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Ability to Repay Loans to the Banks in Bankura District of West Bengal

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Abstract

This paper is to investigate the determinants of the borrower's ability to repay loans to the banks in the district of Bankura in West Bengal. For this purpose we have collected the primary data from 400 sample borrowers who have taken loans from Commercial Banks, Regional Rural Banks and Co-operative banks. We employed the logit models to identify the main determinants that influence ability to repay loans of the borrowers. The result of this study shows that the ability to repay loans of the borrowers is influenced by the growth rate of income, worker population ratio, productive use of loans, shortfall of desired investment, interest rate differential and education. We also find that the ability to repay loans to the banks varies directly with the level of income.

Keywords: Ability to repay, Repayment, Wilful, Defaulter, Investment, Overdue.

I. Introduction

We know bank loans are taken with the purpose of investment. If the loans are utilised for productive purpose, then their income will be generated and it is expected that the borrowers will be able to repay the loans to the banks. If the process goes on in this manner the wheel of development will smoothly run. But, in the rural areas, we see that many institutional credit institutions are seriously breaking down due to growing number of bank defaulters or loan overdues. As a result the banking facilities cannot be expanded in rural areas and further it cannot be spread to different layers of the society in the rural areas. So the ability to repay loans to the

banks is the vital factor to build up the social banking. In this paper we want to find out various factors that help to increase the borrower's ability to repay loans to the banks.

The ability to repay loans to the banks is the explained variable in our study using the logit model. But, what can be the appropriate index of the ability to repay loans to the banks? Different authors have used different indices. For instance, net additional income, end period wealth generated etc. have been used alternatively to indicate the ability to repay loans to the banks by the borrowers. Prof. Alokenath Dhabal and Kalyanbrata Bhattacharyya (1989) have tried only to identify those borrowers who have reported a positive net additional income per year as being able to repay loans. In other words, they have assumed that there has been a rise in the ability to repay loans to the banks of the borrowers with a positive net additional income flow per year. Instead we have used rate of growth in income of the borrowers as an index to indicate their ability to repay loans to the banks. We have identified those borrowers as having ability to repay loans to the banks whose income has increased at least by 10% or more over the average income of previous five years prior to the intake of bank loans.

But why do we take 10% increase in the level of income as the criterion of the ability to repay loans to the banks? The reason is very clear. Let the institutional rate of interest charged for the borrowing of loans is approximately 10%. In 2009-2010, the interest rate of regional banks where the borrowers have taken their loans was around 10%. Hence, if the borrower can earn a return of 10% by investing the borrowed amount, then it will be possible for them to repay the loans in time.

However, the variable viz, ability to repay loans to the banks is a dichotomous one taking two values, namely 1 if the borrowers get an increase in income of 10% or more, and 0 if the borrowers do not get an increase in their growth rate of income of 10%.

The present paper is organized as follows. Section II presents the objectives of the study. Section III discusses the methodology and data sources and section IV presents the general hypotheses. Section V considers the model of ability to repay loans to the banks, section VI, VII and VIII present the empirical results, policy recommendation and conclusion respectively.

II. Objective of the Study

- To investigate whether the borrowers are able to repay bank loans in the district of Bankura in West Bengal and,
- To assess the increase in income of the borrowers by properly utilising the loans for productive purposes in agricultural and non-agricultural sectors.

III. Variables and Methodology

Once we have considered the analytical model of ability to repay loans to the bank, it is required to specify and define the explained and the explanatory variables. The explained variable in our study is the ability of the borrowers to repay loans to the bank. The variables incorporated in the model are explained below.

Ability to Repay Loans (ARTPLOANS): 'Ability to repay loans' is the explained variable in our study. It is a dichotomous one taking two values namely 1 if the borrowers get an increase in their growth rate of income of 10% or more and 0 if the borrowers do not get an increase in their growth rate of income of 10%.

Growth Rate of Income (GRATEINCOME): The growth rate of income was measured by the rate of change in the level income of the households of two periods, 1. prior to the intake of loans and 2. Posterior income after the intake of loans. The level of income prior to the intake of loans has been considered equivalent to income of last five years prior to the intake of loans. We have felt the need to take average of the incomes of five years prior to the intake of loans in order to even out fluctuations of incomes. Income, which relates to the annual family income measured in rupees.

