Determining factors of non-performing financing in Islamic microfinance institutions

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A B S T R A C T

This paper investigates the determining factors of non-performing financing in Islamic microfinance institutions (MFIs) in Indonesia. Using logistic regression, the study sample comprises data from 140 clients; 90 with a good financing status and 50 with a poor financing status. The results show that age, gender, occupation, and type of contract influence the non-performance of clients of Islamic MFIs in Indonesia. Probit regression confirmed the results.

1. Introduction

In this paper, we study factors that influence non-performing financing in Islamic microfinance institutions (MFIs) in Indonesia. An MFI is a financial institution that aims to help and provide financing for the lower classes of society and to reduce poverty (Berhane and Gardebroek, 2011; Fianto et al., 2018). Besides providing financial services to the community, they also help to develop clients' business capacity (Littlefield et al., 2003). Islamic MFIs are institutions that have Islamic values and follow Islamic principles, which can be a solution for people who are not able to access formal financial institutions (e.g., banks) (Ahmad and Ahmad, 2009; Fianto et al., 2018). Islamic MFIs provide several financing products that parallel Islamic beliefs, such as profit and loss sharing (PLS) and non-PLS mechanisms (Dhumale and Sapcanin, 1999).

Our study examines the factors that influence non-performing financing by Islamic MFIs and concludes with an analysis of the economic consequences of the results. The motivation 'Why Indonesia?' is because Indonesia has the world's largest Muslim population and the development of Islamic MFIs in the country is promising (Fianto et al., 2018). Since Muslims need financial products that parallel their beliefs, Islamic MFIs can become institutions that play a significant role in Indonesia. Many Indonesians live in rural areas and Islamic MFIs are institutions that can cover people in rural areas (Fianto et al., 2018).

Among studies on non-performing financing/loans is that by De Aghion and Morduch (2004). The paper begins with the history of microfinance and then focusses on the Grameen bank in Bangladesh. De

Aghion and Morduch (2004) explain that there are many ways to reduce the default rate or non-performing financing of clients, e.g., group lending, focussing on gender (females), and occupation (farmers) before disbursing the finance, are ways to reduce the default rate. Income level, education, and socio-economic factors are also important in minimizing non-performing financing (De Aghion and Morduch, 2004). The issue of financing women is interesting. According to De Aghion and Morduch (2004), there are reasons why women are superior to men in managing finance. From the financial point of view, women are more conservative in managing money and poor women have fewer options to use money than men. From a social point of view, women feel more shame with their peers (community) when they cannot repay the finance as scheduled (De Aghion and Morduch, 2004).

Morduch (1999) examines the repayment rate for the Grameen Bank from 1985 to 1997. The study highlights that key innovations in the Grameen Bank are weekly repayment schedules, progressive increases in loan size, and a focus on female clients (Morduch, 1999). The disbursement of finance by Islamic MFIs is based on several requirements. Beside the capacity of the clients to repay the loan, the products and services must follow certain standards set by Islamic scholars (Azmat et al., 2015; Fianto et al., 2018). The quality of financing for financial institutions is important. Particular attention has been paid to microfinance's use of group-lending contracts with joint liability, a mechanism that reduces problems of moral hazard and adverse selection (Morduch, 1999).

This study examines factors that influence non-performing financing using socio-economic features of the clients (age, gender, education level, occupation), geographical aspects (distance and location), and finance

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characteristics (types of contract and total financing). The limited literature about non-performing financing in Islamic MFI is obvious. This study aims to fill that literature gap using evidence in from Indonesia, the world's largest Muslim population country.

1.1. The motivation for studying Islamic MFIs

Islamic MFIs have different mechanisms from conventional MFIs. The products and services from Islamic MFIs are free from interest and follow Islamic principles, i.e., not to engage in *maysir* (gambling) and *gharar* (uncertainty contracts) (Chong and Liu, 2009; Fianto and Gan, 2017; Fianto et al., 2018; Rahman, 2010). To replace interest, basically there are two financing mechanisms in Islamic MFIs, PLS and non-PLS schemes. A PLS scheme is a business agreement between two or more parties where all parties share their resources and their returns are based on a pre-agreed ratio. A non-PLS scheme generates profit through margins and a fee based on the services provided (Abdul-Rahman et al., 2014; Akhter et al., 2009; Dhumale and Sapcanin, 1999).

