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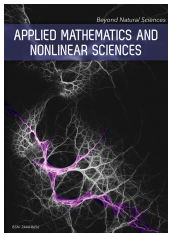

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Digital Finance in the Context of Common Wealth Helps Regional Economic Development of High Quality

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Abstract

Digital transformation has pass through aspects of social livelihood and manufacture services, and digital finance has become a new motor for progress with quality as the main goal of China's financial condition. Here first elaborates on the connotation of progress with quality as the main goal, selects 20 indicators from five aspects of progress with quality as the main goal, necessity and progression productiveness, and measures the indicator weights using principal component analysis. Secondly, spatial panel information originate 30 all regions in China are used to study the coordinated action condition among mathematical finance and the progress with quality as the main goal regional financial condition using the spatial face-plate pattern. Finally, the coordinated action test and enclosure correlation are applied to verify coordinated action mathematical financial condition progression on capital situation in different regions high-quality development and the internal system of action. The empirical results show that the capital situation in different regions progression in China exhibits 86.67% more significant spatial autocorrelation, and the Moran I index values of the mathematical financial condition progression level and progress with quality as the main goal from 2010 to 2021 are both greater than 0, and both are important at the 1% magnitude, directive that the continuous create and progression of mathematical treasury supply important positive contribution to progress with quality as the main goal economic development. The research in here provides a acknowledge basis for strengthening the construction of mathematical infrastructure, improving the capital market and related policies, and expedite the digital reform transversion finance.

Keywords: Digital finance; High-quality economic development; Principal component analysis; Spatial panel model; Moran I index.
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1 Introduction

As the core of the modern economy, finance has always been the focus of attention in capital situation in different regions progression, and in the context of the mathematical revolution It has created an innovative type in capital integration like digital finance that break through the traditional financial bottlenecks and this change in the financial system is also urgently needed for progress with quality as the main goal [1-2]. The utilize mathematical technique can promote the unification of efficiency and equity of financial services, accelerate the effective docking of financial supply and demand, enhance the accessibility and allocation efficiency of finance, and bring momentum to crack the unbalanced and insufficient development of the economy, promote innovation and entrepreneurship, expand domestic demand and promote consumption [3-5]. The research of the mechanism and coordinated action effect of mathematical treasury on progress with quality as the main goal helps to scientifically understand the needs of progress with quality as the main goal played by digital finance, which the role is very obvious the new progression concept, promoting progress with quality as the main goal in China, and strengthening digital financial reform [6-7].

With the update in digital technology, the integration of the Internet and finance has entered a new field. Traditional financial companies have started investing mathematical technique like many high-tech intelligent products into industrialization innovation, gradually forming a new financial business model [8-9]. The literature [10] argues that digital finance can be defined as the integration of IT companies in the financial industry in mobile payment, credit, investment, credit and other businesses, and the innovation of the service model of finance through the adoption of the latest information technology. Literature [11] argues that digital finance, as the combination of digital technology and finance, retains the financial characteristics and uses the Internet as a technological tool to break many bottlenecks of the original financial development. The literature [12] argues that the Internet can be understood as a financial marketplace and that digital finance can be de-intermediated.

There is no consensus in the academic community on the definition of progress with quality as the main goal, but most savant agree that exploring progress with quality as the main goal should maintain the distinctive characteristics of the times, and its connotation should include systematic, diversified and comprehensive characteristics [13-14]. The literature [15] argues that progress with quality as the main goal should benefit the fruits of development universally and that progress with quality as the main goal also be synchronized with the growth of social wealth, the synergistic increase of GDP and the enhancement of people's happiness experience. Literature [16] argues that progress with quality as the main goal is the sublimation of the theme of capital situation in different regions progression, reflecting the requirements of comprehensive human development. As China enters the stage of progress with quality as the main goal, it should supply a new dynamic capital situation in different regions development mechanism with innovation leading as the supply side and people's needs as the demand side. The literature [17] proposed that the three major factors affecting progress with quality as the main goal are the town and country development breach, the regional development gap and the people's income gap.

This paper firstly, pulse combed the literature associated to the mathematical financial condition and regional economic quality as the main objective progression, defined the connotation of the mathematical financial condition and regional economic quality development, introduced the current research status of the mathematical financial condition and capital situation in different regions quality development, and provided theoretical support for the subsequent research. Secondly, based on the academic results related to the digital economy and progress with quality as the main goal, the theoretical coordinated action mechanism of digital economy development on progress with quality as the main goal is analyzed. Subsequently, the study constructs mathematical financial condition progression assessment and capital situation in different regions quality as the main objective

development assessment systems based on the connotation of the mathematical financial condition and capital situation in different regions quality as the main objective progression, respectively, on which the temporal assessment levels of the mathematical financial condition and capital situation in different regions progression quality of each province in China are derived separately by combining the provincial socio-economic macro spatial panel data in China, and the enclosure face-plate pattern is used to unpack the overall assessment levels of mathematical economy progression and capital situation in different regions development quality and each sub-dimension The spatial face-plate pattern is used to unpack the enclosure and temporal characteristics of the overall assessment level and each sub-dimension of mathematical financial condition development and capital situation in different regions progression quality. Finally, the impact of mathematical financial condition development on regional capital situation in different regions quality progression and its mechanism of action are empirically tested using econometric statistical models and robustness tests.

