

**SOURCES AND UTILIZATION OF RURAL
HOUSEHOLD BORROWINGS: SOME ANALYTICAL
AND EMPIRICAL ISSUES**

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IN
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*Dedicated to My Parents
For Their Endless Love Support and
Encouragement*

Certificate

Certified that the Thesis entitled “**Sources and Utilization of Rural Household Borrowings: Some Analytical and Empirical Issues**” submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my research work carried out under the supervision of Prof. Ajitava Raychaudhuri and Prof. Tanmoyee Banerjee, Department of Economics, Jadavpur University.

And that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere/elsewhere.

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List of Abbreviations

AI	Availability Index
AII	Access to Insurance Index
AIDIS	All India Debt and Investment Survey
AIRCS	All India Rural Credit Survey
AIRDIS	All India Rural Debt and Investment Survey
BBI	Bank Branches Index
BPI	Banking Penetration Index
BPL	Below Poverty Line
BIDS	Bangladesh Institute of Development Study
DI	Dimension Index
FII	Financial Inclusion Index
FLI	Financial Literacy Index
GOI	Government of India
HCI	Human Capital Index
ICSSR	Indian Council of Social Science Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDI	Infrastructural Development Index
IV	Instrumental Variable
MFI	Microfinance Institutions
MPBEC	Madras Provincial Banking Enquiry Committee
MPCE	Monthly per capita consumption expenditure
NABARD	National Bank for Agriculture and Rural Development
NPA	Non-performing Asset
NSDP	Net State Domestic Product

NSSO	National Sample Survey Organization
PCI	Physical Capital Index
RBI	Reserve Bank of India
RRB	Regional Rural Bank
SCB	Scheduled Commercial Bank
SHG	Self-Help Group
SHG-SBL	Self-Help Group Bank Linkage
VLSS	Vietnam Living Standard Survey
WB	West Bengal

Contents

Certificate.....	i
Acknowledgement	ii
List of Abbreviations	iv
Contents	vi
List of Tables	xi
Chapter 1: Overview of Rural Credit Market in India.....	1
1.1 Rural Credit Market in India	1
1.1.1 Pre-Independence Period.....	2
1.1.1.1 Establishment of Co-Operative Societies	3
1.1.2 Post-Independence Period	4
1.1.2.1 Emphasis on Co-operatives (1947-1969).....	4
1.1.2.2 Nationalization of Commercial Banks (1969-1990).....	5
1.1.2.3 Establishment of Microfinance Institutions (MFIs) and Self-Help Groups (SHG)-Bank Linkages (SBLs) (1990 onwards).....	5
1.2 Structure and Performance of Institutional Rural Credit System in India	6
1.2.1 Performance.....	7
1.2.1.1 Scheduled Commercial Banks (SCB): At A Glance.....	7
1.3 All India Surveys on Rural Credit.....	9
1.3.1 All India Rural Credit Survey (AIRCS)	9
1.3.2 All India Debt and Investment Survey (AIDIS).....	9
1.4 Features of Rural Credit System	11
1.4.1 Sources of Rural Credit	11
1.4.1.1 Institutional Sources.....	11
1.4.1.2 Non-Institutional Sources	11
1.4.2 Main Problems in Rural Credit System.....	11
1.5 Background of The Study	12
Chapter 2: Review of Literature	17
2.1 Different Sources of Borrowing.....	18
2.2 Types of Purposes of Borrowing and its Pattern.....	24
2.3 Utilization of Loan Proceeds.....	26

2.4 Repayment of Loan Proceeds.....	33
Research Gap	36
Motivation of the Thesis	37
Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India	38
3.1 Introduction	38
3.2 Material and Methods.....	41
3.2.1 Empirical Data	41
3.2.1.1 All India Debt and Investment Survey.....	41
3.2.2 Description of NSS 59 th and 70 th round survey data	41
3.2.2.1 Different Purposes of Borrowing in India	41
3.2.3 Summary Statistics	43
3.3 Empirical Methodology.....	44
3.3.1 Heckman Sample Selection Model.....	44
3.3.1.1 Heckman Probit Analysis	44
3.3.1.2 Heckman Tobit Analysis.....	45
3.3.2 Explanatory and Response variables used in this study	46
3.3.2.1 Socio-economic and demographic factors	46
3.3.2.2 Time factor	47
3.3.2.3 Inequality Measures	47
3.3.2.4 Infrastructural Development	48
3.4 Econometric Results and Discussions.....	50
3.4.1 Results of the Heckman Probit Analysis	52
3.4.1.1 Results of Selection Equation	52
3.4.1.2 Results of the Outcome Equation	54
3.4.2 Results of the Heckman Tobit Analysis	58
3.4.2.1 Results of the outcome equation of Heckman Tobit Analysis.....	58
3.5 Policy Implications.....	61
3.6 Conclusions	63
Appendix 3A.....	65
3.A.1 Calculation Methodology of Infrastructural Development Index (IDI)	65

