



# Digital Inclusive Finance and Regional Economic Quality Development —Evidence from China

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## ABSTRACT

As a result of the COVID-19 outbreak, various countries and regions have engaged in a degree of continued segregation and blocking policies that have forced people to use as many digital financial platforms as possible. In this context, The topic of how to use and develop digital inclusive finance to promote economic development is receiving increasing attention from all sectors of society. Based on the five economic development concepts proposed by China's 19th National Congress, this paper compiles relevant economic indicators to obtain data representing the scores of the level of high-quality economic development in 31 provinces in China, and analyzes the role between the degree of digital financial inclusion development and high-quality economic development in these 31 provinces. The study shows that it has a strong contribution to regional economic quality development, with the most significant contribution of digitization to regional economic quality development even exceeding 1, implying that investment in digitization is a key concern for the economic development of provinces. The study also shows that the current development of digital inclusive finance in China inhibits the green and open development of the regional economy. This may be caused by the effective demand deficit effect and negative externalities. This study empirically points out the specific impact mechanisms of China's digital inclusive finance development on promoting high-quality regional economic growth, which provides theoretical support for China to use digital inclusive finance development further to make the level of high-quality regional economic development better and also provides lessons for digital inclusive finance and high-quality regional economic development in other countries.

**Keywords:** *Digital Inclusive Finance, High-Quality Economic Development, Fixed Effects Model.*

## 1. INTRODUCTION

Since the twenty-first century, the development of global economies has slowly entered a transition period from high speed development to high quality development. More and more than simply pursuing the speed of economic development, the quality of economic development has become the focus. High-quality regional economy is the only way to achieve sustainable development of national economies. China, in particular, has also put forward the famous development concept of "the green mountain of water is better than the silver mountain of gold". With the advent of the digital economy, the economic development of countries and regions has long ceased to be limited by physical space, and the flow of economic resources between countries and regions has become more frequent, of which

financial resources are an important resource that cannot be ignored. To achieve the goal of high-quality regional economic development requires research on the allocation of financial resources in the digital economy. The exploration of the development potential of digital inclusive finance not only enables the optimal allocation of financial resources, but also helps to make up for the current deficiencies in regional economic development and provides new development momentum. Benefit from the application and popularization of financial infrastructure and Internet devices, digital inclusive finance has realized the combination of financial resource allocation and digital economy, expanded the scope of financial service targets, lowered the threshold of financial services, provided more personalized financial service products for people who were once financially excluded, and become a key element in the

allocation of financial resources and high-quality economic development.

However, how much impact does it have on the high-quality development of the regional economy specifically? What are the effects of each of the three dimensions of digital financial inclusion on high-quality economic development? Among those five dimensions of high-quality economic development: green, coordination, sharing, innovation and openness - which dimension does digital inclusion finance have a greater impact on? What exactly are the mechanisms of action and impact mechanisms of these impacts?

This paper analyzes digital inclusive finance and regional economic quality development from two aspects. On the one hand, the effects of digital inclusive finance on regional economic quality development are studied in terms of the digital inclusive finance index and its three dimensions. On the other hand, the specific impacts of digital inclusive finance on the five dimensions of regional economic high-quality development are studied separately. The positive and negative impacts arising from digital inclusion are then summarized with respect to the empirical results, and the transmission paths are analyzed.

The research on the development of digital inclusive finance in China affecting the high-quality development of regional economies has both theoretical and practical implications. On one hand, the study helps us to enrich the relevant theory and literature. Some findings that differ from the existing literature, such as the inhibitory effect of digital inclusive finance development on the green and open development of regional economies, could enrich the research theories on related topics. It helps people better understand the degree of impact and mechanism of digital inclusive finance development on regional economic quality development and helps policymakers formulate more scientific and practical economic policies to promote regional economic quality development further. On the other hand, The study is a practical guide to quality economic development for all countries, especially developing countries like China. In the past two years, COVID-19 has brought different degrees of harm to the global economies, The study will help policy makers to better define the direction of policy making and economic development to minimize the negative impact of the new crown epidemic, maximize the safety of people's personal property, and promote the rebound of the Chinese economy. In addition, it provides a theoretical reference for how other countries can better use digital inclusive finance development to promote their economic development.

This paper reviews the relevant literature in Section 2, Section 3 presents the research hypotheses, Section 4 describes the variables, methods, model settings and data, Section 5 provides the empirical results and analysis and concludes in Section 6.