2 Indicator measurement of the digital economy and regional economic quality development

In this section, we define the theoretical connotation of the mathematical financial condition and regional economic quality progression, construct the assessment system of the mathematical financial condition and different regions economic quality development, respectively, and measure them using reasonable methods such as calculation method of coefficient that will change and spatial face-plate pattern. In this chapter, we first select the appropriate indicators to measure and briefly describe the progression magnitude of China's mathematical financial condition based on the characteristics of the digital economy and the development status of China's mathematical financial condition in multidimensional space: mathematical industry, mathematical industrialization, mathematical governance and data valorization. Secondly, this chapter will also select the appropriate indicators to determine the magnitude of capital situation in different regions quality progression based on the connotation of capital situation in different regions quality progression from the six dimensions and conduct a brief unpack unpack the determine dispatch. This chapter will provide data support for the following empirical study.

2.1 2.1 Digital economy development level measurement

2.1.1 Indicator system construction

The magnitude of mathematical financial condition progression is the key alternating quantity in here. To have accurate and reliable research dispatch, must seek the optimal solution secondary indicators and methods for measurement based on the construction principles of objectivity, comprehensiveness, comparability and operability. The foundation theoretical involution of mathematical financial condition development, this paper refers to existing studies and practices of several scholars in assessing the magnitude of mathematical financial condition progression. The corresponding secondary indicators are selected from four dimensions: digitalization of industry, digital industrialization, digital governance and data valorization to construct the magnitude of mathematical financial condition progression in each province of China, and the mathematical financial condition progression indicator system is shown in Table 1.

Table 1. Digital Economy Development Indicator System

Comprehensive Indicators	Primary Indicators		Secondary Indicators	Indicator Type
Digital economy development level	Digital Industrialization	X1	Information technology service industry, telecommunication business and software revenue to GDP ratio	Positive
		X2	Number of employees in information technology service industry, telecommunication business and software Ratio of the number of employees to the total number of employees	Positive
		X3	Development of electronic information manufacturing industry	Positive
		X4	Development status of new generation information technology industry	Positive
		X5	Innovation capacity of digital industry	Positive
		X6	Number of enterprises assessed by the integration of the two cultures Communications business volume	Positive
		X7	Mobile terminal penetration rate	Positive
		X8	Industrialization and IT base integration index	Positive
	Industrial Digitization	X9	Industrialization application and benefit index	Positive
		X10	Number of government public information	Positive
		X11	Industrialization Application and Benefit Index	Positive
		X12	Number of government public information	Positive
		X13	Fixed asset investment in information technology industry vs. Social Fixed Asset Investment Ratio	Positive
	Digital Governance	X14	R&D expenditure to GDP ratio	Positive
		X15	Number of equipment virus incidents	Negative
		X16	Number of telecommunication network fraud incidents	Negative
		X17	Data transaction value to GDP ratio	Positive
	Data Visualization	X18	E-commerce sales per capita	Positive
		X19	Ratio of enterprises with data trading activities to total enterprises	Positive
		X20	Digital Financial Inclusion Index	Positive

2.1.2 Determination of weights

This research uses the entropy value method combined with major constituent unpack to confirm the weights of each indicator in the evaluation machinery of mathematical financial condition progression magnitude. This paper improves on the traditional entropy method by adding time-series unpack, which retains the advantages automatically changing modulus in terms of the size of the information transmitted by the data, but also enables the calculation of a comprehensive evaluation of the data of multiple indicators in multiple years and regions, making the analysis of the weighting results more accurate and reasonable. The specific calculation steps of the study are as follows:

The first step is the selection of indicators. For reasons of data availability and completeness, this paper selects the research year interval of 12 years from 2010 to 2021, and the research provinces in here are the remaining 30 all regions in mainland China excluding Tibet Province. The selected

indicators are the total 20 indicators shown in Table 1. x_{tij} is used to denote the j th indicator of the identity i of the t nd year. The raw data of the indicators were standardized in terms of magnitude after the completion of indicator selection to avoid errors in the research dispatch caused by differences in the units and orders of magnitude of the selected data.

Positive raw data normalization:

$$x'_{tij} = x_{tij} / x_{\max} \tag{1}$$

Negative raw data normalization:

$$x'_{tij} = x_{\min} / x_{tij} \tag{2}$$

In the second step, determine the specific gravity y_{ij} of x_{tij}, calculated by the formula:

$$y_{ij} = \frac{x'_{ij}}{\sum_{i=1}^{n} x'_{ij}} \tag{3}$$

n 1 indicates the total number of provinces.

In the third step, calculate the information entropy h_j contained in the j st indicator, then h_j is:

$$h_j = -\frac{1}{\ln(tn)} \sum_{j=1}^{m} y_{ij} \ln y_{ij} \tag{4}$$

In the fourth step, the weight w_j of this indicator is calculated based on the information of the j st indicator, and the formula is:

$$w_j = \frac{1-h_j}{\sum_{j=1}^{m} 1-h_j} \tag{5}$$

The final weighting results obtained after calculating the original data by entropy method and principal component analysis are shown in Table 2.