Chapter 4: What determines the household decision to borrow for investment or repayment of old debt? The Indian story	72
4.1 Introduction	72
4.2 Material and Methods.....	74
4.2.1 Empirical Data	74
4.2.2 Description of NSS 70 th round survey data	75
4.2.2.1 The classification of Purpose of borrowing in India.....	75
4.2.2.2 The pattern of Institutional loans in perpetuity 2013.....	76
4.2.3 Econometric Methodology	77
4.2.3.1 To Study the Extent of Institutional Loans for Growth-enhancing Purposes: Box-Cox Double Hurdle Model	77
4.2.3.2 To study the Institutional loans in perpetuity: Instrumental Variable Probit Model	79
4.2.4 Explanatory and Response variables used in both the Models.....	80
4.3 Results of the Econometric Analysis	85
4.3.1 Results of the Box-Cox Double Hurdle Model to estimate size and probability of growth-enhancing borrowing.....	85
4.3.1.1 Results of Selection Equation	86
4.3.1.2 Results of Outcome Equation	87
4.3.2 Results of Instrumental Variable Probit Model to estimate the probability of incidence of Institutional Loan in Perpetuity	90
4.4 Policy Implications.....	92
4.5 Conclusions	93
4.A.1 Calculation Methodology of Financial Inclusion Index (FII).....	95
Chapter 5: Borrowing & Spending behaviour: Evidence from Rural West Bengal, India	97
5.1 Introduction	97
5.2 Background	97
5.2.1 Borrowing behaviour.....	97
5.2.2 Spending Behaviour of loan proceeds	98
5.3 Materials and Method.....	100
5.3.1 Description of Data.....	101
5.3.2 Econometric Methodology	105

5.3.2.1 Heckman Sample Selection Model	105
5.3.2.2 Bivariate Probit Model.....	106
5.3.3 Explanatory and Response variables used in the Models.....	107
5.4 Results and Discussion of Econometric Analysis	109
5.4.1 Results of Heckman Sample Selection Model	109
5.4.1.1 Results of Selection Equation	109
5.4.1.2 Results of Outcome Equation	111
5.4.2 Results of Bivariate Probit Analysis.....	113
5.5 Conclusions and Policy Implications	115
Appendix 5A.....	117
5.A.1 Survey design and Sampling Process	117
5.A.2 Calculation Methodology of Financial Literacy Index (FLI)	118
5.A.3 Calculation Methodology of Deprivation Index (DI).....	119
Chapter 6: Religious and Social group diversity in Borrowing and Spending behaviour: Analysis of Survey Results from Rural West Bengal, India.....	121
6.1 Introduction	121
6.1.1 Religious diversity	121
6.1.2 Social Group diversity	122
6.2 Background	123
6.2.1 Spending loan proceeds for what purposes?.....	123
6.3 Materials and Methods	124
6.3.1 Description of data.....	124
6.3.2 Study Variables.....	127
6.3.2.1 Outcome Variables.....	127
6.3.2.2 Predictors	127
6.3.3 Econometric Modelling	128
6.3.3.1 Fairlie Decomposition (2005).....	130
6.4 Results and Discussion.....	133
6.4.1 Results of Econometric Analysis for Social Group Differences	133
6.4.1.1 Results of Binary Logistic Regression for Social Group Differences	133
6.4.1.2 Results of Fairlie Decomposition Analysis for Social Group differences	134
6.4.2 Results of Econometric Analysis for Religious Differences	137

6.4.2.1 Results of Binary Logistic Regression for Religious Differences	137
6.4.2.2 Results of Fairlie Decomposition Analysis for Religious differences.....	137
6.5 Conclusion and Policy Implications.....	140
Appendix 6A.....	142
Chapter 7: Summary, Findings, and Policy Implications	147
7.1 Summary and Major Findings.....	147
7.2 Policy Implications and Suggestions.....	154
7.3 Scope for further research	156
Bibliography	157

