

Research Article

The Role Model of Inclusive Finance in Regional Economic Development Based on Carbon Neutrality Theory

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The most significant global challenge is global climate change; carbon emission reduction and carbon neutralization are the last way to solve global climate change. Achieving carbon neutrality will significantly impact the global economy and the national economy. The “dual carbon goals” proposed by China will also substantially impact the global economy and regional economic development. Focusing on regional economic development, achieving carbon neutrality is not only an opportunity for regional economic development but also a challenge. To achieve the goal of carbon neutrality, there must be institutional innovation and management innovation, which will provide new opportunities for balanced development among regions. With the development of inclusive finance, financial services for many disadvantaged groups and small and medium-sized enterprises have been further developed, thereby promoting economic development. With the development of Internet finance, big data, cloud computing, and other technologies, the development of inclusive finance, etc., the concept has also emerged. However, due to the short time of digital financial inclusion, the imperfect regulatory system, and the low degree of public participation, it is worth investigating whether the development of digital financial inclusion has a catalytic effect on the improvement of economic growth. Using the data of 31 provinces to build a panel regression model, this paper studies the market development, the development degree of digital financial inclusion, and the impact of digital financial inclusion on the relationship between factor markets and product markets and regions from the perspective of factor markets and product markets.

1. Research Background

The economic development of a country or region must adapt to broader development trends to obtain comparative advantages and effects. All countries that can seize this opportunity have achieved great success in the evolution of human society. In a country's development process, any region that can grasp the opportunities contained in the country's development trend will gain certain development advantages in the country's development model. From the point of view of the nation, grasping the trend of world development is the nation's priority; at the regional level, grasping the trend of national development is the focus of regional development. Climate change is the biggest challenge to world development today. The global response to climate change is an important issue to be solved urgently. However, due to the increase in extreme weather phenomena caused by global climate change, the increasing awareness of climate

change among scientists, and the increasing importance of governments around the world about its impact. As an active party to the United Nations Framework Convention on Climate Change, China has not only participated in a series of agreements on temperature control advocated by the Framework Convention but also actively took measures to achieve higher temperature control indicators [1–5]. At the ninth meeting of the National Economic Committee, Xi Jinping conducted in-depth discussions on achieving carbon peaking and carbon neutrality. Carbon neutrality is the ultimate goal we must achieve in these three areas and the only way to combat global climate change.

2. Literature Review

Since the concept of financial inclusion was put forward, its policy effects have received widespread attention from the academic community. Scholars have researched the

impact of inclusive finance on regional innovation, increasing residents' consumption, alleviating the imbalance of urban and rural economic development, improving poverty status, and promoting economic growth. Scholars at home and abroad have various definitions of inclusive finance. Wang defined financial development as the ratio of financial scale to economic scale in their paper on Establishing and measuring the evaluation index system for high-quality development of 15 sub-provincial cities in China in the new era [1]. Tian and Gao used these data to benchmark financial inclusion (the proportion of the population using formal financial services) in the Research on the driving mechanism of technological innovation [2]. Shi clearly defined the three dimensions of the development level of financial inclusion. The purpose of financial inclusion development is to enable all members of the economic society to obtain and use formal financial resources. It facilitates the efficient allocation of productive resources, potentially reducing capital costs [3]. Wei and Zhao believe that inclusive finance is an expansion of microfinance with marginalized and small-scale characteristics. A systematic and formal financial service system has been formed based on microfinance, and its core concept is to serve the low- and middle-income groups and the poor [4]. Qi believe that the practical significance of inclusive finance is to allow all social strata to have equal access to financial services so that financial resources can better support economic development, and areas with better economic development can Use scientific and technological means to promote the development of inclusive finance [5]. The related Research by Qi and Yuan et al. mentioned that digital finance has the advantages of convenient service, accurate matching, and low cost. This innovative digital finance can overcome the dependence of traditional finance on physical outlets, shorten the business chain, and improve the financial business process system [6, 7]. With the widespread application of Internet technology in modern medical care, e-commerce, remote communication, and other daily life, its application value in the financial field has also received widespread attention. With the digital characteristics of Internet technology, the advantages of digital finance have become more and more obvious. People began to think about using Internet technology to make financial inclusion play a greater role. In their Research, Xiao pointed out that the development of the Internet is a necessary condition for the rise of innovative financial services. New Internet financial products such as Yu'e Bao and Alipay can only provide financial services such as payment and lending with the help of rich Internet platforms [8]. Digital Finance has broken through the limitations of time and space with its technological advantages to carrying out various financial services. It is a new financial service model that integrates artificial intelligence, mobile payment, and digital technology to realize fast payment, lending, investment, financing, etc. [9]. Sun's Research pointed out that the focus of financial innovation at this stage is the integration of finance and digital technology, which has changed the development mode of inclusive finance and

gave birth to a digital inclusive finance development model. Digital financial inclusion is based on the remote transmission function of Internet technology, which expands the scope of financial services [10].

