Operating Performance Evaluation
Based on Z-score Model and Profitability between
Cross-Straits Credit Cooperatives

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*A*bstract: This paper extends the literature evaluating credit cooperatives practices for two sides of Taiwan Strait. It finds evidence of different regulations and systems between cross-straits credit cooperatives resulting in the different profitability. The profitability is significantly and positively related with ratio of loan to deposit and with the capital structure, but is negatively associated with loan growth rate for Chinese rural credit cooperatives.   The higher total asset turnover and ratio of loan to deposit lead to the better profitability and operating performance while the increasing operating expense ratio decreases with the profitability for Taiwanese credit cooperatives.

Keywords: Credit cooperatives; Z-score model; Profitability; Return on assets; Return on sales
JEL Classifications: G00, M40, R11, C23

1. Introduction and Motivation

The credit cooperative mechanism was introduced from German to Taiwan via Japan. Taipei Credit Cooperative, founded in 1910, is the first credit cooperative in Taiwan. The credit cooperative in Taiwan plays a vital role for the local finance in the early 20th century. However, the developments of international finance, the changes of financial environment and widely establishment of the commercial banks have made a great impact on the credit cooperatives with lots of the local members as the primary customers. In 1995 a bank run of the Fourth Credit Cooperative of Chang-Hwa led people to distrust the credit cooperatives.

The government prohibited establishment of the credit cooperatives. The credit cooperatives were required to reorganize in the commercial banks. Meanwhile, the financial holding banks were encouraged to merge with the credit cooperatives. The numbers of the credit cooperatives decreased from 74 in 1994 to 25 in 2011, a sharp reduction by about 66%. The deposits of the credit cooperatives accounting for the total deposits of all financial institutions had declined from 16.4%

in 1994 to 1.7% in the end of 2011. The loans of the credit cooperatives to all financial institutions had dropped from 10.3% to 1.6%. Taiwanese Financial Supervision Commission in 2013 shows that for the credit cooperatives the ratios of non-performing loans and allowance for uncollectible accounts are 0.26% and 623%, while the corresponding ratios for the commercial banks are 0.40% and 270%, respectively.

Chinese rural credit cooperatives are the local institutions with the loans for the local farmers to develop agriculture. In the 1950s Chinese central government positively promoted the cooperative movements. Chinese rural credit cooperatives rapidly developed and became the vital financial institutions in various rural areas. In 1958 Chinese rural credit cooperatives were incorporated into the people's commune and provided the local government with the credit services. Meanwhile Chinese rural credit cooperatives were also viewed as "treasury" for the local finance. In the 1980s the rural credit cooperatives in mainland China were included into Agriculture Bank of China. The cooperative feature of Chinese rural credit cooperatives was gradually displaced by the commercial operating model. At the same time Chinese rural credit cooperatives became the affiliated organizations of Agricultural Bank of China in widely rural areas.

In 1984 the rural credit cooperatives in mainland China were incorporated into "county credit association" organized by a great number of county credit cooperatives. In 1996 the central government in China embarked on reform of the rural credit cooperatives again. In order to complete the process of commercialization Agricultural Bank of China withdrew the rural credit cooperatives. In 2003 Chinese central government reinforced the management reform of the rural credit cooperatives and required the provincial government to manage the rural credit cooperatives. Meanwhile the provincial credit association affiliated to the provincial government was responsible for the operation of all county credit cooperatives within the province.

In mainland China there were a variety of rural financial institutions including Agricultural Development Bank of China, Agricultural Bank of China, Rural Commercial Bank of China and Rural Credit Cooperatives. After separation between Agricultural Bank of China and Chinese rural credit cooperatives in 1996 the rural credit cooperatives all over the country rapidly developed. Lots of the rural credit cooperatives in mainland China were even incorporated into the rural commercial bank.

The changes of the financial environment and the financial reform have the considerable impact on the credit cooperatives between two sides of Taiwan Strait. This study utilizes the Z-Score model and the measurement of profitability to investigates the operating performance between the cross-straits credit cooperatives. Specifically, this study firstly examines the operating performance of the credit cooperatives between Taiwan and mainland China. This study then analyses the influence of the different credit cooperatives mechanism on the credit cooperatives between two sides of Taiwan Strait.

