International Journal of World Economic Research
ISSN: 3080-9886 (Print), ISSN: 3080-9894 (Online) | Vol. 1, No. 3, 2026

The Impact of Digital Finance on the Upgrading of Industrial Structure

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Abstract: The upgrading of industrial structure is of great significance for achieving high-quality economic development. This paper selects China's urban panel data from 2011 to 2021 to empirically test the relationship between digital finance and the upgrading of industrial structure. The research results show that: first, the development of digital finance significantly promotes the upgrading of China's industrial structure, and the robustness of the results is proved by replacing the explained variable, adding interactive fixed effects and using the instrumental variable method. Second, digital finance can promote the upgrading of industrial structure by boosting economic growth, increasing savings and stimulating employment vitality. Finally, from the perspective of regional heterogeneity, it is found that coastal areas, non-first-tier cities and non-eastern regions have a better promoting effect of digital finance on the upgrading of industrial structure. The above research results help to further explore the impact of digital finance on the upgrading of industrial structure, thus providing a policy basis for the government and enterprises to promote the upgrading of industrial structure.

Keywords: Digital Finance, Inclusive Finance, Upgrading of Industrial Structure, Industrial Structure.

1. Introduction

A sound industrial structure can promote the stable growth of the economy. A diversified industrial structure can mitigate the impact of economic fluctuations, reduce systemic risks and enhance economic resilience. The upgrading of industrial structure can provide more employment opportunities, promote the skill training and improvement of the labor force, and help narrow the income gap. The quality of the industrial structure is directly related to a country's competitiveness. Owning internationally competitive industries can enhance a country's position in the global market, increase export earnings, attract foreign investment, and improve the ability of technological innovation and industrial upgrading. A rational industrial structure can effectively allocate resources, improve resource utilization efficiency, and reduce resource waste and environmental pollution. By optimizing the industrial structure, the optimal allocation of resources can be achieved, thereby improving the overall efficiency of the economy. Therefore, the adjustment and optimization of the industrial structure are of great significance for realizing the sustainable development of the economy and improving the overall national competitiveness.

The upgrading of industrial structure is a transformation of economic growth and development modes. In the process of modern economic and social development, the proportion of the secondary and tertiary industries has continued to increase. In particular, the progress and innovation of the tertiary industry can extend the industrial chain, increase added value, and drive the joint development of related upstream and downstream industries. There are multiple factors promoting the upgrading of industrial structure, including policy support and guidance, scientific and technological innovation, talent cultivation and introduction, strengthened inter-industry collaborative cooperation, and enhanced international cooperation and exchanges, which require the joint participation and efforts of the government, enterprises and all sectors of society.

At the same time, digital finance has emerged in China. Digital finance is a financial service model formed by the combination of digital technology and financial innovation. With the help of digital technology, digital finance can provide efficient financial services for more economic entities with lower capital costs and more convenient service methods, thus achieving the inclusive and precise service goal of financial services serving the real economy. The rise of digital finance has had a huge impact on people's lives and economic development. By reviewing the articles of various scholars, it can be summarized that digital finance has alleviated corporate financing constraints, improved the level of regional innovation and opening up, continuously promoted the sharing of development achievements by all people, and boosted high-quality economic development. The upgrading of industrial structure plays an intermediary role in the transmission process of digital finance promoting high-quality economic development. However, there are relatively few literature studies on the impact of digital finance on the industrial structure. Therefore, this paper mainly studies the impact of digital finance on the industrial structure.

2. Literature Review

Traditional finance represented by banks has many problems such as high business thresholds, high labor costs and uncontrollable risks. In contrast, the decentralization, globalization and high efficiency of digital finance have greatly improved transaction efficiency, reduced transaction costs and information asymmetry, and broken the regional restrictions of traditional finance. The rise of digital finance has had a profound impact on people's lives, economic development and industrial transformation and upgrading. From a micro perspective, digital finance includes digital payment, digital credit, digital insurance and other contents. Digital payment facilitates consumption, digital credit boosts consumption, and digital insurance reduces residents' precautionary savings (He Jian, 2024). From a macro perspective, the development of digital finance promotes the income growth of urban and rural residents and optimizes the urban-rural income distribution structure, and this effect is

more significant in regions with a higher urbanization rate (Liu Xiaochun et al., 2023). The rapid development of digital finance has significantly promoted the high-quality development of enterprises and improved the ability of financial services to serve the real economy (Feng Yongqi and Lin Huangfeng, 2024). Digital finance accelerates the modernization of China's industrial chain, and its promoting effect on the modernization of China's industrial chain is more significant in large cities and coastal cities. Digital finance can improve the rural credit reporting system and bring positive impacts on the development of rural revitalization from five aspects: industry, talent, culture, ecology and organization (Wang Cuie, 2024).