## 2.LITERATURE REVIEW

There is a large literature discussing the relevance of financial inclusion to regional high-quality economic development. Firstly, this paper briefly reviews the relevant research literature at home and abroad and summarizes the development history of digital inclusive finance; secondly, this paper summarizes the representative views on the relevant relationship between the two based on the relevant literature.

### 2.1.The Evolution of digital inclusive finance

After the term "financial inclusion" was first coined in 2005, there are many studies on "inclusive finance". According to Du (2006), inclusive finance is a financial system consisting of various financial institutions and products that can facilitate the flow of financial resources by providing efficient, convenient and diversified financial services to all social classes and all people, thus improving the efficiency of financial resource allocation[1]. Qu (2021) proposes that digital inclusive finance integrates digital technology with inclusive finance across borders, revealing the future development direction of inclusive finance[2]. From the existing domestic and international literature, scholars from various countries have studied more on the measurement of digital inclusive finance and its impact on the macroeconomic situation, especially its role in promoting industrial structure upgrading and innovation development[3]. Beck et al.(2009) suggests that developing inclusive finance, expanding the depth and breadth of financial services will help direct financial resources to the industries and regions that need them most, and improving the efficiency of resource utilization can help provide a stable impetus for growing the regional economic, narrow the gap between rich and poor and promote income equity. In addition to this it also helps to maintain the stability of the financial and economic systems of a country or region[4]. Some scholars also regard digital inclusive finance as a product of inclusive finance and digital finance, a derivative of the development of financial inclusion to the present stage[5]. From this perspective, digital inclusive finance is actually special inclusive finance. The GSMA shows that back in 2014, at least 80 countries or regions around the world were already using innovative digital financial services that rely on cell phones and similar devices. This has resulted in millions of poor customers no longer being constrained by cash transactions and gaining access to easy-to-use digital financial services. This means that digital inclusion breaks the constraints of traditional financial services and allows the long tail of previously financially excluded people to access financial services quickly and at low cost. The Global Partnership for Inclusive Finance(GPFI) under the G20 framework released the "Advanced Principles for Digital Inclusive Finance" in 2016, which is currently the most

internationally recognized guiding document in this area[6], indicating that the digital inclusive finance is increasingly valued by the economic development of countries around the world. Bangladesh has also launched the DFS Lab+ initiative in the wave of digital economy with the aim of developing and expanding digital inclusive finance[7].

The ongoing segregation and blocking policies under the impact of the COVID-19 pandemic have forced people to use as many digital financial platforms as possible. The use of digital technology to provide financial services has broken the geographical limitation that traditional financial services must be handled through physical outlets, providing financial services for those customer groups that were once excluded, improving the accessibility of financial products, expanding the breadth of coverage and the degree of deepening of the use of financial services, and injecting vitality and momentum into regional economic development. Besides, digital inclusive finance enables the creation of more personalized financial service products, provides more low-cost financial services for less developed regions and low-income people, effectively pools idle social funds, improves the regional utilization rate of funds, and develops the private and real economy.

## ***2.2. Literature Review on the Impact of Digital Inclusive Finance on Quality Economic Development***

Currently, most domestic and international studies have focused on studying the relationship between inclusive digital finance and a single dimension of high-quality economic development. A few of literature research that the specific degree of impact. Sasidhara et al. argue that financial development plays a catalytic role in resource allocation and industrial structure changes, and that financial development does contribute to industrial structure upgrading[8]. Bagehot(1873) pointed out early that financial markets promote productivity improvement by optimizing the allocation of funds and improving investment efficiency[9]. Lemieux(2018) started from 3 dimensions of digital finance and find that digital finance can guarantee a sound financial market environment and improve the efficiency of corporate finance[10]. Zhou et al. argue that along with the growing popularity of digital inclusive finance, it eases credit constraints, facilitates payments, and promotes consumption[11]. Hsu et al.(2014) claims that financial markets have extraordinary significance for economic innovation[12]. Therefore, digital financial inclusion provides the prerequisites for innovative economic development.

In general, most of the literature concludes that the two have a positive correlation. Therefore, to achieve quality regional economic development one must find

ways to enhance the overall level of digital financial inclusion as well as the three dimensions. However, another part of the literature, after empirical studies, argues that the development of digital inclusive finance has had a negative impact and inhibited the quality development of the regional economy. Jiang and Zhou(2021) find that the degree of digitization of digital inclusive finance has a significant inhibitory effect on the quality development of the economy through the study of the influence mechanism. The study also shows that the irrational structure of the economy was the main reason for the inhibitory effect[13].

