

Research on the Construction of an Evaluation System of Commercial Banks' Service for Rural Revitalization under Common Prosperity

-- Analysis Based on Entropy Weight TOPSIS Model

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Abstract. In the new stage of development, commercial banks actively play the role of high-quality financial services and contribute a vital force to revitalizing villages and the modernization of the Chinese style. This paper selects three dimensions of financial performance, serviceability for agriculture, rural areas, and farmers, and digital inclusion ability to construct an evaluation index system of commercial banks' service for rural revitalization, and uses the entropy weight TOPSIS model to measure its service level for rural regeneration. To simulate the evaluation process, this paper selects nine commercial banks as samples for measurement and data analysis. The study is helpful in comprehensively assessing the level of commercial banks' services for rural revitalization and provides the theoretical basis and data reference for bank managers, investors, and government departments.

Keywords: Rural revitalization; Commercial banks; Evaluation system; Chinese modernization; Entropy weight TOPSIS model.

1. Introduction

Shared prosperity is an essential requirement of socialism and an important feature of Chinese modernization. Rural revitalization is one of the major policy lines for steady growth in 2022 and is also an essential link in achieving the long-term goal of shared prosperity and the short-term goal of continued growth in the country. However, there is still an imbalance between the supply and demand of agricultural products in China. The prominent contradiction between urban and rural dual structure and the increase of unstable international factors have a profound and lasting impact on agriculture, rural areas, and farmers. The central government's document no 1 of 2021 pointed out that it "supports the establishment of a rural revitalization fund in a market-oriented way, leverages financial capital and social forces to participate, and focuses on supporting the development of rural industries." Therefore, the rural revitalization cannot be separated from the solid financial support. It is urgently required to promote more financial resources to "agriculture, countryside, and farmers."

Strong profitability and good credit asset quality are the foundation and guarantee for commercial banks to help and benefit farmers. To serve rural revitalization, retail banks need to balance the risks and benefits of banks, create a benign ecological environment for sustainable development, and realize two-way promotion and dynamic stability of economic and social benefits. The story of digital finance provides commercial banks with opportunities for technological empowerment, innovation, and transformation and helps to explore new financial services for agriculture, rural areas, and farmers. Digital finance has a profound impact on the organization and operation of banks with its digital and intelligent characteristics. On the one hand, the extensive use of high-tech represented by big data and artificial intelligence has pushed forward the innovation of the service model of traditional business, opened up online channels of financial services, and effectively improved the convenience and accessibility of customers in remote areas. On the other hand, digital finance breaks down the data barrier and realizes the interconnection of various businesses, which helps to accurately locate the customer needs of rural farmers and small and micro enterprises and provides technical support and information guarantee for rural revitalization.

2. Literature Review

There is much literature about the construction and analysis of evaluation index systems for commercial banks' operating performance and rural revitalization efficiency, but only some types of research combine the two. As an essential financial force for rural revitalization, commercial banks play a pivotal role in serving agriculture, the countryside, and farmers and revitalizing the industry.

This paper analyzes the existing literature on commercial banks operating performance and rural revitalization evaluation.

For the construction of a bank evaluation index, Ye Chunming et al. (2004), Yang Shuping and Zhao Xiujuan (2009) extended from a financial index to a non-financial index and used the balanced scorecard to construct a commercial bank performance evaluation system from four aspects: finance, customers, internal operation and learning and growth. From a worldwide perspective, the camel (capital adequacy, assets quality, management efficiency, early ability, and liquidity management) model is widely used in the evaluation of bank financial performance (Sangmi and Nazir,2010; Misra, D. S., & Aspal, 2012; Slam, M. Z., & R. M, S,2018). On the other hand, academic circles often select appropriate input data and output data and use Data Envelopment Analysis (DEA) to study bank operating efficiency (Sukmana, R et al.,2020; Cvetkoska, V., & Ćiković, K. F.,2020, Thaker, K.et al.,2021). For example, Keyur T Hacker et al. (2021) uses bank labor, physical assets, and loanable capital as inputs and prepayments, investments, and net interest income as outputs.

