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The Economic Impact of Microfinance: A Comparative Analysis of Small Enterprises

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ABSTRACT

This study is aimed to measure the increase in probability of income level of micro financed entrepreneurs and non-borrowers. The paper identifies some areas for small investment that are more effective to reduce poverty and raises the welfare of mass public of Layyah, South Punjab. Based on 351 cross section observation of borrower (small entrepreneurs) and non-borrower; it is found that the income of micro financed borrowers is greater on average by 17% as compared to that of the non-borrowers. The funds borrowed from Punjab Rural Support Program and First Microfinance Bank is more productive as compared to that of Khushhali Bank. Khushhali Bank fails to improve the living standard of the borrowers. Funds invested in livestock and small business sector are highly profitable while funds invested in other farming activities like agriculture are not lucrative for raising income level and in poverty reduction.
KEY WORDS: Micro financing, Small Enterprises, Discrete Regression and Qualitative Models, Poverty.
JEL Classification: C35, G21, I38, M13

1. INTRODUCTION

Today, the third world major problem is poverty. Every year, millions of people fell into the poverty trap. The biggest challenge facing Pakistan is how to achieve Millennium Development Goal (MDG) of bringing down the incidence of poverty from current level 23% to 13% in 2015. In Pakistan, about 49 million people are below the poverty line and are bound to sleep hungry which is 6% of world population and 17 % of South Asia population (Faisal Abbas et al., 2005)[1]. It is more devastating in rural areas as compared to urban areas. Approximately poverty is double in rural areas; about 27% while in urban areas it is only 13.1% (PSLM2007-08)[21]. Almost 6.5 million poor people in Pakistan need microfinance services and only 5% are being served by MFI's. Emerging modernization in agriculture, increase in income inequality, labor force displacement, absence of farming and non-farming activities and less employment opportunities are making poor's future more vulnerable.

The authors are trying to examine the situation of District Layyah of Pakistan. District Layyah (South Punjab) is situated approximately in the center of Pakistan. Out of 116 districts of Pakistan; District Layyah is at first place in bottom quartile-Backward Districts List (Wasti and Siddiqui 2008)[24]. Its total population is 2 million of which 80% of its population belongs to rural areas. Major population is deficient the basic needs for minimum standard of well-being and life (MICS, 2007-08)[19].There is no any umbrella institution in District Layyah that would extend social protection nets to poor and vulnerable. Some public institutions, NGO's and private financial institutions are positively insisting and generating the income and employment opportunities and assuring the accessibility of basic utilities. They are actively involved in provisions of productive assets to the poor, gender equity enlargement, adequacy and safety nets to protect the farthest poor's and vulnerable.

Microfinance was started in Pakistan in the early 1980's when the Aga Khan Rural Support Program (AKRSP) launched its credit operations in 1982 and with the establishment of the Orangi Pilot Project (OPP) in the same year. The model of AKRSP was implemented in the whole country in 1990's with the establishment of National Rural Support Program (NRSP) and the Sarhad Rural Support Program (SRSP). Kashf Foundation; a specialized microfinance NGO was established in 1996 for Rural Support Program. Further developments followed in 2000, when the Pakistan Poverty Alleviation Fund (PPAF) made its first loan to Microfinance Provider's, and State Bank of Pakistan opened a microfinance unit. In 2001, the Govt. of Pakistan created a major retail institution, the Khushhali Bank, especially to serve the poor. Khushhali bank is an integral part of Pakistan's Poverty Reduction Strategy and Microfinance Sectoral Development Program. A vast network of such institutions is established across the Pakistan to mitigate poverty and achieve economic stability through mobilization of resources. In the district Layyah; critically examined here, Khushhali bank and First Microfinance bank are also functioning since 2004 and 2008 respectively. Some other private institutions and NGO's are also participating in the process of stirring poor's to eradicate poverty.

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As Khushhali bank come into existence in August 2001, it had also opened two branches in District Layyah (Tehsil Layyah & Tehsil Karor) which becomes functioned in 2004. Many of small farmers and poor got benefitted by the provision of credit on easy terms and conditions. The Punjab Rural Support Program (PRSP) and the First Microfinance Bank is also working parallel now. In very short time span tremendous increase occurred in the poor active clients to be benefitted due to splendid services provided by the MFI's. The detail of outreach figures is given in the Table 1.

