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LENDING PATTERNS AND DETERMINANTS OF MICROFINANCE INSTITUTIONS PROFITABILITY IN ETHIOPIAN MICROFINANCE INSTITUTIONS

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Abstract:
This paper emphasizes the lending patterns and determinants of the microfinance institutions' profitability in Ethiopian by taking the different levels and ownership microfinance institutions with survey data in an ordered logistic regression model. The variables of the study such as the loan term, collaterals, knowledge for credit, costs of the loan, interest rates, loan size, lending methodology, credit information and credit repayment period have statistically significant and creates the relationships with the microfinance institutions profitability by holding the positive and negative signs. In the underlying study, the directions of the signs of the variables show that the lending patterns of the microfinance institutions support the profitability status and also the other consequences that affect the microfinance institutions' profitability status. Under the results of the study, the lending patterns of the microfinance institutions bring advantages to the microfinance institutions' to recognizes financial sustainability and healthy financial operations. Although the microfinance institutions' profitability determinant shares the other financial institutions' determinant of profitability variables. The study recommends for a future line of studies to undertake the on the determinants of the microfinance institutions' profitability, addresses the study with taking into accounts of the lending patterns of the institutions as internal factors and also other financial institutions determining factors to investigate and accomplishes the future dreams of the microfinance institutions.

Keywords:
Microfinance institutions, lending patterns, interest rates, Ethiopia
JEL Classification:
F35, C13, C21 & E43

1. Introduction

Microfinance institutions have evolved since the late 1990s as an economic development tool intended to benefits the low-income groups of people. In line with the economic development goals, the microfinance institutions are taken as a means to address the development objectives through creating job opportunities, reduce poverty, promote the business to diversify of the operations, empower women or disadvantaged groups of people, and encourages new business establishments. In short expression microfinance institutions have been expected to reduce poverty, which is considered as the most important development objective(Ledgerwood, 1999).

Microfinance institutions stand with the 1980s to undertake the responses of the doubts and research findings for the delivery of subsidized credit to the poor people, especially for farmers to improve agricultural activities. The governments and international donors have taken the assumptions of credit for the poor would be cheap and this way may promote agricultural production of the small landholders. In addition to providing subsidized credit for agricultural the donors set up credit unions inspired by the Raiffeisen model developed in Germany in 1864. The focus of these cooperative financial institutions was mostly on savings mobilization in rural areas in an attempt to teach poor farmers how to save(Ledgerwood, 2000).

In general speaking, the microfinance institutions are addressed unbanked clients and economically low-income people that are unable to access credit from banks with presenting collaterals. Microfinance institutions work for the economically active poor people who might be expected to take loans to run a small business(Ledgerwood, 2013). In 1976 the Grameen Bank introduced in Bangladesh with the concept of micro-credit to alleviate the poverty and this

experiment conducted by Muhammad Yunus with the focus of credit on the very poor people to alleviate the poverty. In this perspective the microfinance institutions in the last decade experienced on booming of innovations of lending products, partly powered by donors who see microfinance as the next promise to alleviate poverty in the period. In general, the microfinance institutions aim to reduce the vulnerability of clients although in another direction contributes to asset creation, improving repayment rate and sustainability of the services. The product of microfinance institutions innovations typically results from organizations striving to extend outreach, increase impact, and promote sustainability(Giné et al., 2006).

Different authors defined the term microfinance institution with having the similar essences on the microfinance institutions. Ledgerwood(2000)defined microfinance institutions as financial services for poor and low-income people to alleviate from poverty with the credit terms of the institutions. Microfinance institutions provide financial services including credit and savings, insurance and payment services. Also in accordance to United Nations defines microfinance institutions in a broad sense as provider of small-scale financial services such as savings, credit and other basic financial services to poor and low-income people. In this context microfinance institution implies that a wide range of organizations dedicated to providing these services and includes NGOs, credit unions, co-operatives, private commercial banks and state-owned banks. Microfinance is a dynamic field and there is clearly no best way to deliver services to the poor and hence many delivery models have been developed over a period of time(Nasir, 2013). In addition to availing the financial services microfinance institutions provides the financial intermediation and social intermediation services such as group formation, development of self-confidence, and training in financial literacy and management capabilities among members of a group(Ledgerwood, 2013).

The words microcredit and microfinance are often used interchangeably to indicate the range of financial services offered specifically to poor, low-income households and micro-enterprises(Stewart et al., 2010). Although they have different characters and loosely attached to contrasting beliefs about the state of rural finance and the nature of poverty. In the contextual meaning have a small difference whereas in opinion wise big differences between microcredit and microfinance. In the practices of Grameen Bank would be taken as microcredit that is initially focused on giving loans to the very poor people. In this context microcredit focus was explicitly on poverty reduction and social change. In comparison the microfinance came with the recognition of households benefit from access to financial services; in broader senses, their focus was mainly on savings and not just credit for microenterprises (Chatterjee et al., 2006). In comparisons to the traditional banks the microfinance institutions in their nature characterized by the high quality on the loan portfolio, savings mobilization, loan-approval system, loan recovery performance, and similar performance indices (Ledgerwood, 2000).

2. Literature Review

Microfinance institutions own the largest development program in worldwide to meet both the financial terms and the number of poor targeted people to alleviate from poverty. The microfinance institutions perform the micro-credit, micro-savings, micro-insurance, and money transfers, and have been attributed with enabling micro-entrepreneurs to build businesses and increase their income, as well as improving the general economic wellbeing of the poor. However, in Sub-Saharan Africa the lending and saving patterns of the microfinance institutions insignificant and this shows that the difficulties of the formal financial sectors in mobilizing savings and providing financial services, especially for poor people(van Rooyen, Stewart and de Wet, 2012). This indicates that the same is true in Ethiopia financial institutions, in terms of addressing economically lower income segmented clients and financial facilities are very much poor in comparison to other world practices of financial institutions.