For the construction of the rural revitalization index system, scholars have carried out rich research around the "two cross principles" of the new rural construction: "production development, comfortable life, civilized rural style, clean and tidy village, democratic management" (Li Shude and Li Jin, 2006; Zhang Lei, 2009; Wang Yanqi et al., 2009). Some studies design secondary indicators concerning the rural revitalization strategy of "prosperous industry, ecological livable, civilized rural style, effective governance, and rich life" (Zhang Ting et al., 2018; Wei Jiahua and Lian Yi, 2018; Yan Zhou and Wu Fangwei, 2019; Mao Jinhua and Wang Lintao, 2020). In the context of the world's third scientific and technological revolution, the study focuses on the potential impact of the digital process on rural development from the perspectives of data infrastructure quality, workers, food production, etc. (Salemink, K et al.,2017; Rotz, S et al.2019). Financial systemic risk is also inextricably linked to the rise and fall of rural areas (Edelman, M,2021). Rao, CJ & Gao, Y(2022) Establish an evaluation index system for rural revitalization and urban-rural integration from three aspects: spatial integration, social integration, and human settlements integration.

3. Constructing the Evaluation System of Commercial Banks Serving Rural Revitalization

3.1 Evaluation principles

1. Comprehensive. When designing the evaluation system of commercial banks' services for rural revitalization, we should fully consider the financial performance of banks, the development of digital finance, and the support of rural revitalization, and strive to fully reflect the effectiveness and potential of commercial banks' services for rural revival.
2. Scientific. The establishment of the index system should objectively and scientifically reflect the level of banking services for rural revitalization. This paper selects the corresponding indicators based on the existing research and the new stage of rural renewal in China. The index system has both absolute and relative indexes; It not only reflects the performance level of banks but also reflects the actual situation of rural revitalization in inclusive finance.
3. Quantification. Quantitative indicators can measure the service level of rural revitalization more fairly and objectively, avoiding the subjectivity of artificial estimation. The selection of quantitative indicators should fully consider data availability to sustain the indicator system.

4. Practicality. The turbulent changes in the world and the increase in unstable factors have, to a certain extent, hindered the consolidation of the achievements in the crucial fight against poverty and the process of agricultural modernization. The evaluation system of commercial banks' service to rural revitalization should be based on the needs of the development of the times, serve the overall construction of rural revitalization and realize the ultimate goal of high-quality rural development. The evaluation system of this study combines the financial nature of banks with the common prosperity of socialism and has significant practical value.

3.2 The selection of evaluation indicators

Table 1 constructs an evaluation system for the rural revitalization of banking services, which consists of three first-level indicators, nine second-level indicators, and thirty-three third-level indicators.

Financial performance evaluation dimension.

The level of financial performance reflects not only the operating conditions of the service-oriented financial institutions themselves but also the ability and future potential of the banking villages to revitalize. In this paper, the dimension of financial performance evaluation selects four secondary indicators, including profitability, growth ability, safety, and liquidity.

Profitability: Level 2 Indicators Profitability selects three level 3 indicators, namely, return on net assets, cost-to-income ratio, and net interest margin. ROE is the ratio of the increase in the bank's net assets in the current period to the total net assets in the previous period. The higher the index, the faster the bank's capital scale expansion. Cost-to-revenue ratio is the ratio of operating expenses less operating taxes and surcharges to operating income. The indicator is a reverse indicator, and the higher the value, the weaker the ability to generate revenue per unit cost. Net interest margin is the ratio of the difference between operating income and operating expenses to the average interest-bearing asset balance, which reflects the profitability and risk-pricing capabilities of the banks' interest-bearing assets.

Growth ability: Level 2 Indicators Growth ability selects three level 3 indicators: growth rate of total assets, operating income growth rate, and net profit growth rate. Total assets growth rate refers to the ratio of the increase in net assets of the current period to the total net assets of the previous period, which reflects the expansion speed of the capital scale of the enterprise. The growth rate of operating income is the ratio of the growth of the operating income of the enterprise to the total operating income of the previous year, which reflects the increase or decrease of the operating income of the enterprise. The net profit growth rate represents the growth rate of the enterprise's current net profit compared with the previous period's net profit, which indicates that the higher the target value, the stronger the enterprise's profitability.

