

## **Factors Influencing Cooperative Membership and Share Increment: An Application of the Logistic Regression Analysis in the Malaysian Cooperatives**

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*This study investigates factors that influence cooperative membership and their share capital increment using the binary logistic regression analysis. Data from a survey conducted in late 2008 with 380 respondents (members and non-members) from cooperatives in Selangor and Kuala Lumpur were used to investigate the factors. The study showed that age, occupation, AGM attendance and membership duration are important predictors in the model. It was found that people in the older age group (45 years thru highest) are 19 times more likely to become members. Those in the private sector are 0.517 less likely to become members as compared to government servant. Those that diligently attended cooperative AGM were found to be 4 times more likely to increase their cooperative share holding.*

**Field of Research:** Cooperative, Development economics

### **1. Introduction**

Cooperative is defined in the Malaysia Cooperative Societies Act 1993 (Act 502), as an organization formed and owned by a group of individuals for the purpose of improving their participation in economic and social activities of its members based on the cooperative principles. All cooperatives in Malaysia are managed based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity. Following the Statement of Cooperative Identity 1995 by the International Cooperative alliance (ICA), Malaysian cooperatives also observed the seven universally accepted principles.

Co-operatives are regarded by government as a tool for the country economic development especially in helping to eliminate rural poverty, enhance rural and urban development, solves the unequal income distribution and thus bridging the income disparity between rural and urban. The movement has been considered as the third engine of growth besides public and private sector. Commitment and confidence placed by the government are reflected by the financial and non-financial support indicated in various development plans (Azmah Othman and Fatimah Kari 2008).

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As in other countries such as Spain, Italy and Canada, cooperative development in Malaysia is also influenced by the government's commitment and support (Adeler 2009). Malaysian government have played important role towards the promotion and continued growth of co-operatives. Technical assistance in the form of seconding government officers to co-operatives to assist them during their initial development stage helped co-operatives overcome their initial financial burden.

As at December 2010, there are 8,146 registered cooperatives in Malaysia with 6.6 million members (Malaysian Cooperative Societies Commission, 2012). Relate this to the total number of populations in Malaysia (28.3 million in 2010), 23.3 percent of the population is a member of some form of Malaysian cooperative. Although these figures can be an indication of support from the people, co-operatives in Malaysia is still at a cross roads due to stiff competition and challenges from other institutions and organizations that are also expanding and developing rapidly with increased opportunities in and outside Malaysia.

The co-operative movement is facing problems and challenges that need to be address by the cooperative themselves and the government. In the National Co-operative Policy (NCP) 2002-2010 the government had acknowledge that a majority of co-operatives are small in size and capital, they are facing members' apathy problem and have very poor networking among them. They are also facing problem generating and getting sufficient capital to implement their activities (Malaysia, Department of Cooperative Development 2003). As a grass root organization, it is the people in the cooperative that should be given the most attention. A typical social economic enterprise organized by the people and run by themselves, naturally they themselves would ensure that they reaped the benefit of their own labour. People being referred here are the cooperatives' members. The findings of this research are different from other research as this study focus on factors that influence cooperative membership and their share increment in Malaysia. This is important because the success or failure of the organization highly depends on membership and to a certain extent the share increment.

The importance of cooperative movement in the economic development and lack of research on cooperative in Malaysia has motivated the researchers to examine two issues. They are:

1. The factors that might influence cooperatives' membership preferences such as their age, income level, types of occupation, educational background and level of outside involvement and
2. The factors that affect and influence members' decisions to increase share capital contribution such as capital ownership in a cooperative, the duration of membership, attendance at annual general meetings (AGM), familiarity with board of directors (BOD), involvement in other cooperative activities, and involvement in other voluntary activities.

These issues are pertinent as they could affect the cooperatives performance in this country. Furthermore the issues have not been discussed before by past researchers. Past works on cooperatives have looked at the cooperative development and policies in West Malaysia (Fredericks1986), cooperative contributions in providing housing for

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Malaysian (Alip Rahim, Abu Hassan Abu Bakar & Abdul Mutalip Abdullah n.a) and the efficiency of Fishermen cooperatives in Malaysia (Jamilah Din 2006). The findings from this study are also useful for cooperative board of governance, management as well as government agencies supervising and monitoring the cooperative movement in Malaysia.