In 2010, there were for 1.6 billion Muslims in the world; this number is expected to grow to about 2.8 billion by 2050, equal to 23.2% and 29.7%, respectively, of the world's population. Table 1 shows the countries with the world's five largest Muslim populations in 2010. Indonesia had 209 million Muslims or 13.1% of the world's Muslim population. As the largest Muslim population country, about 87.2% of Indonesia's population is Muslim. India had the second most Muslims (176 million) followed by Pakistan (167 million), Bangladesh (134 million) and Nigeria (77 million) (Pew Research Center, 2015). However, despite Muslims representing over 23% of the world's population, in 2014, they produced only about 15% of the world's total GDP (Organisation of Islamic Cooperation, 2015).

Poverty is a major problem in countries with a Muslim majority. Based on data from SESRIC (2015), in 2011, about 33.1% of the world's total poor lived in the Organisation of Islamic Cooperation (OIC) countries. The top five OIC countries with the greatest number in poverty are: (1) Nigeria; (2) Bangladesh; (3) Indonesia; (4) Pakistan; (5) Mozambique. Nigeria has 98.6 million poor contributing about one third (30.7%) of the OIC's total poor. Bangladesh is second with 18.8% (60.5 million), followed by Indonesia with 12.3% (39.5 million), Pakistan with 7% (22.4 million), and Mozambique with 4.2% (13.4 million) (SESRIC, 2015).

According to Berhane and Gardebroek (2011); Fianto and Gan (2017); Fianto et al. (2018); Littlefield et al. (2003), MFIs are institutions that aim to achieve financial inclusion, especially by helping the rural poor. Moreover, Islamic MFIs are uniquely different from conventional MFIs because their products and services follow Islamic law. Finally, Indonesia as the largest Muslim country and Muslims demand products and services that parallel their beliefs.

2. Theory

There are some studies that investigate conventional and Islamic MFIs. For instance, Saad and Duasa (2010) investigate the determinants of economic performance of clients participating in Amanah Ikhtiar Malaysia (AIM) in Malaysia. The study examines respondents' socio-economic background, incomes and assets, borrowing status from AIM, expenditure, and their awareness and opinions when receiving

financing from AIM. The study revealed that finance received by AIM participants correlated with their economic performance. Clients with more education were better at handling their project or business (Saad and Duasa, 2010).

According to the study by Ashraf et al., (2014), the proportion of women clients is significant in recovering non-performing financing by Islamic MFIs especially in Organization of Islamic Conference (OIC) countries. The study investigates the performance of MFIs in OIC countries and non-OIC countries based on several aspects such as loan recovery, financial performance, and outreach (Ashraf et al., 2014). Nawai and Shariff (2013) reveal that clients' knowledge of religion is correlated with clients' financing performance. Other factors such as distance, loan type, and repayment schedule, also contribute to the clients' repayment quality. The study focusses on factors that influence repayment performance in MFI programs in Malaysia (Nawai and Shariff, 2013). A study on the determinants of performance by Islamic and conventional MFIs by Fersi and Boujelbéne (2016), reveals that sustainability in Islamic MFIs is related to social performance but in conventional MFIs, financial performance is the factor that determines sustainability.

Some studies focus on the impact of financing by MFIs. Studies by Fianto et al. (2018) and Ghalib et al. (2015) investigate the relationship of rural household access to microfinance with poverty reduction in Indonesia and Pakistan, respectively. Both studies reveal that MFI financing had a positive impact on rural household welfare and helped reduce poverty. A study by Fianto et al. (2018) investigated the impact of the two types of financing mechanisms by Islamic MFI on changes in rural households' welfare. The study exhibit that PLS financing mechanism has a greater positive impact on rural households' welfare compare to non-PLS financing mechanism (Fianto et al., 2018).

