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The Impact Of Financial Technology On The Quality Of Export Products

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Abstract

In recent years, with the continuous advancement of the process of global economic integration, international trade has become more frequent and com-plex, and the global trade pattern has been accelerated to restructure, and the quality of export products has become the core competitiveness of countries to compete for international market share. Although China's total export has been ranked first in the world for several years, the problems of low added value and insufficient technical content of export products still restrict international competitiveness. At the same time, developed countries have raised the quality threshold of the international market by means of "carbon tariffs", complex technical standards and certifications, and seriously impacted China's export industry.
Under the dual background of global value chain reconstruction and China's export transformation and upgrading, this study empirically examines the im-pact mechanism of fintech on the quality of export products, as well as regional differences and threshold effects, based on China's provincial panel data from 2011 to 2023. The research results show that fintech can significantly improve the quality of export products through multiple channels: (1) Fintech provides strong support for technology research and development and product upgrading by improving the innovation ability of enterprises, thus promoting the export of high-tech and high value-added products; (2) By optimizing the efficiency of resource allocation, financial technology enables capital, technology and human resources to flow efficiently to the key fields of export product production, and improves the overall production efficiency and product quality

Keywords

Financial technology; Quality of export products; Technological innovation

1. Introduction

In 2024, China's goods trade demonstrated remarkable resilience in a complex international environment. The total value of imports and exports reached 43.85 trillion yuan, an increase of 5% year-on-year, setting a new record and solidifying China's position as the world's largest goods trading nation. However, traditional competitive advantages are under threat. The added value of China's export products is lower than that of manufacturing powerhouses like Germany and Japan. Rising labor

costs and resource utilization bottlenecks have formed constraints on key factors. Geopolitical tensions and energy fluctuations have imposed dual cost pressures on the manufacturing sector. The proportion of mechanical and electrical product exports exceeded 55%, but the import dependence of core components reached 32%. The Boston Consulting Group pointed out that if the export quality index does not increase by 15% in the next five years, China may face a market substitution risk of approximately 1.2 trillion US dollars. Chinese enterprises are accelerating the construction of a new international competitive advantage centered on quality.

Under the "dual circulation" pattern, the strategic value of fintech has become more prominent, reshaping the underlying logic of industrial upgrading. As of June 2023, there are over 12,000 fintech enterprises in China, with a mobile payment penetration rate of 86% and a 67% share of global blockchain technology patent applications. The state has made systematic deployments, with relevant plans from the State Council and the People's Bank of China emphasizing the promotion of the integration of fintech and the real economy, and enhancing the financial service capabilities of the industrial chain and supply chain. Technologies such as blockchain and artificial intelligence have deeply permeated the financial sector, driving the leapfrog development of fintech.

FinTech, supported by a cluster of technologies, holds dual strategic values. It deepens application to restructure business frameworks and gives rise to a trillion-dollar market. The commercialization of underlying technologies is accelerating, and emerging business forms are reshaping the global financial landscape. The quality of its development is related to China's position in the global value chain.The coupling of export quality upgrading and the efficiency of financial resource allocation, as well as the issues within the financial system, affect industrial upgrading and exports. There is a gap between the quality of China's export products and those of developed countries. Fintech, through smart contracts driving supply chain finance, enhances the efficiency of product quality traceability, providing a digital solution to break the "low-end lock" of export products.

2. Literature review

2.1. Research on fintech and export product quality

Today, product quality plays a pivotal role in many key areas. At the level of international trade, quality products have become a strong engine driving trade prosperity. In the process of industrial development, product quality is the core factor to promote industrial upgrading; In the field of people's livelihood, it is an important basis for improving people's lives and well-being. Because of this, product quality has gradually become a core issue in many fields such as economy, trade, science and technology and culture. In this context, fintech is growing rapidly as a force for innovation, especially in China and globally. A series of emerging financial technology tools, such as artificial intelligence, big data and cloud computing, are gradually

changing the production mode of enterprises , providing a strong driving force for serving the real economy and promoting the high-quality development of trade. As mentioned above, key factors affecting the quality of export products, such as enterprise innovation, factor endowment and industrial upgrading., which is closely related to financial technology. Based on this, does fintech actually have an impact on the quality of export products? By what mechanism or pathway does it produce this effect?

A systematic review of the existing literature shows that the discussion on the impact and mechanism of fintech on the quality of export products can be divided into two dimensions: breadth and depth. In terms of breadth, fintech, through its new technology and new model, improves the efficiency of resource allocation of enterprises in various provinces, expands and optimizes production, and promotes the improvement of the quality of enterprises' export products. In depth, through the information matching mechanism, fintech relieves the pressure of corporate financing constraints, provides financial help for enterprise production and management innovation, drives technological innovation in the whole industry, and then promotes the improvement of the quality of export products.

