Research on the Impact of Regional Financial Technology Development on Import and Export Trade

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Abstract: The global economic development showed a downward trend due to the impact of the COVID-19 pandemic, and to promote economic recovery, countries around the world have begun to digitize their trade and adopt financial technology. This research focuses on the impact of financial technology on import and export trade, using a regional financial development evaluation system constructed from data covering the period from 2011 to 2020 for 31 provinces, autonomous regions, and municipalities in China. The regional financial technology development index is calculated using the entropy method. The empirical results demonstrate that regional financial technology development can positively promote international trade by improving convenience, financing efficiency, security, and data analysis and prediction capabilities. This research provides a reference for policymakers to promote regional financial technology development and improve the efficiency and competitiveness of import and export trade.

Keywords: Regional development; Financial technology; Import and export trade; Entropy method.

1. Introduction

With the outbreak of the COVID-19 pandemic, the global economy has shown a downward trend. To promote China's opening up to the outside world and trade development, the Ministry of Commerce of the People's Republic of China issued the "14th Five-Year Plan for High-Quality Development of Foreign Trade" in 2021. The plan clearly states that digitalization of trade is an important tool for China to achieve higher-level opening up to the outside world and to become a strong trading nation [9]. Therefore, traditional trade is no longer able to support China's higher-level trade development, and digitalization upgrade is a necessary step for China to become a strong trading nation. Digitalization upgrade implies the adoption of various digital technologies such as the internet, cloud computing, big data, the Internet of Things, and artificial intelligence. Therefore, trade digitalization cannot be separated from the development of the digital economy. In addition, if international trade wants to go digital, transaction digitization is essential, which shows that the development of fintech is very important. Fintech not only

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provides strong support for trade digitalization, but also promotes the rapid development of China's new pattern of dual circulation. As for how the development of fintech specifically affects China's import and export trade, it is currently unknown, so exploring this issue is necessary.

Currently, the academic research in macroeconomics is limited to the research of the impact of financial technology on sustainable development, regional economic development, regional collaboration, and other related areas. Deng et al. (2019) proposed a set of evaluation systems for sustainable development based on the data of P2P platforms in 31 provinces in China and studied the detailed relationship between financial technology and sustainable development [4]. The research results showed that there was a U-shaped relationship between financial technology and sustainable development, mainly due to the impact of extensive economic growth patterns. However, this conclusion is not absolute. Subsequent heterogeneity analysis showed that the impact of financial technology on sustainable development varies significantly by region, being significant in eastern and central China, but not significant in western China. In addition, its impact on central China is significantly higher than that on eastern China.

Regarding the impact of financial technology on regional economic development, Appiahotoo and Song (2021) used the IV-GMM technique to research 31 provinces in China and found that financial technology and sub-indicators such as third-party payment, credit, and insurance could significantly promote China's economic growth, with the effect being most significant in eastern China [1]. Moreover, Huang (2022) studied the impact of financial technology on regional economic development based on annual data from 31 provinces and cities in China from 2009 to 2020[6]. The empirical research showed that financial technology can significantly promote regional economic development and effectively increase the annual increment of the tertiary industry, playing a certain role in promoting the development of the tertiary industry.

Based on the above, China currently has rich research results in the macroeconomic aspect of financial technology. However, there is currently no research on the impact of financial technology on the import and export trade volume of each province (autonomous region, municipality). Therefore, this research takes the 31 provinces (autonomous regions, municipalities) of China as the research object, and uses the data of the 31 provinces (autonomous regions, municipalities) from 2011 to 2020 as the research sample to explore in depth whether the regional development level of financial technology will have an impact on the import and export trade volume of the region. The final research results of this research show that there is a positive correlation between the regional development level of financial technology and the import and export trade volume of the region, that is, the improvement of the regional development level of financial technology can effectively promote the growth of the import and export trade volume of the region.

The marginal contributions of this research are in the following three aspects. First, this research is the first academic article to explore the impact of the regional development level of financial technology on the import and export trade volume of the region, filling some gaps in existing research, and providing a certain reference and research path for future research. Second, this research constructs a regional financial technology development system to measure the regional development level of financial technology. The construction of this system is different from the content of previous scholars, providing a certain theoretical basis and practical methods for subsequent research on regional financial technology. Third, whether in basic regression or

robustness tests, the explanatory variables in this research use the entropy method to comprehensively evaluate the digital indicators of enterprises. The use of this method reduces the influence of subjective factors on the results, making the results more accurate and convincing.