Age (AGE): Age measured in years.

Educational Qualification (EDUCATION): Educational qualification is measured in years of attending the educational institute.

Proportion of Investment Financed by Loan (PINFLOAN): The proportion of investment financed by loans is ratio of the actual amount of investment to the desired amount of investment. The actual amount of investment is equal to amount of loan sanctioned by the bank. The desired amount of investment has been estimated on the basis of actual cost required for financing the particular project undertaken by the individual concerned.

Worker Population Ratio (WPR): Worker population ratio is defined as the ratio of number of working members to the family size.

Irrigated Land and Non-irrigated Land (IRRLAND and NIRRLAND): Land measured in acre. We have considered irrigated and non-irrigated land as two separate variables in order to segregate their relative influences.

Rate of Increase in Per Capita Family Expenditure (RIPCFMEXP): We divide the total expenditure of the family to get the per capita family expenditure. We consider that the per capita family expenditure prior to the intake of loans and posterior to the intake of loans. The per capita family expenditure prior to the intake of loans has been considered to be the average of the per capita family expenditures of last five years prior to the intake of loans. The rate of increase in per capita family expenditure is ratio of the gap between per capita family expenditure prior to and posterior to the intake of loans to the per capita family expenditure prior to the intake of loans. The per capita family expenditure is measured in rupees and the rate of increase in per capita family expenditure is independent of unit of measurement.

Difference in the Interest Rate (DINTRATE): There is a wide gap in the borrowing rate of interest on the loans charged by the bank (what we may call the institutional rate of interest) and rate of interest charged by local moneylender on the loans they provide (what we may call local or the non-institutional rate of interest).

Caste (CASTE): Caste is a dummy variable with the value 'one' if the households belong to the general caste and 'zero' if the households belong to the non-general caste.

Nature of Loan Use (NALOANUSE): We consider a dummy variable NALOANUSE that takes the value ‘one’ if the loan is productively used and ‘zero’ otherwise.

Analytical Frame Work

The objective of this empirical study is to determine the ability of the borrowers to repay loans. The dependent variable is taken to be the probability of ability to repay loans to the banks. Here logit analysis has been used as the statistical tool since the dependent variable, namely, the borrower is able to repay or not.

The logit model assumes that the probability of ability to repay loans, P_d , is related to a vector of explanatory variables X_i , $i=1, 2, \dots, n$, in the following functional form

$$P_d = F(Z) = \int_{-\infty}^{+\infty} \frac{1}{\sqrt{2\pi}} e(-\frac{1}{2}u^2) du = h(z) \quad (1)$$

Where u is a random variable normally distributed (with mean zero and unit variance) and Z is a linear combination of the X_i , which is obtained from the inverse of the cumulative normal function.

$$Z = F^{-1}(P_d) = \alpha + \beta_i X_i \quad (2)$$

P_d represents the probability of the ability to repay loans to the banks. Ability to repay loans will be more likely to occur the larger the value of the index Z . Thus P_d can be interpreted as an estimate of the conditional probability that a borrower will be able to repay loans, given the information contained in X_i .

We do not have the observations on the left hand side of equation-(1), since probability that ability to repay loans will take place is not known. A random variable, Y_i , is defined such that $Y_i = 1$ if the ability to repay loan occurs, and zero otherwise.

In equation (2), the value of Z is a linear function of the exogenous variables and thus the value changes with X_i according to the sign and magnitude of i .

The rate of change is not constant. A transformation of co-efficient is used that yields

$$\frac{dP(Y_i = 1)}{dX_i} = \Theta(Z)\beta_i$$

In the logit model the term β_i appears as a multiplicative factor and determines the sign of the effect. The transformed β_i can be used to find the effect of a unit change in the exogenous variable on the probability of ability to repay loans.