2.1. The impact of fintech on the quality of export products

On the one hand, the lag of the enterprise's internal management mode and production mode makes it more difficult to rationally allocate resources among various departments, reduces the efficiency of resource allocation, and then leads to the increase of production and operation costs, which seriously restricts the process of product upgrading. However, with its ability to process massive data at low cost and low risk, fintech can effectively improve the transparency of internal information of enterprises and comprehensively supervise and control the production and operation activities of enterprises. In addition, through advanced technological tools, fintech can help enterprises identify the path of product production optimization, support enterprises to make more scientific and reasonable production and technological innovation decisions, and create a favorable internal environment for the production of high-quality products. The empirical analysis of Qu Hui et al. shows that the digital platform built on the Internet infrastructure not only eliminates the time-space constraints of traditional financial services, but also improves the efficiency of regional capital allocation through algorithmic service innovation. In regions with a higher level of economic development, the innovation characteristics of fintech are more prominent and can play a stronger driving effect of technological innovation, thus promoting the improvement of the quality of export products.

On the other hand, the rapid development of financial technology has significantly improved the ability of financial institutions to collect "soft information" of enterprises, which not only reduces the information asymmetry, but also helps financial institutions to accurately identify the needs of enterprises and provides financial support for technological innovation of enterprises. In addition, fintech can help

improve bank credit constraints and commercial credit constraints, and effectively alleviate the financing constraints of enterprises, which provides more efficient financial support for the production and innovation activities of enterprises. It enables enterprises to invest advanced technology, equipment, high-quality intermediate inputs and high-quality technical and managerial personnel in production, so as to produce and export high-quality products. Based on the sample data of 347,919 industrial enterprises in China, Chen Xu and Qiu Bin adopted the Heckman two-stage model to show that technological innovation is an important factor limiting the quality improvement of export products, and this impact is different between smes in the east and the west.

3. Analysis of the status quo of fintech and export product quality

In the context of the in-depth development of global economic integration and the vigorous rise of digital technology, fintech and the quality of export products have become key factors affecting the economic competitiveness of countries and the status of international division of labor. I will elaborate on the status quo of fintech and export product quality, and analyze the relationship between the two and the problems and challenges faced in their development.

3.1. Current status of fintech development

In recent years, the global fintech industry has shown explosive growth. In China, for example, as of June 2023, the number of fintech enterprises exceeded 12,000, and this huge group of enterprises constitutes the core force to promote the development of the industry. The penetration rate of mobile payment reached 86%, which means that the vast majority of people have deeply integrated into the mobile payment ecosystem, and daily consumption, money transfer and other financial behaviors can be easily completed with mobile devices. The number of blockchain technology patent applications accounted for 67 percent of the global total, highlighting China's leading position in blockchain technology innovation. Many fintech companies continue to increase research and development investment, and actively explore the application of new technologies in the financial field, such as the use of big data to analyze user consumption behavior and credit status, to provide financial institutions with accurate risk assessment services; Through artificial intelligence to optimize investment decisions, achieve intelligent investment advisory, reduce the investment threshold, so that more investors can enjoy professional financial services.

Blockchain, artificial intelligence, big data, Internet of Things and other technologies have been widely and deeply applied in the financial field. In the field of payment clearing, blockchain technology, with its decentralized, immutable and other characteristics, greatly improves the transparency and security of transactions, and reduces the cost and time cost of cross-border payments. For example, some cross-border e-commerce platforms have introduced blockchain payment systems,

and funds can be received in real time after consumer payment, and transaction information can be traced throughout the process, effectively solving the trust problem in traditional cross-border payments. Artificial intelligence technology plays an important role in risk management. By analyzing massive financial data through machine learning algorithms, it can identify potential risks in time, warn financial institutions in advance, and help them formulate effective risk prevention strategies. Big data technology helps financial institutions fully understand customer needs, achieve precision marketing, and recommend personalized financial products according to customer consumption habits and preferences.

3.2. Quality status of export products

From a global perspective, China, as a manufacturing country and the first country in goods trade, has a rich variety of export products and a large quantity, but there is still a certain gap with some manufacturing powers in terms of quality. In some high-end manufacturing fields, such as precision instruments, high-end equipment manufacturing, China's export products in terms of technical content, product performance, reliability and other countries compared with Germany, Japan and other products, are at a relative disadvantage. For example, in the field of automobile manufacturing, German automobiles occupy a high-end share in the global market with their superb craftsmanship, advanced technology and excellent quality, and China's automobile exports have grown rapidly in recent years, but there is still a big gap with German brands in engine technology, automotive electronic systems and other core components. In the international market, the added value of China's export products is relatively low, according to relevant data, the added value of China's export products is significantly lower than Germany, Japan and other manufacturing powers.