Table 1: Mobilization of Loan over Time by Source.

MFI	Item	2007-08	2008-09	2009-10	2010-11	2011-12
PRSP	No of loans (M)	4826	3964	2091	1623	2379
	No of loans (F)	935	718	322	305	457
	Loan dispersed	75,752,044	70,031,734	39,261,439	33,081,460	53,150,061
	Active clients (M)	-	-	-	-	-
	Active clients (F)	-	-	-	-	-
FMFB	No of loans (M)	578	2231	2789	3872	4590
	No of loans (F)	201	576	793	911	1037
	Loan dispersed	15,134,596	46,505,831	51,467,312	58,387,639	67,048,169
	Active clients (M)	332	1507	2396	3179	4139
	Active clients (F)	478	1149	1652	2716	3561

Source: PRSP & First Microfinance Bank; District Offices District Layyah

The data in the table shows that credit has been mobilized increasingly over the period of time. The data for Khushhali bank was not accessible. The increasing trend in mobilization of loans clearly depicts that loan made to poor people's may have some positive impact on income and consumption pattern of the clients. The gender disparity has also reduced significantly. When we compare the percentage of male and female borrower over the period of time, it shows increasing trend for the women's to take play the active role in the economic activities.

2. OBJECTIVES OF THE STUDY

Microfinance has unbroken relationship with poverty alleviation. Their major focuses are the people that are socially deprived and have no access to employment opportunities that would assure their better living standard and sustainable future lives. Microfinance provides basic financial services such as loans, savings, and other micro services to the poor people. The poor's mobilize these funds in productive ways. The principal objective of microfinance programs is to raise incomes and broaden financial markets by providing financial and non-financial services to the financially excluded people (Armendariz de Aghion and Morduch, 2000)[8]. Microfinance targets the economically active poor's in the society to assist them for overall wellbeing of society. It is necessary to evaluate that how micro credit impact on economic life of the poor people, enhance people's income, improve quality of life and reduce vulnerability. The major objectives of above cited study is to measure the increase in probability of income levels of small borrowers and to assess how small entrepreneurships remained successful in reduction of poverty and improved the living standards of the poor's on sustainable basis. Rising income level assures the better living standard and improvement in the social status of the poor people. The study also aimed at identifying the most convenient and productive source of borrowing and what are the more profitable sectors for small investment.

3. LITERATURE REVIEW

A substantial research has been conducted on the issue by ILO, IMF, IFAD and World Bank but in reality in rural areas; poverty is obvious with multiple aspects. Since the above cited issue is the major memo of all international organizations. Three international reports published by World Bank (2000), IFAD (2001) and ILO (2003) by the start of 21'st Century to observe the severity of the issue. The International Fund for Agricultural Development (IFAD) Report on the rural poverty of the year 2001 was also published on the challenge of mitigating rural poverty. The International Labor organization (ILO) report presented in the 91'st session, 2003, of International Labor conference was also on the working out of poverty. The Asian Development Bank's Country Strategy Program (CSP-2002-2006)emphasis in good governance including devolution and sector and province-based reforms, sustainable pro-poor growth including rural development and employment creation, and inclusive social development considering education, health, water supply and sanitation, and social protection.

With this brief global importance of the issue of poverty, we now come to the experience of Pakistan. A generous evidence of poverty that it has increased in 1960's; decline rapidly in 1970's and 80's and returned back in 1990; but again declining trend in 2000's. The trend line of poverty is again at rising level for last two years [Amjad and Kemal (1997)[4], Ali and Arif (1999)[2] and Government of Pakistan (2003)[22]]. Nevertheless the bulk of poverty exists in Pakistan but more than that in remote areas. Kemal (2003)[12] explained four points to

trim down the poverty. First he focused on new technologies and promotion of large and small scale firms. Second, the taxation policy should be revised. Third, the gap between the rich and poor segment of society should be overcome so that income equality could be improved. Malik (1996)[14] used micro survey data from a Punjab village and explained the land holding variables and their role in raising levels of living of rural masses and subsequently to alleviate rural poverty. An inference is drawn that by breaking of land concentration; the rates of agricultural growth increases and then consequently, the poverty of rural areas of Punjab may be alleviated to some extent.

