



Factors Affecting Performance in Cooperative Terengganu By Using Logistic Regression

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ABSTRACT

Co-operative is a direct translation from the Latin word "Co-operation" which means "working together". Cooperative as an organization comprising a group of people to carry out economic and social activities for the benefit of its members. A society registered under the Societies Act 1993 with the aim of improving the economic interests of its members through activities carried out based on the principles of cooperatives. but there are a few cooperatives in Terengganu not run smoothly and become loss. The main objective of this study was to determine whether there is relationship between independent variable such as the number of cooperative members legally registered, the assets owned by each cooperative, amount of capital or shared used by each society involved in the initial engagement, the function of cooperative, turnover and the seat of cooperative in the state of Terengganu on the dependent variable which is earnings cooperative. The secondary data for the years 2010 were obtained from Department of Cooperatives Commission of Malaysia (SKM) Terengganu branch. Data were analyzed by using the "Logistic Regression". At the end of the study, can determine which factors having the influence to performance (profit and loss), examine the association between variables (members, assets, capital shares, region, function and turnover), and construct the logistic model.

| Cooperative Terengganu | Earnings | Logistic Regression. |

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1. INTRODUCTION

Co-operative is a direct translation from the Latin word "Co-operation" which means "working together". Co-operative as an organization consisting of a group of people to carry out economic and social activities to bring benefits to its members (M.Iskandar Soesilo). A society registered under Societies Act 1993 with the aim of improving the economic interest of its members through activities carried out based on the principles Co-operatives. But there are several cooperatives that suffered losses in Terengganu. Cooperatives movement in Malaysia continues to grow with the establishment of various types of cooperatives such as consumer, agriculture, housing, transportation, industrial, construction and services. There are cooperatives that carry out various type of activities categorized as Various purpose. International Cooperatives (ICA) defines human society as an association of autonomous, join voluntarily to meet common needs and aspirations in the economic, social and culture through organization that is jointly owned and democratically controlled. Cooperatives providing microfinance, employment and business opportunities.

Business cooperatives can lead to increased social capital and human capital and able to change the economic and social well-being of members and contribute to society. Jamilah *et al.* (2007) in studies using Logistic Regression found that the society in Sarawak is small in terms of ownership of assets, profitability, membership and payment dividend. Chairman, Secretary and Treasurer, mostly aged over 51 years and has a level of education SPM and below. Group of highly educated professionals are not interested in society [2]. Ramsey (2007) has made a study of what makes society in New Zealand, so success. In overall, there are 300 active cooperative work with others groups. Beside that, there are more than 1.8 million total of members. Flexibility model number of cooperative efforts was used to getting profit. Cooperative in New Zealand operate by democracy, communication and co-operative can offer a grant of large cap dividend, responsive, responsible and innovative and proactive is the secret of success in New Zealand society [5].

2. EXPERIMENTAL

2.1 Materials, method and instruments

Data used in this study is secondary data. This data was obtained from the Cooperative Commission of

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Malaysia Terengganu, based on the 2010 Annual Report and analysed by using SPSS version 17.0 software. The data obtained should not be modified because the data is obtained directly through the primary source. But the name of every society who are involved are not disclosed at the request of the parties involved. Factors affecting the loss of cooperative problem listed in this study involving six independent variables and one dependent variable. The variables independent involved are the number of legally registered cooperatives (X_1), Assets held by each cooperative (X_2), the region (X_3) of each cooperative that is located in Terengganu either at State, North, South or Central, Function (X_4) of the cooperatives such as in field consumers, agriculture and services, Shares capital (X_5) the amount of capital used by each of the cooperative who are involved in the initial engagement, and Turnover (X_6) earned by the end 2010. Dependent variable (Y) takes the value 0 representing profits earned a cooperative and a value of 1 is the opposite of the problem where losses involved. To achieve the objectives of this study, several steps should be taken to implement the survey analysis

2.2 Backward Likelihood-ratio Selection

Starting the model with only a constant, it begins the model with all predictors included. Computer test whether any of these predictors can be removed from the model without having a substantial effect on how well the model fits the observed data. Wald statistic is usually used to ascertain whether a variable is a significant predictor of the outcome. However, it is probably more accurate to examine the likelihood because when regression coefficient (B) is large, the standard error tend to become inflated. Result in Wald statistic being underestimated (Menard, 1995).