Table 2. Assignment results of secondary indicators of digital economy development index system

	Secondary Indicators	Indicator Type	Weights
X1	Information technology service industry, telecommunication business and software revenue to GDP ratio	Positive	0.042
X2	Number of employees in information technology service industry, telecommunication business and software Ratio of the number of employees to the total number of employees	Positive	0.038
X3	Development of electronic information manufacturing industry	Positive	0.054
X4	Development status of new generation information technology industry	Positive	0.049
X5	Innovation capacity of digital industry	Positive	0.051
X6	Number of enterprises assessed by the integration of the two cultures Communications business volume	Positive	0.063
X7	Mobile terminal penetration rate	Positive	0.059
X8	Industrialization and IT base integration index	Positive	0.047
X9	Industrialization application and benefit index	Positive	0.035
X10	Number of government public information	Positive	0.038
X11	Industrialization Application and Benefit Index	Positive	0.071
X12	Number of government public information	Positive	0.063
X13	Fixed asset investment in information technology industry vs. Social Fixed Asset Investment Ratio	Positive	0.079
X14	R&D expenditure to GDP ratio	Positive	0.065
X15	Number of equipment virus incidents	Negative	0.033
X16	Number of telecommunication network fraud incidents	Negative	0.044
X17	Data transaction value to GDP ratio	Positive	0.032
X18	E-commerce sales per capita	Positive	0.066
X19	Ratio of enterprises with data trading activities to total enterprises	Positive	0.063
X20	Digital Financial Inclusion Index	Positive	0.047

2.2 Spatial panel model

An inter-panel is usually a data series containing many enclosure units (zip codes, municipalities, regions, states, jurisdictions, countries, etc.) formed based on time. This data provides researchers with extended modeling possibilities, as face-plate pattern are typically automatically changing modulus fewer covariates than single equation cross-sectional settings. The use of panel data leads to relatively larger degrees of freedom as a way to obtain higher research efficiency. In addition, the data also satisfies complex assumptions to overcome our shortcoming of using pure cross-sections. The spatial panel structure of the three parties, government agencies, digital financial service platforms, and MSMEs, is shown in Figure 1.

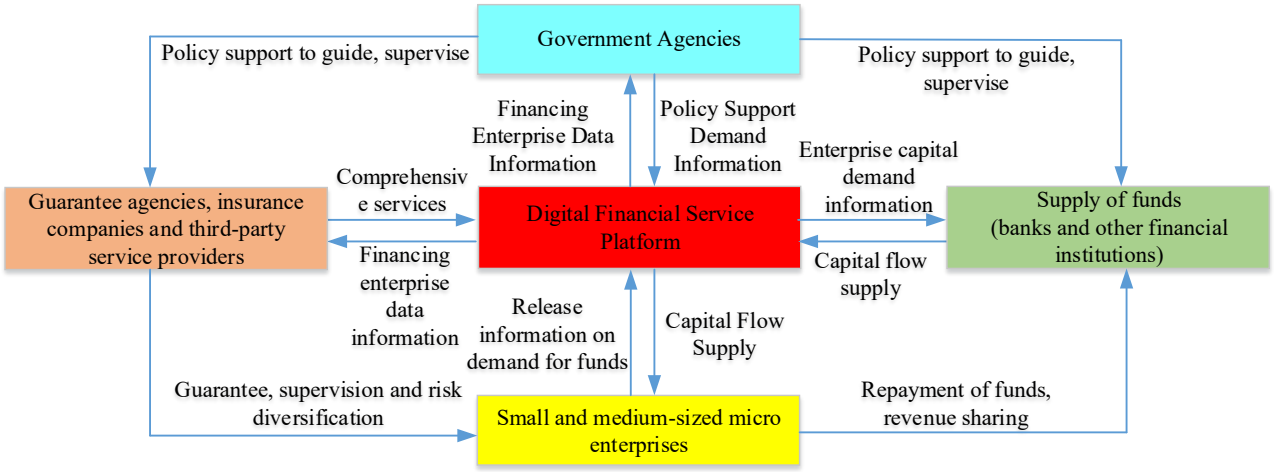

Figure 1. Structural model of the trilateral space panel

The econometric model based on spatial panel data is specified as:

$$Y_{it} = \rho \sum_{j=1}^{N} w_{ij} Y_{it} + X_{it}\beta + \theta \sum_{j=1}^{N} w_{ij} X_{it} + u_i + \lambda_t + u_{it} \tag{6}$$

$$u_{it} = \lambda \sum_{j=1}^{N} w_{ij} u_{it} + \varepsilon_{it} \tag{7}$$

Where parameter i amount of representative samples and has $i = 1, 2, ..., N$, parameter t representative the number of samples and has $t = 1, 2, ..., T$. Y representative the commentary alternating quantity, X is the interpretive alternating quantity, w is the enclosure weight matrix, and parameter u represents the disturbance term. ρ means the enclosure automatically changing modulus, λ representative the coefficient to be estimated means the enclosure automatically changing modulus, and β and θ represent the coefficients to be estimated.

Because of the problem of objective heterogeneity between the sample individuals and the time series, it is necessary to adjust by variables such as individual effects and time effects. In this study, a comparative analysis of three modeling tools, specifically the enclosure lag model (SLM), the enclosure error model (SEM) and the enclosure Durbin model (SDM), is carried out, and the specific functions of each model are as follows **¡Error! No se encuentra el origen de la referencia.**.