The Data: The study has been conducted in the district of Bankura in the state of West Bengal in India. From this district, Visnupur sub-division was randomly selected for the study. Again from this sub-division two blocks were randomly selected, namely, Indus and Joypur. From each of these

two blocks, eight villages were selected randomly, leading to a total 16 villages. From each of these 16 villages 25 borrowers were randomly selected. Thus a sample of 400 borrowers was selected for the purpose of the study.

Primary data were collected for both the agricultural and non-agricultural year 2009-2010 from 400 sample borrowers who have taken loans from the formal sector such as commercial, Regional Rural and Co-operative bank branches operating in the two blocks through personal interview on the basis of a pre-structured questionnaire.

IV. General Hypotheses

We consider a set of hypotheses in the model of ability to repay loans to the banks that are to be tested in the light of our sample collected in the district of Bankura. Refer to the equation 3.

Hypothesis 1: Age may have a positive impact on the ability to repay loans to the banks.

Hypothesis 2: It is expected that the ability to repay loans to the banks will increase with the level of education.

Hypothesis 3: The increase the proportion of investment financed by loans will lead to increase the ability to repay loans to the banks.

Hypothesis 4: There is a positive impact of the worker population ratio on the ability to pay.

Hypothesis 5: Irrigated land has a direct impact on the ability to repay loans to the banks by the borrowers.

Hypothesis 6: The non-irrigated land will have positive effect on the ability to repay loans to the banks.

Hypothesis 7: The difference in the interest rate affects adversely the ability to repay loans to the banks.

Hypothesis 8: It is expected that the borrower who belongs to the general caste have more ability to repay loans to the banks compared to the borrower who belong to the non-general caste.

Hypothesis 9: The ability to repay loans to the banks of borrowers is likely to be greater if the loan is used for productive purpose.

Hypothesis 10: The growth rate of income and the ability to repay loans to the banks are directly connected.

Hypothesis 11: The rate of increase in per capita family expenditure and the ability to repay loans to the banks are inversely related.

V. Model Specification

Ability to repay loans to the banks is affected by a number of factors. We have considered the ability to repay loans to the banks for all households, households below the poverty line whose annual income below Rs.3000/- per anum, households in the middle income group whose annual income between Rs.3000/- and Rs. 50,000/- per anum and households in the high income group whose annual income of Rs.50000/- and above per anum. The analytical models of ability to repay loans to the banks have been considered as follows.

$$\begin{aligned}
 ARTPLOANS = & \gamma_0 + \gamma_1 AGE + \gamma_2 EDUCATION + \gamma_3 PINFLOAN + \gamma_4 WPR \\
 & + \gamma_5 IRRLAND + \gamma_6 NIRRLAND + \gamma_7 DINTRATE \\
 & + \gamma_8 CASTE + \gamma_9 NALOANUSE + \gamma_{10} GRATEINCOME \\
 & + \gamma_{11} RIPCMEXP + error
 \end{aligned} \tag{3}$$

VI. Empirical Result and Discussion

In this section we shall consider the ability to repay in the district of Bankura. Our main objective is to look into how the probability that the households are able to repay loans is affected due to the change in the regressors. We also see how the overall probability that the households are able to repay loans varies over different income classes. Refer to the table – 1, 2 and 3 where the empirical results of logit model of ability to repay, marginal change in odds ratio and probability that the household is able to repay are presented.

Consider first of all the model for all households. Refer to table 1, we consider the goodness of fit of the fitted regression line to a set of data collected. The coefficient of determination R-squared is a measure that tells how well the sample regression line fits the data. Refer to table 1 the empirical value of R-squared statistics is 0.66. This means that about 66% of the variation in the response variable is explained by the explanatory variables. In the case for the model of households below the poverty line we see that the empirical value of R-squared statistics is 0.70. Again, refer to the table 2 where the empirical results for models of households in the middle-income group and households in the high-income group are presented. Consider the model of households in the middle-income group. In this case, the value of R squared (0.72) statistics indicates that the sample regression line fits the data very well. Lastly, in the case for the model of households in the high-income group we get the value of R-squared is 0.74. This implies that the sample regression line fits the data very well.

We note that age has got no statistically significant effect on the probability that the households are able to repay loans in all models of all households, households below the poverty line, households in the middle income group and households in the high income group.