The quality of exports varies by industry and product. In the field of mechanical and electrical products, although China's exports accounted for more than 55%, the dependence on the import of core parts is still as high as 32%. This means that the competitiveness of China's mechanical and electrical products in the international market depends on imported core parts to a certain extent, and its own ability to develop and produce key technologies is insufficient, which restricts the further improvement of product quality. In some traditional labor-intensive industries, such as textiles, clothing, toys, etc., China's products need to be strengthened in terms of quality stability and brand influence. Taking the textile and garment industry as an example, although China is the world's largest textile exporter, in the international high-end clothing market, there are fewer well-known brands, and most products are medium and low-end, with obvious price competitive advantages, but the quality and brand premium ability are weak.

4. Theoretical hypothesis and measurement model construction

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4.1. Theoretical basis

1) Innovation diffusion theory

Diffusion theory of innovation, developed by Everett Rogers, is the study of how innovative technologies, products, and ideas spread through markets and how they affect economic behavior and industrial structure. The theory provides a framework for understanding how new technologies or products are adopted and the economic effects of the adoption process. The theory emphasizes that the speed and scope of innovation diffusion are influenced by the characteristics of innovation itself, the channels of transmission, the social system and the time dimension. For example, if a technology can significantly improve productivity or create new market demand, companies are more likely to adopt it quickly, driving innovation in the entire industry or market. The cultural background and communication mode in the social system directly affect the transmission efficiency of innovation. Innovation diffusion is generally divided into five types of adopters, from the earliest innovators to the latest laggards, and gradually realize the diffusion process from individuals to groups. This theory has been widely used in the research of technology dissemination and industrial development.

2)Financial deepening theory

Financial deepening theory refers to the process that the development of financial system, especially the innovation and expansion of financial markets, financial institutions and financial products, can promote economic growth, improve the efficiency of resource allocation, reduce the gap between the rich and the poor, and strengthen market stability. Financial deepening refers to the continuous improvement of financial markets, institutions, instruments, and services, which can promote economic growth by reducing transaction costs, improving liquidity, and enhancing information transparency. Financial deepening not only expands the size of financial markets, but also improves the ability to allocate capital effectively, which helps companies raise capital and economic investment, thereby driving productivity and innovation.

Research shows that financial deepening is closely related to economic growth. A better financial system can better address information asymmetry and promote efficient allocation of capital, thereby enhancing the overall competitiveness and resilience of the economy. In short, financial deepening provides solid support for economic growth and contributes to long-term sustainable development.

4.2. Theoretical assumption

Technologies such as the Internet, artificial intelligence, big data and cloud compu-

ting are key drivers of financial development, as well as long-term drivers of high-quality development of the world economy and trade. From the analysis and summary of existing literature, we can see that fintech can improve regional innovation capacity, optimize factor allocation efficiency, and improve the quality of export products .

On the one hand, fintech improves the level of innovation and thus the quality of export products. The development of financial technology has promoted knowledge sharing and cooperative innovation in the region. Through the Internet and big data technology, enterprises can more easily obtain the latest technology and market information, so as to adjust their product strategy and technology research and development direction, and improve product quality.

On the other hand, fintech optimizes the efficiency of factor allocation and provides support for the improvement of the quality of export products. Fintech has overcome the problem of information asymmetry in traditional finance by improving data processing capabilities. Through intelligent production process, supply chain collaboration, Internet marketing and other technical means, it has penetrated into all aspects of enterprise production, realized resource sharing and joint research and development among various departments of enterprises, and improved the efficiency of internal management and resource allocation of enterprises. Based on the above analysis, hypothesis 1 and hypothesis 2 are proposed.

Hypothesis 1: Fintech plays a promoting role in improving the quality of export products.

Hypothesis 2: Fintech promotes the quality of export products by improving the level of innovation and optimizing the efficiency of resource allocation.

The impact of fintech on export products is different in different regions, which can be mainly attributed to the following two points: First, the industrial structure and policy environment of different regions will also have different impacts on export products of fintech. Some regions may pay more attention to the development of high-tech industries and have more high-tech enterprises and innovation resources, so the application of fintech in these regions is more extensive and in-depth. These regions usually have large market demand and policy support to encourage the deep integration of fintech with the real economy, thereby enhancing the innovation capacity of the region and improving the quality of export products. Second, there are significant differences in the development level and application ability of fintech in different regions. Relatively developed regions invest more in fintech infrastructure, talent training, technology research and development, and have advanced fintech enterprises and research institutions, which can provide high-quality fintech services, establish a fair, just and transparent market environment, and better optimize the efficiency of resource allocation. Based on the above analysis and hypothesis 1, hypothesis 3 is proposed.

Hypothesis 3: There is regional heterogeneity in the impact of fintech on the quality

of export products.