The Ethiopian government presently liberalized the financial institutions in the financial policy to improve the infrastructures of the financial sectors of the country. Nowadays provides licenses and supervisions for banks, insurances, microfinance institutions and other financial institutions to operates in the country's financial sectors. While the microfinance institutions in Ethiopia is a recent phenomenon after the issuances of the proclamation number 40/1996 for the establishment of microfinance institutions. Presently microfinance institutions engaged on providing financial services in line to the perspectives of programs the worldwide programs of the microfinance institutions. In Ethiopian microfinance institutions legally registered with the National Bank of Ethiopia, abide by and meet all relevant policies and directives issued by National Bank of Ethiopia (NBE) (Ethiopia, 1996).

Microfinance institution programs stand to provide financial services for low-income groups of people to alleviate poverty. Although faces the challenges to address the programs concerning in relation to the costs of the loan, loan

terms, loan sizes or amounts, collateral requirements, interest rates, and other fee charges, lending methodologies, credit information or exposures, pieces of knowledge and values of the credit and credit repayment frequency to overcome the profitability of the institutions. Under different scholars' judgments the challenges that adhere to the microfinance institutions for profitability grouped into problems plaguing microfinance institutions, namely high-interest rates, sustainability issues, and ability of institutions to help the poor to generate income (Auwalin, no date). In line with this perspective the authors argued on microfinance institutions as instead of helping poor people, the loans from microfinance institutions often becomes a burden to poor people. The argument implies that the microfinance institutions usually impose high-interest rates on the loan to resolve the default risks of institutions to finance the poor people (Ghosh et al, 2001), as cited in (Auwalin, no date).

Microfinance institutions provide financial services for low-income people per the programs of microfinance institutions. Yet, the growths influenced by the regulatory and operational factors would hinder the smooth functions of microfinance institutions. The challenges faced with the microfinance institutions in financing the rural poor people the recognition of low profitability and high transaction cost while trying to maximize the reaching to the needy in terms of small credit at regular intervals(Prathap, Subrahmanya and Harisha, 2018). In addition to that, the challenges of microfinance institutions also evolved from the programs of the microfinance institutions as emphasized concerning cost-effectiveness of the organizational structures and the appropriateness of the organizational structures from the former financial services when working under non-government organizations and transformation to banks. This implies that when transformed microfinance institutions to commercial activities and concerned the hybrid forms of an organization evolves in the microfinance systems(Prathap, Subrahmanya and Harisha, 2018). While under the Sharma M (2011) study cited in (Prathap, Subrahmanya and Harisha, 2018) stated the challenges for banks are to establish a network of agents that can provide profitably as well as reliable services to lower-income people and such segments who do not have access to other banking facilities. Banks are expanding a wide range of services and are now looking range of services and are now looking to drive lending facilities through agents. Even this will depend on the microfinance institutions that understand this segment of people.

Microfinance institutions are crucial means to come up the financial inclusion services for low-income groups to access financial services(Prathap, Subrahmanya and Harisha, 2018). Financial inclusion refers to people and businesses having access to appropriate and affordable financial services within a given proximity to the lower income groups of people(Ledgerwood, 2013). Knowingly the financial inclusions measured with the access, usage, quality and welfare. While at the same time required from the institutions becomes sustainable and profitability financially to avail the expected services from the institutions(Hermes and Hudon, 2018). Nowadays owing the limited literatures on the microfinance institution profitability although the microfinance institutions offers banking services to poor. Existing empirical literature expressed the profitability of a financial intermediary as the return on assets (ROA) or the return on equity (ROE). This is measured as a function of internal and external factors. Internal factors are influenced by management decisions or within the control of firm management. Such factors include firm size, capital adequacy, credit risk provisioning, and efficiency in the management of operating expenses. The external factors include macroeconomic and industry-specific which reflect the economic, legal and business orientation within the context where the financial institution operates(Muriu, 2017). The determinants of the microfinance institutions drawn from the industry-specific and macroeconomic variables. In line with these perspectives, we can state several explanatory variables would be proposed for both categories depending on the nature and purpose of each study. The economy posts the negative reports on the microfinance institutions in developing countries like in Sub-Saharan African countries even though the microfinance institutions recognized large average profitability whereas dispersed the earned profit with corruption(Muriu, 2017).

Nowadays the microfinance attempts to provide financial services to households and micro-enterprises that are excluded from traditional commercial banking services(Beck, 2019). In undertaking the financial services, the microfinance institutions required to design the lending products to meet demands and to keep up the financial performances as well as profitability. In designing the lending product for the microfinance institutions taken into accounts of the loan amounts, loan terms, collateral requirements, interest rates, and fees, compulsory savings or group contribution requirements, lending methodology, credit information or exposures, knowledge, and values of credit (Ledgerwood, 2000). Most of the time lending products designed based on the cash patterns, loan terms, and payment frequency, collateral, and loan pricing to overcome the financial performances and sustainability of the institutions(Ledgerwood, 2000). In microfinance institutions, the loan price determines the institutions' profitability

and taken as the basis to design the lending products. In microfinance institutions, the determinants of the lending product would be the loan interest rate charged on loans and this determines the costs of loan structure of the microfinance institutions. Costs of the microfinance institutions determined based on financing costs, operating costs, loan loss provision and cost of capital(Ledgerwood, 2000). The cost component of the microfinance institutions loan probably affects the financial viability of the institutions.