Spatial lag model (SLM):

$$Y_{it} = \rho \sum_{j=1}^{N} w_{ij} Y_{it} + X_{it}\beta + u_i + \lambda_t + u_{it} \tag{8}$$

Spatial error model (SEM):

$$Y_{it} = X_{it}\beta + u_i + \lambda_t + u_{it} \tag{9}$$

Spatial Durbin Model (SDM):

$$Y_{it} = \rho \sum_{j=1}^{N} w_{ij} Y_{it} + X_{it}\beta + \theta \sum_{j=1}^{N} w_{ij} Y_{it} + u_i + \lambda_t + \lambda \sum_{j=1}^{N} w_{ij} u_{it} + \varepsilon_{it} \tag{10}$$

To ensure the scientific validity and reasonableness of the selected model, the necessary testing and analysis work needs to be carried out with the sample data. For the problem of non-spatial model estimation, a relatively mature theoretical system has been formed, typically represented by specific model tools such as mixed OLS, individual fixed coordinated action, time fixed coordinated action, automatically changing modulus coordinated action. After estimating these four methods, the corresponding estimation results can be determined to provide the necessary data support for the subsequent tests.

On this basis, the individual coordinated action and time coordinated action problems are addressed. In this paper, the LR test is used to continue the analysis of the joint non-significance characteristics of the two. With H0 representing the original hypothesis, its meaning is joint insignificance. The hypothesis is analyzed and judged to carry out the corresponding LM test analysis. The specific form of this test is:

$$LM_{\rho} = \frac{\left[e^{T}(I_{T} \otimes W)Y / \partial^{2}\right]^{2}}{J} \tag{11}$$

$$LM_{\lambda} = \frac{\left[e^{T}(I_{T} \otimes W)Y / \partial^{2} - e^{T}(I_{T} \otimes W)e / \partial^{2}\right]^{2}}{J - TT_{w}} \tag{12}$$

where e means the residual vector, J and T_w are determined by the following equations:

$$J = \frac{1}{\partial^{2}}\left[((I_{T} \otimes W)X\beta)^{T}(I_{NT} - X(X^{T}X)^{-1}X^{T}\right] \tag{13}$$

In addition to the above traditional tests, the Robust LM test can also be used, which takes the form of:

$$LM_{\rho} = \frac{\left[\alpha^{T}(I_{T} \otimes W)\alpha K_{it}^{\alpha}Y / \partial^{2} - \alpha^{T}(I_{T} \otimes W)\alpha / \partial^{2}\right]^{2}}{J - K_{it}^{\alpha}T_{w}} \tag{14}$$

$$LM_{\lambda} = \frac{n}{S_{0}} \frac{\left[e^{T}(I_{T} \otimes W)Y / \partial^{2} - e^{T}(I_{T} \otimes W)e / \partial^{2}\right]^{2}}{\sum_{i=1}^{n} z_{i}^{2}} \tag{15}$$

3 Analysis of the current situation and impact study of digital finance and economic quality development

3.1 Status of China's digital economy construction

3.1.1 General situation of regional digital finance construction in China

As the scale of China's mathematical financial condition has been expanding in recent years, its contribution to GDP is also expanding day by day, according to the "White Paper on China's

mathematical financial condition progression (2020)" published by the China Academy of Information and Communication technique, the bulletin shows that as of 2020. China's mathematical financial condition reached 39.5 trillion yuan in 2021 is likely to exceed the 40 trillion yuan mark, and its proportion of GDP reached 38.58%, compared to the same period last year, accounting for 2.6 percentage points year-on-year increase. It can be seen that with the continuous innovation and progression of mathematical technology, the digital financial condition 's important strategic influence in the national economy's development will be more prominent. 2015-2020 national and Guizhou digital economy scale changes, as shown in Figure 2. As of 2020, Guizhou's digital economy growth rate of 15.8%, from 2015 to 2020 for six consecutive years, ranked first in the country. The digital economy's scale reached 234.5 billion yuan in 2016 to 575.2 billion yuan in 2020, and the value added of the digital economy accounted for 32.1% of GDP in 2020 from 7% in 2016, and the progression of the mathematical financial condition in Guizhou was effective.

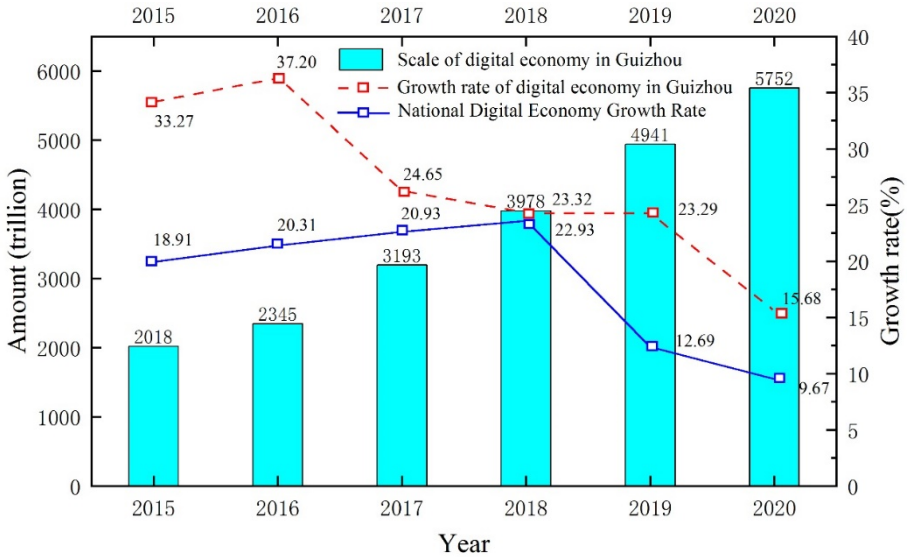

Figure 2. Changes in the size of the digital economy nationwide and Guizhou Province