Security: Level 2 Indicators Security selects four level 3 indicators, namely, non-performing loan rate, capital adequacy ratio, capital leverage ratio, and provision coverage rate. Non-performing loan rate refers to the proportion of non-performing loans of financial institutions in the total loan balance. The higher this indicator is, the larger the proportion of loans that banks may not be able to recover in the entire loan. Capital adequacy ratio is the ratio of the difference between the total capital less the corresponding capital deductions and the total weighted risk assets, which reflects the ability of the enterprise to resist risks. The gearing ratio is the ratio of net core capital in the balance sheet to the difference between on-balance sheet and off-balance sheet exposures and core capital deductions, the greater the indicator, the higher the risk. Provision coverage is the loan loss allowance balance ratio to the non-performing loan balance. The higher this indicator is, the stronger the ability to resist risks.

Liquidity: Level 2 Indicator Liquidity selects three level 3 indicators, namely, loan-to-deposit ratio, liquidity ratio, and reserve ratio. Loan-to-deposit ratio is the ratio of each loan balance to each deposit balance, which reflects the degree of occupation of deposit funds. The higher the bank loan-to-deposit ratio, the lower the liquidity of bank funds and the greater the risk. The liquidity ratio is the ratio of current assets to current liabilities, which is a measure of the financial safety of

commercial banks and short-term solvency key indicators. The reserve ratio is the ratio of the reserve balance to each deposit balance, which helps to limit the excessive expansion of bank loans and ensure the normal payment capacity of the banking system.

3.2.1 Evaluation dimension of serviceability for agriculture, countryside, and farmers.

Commercial banks should actively assume social responsibilities, continuously narrow the service radius, and infiltrate financial services into all aspects of farmers' lives. The evaluation system of this study pays attention to both service breadth and service depth. It pays attention to both "quantity" and "quality" and pays attention to the mission and responsibility of commercial banks to effectively undertake the rural revitalization strategy. In this paper, three three-level indicators, namely social contribution, service penetration, and service effect, are selected for the evaluation dimension of serviceability for agriculture, rural areas, and farmers, with 11 three-level indicators in total.

Social contribution: Level 2 Indicator Social contribution selects five three-level indicators, namely, employment contribution, tax contribution, public welfare and charity, green credit support, and whether to publish the annual ESG report. Commercial banks play an essential role in supporting employment, increasing tax revenue, helping low carbon, and other dimensions. Employment contribution is measured by the number of bank employees; The tax contribution is measured by the income tax charge paid; the Public welfare charity is the amount of public welfare charity expenditure in the current period; The green credit support level is calculated based on the current bank green credit balance. In addition, this article focuses on whether banks issue annual ESG reports. At present, China has yet to force all listed companies to disclose ESG social responsibility reports. The annual ESG report issued by the enterprise reflects a certain extent, the importance attached to its social responsibility and the fulfillment of its social responsibility. The bank's social responsibility is closely related to poverty alleviation and assistance to agriculture, rural areas, and farmers. Therefore, the index has particular evaluation significance.

Service penetration: Level 2 Indicator Service Penetration Two three-level indicators are selected: the layout of village banks and the layout of financial institutions' outlets. Banks are gradually popularizing the "grid" management model and sinking their work locations. The bank's village bank layout and the financial institution network layout are represented by the number of village banks and the number of financial institution network points belonging to the bank, respectively. The higher the number, the higher the convenience and accessibility of banking services.

