

# **Determinants of microcredit loans repayment problem among microfinance borrowers in Malaysia**

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## **ABSTRACT**

Microfinance has been widely accepted as a policy option for alleviating poverty. However, microfinance institution often facing loan repayment problem. Loan default or lower loan collection can be caused by borrowers' themselves or unfavourable loan product's characteristics designed by the microfinance institutions. This paper investigates the determinants of loan repayment problems among microfinance borrowers in TEKUN and YUM institutions in Malaysia. By using logistic regression model, the empirical results showed borrower's characteristic (age, gender and type of business involved) and microcredit loan's characteristics (mode of repayment, repayment amount) are among the factors contribute to microcredit loan repayment problem among TEKUN and YUM borrowers in Malaysia.

**Keywords:** microcredit; loan repayment problems; subsidised microfinance institution; logistic regression; Malaysia.

## **1.0 Introduction**

Microfinance can be defined as financial instruments, such as loans, savings, insurance and other financial products that are tailored only to the poor. Microfinance is created in the economy for the economic benefit of the poor and to alleviate poverty. Microcredit is the lending side of microfinance. Microcredit loans help the poor to be involved in income generating activities that allow them to accumulate capital and improve their standard of living. As quoted by the late Milton Friedman, Nobel Prize winner in the Economics 1976, "The poor stay poor not because they are lazy but because they have no access to capital" (Smith & Thurman, 2007, p.1). This is true since many of poor people around the world are already benefiting from microfinance. Previously, microfinance was known as rural finance or informal finance. Rural finance and informal finance have similar characteristics and practices as microfinance, as they involved in small loans that are normally tailored to the poor. The term "microfinance" became popular and widely used with the establishment of Grameen Bank by Muhammad Yunus in the 1970s.

Microcredit was introduced in Malaysia as part of poverty eradication programmes in the country. Malaysia is a multi-ethnic country with three distinct ethnic groups; *Bumiputra*<sup>1</sup> Chinese and Indian. Malaysia gained independence from British rule in 1957. After receiving independence and a colonial inheritance of a well-developed infrastructure and efficient management, Malaysia experienced rapid economic growth (Menon, 2009). In the 1970s, the Malaysian economy was predominantly based on mining and agriculture then, in the 1980s, a transition began towards the industrial sector, which led to Malaysia's growth. Among the countries in East and Southeast Asia, Malaysia's per-capita income, levels of literacy and health care are well ahead of its neighbours (Menon, 2009). Despite the economic growth, the economic status of the *Bumiputras* did not improve. Although the average income of Malaysia was higher than its neighbours, large income disparities existed between the Malays and Chinese, inherited from the colonial period (Jomo, 2004). Between 1970 and 1990, the Malaysian government introduced the New Economic Policy (NEP) that undertook social and economic development in the country (Jomo, 2004). The main objective of the NEP was to eradicate poverty and restructure the society of the country (Jomo, 2004). It was hoped that the NEP would eliminate the identification of race with economic function; for example, Chinese in the business sector, Malays in agriculture and Indians in rubber plantations (Jomo, 2004). After the NEP, economic and social development of the country was continued, from 1991 to 2000, by the National Development Policy (NDP) framework. The NDP continued the policies of the NEP to reduce racial imbalances in the economic sector (Menon, 2009). Poverty reduction became a major objective in Malaysian development plans following the development of NEP and NDP. As a result, the incidence of poverty in Malaysia has fallen over the years. Although the overall poverty incidence in Malaysia has been reduced; there are still outstanding issues that need to be addressed. First, the *Bumiputra* still represent the largest ethnic group among those living in poverty and, secondly, the incidence of hard-core poverty in rural areas is still high.

Inspired by the microcredit programme in Bangladesh, microcredit programme was introduced in Malaysia in 1987. Despite the need to eradicate poverty, especially among *Bumiputra*, the microcredit programme also hoped to reduce the dependency of poor people on the government by promoting the concept of self reliance (Roslan, 2006). In microcredit programmes, the poor are given credit to start an income-generating activity. The first microfinance institution in Malaysia was Amanah Ikhtiar Malaysia (AIM), established in 1987. AIM provides microcredit services throughout Malaysia (Peninsular, Sabah and Sarawak). Meanwhile, in 1987, the state of Sabah established its own microfinance institution called Yayasan Usaha Maju (YUM), with a focus on providing microcredit loans to the poor people of Sabah. Both YUM and AIM replicate the Grameen Bank microcredit model. The third microfinance institution in Malaysia is The Economic Fund for National Entrepreneurs Group (TEKUN), established in 1998. TEKUN provides microcredit services throughout Malaysia. All of them are subsidised microfinance institutions and receive full financial support from the government in terms of grants and soft loans from its early establishment until today.