2. Theoretical Analysis and Hypotheses

Financial technology (Fintech) refers to a development model aimed at addressing problems in regional financial activities by promoting digitization, intelligence, and service orientation of financial business through technological and pattern innovations. Regional Fintech has become an inevitable trend in modern economic development, and its innovation and development are of great significance in promoting economic development, improving the financial ecosystem, and promoting financial inclusion. The development of regional Fintech aims to build a more intelligent, efficient, and trustworthy financial ecosystem to support the sustainable development of the financial industry. In recent years, regional Fintech, as a new type of financial business, has developed rapidly. Its application areas are extensive, including payment settlement, loan financing, insurance, investment, risk management, and other fields. Especially in mobile payment, P2P lending, online insurance, and other areas, regional Fintech has achieved significant results and market share. With the development of regional Fintech, various new business models and service models emerge, which have an important impact on import and export trade. This research uses the Regional Fintech Development Index to measure the development level of regional Fintech and then studies the impact of regional Fintech development on import and export trade. This research believes that the specific impact of the development level of financial technology on import and export trade mainly involves the following four aspects: First, the development of financial technology can enhance the degree of trade facilitation. Second, the development of financial technology can improve the efficiency of trade financing. Third, the development of financial technology can improve transaction security. Fourth, the development of financial technology can improve the ability of trade data analysis and prediction.

The above-mentioned impacts have also been confirmed by academic research in this research. According to Chai and Yang (2022), who used provincial data from 2011-2020 to construct a comprehensive system for measuring the level of upgrading in the manufacturing industry supply chain, the final results based on GMM model showed that the development of financial technology can effectively promote the upgrading of the manufacturing industry supply chain, and the trend has certain sustainability and continuous growth [2]. Tan, W. (2022) studied the impact of financial technology development on sub-sectors of the commercial circulation industry from the perspective of heterogeneity of scale and efficiency. The final research results showed that the development of financial technology has broken the temporal and spatial constraints of financing, effectively reduced financing constraints, and promoted the scale development of the commercial circulation industry[8]. Similarly, Da, T. and Liu, D. (2023) found that financial technology development can significantly promote the innovation investment of private enterprises, as they studied Chinese A-share listed companies, particularly private listed companies from 2011 to 2020[3]. Further analysis revealed that financial technology development can effectively alleviate corporate financing constraints and thus promote innovation investment. According to the empirical results of their research using

provincial panel data from 2011 to 2020 and based on the digital inclusive finance index, Fu, H. and Jiang, S. (2022) found that technology investment is an important channel for financial technology to promote economic growth, and financial technology can play a significant role in promoting economic growth. However, there is a marginal diminishing effect of financial technology investment on its promoting effect, so it is not advisable to blindly pursue the use of technical means [5]. Based on the above analysis, this research believes that the level of regional fintech development has a significant impact on the import and export trade of provinces (autonomous regions and municipalities). Verifying the influence and mechanism can not only help provinces (autonomous regions and municipalities) to formulate policies and regulations that are suitable for their own situation but also promote enterprises in various provinces (autonomous regions and municipalities) to have a deeper understanding of the importance of technological means and to formulate and implement strategic goals for digital transformation. Therefore, this research proposes the following hypothesis: H1: The development of regional fintech can have a positive impact on import and export trade by promoting facilitation, financing efficiency, security, and data analysis and prediction capabilities.

3. Research Design

3.1Sample Selection and Data Source

The research sample of this research consists of data from 31 provinces (autonomous regions, municipalities directly under the central government) in China from 2011 to 2020, and the research data used comes from the CSMAR database. To ensure the availability and accuracy of the data, the following processing was carried out on the samples used in this research: (1) Winsorization was applied to the research sample data; (2) sample data with missing values were excluded.

3.2 Variable Setting

1.Independent and Dependent Variables

The regional fintech development index constructed in this research is based on the description of fintech content by Zhang, Y. and Lu, J. (2022). After the construction of the index system, the entropy method was used to calculate the regional fintech development index as the independent variable of this research, which represents the fintech development level of each province (autonomous region, municipality directly under the central government) [10]. The data used to construct the index system comes from text information mining.

The dependent variable of this research is the total import and export trade volume of each province (autonomous region, municipality), which represents the import and export trade situation of each province (autonomous region, municipality). The data of total import and export trade volume for each province (autonomous region, municipality) are obtained from the CSMAR database.

2.Control Variables

Based on existing research, this research selected the following control variables: regional consumer price index, regional employment, regional total retail sales of social consumer goods,

per capita disposable income of residents, per capita regional GDP, and domestic tax revenue. The data sources for these variables are all from the CSMAR database.