Since its introduction in China in 2006, inclusive finance has been highly valued by all walks of life. The existing Research provides a good reference for this paper. From the review and analysis of existing literature, because the concept of high-quality economic development has been proposed relatively quickly, there are currently few articles on the relationship between inclusive finance, especially digital inclusive finance, and high-quality economic development. Some studies on financial inclusion, especially digital financial inclusion, are mostly based on theoretical discussions. However, the environment facing our country's financial development is complex, and its effects on the macroeconomy may deviate from micro theories. Therefore, based on theoretical analysis, we should also fully consider our country's current economic development status to conduct empirical Research. In addition, it will deeply analyze whether the Internet penetration rate will impact the implementation of digital inclusive finance policies to provide ideas and directions for the development of inclusive digital finance, as well as practical guidance for the realization of innovation-driven innovation and high-quality economic development.

3. Carbon Neutrality

Carbon neutrality has become the common goal of the global response to climate change. However, to achieve this goal, we need to face the following challenges: CO₂ emissions are enormous, and the average concentration of CO₂ in the air continues to rise; India, Russia, and other world Powerful countries have not yet committed to the time to achieve carbon neutrality [11]; The energy consumption structure is still dominated by fossil energy, with coal, oil, natural gas, and new energy being "four parts of the world." The proportion of new energy is relatively low. Energy transformation is facing severe challenges. The global distribution of new energy sources such as solar and wind energy has intermittent and spatial distribution differences, which brings severe challenges to the large-scale development of new energy sources; Hydrogen energy, CCUS, energy storage, etc. The application cost of technology is very high, and there is no large-scale commercial promotion and application. Our country's energy consumption and CO₂ emissions can be roughly divided into three stages: slow development (gentle slope area), rapid development (steep slope area), and stable development (platform area). From 1980 to 2001, our country's energy consumption was in a gentle slope area. The annual increase in energy consumption was 0.43×10^8 tons, and the CO₂ emission increased to 0.93×10^8 tons [12]. The annual increase in CO₂ and the energy consumption ratio reached 2.2; China's energy consumption showed a steep slope from 2002 to 2013, with an annual increase in energy consumption of 2.06×10^8 tons, an annual increase in CO₂ emissions of 4.50×10^8 tons, and the proportion of the

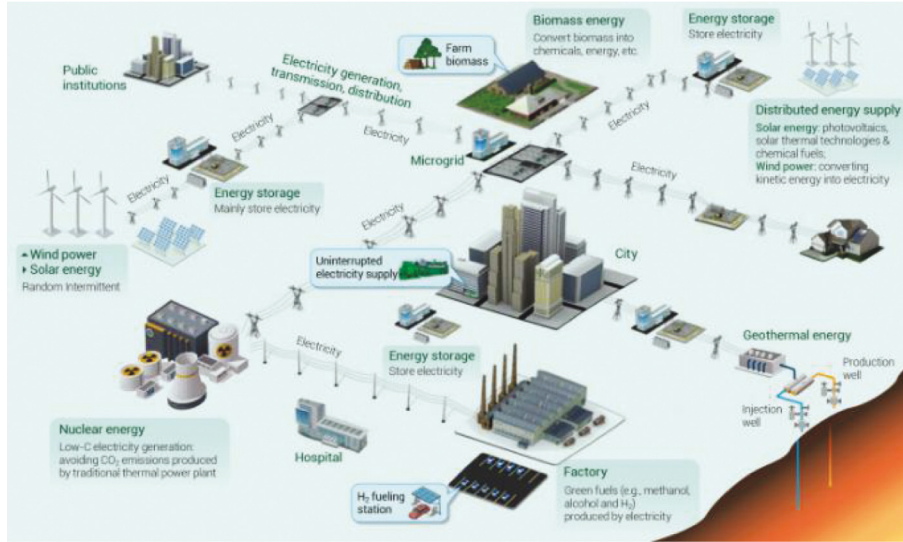


FIGURE 1: Carbon neutralization theory technology.

annual increase in CO₂ emissions in annual energy consumption was 2.2; the platform area was 2014. For the energy consumption in the period of ~2020, the annual new energy consumption will be 1.12×10^8 tons of standard coal, the carbon dioxide emission will increase by 0.81×10^8 tons per year, and the annual increase in CO₂ energy consumption ratio will be 0.7. Our country’s energy consumption structure is mainly coal, oil and gas resources are relatively light, and new energy resources are relatively scarce [13]. Figure 1 shows the related carbon neutralization theory technology. In order to achieve carbon neutrality, China must transform the “big three, small” energy structure into a “three small and one big” new energy structure.

