Determinants of Agricultural Cooperative Performance Using Financial Ratio

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ABSTRACT

The main aim of this study is to examine the financial performance of agricultural cooperatives in Malaysia during the period of 2010-2014 using financial ratio (i.e. liquidity, leverage and asset efficiency). Based on the panel data model approach, the results of the study showed that liquidity, asset efficiency, dividend and cooperative size have significant relationship to financial performance of agricultural cooperatives. The outcome of this study would provide some insights to regulators, cooperative managements, and cooperative members towards designing and implementing future strategies to enhance cooperative performance.

Keywords: Cooperative, financial performance, Malaysia, ratio analysis.

1. INTRODUCTION

Agricultural cooperatives have played important economic roles in providing market access to overcome the exploitation on the rural agriculture farmers by middleman in Malaysia (Dasar Koperasi Negara, 2004). First agricultural cooperatives are established by paddy planters in 1922. Later, the number of cooperatives grew rapidly to different sectors such as credit cooperatives, government sectors, and cooperative stores. In 2002, agricultural cooperative registration and supervision were handled by Lembaga Pertubuhan Peladang (LPP), and government introduced the government agency of Suruhanjaya Koperasi Malaysia (SKM) to act as the cooperative regulator. In 2014, the number of cooperative has grown to 11450 and constitute of 2439 agricultural cooperatives with turnover of RM511million (SKM website). At present, all cooperatives are governed by SKM. This study is important and a relevant subject matter given the recent increased in number of established cooperatives, cooperative members and expectation of performance stability in Malaysia. In

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addition, cooperative enterprises as a whole have been recognized as a democratic entity organization (Norkovic, 2008).

Financial statement is prepared for internal users (cooperative members) and also for external users (Suruhanjaya Koperasi Malaysia; potential new cooperative members) and it served as a map to understand and measure the financial health of a cooperative. Financial ratios provide significant information regarding financing activities, operating cost, business stability and it depends on the information needs by the users. For example, financial performance measurement such as profitability ratios, coherently describes objectives of firms in a long run which reflect the aggregate view of purely financial performance. Financial ratio analysis has received the attention in determining detailed coverage of the cooperative liquidity, resources and operations. Report prepared from financial ratio analysis is extensively accepted whether it is for a large or small company. Cooperative members will accept lower returns in terms of dividends, members benefit and other benefits from cooperative because of the lower risk of the cooperative.

Performance measurement in cooperatives mostly focuses on financial dimension and financial stability. Another purpose includes reporting the correct use of resources especially to cooperatives members which is the main funder of cooperatives. The cooperatives incorporate both democratic control and business functions in their social organization. These values and principles result in an integrated expectation of financial performance and social objectives. Without appropriate measures, cooperative social development is deficient. Hence, demonstrating performance measures according to the objectives of the firm is seen as an important key for success (Mulgan, 2010; Simpson et al., 2012). Financial indicators offer information regarding the financial status of firms and thus it helps the managers to make decision accordingly to improve the financial performance. In addition, financial information through financial reporting and financial analysis will reduce information asymmetries between cooperative members and managers.

In response to the increasing number of cooperatives and its contribution in the economy, cooperative must be stable in financial performance for long-term survival. In relation to the cooperative performance in Malaysia, the lack of research on cooperative financial performance measure is due to the limitation of data access to public. Therefore, there is a need for an in-depth research to better understand the relevant financial ratios that can contribute to cooperatives financial performance in Malaysia. Since the main objectives of cooperative is to fulfil the members' interest through payment of dividends. This paper contributes to the body of knowledge as there is a lack in performance measurement which is reflective to members' interest such as members' dividend.

This paper is organized as follows: the next section (Section 2) provides literature review, Section 3 discusses the methodology and Section 4 provides discussion on data analysis and findings. The last section (Section 5) concludes this study.