3.Model Construction

$$Ftec = \alpha + \beta Fintech_{it} + \gamma CVs_{it} + \varepsilon_{it} \qquad (1)$$

In the above equation, i represents provinces, and t represents years. α is the constant term, β is the estimated parameter of the explanatory variable, γ is the estimated parameter of the control variable, CVs represents the control variable, and εit is the error term vector.

4. Empirical Results Analysis

4.1 Descriptive Statistics

Descriptive statistics analysis of the entire sample of this research shows that the maximum value of the regional fintech development index is 6.528, the minimum value is 0, the standard deviation is 1.726, and the mean value is 2.123. This indicates that there is a large gap in the development of fintech among provinces (autonomous regions, municipalities directly under the central government) in China. Some provinces need to increase their efforts in fintech development to narrow the gap with other provinces and municipalities directly under the central government. The maximum value of import and export trade volume is 1.077e+08, the minimum value is 54481.517, the standard deviation is 22042027, and the mean value is 13540407. This indicates that there is also a large gap in import and export trade volume among provinces (autonomous regions, municipalities directly under the central government) in China, and some provinces still have significant room for improvement.

4.2 Correlation Analysis

The correlation analysis results of this research, obtained through Pearson correlation coefficient, show that there is a significant positive correlation between the regional fintech development index and the import and export trade volume of each province at the 1% significance level, which verifies the hypothesis 1. The correlation coefficients between other variables are not significant, indicating that the model is appropriate, and there is no multicollinearity between the control variables and the explanatory variable.

4.3 Basic Regression

The data used in this research are panel data, and the Hausman test shows that a fixed-effects model should be used. This research first conducted linear regression analysis, and the regression results show that the P-value of the regional fintech development index is 0.000, indicating that the impact of the regional fintech development index on the import and export trade volume of each province is significant. The higher the regional fintech development index, the more significant the positive promotion effect on the import and export trade volume of each province, which is consistent with the theoretical hypothesis of this research.

4.4 Robustness Test

To enhance the persuasiveness of the empirical results, the explanatory variable of regional fintech development index was replaced with the comprehensive score of digital transformation of enterprises. The specific calculation method of the comprehensive score of digital transformation of enterprises referred to Liu, Z., et al. (2022). The strategic leadership score, organizational empowerment score, and technology-driven score were selected to represent corporate governance, while the environmental support score was selected to represent the external environment. The score of digital achievements, the score of digital applications, and the score of digital transformation index were selected to represent digital transformation. Then, the entropy method was used to calculate the comprehensive score of digital transformation of enterprises as the final evaluation result of listed companies' digital transformation [7].

The analysis of the final replacement results shows that the results are still significant after the replacement, indicating that digital transformation of enterprises has a positive effect on regional import and export trade. Therefore, the presentation of these results demonstrates that to a certain extent, the basic regression results of this research are robust.

5. Conclusion and Insights

This research focused on 31 provinces (autonomous regions and municipalities) in China from 2011 to 2020. Firstly, we constructed an evaluation system to assess the level of financial technology development in these regions. Then, we calculated the regional financial technology development index of each province (autonomous region and municipality) using the entropy method and studied its impact on import and export trade. Through empirical research, it was found that regional financial technology development can promote international trade facilitation, financing efficiency, security, and data analysis and prediction capabilities, which can have a positive impact on import and export trade. However, due to the large gap in financial technology development levels among provinces (autonomous regions and municipalities) in China, some regions need to increase their efforts in developing financial technology to narrow the gap with other provinces and municipalities.

Based on the findings of this study, the following insights are also obtained: at the level of the government of each province (autonomous region, municipality directly under the central government), the development of fintech should be vigorously promoted and supported, and different types of policies and decisions can be issued for listed companies and SMEs. In addition, according to the actual situation of the province (autonomous region, municipality directly under the central government), enterprises from other provinces (autonomous region, municipality directly under the central government) can be encouraged to establish factories or branches in the province (autonomous region, municipality directly under the central government) to promote employment in the province (autonomous region, municipality directly under the central government), thus promoting the economic development and import/export trade of the province (autonomous region, municipality directly under the central government). At the level of enterprises in each province (autonomous region, municipality directly under the central government), they should actively develop goals and strategies related to financial technology or to promote the digital transformation of the enterprise according to their own situation, the implementation of which will not only improve the efficiency of corporate

governance within the enterprise but also promote the enterprise to better meet the needs of the current social development of China, enhance the life cycle of the enterprise and help the future of the enterprise.

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