Service utility: Level 2 Indicators Service Utility selects four three-level indicators: agriculture-related loans, inclusive small and microloans, whether to issue special financial bonds for agriculture, rural areas, and farmers, and whether to set up special financial service institutions for agriculture, rural areas, and farmers. Agriculture-related loans and inclusive small and microloans are represented by the bank's current balance of agriculture-related loans and inclusive small and microloans, respectively. Credit fund support is one of the important measures to revitalize rural areas. It is an important way to alleviate the problems of difficult, expensive, and slow financing in agricultural and rural areas. Special financial bonds for agriculture, rural areas, and farmers refer to the financial bonds that raise funds and are specially used to issue loans related to agriculture. Whether the bonds are issued or not, to a certain extent, reflects the willingness and level of banks to respond to national policies and serve the rural economy actively. If the bank issues special bonds in the current period, the index score is defined as "1". Otherwise, it is defined as "0". In order to better serve agriculture, rural areas, and farmers, some banks have set up particular financial services institutions for agriculture, rural areas, and farmers in their organizational structure. In this study, if the specialized agency is established in the current period, the index score is defined as "1"; otherwise, it is defined as "0".

3.2.2 Evaluation dimension of digital inclusion ability.

In this paper, the evaluation dimension of digital inclusion ability selects two three-level indicators, namely, regional digital inclusion degree and bank digital inclusion degree, with eight three-level indicators in total.

Regional digital inclusion degree: Level 2 Indicators Regional digital inclusion degree selects three level 3 indicators: digital finance coverage, digital finance usage depth, and digital degree of inclusive finance. The development of the regional digital welfare degree reflects the resource allocation of the financial service system of banks and the function of benefiting the three rural areas. The "Peking University Digital inclusive finance Index" includes thirty three indicators in three categories, namely, the breadth of digital finance coverage, the depth of use of digital finance, and the degree of digitalization in inclusive finance. Since the index was released, it has had a very great impact in academic and industry circles. This paper refers to the "Peking University Digital inclusive finance Index" and takes three major categories of inclusive finance Index where banks are headquartered as the index scores.

Banking digital inclusion: Level 2 Indicators Banking digital inclusion Self-help banks were selected as Level 3 indicators. Considering the dispersion of rural residents and the availability of data, this paper mainly measures the degree of digital inclusion of banks from the payment channels. The higher the value, the higher the degree of digital inclusion of banks.

Table 1 Evaluation System for Rural Revitalization of Banking Services

class a index	secondary indicators	level 3 indicators	indicator quantification	indicator type
financial affairs performance (f)	profitability (f1)	rate of return on common stockholders' equity (f11)	net profit/owners' equity	positive indicator (%)
		cost-to-revenue ratio<45% (f12)	(operating expenses-operating, taxes, and surcharges)/operating income	reverse indicator (%)
		net interest margin (f13)	(interest income-interest expense)/average interest-bearing asset balance	positive indicator (%)
	ability to grow (f2)	total assets growth rate (f21)	increase in total assets for the current period/total assets for the previous period	positive indicator (%)
		operating income growth rate (f22)	growth in operating income for the current period/operating income of the previous period	positive indicator (%)
		net profit growth rate (f23)	profit growth for the current period/profit for the previous period	positive indicator (%)
	security (f3)	non-performing loan rate≤ 5% (f31)	non-performing loan balance/various loan balances	reverse indicator (%)
		capital adequacy ratio (f32)	(total capital-corresponding capital deduction)/risk-weighted assets	positive indicator (%)
		capital leverage ratio≥ 4% (f33)	net core capital/(on-and off-balance-sheet exposures-core capital deductions)	positive indicator (%)
		provision coverage (f34)	loan loss allowance balance/npl loan balance	positive indicator (%)

	liquidity (f4)	loan to deposit ratio about 75% (f41)	each loan balance/each deposit balance	moderate index (%)
		liquidity ratio ≥ 25% (f42)	current assets/current liabilities	positive indicator (%)
		cash reserve ratio (f43)	reserve balance/balance of each deposit	positive indicator (%)
serviceability for agriculture, countryside, and farmers (s)	social contribution (s1)	employment contribution (s11)	number of employees	positive indicator (person)
		tax contribution (s12)	income tax expense	positive indicator (billion yuan)
		charity (s13)	amount of current public welfare and charity expenditures	positive indicator (ten thousand yuan)
		green credit support (s14)	green credit balance	positive indicator (billion yuan)
		is the annual esg report published (s15)	the current issue is defined as 1, on the contrary, 0	positive indicator (0-1 variable)
	service osmolality (s2)	village bank layout (s21)	belonging to a bank number of village banks	positive indicator (%)
		network layout of financial institutions (s22)	affiliated with commercial banks financial institution network points	positive indicator (units)
	service utility degree (s3)	agricultural loan (s31)	agricultural loan balance	positive indicator (billion yuan)
		inclusive small and microloans (s32)	balance of inclusive small and microloans	positive indicator (%)
		whether to issue special financial bonds for agriculture, countryside, and farmers (s33)	the current issue is defined as 1, on the contrary, 0	positive indicator (0-1 variable)
		whether to set up a special financial service agency for agriculture, rural areas, and farmers (s34)	current establishment is defined as 1, on the contrary, 0	positive indicator (0-1 variable)
	regional digital	digital finance coverage (d11)	for the digital financial coverage index of the bank location, refer to the digital inclusive finance index	positive indicator (index)