2. LITERATURE REVIEW

Financial ratio has been used in evaluating the performance and financial condition of a firm. Financial ratios offer indication of the firm's position in the dimensions of profitability, liquidity, solvency and efficiency. Early researchers by Pinches et al., (1973) have attempted an empirically based to reduce the set of financial ratios to represent seven ratios – return of investment, financial leverage, capital turnover, short-term liquidity, cash position, inventory turnover, and receivables turnover. These seven financial ratios occurred in each year was examined and they were relatively stable for a long-term by taking into consideration the accounting for a consistency and high amount of variance.

Similar study of reducing set of financial ratios using principles component analysis of 39 ratios of 1053 firms in 1977 has been done by Chen and Shimerda (1981). The statistical tool used to summarize inter-relationships and group variables into a few factors that retain a maximum of information contained in the variable set. An example from the analysis: A ratio of earnings before interest and taxes/sales and net income/net worth are significantly correlated and classified as ratios exhibiting returns on investment activities. Their studies have demonstrated the importance to select a set of ratios that represent a factor that offers most of the common information retained in the factor.

Both empirical and analytical evidences found that financial ratios can be used to predict financial distress (Altman, 1968), to determine whether bad or potential performing firms (Kumar and Ravi, 2007), bankruptcy prediction using unique set of financial characteristic or different sets of prediction model (Holsapple and Wu, 2011; Olson, et al., 2012) and detecting fraudulent financial reporting in listed companies (Zainudin & Hashim, 2016). Likewise, a number of previous researches used financial ratios to determine the financial performance of cooperative. Performance of cooperative is measured in two main categories: the first category consists of profitability and efficiency ratios that show the ability and the efficiency of equity capital to generate returns. The second category consists of capital financing ratios to show the ability of the firms to pay debt and how cooperative finances its equity (Gengzoglanis, 1997; Lerman & Parliament, 1990; Harris & Fulton, 1996; McKee, 2008; Soboh, 2004; Soboh et al., 2011). Furthermore, financial ratio analysis is useful to measure members' benefits transmitted by the cooperative to members in the short-run (McKee, 2008).

In relation to cooperative performance in Malaysia, there is lack of studies done to evaluate the performance of cooperative. Previous studies in Malaysian

cooperative only focus on several regions and small numbers of sample with mixed findings on the performance measurement merely in the aspects of ratio analysis. A study of cooperative performance done by Hassan and Mat Noh (2005) focused in cooperative organization operating in the state of Kedah and the performance evaluations are based on liquidity, leverage, and profitability ratios. A performance measurement of cooperative in Malaysia is also documented in a study that examines economic performance and member benefits performance   A sample of 20 large cooperatives and 20 small cooperatives was selected to measure financial performance and member benefits. Overall findings indicate that the financial performance measure from the aspects of profitability and liquidity ratios varies between large and small cooperatives (Kaur, 2006).

Most of the cooperative performance in U.S and Europe is measured using regression analysis that compares the financial performance in terms of profitability, productivity, liquidity, leverage, and asset efficiency ratios. These findings are mixed regarding the financial performance of cooperative and Investors Owned Firm IOFs. Besides that, the findings also did not take into account the members' interests such as dividend in the performance evaluation (Chaddad and Iliopoulos, 2013). Therefore, in this paper we used dividend as a proxy to measures cooperative members benefit.

This paper contributes to cooperative financial performance literature by concluding that performance measurement practices should cover aspects related to members benefit. The cooperative incorporate both democratic control and business functions in their organization. These values and principles result an integrated expectation of financial performance.

3. METHODOLOGY

3.1 Data

Data was collected on a sample of 128 of the most prominent agricultural cooperatives for the year 2010-2014, an unbalanced panel for which financial data were available from Suruhanjaya Koperasi Malaysia.