List of Tables

Table 1.1:	Scheduled Commercial Banks (SCBs) in India After Independence	7
Table 1.2	Distribution of SCB Branches in Rural Area According to the States of India	7
Table 3.1:	Relative Frequency of Purpose of borrowing across various Credit Agencies in 2003 and 2013.....	42
Table 3.2:	Summary Statistics (Column wise percentage)	43
Table 3.3:	Description of Explanatory and Response Variables.....	49
Table 3.4.1:	Cramer's V of Institutional Borrowing for non-production purposes and Borrowing between the explanatory variables.....	51
Table 3.4.2:	Kendell's tau-b among the dummy of states.....	51
Table 3.4.3:	Tetrachoric - correlation among the binary variables	52
Table 3.5:	Estimations of Heckman Probit Regressions in 2003 and 2013	57
Table 3.6:	Estimations of Heckman Tobit Regressions in 2003 and 2013	60
Table 3.A.1:	States with respect to Gini coefficient based on MPCE in 2004 and 2009.....	66
Table 3.A.2:	States with respect to Gini coefficient based on the Asset value of Households in 2003 and 2013.....	66
Table 3.A.3:	Calculation of Infrastructural Development Index (IDI) in 2003.....	67
Table 3.A.4:	Calculation of Infrastructural Development Index (IDI) in 2013.....	68
Table 3.A.5:	States with respect to Infrastructural Development Index (IDI) in 2003 and 2013.....	69
Table 4.1:	Purpose of borrowing across various Credit Agencies in 2013 (In Percentages)	76
Table 4.2:	Explanatory variables used in the study.....	81
Table 4.3:	Summary Statistics of Explanatory and Response Variables	82
Table 4.4:	Column-wise percentages of categories of Explanatory variables in 2013 (Column-wise percentages)	84
Table 4.5:	Cramer's V of Amount of Institutional Borrowing for growth-enhancing purposes and Institutional Loan in perpetuity between the explanatory variables	84
Table 4.6:	Kendell's tau-b among the state dummy	85
Table 4.7:	Tetrachoric - correlation among the binary variables	85

Table 4.8:	Estimations of Box-Cox Double Hurdle Model	89
Table 4.9:	Estimations of Instrumental Variable Probit Model	91
Table 5.1:	Socio-economic, demographic, and financial profile across the sample	101
Table 5.2:	Institutional loan profile among the institutional borrowers (data in percentages)	102
Table 5.3:	Difference in Stated use and Actual use of Institutional loan (In numbers)	103
Table 5.4	Sample Proportion Test for Incidence of multiple borrowing among those who have diverted loans and who do not	104
Table 5.5:	Two-sample t-test of relevant variables among those who diverted loans and who do not.....	105
Table 5.6:	Summary Statistics of Explanatory and Response Variables	107
Table 5.7:	Cramer's V and Tetrachoric-Correlation among Loan diversion and Institutional borrowing with the explanatory variables	109
Table 5.8:	Tetrachoric-Correlation among all binary explanatory variables	109
Table 5.9:	Estimation of Heckman Probit Model	112
Table 5.10:	Estimation of Bivariate Probit Model.....	114
Table 5.A.1:	Indicators used to measure FLI.....	118
Table 6.1:	Descriptive Statistics of use of financial services across the surveyed and borrower households (Column wise in percentages)	125
Table 6.2:	Descriptive Statistics of use of financial services across the social groups (Column wise in percentages).....	125
Table 6.3:	Descriptive Statistics of use of financial services across the religion (Column wise in percentages).....	125
Table 6.4:	Socio-economic and demographic profile across the surveyed and borrower households (Column wise in percentages)	126
Table 6.5:	Fairlie Non-linear Decomposition of Social Group Differences	136
Table 6.6:	Fairlie Non-linear Decomposition of Religious Differences	139
Table 6.A.1	Statistical Significance of Social Group differences in Principal Earner's Age	142
Table 6.A.2	Statistical Significance of Social Group differences in Principal Earner's Financial Literacy Index (FII)	142
Table 6.A.3	Statistical Significance of Religious differences in Principal Earner's Age.....	142

Table 6.A.4	Statistical Significance of Religious differences in Principal Earner's Financial Literacy Index (FII).....	143
Table 6.A.5	Chi-Square Test of Association between Social Group and Discrete Explanatory Variables.....	143
Table 6.A.6	Chi-Square Test of Association between Religion and Discrete Explanatory Variables.....	145

Chapter 1: Overview of Rural Credit Market in India

A strong financial system acts as a pillar in the growth of developed and under-developed countries as it facilitates persistent growth of the economy. India, one of the largest global economies, demonstrates high economic year-on-year growth. Rural India constituting 68.84% of the total population, according to 2011 census of India (Chandramouli, 2011), plays a very significant role in India's growth process. An organogram of the Indian financial system shows the Reserve Bank of India (RBI) to be at the helm of Indian financial institutions. Financial policies towards the economic development of the country rely on the inclusion of financial interests of individuals residing in the rural area to enhance their quality of life. Among all rural credit is one of the crucial areas that demand more attention and focus. Rural credit system with formal financial institutions, micro venture capital firms, and small-scale financiers plays a pivotal role in India's financial system as well as economic development.