digital inclusion (d)	inclusion (d1)		released by peking university.	
		depth of use of digital finance (d12)	the digital financial usage depth index for the locations of banks is based on the digital inclusive finance index published by peking university.	positive indicator (index)
	degree of digitalization in inclusive finance (d13)	for the digitalization degree of digital finance at the location of the bank, refer to peking university development bank. cloth's digital inclusive finance index	positive indicator (index)	
	bank figures degree of inclusion (d2)	self-help bank (d21)	number of self-service banks	positive indicator (units)

Source: Bank Annual Report, Corporate official website, Corporate Social Responsibility Report

3.3 the selection of evaluation methods and model building

In this paper, the entropy method is used to objectively weigh the indicators when evaluating the revitalization of banking service villages, which can avoid subjective errors to a certain extent. However, the entropy method is difficult to solve the problem of index weight error caused by a large degree of numerical dispersion of an index. Therefore, based on the entropy method, this paper uses the TOPSIS method to correct and more accurately evaluate the level of commercial banks' service to rural revitalization.

3.3.1 Establish the index weight by the entropy method

- (1) The original data matrix: $X = (x)_{ij_{m \times n}}$ ($1 \leq i \leq m, 1 \leq j \leq n$) where X_{ij} is the j -th index of the i -th sample.
- (2) The extreme value method is used to standardize the data. In order to eliminate the impact of dimensional differences and magnitude differences, heterogeneity indicators need to be homogenized and standardized. This paper uses the method of Zhu et al. (2015) for reference and the extreme method to standardize the data.

Positive indicator: $X'_{ij} = \frac{X_{ij} - X_{min}}{X_{max} - X_{min}}$ ($i=1,2,\dots,m; J=1,2,\dots,n$); Negative indicators: $X'_{ij} = \frac{X_{max} - X_{ij}}{X_{max} - X_{min}}$ ($i=1,2,\dots,m; j=1,2,\dots,n$).

- (3) Calculate the specific gravity matrix of the index system. $P_{ij} = \frac{X'_{ij}}{\sum_{i=1}^n X'_{ij}}$ ($j=1,2,\dots,n$), where $0 \leq P_{ij} \leq 1$.
- (4) The entropy weight of each index is calculated. $e_j = -k \sum_{i=1}^m (p_{ij} \ln p_{ij})$, $i=1,2,\dots,m$, where $k = \frac{1}{\ln m}$, $0 \leq e_j \leq 1$.
- (5) The coefficient of variance is calculated. $g_j = 1 - e_j$ ($j=1,2,\dots,n$).
- (6) Calculate the weights of the indicators. $w_j = \frac{g_j}{\sum_{j=1}^n g_j}$ ($j=1,2,\dots,n$), where $\sum_{j=1}^n w_j = 1$.
- (7) Calculate the total score of each indicator. $F_i = \sum_{j=1}^n w_j X'_{ij}$, where $0 \leq F_i \leq 1$.

3.3.2 Revise by TOPSIS method

The ranking method based on the proximity of the evaluation objects to the idealized objects is a distance-comprehensive evaluation method.

- (1) The weighted normalized matrix Z is calculated. $Z = (z_{ij})_{n \times m} = (P_{ij} * w_j)$, where $1 \leq i \leq n, 1 \leq j \leq m$.