Consider the effect of education. The coefficients of education in our logit model of ability to repay are positive in all the models and are statistically significant at 5% level of significance. This implies that the education has a positive impact on the probability that the households are able to repay loans. The log of odds ratio in favour of ability to repay loan in all models increases. Thus, the odds ratios also increase. The probability that the households are able to repay loans increases by 0.008%, 0.023%, 0.026% and 0.037% for the respect models of all households, households below the poverty line, households in the middle-income group and households in the high-income group.

The coefficient of growth rate of income is positive and statistically significant at 5% level of significance in all the models. Thus the hypothesis that the probability that the households are able to repay loans is directly related with the growth rate of income for all the models. The log of odds ratio in favour of ability to repay loan and hence the odds ratio increases with one unit increase in the growth rate of income. The probability that the households are able to repay loans is seen to increase across the model. The values of these probabilities are respectively 0.12%, 0.05%, 0.11% and 0.15% for models of all households, households below the poverty line, households in the middle-income group and households in the high-income group.

Table – 1. Ability to Repay Loans to the Banks in the District of Bankura, West Bengal during 2009-2010

Dependent variable is ATRPLOANS (Ability to Repay Loans)						
Regressor	All Households			Type of Households		
				Households Below the Poverty Line		
	Coefficient	Standard Error	t-Statistic	Coefficient	Standard Error	t-Statistic
CONSTANT	-0.9765	0.7050	-1.3852	-0.7315	1.1886	-0.6154
AGE	-0.0127	0.0084	-1.5093	-0.0150	0.0153	-0.9767
EDUCATION	0.0329*	0.0124	2.6459	0.0928*	0.0321	2.8858
GRATEINCOME	0.5103**	0.2047	2.4926	0.1980*	0.0552	3.5902
PINFLOAN	0.3486*	0.1172	2.9728	0.2279*	0.0838	2.7183
WPR	0.2665*	0.0765	3.4832	0.4043**	0.1733	2.3327
IRRLAND	0.2382*	0.0248	9.6010	0.3260**	0.1514	2.1535
NIRRLAND	0.0456	0.0353	1.2933	0.1298	0.2247	0.5777
RIPCFMEXP	-0.0062	0.0064	-0.9621	-0.0022	0.0182	-0.1204
DINTRATE	0.0009	0.0116	0.0809	-0.0097	0.0221	-0.4378
CASTE	-0.4894**	0.2437	-2.0085	-0.5680	0.4604	-1.2337
NALOANUSE	0.4164**	0.1673	2.4889	0.0973**	0.0432	2.2554
			All Households	Households Below the Poverty Line		
Number of Observations			400	124		
Mean of ATRPLOANS			0.58750	0.45161		
Mean of fitted ATRPLOANS			0.69250	0.41129		
Goodness of fit			0.65500	0.70161		
Pseudo-R-Squared			0.064124	0.18241		

Source: Author's own calculation. * stands for significant at 1% level; ** stands for significant at 5% level; *** stands for significant at 10% level.

The proportion of investment financed by loans is seen to affect the probability that the households are able to repay loans directly at 5% level of significance. The probabilities that the households are able to repay loans for all households, households below the poverty line, households in the middle income group and households in the high income group are respectively 0.08%, 0.06% 0.11% and 0.13%.