Knowingly microfinance institutions are a very effective means for financial inclusion and alleviating poverty from the country's low-income groups of people(Prathap, Subrahmanya and Harisha, 2018). Whereas offering financial services to poor people in developing countries is an expensive business and the reason happened due to the recognition of the biggest costs in comparison to traditional financial institutions. Microfinance institutions designed lending products in accordance with commercial business operations to recognize the expected profit from the ongoing operations. Although faces the challenges to overcome the profitability of microfinance institutions impacted from the nature of the clients' business, networking and information exchanges, costs of processing loans or transaction costs of the loan(Nagarajan and McNulty, 2004).

Nowadays the scholars stated the determinants of the microfinance institutions' profitability variables grouped into the firm-specific and macroeconomic. The determinants of the microfinance institutions' profitability concluded in the study of Cull, Demirgüc-Kunt, and Morduch (2007), cited in Muriu(2017) as the impact of operational costs on the profitability of MFIs depends on an institution's lending methodology. Also advanced this study under Hollis and Sweetman (2007), cited in Muriu(2017) find that higher net income is associated with higher salaries and other non-interest costs which is consistent with expense preference theorem. In most of the studies derived the determinant of the microfinance institutions' profitability from the conventional financial institutions'. Although the business natures of the microfinance institutions' and traditional financial institutions completely differed in their nature of the business operations. Even though this study shows the possibly conduct to a meaningful analysis on the determinants of MFI profitability concerning the lending patterns of the microfinance institutions (Muriu, 2017). Moreover, the study addresses the determinants of microfinance institutions' profitability to some extent to overcome the limited literature faced on the determinants of microfinance institutions' profitability.

3. Research Design and Methodology

Research design is a plan for a study to provides the overall framework for collecting data (Leedy, 1997), as cited in (Van Zyl, 2012). Research methodology also a theory of how an inquiry should proceed. It involves analysis of the assumptions, principles and procedures in a particular approach to inquiry(Schwardt, 2007), as cited in (van Zyl, 2012). In line to the general perspectives of the research design and methodology for this study developed the mixed research approach undertaken to conduct the study on lending patterns and its impact on profitability of Microfinance institutions in Ethiopian with the ordered logistic regression model.

3.1. Sources of Data, Types of Data and Methods of Data Collection

This study uses the primary data, gathered through designed survey instruments. The instruments consist of open and close-ended questions. Open-ended questions allow the respondents to write the opinions without restrictions and also cover the ideas might not be included in the instruments. Closed-ended questions designed with the five point likert scale measurements. The scales represented as (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. Close-ended instruments support to access a high degree of response rate from the expected sample respondents.

3.2. Target Population, Sample Size and Sampling Techniques

Target population of the study taken from the Ethiopian microfinance institution registered under the national banks of Ethiopia requirements in a proportionately. In the study undertaken the sub-classifications of a sample to address the required analysis, variation, precision, availability, and cost of investigations(Singh and Masuku, 2014). In the determination of sample size as well as to draw the appropriate sample size taken into accounts the level of precision, confidence, and degree of variability(Singh and Masuku, 2014). The study uses the equation to determine sample size of the study in accordance to Cochran (1963, 1975), as cited in (D.Israel, 2003), developed the equation to yield a representative sample for proportions of a large sample of the study and presented the equation as follows;

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where n is sample size, Z2 is abscissa of normal curve cutoff an area α at the tails (1 - α equals desired confidence level is 95%), e is desired level of precision, p is estimated proportion of attribute and q is 1-p. Per the above equation determined sample size and proportional random sampling method was employed to select a sample from each state and city administration of the nation with taking as a stratum.

$$n_0 = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384$$

Where: n sample size, N target population

The target population of the study would be 7856 selected from active microfinance institutions of the country. In accordance to the above equations would be determined the sample size of the study as follows;

$$n = \frac{384}{1+\frac{(384-1)}{7856}} = 366$$

Proportional simple random sampling method was employed to select the sample respondents from each microfinance institutions on the basis of the clients' holding from each stratum.

3.3. Methods of Data Analysis

After gathering data undertaken the descriptive and econometric data analysis with the aid of Statistical software. In parallel to the descriptive analysis conduct the econometric analysis with the statistical regression model known as ordered logistic regression for the study.

3.3.1. Model Specification: Ordered Logistic Regression Model (Ologit)

When the outcome variable is ordinal and the relative ordering of response values is known and have the exact distance between them then the most popular method is the ordered logistic regression model, which is also known as the proportional odds model(Williams, 2016). Unfortunately, experience suggests that the assumptions of the ordered logistic model are frequently violated indicated the situations most of experts studies as (Long & Freese, 2014), cited in (Williams, 2016).

The ordered logistic model is a regression model for ordinal response variables. The model is based on the cumulative probabilities of the response variable: in particular, the logistic of each cumulative probability is assumed to be a linear function of the covariates with regression coefficients constant across response categories(Michaels, 1989). It is tempting to analyze ordinal outcomes with the linear regression model, assuming equal distances between categories. However, this approach has several drawbacks which are well known in literature as (McKelvey and Zavoina, 1975; Winship and Mare, 1984; Lu, 1999), cited in (Michaels, 1989). When the response variable of interest is ordinal, it is advisable to use a specific model known as the *ordered logit model.*

Questions relating to the lending patterns and its impact on profitability of Microfinance institutions are usually ordinal in nature. Under this study the ordered logistic model would be uses to estimate the relationships between ordinal responses on the lending patterns and its impact on profitability of Microfinance institutions and selected exogenous variables of the study. The collected responses are categorical as well as ordered them sequential from the small magnitude to the large magnitude with setting an equal distance between each other's', the responses expressed as strongly disagree [1], disagree [2], agree [3] and strongly agree [4].