(2) Positive and negative ideal solutions are determined. A positive ideal solution means that each indicator reaches the best value in the sample, and a negative ideal solution means that each indicator is the worst value in the sample.

$$Z^+ = (\max\{z_{11}, z_{21}, \dots, z_{n1}\}, \max\{z_{12}, z_{22}, \dots, z_{n2}\}, \dots, \max\{z_{1m}, z_{2m}, \dots, z_{nm}\})$$

$$Z^- = (\min\{z_{11}, z_{21}, \dots, z_{n1}\}, \min\{z_{12}, z_{22}, \dots, z_{n2}\}, \dots, \min\{z_{1m}, z_{2m}, \dots, z_{nm}\})$$

(3) Calculate the distance between each sample and the positive and negative ideal solutions. $D_i^+ =$

$$\sqrt{\sum_{j=1}^m (z_{ij} - z_j^+)^2}, D_i^- = \sqrt{\sum_{j=1}^m (z_{ij} - z_j^-)^2}, (i=1, \dots, n).$$

(4) Calculating the closeness degree between each evaluation object and the optimal scheme.

Where the value range is $[0, 1]$, closer to 1 indicates a better sample score, and $C_i = \frac{D_i^-}{D_i^+ + D_i^-}$.

4. Simulation Results and Analysis on the Revitalization Level of Banking Service Villages

In this paper, nine banks are selected as research samples for model simulation, including Shanghai Agricultural Bank, Zhangjiagang Bank, Chongqing Agricultural Bank, Wuxi Agricultural Bank, Jiangsu Agricultural Bank, Qingnong Bank, Jiangyin Bank, Changshu Bank, and Zijin Agricultural Bank. Data sources are mainly the CSMAR database and manual collection of the bank's official website, corporate annual reports, and corporate social responsibility reports.

4.1 Comprehensive Evaluation on the Service Level of Rural Revitalization in Banks

4.1.1 Treat Same Trend and Dimension Problem

The non-performing loan rate and cost-income ratio in the evaluation index system are reverse indicators, which need to be treated with the same trend. The deposit-loan ratio is a moderate indicator, and the rest are positive indicators that do not need to be adjusted. In order to eliminate the influence of different index units, dimensionalization is carried out. In this paper, the extremum treatment is adopted to unify all evaluation indexes into the same type.

4.1.2 Calculate Weight by Entropy Method

The evaluation of the index system first needs to determine the weight. At present, the standard weighting methods in our country are the subjective weighting method and the objective weighting method. In this paper, the entropy method in the objective weighting method is adopted for weighting to reduce the emotional influence of the weight and make the evaluation score more scientific and reasonable (Wang Jun et al., 2013). The greater the importance of the indicators, the greater the impact on the service level of the bank and village revitalization. As can be seen from Table 2, the service capability for agriculture, rural areas, and farmers (S) has the most significant impact on the bank service level, reaching 68.06%. This indicator is the most intuitive dimension to measure the commercial bank's service for rural revitalization, and the high weight has strong rationality. Whether to issue the annual ESG report (15.824%), whether to issue special bonds for agriculture, rural areas, and farmers (15.765%), and the distribution of financial institution outlets are the key elements of the service level for agriculture, rural areas and farmers (6.503%), which are also ranked in the top three out of twenty-nine indicators, respectively reflecting the social contribution, service effectiveness and service penetration of banks. Financial performance (F) is of great significance to ensure the sustainability of the bank's support to farmers, accounting for 23.02%. The weight difference of each indicator is negligible, among which the cost-income ratio (3.201%) and the provision rate (2.341%) have a more significant impact. Digital inclusion capability (D) represents the potential and future development trend of the bank's three rural service capabilities, accounting for 8.74%.