Hulme and Mosley (1996)[11]did a comparative study of MFI female and male clients. He analyzed that female clients remained more successful as compared to male clients and more benefitted by the services offered by an MFI. They also found that extreme poor clients had increased their consumption significantly instead of more productive activities. Amjad and Kemal (1997)[4] analyzed the impact of the structural adjustment policies on poverty in Pakistan. Micro-credit has tremendous impact on the economic life of the people in the rural areas. Pitt and Khandker (1998)[23] analyzed the BRAC clients and found that the consumption of female and male clients has been increased by 18% and 17% respectively. Almost 15-25% of the clients get rid of the poverty. Montgomery et al. (1996)[17] found that the borrower which have completed three loan cycles successfully have higher incomes and more assets as compared to non-borrower or any MFI clients completed less than three loan cycles.

Every micro-credit institution has some strategies to focus on his clients. They specially target the female clients and provide access to resources. It shows that there is an increasing trend of gender participation rate in economic activity. It's inherited that an earning hand (male or female) has some decision power in her family economic, social or political affairs. MkNelly and Dunford (1998)[16] in Ghana found that women are playing active role in community government. Hashemi, Schuler and Riley (1996)[9] conducted a survey of 1300 females which shows that female clients of an MFI were more empowered in terms of economic participation, decision making, resources owned, physically mobility and political awareness.They found that 59% clients of Grameen bank are using contraceptive methods while it observed among 43% in non-clients only.

Mshenga and Richardson (2012)[18]analyzed the participation of micro and small enterprise in tourism industry of Kenya. They postulated that small business is helpful to reduce the poverty and income inequality. Lopez Garcia and Puente (2012)[13] used dynamic Probit model to Spanish small firm's data. He concludes that small firms creates employment opportunities and their access to microcredit improve the firms size and hence improvement in well-being indicators of peoples. Chnadler (2012)[6] conducted a study to assess the economic impact of small business financing enterprise. He found that on average beneficiaries of small business financing program are providing employment opportunities by 12 percent greater proportion and their revenues are 7 percent higher than other firms.

As microfinance intermediary's has better served the vulnerable and poor's but it has also assured access to better health facilities and day care services. Barnes, Morris and Gaile (1998)[5] found that FOCCAS clients are using twice better health care and nutritional techniques as compared to the non-clients.A remarkable increase in the level of farmers' incomes, improvement in the quality of life and the increased value of assets have been observed and the provision of the credit has uplifted the socio-economic status of small and marginal farmers (Nazli, 2000)[20]. Rural poor need credit to allow investment in their farms and small businesses, to smooth consumption and to reduce their vulnerability to weather and economic shocks. Therefore, micro-credit is fulfilling the farming and non-farming needs by providing the poor with access to financial resources.

4. DATA COLLECTION MECHANISM

This study is limited to the areas of District Layyah-Dera Ghazi Khan Division in Southern Punjab. The study focuses on the participant's primary data obtained by a simple and well-structured questionnaire. The Sample consists of three major microfinance beneficiaries; The Khushhali bank (KB), The First Microfinance bank (FMFB) and Punjab Rural Support Program (PRSP).According to Economic Survey of Pakistan (2010-11) the labor force participation rate (refined) of male is 68.8% and only 21.5% for female. It means females are not being employed in general service and business sectors. The microfinance provides opportunities to females to play active role in economic activity. The distribution of bank/non-bank borrowers is as given in Table 2.

Table 2: Data Collection &Sampling

Category	Rural		Urban		Sub-Total		Total
	Male	Female	Male	Female	Male	Female	
KB Borrower	37	34	8	6	45	40	85
FM Borrower	20	25	5	5	25	30	55
PRSP Borrower	25	20	5	5	30	25	55
Non-Borrower	70	60	15	11	85	71	156
Total	152	139	33	27	185	166	351
Source: Author (s)							

The financial intermediaries provide loans and keep the loyal and profitable customers. They prefer to give loans to better credit worthiness and rich clients. But the point to here is that wealthier borrowers are automatically excluded in built in mechanism of microcredit. We can say that our results will unbiased of wealthier borrower having more business/entrepreneur skills. Data for 351 respondents has been collected out of which 195 are FMI's client and remaining 156 are non FMI's client. Out of which 50% of weight is given to Tehsil Layyah and other half of clients are interviewed from Tehsil Karor and Choubara respectively. A proportionate stratified random sampling procedure is adopted to identify the nominee of an MFI from which the data is collected. While the data from the non-borrowers; is collected in same proportion from that strata. The researcher used a questionnaire obtained from CGAP's Poverty Assessment Tools (2003)[10]. Structured and unstructured, closed and open ended questions were asked to the respondent to obtain the reliable and unbiased information about the impact assessment of microfinance. The questionnaire is modified according to the geographical and cultural aspects prevailing in the focused area. To collect the data, a group of well-trained five enumerators and two research assistants were employed.