4. The Connotation of Carbon Neutrality

“Carbon Neutrality” aims at the dynamic balance between carbon dioxide emissions caused by human activities and the Earth’s carbon cycle and uses carbon-free new energy to replace fossil energy in an orderly manner. The study of minimizing the impact of human activity footprint on the natural environment is an interdisciplinary subject between energy science and social science [14, 15].

“Carbon Neutrality” is a discipline of energy science and energy research idea centered on the interaction and coordinated development of the Earth, energy, and human beings. “Carbon Neutrality” includes three main research contents: (1) In the Earth system, the impact of energy generation and consumption on the Earth’s climate and environment, reflecting the interconnection between the Earth and energy, (2) The Earth’s environment is the evolution of human beings. The product is the impact of human activities on the environment and the interaction between man and nature; (3) The human beings use science and technology to develop energy and develop energy as the driving force, which is the interactive relationship between man and energy.

Establishing a carbon-neutral global energy system is integral to “carbon neutrality” research [16]. The earth’s energy originated from the prosperity, extinction, burial, and evolution of the sun. With the evolution of the Earth system, it finally became an “artificial sun” (controllable nuclear fusion), thus realizing “from the sun, and then back to the sun.” The energy cycle [17]. Under carbon neutrality, a “new energy” + “smart source” system will be formed with clean, carbon-free, intelligent, and efficient energy development goals at the core. Energy technology will be transformed from a resource-based type based on resource advantages to a technology-leading type [18]; our country’s energy structure will be transformed from the direct consumption of single energy to the consumption of secondary energy of electricity from centralized use to intelligent, balanced energy management. The purpose of carbon neutrality is consistent with the purpose of energy research [19]. Figure 2 shows the financial analysis under carbon neutrality theory. The energy perspective reveals the symbiotic distribution of fossil energy and non-fossil energy in the earth system, the orderly replacement and transformation of carbon energy and hydrogen energy, and the harmony between the energy system and green earth—the laws of natural change in development.

5. Empirical Analysis of the Impact of Digital Inclusive Finance on Regional Economic Development Competitiveness Based on Carbon Neutrality

Assuming that there are n decision-making units DMU in this model, each DMU has m types of input items and s output items [20]. The corresponding weight vectors are recorded as $A = (a_1, a_2, \dots, a_m)^T$ and $B = (b_1, b_2, \dots, b_s)^T$ respectively. Among them, the input item vector of the j th is denoted as $X_j = (x_{1j}, x_{2j}, \dots, x_{mj})^T$, $Y_j = (y_{1j}, y_{2j}, \dots, y_{sj})^T$, $j = 1, 2, \dots, n$. Among them: x_{ij} is the total input of

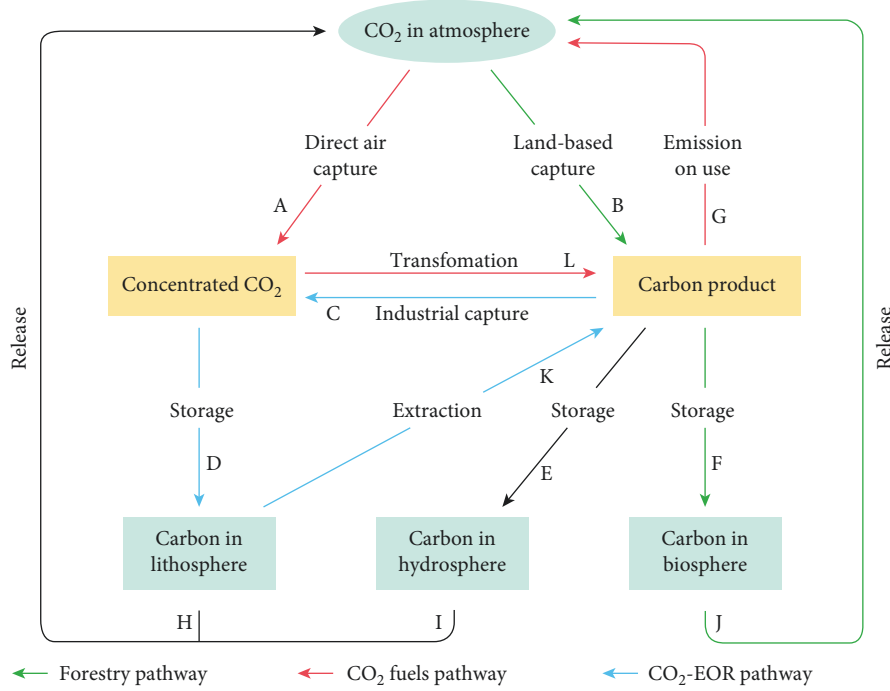


FIGURE 2: Financial analysis under carbon neutrality theory.