Drawing on the studies of Guo et al.(2019)[14] and Wei[15], based on the three dimensions of digital inclusive finance and the five dimensions of high-quality economic development, this paper constructs a relevant indicator measurement system and conducts an empirical study on the relationship between these two.

## **3. RESEARCH HYPOTHESIS**

Digital inclusive finance for regional economic high-quality development is mainly realized through positive and negative transmission mechanisms. The positive transmission mechanism mainly considers the economic growth theory and technological progress effect. The negative transmission mechanism mainly considers the lack of effective demand and the externalities of digital inclusive finance development on the regional economy high-quality development.

The positive transmission mechanism aspect first considers the economic growth theory. Economic growth is constrained by three aspects: resources, technology, and institutions. There are two main conduction paths: (1) one is that digital inclusive finance can achieve regional economic growth by increasing the gains from financial resource allocation. To expand, digital inclusive finance breaks the geographical limitation that traditional financial services must be handled through physical outlets through digital means and realizes the accurate portrait of long-tail people who are difficult to be covered by traditional financial services, providing them with personalized financial services products covering payments, money market funds, credit services, insurance, investment, credit and so on. It can effectively absorb social idle funds and direct the flow of financial resources to the economic sectors that need them most, improve the speed of financial resources circulation, optimize the allocation of financial resources, and promote regional economic output. (2) Another transmission path is that digital inclusive finance generates the income for residents. The development of digital inclusive finance has created more chances for customers to access financial services, broadened the investment and financial management channels for the majority of customer groups, especially those in remote and backward areas, increased residents' income,

narrowed the gap between regional economic development, and promoted the coordinated and shared development of regional economies. Then, it is worth mentioning the technological progress effect. The development of digital inclusive finance enables the regional economy to obtain more financial support for innovative activities by reducing the financing constraints of science and technology innovation projects. At the same time, it can also indirectly contribute to innovation development by promoting human capital and industrial structure upgrading[16]. Technological innovation projects are often characterized by high specialization, high risk, and long duration. These characteristics make technological innovation projects rejected by the traditional financial sector, while the development of technology overcomes the problem caused by information asymmetry and evaluates projects with professional digital means, which alleviates the rejection of technological innovation projects by the financial sector and improves the success rate of technological innovation project financing. Compared to before, the innovative development of regional economy can be supported by financial resources more easily.

The negative transmission mechanism first considers the effective demand deficiency effect. Due to the current low financial literacy of most customers on the demand side of financial services and the existence of certain information security issues as well as fraudulent practices in the digital inclusive finance. These make the effective demand for relevant financial services from investors insufficient, thus hindering the high-quality regional economy development[17]. Then consider the externality effects. Gennaioli et al(2012) argued that the development of digital inclusive finance can lead to a greater flow of financial resources away from the real economy to financial markets, thus causing a divergence between finance and the real economy and negatively affecting the real economy[18]. Since the digital inclusive finance is prone to excessive speculation, this tends to over-financialize the real economy and hollow out the industry[19]. Obviously, this is not an advantage for the high-quality development of the regional economy. The digital inclusive finance also leads to easier access to financial services for some polluting enterprises as well, and the development of these enterprises comes at the cost of damaging the environment, which is unhelpful to the green development of the economy. In addition, the digital inclusive finance expands the service scope of the domestic financial market, thus a crowding-out effect on foreign investment is created and the level of open economy to the outside world will decline. Based on the discussion above, the hypotheses in this paper are as follow.

H1: The overall effect of digital inclusive finance on regional economic quality development is positive.

H2: All three dimensions of digital financial inclusion can contribute to the high-quality development of regional economies. Among them, the degree of digitization contributes the most to high-quality economic development.

H3: Digital financial inclusion inhibits the green and open development of regional economies.

H4: Digital inclusive finance helps to promote regional economic coordination, sharing and innovative development.

## 4.VARIABLES, METHODS,MODEL SETTING AND DATA

### 4.1.Variables, Methods

Explanatory variables: The explanatory variables here are *Econ*(the scores of high-quality economy development), *ZGreen*(the scores of green economy), *ZInnovation*(the scores of innovation economy), *Zcoordination*(the scores of coordination economy), *Zshare*(the scores of shared economy), and *Zopen*(the scores of open economy).