5. METHODOLOGY

To assess the impact of microfinance the major techniques of statistics and econometrics are applied to evaluate the mean differences between the major wellbeing indicator of MFI borrower and non-borrower treated as control group. Among the econometrics techniques; Logit-Probit model is used to glimpse the effect of microfinance on MFI beneficiaries assessing major wellbeing indicators such as increase in income, food expenditure, expenditure on health and education, increase in assets; house ownership, communication assets and domesticated bovine animals. In the regression model income is considered as nominal dependent variable by assuming 1 for increase and 0 for vice versa. Some explanatory variables are also considered as dichotomous to measure the physiological effects by taking 1 for increase and 0 for otherwise(decrease or constant).Cumulative distribution function is used in the regression model because our response variable is nominal. The probability of improvement in income and explanatory variable relationship is depicted as follows;

$$y = f\left(\sum_{k=1}^{n} x_{ik}\right) \tag{1}$$

Where y is the probability of increase/decrease in income and x_{ik} refers to all explanatory variables. The writer used the Logit model because of nominal nature of data on study variables; as suggested by Maddala (1983)[15], Gujarati (1992)[7] and Amemiya (1985)[3].The basic rationale under the Logit model is as:

$$P_i = E(y = 1 / x_i) = \beta_1 + \beta_k\left(\sum_{k=1}^{n} x_{ik}\right) + u_i \tag{2}$$

Where y = 1 if there is increase in the income of respondents. Specifying the particular logistic distribution;

$$P_i = E(y = 1 / x_i) = \frac{1}{1 + e^{-\left[\beta_1 + \beta_k\left(\sum_{k=1}^{n} x_{ik}\right) + u_i\right]}} = \frac{e^{Z_i}}{1 + e^{Z_i}} \tag{3}$$

$$where\ Z_i = \beta_1 + \beta_k\left(\sum_{k=1}^{n} x_{ik}\right) + u_i$$

The above equation represents the logistic distribution function. When Z_i ranges from $-\infty$ to $+\infty$, P_i ranges from 0 to 1. If Pi is the probability of increase in income then probability of not increase in income (vice versa) is given as;

$$\frac{P_i}{1 - P_i} = \frac{(1 + e^{Z_i}) * e^{Z_i}}{1 + e^{Z_i}} = e^{Z_i} \tag{4}$$

The left side of expression is simply the odds ratio of increase in income of the clients. Applying the natural log on both sides, it gives;

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = Z_i = \beta_1 + \beta_k\left(\sum_{k=1}^{n} x_{ik}\right) + u_i \tag{5}$$

Expanding the regression equation; the following expression results:

$$L_i = \beta_1 + \beta_2 ebs + \beta_3 pcexp + \beta_4 cea + \beta_5 ls + \beta_6 nbd + u_i \tag{6}$$

Where L_i(Likelihood ratio) is simply the natural log of odds ratio in-favor of increase in income (y_i) of the respondents, representing the Logit model; which is not now linear in explanatory variables but also in respective parameters. EBS represents Respondent employment and beneficiary status; the probability of being a borrower and self-employed is 1 while not self-employed is zero. The expected sign is positive. PCEXP represents per capita expenditure on food items, health, education and clothing (absolute amount for borrower and non-borrower).If the poor farmers are spending a major portion of their income on food, health, clothing and education; it's expected that they are utilizing their loans in productive ways and their portfolios are profitable. CEA represents increase in communication assets and electric appliances; cell phones, radio, TV, washing machine, deep freezer, fans, electric motors etc. (absolute numbers). LS is the increase in livestock-domestic bovine animals; (absolute numbers) while NBD is a dummy for Non-borrower; 1 for non-borrower and 0 otherwise.