2. Literature Review

2.1 Measurements of profitability

Boyd and Graham (1988) utilize the Z-Score as an indicator for the probabilities of bankruptcy and find that the high values of Z are related with the low probabilities of failure. The increasing Z-score is associated with the ratio of equity to asset and the mean rate of return on assets. However, the value of Z decreases with the volatility of asset returns. Laderman (2000) also employs the Z-Score as an indicator for the bankruptcy probability and demonstrates that the bank holding company mergers with the appreciable levels of investment in life insurance underwriting, casualty insurance underwriting, and securities brokerage are optimal for reducing the probability of

bankruptcy. Moreover, Stiroh (2004) assesses the historical relation between the noninterest income shares and the two standard measures of performance and risk – the "Sharpe Ratio" and the "Z-score."   Stiroh finds the limited evidence that this shift brings the large diversification benefits in the form of more stable profits or revenue. The Z-Score is related with the probability of failure and the lower value increases with the risk of failure.

Miller and Noulas (1997) measure the bank profitability of the return on assets to examine the performance of 201 large US commercial banks. The results show that the large commercial banks with a declining quality of the loan portfolio experience the poor performance. The real estate loans are negatively related with the large bank profitability while the construction and land development loans have significantly positive impact on the large bank profitability. Williams (2002) views the return on assets after tax as the best available measure of the bank profits and finds that the bank profits have the negative impact on the competitor market share and the bank license status, and the positive impact on the Australian size and the home GOP growth for the period 1989 to 1993. Goddard *et al*. (2005) find the consistent evidence of a positive association between the market share and the profitability, and stronger in manufacturing than in service sector firms. The association between the liquidity ratio and profitability also appears to be positive.

Furthermore, Vennet (2002) employs three measures of performance (ROA, ROE and IMA) to investigate the cost and profit efficiency of the universal banks, financial conglomerates, and their more specialized competitors in the EU from seventeen countries for the years 1995 and 1996. The results seem to suggest that comparing to their specialized competitors, the conglomerates are more income efficient. The universal banks have the higher degree of both cost and profit efficiency than the non-universal banks. Accordingly, further de-specialization tends to become a more efficient banking system. The operational efficiency appears to the major determinant of the bank profitability in European banking. Using an international sample of 1,334 banks from 101 countries covering the period 1999 to 2007, Demirguc-Kunt and Huizinga (2010) utilize two measures of profitability (ROA and ROE) as the dependent variable to investigate the implications of a bank's activity mix and the short-term funding strategies for its risk and return. The results indicate that the higher noninterest income-generating activities are related with the return on assets and decrease with some risk diversification benefits. The return on assets remains to present as the better available measure of profitability as the return on equity is easily influenced by the ratio of owned capital.

Finally, Lu and Shen (2006) insist the return on assets as the measure of profitability, rather than the return on equity. Shen and Chang (2002) demonstrate the return on assets is more available measure of profitability than the net profit margin.

2.2 Measurement of management capability

The M of CAMEL indictor represents the management capability and the operating efficiency of the banks. The management efficiency of the banks can be evaluated by the view of expense ratio or the ratio of loan to deposit. The commercial bank with the significant performance for the non-interest interest is viewed as a potential growth engine as the result of the more and more small gap between the deposit interest rate and the loan interest rate in recent years. Shen and Lin (2009) illustrate that the dependent variable for the management capability of the financial and the non-financial holding banks by CAMEL is measured using three different ratios. The first evaluated ratio is efficiency ratio. The greater efficiency ratio is related with the higher non-interest expense. The second used ratio is the burden ratio. The ratio is also utilized to evaluate whether the banks own excessive spending. Such a ratio commonly appears as a negative variable. However, the variable approaching zero increases with the bank profits. The third measured variable for the management capability of holding banks is defined as total expense / total asset. The greater ratio decreases with the efficiency of bank management capability. Shen and Lin (2009) demonstrate that

the overall mean of the financial holding banks is better than that of the independent banks.

Nevertheless, Hsu *et al*. (2003) indicate that the dependent variable for the management capability of the commercial banks measured as "the ratio of non-interest expense to average asset" and "operating expense ratio" is significantly related with the bank crisis.

3. Methodology

3.1 Sample selection

There were twenty-five Taiwanese credit cooperatives[1] over the period 1994 to 2011 extracted from the database of Financial Supervision Commission. Due to a difficult collection of data there were only six Chinese rural credit cooperatives[2] for a period of six years from 2003 to 2008 investigated in this study. The balance sheet and income statement of the cross-straits credit cooperatives were empirically examined for the measures of profitability.