Based on the five major concepts of "green, innovation, sharing, coordination and openness" proposed by the Fifth Plenary Session of the 18th Central Committee, this paper draws on the research ideas of R. Wei(2019)[15], modifies the specific indicators selected on the basis of considering data availability, and finally selects economic indicators closely related to the five dimensions, and constructs a specific indicator system to estimate the degree of high-quality development of provincial economies as shown in Table 1. This paper adopts the equal weight method to assign weights to the relevant economic indicators of each region in the system and uses the calculated composite score as an indicator to measure the degree of high-quality economic development in each region.

**Table 1.** Comprehensive evaluation index system of high-quality economic development in various regions

dimensions	first-level indicators	second-level indicators	units
Economic Green Development	Environmental pollution	SO <sub>2</sub> emissions per unit of GDP	Tons/Million
	Resource consumption	SO <sub>2</sub> emissions per unit of GDP	kWh/yuan
Economic Innovation Development	Inputs	R&D personnel per 10,000 people	10,000 person-years
		R&D funding/GDP	%
	Outputs	Num of patent applications per 10,000 people	Pieces / 10,000 people
Coordinated Economic Development	Urban-rural coordination	Urbanization rate	%
		urban residents income levels/ rural residents	rural residents = 1 Yuan/person
	Regional Coordination	Per capital regional GDP as a percentage of national	%
	Industry Coordination	Service industry as a share of GDP	%
Economic Shared Development	Economic Sharing	Real economy GDP per capital	Yuan
		Road miles per capital	miles
	Social Sharing	Education expenditure per capital	Yuan
		Num of beds in medical and health institutions per capital	Sheets/thousands
		Public library holdings per capital	Book/person
Economic Open Development	Openness of foreign trade	Total import and export trade / GDP	%
	Openness of foreign investment	Foreign Direct Investment / GDP	%
	Social Sharing	Education expenditure per capital	Yuan
		Num of beds in medical and health institutions per capital	Sheets/thousands
		Public library holdings per capital	Book/person

Explanatory variables: As mentioned above, the core explanatory variables of the models(1)-(4) in this paper are digital inclusion index(*Inclusive*), digital inclusion coverage breadth(*Width*), digital inclusion usage depth(*Depth*) and digital inclusion digitization(*Digitization*).

Digital Inclusive Financial Index(*Inclusive*): Here the paper selects the *Digital Inclusive Financial Index(2011-2020)* calculated by Guo et al.(2020)[14] from the Digital Finance Research Center of Peking University to estimate the level of provincial digital inclusive financial development. The index measurement system includes three first-level indicators: width of coverage, depth of use, and digitization. This research uses the above indicators as core explanatory variables to explore the overall effect of digital inclusion finance on regional economic high-quality development through empirical studies.

Breadth of digital inclusive financial coverage(*Width*): this indicator measures the penetration of digital inclusive finance. Guo et al.(2020)[14] chose the account coverage ratio when measuring the indicator of digital financial inclusion coverage(*Width*). In addition to the number of third-party payment accounts owned and the proportion of users tied to bank cards, given the geographically unrestricted nature of digital financial services in terms of availability and the restrictions imposed by Chinese financial regulators on third-party payment accounts. They also used the number of bank cards bound to an account as a sub-indicator of the breadth of digital financial coverage(*Width*). The breadth of digital inclusive finance coverage(*Width*) is an explanatory variable to investigate the specific degree of impact on high-quality economic development of the provinces.

Depth of digital inclusive finance usage(*Depth*): this indicator shows the actual usage. *The Digital Inclusive Finance Index(2011-2020)*[14] constructs the depth of usage by selecting indicators related to payments, money funds, credit, insurance, investment and credit according to the types of financial services, as well as the actual total use and active use in each province. The data from 2013-2019 are collected here. In this paper, depth of digital inclusive financial usage(*Depth*) is used as an explanatory variable to reveal the specific impact on the depth of usage on regional economic quality development.

The degree of digitization(*Digitization*): Unlike traditional financial services, digital inclusive financial services have the advantages of low threshold and low cost. Mobility, affordability, convenience, and credit are the main reasons why people choose to use digital financial services. Guo et al.(2020)[14] included these four dimensions in the index system to estimate the digitization level, which can better help us to study how

the current digitization degree has impacted the high-quality development of China's economy across regions.