2.1.1 Check multicollinearity

If the value in correlation matrix less than 0.7, means that multicollinearity does not exist, but if the value in correlation matrix more than 0.7, means that multicollinearity are exist [3].

2.4. Check 2 way interaction term

Test 2 way interaction term one at a time. Choose the 2 independent variable and create interaction term, Check if P value < 0.05 , means that the model have interaction.

2.5 The Hosmer-Lemeshow test

The Binary Logistic Regression procedure reported the Hosmer-Lemeshow goodness-of-fit statistic. At each step, this is a goodness-of-fit test of the null hypothesis that the model adequately fits the data. If the null is true, the statistics should have an approximately chi-square distribution with the displayed degrees of freedom.

If the significance of the test is small (less than $\alpha = 0.05$) then we reject H_0 and conclude that the model does not adequately fit the data.

2.6 Classification table

The classification table helps to assess the performance of the model by cross-tabulating the observed response categories with the predicted response categories.

2.7 Area under the Receiver Operating Characteristic (ROC) curve

The ranges of area under the ROC curve should be from 0 to 1. This value is used to determine that the model is able to assess the model discrimination. If the value of the area was 0.5 and less means the model was useless for discrimination [1].

2.8 Establish final model

The meaning of logistic regression coefficient is not straightforward as line regression coefficient. The predictors and coefficient values was shown in the last step that were used for making the predictions. The prediction equation was [4].

$$\log \left[\frac{p}{(1-p)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_i X_i$$

3. RESULTS & DISCUSSION

Descriptive Analysis

Based on table 3.1, 11 cooperative in the state region most experienced losses. But only 5 cooperative at central region experienced losses. Based on table 3.2, 20 cooperative which users operate most experienced losses compared to cooperative in field services. Based on table 3.3, 23 cooperative which had turnover in mikro scale most experienced losses compared to cooperative which had turnover in large scale.

Association Test.

From the correlation matrix in table 3.4, not all variables are correlated with other. For overall, only Turnover and asset with shares capital and asset have a moderate relationship since the value of r more than 6. In univariate analysis, the variable that has p-value less than 0.25 is significant. In this case, there are 3 variables that are significant (Assets, Functions and Turnover).

After analyze the data using Backward Stepwise (Likelihood Ratio), only 2 variables are significant since the p-value were less than 0.05. The variables that significant were functions and turnover.

Table 3.1 Demographic characteristics of performance with region.

		Functions			Total
		Consumers	Agriculture	Services	
Y = Performance	Profit	163	20	7	190
	Loss	20	9	3	32
Total		183	29	10	222

Table 3.2 Demographic characteristics of performance with functions

		Region				Total
		North	South	State	Central	
Y=Performance	Profit	42	53	56	39	190
	Loss	8	8	11	5	32
Total		50	61	67	44	222

Table 3.3 Demographic characteristics of performance with turnover

		Turnover				Total
		Mikro : Rm0- Rm199999	Small: Rm200000 -Rm999999	Simple : 1 million -rm4999999	Large : >= 5 million	
Y=Performance	Profit	132	43	9	6	190
	Loss	23	3	6	0	32
Total		155	46	15	6	222

Table 3.4 : Correlation between variables , r

	Y = Performance	Members	Functions	Turnover	Shares capital	Assets
Y=Performance	1	-0.184	0.214	-	-	-
Members	-	1	-0.367	0.207	-	0.198
Functions	0.214	-0.367	1	-	-	0.308
Turnover	-	0.207	-	1	-	0.630
Shares capital	-	-	-	-	1	0.662
Assets	-	0.198	0.308	0.639	0.662	1

All possible two way interaction was checked. The p-value for interaction between Function and Turnover is 0.172. Therefore there was no interaction between Function and Turnover since the significant value is more than 0.05.