3.2 Empirical model

Table 1 below details the variables used in this study.

Table 1. Variables and their definitions

Variables	Code	Definition	Expected Direction	
			ROA	ROS
Operating Expense Ratio	BER	Operational, administrative and management expenses / operation revenue	-	-
Total Assets Turnover	ATR	Operation revenue / total assets	+	+
Ratio of Loan to Deposit	LDT	Loan / deposit	+/-	+/-
Total Assets	Log ASSET	Log of total assets	+	+
Capital Structure	CS	Net assets / loan	+	+
Loan Growth Rate	TLR	Growth in loan year t-1 to year t (%)	+/-	+/-
Z-SCORE	ZS	Z-score	+	+

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[1] The observations for Taiwanese credit cooperatives include the Taipei Fifth Credit cooperative, Taipei Ninth Credit cooperative, Keelung First Credit cooperative, Keelung Second Credit cooperative, Tamsui Credit cooperative, Tamsui First Credit Cooperative, Yilan Credit Cooperative, Taoyuan Credit Cooperative, Hsinchu First Credit Cooperative, Hsinchu Third Credit Cooperative, Taichung Second Credit Cooperative, Changhua First Credit Cooperative, Changhua Fifth Credit Cooperative, Changhua Sixth Credit Cooperative, Changhua Tenth Credit Cooperative, Lugang Credit Cooperative, Chiayi Third Credit Cooperative, Chiayi Fourth Credit Cooperative, Tainan Third Credit Cooperative, Kaohsiung Third Credit Cooperative, Hualien First Credit Cooperative, Hualien Second Credit Cooperative, Penghu First Credit Cooperative, Penghu Second Credit Cooperative, and Kinmen Credit Cooperative.

2 The objects of investigation for Chinese rural credit cooperative in this study consist of Liuhe Rural Credit Cooperative, Jiangning Rural Credit Cooperative, Pukou Rural Credit Cooperative, Gaochun Rural Credit Cooperative, Nanjing Rural Credit Cooperative, and Lishui Rural Credit Cooperative.

This study employs the ordinary least square method and the panel data model to executive the Z-score model and the multiple regressions. The empirical results reported here are those variables for the following specification:

$$Y_{st} = \alpha_0 + \beta_1 BER_{st} + \beta_2 ATR_{st} + \beta_3 LDT_{st} + \beta_4 l \log ASSET_{st} + \beta_5 CS_{st} + \beta_6 TLR_{st} + \varepsilon_{st}$$

4. Empirical Results

4.1 Descriptive statistics

Table 2 presents the average and the standard deviation for the credit cooperatives between two sides of Taiwan Strait. Over the period 1994-2011 the mean for the return on assets, the return on sales, the operating expense ratio, the total asset turnover, the ratio of loan to deposit, the asset scale, the capital structure and the loan growth rate for Taiwanese credit cooperatives are 0.32%, 16.96%, 93.30%, 4.54%, 56.59%, 23.019 billion, 13.92% and 0.76% respectively. The average of the loan growth rate for Taiwanese credit cooperatives, 0.76%, indicates that the changes of the financial environment have a great impact on the credit cooperatives. The declining loan growth rate decreases with the future development of Taiwanese credit cooperatives.

Table 2. The descriptive statistics for the cross-straits credit cooperatives

Sample	Taiwan		Taiwan		Mainland China	
	1994-2011		2003-2008		2003-2008	
Variables	Mean	S.D.	Mean	S.D.	Mean	S.D.
Return of Assets	0.0032	0.0045	0.0014	0.00439	0.0068	0.0123
Return of Sales	0.1696	0.2352	0.0782	0.2033	0.1051	0.0610
Operating Expense Ratio	0.9330	0.1240	0.9503	0.1481	0.8663	0.0645
Total Assets Turnover	0.0454	0.0235	0.0306	0.0043	0.0607	0.0741
Ratio of Loan to Deposit	0.5659	0.1272	0.5551	0.1438	0.8129	0.3458
Total Assets	7.2420	0.3581	7.2417	0.3612	7.1521	0.3925
Capital Structure	0.1392	0.0981	0.1502	0.1139	0.0092	0.0052
Loan Growth Rate	0.0076	0.0808	0.0368	0.0735	0.2135	0.1507
No. of observations	425		425		30	

Note: All variables as previously defined.