A major criticism of subsidised microfinance systems is their high default rates (Morduch, 2006; Robinson, 2001). This notwithstanding, according to the AIM management report as at 31 July, 2009, AIM recorded repayment rates of 98.98% (AIM, 2009). This is a good achievement for a subsidised microfinance institution. However, TEKUN and YUM did not record such a good repayment performance. For example, in 2009, TEKUN recorded an 85% repayment rate, with RM 225 million worth of loans outstanding since 1999 (Berita Harian, 2009). As at 31 December, 2008, YUM's repayment rate stood at 90.72% (YUM, 2009). What factors that influence the borrowers of TEKUN and YUM from having loan repayment problems?

This paper aims to empirically analyse the factors affecting the YUM and TEKUN borrowers of having loan repayment problems. The examination of the determinants of the loan repayment problem among TEKUN and YUM borrowers would benefit these two institutions in understanding the factors that lead borrowers miss their loan repayments or to default in the future. This understanding may improve their repayment collection scheme and future profit margins. The remainder of the paper is organised as follows. Section 2 provides an overview of microcredit lending system in Malaysia. Section 3 and 4 discusses the research methods and data collection, respectively. The empirical results are discussed in Section 5, with concluding remarks presented in Section 6.

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<sup>1</sup> *Bumiputra* is a Malay word that refers to the Malays and Indigenous people in Malaysia.

## 2.0 Malaysian Microcredit lending system

Malaysian microfinance institutions (AIM, YUM and TEKUN) have different types of lending systems and provide services to different strata of people. AIM and YUM offer loans to the poor and hard-core poor women, whereas TEKUN gives loans to both poor and not-so-poor men and women borrowers. AIM uses a group lending scheme, whereas TEKUN and YUM use an individual lending scheme.

Microfinance institutions in Malaysia offer only microcredit loans and no other microfinance services such as microsavings or microinsurance. This limited financial service is due to restrictions based on the Malaysia Banking and Financial Act 1989 that states *“No person shall carry on banking services, including receiving deposits on current account, deposit account, savings account or no other similar account, without a licence as a bank or financial institutions”* (McGuire et al., 1998, p. 9). Furthermore, within the restrictions of Muslim law (*Sharia Law*)<sup>2</sup>, interest cannot be charged on loans in Malaysia, therefore it has been replaced with management fees.

Apart of offering limited microfinance products, Malaysian microfinance institutions also have a standardised lending contract. For example, AIM and YUM impose weekly loan payments on all types of businesses, both small and agricultural businesses, regardless of their business revenue cycle (AIM, 2009; YUM, 2009). Both AIM and YUM also impose one and two week grace periods, respectively, to agricultural types of businesses (AIM, 2009; YUM, 2009). Unlike YUM and AIM, TEKUN gives reasonable grace periods to borrowers involved in agricultural businesses. For example, a one-year grace period is given for cattle farming activities, six months for fishponds and poultry farming and one year for fruit and vegetable farming (TEKUN, 2009). According to TEKUN, the duration of the grace period given to the borrowers is based on harvesting cycles (TEKUN, 2009). This study provides evidence about whether the microfinance institutions' (TEKUN and YUM) lending contracts such as their repayment period, repayment amount and mode of repayment, have any impact on borrowers' capability to repay their loans.

## 3.0 Research method and data collection

### 3.1 Conceptual framework and empirical model

The capability of borrowers to repay their microcredit loans is an important issue that needs attention. Borrowers can either repay their loan or choose to default. Borrower defaults may be voluntary or involuntary (Brehanu & Fufa, 2008). According to Brehanu and Fufa (2008), involuntary defaults of borrowed funds could be caused by unexpected circumstances occurring in the borrower's business that affect their ability to repay the loan. Unexpected circumstances include lower business revenue generated, natural disasters and borrowers' illness. In contrast, voluntary default is related to morally hazardous behaviour by the borrower. In this category, the borrower has the ability to repay the borrowed funds but refuses to because of the low level of enforcement mechanisms used by the institution (Brehanu & Fufa, 2008). Research has shown that a group lending mechanism is effective in reducing borrower defaults (Armendariz de Aghion, 1999). In group lending, the loan is secured by the co-signature of members within the group and not by the microfinance institution. Each member will put pressure on the others in the group to meet the loan repayment schedule. Thus, group sanction is important in discouraging defaults among members in microfinance (Van Tassel, 1999).