There are various factors affecting the upgrading of industrial structure. From the perspective of reducing carbon emissions, improving the utilization efficiency of fossil energy is an important way to reduce carbon emissions and improve economic benefits. Different industries have different degrees of dependence on fossil energy, and improving its utilization efficiency helps to promote the upgrading of industrial structure (Xu Bin et al., 2023). From the perspective of the impact of fiscal policies, tax policies, education expenditure, scientific and technological expenditure and income tax are conducive to industrial structure adjustment, while fiscal expenditure policies, government investment expenditure and administrative management expenditure hinder the upgrading of industrial structure (Chu Deyin and Jian Kecheng, 2014). From the perspective of the development of high and new technologies, the improvement of artificial intelligence services or artificial intelligence extended technologies will promote the flow of production factors among industrial sectors, and the proper flow will promote the transformation and upgrading of industrial structure and the change of labor income share (Guo Kaiming, 2019). From the perspective of talent cultivation, the expansion of higher education scale can significantly promote the upgrading of local industrial structure, and the quality of the labor force can strengthen the direct effect of higher education scale on the upgrading of industrial structure, but this promoting effect is limited to the local area and difficult to expand to the whole country (Hu Dexin and Pang Dandan, 2024).

With the continuous development and progress of technologies such as big data, blockchain and artificial intelligence, the traditional financial industry is undergoing earth-shaking changes, creating a good environment for the development of digital finance and providing a brand-new perspective for studying the optimization and upgrading of industrial structure. Studies have shown that there is a significant positive spatial correlation between digital finance and industrial structure, and digital finance and its sub-dimensions have a significant positive impact on the upgrading of industrial structure. In addition, artificial intelligence and database technology play a partial transmission and intermediary role between digital finance and the upgrading of industrial structure (He Bin, 2023). Digital finance can effectively boost the upgrading of urban industrial structure not only through its coverage breadth and usage depth, but also indirectly promote the upgrading of industrial structure by influencing scientific and technological innovation, consumption level and traditional finance (Si Zengchuo et al., 2024).

By sorting out the rich theoretical research literatures and data on the relationship between digital finance and the upgrading of industrial structure, it is found that: first, at present, domestic and foreign scholars' research on this issue is mostly concentrated at the provincial level, and there are relatively few research articles for the national scope; second, the development of digital finance is unbalanced among different regions, and its promoting effect on the industrial structure also has certain differences. Therefore, based on the urban panel data from 2011 to 2021, this paper empirically analyzes the mechanism and relationship between the development of digital finance and the optimization and upgrading of industrial structure, in order to provide certain decision-making references for China's development of digital finance, optimization of industrial structure and promotion of regional economic development.

3. Theoretical Analysis and Research Hypotheses

The emergence of digital inclusive finance has enriched wealth management tools and services. The big data technology in digital finance makes everyone's identity and property more open and transparent, reduces the risk of bank lending, improves the utilization rate of funds, and enhances the rational allocation level of national asset structure in a wider range. This not only enables high-income groups to manage wealth more effectively, but also provides more investment and savings options for low-income groups, thus narrowing the wealth gap. The narrowing of this income gap can effectively bridge the gap in social consumption demand, encourage low-income groups to increase human capital investment, and promote social stability. Digital inclusive finance indirectly improves the purchasing power of low-income groups, drives the rise of social consumption demand, especially in the field of basic living goods and services, thereby promoting the development and optimization of related industries. Under the joint action of improving labor quality and production efficiency, it promotes the organic integration of labor and capital factors on the demand side, thus driving the overall optimization of the industrial structure.

At present, the main contribution of China's industrial upgrading still comes from the massive mobilization and input of factors such as capital, and capital accumulation is still a strong foundation supporting the optimized development of the industry. Relying on the advantages of data acquisition and processing, digital inclusive finance makes the connection between capital and investment and financing more accurate, avoids resource waste and misallocation, accelerates the accumulation and flow of capital, and promotes the high efficiency of resource allocation. Through digital financial services, enterprises can more easily obtain financing support, reduce the capital pressure in their development, alleviate corporate capital constraints, thus focusing more on technological innovation and productivity improvement, and promoting the structural optimization of the industry. In addition, compared with traditional finance, digital inclusive finance has comparative advantages and can provide capital support for a large number of small, medium and micro enterprises, thus effectively alleviating the financing difficulties and high financing costs of small, medium and micro enterprises. At the same time, small, medium and micro enterprises are the main force of innovation and entrepreneurship, and digital inclusive finance can indirectly promote the upgrading of industrial structure by boosting innovation and entrepreneurship. The

competitive effect of digital finance is more conducive to the survival of the fittest and promotes the upgrading and transformation of the industry. Competition in the digital financial market stimulates the motivation of financial institutions to improve service quality and efficiency, which is conducive to optimizing resource allocation and supporting enterprises with development potential. Digital finance is more flexible, can better adapt to market demand and industrial changes, avoid excessive dependence on foreign capital and technology, thus promoting the diversification and healthy development of the industrial structure.