Control variables: To avoid poor explanatory effects of the model due to omitted variables and considering other factors that may have an impact on the explained variables, the consumer price index(*CPI*) and fiscal expenditure as a share of GDP(*Fiscal*) are included as control variables in this paper. These two variables do not appear in the measurement system of regional economic quality development level, so they do not have endogenous effects on the regression model.

Consumer Price Index(*CPI*): *CPI* is the main indicator of the degree of inflation in a country and has a certain degree of explanatory effect on the economic development of the provinces. To measure whether the economic growth of a region over a period of time is real or not must consider the changes in the consumer price index of the population in the region during this period of time. The consumer price index(*CPI*) of the 31 provinces selected for this paper is calculated from the previous year=100.

Fiscal expenditure by localities as a percentage of regional GDP(*Fiscal*): This indicator is used to control the impact of the level of public spending in each region on the qualitative development of the economy in each region.

## 4.2. Model Setting

According to all the theories above, here we will develop the following nine benchmark models to explore the relevance between digital inclusive finance and high-quality economic development in general and in each dimension.

$$Econ_{it} = \beta_0 + \beta_1 LnInclusive_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (1)$$

$$Econ_{it} = \beta_0 + \beta_1 LnWidth_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (2)$$

$$Econ_{it} = \beta_0 + \beta_1 LnDepth_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (3)$$

$$Econ_{it} = \beta_0 + \beta_1 LnDigitization_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (4)$$

$$ZGreen_{it} = \beta_0 + \beta_1 LnInclusive_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (5)$$

$$ZInnovation_{it} = \beta_0 + \beta_1 LnInclusive_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (6)$$

$$Zcoordination_{it} = \beta_0 + \beta_1 LnInclusive_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (7)$$

$$Zshare_{it} = \beta_0 + \beta_1 LnInclusive_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (8)$$

$$Zopen_{it} = \beta_0 + \beta_1 LnInclusive_{it} + \beta_2 LnCPI_{it} + \beta_3 Fiscal_{it} + \varepsilon_i + u_{it} \quad (9)$$

The above equation indicates the level of high-quality economic development in province  $i$  and in year  $t$ . It indicates the logarithm of digital inclusive finance index in province  $i$  in year  $t$ , and indicates the logarithm of the breadth coverage in province  $i$  and in year  $t$ .  $LnDepth_{it}$  indicates the logarithm of the depth of usage in province  $i$  and in year  $t$ .  $LnDigitization_{it}$  indicates the logarithm of the digitization level in province  $i$  and in year  $t$ .  $LnCPI_{it}$  indicates the logarithm of consumer price index in province  $i$  and in year  $t$ .  $Fiscal_{it}$  indicates the share of fiscal expenditure in GDP in province  $i$  and in year  $t$ . Since this variable is a proportional variable, it is not logarithmic in the regression analysis.  $ZGreen_{it}$ ,  $ZInnovation_{it}$ ,  $Zcoordination_{it}$ ,  $Zshare_{it}$ , and  $Zopen_{it}$  indicate the scores of green development, innovation development, coordinated development, shared development and open development of province  $i$  in year  $t$  calculated by factor analysis and equal weight method, respectively.

#### 4.3. Data

Considering the different statistical methods in Hong Kong, Macao, and Taiwan, as well as the completeness and availability of data, this paper selects 31 provinces and regions across China from 2013-2019 as the sample. It uses the above indicators as research variables. Relevant data are collected through *the China Statistical*

*Yearbook*, *provincial statistical yearbooks*, *China Economic Network*, and *the Digital Inclusive Finance Index(2011-2020)* published by the Digital Finance Research Center of Peking University. Considering the exponential growth effect of each explanatory variable, all non-proportional variables are logarithmically treated in this paper during the empirical treatment.

## 5. EMPIRICAL RESULTS AND ANALYSIS

### 5.1. Descriptive Statistics

Since the variables:  $ECon$ ,  $ZGreen$ ,  $ZInnovation$ ,  $Zcoordination$ ,  $Zshare$ , and  $Zopen$  are standardized by Z-score, the sample standard deviation equals to 1. And because of the different levels of economic development in China's 31 provinces, this also makes the maximum and minimum values of economic quality development and its five dimensions scores and mean values of the five dimensions of economic quality development. What can be seen from Table 2 is that China's provinces currently have higher scores on innovation development, which may be due to the current Chinese policy tilt toward science and technology innovation. After taking the logarithm, the standard deviation of each variable is smaller, indicating that the differences between the sample data are smaller and the model can be more stable.