3. Methods

We compile specific data for 90 clients with good financing repayment status and for 50 clients with poor financing repayment status (default categories 2, 3, and 4). Based on the regulations of the Ministry of Cooperatives and Micro, Small, Medium enterprises of the Republic of Indonesia No. 35.3/Per/M.KUKM/X/2007, the collectability of finance for conventional and Islamic MFIs is divided into four categories. The financing categories are: (1) good performance; (2) poor performance; (3) under monitoring (close to default); and (4) defaulter. All data were collected from the databases of selected Islamic MFIs in Indonesia at the end of 2018. The variables used in this study are divided into three groups: socio-economic (age, gender, education level, and occupation), geographic (distance and location), finance characteristics (type of

Table 1
The countries with the world's five largest Muslim populations in 2010.

No	Country	Share of the world's Muslim population	Share of Muslims within the country	Muslim population
1	Indonesia	13.1%	87.2%	209 million
2	India	11.0%	14.4%	176 million
3	Pakistan	10.5%	96.4%	167 million
4	Bangladesh	8.4%	90.4%	134 million
5	Nigeria	4.8%	48.8%	77 million

Source: Pew Research Center (2015).

Table 2
The variables used in the logit model.

Variable	Type of variable	Description of variable
Socioeconomic		
Age	Continuous	Age of client (in years)
Gender	Dummy	Gender of client (1 = female, 0 = male)
Educational level	Dummy	Educational level of client (1 = upper middle class, 0 = lower middle class)
Occupation	Dummy	Occupation of client (1 = formal, 0 = informal)
Geographic		
Distance	Dummy	Distance from member's residence to the cooperative (1 = far if >10 km, 0 = close <10 km)
Location	Dummy	Geographic location of member's residence (1 = city, 0 = district)
Finance characteristics		
Type of contract	Dummy	Contract type used in financing (1 = PLS, 0 = Non-PLS)
Total financing	Dummy	Client's total financing (1 = Less than 3 mill IDR[1], 2 = 3 mill - 8 mill IDR, 3 = 8 mill -18 mill IDR, 4 = 18 mill -30 mill IDR, 5=> 30 mill IDR

[1] In 19th January 2019, 1 USD = 14,177 IDR (Bloomberg, 2019).

contract and total financing). Table 2 defines the variables used in the empirical model.

The sample selection method was purposive sampling. Purposive sampling, also called judgement sampling, is the deliberate choice of an informant because of the qualities the informant possesses. It is a non-random technique that does not need underlying theory or a set number of informants. In this technique, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Lewis and Sheppard, 2006).

To identify the factors that influence non-performing financing in Islamic MFIs, we used the discrete choice model (DCM) that models the choice from a set of mutually exclusive and collectively exhaustive options (Li et al., 2011; Train, 2009; Umoh, 2006). The logit model to forecast the probability of having non-performance n of clients is as follows:

$$P_n(Y_n = 1) = Pr(U_{1n} > U_{0n}) = Pr(Z_n > 0) = \frac{1}{1 + e^{-\beta X_n}}$$

Where Y_n equals 1 if the client has a poor repayment status and 0 otherwise; and P_n is the estimated probability of a client having a non-performing status. The logit model is used because it is similar to the formula of choice probability (Train, 2009). The logit model is also convenient to use and the probability (e.g., of non-performing status) is logically distributed (Ben-Akiva and Lerman, 1985; Li, 2010).

4. Results & discussion

4.1. Socio-economics

Table 2 summarizes the clients' general characteristics. The results indicate that non-performing and performing clients are mostly in the 36–55 age category (84.0% and 83.3%, respectively). Non-performing clients are mainly males (60.0%); performing clients are dominated by females (81.1%). In terms of education level, both groups are dominated by clients with upper middle-class education level (90% in non-

performers and 88.9% in performers). This means that most respondents have completed senior high school or above. Most respondents in both groups work in the informal rather than the formal sector (see Table 3).