The convenient payment methods of digital inclusive finance make consumption more convenient and fast, stimulating people's consumption desire, especially in the fields of mobile payment and online shopping, providing support for the expansion of the consumer market. And with the improvement of consumers' requirements for product quality and service level, the industry is constantly iterating and upgrading towards higher added value and innovation-driven direction. By providing financial support and services, digital inclusive finance accelerates the development of this trend, thus promoting the optimization and renewal of the industrial structure. Through the in-depth application of digital technology, digital inclusive finance provides a new financial service model for enterprises, improves the external financing environment, and promotes technological innovation and the optimization and upgrading of industrial structure. The expansion of digital financial business not only brings innovation to the financial service industry, but also accelerates the technological upgrading and the integrated development of the science and technology industry. By continuously increasing the investment scale, the financial system effectively supports technological progress, drives enterprises' R&D investment, technological innovation and the improvement of total factor productivity, thus promoting the optimization and upgrading of the industrial chain and the overall industrial structure. Therefore, this paper puts forward:

Hypothesis 1: Digital finance can promote the upgrading of industrial structure.

From an economic perspective, as an important force to promote economic growth, digital finance provides the necessary capital and technology for economic development. Through the innovation of digital technology and financial services, it brings advanced technology and management experience, providing impetus for economic growth. Compared with the traditional financial industry, digital finance is not restricted by regions, can support small and medium-sized enterprises and emerging industries more extensively, and provides an important driving force for economic growth. Sufficient capital and technical support enable enterprises to continuously innovate and upgrade, and at the same time intensify competition among enterprises. This benign competition makes enterprises continuously invest in R&D and innovation, improve production efficiency and management efficiency, and promote the improvement of the overall economic efficiency and productivity. Competition makes the market more active and dynamic, and the allocation of resources more optimized and effective. Market competition makes resources flow to more efficient enterprises and industries, promoting the optimal allocation and flexibility of resource allocation, thus improving the overall economic efficiency and competitiveness.

From the perspective of exports, first of all, digital finance helps enterprises better integrate into the global value chain. Through digital payment and cross-border financial services, enterprises can conduct cross-border transactions and capital settlement more conveniently, reduce transaction costs and risks in international trade, and enable enterprises to participate in global division of labor and cooperation more flexibly, thus accelerating the circulation and exchange of products and services on a global scale. Secondly, digital finance enhances the international competitiveness of enterprises. With the support of digital finance, enterprises can carry out marketing and brand promotion more effectively, expand overseas markets by using digital technology, open up sales channels, and enhance the popularity and recognition of products in the international market. This enhanced international competitiveness is not only conducive to the development of individual enterprises, but also helps to the growth of the country's export trade, thereby promoting economic growth. Finally, digital finance promotes China's learning and absorption of the marketing models and management experience of foreign-funded enterprises. Through interaction and learning with the international financial market, Chinese enterprises can better understand and adapt to the needs and rules of the international market, and improve their own competitiveness and adaptability. This process of learning and absorbing the experience of foreign-funded enterprises helps Chinese enterprises to participate in international market competition more actively and promote the continuous growth of export trade.

In terms of consumption, the popularization of digital finance has promoted the innovation and upgrading of consumption patterns. Through convenient financial tools and innovative consumption models, consumers' willingness to consume is stimulated, which promotes the expansion and upgrading of the consumer market, drives economic growth, and further pushes the industrial structure towards service-oriented, innovation-oriented and high-end consumer goods. The popularization of digital finance has also promoted consumption upgrading. Through convenient financial tools and innovative consumption models, it has stimulated consumers' willingness to consume, promoted the expansion of the consumer market and the optimization of the industrial structure. Therefore, this paper puts forward:

Hypothesis 2: Digital finance can promote the upgrading of industrial structure by boosting economic growth.

Economic development is a dynamic adjustment process of resources, and the reallocation of labor resources is an inevitable requirement for the upgrading of industrial structure. Since the reform and opening up, China's rural surplus labor force has been continuously transferred to cities and towns, flowing from the original low value-added production sectors to high value-added and high-tech production sectors such as construction, manufacturing and service industries. In fact, with the rapid advancement of China's urbanization in the future, the employment absorption capacity of the secondary and tertiary industries will be gradually strengthened, the demand for technical and skilled labor will continue to increase, and the division of enterprise positions will be more refined, requiring specialized talents to correspond. The development of digital finance provides more convenient and flexible borrowing channels, and reduces borrowing thresholds and costs. This convenient loan method enables ordinary people to meet the educational expenditure needs of their families and children in a more timely manner. This has a direct positive impact on improving the educational level of the next generation. With sufficient

financial support, parents can more easily provide better educational resources and conditions for their children, thus improving their educational level and labor quality. More higher education can effectively promote the transfer of labor from rural areas to urban areas, helping them to obtain employment and stabilize employment. At the same time, high-quality labor can adapt to more positions, effectively reduce structural unemployment, and provide support for the smooth realization of industrial structure upgrading.