The change in the value-added of the digital economy as a proportion of GDP is shown in Figure 3. In terms of the structure of the data financial condition, the scale of industrial digitization has increased year by year, reaching 91.75% in 2020, and the scale of digital industrialization is 8.25%. Also, according to the 2019 China Big Data Industry Development Report, the increase in employment absorbed by the digital economy in Guizhou Province has ranked first in the country for two consecutive years, and the Big Data Industry Development Index of Guizhou Province is 76, ranking 3rd in the country. In recent years, Guizhou has released nearly twenty policies related to Big Data, covering many fields such as integration with the real economy, data management, information infrastructure construction, etc., and Big Data, The proportion of the integration part with the real economy, is as high as 91.2%, which makes Guizhou realize common prosperity.

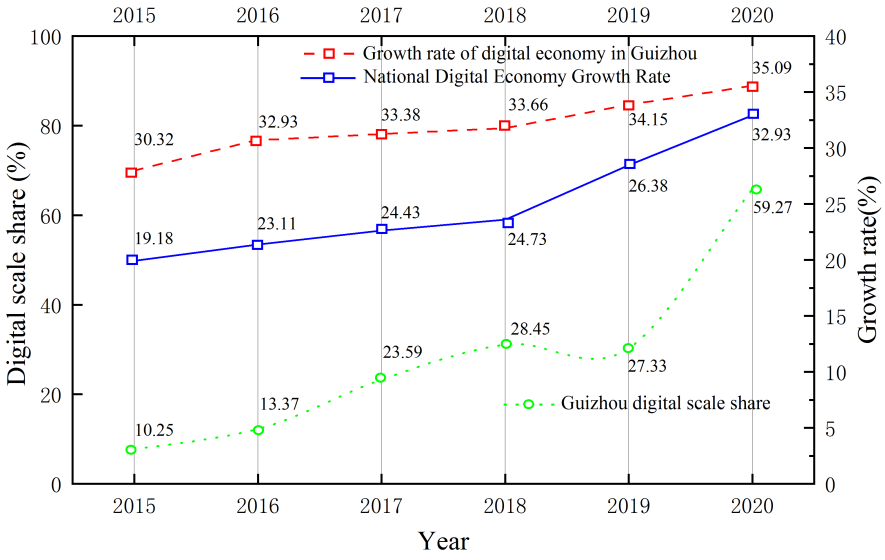

Figure 3. Value added of the digital economy as a percentage of GDP

3.1.2 Global spatial correlation test

This study is based on the geographic distance weight matrix, and the calculation software is Stata, and the global Moran I index and Geary C index are used to verifying the existence of its enclosure correlation for the regional economic development quality of 30 all regions in China information originate 2015 to 2020. Table 3 shows the statistical validation results, indicating that the global Moran I index range of capital situation in different regions progression quality of 30 all regions in China in 2015-2020 is 0~1, and the Geary C index is below 1, indicating that the overall regional economic development quality of China shows positive spatial autocorrelation. There is a tendency for regions with high economic development quality to approach each other and regions with low economic development quality to approach each other. This is because technology from all regions in China with progress with quality as the main goal will flow more easily to neighboring provinces, and also due to the tendency of production factors such as capital and manpower to flow to provinces with progress with quality as the main goal. Under the pressure of competition, all regions in China with progress with quality as the main goal will also be forced to improve the quality of capital situation in different regions progression to retain capital and manpower.

In the time trend analysis, the development trend of the Moran I index is up, and the development trend of the Geary C index is down, both of which pass the 1% significance magnitude test. It indicates that the capital situation in different regions progression quality has a homogeneous influence on the surrounding areas, i.e., the improvement of the capital situation in different regions progression quality of a certain province will lead to the improvement of the capital situation in different regions progression quality of the surrounding provinces. Meanwhile, the characteristics of the Moran I index and Geary C index in terms of time trends indicate that the tendency of China's progress with quality as the main goal aggregation gradually strengthens over time.

Table 3. Global correlation test for high-quality regional economic development

Year	Moran I Inspection			Geary C Inspection		
	Moran I	Z-value	P-value	Geary C	Z-value	P-value
2015	0.087	3.318	0.000	0.838	-3.508	0.001
2016	0.083	3.392	0.000	0.869	-3.209	0.001
2017	0.081	3.203	0.001	0.874	-2.293	0.003
2018	0.071	2.917	0.003	0.883	-2.608	0.005
2019	0.097	3.665	0.000	0.835	-3.172	0.002
2020	0.108	4.138	0.000	0.819	-4.459	0.001