Furthermore, the mean of the loans accounts for around half of the deposits. Such a ratio of loan to deposit has also influenced on the credit cooperatives profits in Taiwan. Taiwanese credit cooperatives tend to reduce the loans. The mean of the operating expense ratio is too high. The standard deviation for the asset scale and the return on sales is 0.35% and 0.23% separately. The corresponding values for the operating expense ratio, the total turnover, the ratio of loan to deposit, the capital structure and the loan growth rate are 12.40%, 2.35%, 12.72%, 9.81% and 8.08% respectively.

For Taiwanese credit cooperatives from 2003 to 2008 the mean of the operating expense ratio, the capital structure and the asset scale are 95.03%, 15.02% and 23.062 billion respectively. The average for those variables are all higher than that of Chinese rural credit cooperatives. By contrast, the average of the return on assets, the return on sales, the total asset turnover, the ratio of loan to deposit and the loan growth rate for the credit cooperatives in Taiwan are 0.14%, 7.82%, 3.06%, 55.51% and 3.68% separately which are smaller than that of the rural credit cooperatives in mainland China.

Compared with Taiwanese credit cooperatives the mean of the operating expense ratio for Chinese rural credit cooperatives for a period of six years from 2003 to 2008 is smaller, 86.63%. However, the average of the return on assets (0.68%), the return on sales (10.51%), and the total asset turnover (6.07%), the ratio of loan to deposit (81.29%) and the loan growth rate (21.35%) for the rural credit cooperatives in China all are greater than that of Taiwanese credit cooperatives. The interest income for Chinese rural credit cooperatives are higher than that for Taiwanese credit cooperatives, suggesting Chinese rural credit cooperatives operate well.

However, the capital structure and the operational management of Taiwanese credit cooperatives are better than that of Chinese rural credit cooperatives for a period of six years from 2003 to 2008. The loan growth rate, the interest income and the profitability for Taiwanese credit cooperatives are lower than that for the rural credit cooperatives in mainland. The standard deviation of the return on asset, the return on sales, the operating expense ratio and the capital structure for Taiwanese credit cooperatives are 0.43%, 20.33%, 14.81% and 11.39% respectively which are more fluctuating than Chinese rural credit cooperatives.

Moreover, the standard deviation of the total asset turnover (0.43%), the ratio of loan to deposit (14.38%), the asset scale (36.12%) and the loan growth rate (7.35%) for the credit cooperatives in Taiwan all are less fluctuate than the rural credit cooperatives in mainland China. Overall, the operating efficiency for Chinese rural credit cooperatives is better than Taiwanese credit cooperatives.

4.2 Empirical analysis of multiple regression

This study uses two measures of profitability as the dependent variables and six measures of credit cooperatives profits as the independent variables. The profitability measures are the return on assets and the return on sales. The explanatory variables include the operating expense ratio, the total assets turnover, the ratio of loan to deposit, the asset scale, the capital structure and the loan growth rate.

4.2.1 Return on assets

Table 3 shows the empirical results for the influences of factors on the return on assets for Taiwanese credit cooperatives and Chinese rural credit cooperatives. The empirical results demonstrate that the dependent variable for the return on assets significantly and positively relates with the total assets turnover and the ratio of loan to deposit for Taiwanese credit cooperatives. The higher total assets turnover and the ratio of loan to deposit result in the higher the return on assets. However, the return on assets is significantly and negatively related with the operating expense ratio. Consistent with Lee (2007), the increasing operational, administrative and management expenses for the credit cooperatives result in the decreasing the return on assets.

For the rural credit cooperatives in mainland China, significantly positive associations are among the return on assets, the total assets turnover, the ratio of loan to deposit, the asset scale, and the capital structure. The higher total assets turnover, the ratio of loan to deposit and the asset scale, and the better capital structure lead to a higher return on assets. The result is consistent with Lee (2007) suggesting that the return on assets significantly increases with the capital structure.