Let Y_i be an ordinal response variable with $\mathcal{C}$ categories for the $i-th$ subject, alongside with a vector of covariates $\mathcal{X}_i$. A regression model establishes a relationship between the covariates and the set of probabilities of the categories $p_{ci} = \mathcal{P}r(Y_i = y_c|\mathcal{X}_i), c = 1, \dots, \mathcal{C}.$ usually, regression models for ordinal responses are not expressed in terms of probabilities of the categories, but they refer to convenient one-to-one transformations, such as the cumulative probabilities of $g_{ci} = \Pr(Y_i \leq y_c|X_i)\ \ c = 1, \dots, \mathcal{C}$. Note that the last cumulative probability is necessarily equal to 1, so the model specifies only $\mathcal{C} - 1$ cumulative probabilities.

An ordered logistic model for an ordinal response $Y_i$with $\mathcal{C}$ categories is defined by a set of $\mathcal{C}-1$ equations where the cumulative probabilities $g_{ci} = \Pr(Y_i \leq y_c|X_i)$ are related to a linear predictor $\beta' X_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots$ through the logit function:

$$logit(g_{ci}) = \log\left(\frac{g_{ci}}{1-g_{ci}}\right) = \alpha_c - \beta' X_i,\ \mathcal{C} = 1,2,\ldots,\mathcal{C}-1. \quad (1)$$

The parameters α_c, called *thresholds* or *cut-points*, are in increasing order ($\alpha_1 < \alpha_2 < \cdots \alpha_{c-1}$). It is not possible to simultaneously estimate the overall intercept β_0 and all the $\mathcal{C}-1$ thresholds: in fact, adding an arbitrary constant to the overall intercept β_0 can be counteracted by adding the same constant to each threshold α_c. This identification problem is usually solved by either omitting the overall constant from the linear predictor (i.e.$\beta_0 = 0$) or fixing the first threshold to zero (i.e.$\alpha_1 = 0$).

The vector of the slopes β is not indexed by the category index $\mathcal{C}$, thus the effects of the covariates are constant across response categories. This feature is called the *parallel regression assumption*: indeed, plotting $logit(g_{ci})$ against a covariate yields $\mathcal{C}-1$ parallel lines or parallel curves in case of a non-linear specification. In model (1) the minus before β implies that increasing a covariate with a positive slope is associated with a shift towards the right-end of the response scale, namely a rise of the probabilities of the higher categories. Some authors write the model with a plus before β: in that case the interpretation of the effects of the covariates is reversed.

From equation (1), the cumulative probability for category c is

$$g_{ci} = \frac{\exp(\alpha_c - \beta' X_i)}{1 + [\exp(\alpha_c - \beta' X_i)]} = 1/(1 + \exp(-\alpha_c + \beta' X_i)$$

The ordered logistic model is also known as the *proportional odds model* because the parallel regression assumption implies the proportionality of the odds of not exceeding the $c-th$ category $odds_{ci} = g_{ci}/(1-g_{ci})$: in fact, the ratio of these odds for two units, say i and$j$, is $\frac{odds_{ci}}{odds_{cj}} = \exp[\beta'(X_j - X_i)]]$, which does not depend on c and thus it is constant across response categories.

4. Results and Discussions

4.1. Descriptive Statistics of the Study

Table 1: Summary of the endogenous variable responses in their categories

Profitability of MFIs	Freq.	percent	Cum.
Strongly Disagree	15	4.10	4.10
Disagree	20	5.46	9.56
Agree	10	2.73	12.30
Strongly Agree	321	87.70	100.00
Total	366	100.00	

Source: Author's survey data, 2019

The above table shows that the endogenous variable responses distributions from the sampled respondents of the study. Per the respondents' responses, the strongly disagree equal to 4.10 %(15), disagree 5.46 %(20), agree 2.73 %(10), and also strongly agree with 87.70%(321). The statistical output implied that most of the respondents respond as strongly agree on the profitability of microfinance institutions. The average sample respondents agreed on the recognition of the microfinance institutions' profitability from their business operations.

Table 2: Descriptive Statistics for the endogeneous and exogeneous variables of the study

Variables	Obs.	Mean	Std. Dev.	Min	Max
Profitability of MFIs	366	3.740437	.740865	1	4
Loan term	366	3.34153	.8323448	1	4.625
Collaterals	366	3.432719	.4982402	1.25	5
Knowledge for credit	366	3.795082	.7578469	1	5
Cost of loan	366	3.257377	.8375357	1	4.4

Interest rates	366	3.760929	.7077483	1	4.5
Loan size	366	2.738919	.4314397	1.222222	4.111111
Lending methodology	366	3.035939	.3969795	1.461539	3.769231
Credit information	366	2.215847	.8208717	1	4
Credit repayment period	366	2.437158	1.0069	1	5

Source: Author's survey data, 2019

Table 2 presents the summaries of the endogenous and exogenous variables of the study undertaken in the ordered logistic model. In the above table listed the numbers of sampled respondents of the study mean, standard deviations, minimum and maximum values of the categorical variables of the study given the responses from the selected respondents of the study. The expected value of the dependent variable, known as the profitability of microfinance institutions is closed to 3.740 and its standard deviation also closed to 0.741. This value implies that the sample respondents' responses would deviate in between agree and strongly agree on the scales of measurements.