The development of digital finance has promoted the expansion and diversification of the financial industry, thus creating more employment opportunities involving many fields such as financial technology, data analysis and network security. For example, with the rise of digital payment, online banking and financial technology companies, a large number of technical personnel, financial professionals and relevant support personnel are needed. Therefore, the development of digital finance has directly driven the employment growth of the financial industry. The popularization and application of digital finance have also directly promoted the development of the real economy, thus indirectly creating more employment opportunities. For example, the improvement and facilitation of digital financial services enable enterprises to obtain financing support more easily, expand production scale and increase employment positions. At the same time, the development of digital finance has also driven the growth of related industrial chains, such as logistics and e-commerce, further boosting employment.

The development of digital finance provides more sources of funds and financial service tools for innovation and entrepreneurship. Innovative enterprises and start-ups often face capital shortages and financing difficulties. Through crowdfunding, venture capital, microcredit and other methods, digital finance provides more flexible and convenient financing channels for these enterprises, promotes the emergence and development of more innovative enterprises, and thus creates more diversified employment opportunities. Therefore, this paper puts forward:

Hypothesis 3: Digital finance can promote the upgrading of industrial structure by boosting employment.

Generally speaking, capital formation mainly comes from two aspects: one is monetary funds, which are mainly composed of savings deposits formed by the labor income of individual workers, companies and enterprises, and social groups such as the government, as well as idle funds circulating in the financial system; the other is physical capital formed by the transformation of monetary funds into investment. Therefore, monetary funds are particularly critical, as they are the material basis for capital formation. The depth and breadth of access to monetary funds also determine the accumulation of physical capital, and further affect the changes in the industrial structure. Aggregating savings is an important function of finance. As a new financial service model, digital finance integrates more advanced payment technology on the basis of traditional finance, allowing people to save money anytime and anywhere, and transfer digital money to bank accounts without space and time restrictions. This can more effectively gather idle funds scattered in various parts of society and provide savings resources that can be transformed into capital. Secondly, digital finance can broaden the investment and financing channels of enterprises. Regions with a high level of digital finance usually have a more sound, convenient and efficient financial system, which can provide diversified trading tools, wealth management products for cash holders according to demand, and provide customized investment portfolio services. This increases direct or indirect financing channels for enterprises and individuals. At the same time, the channels for financial intermediaries to invest the collected savings funds into economic activities are more smooth, which improves the efficiency of the transformation of savings into investment and promotes the transformation and upgrading of the industrial structure. In addition, financial agglomeration has also narrowed the spatial distance, realized resource sharing, improved the efficiency of sectors with financing needs to find capital surplus units, made up for the imbalance between capital supply and demand in the process of industrial development, and greatly reduced the financing costs of enterprises, especially small and medium-sized enterprises. Therefore, this paper puts forward:

Hypothesis 4: Digital finance can promote the upgrading of industrial structure by increasing savings.

4. Data Sources and Model Construction

The data sources of this paper include two parts: the first is the data from the Urban Statistical Yearbook, which is used to construct the industrial structure upgrading index; the second is the digital finance index released by the Digital Finance Research Center of Peking University.

The model used in this paper is a panel regression model with fixed time and city effects:

$$Y_{it} = \beta_0 + \beta_1 x_{it} + C\beta_C + \theta_i + \delta_t + \epsilon_{it} \quad (1)$$

Among them, the subscripts i and t represent city and time respectively, and Y is the upgrading of industrial structure. Referring to the research method of Xu Min and Jiang Yong (2015), this paper adopts the sum of the product of the output value ratio of the primary, secondary and tertiary industries and the corresponding industrial ordinal number as the measurement of industrial structure upgrading. β_0 is a constant term, and β_1 characterizes the influence direction and degree of digital finance on the upgrading of industrial structure. If β_1 is significantly positive, it means that digital finance can promote the upgrading of industrial structure;x is the logarithm of the digital finance index;C is the control variable used in this paper, including economic level, consumption level, fiscal expenditure and labor force. The economic level is the logarithm of regional gross domestic product, the consumption level is the logarithm of total retail sales of social consumer goods, the fiscal expenditure is the logarithm of local general budgetary expenditure, and the labor force is the logarithm of the number of employed persons in units at the end of the year. θ_i is the fixed city effect, δ_t is the fixed time effect, and ϵ_{it} is the random error term. The following table shows the descriptive statistics.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Upgrading of Industrial Structure	3119	1.067	0.6	0.114	5.35
Digital Finance	3119	5.1	0.523	2.834	5.885
Economic Level	3119	7.393	0.949	4.826	10.674
Consumption Level	3119	15.603	1.07	5.472	19.013
Fiscal Expenditure	3119	14.929	0.756	12.031	18.25
Labor Force	3119	3.612	0.856	1.228	6.895