This paper is divided into 5 parts. Following the introduction is part 2, which discuss in brief the literature review. Part 3 present data and methodology followed by results from the analysis in part 4 and in part 5 are the discussions and conclusion.

### **2. Literature Review**

Cooperative organizations are seen by most people as a form of social enterprise as well as a grass root organization with potential in helping people. Various researches on cooperative role in community development in countries around the world and its role in poverty reduction confirmed the cooperative importance (Birchall & Ketilson 2009, Birchall & Simmons 2008, Frederick 1997 and Zeuli & Cropp 2004). Although cooperative organizations have been in existence in Malaysia for the past ninety years (Malaysia Societies Cooperative Commission, 2012), there is still a need for in depth studies on the movement. As compared to other types of organizations, cooperative has not been a very popular research topic.

Past research done by Fredericks (1986) on cooperative movement in West Malaysia showed that there are differences between cooperative policies before and after independence. His study also concludes that the movement have economic and social impact on the communities. Another research by Azmah Othman 1999, on consumer cooperatives' in Peninsular Malaysia found that consumer cooperatives are not attracting members from the lower income people and was behind in terms of performance when compared with private businesses. Alip Rahim, Abu Hassan Abu Bakar & Abdul Mutalip Abdullah (n.a) disclosed that housing cooperatives have not been very successful and recommends a production subsystem to strengthen these cooperatives activities. On a more recent note, Jamilah Din (2006) studied the Fishermen's Associations in Malaysia and found them to be beneficial for the members as they provide both economic and social benefits.

To the best of the researchers' knowledge no other research was undertaken with the focus on finding factors influencing membership in Malaysia and our respondents are both members and non members. Yet, membership and progress of cooperative business are related because unlike other businesses, cooperatives are highly dependent on members for business survival and success.

Membership participation, commitment and members' loyalty became important, complex and sensitive issues in the development and progress of cooperatives. Cooperative members' commitment and their trust towards their directors are influenced by their economic background, age and experience in the cooperative (Osterberg, Hakelius, & Nilsson 2007). Trusts among cooperative members are also important in determining group cohesion and performance (Hansen, Morrow & Batista 2002). As

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cooperative membership size gets bigger and more heterogeneous, this will likely to affect members' commitment, democratic control and cooperative success (Fulton 1999 and Fulton & Giannakas 2001). The linkages between membership, patronage and investment will also affect cooperative progress (Pischke & Rouse 2004). Increase in membership will increase members' share capital commitment. As amount of capital held by cooperative gets bigger with more members' share, the ability to invest in technology, training and education will also improved. However, loyalty among cooperative members constitutes challenge to the cooperative model. Experts on cooperative suggest that cooperation among cooperatives could be a way out in enhancing cooperative benefits and reducing membership loyalty problems (Zeuli & Bentancor 2005).

### 3. Data and Methodology

Data used for analysis is primary data collected via survey using self-administered questionnaires from twenty cooperatives. Questions regarding respondent's background (age, income level, types of occupation, educational background), members capital contribution such as capital ownership in a cooperative, the duration of membership, attendance at annual general meetings (AGM), familiarity with board of directors (BOD), involvement in other cooperative activities, and involvement in other voluntary activities and level of outside involvement were posed. Survey was done in late 2008 on cooperatives from Selangor and Federal Territory, Kuala Lumpur. The number of respondents is 380 (175 cooperative members and 205 non-members). The selections of cooperatives were based on random sampling and the respondents were randomly picked and interviewed at the respective cooperatives visited.

The Statistical Package for Social Science (SPSS) version 11.0 was used to analyze data from this study. The analysis went through the exploratory steps where data was checked, explored and cleaned, followed by examination of distributions and frequencies. Descriptive statistics and graph were run for each variable to check for missing values and outliers. Chi-square test was used to test the following relationship and to identify the significant variables in this study:

1. The relationship between cooperative membership and age, income level, occupation, educational background and involvement in outside activities.
2. The relationship between members' cooperative share increment and the duration of membership, AGM attendance, attendance at other cooperative activities, involvement in outside activities.

