea export effect of digital inclusive finance on the expansion of the tea export business by small and medium-sized enterprises. The research found that the development of digital inclusive finance can ease financing constraints, reduce financing costs, and promote the innovation of sales mode of tea enterprises, to promote tea export. E-commerce plays a positive regulatory role, and digital inclusive finance can play a greater role in driving the regions with relatively backward tea export activities. But in the area with a relatively weak economic foundation, the role is relatively weak.

Keywords: digital inclusive finance; tea export; e-commerce

1. Introduction

The 10th anniversary of the Belt and Road initiative is held in 2023. High-level opening-up is the only way to achieve high-quality development. For many years, China's tea has been occupying a pivotal position in the international tea industry market. In 2021, China's tea production reached 3.1640 million tons; tea exports reached 369,354 tons, reaching $2299.10 million. According to David Ricardo's comparative advantage theory, because China has more natural advantages in the production of famous tea, China's tea is of good quality and has strong competitiveness. It is of great significance to explore the influence mechanism of tea export for the development of China's foreign trade.

Inclusive finance has improved the availability of financial services, enabling people in less developed areas to enjoy more convenient financial services. In recent years, global economic integration, information in-depth development, and the rise of e-commerce. For tea exports, the digital economy can significantly drive China's agricultural modernization. Cross-border e-commerce can effectively reduce trade costs and expand the trade scope. The development of digital inclusive finance not only increases rural savings and accumulates rural funds, but also improves the construction of rural cross-border e-commerce to help the development of tea foreign trade. Although, there is a lot of literature on the positive role of digital finance on economic growth. But most of them lie in household consumption, mass entrepreneurship, enterprise innovation, and other aspects. So, has digital inclusive finance improved the level of tea exports, and what is the mechanism of action? Does the development of e-commerce play a promoting role in this process? Based on the above problems, the existing literature is not fully explained. To this end, this paper is committed to conducting empirical research on the influence mechanism of digital inclusive finance on tea export and seeking breakthrough space.

2. Literature Review

Inclusive finance means that the public can enjoy more financial services. In terms of export trade, Fan Zhaobin (2017) found that inclusive finance has a promoting effect on export trade. The higher the dependence on external financing of the industry is, the better the impact of export trade is[]Zhao Caixia (2021) affirmed that digital inclusive finance can convert a large number of idle funds into effective supply in a larger scope, easing the financial constraints of export enterprises, and thus promoting export. Yang Yuanyuan (2021) demonstrated that digital inclusive finance can

improve the export scale by improving the efficiency of capital allocation and the level of urban innovation and entrepreneurship .

In Principles of Economics, Marshall discusses two ways to form economies of scale. One is internal economies of scale, that is, the full use of their resources, to realize the improvement of efficiency. The second is the external economies of scale formed by the reasonable division of labor and union among multiple enterprises. The continuous development of digital inclusive finance will form a certain economy of scale, both within enterprises and among industries. This plays an important role in the development of many industries. Tian Juanjuan (2020) concludes that the development of digital inclusive finance can have a positive impact on the development of the modern agricultural economy and the upgrading of the agricultural industrial structure. When referring to the impact of e-commerce on rural economic development, Yao Hui Hui (2022) analyzed the synergistic promotion effect of rural e-commerce and digital inclusive finance on county economic growth, and found that the synergistic effect was significant and the marginal efficiency showed an increasing trend, among which the adjustment effect of the digitalization degree of digital inclusive finance was the strongest. Lu Yue (2022) believes that enterprises located in the central and western regions and local enterprises play more prominent export promotion effects with the help of dual e-commerce platforms. Scale effect and intermediate goods effect are two important channels for enterprises to participate in e-commerce platforms to influence export.

At present, there have been many academic arguments about the benefits brought by the development of digital inclusive finance. However, mostly from the industry or provincial level, ignoring the differences between different regional development levels. As a labor-intensive product, tea is affected by many factors in the export trade. Previous research has failed to reflect the particularity of tea as an agricultural product. Based on David Ricardo's comparative advantage theory, the development level of a digital inclusive economy in different regions and the development endowment of e-commerce are different, so there are differences in tea export levels among regions. Previous literature does not pay attention to the role of e-commerce. This paper will further explore the impact of digital inclusive finance on tea export volume and its mechanism of action.