1.1 Rural Credit Market in India

This brief overview of the rural credit market starts in the 19th century and ends in the 21st century. We begin with a picture of the late colonial or pre-independence period of India concerning the rural credit system. Dependence on the informal lenders, especially on the moneylenders remains a crucial part of the rural credit system in India and it continues throughout this period. The later part of this period saw the beginning of cooperative credit societies. Co-operatives were given vital roles in various plans taken Government of India in the post-independence period. Following the insignificant performance of co-operative credit societies in leveraging rural credit, 19 commercial banks were nationalized of was in 1969. Thereafter, the establishment of Regional Rural Banks (RRBs), Microfinance Institutions

(MFI) models and Self-Help Group Bank Linkage (SBL) approach, etc. has been taken to make a potential impact on the rural credit system in India.

1.1.1 Pre-Independence Period

Rural credit continued to be a major concern in the pre-independence period in India. The Indian Central Banking Committee Report (1931) discussed the importance of rural finance and mentioned the steep rise in rural indebtedness from all parts of India at that time. Shah *et al.* (2007) highlighted that repayment of debt was a major concern for the farmers and they are forced to borrow again and again to repay their old debt. In this context, Madras Provincial Banking Enquiry Committee (MPBEC) report (1930) found one of the major motivations for borrowing was repayment of old debt in 1929, which leads to a ‘vicious cycle of debt’. It states as:

"Frequently the debt is not repaid in full and a part of the loan persists and becomes a pro-note debt. In the course of time, it may with a lucky year be paid off or it may become a mortgage debt. By the existence of this heavy persisting debt, the creditor takes the bulk of the produce and leaves the “Ryot”¹ unable to repay short-term loans. But equally, the short-term loan has produced long-term debt and there is a vicious circle. The “Ryot” cannot clear his short-term debt because of the mortgage creditor and he cannot cultivate without borrowing because his crop goes largely to the long-term creditor. If he pays his long-term creditor his current debts swell and overwhelm him” (MPBEC Report, 1930, Vol. I, p.77).

Therefore, it shows that repayment of debt poses severe concern to the rural population in India and it also leads to multiple borrowing.

The Dependence of the rural credit market on extremely high-interest rates by moneylenders and rich landowners was a major drawback in the pre-independence period. Besides, moneylenders often cheated the poor farmers by not deducting the repayment

amount from the future dues (Shah *et al.*, 2007; Sathyanathan, 1935). MPBEC report again found that rural borrowers had to sell their produce immediately after harvesting at a price that is lower than the market price to take into account the adjustment of interest on the loan (Shah *et al.*, 2007). It states as:

“The merchants advance loans on condition that crops grown by the agriculturist should be sold to them wholesale as soon as they are harvested at a price 4 percent less than its market value. If he fails to satisfy this condition, the merchant refuses further advances and enforces the payment of the loan through the Court” (MPBEC Report, 1930, Vol. II, p.403)

Historical reports suggest a few policy decisions taken by the colonial administration like Deccan Agricultural Debtors' Relief Act in 1879, Land Mortgage Banks, Land Improvement Loans Act (for long-term loans) in 1883, and the Agriculturists Loan Act (for daily needs) in 1884, but these initiatives were ineffective to give relief to the distressed rural borrowers in India (Shah *et al.*, 2007).

1.1.1.1 Establishment of Co-Operative Societies

The achievement of the co-operative movement in Europe and the co-operative credit movement in Germany laid the path of the Cooperative Credit Societies Act in India in 1904 (Catanach, 1970). Later, the Cooperative Credit Societies Act, 1904 was amended in 1912. In 1915, the Maclagan Committee was appointed to evaluate the performances of the co-operative societies and suggest measures for strengthening them. The committee also felt that the establishment of such institutions would cater to the needs of lower and middle-income groups of the economy and most importantly it would educate the importance of banking to them. On recommendations of this committee, provincial cooperative banks were established in almost all major provinces of India by 1930 (except in UP, it was set upon 1944) (Shah *et al.*, 2007; Maclagan, 1928).

Literature showed that these cooperative societies were mostly run by rich landlords and moneylenders. They were also involved in local power politics in rural India (Shah *et al.*, 2007; Catanach, 1970). According to Darling, (1925) “the Indian peasant is born in debt, lives in debt and dies in debt”. Severe market imperfection was there in all the markets, viz, land, labor, input, output, and also in rural credit markets (Baker, 1984). According to Shah *et al.*, (2007) rich landlords in rural India took various roles in rural India - moneylenders on one side and crop buyers, labor employers etc. on another side. In such a situation where it was difficult to fulfill the daily consumption needs, productive investment out of borrowing was challenging (Shah *et al.*, 2007). In such a situation where basic consumption needs were hardly met, productive investment out of borrowing was virtually impossible. Later, in 1935 the Reserve Bank of India was set up based on the recommendations of the Hilton Young Commission.

It is clear from the above discussion that the issues related to the multiple borrowing, borrowing to repay previous debts, and debt burden were burning the income and growth of the rural population in the pre-independence period of rural India.