4.3. Model building

According to the above analysis, fintech has an impact on the quality of export products, and industrial upgrading has an intermediary effect on the impact of financial support on the quality of export products. In order to investigate the impact of fintech on the quality of export products, this paper establishes the following regression model:

$$Quality_{i,t} = \delta_1 + \alpha_1 Fintech_{i,t} + \alpha_2 Controls_{i,t} + \mu_1 \quad (1)$$

In the above model, i representing the province and t the year, $Quality_{i,t}$ is the measurement index of the export product quality of each province, $Fintech_{i,t}$ is the measurement index of the financial technology of each province, and $Controls_{i,t}$ is a group of control variables. δ_1 is an individual fixed effect, indicating the characteristics of the province that do not change with time, and μ_1 is a random error term, subject to independent and same distribution. In view of robustness, this paper uses alternative variables and other methods to further verify.

5. Empirical analysis

5.1. Baseline regression analysis

Table 1. Regression results of the impact of financial technology on the quality of export products.

	(1) Quality	(2) Quality	(3) Quality	(4) Quality	(5) Quality
Fintech	1.581*** (4.725)	1.466*** (4.323)	3.478*** (0.284)	3.178*** (0.277)	2.691*** (9.664)
Open		0.301* (1.838)	0.865*** (0.128)	0.740*** (0.125)	0.645*** (5.347)
FDI			2.751*** (0.169)	2.412*** (0.172)	5.183*** (4.782)
Labor				6.413*** (1.109)	2.138*** (12.478)
Tax					-4.112*** (-5.684)
Constant	-0.942 (-0.341)	0.0873 (0.035)	4.640** (2.129)	4.600** (2.035)	6.803*** (3.427)
N	377	377	377	377	377
R-squared	0.064	0.069	0.474	0.520	0.561
Province	YES	YES	YES	YES	YES

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In-depth exploration of the correlation between fintech and the quality of export products, this paper takes the lead in analyzing the impact of fintech on the quality of export products, and the corresponding regression results are shown in Table 5.4. Among them, column (1) is obtained when control variables have not been included. It is observed that the regression coefficient of the Financial Technology index (Fintech) is significantly positive at the 1% confidence level. This result clearly shows that when other factors are not considered for the time being, the development of fintech has a very significant role in promoting the quality of export products. This finding lays an important foundation for further exploring the relationship

between the two, especially how fintech affects the quality of export products after incorporating more complex realistic factors. Based on the above analysis, the preliminary conclusion can be drawn that the development of fintech has a positive impact on improving the quality of export products, and this impact is still significant after controlling for a number of relevant variables. This result shows that fintech not only has a positive promoting effect on export quality when other variables are not controlled, but also maintains its positive effect after considering factors such as the degree of openness to the outside world, labor force level, foreign direct investment and tax burden level, further verifying that fintech has a strong robust promoting effect on export product quality.

5.2. Heterogeneity analysis

Considering that the differences in economic development level, scientific and technological innovation and industrial structure between the eastern, central and western regions may lead to different impacts of fintech on the quality of export products, this paper conducts a regional heterogeneity study on the eastern, central and western regions. The empirical results are shown in Table.

Table 2. Regional heterogeneity regression results

	(1) east	(2) Middle	(3) west	(3) Northeast
Fintech	3.163*** (4.442)	4.378** （3.635）	2.712** （3.242）	-0.358 （-1.103）
Control	YES	YES	YES	YES
N	130	78	130	39
R-squared	0.714	0.591	0.669	0.761
Province	YES	YES	YES	YES

In the eastern region, fintech significantly promoted the improvement of the quality of export products. In the regression results of the central and western regions, the effect of fintech on the quality of export products was slightly significant, but not significant in the northeast region, reflecting the difference in the impact of fintech in different regions.

This paper believes that the possible reason is that in the eastern part of the country, fintech plays the most significant role in promoting exports, which may be attributed to some provinces, Guangdong and Zhejiang, which have perfect digital infrastructure, highly open export-oriented economy and active private economy. Fintech can effectively reduce the cost of trade financing and improve the efficiency of cross-border payment. The central provinces of Hubei and Henan undertake the industrial transfer in the east, and fintech may accelerate the integration of the industrial chain through supply chain finance, but its foreign trade structure is still dominated by traditional manufacturing, and the technology spillover effect has not been fully released. The promotion effect of financial technology exists but is weaker than that of the eastern and central regions, reflecting that the western regions of Sichuan and Shaanxi are limited by the digital divide and financial exclusion, the penetration rate of financial technology is low, and the export products are relative-

ly resource-intensive, and the dependence on digital finance is relatively weak. The negative but not significant results may indicate that the traditional heavy industry in northeast China, such as Liaoning and Heilongjiang, is dominated, the digital transformation of enterprises is lagging behind, and fintech has not penetrated effectively. At the same time, population outflow and shrinking financial resources may lead to a disconnect between technology application and export upgrading.

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