The expected values of the independent variables namely, the loan term, collaterals, knowledge for credit, costs of the loan, interest rates, loan size, lending methodology, credit information, and credit repayment period presented on the above table. The expected value of the loan terms equal to 3.342 from the given responses of the sample respondents whereas the standard deviation equal to 0.832. The expected value of the collaterals equal to 3.433 and also the standard deviation equal to 0.498. The expected values of knowledge for credit equal to 3.795 and although the standard deviation equal to 0.758. The mean values of the cost of the loan equal to 3.257 and its standard deviation equal to 0.838. The expected values and standard deviations of the interest rates equal to 3.761 and 0.0.708. The expected values of loan size, lending methodology, credit information, and credit repayment period equal to 2.739, 3.036, 2.212, and 2.437, and their standard deviations also equal to 0.0.431, 0.397, 0.821 and 1.007 respectively. The expected values of the variables imply that the respondents' responses agree on the situations for the average responses above 2.5 expected values.

Know the profitability of microfinance institutions, loan term, collaterals, knowledge for credit, costs of the loan, interest rates, loan size, lending methodology, credit information, and credit repayment period variables are ready to undertake the data analysis with the specified econometrics model. According to the measures of the central tendency especially the mean values and standard deviations indicate that the distributions of the data would be concentrated to the center and also their standard deviation indicates that the data distributions closed to the mean values.

4.2. Ordered Logistic Model Estimation Results

4.2.1. Evaluating Ordered Logistic Model Fit

Table 3: The Pearson Chi-square tests for the model fit

Dependent variable	Independent variables	df	Pearson Chi-square	p-values
Profitability of MFIs	Loan term	36	342.9106	0.000
Profitability of MFIs	Collaterals	39	833.2655	0.000
Profitability of MFIs	Knowledge for credit	9	429.0612	0.000
Profitability of MFIs	Cost of loan	45	678.1674	0.000
Profitability of MFIs	Interest rates	18	643.6533	0.000
Profitability of MFIs	Loan size	45	9481.7	0.000
Profitability of MFIs	Lending methodology	39	743.3251	0.000
Profitability of MFIs	Credit information	9	19.7426	0.020
Profitability of MFIs	Credit repayment period	12	41.5276	0.000

Source: Author's survey data, 2019

The above table presents the Pearson chi-square tests, addressed the null hypothesis tests for the fit of the model undertaken to know the associations of the studied variables. Under the Pearson chi-squares tests for each of the independent variables with the dependent variable observed that from the above-given table shows an association

between the studied variables, which the outcome variable with an endogenous variable. In addition to that, the p-values from each dependent and independent variable less than 0.05 or the value of alpha. These situations suggest to accept the research hypothesis and also in another direction required to reject the null hypothesis of the study.

4.3. Discussion

4.3.1. Ordered Logistic Model Interpretations with the Coefficients

Iteration Log: This is a listing of the log-likelihoods for each of the iteration. The ordered logistic regression uses the maximum likelihood estimation, which is an iterative procedure. The first iteration for the iteration of zero is the log-likelihood of the null or empty model; that is, a model with no predictors. Next to the zero iteration, the predictors are included in the model. The iteration of the log-likelihood increases because the goal is to maximize the log-likelihood. When the difference between successive iterations is very small, the model is said to have converged, finally the iterating stops, and the results are displayed, under these expressions, the model iteration converged to -86.850555 contextual in the model.

Model Summary

Ordered logistic regression	Number of obs	=	366
	LR chi2(9)	=	194.64
	Prob > chi2	=	0.0000
Log likelihood = -86.850555	Pseudo R2	=	0.5284

Number of observations: This shows that the number of observations undertaken in the ordered logistic regression model. The number of observation equal to 366 and there is no missing value from the data sets.

LR Chi2 (9): This is the Likelihood Ratio (LR) Chi-Square test that at least one of the predictors' regression coefficients is not equal to zero in the model. The number in the parenthesis indicates that the degree of freedom of the Chi-square distribution undertaken to test the LR Chi-Square statistics and defined by the number of predictors in the model. The LR Chi-square statistics calculated as; -2(L (null model) - L (fitted model)) = -2[(-184.16995) -(-86.850555)] =194.64. Where L (null model) is from the log-likelihood with just the response variable in the model (Iteration 0) and L (fitted model) is the log-likelihood from the final iteration with all the parameters. In general speaking, the LR Chi-square (9) shows that the model fits the data well as compared to the null hypothesis.

Pro > Chi2: This is the probability of getting an LR test statistics as extreme as, or more so than the observed under the null hypothesis of the regression coefficients in the model are equal to zero. In other words, this is the probability of obtaining these Chi-square statistics (194.64) if there is, in fact, no effect of the predictor variables. This p-value is compared to a specified alpha level, this is the willingness to accept type I error, which is typically set at 0.05 or 0.01. The small p-value from the LR test, <0.0001, would lead us to conclude that a least one of the regression coefficients in the model is not equal to zero. The parameter of the Chi-square distribution used to test the null hypothesis is defined by the degree of freedom in the prior line, chi2 (9). In this study, the p-value shows that a highly significant for the exogenous variables of the study, and this implies that the loan term, collaterals, knowledge for credit, costs of loan, interest rates, loan size, lending methodology, credit information and credit repayment period statistically significant effects on the profitability of the microfinance institutions.

Pseudo R^2: This is McFadden's Pseudo R-squared Logistic regression does not have an equivalent to the R-square that is found in OLS regression. Then the value of McFadden R^2 (aka pseudo R^2) would be computed as follows;

McFadden R^2 (aka pseudo R^2) is $Pseudo\ R^2 = \frac{Model\ LR\ Chi2}{DEV_0} = \frac{194.64}{368.3399} = 0.5284$

(Remember, DEV_0=-2*LL_0 = -2*-183.77464 = 368.3399)

According to the above expressions the Pseudo R^2 of the model output as well as the computed values of Pseudo R^2 with an equation obtained an identical value.