Table 2 Weights of Comprehensive Evaluation Indicators

index	information entropy value e	information utility valued	weight (%)	rank	index	information entropy value e	information utility valued	weight (%)	rank
rate of return on common stockholders' equity	0.944	0.056	0.886	28	charity	0.786	0.214	3.382	10
cost-to-revenue ratio	0.798	0.202	3.201	12	green credit support	0.73	0.27	4.278	seven
net interest margin	0.88	0.12	1.901	18	publish annual ESG report	0	one	15.824	one
total assets growth rate	0.935	0.065	1.033	27	village bank layout	0.729	0.271	4.282	six
operating income growth rate	0.908	0.092	1.454	22	network layout of financial institutions	0.589	0.411	6.503	three
net profit growth rate	0.796	0.204	3.223	15	agricultural loan	0.742	0.258	4.090	eight
non-performing loan rate	0.921	0.079	1.257	23	inclusive small and microloans	0.876	0.124	1.963	17
capital adequacy ratio	0.905	0.095	1.508	21	whether to issue agriculture, countryside, and farmers special financial bonds	0.004	0.996	15.765	2
capital leverage ratio	0.922	0.078	1.232	24	whether to set up "three rural" funds specialized agency for financial services	0.946	0.054	0.847	29
provision coverage	0.857	0.143	2.259	16	service capabilities for agriculture, rural areas, and farmers (s)			68.06%	
loan to deposit ratio	0.924	0.076	1.200	25	digital finance coverage	0.833	0.167	2.649	13
liquidity ratio	0.892	0.108	1.703	19	depth of use of digital finance	0.782	0.218	3.448	nine
cash reserve ratio	0.852	0.148	2.341	14	inclusive financing degree of digitalization	0.899	0.101	1.602	20
financial performance			23.20%		self-help bank	0.934	0.066	1.041	28
employment	0.679	0.321	5.082	five	digital inclusion (d)			8.74%	

contribution						
tax contribution	0.618	0.382	6.048	four		

4.2 Calculate and analyze results of the TOPSIS evaluation method

From Table 4, regarding financial performance, Jiangyin Bank ranked highest with a score of 0.5752, followed by Changshu Bank, Zhangjiagang Bank, and Shanghai Agricultural Bank. There is little difference in scores among the three banks. The last three banks were Chongqing Agricultural Bank, Qingnong Bank, and Sunong Bank, with scores of 0.4217, 0.3783, and 0.3679, respectively.

In terms of service capabilities for agriculture, rural areas, and farmers, Changshu Bank still ranks first with a score of 0.5885. The second is Chongqing Agricultural Commercial Bank and Shanghai Agricultural Commercial Bank, with scores of 0.4459 and 0.3999, respectively. There is a particular gap. The difference between the fourth and seventh place (Qingnong Commercial Bank, Zijin Commercial Bank, Jiangyin Bank, and Zhangjiagang) was insignificant, with a difference of only 0.05. Su Nong's firm could have performed better in the serviceability for agriculture, countryside, and farmers, and Wuxi Nong's firm is at the bottom.

In terms of digital inclusion ability, Zijin Agricultural Firm performed surprisingly with a score of 0.8676, followed by Shanghai Agricultural Firm with a score of 0.7762, which was much higher than that of the third Qingnong Firm with a score of 0.4681. This is mainly due to the difference in digital infrastructure construction caused by geographical location. Nanjing and Shanghai, and other places have a large radiation driving capacity to the surrounding counties and villages. The remaining six banks showed little difference in performance, with Jiangyin having the lowest score.

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Table 3 Evaluation Results of Bank's Service Capability for Rural Revitalization

bank abbreviation	financial performance score	rank	service ability score for agriculture, countryside, and farmers	sort	digital inclusion score	sort
Shanghai Agriculture Firm	0.4738	four	0.3999	three	0.7762	2
Yunong Commercial Bank	0.4217	seven	0.4459	2	0.2996	five
Zhangjiagan g Bank	0.4800	three	0.1237	seven	0.1682	eight
Wuxi Agricultural Firm	0.4302	six	0.0908	nine	0.2583	six
Song Comptoir	0.3679	nine	0.1152	eight	0.3016	four
Qingming Commercial Bank	0.3783	eight	0.1749	four	0.4681	three
Jiangyin Bank	0.5752	one	0.1564	six	0.1529	nine

Changshu Bank	0.5301	2	0.5885	one	0.1747	seven
Zijin Agricultural Firm	0.4457	five	0.1602	five	0.8676	one