6. RESULTS AND DISCUSSIONS

The study is based on ungrouped data sample of 351 observations. The most appropriate technique to calculate ungroup logistic function is the maximum likelihood method but in estimation of binary dependent variable model the existence of Heteroskedasticity is the most common problem. There are three techniques to get rid of Heteroskedasticity problem. The first one is use to weight least square method, which is not applicable in the given case that is in case of ungroup data. The second technique is the use of robust standard error and the third one is to use heteroskedastic instead of homoscedastic model. In this study the focus is given on the use of robust standard error to get rid of Heteroskedasticity problem and for comparison the heteroskedastic Probit model is also estimated. The results of linear probability model, robust logistic model, robust and heteroskedastic Probit model are presented in Table 3.

The results show that the sign of coefficients of all variables in all models are stable and consistent with theory. The sign of the main variable non borrower dummy 'NBD' is negative which means that the odd ratio in favor of increase in income of individuals who borrowed from micro finance institutions is greater than that of non-borrowed individuals which support the argument that micro financing is likely to increase the income and wellbeing of individuals and make them out of poverty circle. The coefficient of 'NBD' is significant at less than 5% in all models. The results are similar with Montgomery et al. (1996)[17]. The coefficients of linear probability model directly presenting the change in probabilities of increase in income while the coefficients of logistic, Probit and heteroskedastic Probit model presenting the change in log of odd ratio. The results shows that 'EBS' has positive impact on log of odd ratio, which means that if an individual is self-employed either borrower or non-borrower has higher chances of increase in income as compared to individuals who are not self-employed in all models[Garcia and Puente (2012)[13]and Chnadler (2012)[6]]. The odd ratio in-favor of increase in income increases as per capita expenditure (PCEXP) increases. The sign of PCEXP is positive but is statistically insignificant in all models. It means microfinance causes to raise the per capita consumption expenditure as supported by Pitt and Khandker (1998)[23]. The increase in 'CEA' is likely to decrease the log of odd ratio and is statistically significant at less than 10% level instead of heteroskedastic Probit model where it is insignificant. The increase in number of livestock 'LS' due to micro financing is likely to increase the odd ratio in favor of increase in income and is significant at less than 1% in all models. The results of all four models are identical in sign as well as in level of significance showing the consistency and stability of results. Among the Probit and heteroskedastic Probit model the results shows that $LNSINGMA^2$(CEA) is significant at less than 1% significance level presenting evidence for the in favor of heteroskedastic Probit model as the two models are the type of nested models.

Table-3: Results of Linear, Logit and Probit model.

	LINEAR PROBABILITY MODEL		LOGIT MODEL		PROBIT MODEL		HETEROSCEDASTIC PROBIT MODEL	
variables	**Coefficient**	**Z-value**	**coefficient**	**Z-value**	**coefficient**	**Z-value**	**coefficient**	**Z-value**
EBS	0.367	7.12***	1.860	6.68***	1.115	6.88***	1.361	6.39***
PCEXP	4.18e-06	0.77	0.00002	0.69	9.7e-06	0.52	1.47e-06	0.54
CEA	-0.0661	-1.81*	-0.342	-1.76*	-0.206	-1.77*	-0.197	-0.84
LS	0.0443	4.31***	0.244	3.43***	0.142	3.66***	0.224	3.54***
NBD	-0.135	-2.11**	-0.728	-2.08**	-0.458	-2.30**	-0.596	-2.27**
CONST	0.1721	1.33	-1.689	-2.20**	-0.936	-2.19**	-1.222	-2.19**
$LNSIGMA^2$ (CEA)							0.619	2.64***
R^2/ Pseudo R2	0.319		0.261		0.262			
F/chi^2	53.94Prob(0.0000)		91.38Prob(0.000)		107.45 Prob(0.0000)		64.98Prob (0.0000)	
Log pseudo likelihood			-177.56622		-177.3739		-173.153	

*, ** and *** indicate significance at less than 10%, 5% and 1% level respectively.