Table 4: Parameter Estimates

Profitability of MFIs	Coef.	Std. Err.	z	P>z[a]	[95% Conf. Interval][b]	
Loan term	.9450301	.3083497	3.06	0.002	.3406757	1.549384
Collaterals	1.360526	.3911492	3.48	0.001	.5938877	2.127165
Knowledge for credit	1.059208	.2939877	3.60	0.000	.4830026	1.635413
Cost of loan	-1.390924	.6034216	-2.31	0.021	-2.573609	-.2082398
Interest rates	2.350355	.430718	5.46	0.000	1.506164	3.194547
Loan size	-4.251117	.6834061	-6.22	0.000	-5.590569	-2.911666
Lending methodology	2.750517	.7650238	3.60	0.000	1.251098	4.249936
Credit information	-.655219	.3190299	-2.05	0.040	-1.280506	-.0299319
Credit repayment period	-.502205	.2017494	-2.49	0.013	-.8976265	-.1067834
/cut1	3.415438	1.503341			.4689435	6.361933
/cut2	5.711946	1.579228			2.616715	8.807177
/cut3	6.525228	1.616962			3.356041	9.694416

Source: Author's Survey data, 2019

Coefficients' of the variables: The above table shows that the ordered log-odds (logistic) regression coefficients of the study variables. Undertaken the interpretation of the coefficients variables inline to the standard interpretation of the ordered logistic coefficient, accordingly as the one-unit increase in the predictor, the response variable level is expected to change by its respective regression coefficients in the ordered log-odds scale while the other variables in the model held constant. Knowingly the interpretation of the ordered logistic estimates is not dependent on the ancillary parameters; the ancillary parameters used to differentiate the adjacent levels of the response variables. However, the ordered logistic model estimates one equation overall the levels of the dependent variable, a concern is whether one-equation of the model is valid or a more flexible model is required.

Under the ordered logistic regression model the exogenous variables are statistically significant. The results of the model interpreted as per the standard interpretations of the model. Under the model output, the positive coefficient variables are the loan terms, collaterals, knowledge for credit, interest rates, and lending methodology; this implies that the likelihood of the lending pattern variables supports the microfinance institutions' profitability. Whereas the negative coefficient variables are the costs of the loan, loan size, credit information and credit repayment period; this implies that the likelihood of the lending pattern variables may not supports the microfinance institutions profitability rather impacts for the reductions of microfinance institutions profitability and adds extravagant costs to the institutions. Independently interpreted the coefficients of the variables as follows;

Loan terms: When increases one unit to the microfinance institutions profitability, then the loan terms expect to 0.945 increases in the log-odds of being the microfinance institutions profitability, given all of the other variables in the model are held constant. This implies that the loan term as the lending patterns of the microfinance institutions influences the microfinance institutions profit.

Collaterals: When increasing one unit to the microfinance institutions' profitability, then the collaterals expect to 1.361 increases in the log-odds of being the microfinance institutions' profitability, given all of the other variables in the model are held constant. This implies that the collaterals would be a significant contribution as well as a key factor for the overcoming of institutions' profitability and to improve the credit practices of the institutions.

Knowledge for credit: When it increases one unit to the microfinance institutions' profitability, then the knowledge for credit of the creditors increases to the expected values of 1.059 in the log-odds of being the lending patterns of the microfinance institutions, given all of the other variables in the model are held constant. This implies that the knowledge for the microfinance institutions credit improved when financial sustained on the microfinance institutions' operations.

Cost of loan: When increases one-unit to the microfinance institutions' profitability, then the cost of loan declines with 1.391unit in the log-odds of the institutions' profitability, given all of the other variables in the model are held

constant. This implies that the cost of processing the loan of the microfinance institutions influences negatively the microfinance institutions profit status.

Interest rates: When it increases one-unit to the microfinance institutions' profitability, then the interest rate of the microfinance institutions increases to the expected values of 2.350 in the log-odds of being the lending patterns of the microfinance institutions, given all of the other variables in the model are held constant. This implies that the interest rates as a lending pattern of the microfinance institutions have a direct impact on the institutions' profit status.

Loan Size: When loan size of the microfinance institutions declines to the expected values of 4.251, then the microfinance institutions' profitability declines with one-unit, in the log-odds of being the lending patterns of the microfinance institutions, given all of the other variables in the model are held constant. This implies that as the lending patterns of the microfinance institutions the loan size negatively affects the profitability of the institutions and the creditors may not use the credit for productive purposes and this probably increases the microfinance institutions' credit defaults.

Lending methodology: When it increases one-unit to the microfinance institutions' profitability, then the lending methodology of the microfinance institutions increases to the expected values of 2.751 in the log-odds of being the lending patterns of the microfinance institutions, given all of the other variables in the model are held constant. This implies that the lending methods of the microfinance institutions improve the microfinance institutions' profitability and also matters to minimizes the credit defaults of the microfinance institutions.

Credit information: When the credit information of the microfinance institutions declines to the expected values of 0.655, then the microfinance institutions' profitability declines with one-unit, in the log-odds of being the lending patterns of the microfinance institutions, given all of the other variables in the model are held constant. This implies that the credit information not well awarded to the clients the credit processing is too long and increases the costs of the institutions and also may affect the credit transparency of the institutions.

Credit repayment period: When the credit repayment period of the microfinance institutions declines to the expected values of 0.502, then the microfinance institutions' profitability declines with one-unit, in the log-odds of being the lending patterns of the microfinance institutions, given all of the other variables in the model are held constant. This implies that the credit repayment period too short and affects the business operations of the client customers and the consequence also affects the institutions' profit status.

Ancillary parameters: These refer to the cut-points (a.k.a. thresholds) used to differentiate the adjacent levels of the response variable. In this study the threshold points for the endogenous variable would be discrete and easily observable to distinguish them; this may result in the different observed values on the proxy variable.

