The Impact of Ownership Structure on the Performance of Rural Commercial Banks Based on Random Effect Variable Intercept Model

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Abstract: The ownership structure plays a vital role in the development of rural commercial banks. This paper selects the largest shareholder's shareholding ratio and the degree of equity balance as explanatory variables, chooses the cost-to-income ratio as the bank's performance proxy variable, and uses the logarithm of total assets, non-performing loan ratio and capital adequacy ratio as control variables. This paper collates the panel data of 13 rural commercial banks in China from 2013 to 2020, uses Stata software to conduct unit root test and cointegration test for each variable, and determines the applicability of the mixed cross-section model and the random effects model. Finally, the random effect variable intercept model is used to empirically study the impact of the ownership structure on the performance of rural commercial banks. The empirical results show that the shareholding ratio of the largest shareholder has a significant negative impact on the cost-to-income ratio; the degree of equity checks and balances has a significant negative impact on the cost-to-income ratio; when the equity ownership is state-owned, it has a significant negative impact on the cost-to-income ratio.

Keywords- Random effect variable intercept model; Equity structure; Cost-to-income ratio

1 Introduction

1.1 Research Background

The original intention of the rural commercial bank was to solve the "three rural issues", and it assumes the responsibility of promoting the development of my country's rural economy. In recent years, the rapid development of my country's economy has inevitably led to the influx of various foreign banks, which intensified the competition among domestic banks to a large extent. As a financial institution with a local and regional nature, rural commercial banks face huge competition and challenges.

The equity structure will largely have a direct positive or negative impact on the operating performance of rural commercial banks [1]. Mcconnell and Servaes (1990) found that a reasonable shareholding structure has a significant increase in the value of the company [2]. Shleifer (1997) also believes that the relationship of the concentration of equity and the performance is positive [3]. Pedersen (2000) and Vera (2007) conducted researches on more than 500 listed companies in Europe and more than 400 companies in Spain, and found that the majority shareholder's shareholding ratio has a positive impact on performance [4] [5].

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However, Demsetz (2001) believed that the ownership structure does not have a significant impact on corporate performance [6]. Ming (2008) also confirmed this point through empirical research [7].

To analyze the ownership structure, we often start from the attributes of the equity owners and the concentration of equity. Through these two aspects, there are three types of equity structure: state-owned holding, equity concentration, and equity dispersion. Different ownership structures have different impacts on the development of an enterprise, which will lead to different performances in the operation of the enterprise. Therefore, this article studies the impact of rural commercial bank's equity structure on corporate performance.

1.2 Significance

This article selects a number of samples for many years of data, carries out a detailed anatomy of the ownership structure, and uses a variety of influencing factors to study the impact of these influencing factors on company performance from different perspectives. The results of these studies can provide a certain reference for the managers of rural commercial banks in terms of equity structure and directions for improving their performance.

2 Empirical test

2.1 Sample data and variable selection

Taking into account the availability and completeness of sample acquisition, this paper finally selected 13 rural commercial banks as sample banks for the empirical research of this paper. The sample data mainly comes from the annual reports published by commercial banks.

Cost-to-income ratio as a regulatory indicator of commercial banks can not only reflect the overall operating efficiency of the bank, but also reflect the actual performance of the bank. Therefore, this paper selects the cost-to-income ratio as the bank's performance indicator variable denoted as CTI.

This article selects the proxy variable from the equity governance theory, which mainly includes the shareholding ratio of the largest shareholder and the degree of equity balance (the ratio of the second to the fifth largest shareholder to the first largest shareholder) and the proportion of the top ten shareholders, which are recorded as DS, Z, and OS respectively. Taking into account the different nature of equity, this article introduces the dummy variable "equity attribute". If the equity is state-owned, it is assigned a value of 0; otherwise, it is assigned a value of 1. This variable is recorded as BPR. The control variables are introduced into the equation. These control variables are the bank's total assets, non-performing loan ratio, and capital adequacy ratio. To avoid excessive data fluctuations, the total assets are taken as logarithmic values. The above three control variables are respectively marked as SIZE, NPR, CAR.