the j th decision-making unit to the i th type of element, y_{ij} is the total output of the j th decision-making unit to the r th type of product, $x_{ij} * y_{ij} > 0$; a_i is the input item of the i th type Weight coefficient, b_r is the weight coefficient of the r th output item, $a_i * b_r > 0$. Therefore, the relative efficiency evaluation index of the j th DMU factor input and product output is obtained as follows:

$$D_j = \frac{\sum_{r=1}^s b_r y_{rj}}{\sum_{i=1}^m a_i x_{ij}} \quad (1)$$

Select suitable input weight A and output weight B to make the j th DMU relative efficiency evaluation index $D_j \leq 1$. Perform performance evaluation on the k th DMU, denoted as DMU_k , and take the efficiency index of the k th DMU as the goal to obtain a general DEA optimization model:

$$\text{MAX} = \frac{B^T Y_j}{A^T X_j} \quad (2)$$

In order to simplify the operation of this model, it is transformed into an equivalent linear programming model, and the Archimedes infinitesimal variable ε is introduced. ε represents a positive actual number greater than 0 but less than any positive number, which constitutes the C^2R model of DEA. The specific dual linear programming model is as follows:

$$D(\varepsilon) = \min[\theta - \varepsilon(e^m S^- + e^s S^+)],$$

$$\text{s.t.} \begin{cases} \sum_{j=1}^n X_j \lambda_j + S^- = \theta K_K, \\ \sum_{j=1}^n Y_j \lambda_j - S^+ = Y_k. \end{cases} \quad (3)$$

Among them, $\lambda_j = 1, 2, \dots, n, \lambda_j, 0$ is the dual variable; e^m is the m -dimensional unit vector, that is, e^s is the s -dimensional unit vector, that is $e^s = (1, 2, \dots, 1) \in E_s, S^+$ and S^- are slack variables, $X_j = (x_{1j}, x_{2j}, \dots, x_{mj})^T$, $Y_j = (y_{1j}, y_{2j}, \dots, y_{sj})^T$, $X_k = (x_{1k}, x_{2k}, \dots, x_{mk})^T$, $Y_k = (y_{1k}, k, \dots, y_{sk})^T$, $\lambda_j \geq 0, j = 1, 2, \dots, n$, $S^+ = (S_1^+, S_2^+, \dots, S_s^+) \geq 0$, $S^- = (S_1^-, S_2^-, \dots, S_s^-) \geq 0$.

Model C^2R was initially only set as the constant return to scale of the project production technology. After the continuous improvement of the model by researchers, the assumption of the project production technology was developed into a situation of diminishing returns to scale. If the constant return to scale is assumed (C^2R) Changed to the variable returns to scale assumption (VRS), the DEA model is perfected as:

$$V(\varepsilon) = \min[\theta - \varepsilon(e^m S^- + e^s S^+)],$$

$$\text{s.t.} \begin{cases} \sum_{j=1}^n X_j \lambda_j + S^- = \theta x_K, \\ \sum_{j=1}^n Y_j \lambda_j - S^+ = Y_K, \\ \sum_{j=1}^n \lambda_j = 1. \end{cases} \quad (4)$$

The relative efficiency calculated by the model under the assumption of VRS is pure technical efficiency. The relative efficiency calculated under the assumption of the C^2R condition is technical efficiency or total efficiency, which includes scale efficiency and pure technical efficiency.

The C^2R model shows that when the output Y_k of the k th DMU remains unchanged, the input factor X_k should be kept as low as possible in the same proportion. If C^2R obtains the best solution, and if $\theta_k = 1$, $S^{k-} = 0$, and $S^{k+} = 0$ are relatively effective at this time, the evaluated DMU is both technically practical and effective in scale; if $\theta_k = 1$, $S^{k-} = 0$, and $S^{k+} = 0$ are not zero vectors at the same time, the evaluated DMU is called weak DEA Effective, the decision-making unit does not satisfy both scale effectiveness and technical effectiveness, solve its VRS model, if $\theta_k < 1$, it is said that the evaluated DMU is not DEA effective.

6. The Role of Inclusive Finance in Promoting High-Quality Development

The role of inclusive finance in economic development has two aspects: First, SMEs are an essential link in our country's economic development. The "China Economic Census Yearbook" shows that by the end of 2019, the scale of small and medium-sized enterprises in China has reached about 70% [21]. In essence, inclusive digital finance is an organic integration of inclusive finance and digital finance, which can accurately mine and analyze user data, provide more accurate financial services, and improve service quality and efficiency. It provides powerful help to solve small and medium-sized enterprises' complex financing and financing difficulties. At the same time, inclusive development has also provided more financial services for people in remote and backward areas and promoted regional economic development. Essential financial services in China have covered 99% of the population, and the coverage rate of outlets in rural areas has reached 96% [22, 23]. Digital inclusive finance expands the coverage of financial services, lowers the threshold for marginal customers to obtain financial services, broadens the investment and wealth management channels for marginal customers, and increases the channels for marginal customers to obtain benefits. From the perspective of Keynesian economics, the endogenous growth of income can promote residents' consumption, expand domestic demand, and promote the high-quality development of the region.