_cut1: This is the estimated cut-point on the endogenous variable used to differentiate strongly disagree of taxing of an informal economy from disagree, agree and strongly agree taxing of an informal economy when values of the predictor variables are evaluated at zero. Subjects that had a value of 3.415 or less on the underlying endogenous variable that gave rise to the taxing of an informal economy variable would be classified as strongly disagree of taxing of an informal economy.

_cut2: This is the estimated cut-point on the endogenous variable used to differentiate strongly disagree and disagree taxing of an informal economy from agree and strongly agree of taxing of an informal economy when values of the predictor variables are evaluated at zero. Subjects that had a value of 5.712 or less on the underlying endogenous variable that gave rise to the taxing of an informal economy variable would be classified as strongly disagree and disagree of taxing of an informal economy.

_cut3: This is the estimated cut-point on the endogenous variable used to differentiate strongly disagree, disagree and agree taxing of an informal economy from strongly agree of taxing of an informal economy when values of the predictor variables are evaluated at zero. Subjects that had a value of 6.525 or less on the underlying endogenous variable that gave rise to the taxing of an informal economy variable would be classified as strongly disagree, disagree and agree of taxing of an informal economy.

In general, speaking the marginal effects of the outcome variable the probabilities of the categories to be becoming of the strongly disagree (1), disagree (2), agree (3) and strongly agree (4) would be indicated as 0.00114367, 0.010108720, 0.01377165 and 0 .97497595 respectively. This implies that the respondents of the sampled study would be responded to for the microfinance institutions profitability as strongly agreed. While, the post estimations of the marginal effects would be run after the running of the ordered logistic regression, would have obtained the probabilities of the given categories.

Std. Err.: This shows that the standard errors of the individual regression coefficients of the ordered logistic model. They are used in the calculation of the z test statistic, the superscript a in the model output, and the confidence interval of the regression coefficient, superscript b in the model output.

z and P>|z|: This shows that the test statistics and p-value, respectively, for the null hypothesis of an individual predictor's regression coefficient is zero given that the rest of the predictors are in the model. The test statistic z is the ratio of the coefficient to the standard error of the respective predictor. The z value follows a standard normal distribution which is used to test against a two-sided alternative hypothesis that the coefficient is not equal to zero. The probability that a particular z test statistic is as extreme as, or more so, than what has been observed under the null hypothesis is defined by P>|z|.

Under the z test statistic of each predictor's such as the loan term, collaterals, knowledge for credit, costs of the loan, interest rates, loan size, lending methodology, credit information and credit repayment period would be 3.06, 3.48, 3.60, -2.31, 5.46, -6.22, 3.60, -2.05 and -2.49 with an associated p-value approximately for all exogenous variables less than 0.05. If we set our alpha level to 0.05, we would reject the null hypothesis and conclude that the regression coefficient for the loan term, collaterals, knowledge for credit, costs of the loan, interest rates, loan size, lending methodology, credit information and credit repayment period is statistically different from zero in estimating taxing of an informal economy.

[95% Conf. Interval]: This is the Confidence Interval (CI) for an individual regression coefficient given the other predictors is in the model. For a given predictor with a level of 95% confidence, we would say that we are 95% confident that the true population regression coefficient lies in between the lower and upper limit of the interval. It is calculated as the Coef. $\pm$ ($z\alpha/2$) *(Std. Err.), where $z\alpha/2$ is a critical value on the standard normal distribution. The CI is equivalent to the z test statistic: if the CI includes zero, we would fail to reject the null hypothesis that a particular regression coefficient is zero given the other predictors are in the model. An advantage of a CI is that it is illustrative; it provides a range where the true parameter may lie.

5. Conclusions and Recommendations

The study undertaken on the lending patterns and determinants of the microfinance institutions profitability in Ethiopian with taking survey data from the Ethiopian microfinance institutions of the different levels of the microfinance institutions. The lending pattern variables of the microfinance institutions determine the profit status of the microfinance institutions. Under the study output, the lending patterns of the microfinance institutions influence the microfinance institutions' profitability status. The variables of the study like loan term, collaterals, knowledge for credit, costs of the loan, interest rates, loan size, lending methodology, credit information and credit repayment period as a whole show that the significance on determining the institutions' profit status withholding the positive and negative signs and also statistically significant in determining the microfinance institutions profit. Per the results of the study, concluded as the microfinance institutions' profitability brings advantages to the microfinance institutions' financial sustainability and to operate healthy financial operations. The microfinance institutions to overcome the mission drift in the developing as well as developed countries required to undertake carefully the lending patterns of the institutions. Although most of the pieces of literature emphasize the determinants of the microfinance institutions made comparability with the banking industries, while the business natures of the microfinance institutions somehow operate the businesses in a different circumstance of the banking industry. This implies that the determinants variables of the microfinance institutions' profitability described with the institutions' lending patterns in addition to the regularly influencing factors of the other sector financial institutions.

In general, speaking the microfinance institutions' profits would be determined by the lending pattern of the institutions in line to the financial institutions determining factors of profitability. In this perspective, the microfinance institutions determining factors of profitability may not be measured solely with the financial institutions determining factors although to some extent the lending patterns also expressed in other financial institutions determining factors of profitability. In this context the microfinance institutions profitability shares the other financial institutions determining variables, this means the microfinance institutions determined with the institutions' lending variables as well as the external factors to recognizes the expected profits in the institutions.

References

Auwalin, I. (no date) 'Microfinance Institutions: Overcoming the Obstacles', Faculty of Economics and Business, Universitas Airlangga, pp. 1–10.