3. Theoretical analysis and Hypothesis

Digital inclusive finance can optimize the credit approval process, more efficiently build a bridge of information symmetry between capital supply and demand, provide low-price and formal financial support for small and medium-sized enterprises, improve the scale of capital supply, and promote the innovation of enterprise business activities. Tea farmers can obtain more business funds to carry out production activities and business activities design innovation, such as innovation in sales channels. The combination of digital finance and agriculture can save agricultural costs, improve agricultural production efficiency, promote the quality improvement of agricultural products, and optimize the agricultural structure. In tea production, tea enterprises can use new digital equipment to control and supervise in real time, improve the mechanization and intelligence level of tea production, and promote the modernization of export tea production mode. Digital finance can promote new industries, new business forms and new models. The penetration and extension of digital finance to rural areas, accelerate the transmission and dissemination of information, promote the multifunctional development of the tea industry, promote the extension of the tea industry chain, and provide more abundant tea products for export. Digital finance also promotes the sharing of information and resources among tea enterprises, promotes a new mode of agricultural production and operation, expands the traditional sales scope, and improves the management level of tea foreign trade.

Hypothesis 1: Digital finance has a significant positive impact on tea export.

Sun Churen (2017)The higher the level of economic development of cities, the more they will adopt diversified strategies when participating in the international division of labor. Residents in more economically developed areas have higher incomes, so diversified consumer demand drives the diversification of exports. According to Ricardo's comparative advantage theory, the labor force of different economic development levels has different skill distribution and sizes. The division of labor in regions with higher levels of economic development will be more detailed, and the proportion of highly skilled labor force will be more, which will export more products and have a higher degree of export diversification. The continuous development of the digital economy has improved the economic development level of the region and refined the division of labor, to provide more abundant export tea products.

Hypothesis 2: With the increasing improvement of the economic level, the impact of digital finance on tea exports is more significant.

Trade boundary expansion refers to the promotion effect of e-commerce on the wide extension of the destination countries of enterprises. E-commerce platforms weaken the geographical distance, spread rural natural endowments to larger markets, and also reduce the fixed cost of entering the market, making it easier for enterprises to enter new markets. Rural enterprises can leverage existing industries and increase their scale together with e-commerce, such as cross-border trade. E-commerce can promote the cross-regional combination of transactions, and improve the quality of export trade by improving the export diversification level of enterprises, reducing the portfolio risk of enterprises in the export market.i[] Tea farmers can use this to sell products at higher prices, thus increasing export spending. Digital finance has provided strong support for it, such as providing credit support, optimizing the platform construction, providing payment and settlement services, and cultivating new payment habits. Rural e-commerce and digital inclusive finance are deeply integrated, forming a new model of developing rural e-commerce with financial service stations as the front end and joint Internet, and selling tea products to further regions and even overseas. Historically, China's tea exports are mostly concentrated in the southern coastal cities, while the inland areas are relatively few. This is limited by the traffic conditions. The development of e-commerce has broken through this restriction, enabling inland areas to participate in export trade, and bringing more Chinese good tea to the world.

Hypothesis 3: the development of e-commerce enhances the positive effect of digital finance on tea export.

4. Variable definition and model

4.1 model specification

To demonstrate the impact of digital inclusive finance on tea export trade, the benchmark regression model is set as follows:

$$\ln EXP_{i,t} = \alpha + \beta \ln COV_{i,t} + \gamma Z_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \ (1)$$

it$\ln EXP_{i,t}$itIn formula (1), the substandard represents the province and the year, which represents the tea export trade level of the province in the first year and the digital inclusive finance level of the enterprise in the first year. $\ln COV_{i,t}$it$Z_{i,t}\mu_i\lambda_t$ Represents control variables that may affect tea export, and represents fixed effects controlling for individual and year, respectively.$\varepsilon_{i,t}$Random error term

4.2 data sources

The data used in this paper are from the National Bureau of Statistics, the Digital Finance Research Center of Peking University, and China Customs. The panel data of 31 provinces, autonomous regions, and municipalities directly under the Central Government (excluding Hong Kong, Macao, and Taiwan) in China from 2017 to 2021 were selected.

4.3 variable-definition

1. Tea export. The explained variable is tea export volume (lnEXP), which is taken from Chinese customs trade data and processed logarithmically.

2. Digital finance. The core explanatory variable is digital finance (lnCOV), and the digital financial coverage breadth Index is selected as the explanatory variable examined in this paper.ii It chooses the "number of electronic accounts" to reflect the coverage of the Internet-based digital financial model, following the characteristics of the Internet that is naturally free from geographical restrictions. The breadth of coverage is mainly affected by the number of bank cards bound to the account, the number of payment businesses, and the number of money fund businesses.