3.2 Empirical Model

The following economics model is tested by using panel data techniques to capture the relationship between financial ratio variables and cooperative performance, the regression model used is as follows:

$$FP_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta2 DEBT_{it} + \beta_3 FATA_{it} + \beta_4 INVT_{it} \ldots \quad (1)$$
$$+ \beta5 DIV_{it} + \beta_4 LnSIZE_{it} + u_{it}$$

where FP is the financial performance measure through return on asset (ROA) and return on equity (ROE). LIQ is liquidity, DEBT is leverage, FATA is asset efficiency, INVT is investment, DIV is dividend paid to cooperative members, LnSIZE is cooperative assets, level subscripts *i* and *t* index are cooperative and time respectively. In addition, *u* represents the error term.

3.3 Summary of variables and measures

Table 1 report the summary of dependent and independent variables used in this study. It briefly defines the financial ratios that often reported by cooperative researchers who are not exclusive in assessing cooperative performance (Gentzoglanis, 1997; Harris and Fulton, 1996; Schrader et al., 1985; Chen et al., 1985; Lerman and Parliament, 1991; Hardesty and Salgia, 2004; Notta and Vlachvei, 2007, McKee, 2008, Soboh et al., 2011; Kalogeras et al., 2013; Beaubien and Rixon, 2012).

Table 1 Summary of Variables and Measures

Variables	Symbol	Formula	Indicator
Independent & Control variables			
Current ratio	LIQ	Current asset ÷ Current liabilities	Indicator of short term solvency
Leverage	DEBT	Total liabilities ÷ Total assets	Indicator of asset claimed by outside interest
Net fixed asset turnover	FATA	Sales ÷ Fixed assets	Indicator of sales generated from cooperative asset
Investment	INVT	Investment ÷ Total assets	Investment use from available total asset
Dividend	DIV	Dividend ÷ Net profit	Dividend policy
Cooperative size	LnSize	Natural log of total asset	Total asset
Cooperative financial performance variables			
Return on equity		Net profits ÷ Total equity	Indicator of the return of invested capital and managerial efficiency
Return on total assets		Net profits ÷ Total assets	

4. FINDING AND DISCUSSION

4.1 Descriptive statistic and correlation of variables

Table 2 presents the summarized statistics for variables used in this study. The average ROA and ROE is 0.998 and 3.186 respectively. This indicates that agricultural cooperatives in this study have high equity performance, which is an important ratio in measuring the performance of the agricultural cooperative. The average LIQ is 16.472 and DEBT is 0.258, which suggest that debt is lower than liquidity, ROA and ROE performance. This important information indicates that the agricultural cooperative in this study is good in maintaining its liquidity. The mean ratio for INVT is the lowest probably because the agricultural cooperatives have trouble in the investment instrument. The DIV mean of 0.636 indicate that most agricultural cooperatives have good dividend policy for its members which is exceeding 50%.

Table 2 Descriptive Statistics

Variable	Mean	Min	Max	Standard deviation
ROA	0.998	0.002	2.821	0.940
ROE	3.186	0.006	49.390	8.431
LIQ	16.472	0.323	329.458	56.029
DEBT	0.258	0.002	1.399	0.189
FATA	0.257	0.170	2.045	0.278
INVT	0.154	0.014	0.715	0.156
DIV	0.636	0.042	5.731	1.029
LnSIZE	6.953	5.733	8.901	0.826

Table 3 shows the correlation matrixes between all variables. The result shows that there is a positive relationship between DEBT, INVT, DIV and ROA ($p<0.05$). DEBT related significantly negative to ROE ($p<0.01$); whilst LIQ shows a significant positive relationship with ROE ($p<0.01$). INVT and DIV are positively correlated to ROA ($p<0.05$). A significant positive correlation is also found between INVT and LnSIZE with FATA. Finally, DIV and LnSIZE are found to have a significant correlation with the INVT ($p<0.01$). The correlation matrix tested in this study confirms that no multicollinearity exist between the variables because none of the variables correlate above than 0.90 (Hair et al., 2010).