6.1. Inclusive Finance Has Played an Essential Role in Promoting the High-Quality Development of the Regional Economy. The factor market is an essential factor in promoting high-quality economic development. In real life, factor markets, labor, capital, and other factor markets and product markets are optimally allocated according to the principle of efficiency to maximize the productivity of the entire society [24]. On this basis, accelerating the construction of the factor market system has great practical significance for promoting the high-quality development of our country's economy. The balanced development of the product market is conducive to realizing the rational allocation of the industry and the promotion of fair competition in the market, which is an essential factor in promoting the sustainable development of the regional economy and society. The development of the capital factor market can

promote the sustainable development of the economy from the aspects of resource allocation, productive investment, and technological progress. At present, China's capital factor market is operating well. The yield of 10-year treasury bonds is around 3.2%, and good results have been achieved in resource allocation, capital accumulation, and technological progress [25]. Further development of the market is conducive to promoting the high-quality development of our country's economy. Figure 3 shows the theoretical analysis of financial inclusion under carbon neutrality theory.

Table 1 displays the high-quality economic development index of different provincial-level regions in China from 2011 to 2018. It can be seen from the table that the average value of the high-quality development index of the digital economy every year is close to the median value. Moreover, with time, the values of the two are getting closer and closer, which indicates that the development of digital financial inclusion in various regions has gradually tended to be balanced. At the same time, it can be found that the high-quality development index of China's digital economy in 2018 has increased by more than seven times that of 2011, with an average annual growth of 33.37% [26]. That shows the rapid growth trend of digital financial inclusion in China. At the same time, according to the different growth rates, it can be divided into three development stages, of which the first 5 years are the accumulation stage of development. At this stage, thanks to the breakthrough development of information technology, the development of inclusive digital finance is also moving toward a big step forward. After this stage, the development growth rate slowed down, and inclusive digital finance encountered a development bottleneck. Most provinces have a small growth rate at this stage, and even Ningxia has declined; 2016–2018 is a stage of stable development. With the introduction of the normative documents for developing inclusive digital finance, China's digital inclusive finance regulatory system is becoming more and more perfect. The corresponding development of inclusive digital finance has also entered a sustainable and stable development stage [27].

6.2. The Development Level of the Factor and Product Markets Plays an Essential Role in Improving the High-Quality Development of the Regional Economy. The combination of inclusiveness and digital finance will provide new impetus for developing the regional economy. First, promote the development of inclusive finance, promote the improvement of urbanization level, and infrastructure construction, maintain the supply of essential elements, and promote the development of emerging elements. Secondly, the development of inclusive finance can effectively guide the flow of funds to high value-added industries and increase the output of high-value-added products, thereby promoting the high-quality development of the regional economy; Financial markets are increasingly required to provide adequate support for the real economy, and at the same time, there are more and more problems caused by economic development and income disparities between regions [28]. In our country's middle- and low-income areas, the market for