3. Control variables are mainly obtained from the National Bureau of Statistics. From traffic facilities (traffic): railway and highway mileage, government intervention degree (gov): government spending and GDP ratio, information level (information): at the end of the user and the end of the total population, tea production (production), population (population): at the end of the permanent population, education level (edu): the number of students, economic development degree (GDP): GDP, per capita water resources (lnwat), e-commerce trading activities Enterprise proportion (lnpor).

4. Robustness replacement variables. Digital annual search Index (digital). From Baidu search index official website collation.

5. Regulatory variables are taken from the National Bureau of Statistics data. Based on the median annual e-commerce purchase amount, it is divided into areas with active e-commerce activities and areas with sluggish e-commerce activities.

5. Empirical Analysis

5.1 Descriptive statistical analysis

Descriptive statistics for each variable are shown in Table 1. The average value of tea export (ln EXP) was 13.15, the minimum value was 0.000, and the maximum value reached 18.940. This is because the export volume of some provinces is small, even less than 1 kg, after logarithmic treatment, the minimum value is 0. At the same time, the traffic (traffic) in each region also has a large deviation, with a minimum value of 0.08, a maximum value of 2.12, and the variance of 0.45. Because of China's vast area, there are still a certain degree of regional differences in transportation infrastructure.

Table 1: Descriptive statistical analysis

variable symbol	Mean	Std.Dev.	Obs	min	max
lnexp	13.150	3.980	138	0.000	18.940
lncov	5.710	0.160	155	5.344	6.072
traffic	0.940	0.450	155	0.080	2.120
gov	0.290	0.200	155	0.105	1.289
information	36486.510	89437.600	154	0.000	560000
production	10.810	14.010	129	0.000	50.210
population	4535.270	2989.910	155	349.000	13000.000
edu	99.340	62.230	155	3.560	268.600
GDP	31490.030	25789.490	155	1300.000	120000.000
digital	89.720	56.760	155	0.000	236.000
lnwat	7.240	1.480	155	3.949	11.870
lnpor	2.230	0.340	155	1.459	3.157

5.2 Regression

Table 2 is the regression results of digital inclusive finance for tea export. Column (1) The benchmark regression model indicates that the digital economy (lncov) has a significant positive impact on tea export (lnexp). Column (2) is still a significant positive correlation with lncov after previously controlling the relevant influencing factors. Among them, transportation facilities (traffic), government intervention degree (gov), information level (information), tea production (production), population (population), education level (edu) and economic development level (GDP) are the influencing factors of tea export. Column (3) is to further control the fixed effect of province and the fixed effect of year. The results show that the coefficient of digital finance (lncov) is 22.547, which is significantly positive at the level of 5%, indicating that with the improvement of the development level of digital economy, tea enterprises also perform better in export trade. From this, Hypothesis 1 is verified.

Table 2 Digital regression results of inclusive finance for tea export

	（1）	（2）	（3）
	lnexp	lnexp	lnexp
lncov	19.873**	3.052*	22.547**
	(7.614)	(1.648)	(10.755)
traffic		-2.428***	0.051
		(0.646)	(2.303)
gov		-15.007***	-21.833*
		(2.198)	(12.062)
information		0.000***	0.000
		(0.000)	(0.000)
production		0.087***	-0.021
		(0.014)	(0.083)
population		0.000*	-0.001
		(0.000)	(0.003)
edu		0.010	0.005
		(0.011)	(0.021)
GDP		-0.000***	0.000
		(0.000)	(0.000)
_cons	-96.480**	-0.670	-103.751
	(41.947)	(9.293)	(65.523)
Area fixation effect	YES	NO	YES
Time fixed effect	YES	NO	YES
N	138	114	114
r2_a	-0.220	0.734	-0.340

Standard errors in parentheses
*p <0.1,**p <0.05,***p <0.01

5.3 Robustness test

Thereafter, this paper replaces the explanatory variables with the provincial Baidu index, information index, and media index. Referring to the practice of Li Xinwu (2022) [], R language was used to select the number of words related to the digital economy such as "digital" in the Baidu index of each year to conduct the robustness test. The regression results correspond to Table 3 column (1), and the regression coefficient of the new digital financial variable (digital) is positive at the 1% significance level, which is consistent with the benchmark regression, indicating that the above conclusion is robust. In Table 3 (2), the independent variable of the digital annual search index is (eco). The regression coefficient is positive at the 5% significance level, which is again consistent with the benchmark regression to further test its robustness. Table 3 (3) uses the digital Financial Inclusion Index (index) with the regression coefficient positive at the 5% significance level. In Table 3 (4), the substitution model is the generalized least squares model, and the

regression results remain positive at 10%. In Table 3 column (5), the dependent variable (lnEXP) is delayed to analyze whether it is still robust in time series. The regression coefficient was positive at the 10% significance level. Based on this, the robustness test of this paper is over.