Table 3. Empirical results for the impact of factors on ROA for the cross-straits credit cooperatives

Sample	Taiwan		Mainland China	
	1994-2011		2003-2008	
Code	OLS		OLS	
	Estimated Coefficient	P-value	Estimated Coefficient	P-value
Operating Expense Ratio(BER)	-0.0288***	0.0000	0.00188	0.8130
Total Assets Turnover(ATR)	0.0703***	0.0000	0.1765***	0.0000
Ratio of Loan to Deposit (LDT)	0.0026**	0.0186	0.0016**	0.0364
Total Assets (Log ASSET)	0.0037	0.2832	0.0023**	0.0325
Capital Structure (CS)	0.0013	0.2351	0.5162***	0.0000
Loan Growth Rate (TLR)	0.0010	0.3709	-0.0049**	0.0242
ZS	0.0007*	0.0712	N/A	
R-squared	0.8334		0.9925	
Adjusted R-squared	0.8306		0.9906	
No. of observations	425		30	

Notes: All variables as previously defined.
***, ** and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

The higher loan growth rate statistically decreases with the return on assets. The increasing loans business causes the reduction of the return on assets for Chinese rural credit cooperatives. The heavily financial burden in the past reduced the profits for the rural credit cooperatives in mainland China. The empirical result is consistent with the study of Lu and Shen (2006) who find a relation between profitability and operating risks for the banks in mainland China.

4.2.2 Return on sales

Table 4 presents the empirical results for the impacts of factors on the return on sales for Taiwanese credit cooperatives and Chinese rural credit cooperatives. The dependent variable of the return on sales significantly increases with the independent variable of the total assets turnover, the ratio of loan to deposit and Z-score for Taiwanese credit cooperatives. The higher total assets turnover, ratio of loan to deposit and Z-score result in the higher return on sales for Taiwanese credit cooperatives. The empirical results also illustrate that there is a significantly negative relation between operating expense ratio and return on sales. The operational, administrative and management expenses statistically decrease with the return on sales for Taiwanese credit cooperatives. However, there are insignificant associations among the asset scale, the capital structure, loan growth rate and the return on sales.

The dependent variable of the return on sales conventionally increases with the independent variables of the capital structure and the ratio of loan to deposit for the rural credit cooperatives in mainland China. The higher capital structure and ratio of loan to deposit lead to the increasing return on sales for Chinese rural credit cooperatives. The empirical results are consistent with Lee (2007). There are insignificant relations among the operating expense ratio, the total assets turnover,

the asset scale, the loan growth rate and the return on sales for the rural credit cooperatives in China.

Table 4. Empirical results for the impact of factors on ROS for the cross-straits credit cooperatives

Sample	Taiwan		Mainland China	
	1994-2011		2003-2008	
Code	OLS		OLS	
	Estimated Coefficient	P-value	Estimated Coefficient	P-value
Operating Expense Ratio(BER)	-1.4689[***]	0.0000	-0.0702	0.6046
Total Assets Turnover(ATR)	3.4137[***]	0.0000	0.1003	0.2904
Ratio of Loan to Deposit (LDT)	0.0489[**]	0.0171	0.0372[***]	0.0049
Total Assets (Log ASSET)	0.0418	0.4611	0.0175	0.3284
Capital Structure (CS)	0.0469	0.5913	9.7490[***]	0.0000
Loan Growth Rate (TLR)	0.0937	0.2075	-0.0577	0.1101
ZS	0.0523[**]	0.0228	N/A	
R-squared	0.7818		0.8844	
Adjusted R-squared	0.7781		0.8542	
No. of observations	425		30	

Notes: All variables as previously defined.
***, ** and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

4.3 Summary

Table 5 shows the comparison of empirical results for the influences of factors on the return on assets and return on sales for the credit cooperatives between two sides of Taiwan Strait. The total assets turnover and the ratio of loan to deposit have a significantly positive relation with the return on assets for Taiwanese credit cooperatives. The operating expense ratio statistically decreases with the return on assets for the credit cooperatives in Taiwan. For Chinese rural credit cooperatives there are conventionally relations among the total assets, the ratio of loan to deposit, the asset scale, the capital structure and the return on assets. The empirical results also demonstrate that the return on assets significantly increases with the total assets turnover and the ratio of loan to deposit for the cross-straits credit cooperatives. There are distinct associations among the operating expense ratio, the asset scale, the capital structure, the loan growth rate and the return on assets for the credit cooperatives between two sides of Taiwan Strait.

The return on sales is statistically and positively related with the total asset turnover, the ratio of loan to deposit and Z-score for Taiwanese credit cooperatives. The return on sales conventionally decreases with the operating expense ratio for the credit cooperatives in Taiwan. For Chinese rural credit cooperatives there are significantly positive relations among the ratio of loan to deposit, the capital structure and the return on sales. The dependent variable for the return on sales is conventionally and positively associated with the ratio of loan to deposit for the cross-straits credit

cooperatives. The remaining independent variables have the diverse impacts on the return on sales for the credit cooperatives between two sides of Taiwan Strait.