The empirical test model of this article is constructed as follows:

$$CTI_i = \alpha_i + \beta_{1i} DS_i + \beta_{2i} Z_i + \beta_{3i} OS_i + \beta_{4i} BPR_i + \beta_{5i} SIZE_i + \beta_{6i} NPR_i + \beta_{7i} CAR_i + \mu_i + \gamma_i \tag{1}$$

i-the number of cross sections; α_i-intercept term, $\alpha_i = \bar{\alpha} + \alpha_i^*$; β_i-coefficient term; u_i-non-

observed effect term; v_i- random error term.

2.2 Unit root test

The sample data in this article is panel data, so this article first conducts a unit root test, in order to prevent the occurrence of "false regression", resulting in unreliable regression results. It is worth noting that due to the data characteristics of dummy variables, unit root tests cannot be performed.

Table 1 Unit Root Test of CTI

Method	Statistic	Prob.**	Cross-sections	Obs
LLC	0.41559	0.6611	13	86
IPS	-0.41607	0.3387	13	86
ADF	37.9220	0.0616	13	86
PP	43.2748	0.0181	13	91

It can be seen from the above table that LLC and IPS inspections fail, while ADF and PP inspections can pass. Because there are two tests that reject the null hypothesis, the time series can be determined to be stationary.

We also perform unit root tests on other variables and find that except the total assets is a first-order single integer sequence, the other sequences are stationary sequences.

2.3 Cointegration test

It can be seen from the test results that there are non-stationary vectors in the time series, so the regression cannot be directly performed. But if there is a long-term co-integration relationship between variables, then even if it is not stable, it can be regressed without the possibility of spurious regression.

From the specific operation point of view, the model has many variables, and the Pedroni test cannot be performed. This article chooses Kao test.

Table 2 Kao (Engle-Granger Based) test

ADF	t-Statistic	Prob.
	-2.389347	0.0084
Residual variance	7.456688	
HAC variance	5.807674	

The Kao test results based on Engle-Granger show that the null hypothesis is rejected, that is, there is a long-term cointegration relationship between variables, and regression can be performed.

2.4 Model judgment

Panel data includes a variety of models, classified according to the form of individual influence, there are two major categories of fixed-effects models and random-effects models. From the results of equation coefficient estimation, there are two major categories: variable coefficient model and variable intercept model. At the same time, there is the possibility of a mixed cross-sectional model. The mixed cross-sectional model means that there is no significant difference between individual cross-sections and the parameters are inconvenient. The data is regressed using ordinary least squares.

2.4.1 Applicability judgment of mixed cross-section model

The applicability of the mixed cross-section model is based on the fixed-effects model, so we perform regression of the fixed-effect variable-intercept model on the variables, and then perform the LR test and F test on the estimated results.

Table 3 LR test and F test of mixed cross-section model

Effects Test	Statistic	d.f.	Prob.
Cross-section F	7.120246	(12,84)	0.0000
Cross-section Chi-square	72.976749	12	0.0000

It can be seen from Table 3 that the LR and F test results are both 0.0000, rejecting the hypothesis that the mixed cross-section model is more effective, indicating that the fixed effects model is more effective than the mixed. Therefore, the fixed effects model is first selected between the two.

2.4.2 Applicability of random effects model

The Hausman test can compare the validity between random effects and fixed effects models.

Table 4 Hausman test results of random effects model

Test SummarVALUE	Statistic	d.f.	Prob.
Cross-section random	3.298610	7	0.8561

It can be seen from Table 4 that the model can accept the null hypothesis H0, that is, the random effects model is more effective than the fixed effects model. Therefore, we need to choose the random effects variable intercept model.

2.5 Result analysis

Therefore, this paper uses a random effect variable intercept model to perform regression, and the results are shown in the following table.

Table 5 The coefficient estimation result of the regression equation

variable	coefficient	P value	variable	coefficient	P value
$\bar{\alpha}$	32.1537	0.0000	BPR	0.488181	0.0642
DS	0.686081	0.0210	SIZE	-1.148217	0.0670
Z	1.008374	0.0619	NPR	1.763987	0.0000
OS	-0.006841	0.9332	CAR	-0.247052	0.0965

It can be seen from the P value that the coefficient regression results of DS, Z, and BPR among the independent variables are significant. The regression results of coefficients among the control variables are all significant.