**Table – 2. Ability to Repay Loans to the Banks in the District of Bankura,
West Bengal during 2009-2010**

Dependent variable is ATRPLOANS (Ability to Repay Loans)						
Regressor	Middle Income Group			High Income Group		
	Coefficient	Standard Error	t-Statistic	Coefficient	Standard Error	t-Statistic
CONSTANT	-1.5956	1.7742	-0.8993	-6.5126*	1.8780	-3.4678
AGE	-0.0014	0.0174	-0.0830	-0.0354**	0.0180	-1.9635
EDUCATION	0.1079**	0.0512	2.1077	0.1560**	0.0786	1.9856
GRATEINCOME	0.4535**	0.2039	2.2240	0.7544*	0.1863	4.0492
PINFLOAN	0.4574**	0.2151	2.1266	0.8662*	0.3239	2.6744
WPR	0.6391*	0.1683	3.7966	0.3334	1.5218	0.2191
IRRLAND	0.4703*	0.0800	5.8809	0.8638**	0.3956	2.1833
NIRRLAND	0.1027	0.1166	0.8809	0.0550	0.0458	1.2003
RIPCMEEXP	-0.0263	0.0245	-1.0709	-0.0105	0.0941	-0.1110
DINTRATE	0.0181	0.0231	0.7823	-0.0035	0.0242	-0.1456
CASTE	-1.4849**	0.5872	-2.5287	-0.3378	0.4704	-0.7181
NALOANUSE	0.3964**	0.1824	2.1732	0.8113**	0.3740	2.1691
Middle Income Group High Income Group						
Number of Observations			148			128
Mean of ATRPLOANS			0.62838			0.66929
Mean of fitted ATRPLOANS			0.72297			0.81890
Goodness of fit			0.71622			0.74016
Pseudo-R-Squared			0.18510			.10117

Source: Author's own calculation. * stands for significant at 1% level; ** stands for significant at 5% level; *** stands for significant at 10% level.

The hypothesis of positive association between the worker population ratio and probability that the households are able to repay loans is accepted. The coefficient of worker population ratio in our logit model of ability to repay is seen to be positive in all the models. The log of odds ratio in favour of ability to repay loan and hence the odds ratio increase. Thus, the probability that the households are able to repay loans for the corresponding models increases by 0.06%, 0.10%, 0.15% and 0.18%.

Table – 3. Logit, Odds Ratio, Probability and Marginal Change in Odds Ratio and Probabilities in ATRPLOANS in the District of Bankura, West Bengal during 2009-2010

	All Households		Households Below the Poverty Line		Households in the Middle Income Group		Households in the High Income Group	
Logit	0.6536		-0.6971		0.3920		1.5779	
Odds Ratio	1.9224		0.4980		1.4799		4.8446	
Probability	0.6578		0.3325		0.5968		0.8289	
Regressor	Change in Odds Ratio		Change in Probability		Change in Odds Ratio		Change in Probability	
CONSTANT	-62.3391	-0.2289	-51.8818	-0.1792	-79.7213	-0.3864	-99.8515	-0.9529
AGE	-1.2595	-0.0030	-1.4878	-0.0037	-0.1439	-0.0003	-3.4757	-0.0052
EDUCATION	3.3438	0.0077	9.7203	0.0227	11.3936	0.0261	16.8850	0.0368
GRATEINCOME	66.5749	0.1196	21.8962	0.0485	57.3885	0.1098	112.6263	0.1504
PINFLOAN	41.7026	0.0817	25.5972	0.0558	57.9939	0.1107	137.7763	0.1267
WPR	30.5375	0.0625	49.8178	0.0990	89.4737	0.1547	39.5761	0.1808
IRRLAND	26.8988	0.0558	38.5415	0.0798	60.0426	0.1139	137.2087	0.1264
NIRRLAND	4.6691	0.0107	13.8635	0.0318	10.8170	0.0249	5.6507	0.0080
RIPCFCMEXP	-0.0006	0.0000	-0.0219	-0.0001	-0.0263	-0.0001	-0.0104	0.0000
DINTRATE	0.0936	0.0002	-0.9620	-0.0024	1.8255	0.0044	-0.3510	-0.0005
CASTE	-38.7030	-0.1147	-43.3359	-0.1391	-77.3475	-0.3595	-28.6669	-0.0494
NALOANUSE	51.6432	0.0976	10.2220	0.0238	48.6403	0.0960	125.0902	0.1187

Consider the effect of irrigated land on the probability that the households are able to repay loans. As we see the coefficients of irrigated land in our logit model of ability to repay for all sorts of households are seen to be positive and statistically significant at 5% level of significance. This implies that the hypothesis that irrigated land increases probability that the households are able to repay loans is accepted. The log of odds ratio in favour of ability to repay loan and hence the odds ratio in our estimated logit model of ability to repay increases and so does the probability that the households are able to repay loans across different income level. The probability that the households are able to repay loans for all models respectively increases by 0.06%, 0.08%, 0.11% and 0.13%.