Table 3 Pearson's Correlation

	ROA	ROE	LIQ	DEBT	FATA	INVT	DIV	LnSIZE
ROA	1							
ROE	0.072	1						
LIQ	0.028	0.909**	1					
DEBT	0.185*	-0.205*	-0.276*	1				
FATA	0.039	-0.110	-0.120	0.008	1			
INVT	0.291*	-0.085	-0.114	0.078	0.384*	1		
DIV	0.200*	-0.032	0.052	0.078	-0.045	0.388**	1	
LnSIZE	0.132	-0.083	-0.119	-0.103	0.606**	0.500**	0.209	1

Notes: ** Correlation is significant at the 0.01 level (two-tailed); * Correlation is significant at the 0.05 level (two-tailed).

4.2 Regression Analysis

This study applied regressions analysis using panel data estimators to predict and estimate the effects of some explanatory variables on the dependent variable. Breusch-Pagan LM test and Hausman test were conducted to choose the model between ordinary least square (OLS) and random effect (RE) as well as between random effect and fixed effect (FE). Those tests are translated into the following hypotheses:

Ho: Cov (λ_{it}, X_{it}) = 0 (no correlation between the regressors and individual effects), accept RE

H_A: Cov (λ_{it}, X_{it}) = 0 (correlation between the regressors and individual effects), accept FE

From the Hausman test for financial performance of ROA and ROE, the null hypothesis is rejected (p-value<0.05). Thus, the fixed effect model for both ROA and ROE is accepted.

Diagnostic test of heteroskedasticity and serial correlation in FE regression was conducted and found that both heteroskedasticity and serial correlation problem exist in FE regression model. To rectify these problems, further robustness test to FE regression model was performed.

Table 4 reports the result of Breush-Pagan LM, Hausman and diagnostic test for ROA and ROE.

Table 4 Breusch-Pagan LM (BP), Hausman and diagnostic test

Estimation model	Test	Hypothesis	Test statistic	Probability	Decision
ROA					
OLS and RE	BP	Ho: Cov(λ_{it}, X_{it})=0	χ^2=1.00	0.000*	RE
FE and RE	Hausman	Ho: Cov(λ_{it}, X_{it})=0	χ^2=12.80	0.044*	FE
Accepted Model : FE	Heteroskedasticity (Modified Wald)	Ho: Constant Variance	χ^2=1424.91	0.000*	
	Serial autocorrelation	Ho: No first order Serial correlation	F=59.73	0.000*	FE robust
ROE					
OLS and RE	BP	Ho: Cov(λ_{it}, X_{it})=0	χ^2=24.26	0.000*	RE
FE and RE	Hausman	Ho: Cov(λ_{it}, X_{it})=0	χ^2=15.03	0.020*	FE
Accepted Model : FE	Heteroskedasticity (Modified Wald)	Ho: Constant variance	χ^2=140.93	0.000*	
	Serial autocorrelation	Ho: No first order Serial correlation	F=15.538	0.001*	FE robust

Note: * Significant at 0.05 and reject null hypothesis

Here, we will discuss the results of robust specification, which is fixed effect robust regression model.

Table 5 reports the regression model for ROA and Table 6 reports the regression models for ROE. Based on Table 5, solvency risk is measured by the total liabilities to total asset (DEBT) that examine the cooperative's long term debt position. This study showed that the DEBT does not affect ROA. Liquidity ratios measure the cooperatives short-term financial strength. The result of the study also showed that the liquidity did not significantly affect the ROA. Results in this study (DEBT and LIQ on ROA) differ from findings by McKee (2008) and Notta and Vlachvei (2007) that found a significant effect of DEBT to performance.