Studies on the effectiveness of the group-lending mechanism include Ahlin and Townsend (2007) on Thailand's microcredit borrowers and Olomola (2000) on Nigeria's microcredit borrowers. In addition, Sharma and Zeller (1997) and Zeller (1998) undertook studies on Bangladesh and Madagascar microfinance borrowers, respectively, examining the impact of group characteristics, lender characteristics and community characteristics on loan default rates. The repayment behaviour among borrowers in the group-lending model was also investigated by Wydick (1999). The author investigated the impact of social ties, group sanctions and peer monitoring on loan repayment behaviour among Guatemalan microfinance borrowers. Bhatt and Tang (2002) conducted a study to investigate the determinants of loan repayments in microcredit programmes that applied the group lending approach, but took a different approach. Bhatt and Tang looked at the borrower's socio economic variables instead of the elements of group lending for their influence on loan repayment behaviour. The borrower's socio-

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<sup>2</sup> Sharia law is a Muslim or Islamic law. It covers both civil and criminal justice as well as regulating personal and moral conduct of individuals based on the Holy Quran and Prophet Muhammad's teachings (Esposito, 2003).

economic variables included gender, educational level, household income and characteristics of the business (type of business, years in business, etc.). In their study, they found that a higher education level was significant and positively related to better repayment performance. Conversely, female borrowers, level of household income, type of business and borrower's experience had no significant effect on repayment behaviour.

Most previous research that investigated the issue of loan repayment defaults in microcredit concentrated more on the effectiveness of group lending in discouraging defaults. However, little study has been conducted on the issue of the credit worthiness of the individual lending design applied by microfinance institutions. Research on the determinants of loan repayment defaults in individual-based lending schemes can be found only for rural banks or semi-formal financial institutions. Chaudhary and Ishafq (2003) examined the credit worthiness of 224 rural borrowers in Pakistan. Using logistic regression, they found that borrowers with higher educational levels, involved in a non-farm business activity, who were using the loans for investment and were female had a higher probability of repaying their loan. The study found that the subsidised interest rate level did not have a significant effect on repayment behaviour among rural borrowers in Pakistan. They concluded that a subsidised interest rate was not the best way to ensure good repayment by borrowers.

The determinants of loan repayment rates for agricultural loans were investigated by Brehanu and Fufa (2008). Using probit and logit regression, they conducted a study on the determinants of repayment performance among small-scale farmers in Ethiopia. In the study, they found that borrowers with larger farms, higher numbers of livestock and farms located in a rainfall area had a higher capacity to repay loans, since all those factors increased the farmers' productivity and income. The study also found that borrowers who had extra business income and were experienced in using agricultural technology had a good repayment performance. Roslan and Abd Karim (2009) investigated microcredit loan repayment behaviour in Malaysia. They conducted a study on microcredit loan borrowers from AgroBank Malaysia. AgroBank is a commercial institution specialising in loans to borrowers involved in agricultural business. Apart from giving large-scale loans, it also provides small-scale loans, such as microcredit loans, to borrowers. In their research, they found that male borrowers and borrowers who had a longer duration for repayments had a higher probability of defaulting. Borrowers involved in non-production oriented business activities such as in the service or the support sectors who had training in their particular business and who borrowed higher loans had lower probabilities of defaulting. Okorie (1986) studied the repayment behaviour in one agricultural corporation in Nigeria. The author's results from interviews with borrowers showed that the nature of the loan, either cash or in kind (seeds, fertilizer and equipment) can influence the borrowers' repayment behaviour. He found that borrowers who received a loan in kind had higher repayment rates than borrowers who received a cash loan. This was because many borrowers misused the cash, diverting it into personal consumption instead of investing in making their business productive. Regular visits by the loan officer to the borrowers' business site and higher profits generated by the borrowers also contributed to higher repayments by borrowers. Overall, the loan repayment performance can be influenced by three factors: borrower characteristics, business characteristics and loan characteristics.

### 3.2 Estimation techniques

The determinants of the loan repayment problem model were analysed using logistic regression. The loan repayment model is as follows (Gujarati, 1995):

$$\text{Loan repayment problem} = f(\text{Borrower characteristics, business characteristics, microcredit loan characteristics}) \quad (1.1)$$

$$P_i = E(Y_i = 1 | X_{ij}) = \frac{1}{1 + e^{-z_i}} = \frac{1}{1 + e^{-(\alpha + \sum_j \beta_j X_{ij} + \epsilon_i)}} \quad (1.2)$$

Where:

$Y_i$  is equal to 1 if the borrower missed loan repayments more than four times in the two years since receiving the microcredit loan (having a repayment problem); 0 if the borrower never missed a loan repayment (not having a repayment problem); and

$P_i$  is the estimated probability of a loan repayment problem (high value of  $P_i$  implies a high loan repayment problem risk);

$$Z_i = \alpha + \sum_j \beta_j X_{ij} + \varepsilon_i$$

$Z_i$  is the probability of a loan repayment problem,

$\alpha$  and  $\beta_j$  are an intercept term and parameter, respectively.