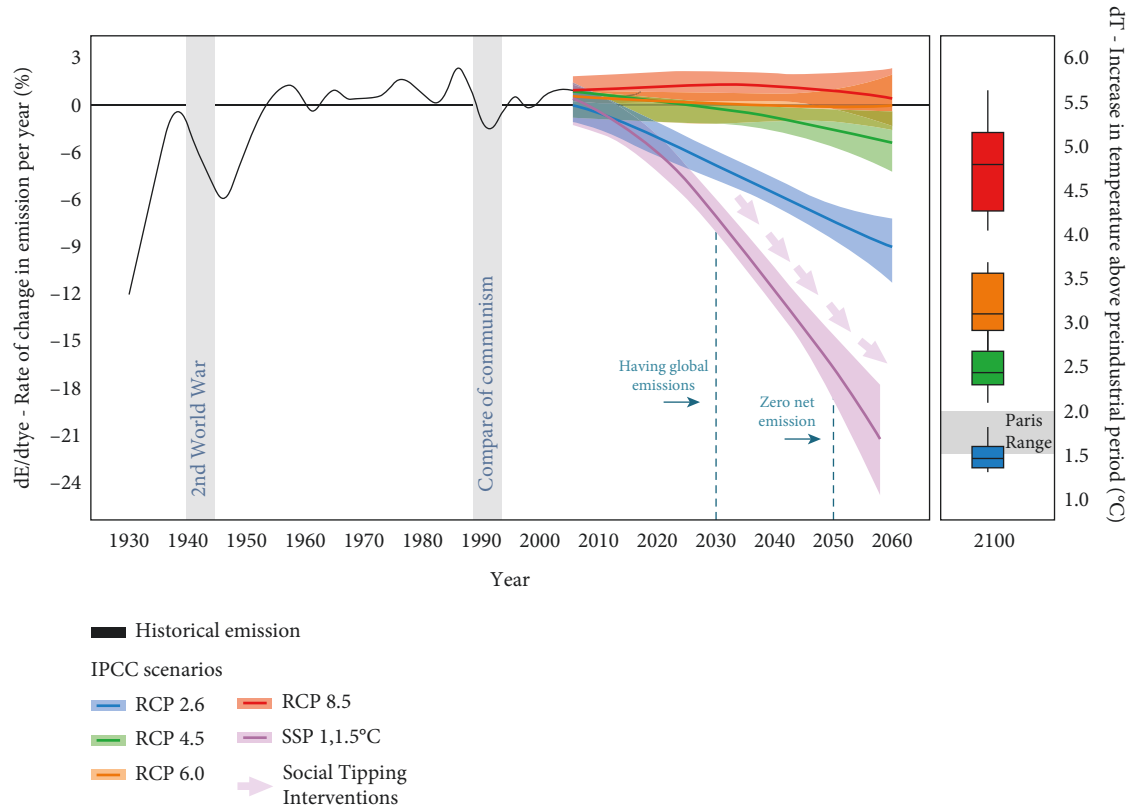


FIGURE 3: Theoretical analysis of financial inclusion under carbon neutrality theory.

TABLE 1: High-quality economic development index.

Area	Province	2011	2012	2013	2014	2015	2016	2017	2018
Central	Beijing	0.4174	0.4294	0.4393	0.4381	0.4552	0.4797	0.5241	0.5216
	Tianjin	0.2759	0.2918	0.2716	0.2815	0.2718	0.2215	0.2421	0.2198
	Hebei	0.1504	0.1501	0.1571	0.1601	0.1647	0.1719	0.1889	0.2173
	Liaoning	0.2538	0.2681	0.2551	0.2414	0.1912	0.1918	0.2161	0.2212
	Shanghai	0.3525	0.3569	0.3491	0.3535	0.3458	0.3453	0.3534	0.3611
	Jiangsu	0.3166	0.3462	0.3228	0.2928	0.3228	0.3122	0.3125	0.3629
	Zhejiang	0.2979	0.3300	0.3417	0.3415	0.3616	0.3614	0.3616	0.4130
	Fujian	0.2315	0.2524	0.2543	0.2424	0.2640	0.2967	0.2725	0.2817
	Shandong	0.1944	0.2492	0.2134	0.2254	0.2243	0.2346	0.2348	0.2643
	Guangdong	0.3531	0.3656	0.3832	0.3837	0.4002	0.4057	0.4371	0.5043
Hainan	0.2014	0.2106	0.2007	0.2006	0.2024	0.2065	0.2179	0.2278	
Central	Shanxi	0.1423	0.1666	0.1659	0.1646	0.1641	0.1896	0.1645	0.1831
	Jilin	0.1522	0.1590	0.1608	0.1639	0.1642	0.1702	0.1783	0.1979
	Heilongjiang	0.1792	0.1911	0.1980	0.1877	0.1838	0.1874	0.1885	0.2047
	Anhui	0.1644	0.1850	0.2002	0.1985	0.2099	0.2161	0.2213	0.2331
	Jiangxi	0.2007	0.2119	0.2094	0.2143	0.2224	0.2350	0.2428	0.2553
	Henan	0.1247	0.1393	0.1487	0.1543	0.1634	0.1724	0.1861	0.2027
	Hubei	0.1586	0.1674	0.1756	0.1837	0.1916	0.2057	0.2119	0.2253
	Hunan	0.1911	0.1945	0.1895	0.1894	0.1994	0.1949	0.2143	0.2194
West	Chongqing	0.2368	0.2463	0.2467	0.2547	0.2602	0.2507	0.2551	0.2872
	Sichuan	0.1720	0.1838	0.1893	0.1935	0.1954	0.1971	0.2341	0.2257
	Guizhou	0.1275	0.1529	0.1526	0.1625	0.1528	0.1633	0.1828	0.2525
	Yunnan	0.1308	0.1423	0.1567	0.1574	0.1575	0.1522	0.1596	0.1784
	Tibet	0.2486	0.2390	0.2715	0.2596	0.2545	0.2548	0.2729	0.2762
	Shaanxi	0.1583	0.1693	0.1836	0.1939	0.2337	0.2366	0.2163	0.2239
Gansu	0.1036	0.1379	0.1339	0.1335	0.1330	0.1430	0.1338	0.1348	

