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Retail Credit Default Risk – An Empirical Study

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ABSTRACT

This study empirically examines the role of various socio -demographic and financial factors that determine borrowers default risk in housing loans. Using the data from the housing loan accounts (sanctioned from 1999-2010) of two public sector banks in Bangalore, the study investigates the repayment pattern of two groups of borrowers: defaulters and non-defaulters and group them into different risk level. The study uses stepwise regression to find the extent of influence of socio demographic and financial factors on default risk. The outcome of the study indicates that the association of financial variables like Net worth, Income, maturity and loan size are more significant on borrower default risk. However, one cannot ignore the socio-demographic variables like age, educational level, Number of dependents and experience in the job which otherwise may inhibit lender to properly assess credit risk in developing the internal score sheets. The outcome of the study shows that these parameters also act as default triggers.

General Term Retail credit risk**.**
Indexing terms
Default Risk, Financial variables, Socio-demographic variables and housing loan.
Academic Discipline & Sub-Disciplines
Management, Retail Banking.
Subject Classification
Retail Banking.
Coverage
Public sector banks, Bangalore.
Type (Method/Approach)
Exploratory study,

1. INTRODUCTION

Indian economy has emerged as a demand driven rather than a supply constrained economy after the LPG wave. The typical mindset of Indian consumers towards borrowing has changed. The consumers are seeking a better lifestyle and no longer consider borrowing as a taboo. The lenders of credit are leveraging this by offering varieties of products through varied distribution channels to different customer group there by making retail banking synonymous with the mainstream banking. In a demand driven environment like this, increased access to availability of credit could strain the credit quality of banks & financial institutions if risk assessment is not done with utmost care. Availability and analysis of credit information is thus assuming greater importance to decide whether or not to grant credit to a particular applicant. Also when people cannot commit to pay back their loans and there is limited information about their characteristics, lending institutions must draw inferences about their likelihood of default. The primary problem of any lender is to differentiate between "good" and

"bad" debtors prior to granting credit. So differentiating the borrowers into different risk category would help them in monitoring them better. Therefore speed in risk assessment is of utmost importance not only to decide to extend credit but also to decide upon appropriate pricing. With this context the research attempts to study the repayment behaviour of housing loans of public sector banks in India. The study classifies the borrower into two groups. The first group is those borrowers who have not missed any payment and called "non defaulters" and the second group are those who have missed their payment for more than 90 days and are called "defaulters". The borrowers repayment behaviour is analysed based on the socio- demographic and financial characteristics and the borrowers are discriminated based on the high and low risk class.

Identifying these as the focus for research, current study will answer the following questions:

1. What is the repayment pattern of borrowers of housing loan?
2. Is the repayment pattern of the two groups of borrowers different based on the demographic and financial factors?
3. What is the profile of borrowers belonging to different risk level?

2. LITERATURE REVIEW

There are several studies which have been carried out to assess the credit risk of retail loans and developing the credit scoring models for the same. Some of the studies like Jappelli (1990), Berger and Udell (1990), Crook (1996), Roszbach and Jacobson. (1998), Sandra and Morgan (1998), Sexton (1977) and other researchers have conducted extensive research in examining the lenders' decision to grant/reject the loans. The outcome of the study was helpful in categorizing the variables for the study. There are few studies likeOzdemir and Boran (2004), Agarwal, et al (2008), Ahmet and Ebru (2006) and others that examine the borrowers' ability to pay the loan. These studies assess the credit risk of varieties of retail loans like personal loans, vehicle loans, credit cards and others. The outcome of these studies was helpful in understanding the behaviour of retail borrowers. Studies by Bandyopadhhyay and Saha (2009), Hosamane and Dinabandhu Bag (2009), Rida and Atanasios (2009) and others examine the default behaviour of mortgage loans. The results of these studies helped to identify the triggers of default.

Selection of Variables

Based on the literature reviews and also based on the risk assessment score sheet parameters used by the bank, independent variables are grouped under two categories: Socio -Demographic variables and Financial Variables

TABLE 1 Table Showing the Independent Variables

Socio -Demographic Variables
Age
Gender
Marital Status

Educational Level
Occupational Level
Residential Status
No. Of Dependants Including self
Experience
Financial Variable
Income
Loan Amount
Maturity
Net worth
Spouse income
Guarantee
Other Assets
EMI
Interest rate

A risk rating sore sheet and risk assessment table was developed after rigorous interaction with the experts. The score sheet thus developed is similar to the score sheet and risk assessment table used by the bank authorities. This score sheet allots scores to each of the independent variables. The cumulative score is then matched with the risk assessment table indicating the risk class of the borrowers. A higher score indicates lower risk and a better rating and vice versa. The defaulters and non defaulters are matched to respective risk class depending on the scores obtained. This would enable the lender in monitoring the defaulter's behaviour on one hand while marking the potential risk class of non defaulters on the other; such an effort would enable the banks in identifying the potential risk level if their repayment pattern changes in future.