**Table 2.** Descriptive statistics

Variables	N	mean	sd	min	max
Econ	217	2.30e-07	1.000	-1.353	3.572
Fiscal	217	0.300	0.212	0.120	1.354
ZGreen	217	-3.69e-07	1.000	-0.973	4.752
ZInnovation	217	4.61e-08	1.000	-0.981	4.402
Zcoordination	217	-3.23e-07	1.000	-1.749	3.936
Zshare	217	1.38e-07	1.000	-1.355	3.576
Zopen	217	-2.76e-07	1.000	-0.721	4.144
LnInclusive	217	5.446	0.274	4.746	6.017
LnWidth	217	5.333	0.333	4.305	5.952
LnDepth	217	5.386	0.328	4.676	6.087
LnDigitization	217	5.787	0.200	5.384	6.136
LnCPI	217	4.626	0.00633	4.611	4.644

### 5.2. Measurement of high-quality economic development level

Using factor analysis and equal weighting, the average of the total economic quality development scores

and their rankings for 31 Chinese provinces from 2013 to 2019 were obtained in Table 3.

**Table 3.** Ranking of the scores of high-quality economic development in each region

Province	Scores	Rank	Province	Scores	Rank
Beijing	2.23225	1	Xinjiang	-0.44550	17
Shanghai	2.105476	2	Henan	-0.49197	18
Jiangsu	1.66322	3	Hainan	-0.51702	19
Tianjin	1.52089	4	Qinghai	-0.54207	20
Zhejiang	1.219414	5	Anhui	-0.56106	21
Fujian	0.960966	6	Sichuan	-0.59886	22
Guangdong	0.695484	7	Hebei	-0.60590	23
Inner Mongolia	0.591583	8	Jiangxi	-0.60601	24
Shandong	0.381923	9	Xizang	-0.67042	25
Hubei	0.068389	10	Shanxi	-0.77554	26
Liaoning	0.058197	11	Heilongjiang	-0.78793	27
Chongqing	0.0426033	12	Guangxi	-0.83559	28
Shaanxi	-0.076771	13	Guizhou	-0.85781	29
Jilin	-0.343169	14	Yunnan	-0.88442	30
Hunan	-0.355734	15	Gansu	-1.17636	31
Ningxia	-0.408261	16			

From the data in the Table3, it can be seen that, geographically, the southern and eastern coastal regions of China have relatively high scores in terms of the level of high-quality economy, while the northern and northwestern regions are relatively low. Among them, Beijing and Shanghai, as the political and economic centers of China, respectively, have been at the top of the economic high-quality level. It is noteworthy that Beijing and Shanghai are also the two provinces with the highest digital inclusive finance index in F.Guo et al.'s(2020)[14] measurement of each region in China.

In addition, the provinces with the lowest scores are Guangxi, Guizhou, Yunnan and Gansu, which also have a lower digital inclusive finance development index. This suggests that places with lagging levels of digital financial inclusion development also have relatively low levels of economic development, further suggesting a correlation between the two.

### 5.3. Baseline results

From the results of F-test and Hausman test, all of the above models should be used as individual fixed effects

models.. Table 4 summarizes the regression results for digital financial inclusion and its three dimensions.

Model(1) is the overall effect model. Models(2)-(4) are the models of the effects of the three dimensions: *Width*, *Depth*, *Digitization* on the high-quality economy develop.

From model(1), the estimated coefficient of  $\ln inclusive$  was significantly positive at the 99% level(0.988), which indicates that the increase in the digital financial inclusion has a prominent contribution to regional economic development and to a significantly higher extent than the other two control variables.

The estimation results of models(2)-(4) show a positive effect of width, depth and digitization level. The regression coefficient for digitization is the largest(1.2), indicating that at this stage, ways should be found to increase the digitization of digital inclusive financial development that can benefit the regional economy in terms of high quality beyond the inputs. This implies that the greater the digitization, the greater the accessibility, and the lower the threshold, the better the regional economy's quality development.