$X_{ij}$  are the vectors of borrower characteristics, business characteristics and microcredit loan characteristics; and

$\varepsilon_i$  is the error term.

Equation 1.2 represents the cumulative logistic distribution function. If  $P_i$  is the probability of having loan repayment problem, then the probability of not having loan repayment problem or  $(1 - P_i)$  is given by:

$$(1 - P_i) = \frac{1}{1 + e^{Z_i}} \quad (1.3)$$

Therefore, the odds in favour of having a loan repayment problem or  $\frac{P_i}{1 - P_i}$  can be written as:

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i} \quad (1.4)$$

Taking the natural log, equation 4.4 becomes:

$$Z = \ln \left( \frac{P_i}{1 - P_i} \right) = \alpha + \sum_j \beta_j X_{ij} + \varepsilon_i \quad (1.5)$$

Where  $Z_i$  is the natural logarithm of the odds ratio in favour of having a loan repayment problem.

The model is a binary choice model so the use of the ordinary least squares estimation technique is inappropriate (Maddala, 1983). Thus, to obtain efficient parameter estimates, the maximum likelihood estimation technique is applied to the logistic regression. The likelihood function  $L$  for the model is given by (Maddala, 2001):

$$L = \prod_{Y_i=1} P_i \prod_{Y_i=0} (1 - P_i) \quad (1.6)$$

From equation 1.5, the probability of having a loan repayment problem can be obtained by the following equation (Greene, 1997):

$$P_i = \text{Prob} \left( Y_i = 1 \mid X_{ij} \right) = \frac{e^{Z_i}}{1 + e^{Z_i}} \quad (1.7)$$

### 3.3 Explanatory variables

#### 3.3.1 Dependent variable

The dependent variable for the logit model takes a value of "1" for borrowers who missed a loan repayment more than four times in the two years since they received the microcredit loan and "0" if they never missed a loan payment<sup>3</sup>.

#### 3.3.2 Independent variables

The independent variables used in the logit model are:

$X_1$	=	Gender (+): gender of borrower (1=male, 0=female) <sup>4</sup>
$X_2$	=	Marital status (+): marital status of the borrower (1=single, 0=married)
$X_3$	=	Educational level (-): educational level of borrower (1= higher than primary school, 0= lower than primary school)
$X_4$	=	Business type (+): type of business conducted by borrower (1=agricultural type of business, 0=small business)
$X_5$	=	Extra income (-): existence of borrower's extra income (1=yes, 0=otherwise)
$X_6$	=	Repayment period (+): loan term period (1=more than 1 year, 0=less than 1 year)
$X_7$	=	Repayment mode (+): weekly mode of payment paid by the borrower (1=yes, 0=otherwise)
$X_8$	=	Extra loan (+): existence of borrower's extra loan (1=yes, 0=no)
$X_9$	=	Age: a vector of dummy variables indicating age group between borrowers [where $X_{9(1)}$ = 1 for 18-25 years old, 0=otherwise; $X_{9(2)}$ =1 for 26-35 years old, 0=otherwise; $X_{9(3)}$ = 1 for 36-45 years old, 0=otherwise; $X_{9(4)}$ = 1 for 46-55 years old, 0=otherwise]
$X_{10}$	=	Number of dependants: a vector of dummy variables indicating number of dependants in the borrower's household [where $X_{10(1)}$ = 1 for 1-2 people, 0=otherwise; $X_{10(2)}$ =1 for 3-4 people, 0=otherwise; $X_{10(3)}$ = 1 for more than 4 people, 0=otherwise]
$X_{11}$	=	Business revenue: a vector of dummy business revenue indicating amount of revenue received by borrowers [where $X_{11(1)}$ = 1 for less RM1,000, 0= otherwise; $X_{11(2)}$ =1 for RM1,001-RM2,000, 0=otherwise; $X_{11(3)}$ = RM2,001-RM3,000, 0=otherwise; $X_{11(4)}$ = RM3,001-RM4,000, 0=otherwise; $X_{11(5)}$ = More RM4,000, 0=otherwise]
$X_{12}$	=	Repayment amount: a vector of dummy repayment amount indicating amount of payment paid by weekly [where $X_{12(1)}$ = 1 for less than RM100, 0=otherwise; $X_{12(2)}$ =1 for RM101-RM150, 0= otherwise; $X_{12(3)}$ =1 for RM151-RM200, 0=otherwise; $X_{12(4)}$ = More RM201, 0=otherwise]