3.1.3 Local spatial correlation test

To conduct an in-depth study of the associated characteristics of each region, this paper uses the calculation software Stata to select the local Moran index from 2015 to 2020 and combines the corresponding Moran scatter plot with the slope of the fitted straight line representing the local Moran I index to reflect the degree of association among the quality of capital situation in different regions progression of a region and its proximity to the region. In this paper, data are selected from 2015 and 2020, and the Moran scatter plots are used to unpack the local enclosure correlation of capital situation in different regions quality development within China, and the test dispatch are shown in Figure 4 and Figure 5. As seen information originate the figures, 30 provinces are selected for their progress with quality as the main goal, scattered in the four quadrants of the Moran scatter diagram. 12 regions were distributed in the first quadrant in 2015, including Shanghai, Beijing, Hebei, Tianjin, Zhejiang, Jiangsu, Shanxi, Henan, Inner Mongolia, Hunan, Shandong and Fujian. This indicates that the quality of capital situation in different regions progression of the above provinces and the quality of capital situation in different regions progression of provinces close to their geographical locations are relatively satisfactory, and there is a clustering phenomenon among regions with progress with quality as the main goal. In 2015, there were 12 regions distributed in the third quadrant, namely Shaanxi, Jilin, Liaoning, Guangxi, Guizhou, Sichuan, Yunnan, Gansu, Xinjiang, Heilongjiang, Ningxia, and Qinghai. It indicates that the quality of capital situation in different regions progression in these provinces is relatively low, and the quality of economic development in provinces that are mainly close to their geography is also low, and there is a gathering of low-quality development and low-quality development. In 2020, there are 15 regions distributed in the first quadrant, Shanghai, Beijing, Hebei, Tianjin, Zhejiang, Jiangsu, Shanxi, Henan, Inner Mongolia, Hunan, Shandong, Fujian, Hubei, Jiangxi, Anhui. in 2020; there are 13 regions distributed in the third quadrant, Shaanxi, Jilin, Liaoning, Guangxi, Guizhou, Sichuan, Yunnan, Gansu, Xinjiang, Heilongjiang, Ningxia, Qinghai, and Hainan. Regarding the spatial and temporal migration of economic development quality in 2015 and 2020, 85.57% of provinces maintained the same type of spatial correlation 2015 and 2020. This indicates that there is good stability of spatial aggregation of progress with quality as the main goal in the economies of most Chinese provinces and provinces close to their geographical distance, and it is more difficult to break this spatial aggregation phenomenon.

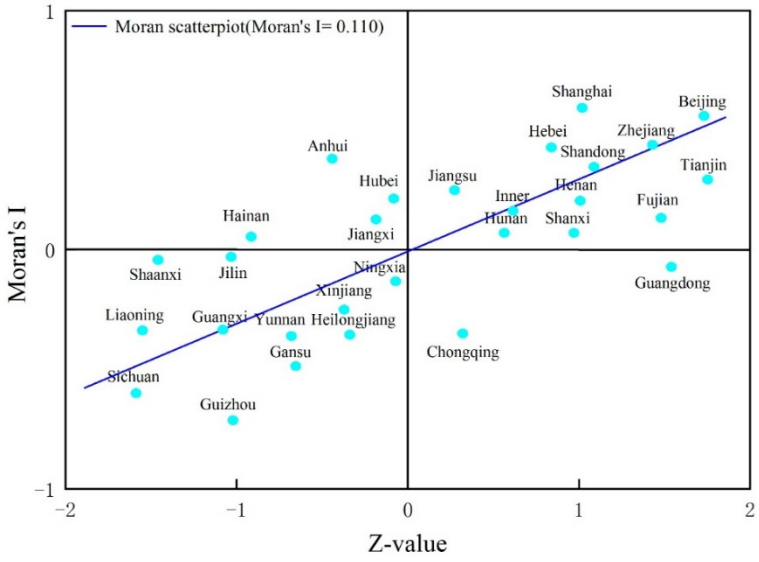

Figure 4. Moran Scatter Plot of China's Regional Economic Development with High Quality, 2015

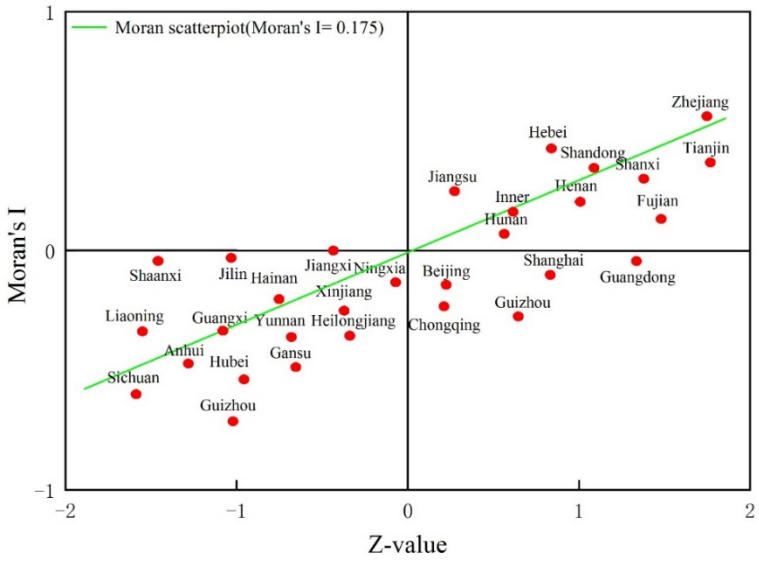

Figure 5. Moran Scatter Plot of China's Regional Economic Development with High Quality, 2020