Following Chi-square test, two logistic regressions were carried using two dichotomous dependent variables (in the first model: members or non members, in the second model: increase share or no share increase). Variables that are found to be significant in the Chi-square test were then selected as the independent variables for the logistic regression models. Each of the independent variable was tested for univariate association with membership status using simple binary logistic regression.

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Logistic regression analysis was performed to identify factors that could influence the choice of becoming a cooperative member or otherwise in the first model and for a member to increase share or not to increase share. The dependent variable in this regression equation is the logarithm of the odds that a particular choice will be made. The independent variable include age of respondent, gender, types of occupation, monthly income level, involvement in outside activities and academic background.

The logistic model can be written as follows:

$$\text{Prob (event)} = \frac{1}{1 + e^{-z}} \text{ where } Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p \quad (\text{Equation 1})$$

The probability of the event not occurring is estimated as

$$\text{Prob (no event)} = 1 - \text{Prob (event)}. \quad (\text{Equation 2})$$

The selected significant independent variables were the ones with p-value < 0.05. A multivariate logistic regression analysis was then conducted in the effort of finding an optimal model with all the independent variables that maintain a significant association with membership status. A forward stepwise likelihood ratio method was chosen and the Chi-square test statistics were examined. Age and occupation were found to be the two significant predictors selected by the first logistic regression model.

Chi-square test was run to examine the association between member's preferences to their cooperative share increment, individual's membership duration, familiarity with BOD or the management, the frequency of attending their cooperative annual general meeting (AGM) and their income level. These independent variables were considered important factors influencing member's preference to share increment. Significant variables were identified and analysed further as the independent variables in the second model with member's preference to share increment as the dependent variable.

The effectiveness of the model expressed in the equation was tested by performing the overall model evaluation. The improvement over the baseline is examined by looking at the three inferential statistical tests: the -2LL, Cox & Snell (CS) R square, Nagelkerke (N) R square and Hosmer and Lemeshow tests. The results are as follows: R square= 1.00 (H & L), .22 (Cox & Snell), .30 (Nagelkerke). Model  $\chi^2 = 82.28$  (1) with p-value .000. Similarly results for the second model showed R square = 1.00 (H & L), .068 (Cox & Snell), .092 (Nagelkerke), model  $\chi^2 = 11.74$  (1) with p-value .003. The results indicate that the logistic regression model fits the data well for both models. Diagnostic checks on the model were carried using the residuals analysis for adequacy of the fitted model. Influence analysis was carried to check for outliers applying measurement such as Cook's distance, leverage, standardized residuals and DFBeta values. Cook's distance and Leverage value are less than 1. All the standardized residuals are under  $\pm 1.96$ . All the DFBeta for constant as well as predictors are less than 1. Hence indicate no outliers detected in the data.

#### 4. Result from the Analysis

Table1 shows the Chi-square tests results on factors influencing membership preferences. Result of tests showed that age, occupation, income level, involvement in outside activities are statistically associated with cooperative membership. Gender and education level attainment however are independent of membership.

**Table 1: Results of Pearson Chi-Square Tests**

Variables	Value	df	Asymp. Sig(2-sided)
Age*Membership	80.139	2	.000*
Gender*Membership	.523	1	.470
Occupation*Membership	32.186	3	.000*
Education level*Membership	1.332	3	.721
Monthly Income*Membership	36.704	3	.000*
Outside Involvement*Membership	16.078	2	.000*

Note: \* significant at .05

Table 2 shows the result of univariate logistic regression. Result shows that Wald statistics for all variables age (1) and (2), occupation (1), (2) and (3), monthly income (1),(2), and (3) with the exception of outside involvement are less than 0.05. Following these findings, all variables with p-value less than 0.05 are useful and are entered into the model.