### 4.0 Data Collection

The primary data is used in this study and were collected through survey interviews using a structured questionnaire. TEKUN borrowers were selected from Selangor and Melaka (West Malaysia), Kelantan (East Malaysia) and Kedah (North Malaysia). This provided an adequate representative population of TEKUN borrowers in Malaysia. The surveys were conducted in several districts in the selected regions. In the West Region, the surveys were conducted in the Kuala Langat district of Selangor, and the Teluk Mas and Masjid Tanah districts in Melaka. In the East Region, four districts in Kelantan were chosen: Tumpat, Tanah Merah, Pasir Mas and Kota

<sup>3</sup> Initially, this study wants to examine the determinants of loan defaults among the borrowers from TEKUN and YUM. However, the study could not access information on loan defaulters of the two institutions since the information is private and confidential. Therefore, as an alternative, in the survey questionnaire borrowers were asked whether they had missed loan repayments more than four times since they received the microcredit loans two years previously. This approach is similar to Sexton (1977), who classified borrowers who missed any repayments as bad borrowers. It is believed that the borrowers who faced problems in repaying their loans are more likely to default in the future.

<sup>4</sup> This hypothesis is tested only on TEKUN's borrowers since the borrowers are male and female.

Bharu. The survey was also conducted in four districts in Kedah (North Region): Kuala Muda, Padang Terap, Kota Setar and Langkawi Island. YUM borrowers were surveyed in the state of Sabah, where the institution is located. Three districts in Sabah were chosen for survey administration: Kota Kinabalu, Kota Belud and Kota Marudu. Using a stratified sampling technique, a total of, 204 TEKUN and 268 YUM borrowers (usable sample) from four states (Selangor, Kedah, Kelantan and Sabah) were included in the sample.

## 5.0 Results and discussion

### 5.1 Determinants of loan repayment problem among TEKUN and YUM borrowers

Logistic regression was used (Equation 1.2) to investigate the determinants of the microcredit loan repayment problem among TEKUN and YUM borrowers. The maximum likelihood estimation technique was used. Tables 1.0 and 2.0 present the results of the logistic model for TEKUN and YUM, respectively. Table 1.0 shows that four out of 20 predicted influencing factors were statistically significant (Chi-Square = 45.1836, P-Value = 0.001, 20 degrees of freedom). The estimated coefficients were statistically different from zero variously at the 1% and 5% levels of significance. Overall, the logistic model successfully predicted factors contributing to 74.26% of the microcredit loan repayment problem among TEKUN borrowers.

The significant positive sign on the *Gender* variable indicated that the probability of a loan repayment problem was higher for males than for females. As hypothesised, male borrowers were less responsible and disciplined in repaying their microcredit loans than female borrowers. Since TEKUN male borrowers have a higher problem in repaying their loan, TEKUN needs to check the financial commitment of male borrowers in their family as well as the record of any male borrower's financial obligations towards loans in other financial institutions before granting them a new loan. The *Business Type* variable was positive and significant at the 5% level of significance. This implied that borrowers involved in agriculture, such as farming, animal husbandry and fisheries, were more likely to have a problem repaying the microcredit loan than borrowers involved in a small business activity. The finding supports the hypothesis that the lower revenue cycle in agricultural businesses creates repayment problems for borrowers. The reliance of agriculture on the weather caused fluctuations in production that were beyond the control of the farmers.

Hence, since TEKUN borrowers involved in agricultural activities have a greater problem repaying their loan, TEKUN needs to consider giving flexibility in loan repayments to borrowers who receive income irregularly caused by drought or flood. In addition, TEKUN also needs to consider introducing a microinsurance policy especially weather insurance for borrowers. A discussion with TEKUN management regarding the reason borrowers involved in agricultural business faced problems in repaying their loans revealed that it was also related to government policy during the fifth Malaysian prime minister, Tun Abdullah Bin Ahmad Badawi (November 2003-2009). The government, in its efforts to reduce the number of unemployed graduates, introduced a special scheme to help new graduates find jobs. One scheme encouraged them to be involved in agriculture. The objective was to encourage young graduates to become agribusiness entrepreneurs in line with the country's mission, which was to promote the country's agricultural industry. This coincided with TEKUN giving microcredit loans to young graduates to be involved in agricultural projects. However, many projects faced problems and some were unsuccessful because the young graduates lacked knowledge and experience in agriculture.