As can be seen from Table 4, Changshu Bank has the highest comprehensive evaluation index for rural revitalization, which is 0.5301. Although the performance of Changshu Bank in terms of digital inclusion ability could be better, its financial performance is considerable. At the same time, Changshu Bank also actively serves agriculture, countryside and farmers, undertakes social responsibilities, and ranks first among the nine banks in terms of the overall level of service for rural revitalization. The second was Chongqing Agricultural Commercial Bank and Shanghai Agricultural Commercial Bank, which were 0.4767 and 0.4351, respectively. Yunong Commercial Bank is active in serving agriculture, the countryside, and farmers, but it needs to pay attention to its own financial ability and development potential to realize the sustainable development of serving rural revitalization. Shanghai's commercial banks have performed well in all aspects and maintained a good and healthy development trend. Then followed by Zijin Agricultural Bank, Jiangyin Bank, Zhangjiagang Bank, and Wuxi Agricultural Bank, and finally followed by Su Agricultural Bank with a score of only 0.1918.

Table 4 Comprehensive Evaluation Results of Rural Revitalization of Banking Services

bank abbreviation	positive ideal solution distance (d+)	negative ideal solution distance (d-)	composite score index	sort
Shanghai Agriculture Firm	0.5099	0.3928	0.4351	three
Yunong Commercial Bank	0.4977	0.4534	0.4767	2
Zhangjiagang Bank	0.6642	0.1782	0.2115	seven
Wuxi Agricultural Firm	0.6591	0.1663	0.2015	eight
Sunong Comptoir	0.6516	0.1547	0.1918	nine
Qingnong Commercial Bank	0.6028	0.1996	0.2487	six
Jiangyin Bank	0.6335	0.2231	0.2604	five
Changshu Bank	0.4355	0.4914	0.5301	one
Zijin Agricultural Firm	0.6261	0.2586	0.2923	four

5. Analysis conclusions and recommendations

China's modernization requires a population of 1.4 billion to enter a modern society as a whole, and its difficulty and complexity will be unprecedented. Commercial banks should actively respond to national policies and seize the opportunity to realize their own transformation and upgrading. Based on the entropy weight TOPSIS model, this paper establishes an evaluation system for commercial banks from the perspective of serving rural revitalization. The study selected nine commercial banks as simulation samples to evaluate and rank their financial performance, serviceability for agriculture, rural areas, and farmers, and mathematical inclusion ability, as well as the comprehensive level of service for rural revitalization. The higher the score, the more outstanding the performance. Based on the analysis of this paper, the following enlightenments and suggestions can be drawn:

First, pay attention to the improvement of their own operating level and financial performance, and strictly control credit risk in order to better serve agriculture, the countryside, and farmers and revitalize the countryside. With financial disintermediation and the continuous opening of the banking market, the competitive pressure on the banking industry is increasing day by day. The development of small and micro enterprises, agriculture, rural areas, and farmers in inclusive

finance requires stable financial support and risk management awareness of the banks. On the one hand, banks can moderately develop off-balance-sheet businesses, actively broaden sources of revenue, and innovate to promote their diversified business development. On the other hand, banks should strengthen the management of credit funds and improve the risk warning mechanism to ensure the sustainable development of rural revitalization.

Second, in response to the state's policies and guidelines, we should actively assume social responsibilities and do our best to contribute to the common prosperity of socialism and the rejuvenation of the countryside. Banks should pay attention to inclusive training professionals, inject fresh blood into grassroots outlets and supplement more human resources in rural and remote areas. At the same time, aiming at the farmers and the country's precise poverty alleviation targets, a reasonable, small-scale, and low-risk financial combination is designed to explore the innovation of collateral for farmers and small and micro enterprises, so as to meet the practical needs of agriculture, rural areas and farmers, and thus improve the service effectiveness and service penetration of universal financial services.

Third, the number enables inclusive finance to increase the distribution of financial technology and realize the transformation and upgrading of banks. Promote data governance and intelligent operation, jointly support intelligent wind control, accurate marketing, efficient operation, and fine management, integrate online and offline payment channels and improve the efficiency of traditional financial services.

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