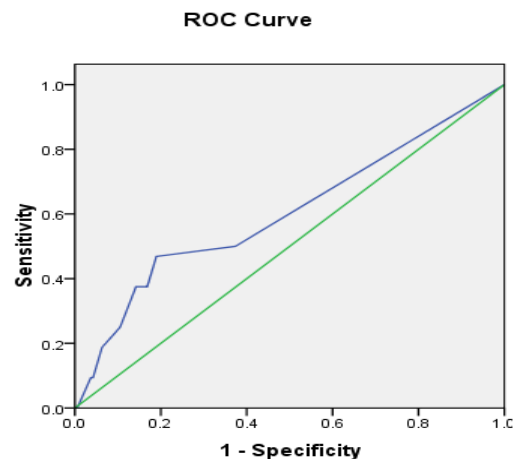
Multicollinearity among predictors can lead to biased estimates inflated standard error. Since the all value of significant less than 0.7, multicollinearity does not exist between variables regarding to the correlation matrix

The Hosmer and Lemeshow test indicate a poor fit if the significant value is less than $\alpha = 0.05$. After using the Backward -LR process, the chi-square value is 1.700 and p-value is 0.637. Here, we can conclude that the model adequately fits the data since the p-value is 0.637, which is larger than $\alpha = 0.05$.

The overall correctly classified was 85.1 percent. It means that overall, 85.1% of the cases are classified correctly. The overall percentage correct is good if above 80%.

The area under the Receiver Operating Characteristic (ROC) curve was 0.603(60.3%) represents the probability that the assay result for a randomly chosen positive case will exceed the result for a randomly chosen negative case. It has a significant p-value which means that using the assay is better than guessing. (95% CI = 0.487, .720 with standard deviation 0.060 and p-value less than 0.05).

In multivariate analysis, the significant independent factors were Function and Turnover by using Backward -LR. But the Turnover were not significant because the p-value is greater than 0.05. So, the area under the ROC curve is used to determine whether to retain the variable Turnover or not. The area under the curve when the variable Turnover is included in the model is higher compared when the variable is eliminated. So, the final model will include Function and Turnover.



Diagonal segments are produced by ties.

Final model

$$OR_{Loss} = e^{-1.9916 + 1.387agriculture + 1.525services - 0.899simple + 2.123small - 19.096mikro}$$

Cooperative which had assets less than Rm 23561070. had 1 times odds of losing compared to cooperative which had assets more than Rm 2361070. But there is a risky of loss in income because the odd ratio, Exp (B) equal to 1. The cooperative which work in the field of agriculture had 4.033 times odds of losing compared to cooperative in field of consumers. Beside that, For the Cooperative work in field of services had 4.593 times odds of losing compared to Cooperative in field of consumers. Cooperative in field agriculture and services have a higher risk of loss in income because the value of odds ratio, Exp (B) more than 1.

Cooperative which get a turnover in simple scale between (Rm 1 million – Rm 4999999) had 0.407 times odds of losing compared to Cooperative which get a turnover in large scale (more than 5 million). and Cooperative which get a turnover in small scale between (Rm 200000-Rm 999999) had 8.360 times odds of losing compared to Cooperative which get a turnover in large scale (more than 5 million). Furthermore, Cooperative in Mikro scale between (Rm 0-Rm 1999999) had 0 times of losing compared to Cooperative which get a turnover in large scale (more than 5 million). Cooperative which get the turnover in simple scale and mikro scale have a less risk of loss in income compared to cooperative in small scale because the odds ratio, Exp (B) less than 1.

4. CONCLUSSION

Cooperatives at state region which was (11) most experiences loss compared to north, south and central region. Next, 183 cooperatives at Terengganu preferred to

involved in consumers business compared to agriculture and services business. There was association between assets, function and turnover towards performance. It meant only three factors were important in order to classify the performance status. From the logistic model, we found that there is a risky for cooperatives which had assets less than Rm 23561070. Beside that, cooperatives in field agriculture and services have a higher risk of loss in income. Lastly, Cooperative which get the turnover in simple scale and mikro scale have a less risk of loss in income compared to cooperative in small scale.

RECOMMENDATION

Based on conclusion, the government especially Cooperative Commission of Malaysia (SKM) should take actions to prevent the cooperatives become loss. Many program should be conduct to increase their turnover. Futhermore, SKM also must be more attention to cooperatives in sector agriculture and services because the number of this cooperatives are small

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