5. Benchmark Regression

The results of the benchmark regression are shown in the following table. The coefficient of digital finance is significantly positive at the 1% significance level, which indicates that for every 1% increase in digital finance, the upgrading of industrial structure increases by 27.1%. This proves that digital finance can significantly promote the upgrading of industrial structure, and Hypothesis 1 is valid. This paper holds that the reason for this phenomenon is that as a new financial service model, digital finance has alleviated the problems such as financing difficulties and high financing costs of enterprises with its good capital support, boosted continuous innovation of enterprises and benign competition among enterprises, thus greatly stimulating scientific and technological innovation and technological flow in industrial sectors, and then significantly promoting the upgrading of industrial structure. At the same time, digital finance has stimulated people's purchasing desire through convenient payment methods (such as mobile payment), driven the rise of social consumption demand, and consumers have put forward higher requirements for product quality and service level, pushing enterprises to continuously improve product quality, which also boosts the development and optimization of the industry.

Table 2. Benchmark Regression

	(1)
VARIABLES	Upgrading of Industrial Structure
Digital Finance	0.271***(0.067)
Control Variables	YES
Fixed Time Effects	YES
Fixed City Effects	YES
Constant	1.253*(0.688)
Observations	3,119
R-squared	0.884
r2_a	0.871

Note: Robust standard errors are in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The same applies to the following tables.

6. Robustness Tests

6.1. Replacement of the Explained Variable

To avoid the sensitivity of regression results to variable measurement methods, referring to Yuan Hang et al. (2018), this paper uses the weighted value of the product of the proportional relationship between industries and the labor productivity of each industry as the alternative index of industrial structure upgrading for regression. After replacing the explained variable, as shown in Column (1) of the following table, digital finance still significantly promotes the upgrading of industrial structure at the 1% significance level, indicating that the previous regression results are robust.

6.2. Adding Interactive Fixed Effects

This paper adds provincial and time interactive fixed effects to further control provincial variables that change with time. The results are shown in Column (2) of the following table. Digital finance significantly promotes the upgrading of industrial structure at the 1% significance level, and for every 1% increase in digital finance, the upgrading of industrial structure increases by 5.2%, which proves the robustness of the previous regression.

Table 3. Robustness Tests

	(1)	(2)
	Replacement of Explained Variable	Addition of Interactive Fixed Effects
VARIABLES	Upgrading of Industrial Structure	Upgrading of Industrial Structure
Digital Finance	0.052***(0.009)	0.255***(0.064)
Control Variables	YES	YES
Fixed Time Effects	YES	YES
Fixed City Effects	YES	YES
Constant	0.340**(0.135)	-0.554(0.856)
Observations	3,119	3,064
R-squared	0.890	0.908
r2_a	0.879	0.888

6.3. Instrumental Variable Method

There may be a reverse causal relationship between digital finance and the upgrading of industrial structure, leading to endogeneity problems. To avoid this problem, instrumental variables are selected to solve the endogeneity problem. The instrumental variable selected in this paper is the average value of digital finance in other regions of the same province in the same year, which is correlated with local digital finance but irrelevant to local industrial structure upgrading, so it meets the requirements of instrumental variables.

The regression results are shown in the following table. Columns (1) and (2) show the two-stage results of the instrumental variable method respectively. In the first stage, the regression coefficient of IV is significantly positive at the 1% significance level, proving that it meets the correlation with the explanatory variable. The second-stage results show that after excluding the endogeneity problem, the coefficient of digital finance is significantly positive at the 1% significance level, which means that the conclusion that "digital finance can promote the upgrading of industrial structure" is robust.