1.1.2 Post-Independence Period

1.1.2.1 Emphasis on Co-operatives (1947-1969)

The importance of the rural credit market in India was recognized in the post-independence period (Kataria and Chahal, 2005). Co-operatives were given vital roles in various plans taken by Planning Commission, India. Reportedly, the first five-year plan (1951-56) emphasized the co-operative development in India. In 1951, RBI conducted the “All India Rural Credit Survey” (AIRCS) to obtain a realistic base of the rural credit system in India for the formation of future paths. The findings of this report (RBI, 1954) displayed that formal credit institutions (co-operatives, banks, and other formal sources) accounted for only 9% of rural credit and almost 75% of the rural credit was sourced from moneylenders, traders, and

rich landlords (Shah *et al.*, 2007). The report also emphasized the outright failure of co-operatives in delivering rural credit (Chakrabarty, 2003; Pradhan, 2013). The report further suggested a multi-agency approach for the institutionalization of credit delivery with a greater emphasis on the expansion of commercial banks in rural India. Thus, to strengthen the availability of credit delivery mechanisms in rural India at a reasonable rate of interest, the Government of India (GOI) and RBI emphasized a broad-financial institutional framework.

1.1.2.2 Nationalization of Commercial Banks (1969-1990)

AIRCS found that the share of banks in rural credit was less than 1% in 1951 (Shah *et al.*, 2007). According to Meyer and Nagarajan (2000), commercial bank branches in rural areas were very few and in distance. Earlier in this period (1969-1990), the Imperial Bank of India was nationalized in 1955 and renamed as State Bank of India and ordered to open 400 branches in semi-urban areas and also asked to encourage agricultural lending.

Nationalization of 14 major commercial banks in 1969 and 1980 (in the second phase) was the first step towards the expansion of the institutionalization process followed by the setting up of RRBs in 1975-76 and then the formation of the National Bank for Agriculture and Rural Development (NABARD) in 1982 (Pradhan, 2013). The establishment of NABARD acted as a major impetus to rural credit in India. NABARD was set up as an apex bank for facilitating credit flow for agriculture and all other allied economic activities in rural areas (Ghate, 2007).

1.1.2.3 Establishment of Microfinance Institutions (MFIs) and Self-Help Groups (SHG)-Bank Linkages (SBLs) (1990 onwards)

Further, from 1990 onwards, the concept of MFIs and SHG – Bank linkage (SBL) models evolved to provide financial services to the underprivileged sections of the population (Pradhan, 2013). As a part of financial innovation in the rural credit markets in India, microfinance had emerged as an effective system for provisions to the financial services to

the rural poor, especially microenterprises (Satish, 2005). Thus, MFI offered a new dimension for the rural poor by making finance more accessible and available (Shah *et al.*, 2007). MFI offered the small scale financial services for credits and deposits to the rural people who involve in agricultural production, fisheries, and operates small or micro-enterprises, etc. (Satish, 2005). On the other hand, NABARD developed SHG-Bank Linkages (SBL) approach as the core strategy to provide banking services to the rural poor (Puhazhendi and Badatya, 2006). The strategy was to establish SHGs which are informal associations of a small group of women (average size 14) who meet regularly, usually once in month to save small amounts. After a minimum of 6 months of savings, those funds were used to lend to the group members in need. To maintain their savings and lending records, these were linked to the local bank branches under the NABARD-sponsored programme that was referred to as SBL programmes (Ghate, 2007)

1.2 Structure and Performance of Institutional Rural Credit System in India

A strong rural credit system was required to stimulate investment and production in rural India. The rural credit system in India had witnessed several fundamental changes in respect to its motivation, structure, and its approach over the past few decades. The establishment of the co-operatives following the enactment of the Co-operative Societies Act, 1904 was the first step of the institutionalization of rural credit in India. Later, in the post-independence period, the development of co-operatives was strengthened following the recommendations of the Rural Credit Survey Committee (RBI, 1954). Though, the All-India Rural Credit Review Committee (RBI, 1969) reported that the performance of co-operatives was not up to the mark in the mobilization of deposits as well as credit disbursement in rural India. The committee further recommended adopting a multi-agency approach towards rural credit delivery and a greater role of commercial banks along with the co-operatives. In 1969, India

also witnessed the nationalization of 14 major commercial banks. Later, in 1975 RRBs were added as a third component of the rural credit delivery system. From 1990 onwards, SHG-SBL models had also emerged in rural India.

1.2.1 Performance

1.2.1.1 Scheduled Commercial Banks (SCB): At A Glance

Banks that are included in the second schedule of RBI Act, 1934 are referred to as Scheduled Commercial Banks (SCB). Table 1.1 presents the status of Scheduled Commercial Banks (SCBs) after independence in India. The table depicts the number of SCBs, number of RRBs, number of SCB branches, population per branch (in thousands), and Credit-Deposit ratio in India every 10 years, starting from 1969. It also shows the number of SCB branches in rural India. Table 1.2 shows the region-wise as well as state-wise distribution of SCB offices in rural India in the states of UTs of India since independence.