Table 1.0: Logit estimates for the microcredit loans repayment problem for TEKUN borrowers

Independent Variables <sup>1/</sup>	Estimated Coefficients	Marginal Effect
Gender	1.1087***	0.1823
Marital status	-1.0044	-0.1250
Educational level	-0.3785	-0.0607
Business type	1.5028**	0.3221
Extra income	-0.0843	-0.0136
Repayment period	0.1422	0.0234
Repayment mode	1.2794**	0.2070
Extra loan	0.7865	0.1477
<i>Dummy variables<sup>2/</sup></i>		
(Age)		
Age <sub>(2)</sub>	0.8940	0.1678
Age <sub>(3)</sub>	0.7532	0.1255
Age <sub>(4)</sub>	1.9923**	0.3894
(Dependant)		
Dependant <sub>(2)</sub>	0.1101	0.0182
Dependant <sub>(3)</sub>	0.4164	0.0633
(Business revenue)- in Malaysian Ringgit-RM		
Business revenue <sub>(2)</sub>	0.3085	0.0520
Business revenue <sub>(3)</sub>	0.0359	0.0058
Business revenue <sub>(4)</sub>	-0.1851	-0.0289
Business revenue <sub>(5)</sub>	0.3092	0.0531
(Repayment amount)- in Malaysian Ringgit (RM)		
Repayment amount <sub>(2)</sub>	-0.9522	-0.1311
Repayment amount <sub>(3)</sub>	-0.11194	-0.0177
Repayment amount <sub>(4)</sub>	-0.4605	-0.0723
Constant	-3.6924**	
McFadden R-squared	0.1572	
Log likelihood	-94.2965	
LR statistics	45.1836**	
Degree of Freedom	20	
Total observation	204	
% Correct Prediction	74.26	

Note: 1/. Dependent variable=1 if borrower has missed payment more than four times; 0 otherwise

2/. To avoid the dummy trap problem, a dummy variable is dropped in each group. The group that has the fewest responses is dropped.

\*\*,\*\*\*, represent 5% and 1% significance level, respectively.

The results also showed that the *Repayment mode* coefficient was positive and significant at the 5% significance level. That result implies that the probability of a loan repayment problem was higher for borrowers who repaid their loans on a weekly basis. As hypothesised, a weekly loan repayment schedule posed problems for borrowers who generated a lower revenue cycle. Therefore, TEKUN should consider lowering the weekly repayment amount and a longer duration of payments in response to borrowers who generate lower revenue having a problem meeting their weekly repayment. The *Age<sub>(4)</sub>* dummy variable was positive and significant at the 5% level. This implies that borrowers in the 46 to 55 age group had a higher probability of having repayment problems. This finding contradicted the hypothesis that older borrowers were more responsible in repaying their loans than younger borrowers. This could be because the TEKUN borrowers in this age group might have higher financial commitments to their family and business expenses. Thus, with higher financial obligations, they could have difficulty in repaying their loans. Hence, it is suggested that TEKUN requests information and analyses the financial commitments and obligations of borrowers in this age group as a condition of giving them the loan. TEKUN should have a certain limit of microcredit loans to the borrowers who have higher financial commitments to family or other financial institutions.



Table 1.0 shows the coefficients for the remaining explanatory variables. *Marital status*, *Educational level*, *Extra income*, *Repayment period*, *Extra loan*, *Age<sub>(2)</sub>*-(26-35 years old), *Age<sub>(3)</sub>*-(36-45 years old), *Dependant<sub>(2)</sub>*-(3-4 people), *Dependant<sub>(3)</sub>*-(more than 4), *Revenue<sub>(2)</sub>*-(1,000-2,000), *Revenue<sub>(3)</sub>*-(2,001-3,00), *Revenue<sub>(4)</sub>*-(3,001-4,000), *Revenue<sub>(5)</sub>*-(More 4,000), *Repayment<sub>(2)</sub>*-(101-150), *Repayment<sub>(3)</sub>*-(151-200), *Repayment<sub>(4)</sub>*-(More 201) did not significantly contribute to the repayment problem among TEKUN borrowers.

Additional information can be obtained through an analysis of the marginal effects calculated as the partial derivatives of the non-linear probability function, evaluated at each variable's sample mean (Greene, 2003). For example, the results showed that a unit increase in the *Gender* factor results had an 18.23% probability that a male borrower will have a loan repayment problem (see Table 1.0). Similarly, a unit increase in the *Business type* factor resulted in a 32.21% increase in probability that a borrower whose business was in agriculture will have a loan repayment problem. From the marginal effects values in Table 1.0, it can be concluded that TEKUN should rank borrowers aged between 46 and 55 as the most important factor contributing to a loan repayment problem. Agricultural businesses and weekly repayment instalments were the second and third most important factors affecting the loan repayment problem. Being a male borrower was the fourth most important factor contributing to the loan repayment problem.

The estimated results of the YUM loan repayment problem are presented in Table 2.0. *Gender* and *Repayment mode* variables were excluded from YUM models because YUM offered loans only to women borrowers and imposed weekly loan payments. The results showed four of the 17 predicted influencing factors were statistically significant (Chi-Square=52.9038, P-Value=0.001, 17 degrees of freedom). The coefficients were statistically different from zero variously at the 1%, 5% and 10% levels of significance. Overall, the logistic model successfully predicted the factors that contributed 76.32% to the microcredit loans repayment problem among YUM borrowers.