Table 4. Instrumental Variable Method

	(1)	(2)
	First Stage	Second Stage
VARIABLES	Digital Finance	Upgrading of Industrial Structure
Fitted Value of Digital Finance		0.399***(0.122)
IV	0.857***(0.067)	
Control Variables	YES	YES
Fixed Time Effects	YES	YES
Fixed City Effects	YES	YES
Constant	0.068(0.415)	0.672(0.851)
Observations	3,119	3,119
R-squared	0.986	0.883
r2_a	0.985	0.871

7. Analysis of Influence Mechanism

Column (1) of the following table proves that digital finance significantly promotes the development of local economic level at the 10% significance level, and for every 1% increase in digital finance, the economic development level increases by 11.3%. As an important force to promote economic growth, digital finance provides the necessary capital and technology for economic development. It urges enterprises to continuously improve production efficiency and management efficiency, and promotes the improvement of overall economic efficiency and productivity. Through digital payment and cross-border financial services, enterprises can participate in global division of labor and cooperation more flexibly, thus accelerating the circulation and exchange of products and services on a global scale, and helping Chinese enterprises to participate in international market competition more actively and promote the continuous growth of export trade. At the same time, the popularization of digital finance has promoted the innovation and upgrading of consumption patterns, promoted the expansion and upgrading of the consumer market, and driven economic growth.

Column (2) of the following table proves that digital finance significantly reduces the unemployment rate at the 5% significance level, and for every 1% increase in digital finance, the unemployment rate decreases by 22.9%. The development of digital finance provides more convenient and flexible borrowing channels, and reduces borrowing thresholds and costs. This convenient loan method enables ordinary people to meet the educational expenditure needs of their families and children in a more timely manner. This has greatly improved the quality of the labor force, enabled more people to meet employment conditions, and promoted employment. The development of digital finance has promoted the expansion and diversification of the financial industry and also indirectly promoted the development of the real industry, thus creating more employment opportunities. At the same time, the development of digital finance has also driven the growth of related industrial chains, such as logistics and e-commerce, further boosting employment.

Column (3) of the following table proves that digital finance significantly increases residents' savings at the 1% significance level, and for every 1% increase in digital finance, the logarithm of savings increases by 33.7%. Aggregating savings is an important function of finance. As a new financial service model, digital finance integrates more advanced payment technology on the basis of traditional finance, allowing people to save money anytime and anywhere, and transfer digital money to bank accounts without space and time restrictions. This can more effectively gather idle funds scattered in various parts of society and provide savings resources that can be transformed into capital.

Table 5. Analysis of Influence Mechanism

	(1)	(2)	(3)
VARIABLES	Economic Level	Unemployment Rate	Logarithm of Savings
Digital Finance	0.113*(0.066)	-0.229**(0.104)	0.337***(0.022)
Control Variables	YES	YES	YES
Fixed Time Effects	YES	YES	YES
Fixed City Effects	YES	YES	YES
Constant	-3.593***(0.948)	13.679***(1.416)	13.102***(0.319)
Observations	3,119	2,940	2,583
R-squared	0.983	0.743	0.994
r2_a	0.981	0.714	0.993

8. Heterogeneity Analysis

China has a vast territory, and there are certain differences among various regions. This paper first conducts a grouped regression according to coastal and non-coastal cities. Coastal areas include Liaoning, Hebei, Beijing, Tianjin, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangxi and Guangdong. The regression results are shown in Columns (1) and (2) of the following table. Digital finance significantly promotes the upgrading of industrial structure in coastal areas at the 1% significance level, but has no significant effect on non-coastal areas.

The reason why digital finance has a greater promoting effect on the upgrading of industrial structure in coastal cities than in non-coastal cities may be as follows:

First, coastal cities are usually important nodes of international trade and cross-border business, which means they need more efficient financial services to support cross-border payment, remittance, financing and other businesses. Digital finance provides more convenient and fast international financial services, promotes more foreign investment, better meets the needs of enterprises and individuals in coastal cities, thus promoting their international development and the upgrading of industrial structure.

Second, coastal cities usually have more financial technology enterprises and innovation institutions, which have stronger technical strength and innovation capacity in the field of digital finance. They can provide more diversified

and high-efficiency financial products and services for coastal cities, driving the industrial structure to develop towards high added value and high technological content.

Third, coastal cities tend to have a more developed capital market and investment and financing environment, and the development of digital finance can further improve these markets and environments. Through digital financial tools, enterprises in coastal cities can conduct financing and investment more easily, promoting the optimization and upgrading of the industrial structure.

Fourth, coastal cities usually have more financial and technological talents and abundant resource advantages. The agglomeration of these talents and resources provides favorable conditions for the development of digital finance and also provides strong support for the upgrading of industrial structure.

Secondly, this paper conducts a grouped regression according to first-tier and non-first-tier cities. First-tier cities include Chengdu, Chongqing, Hangzhou, Wuhan, Suzhou, Xi'an, Nanjing, Changsha, Tianjin, Zhengzhou, Dongguan, Qingdao, Kunming, Ningbo, Hefei, Shanghai, Beijing, Guangzhou and Shenzhen. The regression results are shown in Columns (3) and (4) of the following table. Digital finance significantly promotes the upgrading of industrial structure in non-first-tier cities at the 1% significance level, but has no significant effect on first-tier cities.