Table 1.1: Scheduled Commercial Banks (SCBs) in India After Independence

	1969	1978	1988	1998	2008	2018
Number of SCBs	73	122	274	299	171	149
Number of RRBs[©]	-	48	196	196	91	56
Credit Deposit Ratio	77.5	67.3	57.3	53.5	73.9	75.6
Number of SCB Branches	8262	28016	55410	64218	75709	50777
Population per branch (in thousands)	65	23	14	15	15	-
Number of SCB Branches in Rural Area	1833	11806	31114	32878	28668	49384

© Number of SCBs includes number of RRBs

Source: Basic Statistical Returns, Reserve Bank of India of various years

Table 1.2 Distribution of SCB Branches in Rural Area According to the States of India

Region	States & Union Territories (UT)	1969	1978	1988	1998	2008	2018	2019
Northern Region	Total	949	2091	5002	5016	4319	9091	9209
	Haryana	137	331	733	694	602	1613	1631
	Himachal	102	233	592	654	609	1135	1202

Region	States & Union Territories (UT)	1969	1978	1988	1998	2008	2018	2019
	Pradesh							
	Jammu & Kashmir	64	207	540	574	443	888	903
	Punjab	337	713	1156	1115	983	2526	2529
	Rajasthan	294	566	1895	1914	1624	2852	2858
	Chandigarh	-	4	12	9	12	11	11
	Delhi	15	37	74	56	46	66	75
North-Eastern Region	Total	93	332	1174	1308	1075	1695	1730
	Arunachal Pradesh	5	13	60	68	47	72	71
	Assam	70	212	763	838	700	1064	1071
	Manipur	5	20	40	50	32	77	93
	Meghalaya	5	26	103	131	114	167	167
	Mizoram	-	2	55	61	52	66	66
	Nagaland	2	15	45	37	32	51	50
	Tripura	6	44	108	123	98	198	212
Eastern Region	Total	606	1661	6842	7464	6706	10178	10254
	Bihar	218	697	3328	3528	2182	3112	3139
	Jharkhand	-	-	-	-	876	1310	1322
	Orissa	90	404	1422	1610	1498	2515	2521
	Sikkim	-	-	22	33	32	70	71
	West Bengal	177	552	2058	2276	2104	3148	3178
	Andaman & Nicobar Islands	1	8	12	17	14	23	23
Central Region	Total	880	2083	8319	8131	6876	11926	11996
	Chattisgarh	-	-	-	-	568	1051	1063
	Madhya Pradesh	305	692	2938	2703	1516	2287	2292
	Uttar Pradesh	575	1391	5381	5428	4311	7664	7709
	Uttarakhand	-	-	-	-	481	924	932
Western Region	Total	1032	1787	4170	4045	3391	5853	5854
	Goa	83	-	154	157	127	279	277
	Gujarat	544	858	1615	1558	1309	2459	2487
	Maharashtra	398	783	2393	2324	1951	3098	3073
	Dadra & Nagar Haveli	4	4	7	5	4	14	14
	Daman & Diu	3	142©	1	1	0	3	3
Southern Region	Total	1834	3599	7333	6890	5914	10658	10819
	Andhra Pradesh	377	939	2579	2442	2132	2377	2388
	Karnataka	620	1065	2278	2223	1947	3460	3490
	Kerala	397	768	604	346	278	328	358
	Tamil Nadu	425	806	1838	1847	1531	2914	4524¶
	Lakshadeep	4	5	6	9	7	6	6
	Puducherry	11	16	28	23	19	50	53
All India		5274	11553	32840	32854	28281	49401	

©Including Goa

¶ Includes Telangana (1530)

Source: Basic Statistical Returns, Reserve Bank of India of various years

1.3 All India Surveys on Rural Credit

1.3.1 All India Rural Credit Survey (AIRCS)

Surveys on the incidence of indebtedness among the population are being conducted decennially, that is, every 10 years in India. The first study on the credit market was conducted by RBI in 1951-52 in India to examine the credit in the household sector in 75 selected districts spread all over the country in India. Incidence of indebtedness along with information on assets, economic activities, and particulars of credit operations of the rural populations in India were collected (Ray, 2019). Apart from this, the performances of different credit agencies in supplying credit were also reviewed. The report was published in 1954 as “All India Rural Credit Survey (AIRCS). The survey reported the complete failure of co-operatives in providing rural credit (Chakrabarty, 2003). This survey was followed by a second survey in 1961-62 by RBI and titled ‘All India Rural Debt and Investment Survey’ (AIRDIS). The scope of this survey was extended and included the capital expenditure of the household sectors and some other associated indicators of the rural economy (Ray, 2019). The report of this survey was published in 1965. After that, the responsibility of the subsequent surveys was given to National Sample Survey Organization (NSSO). NSSO has completed five decadal surveys so far and the latest was on 2013-14. NSSO has termed this survey as “All India Debt and Investment Survey”.