Beck, T. (2019) 'My Daily T r avel S ur vey', Improving World Bank Group Development Results Through Excellence in Evaluation, (May), pp. 1–20.

Chatterjee, P. et al. (2006) The Economics of Microfinance, Southern Economic Journal. London: The MIT Press Cambridge, Massachusetts London, England. doi: 10.2307/20111887.

D.Israel, G. (2003) 'Using Published Tables Using Formulas To Calculate A Sample Size Using A Census For Small Populations', Institute of Food and Agricultral Science: University of Florida. Available at: http://edis.ifas.ufl.edu.

Ethiopia, F. D. R. of E. (1996) 'Federal Negarit Gazeta, Proclamation No.40/1996', Proclamation to Provide for the Licensing and Supervision of Micro Financing Institutions.

Giné, X. et al. (2006) 'Evaluating microfinance program innovation with randomized control trials: An example from group versus individual lending', ERD Technical Note Series, 16(3), pp. 1–20.

Hermes, N. and Hudon, M. (2018) 'Determinants of the Performance of Microfinance Institutions: a Systematic Review', Journal of Economic Surveys, 32(5), pp. 1483–1513. doi: 10.1111/joes.12290.

Ledgerwood, J. (1999) Microfinance handbook: An institutional and financial perspective. Washington, D.C. 20433, U.S.A.: The International Bank for Reconstruction and Development/The World Bank 1818 H Street, N.W.

Ledgerwood, J. (2000) Microfinance Handbook: An Institutional and Financial Perspective. Washington, D.C. 20433, U.S.A.: The International Bank for Reconstruction and Development/The World Bank 1818 H Street, N.W. Washington,.

Ledgerwood, J. (2013) The New Microfinance Handbook: A Financial Market System Perspective. Washington DC 20433: International Bank for Reconstruction and Development / The World Bank 1818 H Street NW.

Michaels, E. (1989) 'Let patients see their medical records, Ontario college says', Cmaj, 141(10), pp. 1077–1079. doi: 10.1007/978-94-007-0753-5.

Muriu, P. (2017) 'What Explains the Low Profitability of Microfinance Institutions in Africa ?', (May 2012).

Nagarajan, G. and McNulty, M. (2004) 'Microfinance Amid Conflict: Taking Stock of Available Literature', Accelerated Microenterprise Advancement Project, (August). Available at: http://pdf.usaid.gov/pdf_docs/pnade302.pdf.

Nasir, S. (2013) 'Microfinance in India: Contemporary issues and challenges', Middle East Journal of Scientific Research, 15(2), pp. 191–199. doi: 10.5829/idosi.mejsr.2013.15.2.2306.

Prathap, B. N., Subrahmanya, K. C. and Harisha, B. S. (2018) 'Microfinance Delivery – Challenges and Remedies', International Journal of Management Studies, V(3(9)), p. 138. doi: 10.18843/ijms/v5i3(9)/17.

van Rooyen, C., Stewart, R. and de Wet, T. (2012) 'The Impact of Microfinance in Sub-Saharan Africa: A Systematic Review of the Evidence', World Development, 40(11), pp. 2249–2262. doi: 10.1016/j.worlddev.2012.03.012.

Singh, A. and Masuku, M. (2014) 'Sampling Techniques & Determination of Sample Size in Applied Statistics Research: an Overview', Ijecm.Co.Uk, II(11), pp. 1–22. Available at: http://ijecm.co.uk/wp-content/uploads/2014/11/21131.pdf.

Stewart, R. et al. (2010) What is the impact of microfinance on poor people ?, A systematic review of evidence from …. Available at: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:What+is+the+impact+of+microfinance+on+poor+people+?#4.

Williams, R. (2016) 'Understanding and interpreting generalized ordered logit models', Journal of Mathematical Sociology, 40(1), pp. 7–20. doi: 10.1080/0022250X.2015.1112384.

van Zyl, H. J. D. (2012) 'Chapter 4 : Research Design and Methods', (2003), pp. 117–154.

Appendix: Ordered Logistic Regression Model output

```
Iteration 0:   log likelihood = -184.16995
Iteration 1:   log likelihood = -180.68625
Iteration 2:   log likelihood = -111.95536
Iteration 3:   log likelihood =  -89.14091
Iteration 4:   log likelihood = -86.869925
Iteration 5:   log likelihood = -86.850564
Iteration 6:   log likelihood = -86.850555
Iteration 7:   log likelihood = -86.850555

Ordered logistic regression                     Number of obs     =        366
                                                LR chi2(9)        =     194.64
                                                Prob > chi2       =     0.0000
Log likelihood = -86.850555                     Pseudo R2         =     0.5284
```

Profitability	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Loanterms	.9450301	.3083497	3.06	0.002	.3406757	1.549384
Collaterals	1.360526	.3911492	3.48	0.001	.5938877	2.127165
Knowledgeforcredit	1.059208	.2939877	3.60	0.000	.4830026	1.635413
CostsofLoan	-1.390924	.6034216	-2.31	0.021	-2.573609	-.2082398
InterestRates	2.350355	.430718	5.46	0.000	1.506164	3.194547
LoanSizes	-4.251117	.6834061	-6.22	0.000	-5.590569	-2.911666
LendingMethdololgy	2.750517	.7650238	3.60	0.000	1.251098	4.249936
CreditInformation	-.655219	.3190299	-2.05	0.040	-1.280506	-.0299319
Creditrepaymentperiod	-.502205	.2017494	-2.49	0.013	-.8976265	-.1067834
/cut1	3.415438	1.503341			.4689435	6.361933
/cut2	5.711946	1.579228			2.616715	8.807177
/cut3	6.525228	1.616962			3.356041	9.694416