TABLE 2 Risk Assessment table.

Socio - Demographic Variables	Variable group	Scores assigned	Max score
Age	26 -29 30-39 40-49 50-59 60+	5 4 3 2 1	5
Gender	Male Female	1 0	1
Marital Status	Married Not married	0 1	1
Education	<SSLC, SSLC, PUC Degree/PG, Professional	1 2 3	3
Occupation	Government/ public/ Private Company Business	5 3 1	5
Residential Status	Owns a house Rented house	0 1	1
No. Of Dependants Including	1-2 3-4 5-6	5 3 1	5
Experience	>20 years 16-20 years 11-15 years 6-10 years 1-5 years	5 4 3 2 1	5
Financial Variable			
Income	< 1,00,000 1,00,000-1,50,000 1,60,000 – 2,00,000 2,10,000-3,00,000 > 3,00,000	2 3 4 6 8	8
loan Amount	1,00,000-3,00,000 3,10,000 – 5,00,000 5,10,000 – 7,00,000 7,10,000 – 10,00,000 > 10,00,000	1 2 3 5 6	6

Maturity	< 10 yrs 10 years 11-14 years 15+ years	5 3 1 1	5
Net worth	< 3 lakhs 3.1-5.0 5.1-10.0 10.1-15.0 15.1-20.0 >20.0	1 2 4 6 8 10	10
Spouse income	Yes no	0 1	2
Guarntee	Yes no	0 1	2
Other Assets	Nil Site, 2 /4 wheeler 2 wheeler/site 4wheeler/site	1 2 3 4 5	5
EMI	≤4,000 4001-6000 6001-8000 8001-1000 10001-15000 15000+	1 2 3 4 5 6	6
Interest rate	7.5-8.75% 9-10.75% 11-11.75% 12-13% 13.25%-15%	5 4 3 2 1	5
	Total Max Score Developed		75

After developing the risk assessment scores a risk rating table was developed for a maximum score of 75 depending on the scoring assigned to selected variables.

TABLE 3: **Risk rating table**

Risk category	Score (marks)and Risk rating
Moderate	61-70 'A'
Average	46-60 'B'
Caution	36-45 'C'

3. DATA SOURCE

The study conducted is based on the primary data collected from the loan applications and legal documents for those borrowers who have availed housing loans from 1999 to 2010. Also the data collection involved rigorous discussion with the bank managers and experts to understand the scoring methodology. Secondary data is used to get information about the retail banking industry from various sources like bank reports, RBI website, BIS website etc., The data has two types of borrowers. Good accounts and default/ bad accounts. Good accounts are the borrowers who have not missed their payment at any time and are called "non defaulters" in the study. Bad accounts are those who have missed their payment over 90 days and are marked as arrear accounts by banks and are called "defaulters" in the study. Thus the sample of 300 housing loan borrowers includes 200 defaulters and 100 non defaulters.

4. MAJOR FINDINGS OF THE STUDY

1. The study shows that financial variables rather than the socio-demographic characteristics of clients have a significant influence on borrower's payback performance, though the former cannot be ignored this is in support of the study by Ozdemir and Boran (2004).
2. Older people are found to be less risky as compared to the young borrowers. This result support the work of Sandra and Morgan (1998), Berger and Udell (1990), Sexton (1977), Jappelli (1990),Gan and

Mosquera (2008) and Crook (1996) but contravenes the study by Bandyopadhhyay and Saha (2009). In this study the defaulters were highest in the age group of 30-39 years.

3. People with better education level are found to be less risky, in this study. This is because higher educational level will have a prospect for better job and hence better earnings. This is similar to the study by Crook (1996) and Vasanthi Peter and Raja Peter (2006). The result shows that maximum defaulters had education level only up to SSLC.
4. Occupational status is found to be non significant in the study for defaulters while the non defaulters profile showed that those belonging to private companies were marked in higher risk category.
5. Higher the Income lower is the default risk, because of better financial prospects. The results support Sexton (1977) while contravening Qiwei and Binjie(2008). It's interesting to note that Net worth is more significant than income in the study. Hence the lender need to pay attention towards rating the net worth a higher score will altering their score sheets. This is because higher net worth acts as a buffer during the period of fluctuations in borrowers income due to uncertain economic conditions.
6. Spouse income in found to be non significant in the study may be because in India, the double income concept has started only in the recent past and the study has data from 1999-2008 wherein the double income was still in nascent stage. This contravenes the study by Sexton (1977).
7. The study showed that maturity period of less than 10 years were rated in the A category indicating less risk as compared to those with maturity period of 11-14 years in B risk category showing an increase in risk level. The defaulters who had their maturity period between 11-14 years were highest up to 95.2%. There were no defaulters who had maturity period less than 10 years indicating longer the maturity period defaulter's level being increased. This could be because longer loan term raises the possibility of their sufferings from unexpected events and their default risk being increased. This is similar to the result of Ozdemir and Boron (2004) while contravening with Berger and Udell (1990).
8. The result shows that higher EMI not necessarily increases the default risk this contravenes with that of RiaZaidi (2009) study.
9. It is interesting to note that higher the loan amount lower is the default risk in

this study. This could be because those borrowing higher loans will also have better repayable capability. This contravenes the work of Carling K., Jacobson T and Roszbach K (1998).