The results show the *Business type* coefficient was positive and significant at the 1% significance level. This result was similar to TEKUN borrowers and shows that borrowers involved in agricultural business activities such as farming, animal husbandry and fisheries, had a higher probability of encountering repayment problems than borrowers involved in a small business activity. Apart from the income irregularity facing by the borrowers, the results also showed that the YUM standard lending contract for an agricultural business with weekly loan repayments and a two week grace period could have contributed to loan repayment problems. Thus, a revision of the lending contract is necessary by YUM to overcome this problem. This study found a significant negative effect of *Repayment period* at the 5% significance level. The finding implies that borrowers who had a loan period of over one year had a lower probability of having a loan repayment problem. This means the longer the duration of loan contracts offered by YUM the less of a problem borrowers have in repaying their loan. This is a sign to YUM that their longer duration of loan contract is not giving a problem to the borrowers in meeting their loan repayments.

The *Age<sub>(1)</sub>* dummy variable was positive and significant at the 10% level of significance. This implies that borrowers aged between 18 and 25 years old had a higher probability of having a problem in repaying their loans. The age group 18 to 25 years old is the youngest group among YUM borrowers. These findings support the argument that older borrowers would be more responsible and disciplined in repaying their loans than younger borrowers. The lack of experience in the business involved, which resulted in less income received, might be the reason that the younger group has difficulty in repaying the loan. In addition, younger borrowers are not committed to repaying their loan since they might believe that even if they default; they still can receive microcredit loans from other microfinance institutions because they have more opportunities since they are still young. Thus, YUM needs to monitor closely businesses that belong to borrowers in this age group and ensure they make full use of the loan given. The *Repayment amount<sub>(4)</sub>* coefficient was positive and significant at the 10% level of significance. This result suggests that the probability of having a loan repayment problem was higher for borrowers who repaid more than RM201 per week. The finding supports the hypothesis that higher loan repayments burdened borrowers, especially those who received a lower cycle of cash flow. Since YUM imposed weekly loan repayments on all kinds of borrowers regardless of their business cycle, borrowers in general confront problems in repaying loans with repayments over RM201 per week. Thus, YUM needs to revise its lending system that applies weekly loan repayments on all type of businesses in a way to reduce repayment problems faced by borrowers.

Table 2.0 shows that the coefficients of the remaining explanatory variables: *Marital status*, *Educational level*, *Extra income*, *Extra loan*, *Age<sub>(2)</sub>*- (26-35 years old), *Age<sub>(3)</sub>*- (36-45 years old), *Dependant<sub>(2)</sub>*- (3-4 people), *Dependant<sub>(3)</sub>*- (more than 4), *Revenue<sub>(1)</sub>*- (Less than 1,000), *Revenue<sub>(2)</sub>*- (1,001-2,00), *Revenue<sub>(3)</sub>*- (2,001-3,000), *Repayment<sub>(2)</sub>*- (101-150), and *Repayment<sub>(3)</sub>*- (151-200), did not have any significant effects on the loan repayment problem among YUM borrowers. The marginal effects results in Table 2.0 show that a unit increase in the *Business type* factor resulted in a 31.32% probability that a borrower whose business was in agriculture will have a loan repayment problem. In contrast, borrowers with a *Repayment period* of over one year had a decreased probability of 15.61% of having a loan repayment problem (see Table 2.0). Based on the marginal effects results, it can be concluded that YUM should rank agricultural types of businesses as being the most important factor contributing to loan repayment problems. Borrowers aged between 18 and 25 years old and with repayments of over RM201 per week are the second and third, respectively, most important factors affecting the loan repayment problem.

Table 2.0: Logit estimates for the microcredit loans repayment problem (YUM borrowers)

Independent Variables <sup>1/</sup>	Estimated Coefficients	Marginal Effect
Marital status	0.5192	0.0896
Educational level	-0.0010	-0.0001
Business type	1.8698***	0.3132
Extra income	0.4283	0.0778
Repayment period	-0.8177**	-0.1561
Extra loan	1.1142	0.1777
<i>Dummy variables<sup>2/</sup></i>		
(Age)		
Age <sub>(1)</sub>	1.2021*	0.2739
Age <sub>(2)</sub>	0.3353	0.0667
Age <sub>(3)</sub>	-0.1231	-0.0233
(Dependant)		
Dependant <sub>(2)</sub>	0.3474	0.0634
Dependant <sub>(3)</sub>	0.3957	0.0736
(Business revenue)- in Malaysian Ringgit-RM		
Business revenue <sub>(1)</sub>	1.4657	0.2599
Business revenue <sub>(2)</sub>	0.8591	0.1765
Business revenue <sub>(3)</sub>	1.0601	0.2379
(Repayment amount)- in Malaysian Ringgit-RM		
Repayment amount <sub>(2)</sub>	-0.3681	-0.0657
Repayment amount <sub>(3)</sub>	-0.6721	-0.1100
Repayment amount <sub>(4)</sub>	0.7553*	0.1599
Constant	-1.0813	
McFadden R-squared	0.1637	
Log likelihood	-135.1261	
LR statistics	52.9038**	
Degree of Freedom	17	
Total observation	268	
% Correct Prediction	76.32	