The log of odd ratio is a technical concept. In order to made it simple and understandable, it is necessary to calculate the probability of increase in income but one point is to be noted is that if the sign of coefficient is

positive it increases the log of odd ratio linearly and increase the probability of increase in income non linearly. In order to find the impact of change in explanatory variables directly on the probability of increase in income on individuals one has to calculate the marginal impact of change in probability due to change in one of the explanatory variables. In case of logistic, probit and heteroskedasticprobit model the change in probabilities is non-linearly associated to a unit change in explanatory variables and varies as explanatory variable vary. The results of marginal impact of change in probability associated to change in explanatory variables based on given value of explanatory variables are given in table-4

Here 'y' represents the predicted probability 'p' and dy/dx is the change in probability due to change in explanatory variable at mean value. The impact of EBS, PCEXP and LS is positive on probability of increase in income while that of CEA and NBD is negative. The results show that other variables being constant an individual being self-employed has 40% higher chances on increase in income as compared to the one who is not self-employed. In the same way the chances of microfinance borrower to an increase in income is 17% higher than that of non-borrower, other variables being constant. The increase in livestock 'LS' by one unit will increase the probability of increase in income by about 6% while increase in CEA is likely to decrease the probability by about 8% at mean value. The results of linear probability model is slightly less than that of logistic and probit function as presented in Table 3.

Table-4: Results of Marginal Effects of Variables.

	LOGIT MODEL P=0.4185		PROBIT MODEL P=0.422		HETEROSCEDASTIC PROBIT MODEL P=0.435		
variables	**dy/dx**	**Z-value**	**dy/dx**	**Z-value**	**dy/dx**	**Z-value**	**Mean X**
EBS^	0.415	7.90***	0.408	6.88***	0.370	6.44***	0.575
PCEXP	5.32e-06	0.69	3.81e-06	0.54	4.23e-07	0.54	17534.8
CEA	-0.083	-1.76*	-0.0809	-1.77*	-0.017	-0.29	0.512
LS	0.059	3.37***	0.0557	3.66***	0.064	3.96***	1.660
NBD^	-0.174	-2.14**	-0.176	-2.30**	-0.168	-2.39**	0.4444
R^2	R^2 0.261		R^2 0.262				

, ** and * indicate significance at less than 10%, 5% and 1% level respectively. (^) dy/dx is for discrete change of dummy variable from 0 to 1*

The overall fit of the dichotomous model is measured by pseudo R^2 and count R^2 are presented in table-3 which shows that estimated model can explain about 26% data correctly but these R^2 statistics differ subject to cut-off point for p=1 and p=0. Repeatedly changes cut-off points will generate different model fit statistics. The different combinations of sensitivity (correctly predicting p=1) and 1-specificity where specificity is correctly predicting p=0 are presented by ROC curve (receiver operating characteristics curve) in appendix-A. The area under ROC curve is presented in table-5 showing about 82% fit of the model. Closer the ROC curve to the upper left corner, greater the accuracy of test. Among the three model area under ROC curve is slightly higher with smaller standard error than other two models.

Table-5: Area under Receiver Operating Characteristics (ROC) Curve.

Models	Area under the curve	Std. error	95% confidence interval	
Logit	0.8202	0.0225	0.776	0.864
Probit	0.8208	0.0224	0.776	0.864
Heteroskedasticprobit	0.8272	0.0216	0.784	0.869

It is clear from the results that the chances of borrowers are more likely to an increase in income as compared to that of non-borrower however it is not clear whether it differ from source and purpose of borrowing. To investigate whether the loan taken from each source is of equal importance or having some differential impact as compared to that of non-borrower on the chances of increase in income, the regression based on the dummy variables of all three source of borrowing that is Khushhali Bank (KBD), Punjab Rural Support Program (PRSPD), and First Microfinance Bank (FMFB) is estimated. The results the dummy variable regression model based on the source of borrowing as to that of non-borrower group are presented in table-6.

Table-6: Regression Results for Comparison of Source of Borrowing.

Variables	Constant	KBD	PRSPD	FMFB
Coefficients	-0.523	-0.149	0.893	0.983
z-statistics	-3.65	-0.57	2.93	3.18
p-value	(0.000)	(0.570)	(0.003)	(0.001)

In comparing the non-borrower to that of borrowers only two sources of borrowing (PRSP and FMFB) are more effective in increasing the chances if increase in income of borrowers while loan taken form Khushhali bank is not effective in increasing income. The log of odd ratio is likely to increase by 0.893 and 0.983 if an individual

has borrowed form PRSP and FMFB respectively while it is likely to decrease by 0.149 if they borrowed from Khushhali bank limited.

Now there is need to evaluate the purpose of loan taken. In order to compare the loan taken for different purpose of investment with that of non-borrowers and among itself, the same type dummy variable regression model is applied as in case of evaluating source of borrowing. The results of the dummy based regression model are presented in table-7.