4.2. Geographic location

Both groups, non-performing and performing, are dominated by clients who live close to an Islamic MFI (78% and 77.8%, respectively). Most non-performing respondents live in district areas (56%) whereas the performing group is dominated by clients living in the city (60%) (see Table 3).

4.3. Finance characteristics

Clients with PLS contracts dominate the non-performers (84%), whereas clients with non-PLS contracts comprise two thirds of the performers (66.7%). Non-performing clients receiving 3–8 mill IDR (32.0%) were followed by clients receiving 8–18 mill IDR (22%), clients receiving 18–30 mill IDR (20%), clients receiving over 30 mill IDR (16%), and clients receiving less than 3 mill IDR (10%). Performing clients receiving between 3 – 8 mill IDR (37.8%) were followed by clients receiving less than 3 mill IDR (20.7%), clients receiving 8–18 mill IDR (18.6%), clients receiving between 18 – 30 mill IDR (14.3%), and finally receiving over 30 mill IDR (8.6%) (see Table 3).

4.4. Logistic regression of non-performing financing

The results from the logistic regression are presented in Table 4. In general, the logit model successfully predicted that 80% of the clients most likely to fall in the non-performing group because of the identified factors. Table 4 shows the factors that influence client non-performance with Islamic MFIs. The likelihood ratio test result, a chi-square test statistic, is 56.90, significant at the 1% level with 8 degrees of freedom, which means we reject the null hypothesis so the logit model can be used to explain the probability of non-performance of an Islamic MFIs' clients.

Table 3
Profiles of the clients in the sample.

Variable		Non-performing financing (N = 50)		Performing financing (N = 90)		Total (N = 140)	
		Sub-total	% to N	Sub-total	% to N	Sub-total	% to N
Age	21–35	1	2.0	8	8.9	9	6.4
	36–55	42	84.0	75	83.3	117	83.6
	56–70	7	14.0	7	7.8	14	10.0
	Total		100.0		100.0		100.0
Gender	Female	20	40.0	73	81.1	93	66.4
	Male	30	60.0	17	18.9	47	33.6
	Total		100.0		100.0		100.0
Education level	Upper Middle Class	45	90.0	80	88.9	125	89.3
	Lower Middle Class	5	10.0	10	11.1	15	10.7
	Total		100.0		100.0		100.0
Occupation	Formal	7	14.0	5	5.6	12	8.6
	Informal	43	86.0	85	94.4	128	91.4
	Total		100.0		100.0		100.0
Distance	Far (11–25 km)	11	22.0	20	22.2	31	22.1
	Close (1–10 km	39	78.0	70	77.8	109	77.9
	Total		100.0		100.0		100.0
Location	City	22	44.0	54	60.0	76	54.3
	District	28	56.0	36	40.0	64	45.7
	Total		100.0		100.0		100.0
Type of contract	PLS	42	84.0	30	33.3	72	51.4
	Non-PLS	8	16.0	60	66.7	68	48.6
	Total		100.0		100.0		100.0
Total Financing	Less than 3,000,000 IDR	5	10.0	24	26.7	29	20.7
	3,000,001–8,000,000 IDR	16	32.0	37	41.1	53	37.8
	8,000,001–18,000,000 IDR	11	22.0	15	16.7	26	18.6
	18,000,001–30,000,000 IDR	10	20.0	10	11.1	20	14.3
	>30,000,000 IDR	8	16.0	4	4.4	12	8.6
	Total		100.0		100.0		100.0

Table 4

Logit estimates for factors affecting non-performing financing.