**Table 2: Univariate Analysis by Using Binary Logistic Regression**

Variables	Wald Statistics	df	p-Value	Exp (B)	95% C.I. for Exp (B)	
					Lower	Upper
Age (1)	42.575	1	0.000	.054	.023	.130
Age (2)	7.824	1	0.000	.289	.121	.689
Gender(1)	.523	1	0.470	1.168	.767	1.778
Occupation(1)	12.305	1	0.000	.366	.209	.642
Occupation(2)	8.317	1	0.004	.370	.188	.727
Occupation(3)	25.830	1	0.000	.100	.041	.244
Monthly Income(1)	33.055	1	0.000	.115	.055	.241
Monthly Income(2)	11.048	1	0.001	.319	.163	.626
Monthly Income(3)	5.173	1	0.023	.390	.173	.878
Outside Involvement(1)	3.814	1	0.051	.247	.061	1.005
Outside Involvement(2)	.318	1	0.573	.669	.165	2.708

The result of the final logistic regression model is shown in Table 3 below.

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**Table3: Multivariate Analysis using Forward Stepwise Likelihood Ratio**

Variables	B	S.E	p-Value	Exp (B)	95% C.I. for Exp (B)	
					Lower	Upper
Constant	-0.943	0.394	0.017	0.389	-	-
Age (1)	1.744	0.354	0.000	5.723	2.858	11.458
Age (2)	2.953	0.516	0.000	19.163	6.965	52.721
Occupation(1)	-0.660	0.315	0.036	0.517	0.278	0.959
Occupation(2)	0.271	0.467	0.561	1.312	0.526	3.273
Occupation(3)	-0.793	0.883	0.369	0.453	0.080	2.553

Following the logistic regression results, the final model that explained the factors associated with cooperative preferences are:

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

$$Z = -0.943 + 1.744 x_1 + 2.953 x_2 - 0.660 x_3 + 0.271 x_4 - 0.793 x_5$$

Where,

Z = log odds of cooperative membership preferences = ln (odds (membership preferences))

x<sub>1</sub> = Age (1): 25.01 years old to 45 years old

x<sub>2</sub> = Age (2): 45.01 years old thru highest

x<sub>3</sub> = Occupation(1): private sector workers

x<sub>4</sub> = Occupation(2): self employed/ pensioner/ unemployed/ no fixed job

x<sub>5</sub> = Occupation(3): students

From the results in table 3 of the logistic regression, it can be explained that individuals in age group between 25.01 years old to 45 years old are 5.723 times more likely to become members taking individual age less than 25 years old as the baseline group. However, those in the older age group (45.01 years old thru highest) are 19.163 times more likely to become members.

Those in the private sector are 0.517 less likely to become members taking the government servant as a baseline. Among those that are self employed/ pensioner/ unemployed and having no fixed job the result showed that they are 1.312 times more likely to join cooperative. However students are 0.453 time less likely to become members.

In the second model, chi-square tests result for analysis of factors that are associated to member's preferences for share increment is featured in table 4 below.

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**Table 4: Results of Pearson Chi-Square Tests on Share Increment**

Variables	Value	df	Asymp. Sig (2-sided)
Membership Duration*Share Increment	8.709	3	0.033*
Familiarity with BOD*Share Increment	1.575	1	0.209
AGM Attendance*Share Increment	12.331	3	0.006*
Income level*Share Increment	2.659	4	0.616

Note: \* significant at .05

Result of tests showed that out of the five variables (membership duration, familiarity with Board of Directors (BOD), AGM attendance and age), two variables that is AGM attendance and membership duration statistically associated with members share increment. Familiarity with BOD and income level, however are independent of member preference of share increment.

**Table 5: Univariate Analysis by using Binary Logistic Regression for Share Increment Preferences**

Variables	Wald Statistics	df	p-Value	Exp (B)	95% C.I. for Exp (B)	
					Lower	Upper
Membership duration(1)	2.960	1	0.085	2.632	0.875	7.924
Membership duration(2)	5.321	1	0.021	5.143	1.279	20.676
Membership duration(3)	6.691	1	0.010	4.267	1.421	12.808
AGM attendance(1)	1.694	1	0.193	1.778	0.748	4.228
AGM attendance(2)	10.238	1	0.001	3.948	1.702	9.156

**Table 6: Final Model of Multivariate Analysis using Forward Stepwise Likelihood Ratio for Share Increment Preferences**