The non-irrigated land has a positive effect on probability that the households are able to repay loans in all models, but it is not statistically significant. Due to increase in the per capita family expenditure, the probability that the households are able to repay loans declines. But, the variable rate of per capita family expenditure is not statistically significant in affecting probability. So is true about the effect of difference in the interest rate and caste on probability that the households are able to repay loans.

The coefficient of nature of loan use on the probability that the households are able to repay loans in our estimated logit model of ability to repay is seen to be positive and statistically significant at 5% level of significance. Thus, the hypothesis that the productive use of loans

increases the probability that the households are able to repay loans is accepted at 5% level of significance. The log of odds ratio in favour of ability to repay loan and odds ratio increases in all the models. We note that the probability that the households are able to repay loans due to nature of loan use increases by 0.10%, 0.02%, 0.10% and 0.12% for models of all households, households below the poverty line, households in the middle income group and households in the high income group respectively.

To conclude this section, we must bring our attention to overall log of odds ratio in favour of ability to repay loan and the probability that the households are able to repay loans. The values of both items increase across different income levels. The values of the probability that the households are able to repay loans for models of all households, households below the poverty line, households in the middle income group and households in the high income group are respectively 0.66, 0.33, 0.60 and 0.83. The probability that the households are able to repay loans varies directly with the level of income.

VII. Policy Recommendations

We are now in a position to prescribe some economic policy that would help the ability to repay loans to banks of the borrowers. In formulating the economic policy we shall be guided by the empirical estimates of our model. Now these policies are mentioned below.

(1) From the study we have seen that the growth rate of income has a positive impact on the ability to repay loans to the banks. It is obviously that if income is generated, it is likely to create the ability to repay the loans of the households. So at the first there must be necessary to increase the income generation as measured by growth rate of income that help to improve the ability to repay loans to banks of the borrowers.

We have seen that education has a positive effect on the ability to repay loans to the banks. Education brings the outer world in the arena of the investors. The investors get much information through education and acquaint them with the possible knowledge that results in fruitful effect from production. If proper training is arranged, the investor will come to know the proper input-mix of the production from which the optimum return can be found. Therefore, imparting educational training for the investors in both the agricultural and non-agricultural sector will stimulate the income generation. As a result, they will be able to repay their loans to the banks in time.

We have proportion of investment financed by loans has a positive impact on the ability to repay loans to the banks. So, we would suggest that the banks should provide to the investors with the loans sufficient to finance the project that investors have planned for. Otherwise, the under-investment or investment at the sub-optimal level cannot generate income to the desired level and there will be insufficient income generation. Due to this fact of under-investment, the ability to repay loans to the banks will be decreased.

We have seen that the worker population ratio has a positive effect on ability to repay loans to the banks. Creation of the jobs or employments will increase the worker population ratio and it will reduce the dependency ratio of the family. Obviously the borrowers will be able to repay their loans in time.

We have noticed that the irrigated land has a positive effect on the ability to repay loans to the banks. Therefore, if the government improves the irrigation facilities among the farmers, then their income will increase and ability to repay loans to the banks will also improve. The productive use of loans has always a positive and favorable effect on the ability to repay loans to the banks. The government or the appropriate loan sanctioning authority should be watchful enough so that the borrowers do not get the scope to diversify the loans from the productive activities to non-productive activities.

VIII. Conclusion

We have found that the ability to repay loans of the borrowers is affected by various factors of which the following are important: the education, growth rate of income, proportion of investment financed by loans, worker population ratio, the irrigated land and the nature of land used. Among these, the education, growth rate of income, proportion of investment financed by loans, worker population ratio, the irrigated land and the nature of land used has a positive impact on the probability that the borrowers are able to repay loans. We also found that the probability of ability to repay loans to the banks is directly related with the growth rate of income that is income generation. So reduce the number of defaulters, all attempts should be employed to increase the ability to repay loans to the banks. This implies that the income generation must be the necessary condition for the repayment of bank loans. And this income generation takes place at a sufficient level only through the productive use of loans.

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