Independent variable	Coefficient	Standard Error	Wald Statistic	Marginal Effect
Age	-0.0829**	0.0049	-2.30	-0.0122
Gender	1.1191**	0.0664	2.28	0.1643
Education level	0.9084	0.1167	1.13	0.1334
Type of occupation	-1.9154**	0.1226	-2.18	-0.2813
Distance	0.4031	0.0783	0.75	0.0592
Location	0.6143	0.0660	-0.98	0.0902
Type of contract	-2.6755***	0.0846	-3.83	-0.3929
Total financing	-0.1810	0.0268	1.33	-0.0266
Constant	4.8164	1.9049	2.53	
McFadden R-squared	0.3118			
Log-likelihood	-62.795815			
LR chi-squared	56.90***			
Degrees of freedom	8			
Total observations	140			

	Actual Respondents		
	Client	Non-Client	Total
Number of correct predictions	77	15	92
% of correct predictions	83.70	16.30	65.70
Number of incorrect predictions	13	35	48
% of incorrect predictions	27.08	72.92	34.20
Predicted probability	80.00		

** 5% significance level, *** 1% significance level.

This study also tests the correlation between the variables (see Table 5).

The results show that *Age*, *Gender*, *Occupation*, and *Type of contract* have a significant influence on client non-performance (see Table 4). The significant negative sign of *Age* indicates that clients who are older have a higher probability of not performing than younger clients. A possible argument for this is that younger clients have greater productivity than older clients. Another possible reason is that older clients are closer to retirement and present various risks, such as health issues, more than younger clients.

The results show that *Gender* is positive and significant, which indicates that male clients have a higher probability of non-performance than females. This result supports evidence from the Grameen Bank that female clients are better at managing loans/finance than men. Despite the fact that, in Indonesian culture, men are more dominant than women, this study shows, as in the literature, more men than women are non-performers.

Type of occupation is negative and significant, which indicates that clients working in the formal sector tend to fall more into the non-performance category than clients working in informal sector, which is an interesting result. This implies that working in the formal sector not always as secure as those working in informal sector with a non-fixed income or salary. The possible reason for the result is because most respondents in this survey work as small entrepreneurs who possibly have more income than those receiving a fixed salary. Another reason is that, with entrepreneurial skill, those clients tend to have good money management skills.

The *Type of contract* result is negative and significant, which shows

Table 5

Pairwise correlation of the independent variables for logistic regression.

	Age	Gender	Education	Occupation	Distance	Location	Contract	Financing
Age	1							
Gender	0.156	1						
Education	-0.001	-0.050	1					
Occupation	0.103	-0.106	-0.058	1				
Distance	-0.049	-0.203	0.129	-0.101	1			
Location	0.189	0.015	-0.039	-0.026	0.144	1		
Contract	-0.304	-0.509	0.171	-0.110	0.139	-0.145	1	
Financing	-0.079	-0.286	0.112	-0.111	0.107	0.044	0.490	1

that PLS contracts are more risky than non-PLS contracts. The result indicates that clients with PLS schemes have a higher probability of falling into the non-performing group. This result supports the literature that PLS financing has a higher risk than non-PLS financing, especially for Islamic financial institutions like Islamic MFIs. PLS financing exposes clients to the moral hazard issue especially in *mudharabah* (profit-sharing) contracts. The moral hazard is generally associated with ex-post information asymmetry when the clients have incentives to manipulate their profit (reduce the profit) before reporting to the Islamic MFI. The risk associated with PLS contracts is higher than for non-PLS ones. Therefore, non-PLS contracts (e.g., *murabahah* (cost plus mark-up contracts)) are more popular than PLS contracts with Islamic financial institutions (Dusuki and Abdullah, 2006; Fianto et al., 2018).

Table 4 also shows the average marginal effect of the variables of the logit model. The marginal effect provides an interpretation of the influence of the variables on non-performing financing in Islamic MFIs (Phan, 2012). The marginal effect measures the change in the probability of a certain choice with respect to a unit change in an explanatory variable (Gao, 2011). For instance, the marginal effect of *Age* indicates that an increase in a client's age increases the probability of non-performance in Islamic MFIs by 1.2%. The probability of non-performance increases by 16.4% if the client is male. Clients working in the formal sector have default probability 28.1% higher than clients working in the informal sector. Finally, clients receiving PLS financing contracts have a higher probability of falling into the non-performance group than clients who received non-PLS financing. Increases to clients with PLS financing contribute a 39.2% increase in non-performance.