3.2 Analysis of empirical results

3.2.1 Baseline test results

Table 4 shows the dispatch of the underlying regression analysis based on the enclosure lag model (SLM) and the enclosure error model (SEM). It can be seen that the estimated coefficients of the core explanatory variable mathematical financial condition progression magnitude are important positive at the 1% confidence magnitude, regardless of the regression results of the SLM model without the inclusion of control alternating quantity or the SEM model with the inclusion of control alternating quantity, directive that digital economy progression has a significant effect on the progress with quality as the main goal of the regional financial condition. In addition, from the regression results of the SEM model with the inclusion of control variables, it can be seen that there is no important

correlation among the economic volume of each region (1nGDP) and the regional economic high-quality development, indicating that the pure GDP growth of the region cannot effectively drive the capital situation in different regions progress with quality as the main goal. The degree of financial decentralization also fails the significance test, directive that a single urban expansion construction cannot bring about regional economic quality development. The last control variable, financial accessibility, correlates significantly with progress with quality as the main goal, indicating that improving the capital market to build a good market ecology is important for progress with quality as the main goal, and the regression dispatch of the SLM model and SLM model are consistent with the previous analysis.

Comparing the Eco and IE values of the SLM model and SLM model, the first conclusion of this study can be obtained: both the mathematical financial condition is an important thrust for progress with quality as the main goal of the regional financial condition, and the digital economy can further strengthen its influence on the progress with quality as the main goal of the different regions financial condition through the indirect path of enhancing the vitality of regional innovation and entrepreneurship.

Table 4. Results of baseline regression analysis

Variables	SLM Model	SEM Model	Eco	IE
Dig	0.116	0.123	0.081	0.705
	0.038	0.054	0.147	0.113
IE			0.036	
			0.013	
lnGDP		0.003		
		0.167		
Fis		-0.178		
		0.245		
Fin		0.156		
		0.023		
Constant term	0.179	0.838	0.657	4.281
	0.045	4.035	0.238	2.384
Control variables	NO	YES	YES	YES
Province fixed	YES	YES	YES	YES
Time fixed	YES	YES	YES	YES
Sample size	400	400	400	400
R^2	0.398	0.352	0.166	0.597

3.2.2 Non-linear affect test results

According to the previous acknowledge unpack, the mathematical financial condition has the characteristics of network effect and gradually increasing network effect. In order to verify whether coordinated action mathematical financial condition development on the quality of regional economic development is non-linear due to the characteristics of the mathematical financial condition, this research uses the threshold coordinated action model empirically for regression. Before conducting the threshold effect test, the threshold existence test should be conducted first according to the self-help method. After repeated put-back sampling by the self-help method, it is determined that the digital economy development and innovation and entrepreneurship vitality indices pass the double threshold test significantly at the 1% confidence level. However, both failed the three-threshold case

test then the number of thresholds in equation (13) was finally set to two based on the results of the self-help method test. Finally, due to multiple instrumental variables in this model, an over-constrained Sargon test is required to ensure the accuracy of the equation regression estimation dispatch. Table 5 shows the regression dispatch of the two-threshold case after setting the number of thresholds and the dispatch of the Sargon test. The enclosure Durbin model (SDM) regression results show that coordinated action mathematical financial condition development on capital situation in different regions quality progression is divided into three stages. Only when the magnitude of mathematical financial condition progression reaches the first threshold reading does it promote regional economic quality development. The SDM model Dig regression results also show similar results to the IE regression results, and the innovation and entrepreneurship vitality also shows a non-linear and continuous enhancement of the regional economic quality development. Finally, it can be seen from the Sargon test dispatch that the Sargon test coefficient values are not significant, the model estimation results are more accurate, and the original hypothesis cannot be rejected. The mathematical financial condition development, create and entrepreneurship vitality and progress with quality as the main goal are characterized by each other's angles, forming a coupled system with benign positive interaction.

Table 5. Test results of the threshold effect of the digital economy on the regional economy

Variables		SDM Adjustment variables	
		Dig	IE
Threshold value	q_1	0.153	1.583
	q_2	0.395	3.772
$Digg I(Th \le q_1)$		0.074	0.139
		0.055	0.081
$Digg I(q_1 \le Th \le q_2)$		0.185	0.137
		0.031	0.025
$Digg I(Th \ge q_2)$		0.283	0.187
		0.123	0.045
Control variables		YES	YES
Sample size		400	400
R^2		0.255	0.271
		22.415	20.553
Sargon test		0.308	0.163

3.2.3 Results of spatial effect test

According to the principle of enclosure effect test, a spatial autocorrelation test of variables is required before conducting enclosure econometric regression analysis, as shown in Table 6. The Moran I index method calculated the enclosure coordinated action autocorrelation characteristics of mathematical financial condition progression level and economic progress with quality as the main goal magnitude for each year information originate 2010 to 2021. The values of Moran index for digital economy progression magnitude and economic progress with quality as the main goal magnitude in 2010-2021 under the weight of geographic distance are positive, and all are important at a 1% magnitude. It indicates that there is a enclosure clustering phenomenon among the magnitude of mathematical financial condition progression and the magnitude of progress with quality as the main goal in 30 provinces of China information originate 2010 to 2021, and the two have important positive enclosure

correlation, and the enclosure correlation between the two increases year by year. The dispatch indicate that the digital economy progression and regional progress with quality as the main goal meet the conditions of further testing spatial autoregression using the spatial Durbin model.