Finally, this paper conducts a grouped regression according to eastern and non-eastern regions. Eastern regions include Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan. The regression results are shown in Columns (5) and (6) of the following table. Digital finance significantly promotes the upgrading of industrial structure in non-eastern cities at the 1% significance level, but has no significant effect on eastern cities.

The reason why the promoting effect of digital finance on eastern regions and first-tier cities is not significant compared with central and western regions and non-first-tier cities may be as follows:

First, eastern regions and first-tier cities usually have more developed infrastructure and a higher level of economic development, including financial infrastructure and network infrastructure. Therefore, their financial systems may be relatively perfect and have a high degree of digitalization, so the promoting effect of digital finance is relatively small. Moreover, the industrial structure of more developed regions is already reasonable, and only the sophistication of the industrial structure has room for improvement, while the industrial structure of the western regions and non-first-tier cities has a larger room for upgrading.

Second, the financial market in eastern regions is relatively mature, with more financial institutions and service providers, including traditional financial institutions and internet financial platforms. Therefore, the development of digital finance may be restricted to a certain extent by the traditional financial system, and its promoting effect is limited. Residents in first-tier cities may be more accustomed to using traditional financial services such as bank outlets and ATMs, and their acceptance of digital finance may be relatively low. In contrast, residents in non-first-tier cities may be more willing to accept new digital financial services because they are more attractive in the case of insufficient coverage of traditional financial services.

Third, the policy and regulatory environment in eastern regions may be more stringent and standardized, and there may be certain restrictions and supervision on the development of digital finance. In contrast, central and western regions may be more open and inclusive to the development of digital finance, with a more significant promoting effect.

Fourth, the economic structure and industrial layout of eastern regions may be more diversified and complex, and the application scenarios and demand for digital finance are relatively scattered. In contrast, central and western regions may rely more on traditional industries, and the promoting effect of digital finance may be more prominent.

Table 6. Heterogeneity Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Coastal	Non-coastal	First-tier	Non-first-tier	Eastern	Non-eastern
VARIABLES	Y	Y	Y	Y	Y	Y
Digital Finance	0.307***(0.094)	0.137(0.095)	-0.337(0.552)	0.362***(0.072)	-0.101(0.118)	0.326***(0.084)
Control Variables	YES	YES	YES	YES	YES	YES
Fixed Time Effects	YES	YES	YES	YES	YES	YES
Fixed City Effects	YES	YES	YES	YES	YES	YES
Constant	0.891(0.940)	1.829*(0.958)	10.550**(4.335)	0.889(0.698)	-1.083(1.402)	0.959(0.798)
Observations	1,061	2,058	205	2,914	951	2,168
R-squared	0.922	0.879	0.969	0.866	0.946	0.850
r2_a	0.913	0.865	0.963	0.851	0.940	0.833

9. Conclusions and Recommendations

On the basis of theoretical analysis, this paper takes the data from the Urban Statistical Yearbook from 2011 to 2021 and the digital finance index released by the Digital Finance Research Center of Peking University as data sources, constructs various econometric models, and tests the effect of digital finance on the upgrading of industrial structure. The research results show that digital finance significantly promotes the upgrading of industrial structure. The heterogeneity analysis finds that the development of digital inclusive finance has no obvious promoting effect on the upgrading of industrial structure in coastal areas, but has a positive effect on the upgrading of industrial structure in non-coastal areas. The development of digital inclusive finance in non-first-tier cities and central and western regions is rapid, and its driving effect on the optimization of industrial structure is far greater than that in first-tier cities and eastern regions. Based on the research conclusions, this paper puts

forward the following suggestions:

First, give full play to the driving role of digital finance in the upgrading of industrial structure. Encourage financial technology enterprises and innovation institutions to innovate in the fields of digital payment, intelligent investment, blockchain and so on, and promote the continuous renewal and improvement of digital financial products and services. Strengthen the construction of digital payment infrastructure, improve the efficiency and security of payment and settlement, provide more convenient financial services for upstream and downstream enterprises in the industrial chain, encourage industrial enterprises to cooperate with financial institutions, jointly explore the application of digital finance in the industrial chain, realize the deep integration of industry and finance, and promote the upgrading and transformation of industrial structure. At the same time, promote the application of digital finance in cross-border trade, supply chain finance, intelligent manufacturing and other fields, and improve the efficiency and intelligence level of the industrial chain. The government should establish and improve a sound digital financial supervision system, strengthen the supervision of digital financial platforms and products, guard against financial risks, and ensure the stability and security of the industrial upgrading process.