4.5. Robustness test

Table 6 shows the probit regression results for factors in non-performing financing in Islamic MFIs. We used probit regression as robustness test to re-examine the eight variables that might influence

Table 6

Probit estimates for the factors affecting non-performing financing.

Independent variables	Coefficient	Standard Error	Wald Statistic	Marginal Effect
Age	-0.0475**	0.0208	-2.28	-0.0119
Gender	0.6620574**	0.2880	2.30	0.1661
Education level	0.4864253	0.4624	1.05	0.1220
Type of occupation	-1.084073**	0.5048	-2.15	-0.2720
Distance	0.2190259	0.3120	0.70	0.0549
Location	0.4012522	0.2642	-0.96	0.1006
Type of contract	-1.515159***	0.3752	-4.04	-0.3802
Total financing	-0.1063204	0.1105	1.52	-0.0266
Constant	2.75462	1.1123	2.48	
McFadden R-squared	0.3131			
Log-likelihood	-62.676449			
LR statistics	57.14***			
Degrees of freedom	8			
Total observations	140			

** 5% significance level, *** 1% significance level.

non-performance. The likelihood ratio test, a Chi-square statistic, is 57.14 (significant at the 1% level, 8 degrees of freedom), which means rejecting the null hypothesis. The probit model can be used to explain the probability of non-performance by clients of Islamic MFIs. The probit regression produces the same results as the logistic regression; four of the eight variables significantly influence non-performance: *Age*, *Gender*, *Type of occupation*, and *Type of contract* (see Table 6).

The average marginal effect of the variables in the probit model shows that: the marginal effect of *Age* is 1.1%, i.e., older clients increase the probability of default by 1.1%; males have a 16.6% higher probability of non-performance than females; clients working in the formal sector have a 16.6% higher risk of non-performance than clients in the informal sector; and clients with PLS financing have about a 38% higher probability of defaulting than clients with non-PLS financing (see Table 6). The results from probit model are slightly different from the logit model. However, the probit model confirms that the results from the logit estimation are valid.

5. Conclusions

This study takes a fresh look at the factors that influence non-performing financing in Islamic MFIs. From a financing point of view, PLS financing is different from conventional financing that involves interest in the transaction. PLS financing by Islamic MFIs encourages collaboration between the financial institution and its clients with sharing the profits and losses from the business. The main contribution of this study is that we identify the variables that predict the probability of non-performance in financing by Islamic MFIs. To the best of our knowledge, there is no other analysis of the factors that predicting non-performance financing by Islamic MFIs. Non-performance of financing is one indicator of a financial institution's performance that influences institutional sustainability.

The empirical results from the logistic regression show that a client's age, gender, occupation and type of contract influence client non-performance in Islamic MFIs. This implies that Islamic MFIs should consider age, gender, occupation and type of contract before disbursing finance to clients. Surprisingly, in this study, the main feature of Islamic finance, PLS financing, is a variable that contributes highly to non-performance of clients. This supports the fact that non-PLS financing is more popular than PLS financing. This result also confirms that PLS financing is riskier than non-PLS financing.

These results imply that if the government plans to maintain the sustainability of Islamic MFIs through reducing the non-performance rate, it should minimize the factors that influence the non-performance of Islamic MFIs' clients. By understanding the factors that influence client non-performance, the government may design a specific microfinance programme to accommodate the influencing factors. Islamic MFIs have an advantage over other financial institutions because their operation parallels Islamic law, i.e., it is free from interest, and MFIs are mostly located in rural areas.

Declarations

Author contribution statement

Bayu Arie Fianto: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Hayu Maulida: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Nisful Laila: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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The authors declare no conflict of interest.

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