10. The simple linear regression has R^2 of 77.20% and R^2(adj) of 76.0% indicating that about 76.0% of variations in default risk is explained by variables Net worth, Income, Interest rate, Maturity, Loan amount, Experience, No. of dependents further the stepwise regression that was carried on default risk with predictor variables shows that.75.03% of variance in default risk is explained by seven predictor variables: Net worth, Loan amount, maturity, Income, interest, Experience and age and 79.78% of variance in default risk explained by 6 predictor variables: Loan amount, Net worth, Maturity, Age, Experience, Interest for non -defaulters.

TABLE – 4 **Regression analyses between Variables and Risk rating of Defaulters**

sym	Variables	Correlation coefficient (r)		
		Reg.Coeff (b)	S.E (beta)	t-Value
X1	Age	-0.0993	0.0018	3.79 *
X2	No. of Dependents	-0.7771	0.0134	4.10 *
X3	Experience	0.1878	0.0023	5.71 *
X4	Income	0.0131	0.0001	6.09 *
X5	Net worth	0.1861	0.0018	7.51 *
X6	Maturity	-0.6531	0.0078	5.92 *
X7	Loan amount	0.9187	0.0160	4.06 *
X8	EMI	0.0002	0.0001	1.49 NS
X9	Interest	0.8978	0.0096	6.62 *

Constant (a) = 37.516 R^2 = 77.20 R^2 (adj) = 76.0% F =63.99*

Table 5 **Step wise regression for defaulters w.r.t to default risk scores**.

Variables	S.E (Beta)	t value	R^2
X5	0.378	12.23	43.03
X5,X7	0.795	7.11	54.65
X5,X7,X6	-0.620	5.73	61.15
X5,X7,X6,X9	0.78	5.29	66.03
X5,X7,X6,X9,X4	0.0120	5.01	69.93
X5,X7,X6,X9,X4,X2	-0.86	4.34	72.60
X5,X7,X6,X9,X4,X2,X3	-0.97	5.09	75.03

TABLE –6 **Regression analyses between Variables and Risk rating of Non-Defaulters**

Variables	Correlation coefficient (r)		
	Reg Coefficient (b)	SE (b)	t-Value
Age	-0.2216	0.0043	5.11 *
No. of Dependents	0.5738	0.0313	1.83 NS
Experience	0.1866	0.0064	2.90 *
Income	-0.0003	0.0001	0.39 NS
Net worth	0.4811	0.0066	7.26 *
Repayment period	-0.5603	0.0101	5.54 *
Loan availed	1.4916	0.0435	3.43 *
EMI	-0.0002	0.0001	1.00 NS
Rate of Interest	-0.7689	0.0236	3.26 *

Constant (a) = 54.154 R^2 = 80.80 F =37.49* *Significant at 5% level, NS : Non-Significant

Table 7 **Step wise regression for non-defaulters w.r.t to default risk scores.**

Variables	S.E (Beta)	t value	R^2
X7	1.094	7.72	37.84
X7,X5	0.593	6.94	58.45
X7,X5,X6	-0.650	6.60	71.43
X7,X5,X6,X1	-0.124	3.21	74.22
X7,X5,X6,X1,X3	0.237	3.77	77.61
X7,X5,X6,X1,X3,X9	-0.70	3.16	79.78

5. CONCLUSION

The primary contribution of the research delineated in this study is to demonstrate the importance of borrower specific characteristics in determining the risk of credit default on residential housing loan repayment. The growth in lending to housing sector across the banks has resulted in increased competition among the lenders who are adopting aggressive lending policies in terms of increased tenure; higher loan to value loans, softening collaterals, competitive pricing etc., Apart from this catering to several borrowers with unpalatable credit history could lead to increased default and lower margins. Though the default rate in housing loans in India are not significant now one should not forget the lessons of the recent "boom time facile lending practices of US resulting in mortgage crisis. Understanding the interplay between various factors and their link with borrower default will no doubt help the lenders in fine tuning their existing lending policies better. The present study provides an understanding of the borrowersbehaviour, and also segments the borrowers into different risk class, this would help the lenders in monitoring the characteristics of borrowers by distinguishing the high risk borrowers from that of low risk and take appropriate measures and strategies to deal with them.

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