1.3.2 All India Debt and Investment Survey (AIDIS)

AIDIS is an important source of secondary data that captures the debt, assets, and savings of rural and urban households in India. It is a sample survey, conducted decennially, that is, every 10 years in India that generates basic quantitative information on households’ assets, liabilities, and expenditure in the economy. It also provides data on household debt by formal and informal credit agencies, the purpose of loans (whether production or consumption

related), the interest rate on loans, duration of the loan, and information regarding security/collateral against the loans. Two types of loans have been taken into account- Cash loan (loan taken in cash) and Kind loan (loan taken in-kind). Apart from these, AIDIS also provides data on the households' assets including physical assets and financial assets. Physical assets include land, buildings, livestock, farm, and non-farm equipment, and durable household assets and financial assets include shares, deposits, and loan receivables. Cash held by the households (as on the date of the survey) was included under financial assets from 1991-92 onwards (NSS 48th round).

The third survey in this series of decennial surveys was entrusted by the RBI to the NSSO and was conducted along with the survey on "Land Holdings" during the year 1971-72. It was NSS 26th round survey and known as All-India Debt and Investment Survey (AIDIS). From this survey onwards, both rural and urban areas had been taken into consideration. The next consecutive surveys had been done every ten years; viz. in 1981-82 (NSS 37th round), in 1991-92 (NSS 48th round), in 2002-03 (NSS 59th round), and latest in 2013-14 (NSS 70th round). The objectives of all AIDIS remain the same as those of the earlier surveys, namely, to obtain quantitative information on the incidence of indebtedness, capital formation, and other indicators of rural/urban economy, that is, to generate reliable estimates on assets, liabilities, and capital expenditure of the household sector. It also provides the details of household liabilities required for the formulation of the credit policy of financial institutions and planning for development. The present dissertation uses the last two rounds of AIDIS.

Satyasai (2002) discussed two major findings of the NSS 48th AIDIS (1991) survey. These were, *first*, the survey revealed the extent of under-reporting of outstanding debt that was increased from 64% in 1981 to 74% in 1991 in India (Satyasai, 2002). *Second*, Satyasai (2002) found that the contribution of the institutional sources in the outstanding debt

decreased from 61.2% in 1981 to 56.6 % in 1991. This signifies that rural households in India were still dependent on informal sources of borrowing. Both of the findings were extremely alarming from the policy point of view. He also addressed the existence of inter-state variation on the extent of dependence of rural households on moneylenders. Bhattacharjee and Rajeev (2013) had used 59th All India Debt and Investment Survey of National Sample Survey (NSS) to show that the probability of loan repayment significantly decreases for the loans taken for the working capital needs from formal lending agencies but significantly increases for the loans taken from informal lending agencies.

1.4 Features of Rural Credit System

1.4.1 Sources of Rural Credit

There exist two broad sources of rural credit in India, viz. (i) Institutional sources and (ii) Non-institutional sources. These two sources co-exist side by side.

1.4.1.1 Institutional Sources

The Government of India has taken various initiatives to strengthen the institutional rural credit system in India from time to time after independence. The institutional framework of rural credit in India comprises co-operatives, scheduled commercial banks (SCBs), and regional rural banks (RRBs).

1.4.1.2 Non-Institutional Sources

The non-institutional sources of rural credit include money lenders, landlords, traders, local shop-owners, friends, and relatives.

1.4.2 Main Problems in Rural Credit System

Literature has discussed some major problems of the rural credit system. These are:

1. The rural credit system in India depends mainly on moneylenders and landlords (Acharya, 2006; Pradhan, 2013).
2. The rate of interest charged by moneylenders and landlords is much higher than the prevailing interest rate of financial institutions (Haugen, 2005; Acharya, 2006).
3. High transaction cost makes it difficult for the commercial banks to operate in the rural areas. That is why commercial banks consider rural financing costly and bulky (Gulati and Bathla, 2002)
4. There exists adverse selection (from lenders' side) and moral hazard in rural credit markets (Rao *et al.*, 2013). The adverse selection occurs as institutional lenders (banks, co-operatives) do not have proper information regarding the creditworthiness of the borrowers.
5. As the dimension of priority sector lending has widened, this has an adverse impact on rural agricultural lending (Acharya, 2006).
6. Inter-regional differences create a major hindrance to the expansion of rural credit in India (Acharya, 2006).