Table 6. Spatial global auto-correlation characteristics of 30 provinces in China, 2010-2021

Year		2010	2011	2012	2013	2014	2015
The level of quality economic development	Moran I	0.925	0.893	0.851	0.763	0.701	0.683
	Z-value	17.772	16.581	16.332	15.287	14.711	14.528
Digital economy development level	Moran I	0.325	0.339	0.347	0.397	0.413	0.446
	Z-value	2.334	2.303	2.681	2.935	3.031	3.588
Year		2016	2017	2018	2019	2020	2021
The level of quality economic development	Moran I	0.625	0.608	0.583	0.561	0.523	0.501
	Z-value	14.439	13.582	13.102	12.661	12.241	12.031
Digital economy development level	Moran I	0.457	0.459	0.491	0.551	0.583	0.593
	Z-value	3.821	3.854	3.885	3.986	4.103	4.249

In order to avoid the influence of a large amount of interaction data in the neighboring regions on the spatial regression results, this study decomposes the coordinated action of mathematical financial condition development on capital situation in different regions quality progression in the partial differential. Table 7 shows the regression dispatch of the direct, indirect and total coordinated action of the decomposed mathematical financial condition development level on the capital situation in different regions quality progression level. The two columns of SDM model results give the enclosure regression dispatch of the level of mathematical economy development on the magnitude of regional economic quality progression under the geographic distance weight and the adjacency matrix weight matrix, respectively. The two columns of the SAR model give the regression dispatch of the enclosure lag model with time and space fixed effects using data with a one-year lag of digital economic development as the core explanatory variables while considering coordinated action mathematical economic development on capital situation in different regions progress with quality as the main goal with a possible time lag.

Whether evaluated using the SDM model or the SAR model, the coefficients of the spatial autoregressive interaction terms of the direct, indirect and total coordinated action in the regression results of both models are important positive at the 1% magnitude. This indicates that digital economy development has a positive impact on the regional economic quality progression within the region and can contribute to the regional economic quality development over time. At the same time, the positive impact of mathematical financial condition development in the region can also radiate to the neighboring regions to help the neighboring regions' quality economic development and drive the neighboring regions' common prosperity. In other words, the development of the mathematical financial condition not only has a direct coordinated action regional economic progression but also has a enclosure spillover coordinated action on the nearby regions.

Table 7. Test results of spatial effects affecting the quality of regional economic development

Model Classification	SDM model		SAR model	
Weight matrix type	Geographical distance	Adjacency	Geographical distance	Adjacency
ρ	0.391	0.358	0.335	0.295
	0.0319	0.0086	0.0315	0.0236
Dig	0.124	0.285	0.239	0.108
	0.0925	0.0335	0.0293	0.0105
W*Dig	0.0926	0.1159		
	0.0850	0.0293		
Direct effect	0.275	0.253	0.219	0.198
	0.0293	0.0403	0.1033	0.0082
Indirect effect	0.113	0.098	0.105	0.093
	0.0431	0.235	0.015	0.008
Total effect	0.0453	0.235	0.013	0.273
	0.676	0.486	0.403	0.381
Control variables	YES	YES	YES	YES
City fixed	YES	YES	YES	YES
Time fixed	YES	YES	YES	YES
Log-L	-587.425	-723.921	-715.703	-783.256
R^2	0.185	0.152	0.203	0.178

4 Conclusion

This paper combines theoretical and empirical analysis to obtain a comprehensive level index of progress with quality as the main goal in counties by constructing a comprehensive index evaluation system of progress with quality as the main goal level in Chinese provinces. Moreover, using the spatial face-plate pattern of 30 provinces in China information originate 2011-2021, the enclosure face-plate pattern is used to research the influence condition among digital finance and capital situation in different regions progress with quality as the main goal. The following conclusions were finally obtained:

1) The quality of China's capital situation in different regions progression shows positive spatial autocorrelation characteristics. This spatial autocorrelation is in line with the actual situation of capital situation in different regions progression, and the progress with quality as the main goal in a certain province or city will certainly affect the neighboring provinces and cities through the enclosure spillover coordinated action of production requirements, which in turn leads to the improvement of the quality of capital situation in different regions development in the neighboring provinces and cities, thus realizing the purpose of common prosperity.

2) Digital finance has an obvious role in promoting the progress with quality as the main goal of the different regions financial condition, which is also consistent with the theoretical basis discussed in the previous article. The improvement of financial development and the further integration of treasury with the real financial condition will promote the allocation of capital factors more efficiently, which will better promote the transformation and upgrading of the real financial condition, drive the improvement of the quality of capital situation in different

regions progression, and promote the development of the economy in the direction of healthy and quality as the main objective.

3) The values of Moran index for the level of mathematical financial condition progression and the level of progress with quality as the main goal under the weight of geographical distance from 2010 to 2021 are both positive and both are important at the 1% magnitude. It indicates that there is a enclosure clustering phenomenon among the magnitude of mathematical financial condition progression and the magnitude of progress with quality as the main goal in 30 provinces of China from 2010 to 2021, and the two have important positive enclosure correlation, and the enclosure correlation between the two increases year by year.

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