Table-7: Regression Results for Comparison Purpose of Borrowing.

Variables	Constant	AGRID	LIVED	BUSIND
Coefficients	-0.1098	0.0870	2.763	0.904
z-statistics	-5.93	0.23	8.00	2.87
p-values	(0.000)	(0.821)	(0.000)	(0.004)

Loan invested in business and livestock is effective and is likely to increase the income of borrowers. The odd ratio is likely to increase by 2.76 and 0.904.If an individual has taken loan and invested in agriculture, he failed to make it profitable as represented by odd ratio of 0.087. In comparison of borrowers among themselves the individuals who invested their loan in livestock have higher chances of increase in income followed by business activities.

7. CONCLUSION

To evaluate the impact of micro financing on the welfare of masses and reduction of poverty the study is conducted and based on 351 cross section observations. The study may conclude that the impact of micro financing is likely to increase the income of borrower by 17% as compare to that of non-borrowers. In comparison of funds borrowed from different sources, Khushhali bank is not an effective source of borrowing while fund borrowed form First Microfinance Bank and Punjab Rural Support Program are an effective source of borrowing which are likely to increase the income of borrowers. On the other hand to assess the outcome of loan invested in different businesses sectors, the loan invested in agriculture is unlikely to increase the income of the borrowers while loan invested in livestock is highly effective among three sources of investment followed by business activities. It is recommended that borrower should be careful in borrowing from different sources. They are likely to borrow from first microfinance bank and Punjab Rural Support Program as the terms and condition of these two sources are effective in increasing the welfare of individuals and reduction of poverty. Another think that must be considered in investing the loan in rural areas is that the loan taken is likely to be most effective if it is invested in livestock which is the most effective among different sources followed by investment in small business enterprises. On the other hand government, donor agencies and other poverty reduction non-government organizations are recommended to provide fund and management support for the strengthening and expansion of Punjab Rural Support Program for reduction of poverty and welfare maximization of mass public.

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APPENDIX:

Appendix A: Roc Curves Related to Logit, Probit and Heteroskedasticprobit Model

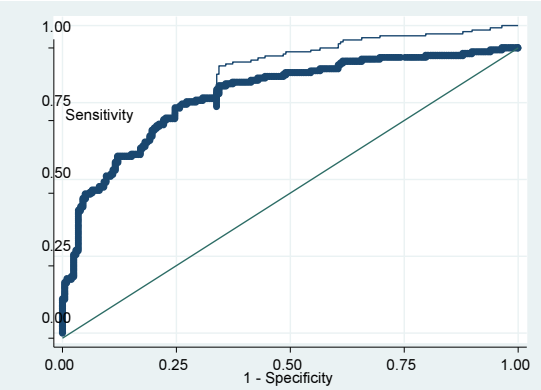

Figure 1: logit model Area under ROC curve = 0.8202

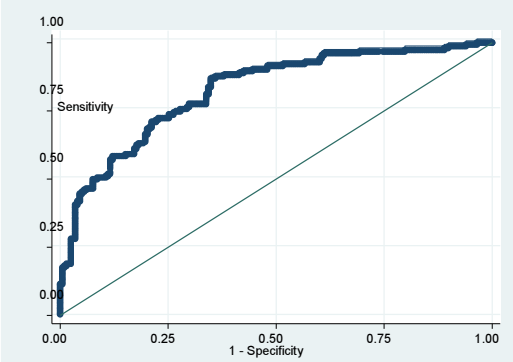

Figure 2: probit model Area under ROC curve = 0.8208

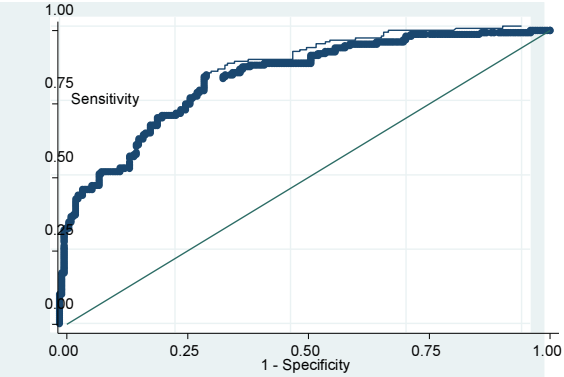

Figure 3: heteroskedasticprobit Area under ROC curve = 0.8272