Asset efficiency is measured by the sales to total asset that show the asset's ability to generate sales. Higher ratio suggests a good performance to cooperative operations. The results of this study showed that the asset efficiency found to be negatively related to ROA, suggesting that cooperatives sales reflected profit negatively and probability of cooperatives experiencing a long term growth opportunity. It is reasonable because cooperatives that purchased fixed asset at an increasing sequence, their net income decreased. This finding supports the study by McKee (2008) which indicates a negative influence between the asset's ability to generate sales to the performance of cooperatives. On the other hand,

dividend and cooperative size show a positive significant to ROA. These results indicate that higher dividend and cooperative total asset will lead to increased ROA and cooperative total asset is the main variable that contributes to ROA. These results are consistent with studies of McKee (2008) and Soboh et al. (2011) that support a positive significant relationship between performance and size of cooperatives. The main objective of cooperative is not only to obtain profit but also to fulfil the members' interest and welfare. Thus, the positive relationship between dividend and ROA provides evidence supporting the view that members' interest and return from investing in cooperative is feasible.

Table 5 Regression results of financial performance, ROA

Explanatory variables	Coefficient	Standard error	Probability
LIQ	0.015	0.041	0.720
DEBT	-1.328	0.923	0.160
FATA	-2.377	0.390	0.000***
INVT	1.084	0.772	0.170
DIV	0.192	0.079	0.021**
LnSIZE	3.979	1.099	0.001**
R^2	0.2487		
F-test	23.73		
P-value	0.000		

Notes: ***Significant at 1% level, **Significant at 10%, *Significant at 5%

According to results in Table 6, liquidity and investment ratios showed that these variables are positively significant to ROE. This indicates that the cooperative has the ability to pay all its short term obligation and good investment decision that contribute to positive return to cooperatives equity performance. These results does not support the study by Liargovas and Skandalis (2010) that indicates negative relation between liquidity and performance; and Soboh et al., (2011) which indicates no relation between liquidity and performance. Cooperatives fixed asset turnover measures the management's ability to use fixed asset efficiently to increase productivity. However, in this study, fixed asset turnover has a negatively relationship to ROE and ROA, suggesting that cooperatives in this study increasingly purchased fixed asset to generate growth of sales and its operations in the future. The greater and positive relationship of fixed asset turnover is more reasonable. Therefore, the management should pay attention to the significant improvement to increase productivity and generate sufficient income. As such cooperatives can avoid financial difficulty in the future.

The results of the study showed that the solvency risk measured by DEBT did not significantly affect the ROE. This study does not conform to study by Gweyi and Karanja (2014) that found a positive relationship between leverage and ROE as measure of the financial performance of a cooperative in Kenya.

Besides that, there is no relation between dividend and cooperatives size to ROE. It showed that cooperatives total asset and dividend paid to cooperatives members did not reflected profit on equity of the cooperatives. This study does not support findings in Arcas et al., (2011) that found a positive relation between cooperatives size and performance.

Table 6 Regression results of financial performance, ROE

Explanatory variables	Coefficient	Standard error	Probability
LIQ	0.134	0.053	0.018*
DEBT	-0.751	1.280	0.561
FATA	-2.681	0.433	0.000***
INVT	1.719	0.815	0.043*
DIV	0.095	0.148	0.527
LnSIZE	2.788	1.816	0.135
R^2	0.3108		
F-test	13.89		
P-value	0.000		

Notes: ***Significant at 1% level, **Significant at 10%, *Significant at 5%

5. CONCLUSION

The main objective of this study is to analyse the usefulness of the financial ratio that contributes to cooperative financial performance. The results of this study show that five ratios: LIQ, FATA, DIV, INVT and LnSIZE are significant indicators for cooperative financial performance. The cooperative management must consider improving utilization of fixed asset and investment that contribute to increase in sales, and good financial performance. In addition, agricultural cooperative must take further steps to improve productivity by controlling expenses and operating profit to ensure stable growth in the future.

It is suggested for future research to include a financial indicators that represent the members benefit, for example, education or training to members, others members benefit, and other non-financial indicator into the analysis. Different ratios define different quality or business objectives. Besides financial perspectives, researchers can consider other cooperative objectives and subjective matters that reflect their business performance; for example, location or region, new product development, service or product quality, employee retention and background, and members satisfaction.

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