Second, actively promote the innovation-driven development strategy, optimize the resource allocation function of digital inclusive finance, strengthen the supporting role for scientific and technological innovation, and cultivate new driving forces for the innovative development of emerging science and technology industries such as advanced manufacturing. Comprehensively and coordinately promote the optimal allocation of innovation resources and the continuous supply of cutting-edge key technologies, and provide financial services and guarantees for scientific and technological innovation, which is a key driving force for industrial optimization and a strategic support for comprehensive national strength.

Third, implement the coordinated regional development strategy, and take digital inclusive finance as the starting point to promote the development of the western region and the rise of the central region. Learn from the successful experience of the development of digital inclusive finance in the central and western regions, establish an effective regional coordination and mutual assistance mechanism, and promote the complementary advantages and common development of various regions in China. Strengthen the training and introduction of digital financial talents, cultivate a group of professionals with both financial and technological backgrounds, and promote the healthy development of the digital financial industry ecosystem. Strengthen cooperation and exchanges with international financial institutions and technological enterprises, learn from international advanced experience and technology, and promote the wider application and development of digital finance in the upgrading of industrial structure.

References

[1] Teng L, Ma D G. Can Digital Finance Promote High-Quality Development? [J]. Statistical Research, 2020, 37(11):80-92.

[2] He J, Guzalinur M. Digital Finance, Income Structure and Consumption Upgrading [J]. Journal of Technical Economics & Management, 2024(04):64-70.

[3] Liu X C, Lin Y X, Li C. The Impact of Digital Inclusive Finance on the Income Gap between Urban and Rural Residents: An Empirical Study Based on Jiangxi Province [J]. Research of Finance and Education, 2023(4):30-41.

[4] Feng Y Q, Lin H F. The Mechanism and Realization Path of Digital Finance Empowering the High-Quality Development of Enterprises [J]. Modern Economic Science, 2024.

[5] Cao R L. Digital Finance, Green Technological Innovation and the Modernization of China's Industrial Chain [J]. Finance and Economy, 2024(05):83-94.

[6] Wang C E. Research on Digital Inclusive Finance Boosting the Development of Rural Revitalization in Jiangsu Province [J]. Modern Agricultural Science and Technology, 2024(08):179-181+193.

[7] Xu B, Ke D, Xu Z Y. Does the Improvement of Fossil Energy Utilization Efficiency Promote the Upgrading of Industrial Structure in China? [J]. Jiangxi Social Sciences, 2023(3):52-63.

[8] Chu D Y, Jian K C. Fiscal Policy and Industrial Structure Adjustment: An Empirical Analysis Based on the Dual Perspectives of Aggregate and Structural Effects [J]. Economist, 2014(02):80-91.

[9] Guo K M. The Development of Artificial Intelligence, the Transformation and Upgrading of Industrial Structure and the Change of Labor Income Share [J]. Journal of Management World, 2019, 35(07):60-77+202-203.

[10] Hu D X, Pang D D. Higher Education Scale, Labor Quality and Industrial Structure Upgrading: An Empirical Study Based on the Spatial Durbin Model [J]. The World of Survey and Research, 2024(04):49-61.

[11] He B. A Study on the Impact of Digital Inclusive Finance on the Upgrading of Industrial Structure [D]. Lanzhou: Lanzhou University of Finance and Economics, 2023.

[12] Si Z C, Cao L Y, Zhang Y. A Study on the Effect and Mechanism of Digital Inclusive Finance Boosting the Upgrading of Industrial Structure [J]. Journal of Capital University of Economics and Business, 2024, 26(02):19-32.

[13] Du J M, Wei S W, Wu W Y. Does Digital Inclusive Finance Promote the Optimization of Industrial Structure? [J]. Journal of Economic and Social Systems Comparison, 2020(06):38-49.

[14] Tang W J, Li S, Tao Y Q. The Development of Digital Inclusive Finance and the Upgrading of Industrial Structure: Empirical Evidence from 283 Cities [J]. Journal of Guangdong University of Finance & Economics, 2019, 34(06):35-49.

[15] Fan S D, Bai R Y. The Impact of Foreign Direct Investment on New-Type Urbanization [J]. Chinese Journal of Population Science, 2022(04):60-73+127.

[16] Yang S N. A Study on the Impact of Financial Agglomeration on the Upgrading of Industrial Structure in the Guangdong-Hong Kong-Macao Greater Bay Area [D]. Nanning: Guangxi University, 2023.

[17] Xu M, Jiang Y. Can the Upgrading of China's Industrial Structure Narrow the Urban-Rural Consumption Gap? [J]. The Journal of Quantitative & Technical Economics, 2015, 32(3).

[18] Yuan H, Zhu C L. Have National High-Tech Zones Promoted the Transformation and Upgrading of China's Industrial Structure? [J]. China Industrial Economics, 2018(08):60-77.