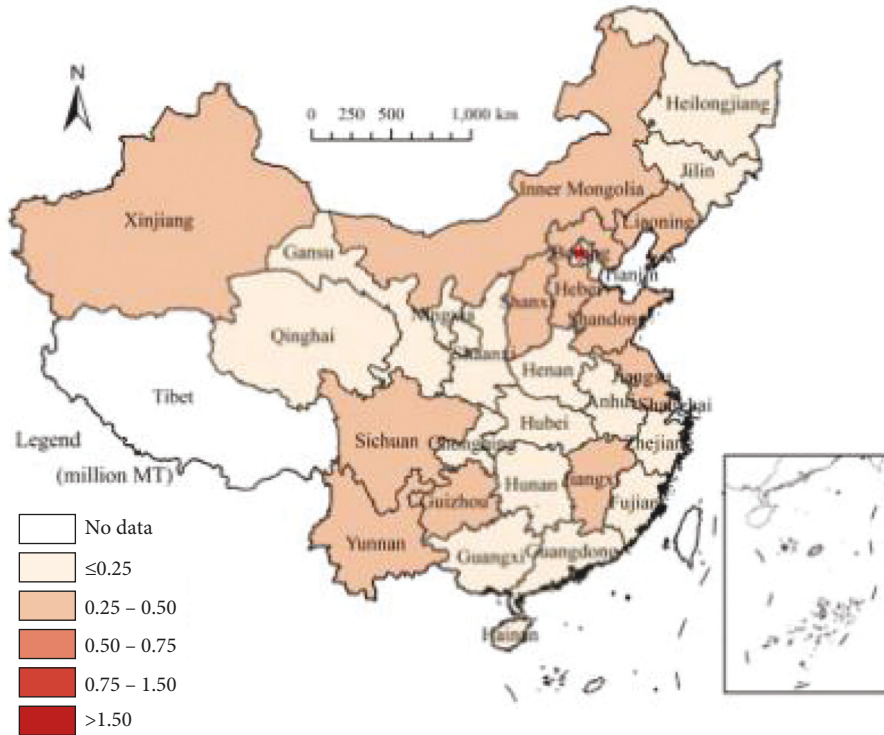


FIGURE 4: Data analysis of financial inclusion theory under China's carbon neutrality theory in 2020.

capital factors is relatively low-developed. The number of financial institutions is small, the level of financial services is low, and the people's financial awareness is poor. The popularization of inclusive finance in our country will provide more financial support for moderately underdeveloped regions and expand the coverage of financial services in poor regions, thereby enhancing the role of the financial market in promoting high-quality regional economic development [29]. Figure 4 shows the data analysis of financial inclusion theory under China's carbon neutrality theory in 2020.

7. Application Models of Inclusive Finance in Promoting High-Quality Development

7.1. Indicator Selection and Data Description. This paper takes 31 provinces and autonomous regions from 2011 to 2020 as samples, selects the following indices as research variables and uses the Wind database and the yearbooks of various provinces and cities for analysis.

7.1.1. High-Quality Economic Development. This paper firmly grasps the connection between the five development concepts and economic growth, and according to the research ideas of Cheng Xiang et al., shares the indicators of five dimensions, and uses the entropy weight method to establish the evaluation index of the high-quality development of the provincial economy. Among them, the main influencing factor of technological progress is technological progress, and the selected indicators include R&D investment intensity, technology market turnover, the number of

invention patents per 10,000 people, and the full-time equivalent of R&D personnel in industrial enterprises above designated size; among them, urban-rural income ratio [30]. The urban-rural consumption ratio, the ratio of the output value of the secondary and tertiary industries to GDP are the coordination dimensions; the green dimension selection indicators include: forest coverage rate, green coverage rate in built-up areas, per capita park green space area, domestic waste harmless treatment rate, environmental protection Expenditure accounts for the proportion of fiscal expenditure, the number of days with air quality reaching or good; the indicators for selecting the open dimension are: trade surplus, the number of foreign-funded enterprises; the number of public library collections in public libraries, the per capita public library collections, and the number of public transport vehicles owned by 10,000 people, the number of urban workers who participate in the endowment insurance and the basic medical insurance for urban workers [31].

7.1.2. Inclusive Finance. The development of provincial-level inclusive finance was evaluated with the indicators of inclusive finance represented by the Institute of Digital Finance of Peking University as an indicator.