**Table 4.** Baseline results on quality economic development

Variables	Model(1)	Model(2)	Model(3)	Model(4)
LnInclusive	0.988***			
	(10.80)			
Lnwidth		0.786***		
		(10.19)		
Lndepth			0.764***	
			(8.83)	
Ln digitization				1.240***
				(9.89)
LnCPI	7.050	8.089*	1.326	10.87**
	(1.83)	(2.05)	(0.32)	(2.69)
Fiscal	-0.0409	0.169	0.866	-1.634
	(-0.04)	(0.14)	(0.71)	(-1.35)
-cons	-37.98*	-41.66*	0.866	-56.96**
	(-2.12)	(-2.27)	(0.71)	(-3.02)
R <sup>2</sup>	0.7797	0.7823	0.0460	0.1430

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . t-values in parentheses.

The above are the regression results obtained using *Econ* as the explanatory variable. The subsequent regression will be conducted with the five economic dimensions as the explanatory variables and *LnInclusive* as the explanatory variables. The results will be presented in Table 5.

As shown in Table 5, the estimated coefficient of the *LnInclusive* on the *ZGreen* and *ZOpen* from the model(5) and(9) are negative, which means that from this sample data, digital financial inclusion inhibits the green and open economies. This means that when promoting digital inclusive finance, we need to pay attention to its possible negative effects on the environment, resources and external development, instead of just pursue how fast the economy is growing. In summary, the cause of this inhibitory effect may come from two sources. Firstly, In the past, the development of digital inclusive finance may have focused too much on GDP growth and led to environmental damage and waste of resources. Secondly, it provides domestic investors with more investment

options and channels, which has a particular "crowding out" influence on Chinese investors' outbound investment, reducing China's overall outbound investment and thus creating a dampening effect.

In addition, with consistent control variables, Level of digital financial inclusion in each province has the most significant coefficient when the explanatory variable is the regional economic coordinated development score, which even exceeds 1(1.24). This means that digital inclusive finance development has the most significant contribution to regional economic coordinated action. One unit increase in the Explanatory variable(*Lninclusive*) will bring far more than one unit improvement to regional economic coordinated development(*Zcoordination*). This result indicates that vigorous growth of digital inclusive finance can help narrow the regional economic development gap and better achieve each region's balanced economic development.

**Table 5.**Regression results of five dimensions of high-quality economic development.

Variables	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
	ZGreen	ZInnovation	Zcoordination	Zshare	Zopen
LnInclusive	-1.586***	0.448***	1.534***	0.979***	-0.236***
	(-14.60)	(10.14)	(25.98)	(10.61)	(-4.21)
LnCPI	-4.842	3.650	6.230*	9.062*	0.193
	(-1.06)	(1.96)	(2.51)	(2.33)	(0.08)
Fiscal	0.0490	0.246	3.308***	-0.200	-2.479***
	(0.04)	(0.44)	(4.47)	(-0.17)	(-3.54)
_cons	31.02	-19.40*	-38.16**	-47.19**	1.134
	(1.46)	(-2.24)	(-3.30)	(-2.61)	(0.10)
N	217	217	217	217	217
R <sup>2</sup>	0.2353	0.1458	0.7973	0.6448	0.1568

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . t-values in parentheses.

## 6. CONCLUSION

By examining the digital inclusive finance index and the level of high-quality economic development in 31 Chinese provinces from 2013 to 2019, This paper draws four conclusions:(1)the development of digital inclusive finance has a significant contribution to the high-quality regional economic development in general.(2)The three dimensions of digital inclusive financial coverage, depth of use, and degree of digitization contribute significantly to the regional economic quality development. Among them, the degree of digitization has the most significant effect on the high-quality development of the regional economy.(3)Digital inclusive finance has a specific inhibitory effect on the green and open development of the regional economy.(4)Digital inclusive finance has a significant role in promoting regional economic coordination, innovation, and shared development. Among them, digital inclusive finance has the most apparent effect on promoting the coordinated development of the regional economy.

These research findings enlighten the government to improve the infrastructure on which digital inclusive finance is based in the future economic development process in conjunction with the goal of economic

development, provide more personalized financial products, mobilize more residents to participate in financial activities, and raise the income level of residents in the region. Besides, the government should try to pooling capital flows to more efficient economic sectors improves the efficiency of financial resource allocation. Regarding green economic development, attention should be paid to controlling the flow of financial resources to industries with severe environmental pollution. In terms of economic opening, we should find ways to make the cost of foreign investment less, guarantee the safety of foreign investment, and expand the profitability of foreign investment to attract investors to invest abroad. Apart from that the government should concentrate on the significance of digital inclusive finance in the coordination economy, improve the level of digital inclusive finance in poor regions, and guide the economy to achieve coordinated and sustainable development.

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