Note: 1/. Dependent variable=1 if borrower has missed payment more than four times, and 0 otherwise;

2/. To avoid the dummy trap problem, a dummy variable is dropped in each group.

The group that has the fewest responses is dropped.

\*, \*\*, \*\*\*, represent e 10%, 5% and 1% significance level, respectively.

## 6.0 Conclusion

The results of the determinants of loan repayment problems among the TEKUN and YUM borrowers showed that the borrower's characteristics (age and gender), business characteristics (business type) and loan characteristics (repayment period, repayment mode, and repayment amount) were among the factors that influenced

borrowers in repaying their loans. For example, male borrowers in TEKUN had problems in repaying their loan. Further, for both TEKUN and YUM borrowers involved in agricultural businesses, this fact contributed to loan repayment problems. This study found that the age of the borrower contributed to loan repayment problems. TEKUN and YUM borrowers aged between 46 to 55 years old and 18 to 25 years old, respectively, had loan repayment problems. Higher financial commitments to family could be the reason older borrowers in TEKUN had problems repaying their loan. Meanwhile, microcredit loans offered by YUM are attracting more young age borrowers than older people. The less income received resulting from a lack of experience in the business involved might be the reason they are having problems repaying their loan. Younger borrowers might also have the perception that they have more opportunities to get microcredit loans even though they already had become a defaulter with one microfinance institution.

Weekly loan repayments caused problems for TEKUN borrowers in repaying their loans, but a loan repayment period of over one year gave fewer problems to YUM borrowers in repaying their loans. YUM borrowers who had to pay over RM201 weekly loan instalment faced problems in repaying their loans. Overall, the findings of this study show that the loan repayment problems facing the TEKUN and YUM borrowers were not only caused by the individual borrower's characteristics and business type but also the lending system (grace periods, mode of repayment, repayment amount) imposed by the microfinance institution. The study findings have implications for microfinance institutions. With regard to YUM borrowers involved in agricultural businesses who were facing problems in repaying their loan, this study found that the lending system, such as weekly loan repayments and the two weeks grace period used by YUM, might have contributed to the problem. Borrowers involved in agricultural businesses used credit both to buy inputs, such as seed, fertilizer and pesticides, and assets, such as farm machinery and livestock. These borrowers have different time frames for their revenue cycle. For example, if the borrower uses credit to buy seed, the borrower needs at least six months to one year to receive the revenue from harvesting the crop. Therefore, they cannot pay back the loan in two weeks. Thus, YUM management should re-evaluate and recognize these weaknesses in their lending system and modify it in order to reduce the burden on the borrowers in repaying loans.

With regard to TEKUN offering loans to inexperienced young graduate to conduct agricultural businesses that resulted in many unsuccessful agricultural projects, this study recommends that TEKUN, as well as other microfinance institutions, ensure that borrowers have the experience and related skills in agriculture before granting them loans. This study also found that TEKUN borrowers who repaid by weekly loan instalments had problems repaying their loans. The repayment schedule, weekly, monthly or seasonally, was determined by the borrowers. Many borrowers involved in small businesses preferred to make loan payments on a weekly basis. However, many of them could not meet their weekly loan repayment schedule. Since TEKUN recorded a high level of non-performing loans worth RM225 million (Berita Harian, 2009), they should guide borrowers to choose the most suitable mode of payment and it must be based on the borrower's revenue cycle. TEKUN also needs to closely monitor the businesses of male borrowers and the borrowers aged between 46 and 55 since these groups contributed significantly to the loan repayment problem. Meanwhile, YUM needs to closely monitor borrowers aged between 18 and 25 because this is an age group that also had loan repayment problems. Agriculture is exposed to climatic factors beyond the borrowers' control. This study recommends that microfinance institutions offer a microinsurance especially weather insurance. An insurance plan not only reduces the burden on the borrowers if their agricultural project failed but also reduces the financial burden on the microfinance institution from uncollectible loans. As a conclusion, the flexibility of the lending contract is really needed in TEKUN and YUM. The study showed that their lending contract has given problems to borrowers in repaying their loan.

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