Table 3: The robustness test

	(1)	(2)	(3)	(4)	(5)
	lnexp	lnexp	lnexp	lnexp	F.lnexp
lncov	0.022***	0.008**	0.015**	2.620*	4.057*
	(0.008)	(0.004)	(0.006)	(1.572)	(2.157)
controlled variable	YES	YES	YES	YES	YES
N	114	109	113	113	95
r2_a	0.515	0.717	0.747		0.703

5.4 Heterogeneity

In this paper, the median volume of tea export was divided into high-export groups and low-export groups. The regression results are shown in Table 4, columns (1) and (2). Among the provinces with low tea export, the development of digital inclusive finance plays a greater role in promoting tea export. Because of the degree of economic development of different regions, it directly affects the vitality of local trade activities. According to the median per capita GDP, it is divided into high economic region and low economic region.iii The regression results are shown in Table 4 columns (3) and (4). It is found that compared with high-economic areas, digital economy has a weak impact on tea export in low-economic areas. Conclusion by Zhao Caixia (2022) Conclusion: Digital inclusive finance is conducive to promoting the development of regional export trade, which plays a greater role in promoting the development of export trade of the eastern and central regions, but has no significant impact on the development of export trade of the western regions. There are great differences in the development degree of digital inclusive finance in China. High economic areas are more conducive to the development of export business due to their more perfect information infrastructure construction and higher depth and breadth of digital coverage. Therefore, hypothesis 2 was tested. So, what role does e-commerce play in promoting tea exports in the digital economy? This paper groups according to the median amount of e-commerce procurement, that is, e-commerce active group and e-commerce, lower group. The regression results are shown in Table 4 columns (5) and (6), which found that the e-commerce activity areas were significantly positive at the significant level of 1%. When the variable changed from the e-commerce active group to the lower e-commerce group, it was found that the coefficient in the regression decreased from 4.480 to 1.491. Compared with areas with less active e-commerce, digital economy with less active e-commerce plays a greater role in tea export, mainly due to the lack of traffic conditions and the degree of government intervention in various regions. Therefore, hypothesis 3 was tested.

Table 4 Results of the regression for the heterogeneity test

	(1) High export	(2) Low export	(3) High economy	(4) Low economy	(5) E-commerce active	(6) E-commerce is low
	lnexp	lnexp	lnexp	lnexp	lnexp	lnexp
lncov	10.018**	71.902**	8.952**	42.357	4.480***	1.491
	(2.240)	(2.407)	(2.462)	(1.645)	(1.656)	(3.054)
controlled variable	YES	YES	YES	YES	YES	YES
N	69	45	55	59	64	49

| r2_a | 0.235 | 0.315 | 0.383 | 0.153 | 0.703 | 0.709 |

Standard errors in parentheses
*p ＜0.1,**p ＜0.05,***p ＜0.01

6. Conclusion and policy suggestion

6.1 Conclusion

Digital finance provides financial supply more efficiently, promotes the innovation of business activities of tea enterprises, and has a significant positive impact on tea export. The development of cross-border e-commerce has enhanced the positive effect of digital finance on tea export. For the regions with relatively backward tea export, the development of digital finance can play a greater driving role. At the same time, the development of e-commerce has provided more powerful support for the new pattern of tea export in China.

6.2 Suggestion

Formulate differentiated development strategies. According to the differences in regional infrastructure construction, it is necessary to carry out differentiated and hierarchical development strategies. In the economically developed areas, we should break through the key technological innovation and strengthen the penetration of achievements and theories; the economically backward areas should make up for the shortcomings, learn and introduce excellent experience, and narrow the gap between the two strengthen e-commerce activities. Industrial agglomeration should be used to drive regional industrial development, improve the infrastructure construction of tea gardens and tea areas, make up for the differences in endowments among regions, strengthen knowledge and technology to the countryside, improve the quality of rural labor force, and provide support for the export of agricultural products in more regions.

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