Variables	B	S.E	p-Value	Exp (B)	95% C.I. for Exp (B)	
					Lower	Upper
Constant	-1.068	0.350	0.002	0.344	-	-
AGM attendance(1)	0.604	0.443	0.173	1.829	0.768	4.356
AGM attendance(2)	1.373	0.429	0.001	3.948	1.702	9.156

The final model that explained the factors associated with cooperative share increment preferences are:

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2$$

$$Z = -1.088 + 0.604 x_1 + 1.373 x_2$$



Where,

$Z$  = log odds of member's preferences to increase shares =  $\ln$  (odds (member's share increase preferences))

$x_1$  = AGM attendance(1): attended AGM 1 – 3 times in the last 5 years

$x_2$  = AGM attendance(2): attended AGM every year in the last 5 years

Table 6 showed the results of the logistic regression that explains the cooperative member's behaviour towards share increment. Other covariates were not selected by the model as it was not important. It was revealed that among AGM attendees, those that went for 1 – 3 times in the last 5 years are 1.829 times more likely to contribute to cooperative share increment as compared to those that had never attended their cooperative AGM (baseline covariate). Those that diligently attended AGM were found to be 3.948 or 4 times more likely to increase their cooperative share holding.

The result from this study is similar to Osterberg, Hakelius, & Nilsson 2007, where age of cooperative members does matters to the developments of cooperatives. They have found that in agriculture cooperatives, age is associated to trust towards directors. Our research revealed that age is statistically associated to cooperative membership preferences. Research results are also consistent with Pischke & Rouse 2004 where members share capital represents the individual member's commitment to their cooperative. Results of this study demonstrate that members who were active in attending their cooperative AGM are committed towards share increment. AGM attendance portrayed members' responsibility and commitment to their cooperative. These positive attitudes indirectly promote group cohesiveness, encourage cooperative patronage and contribute to the achievement of material and social objectives and the success of the cooperatives. Thus, community and country will benefit from this healthy development.

## **5. Discussion and Conclusions**

The essence of cooperatives performance is their strong membership commitment and support. Cooperative success does not rely on the strength and efficiency of the board of governance and management alone but more importantly on their membership as they contributed to the financial strength as well as support and participate in cooperative activities. Without doubt, members played a role in the success or failure of their own cooperative. The analysis showed that those in the older age groups are more likely to become members as compared to the younger people. Hence this study concludes, membership is favourable to the older age group resulting in the potential shortage of younger members. As a result, there will be implications on the governance and decision making in cooperatives.

From the point of view of occupation, our result indicates that cooperative is favoured by workers in the government sector. There is a need for cooperative management to find ways to encourage people from private sector and the self employed to be members as well. The unemployed and non regular job holders seem to favour cooperative, therefore cooperative may be viewed as an organization helpful to them.

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Similar to other non-cooperative enterprises, cooperative enterprises require capital and other resources to enable them to operate smoothly and achieve their objectives. As a self help organization, cooperative financial strength lies on the membership. The internal sources of capital at times are more important and inexpensive compared to other sources. Internal capital is normally drawn from the members' contribution in shares, deposits and fees. Members share increment naturally plays a significant part in cooperative financial stability. Our analysis showed that the frequency of attending cooperative AGM and duration of cooperative membership are found to be statistically associated with members' share increment. Familiarity with BOD and income level, however are independent of members' preference of share increment. Members that have diligently attended AGM were found to increase their cooperative share holding. Thus, share increment and holdings have positive relationship with AGM attendance. Members were inclined to shoulder group responsibility, committed and supported their cooperative as their share holdings in the cooperative are higher.

These results have implications on the current and future government policy with regard to cooperative development in Malaysia. The cooperative movement may be facing problems in reaching out to the younger generations as compared to the older ones. This can have a severe impact on the cooperative business, sustainability, future success and survival of the cooperative movement. Cooperative performance and progress clearly depends on the trust and commitment of not only older people but also the young. In this new globalized era, effective governance and management of the any type of cooperative is dependent on the youthful, skilled, innovative and technological savvy membership. If the Malaysian cooperative movement intends to maintain as a viable and relevant organization and continue help support the community and the country development, the movement must pay due attention to ways of attracting new members and to the needs of the younger members.

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