7.1.3. Market Development Level. China's provincial marketization index compiled by experts such as Fan Gang takes the product market development level as an indicator. The factor market contains more content, including financial marketization, human resource supply, marketization of

technological achievements, etc. Therefore, we separate the financial market-oriented financial products from the development index of the factor market as a financial market. The development index and the excluded financial marketization index are used as the factor market development score (Factor) [32–49]. In addition to the development level of financial inclusion and the development degree of each market, this paper also introduces some control variables to reduce the estimation error caused by ignoring variables: trade openness (open): the scale of foreign trade affects economic growth. A decisive role. Fiscal Expenditure: As the primary measure for local governments to ensure economic development and maintain economic stability, fiscal expenditure plays an essential role in regional economic development. The article analyzes our country's fiscal expenditure with the ratio of provincial fiscal expenditure to GDP as an indicator [33]. Urbanization level: In recent years, with the rapid development of urbanization, the role of the urbanization level in the region cannot be ignored. The article selects the urban population ratio of each province as the evaluation index [34].

7.2. Mode Settings. This study aims to explore the impact of different markets and inclusive finance on high-quality development and further examine the impact of the development level of inclusive finance on our country's high-quality economic development.

In the actual economic operation, the economic activities of any region cannot exist independently, and there will be a certain degree of connection and interaction between economic units in different regions. Existing studies have shown obvious spatial correlations between Paving the way for low-carbon development globally and along the “Belt and Road” report released (Zai Xie) [35] and Supporting green and low-carbon development of economy and society with an interdisciplinary model system (Qu Shen) [36] in different regions. Therefore, this paper uses a spatial econometric model to empirically test the impact of digital finance on high-quality economic development and its spatial spillover effect. Spatial econometric models mainly include Spatial Error Model (SEM), Spatial Autoregressive Model (SAR), and Spatial Durbin Model (SDM). The general expression of the model is shown in formula (5):

$$\begin{aligned}
 Y_{it} &= \rho \sum_{j=1}^n W_{ij} Y_{jt} + \beta X_{it} + \gamma \sum_{j=0}^n W_{ij} X_{jt} + \mu_i + \xi_i + u_{it}, u_{it} \\
 &= \lambda \sum_{i=1}^n W_{ij} u_{jt} + \varepsilon_{it}.
 \end{aligned}
 \tag{5}$$

Among them: Y_{jt} is the high-quality economic development index of the j th region in year t ; ρ is the spatial autocorrelation coefficient of the explained variable; X_{it} is the set of all explanatory variables in the i th region in year t ; β is the estimate of the corresponding explanatory variable coefficient; γ is the spatial autocorrelation coefficient of each explanatory variable; W_{ij} is the spatial weight matrix

TABLE 2: Global index results.

Years	Digital finance		High-quality economic development	
	Index	P	Index	P
2011	0.0383	0.001	0.022	0.028
2012	0.0447	0.000	0.216	0.030
2013	0.0384	0.000	0.021	0.042
2014	0.0414	0.000	0.021	0.044
2015	0.0415	0.000	0.176	0.083
2016	0.0315	0.000	0.145	0.124
2017	0.0235	0.003	0.095	0.293
2018	0.0145	0.009	0.031	0.481

element of the i th and j th regions; μ_i and ξ_i are the spatial and temporal fixed effects, respectively, u_{it} is the spatial error term; λ is each disturbance term of the spatial autocorrelation coefficient. When $\rho = 0$, $\gamma = 0$ is the SEM model; $\lambda = 0$, $\gamma = 0$ is the SAR model; $A = 0$ is the SDM model.

The results are given in Table 2. It can be seen that the indices of China's digital finance from 2011 to 2018 were all positive numbers and were statistically significant at the 5% level; the indices of high-quality economic development were also cheerful and were at the 10% level from 2011 to 2015.

The above is significant, indicating a certain spatial autocorrelation between China's digital finance and high-quality economic development, which is manifested in positive spatial aggregation. Therefore, it is more reasonable to use the spatial econometric model to explore the impact of digital finance on high-quality economic development.

8. Conclusions and Recommendations

From the perspective of factor markets and product markets, this paper uses data from 31 provinces to construct a panel regression model to study market development, the degree of development of digital financial inclusion, and the impact of digital financial inclusion in various factors markets and product markets—relationship with the region. According to our country's high-quality development level and inclusive finance development level, this paper studies the heterogeneous effects of different development levels in our country. The study found that the development of digital financial inclusion and the development of financial markets will both play a positive role in promoting the high-quality development of the regional economy, and financial inclusion can promote high-quality regional development by optimizing the development of factors, products, and financial markets. Develop. In addition, from the regression analysis of small samples, it can be seen that in areas with high levels of development, the regulation effect of inclusive finance on various markets and high-quality development levels is the most obvious; In contrast, the level of inclusive development in inclusive digital finance continues to improve, Its function of regulating various markets and economic development is also gradually weakening.

Data Availability

The dataset can be accessed upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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