According to the regression results, we can find:

1. The coefficient of the shareholding ratio of the largest shareholder is positive, indicating that it has a significant positive correlation with the cost-to-income ratio, that is, it has a negative impact on performance. Because of the concentration of equity, small and medium shareholders have lost part of their right to make decisions, leading to the failure of democratic decision-making. Most of the shareholders of rural commercial banks will have local enterprises. They damage the collective interests for the development of their enterprises and lead to performance problems. decline.

2. The coefficient of the degree of equity balance is positive, indicating that it has a significant positive correlation with the cost-to-income ratio, that is, it has a negative impact on performance. When the balance of equity is too high, the effect of other shareholders' checks and balances on the largest shareholder will be obvious. When the relevant decision-making will lead to damage to the interests of some shareholders, divergence will form, and the best time for decision-making will be wasted. Operating costs and management costs, leading to a decline in performance.

3. The coefficient of the shareholding ratio of the top ten shareholders is negative, but it has not passed the significance test. In the model of this article, the top ten shareholders' shareholding ratio has no significant relationship with performance. The main reason is that the proportion of shares held by the top ten shareholders of the rural commercial banks selected in this paper has basically not changed in the year when the data is selected, and the changes in shares are mostly internal circulation among the top ten shareholders, resulting in no significant relationship.

4. The coefficient of equity ownership is positive, indicating a significant positive correlation with the cost-to-income ratio, that is, when equity ownership is state-owned, it has a negative impact on performance. It can mainly be analyzed based on the historical reasons of our country. Before, our country implemented a planned economy, and the control of enterprises was absolute. The situation is changing with the increase of the reform, and there are still some system residues, which makes the bank's decision-makers not have too much enthusiasm and initiative for their own development, lack of knowledge of the actual market conditions, and it is difficult to grasp the situation in the first time. Business opportunities have caused excessive costs to be invested later, leading to a decline in performance.

3 Conclusions and Recommendations

3.1 Conclusions

Regression analysis of the panel data of 13 urban rural commercial banks for 8 years found that the shareholding ratio of the largest shareholder in the equity structure, the degree of equity balance, the state-owned equity and the performance of rural commercial banks are all negatively correlated.

Excessive concentration of equity will cause small and medium shareholders to lose their due decision-making power, leading to the failure of democratic decision-making, which is not conducive to the development of the bank. However, if the balance of equity is too high, when relevant decisions harm the interests of some shareholders, differences of opinion will form and the best time for decision-making will be wasted, resulting in a decline in performance.

When the equity is owned by the state, bank decision-makers do not have too much enthusiasm and initiative for their own development, lack of awareness of the actual market conditions, and cannot grasp business opportunities. This will cause excessive investment in later stages, which is not conducive to improving performance.

3.2 Recommendations

1. Optimize the shareholding structure and adapt to local conditions.

The rural commercial bank itself needs to look for the characteristics and defects of its own shareholding structure and control the shareholding ratio of shareholders. An over-concentrated shareholding system will cause interest transactions between major shareholders, and small and medium shareholders will be suspected of "free-riding", which is not conducive to increasing the cohesion of the company. An over-dispersed shareholding structure will make it impossible for capable shareholders to exert their own advantages and abilities, making the company's governance and progress slow, and it is difficult to unify opinions when making decisions, which is also not conducive to their own development. Therefore, it is necessary to make the relationship between the owner and the manager of the enterprise coordinated through the allocation of equity, and unify the interests of the manager and the owner.

2. Reasonable allocation of equity attributes and mutual promotion.

It can be found that state-owned shares have a negative impact on the performance of enterprises. State-controlled enterprises have always needed improvement in their work efficiency and innovation capabilities, sometimes focusing too much on superficial processes. Rural commercial banks should appropriately increase the shareholding ratio of private legal persons. They often have more extensive channels and novel ideas. Their participation will inject fresh blood into the rural commercial bank system and bring vitality to the enterprise.

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