Table 5. Comparison of empirical results for the impacts of factors
on ROA and ROS for cross-straits credit cooperatives

Code	ROA		ROS	
	Taiwan	**Mainland China**	**Taiwan**	**Mainland China**
Operating Expense Ratio (BER)	Negative		Negative	
Total Assets Turnover(ATR)	Positive	Positive	Positive	
Ratio of Loan to Deposit (LDT)	Positive	Positive	Positive	Positive
Total Assets (Log ASSET)		Positive		
Capital Structure (CS)		Positive		Positive
Loan Growth Rate (TLR)		Negative		
ZS	Positive		Positive	
R-squared	0.8334	0.9925	0.7818	0.8844
Adjusted R-squared	0.8306	0.9906	0.7781	0.8542
No. of observations	425	30	425	30

Note: All variables as previously defined.

5. Conclusion and Recommendations

5.1 Conclusion

This study employs two measures of profitability as the dependent variables: the return on assets and the return on sales. The empirical results illustrate that there are significantly positive relations among the total asset turnover, the ratio of loan to deposit and the two measures of profitability for Taiwanese credit cooperatives. The increasing asset utilizations result in the higher profitability for the credit cooperatives in Taiwan. The ratio of loan to deposit is measured as the liquidity of credit funds for Taiwanese credit cooperatives. The ratio of loan to deposit significantly increases with the profitability for the credit cooperatives in Taiwan as the consequence of the principal income from the interest income.

Nevertheless, there is a significantly negative association between the operating expense ratio and the profitability. The higher operating expense results in the reduction of two measures of profitability for Taiwanese credit cooperatives. As a result, the priority for the credit cooperatives at present is to decrease the operating expense and increase the operating performance. There are insignificant relations among the asset scale, the capital structure, the loan growth rate and the profitability for the credit cooperatives in Taiwan. The reason appears to the smaller asset scale for the credit cooperatives than that for the commercial banks in Taiwan. Compared with the commercial banks the credit cooperatives are the independent financial institutions. There is insignificant relation between the asset scale and the profitability for Taiwanese credit cooperatives. In recent years the loan growth rate has slowly decreased and the interest margin has dropped for

the credit cooperatives. Taiwanese credit cooperatives have earned less profitability for loans.

In addition, the ratio of loan to deposit and the capital structure conventionally increase with the profitability for Chinese rural credit cooperatives. The interest income is also the main income for the rural credit cooperatives in mainland China. The net profit of loans significantly and positively relates with the profitability for Chinese rural credit cooperatives. The empirical results also illustrate that there is a statistically negative relation between the loan growth rate and the profitability for the rural credit cooperatives in mainland China. There appears to be financial burden in the past for Chinese rural credit cooperatives. The rural credit cooperatives in mainland China have to cover the bad debts when there is the profitability. Subsequently, the increasing loan growth rate decreases with the profitability for the rural credit cooperatives in China.

5.2 Advices for the credit cooperatives and directions of future research

This study suggests some advice for the credit cooperatives between two sides of Taiwan Strait. Firstly, the credit cooperatives should appropriately control the operating expense ratio and pay much higher spending on the financial education and training for the staffs. Taiwanese credit cooperatives could raise loans, but diminish the lending interest rates to increase the interest income and reduce the risk of failure. Chinese rural credit cooperatives should be reorganized to raise the non-operating income. Finally, the rural credit cooperatives in mainland China should strictly control lending rashly and reduce non-performing loans.

There are only six Chinese rural credit cooperatives adopted, and six years investigated in this study due to the difficulty in collecting data. Such a limited sample likely results in a bias. The future research should increase the observations to explore the development trendy and operational performance for the rural credit cooperatives in mainland China. Additionally, for the more explicit analysis of Taiwanese credit cooperatives the acquisitions of the monthly or quarterly financial information is a key point. There are various factors affecting the profitability of the credit cooperatives between two sides of Taiwan Strait. This study merely examines the financial performance of the credit cooperatives. The quantitative and non-financial data such as the human resource management, the service quality, the attitude and morality of the employees, and the corporate social responsibility can be a priority to take into account the investigation of the cross-straits credit cooperatives.

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