1.5 Background of The Study

As stated earlier, AIDIS surveys had already reported the under-reporting of outstanding debt in India. Now, this poses a major concern as Non-performing assets (NPAs) are being treated as an important indicator to monitor the health of the financial institutions, and due to this, the policy environment has also changed in India over time (Satyasai, 2002). Literature has shown various reasons for the increase in loan default. Karlan and Zinman, (2012) commented that lying about the borrowing activities increases the chance of loan default. Aleem (1990) emphasized that the creditworthiness of the borrowers is not fully revealing which also increases the risk of loan default. Literature also highlighted that institutional borrowers often use or divert productive credit for unproductive purposes to meet daily

consumption requirements, social obligations, etc. (Kishore *et al.*, 2009; Vadakarasseril, 2009; Sharma and Kumawat, 2014; Banerjee *et al.*, 2015; Chavan *et al.*, 2016; Khaleque, 2011; Makorere, 2014; Asnake, 2015). Khaleque (2011) had found that the diversion of loan use creates a major hurdle for the Micro-Finance Institutions (MFIs) because it might be a reason for loan default in Bangladesh. Karlan *et al.* (2016) found borrowers are often taking new loans for repayment of old debts but they do not reveal it to the banks at the time of borrowing. Thus, multiple borrowing has become a common phenomenon in the literature (Mpogole *et al.*, 2012; Taylor, 2011; Srinivasan, 2010). Vogelgesang (2003) and Mpogole *et al.* (2012) found a positive correlation between multiple borrowing and over-indebtedness.

With this background, the present thesis examines the following broad issues: (i) intensity of institutional borrowing for non-production purposes, (ii) household's decision to institutional borrowing for physical and human capital investment purposes, (iii) household's decision to repay for outstanding debt by taking new institutional loans, (iv) utilization of institutional loans and incidence of loan diversion, (v) the probability of loan diversion with special reference to financial literacy and also (vi) the disparity in the use of banking services, institutional borrowing and use of institutional loans for production purposes by religious and caste groups in rural India.

Thus, the brief objectives of the thesis are as follows: **First**, to identify the socio-economic variables that determine the probability of institutional borrowing for non-production purposes in India. Also, to examine the socio-economic determinants that affect the extent of institutional borrowing for non-production purposes in India. **Second**, to identify the socio-economic variables that determine the extent or size of institutional borrowing for physical and human capital investment purposes in India. **Third**, to discuss the issue of multiple borrowing and to find out the socio-economic variables that affect the household's decision to repay the outstanding debt by taking new institutional loans. **Fourth**, to

emphasize the utilization of institutional loans and incidence of loan diversion. Also, to observe the variables that affect the probability of loan diversion with special reference to political participation and financial literacy in rural India. **Fifth**, to examine whether the religious and caste differences in the socio-economic variables contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India.

To study these aspects, various data sets have been used. Unit level NSS 59th and 70th survey data (AIDIS) has been used to study the *first* objective. For this purpose, we have merged these two data sets. Now, to observe our *second* and *third* objectives, we have used only NSS 70th round survey data (AIDIS). The reason for this is that in the second objective, the idea is to specify the institutional borrowing for physical and human capital investment purposes. NSS 70th round survey data provides data on various purposes of borrowing including medical treatment, education, and housing along with other purposes. However, NSS 59th round survey data does not provide separate data for purposes of borrowing for medical treatment, education, and housing. It might be clubbed with ‘household expenditure’ - an important purpose of borrowing. That is why, the study has used only NSS 70th round survey data so that purpose of institutional borrowing for medical treatment and educational needs, can be treated as investment for human capital. Further, to study the rest of the objectives, we have used primary rural household sample survey data (Funded by ICSSR) from two districts, namely, North 24-Parganas and South 24-Parganas of West Bengal.

Various econometric methodologies have been used to examine the above-mentioned objectives of the thesis. The study has considered the sample selection bias to examine the first objective, that is, to identify the socio-economic determinants of the probability of the institutional borrowing and probability of institutional borrowing for non-production purposes and also to examine the socio-economic determinants that affect the extent of institutional borrowing for non-production purposes in India. It is a two-stage decision

process where the household chooses to borrow from the institutional sources which are termed as Selection equation and then decide whether to take institutional loans for non-production purposes as well as to what extent to take them, which is referred to as the Outcome equation. Thus, the Heckman Probit model and the Heckman Tobit model have been used respectively after considering the sample selection bias. The second objective of this thesis examines the household's decision to have institutional borrowing for physical and human capital investment purposes and identifies the socio-economic determinants of the intensity and size of the same. To do so, the thesis considers the Box-Cox Double-Hurdle model which rules out some of the shortcomings of both the simple Tobit model and the Heckman Sample Selection model. The third objective of this thesis is to find out the socio-economic variables that affect the household's decision to repay the outstanding debt by taking new institutional loans. The study uses here the Instrumental Variable (IV) probit model. The fourth objective of this thesis is to emphasize the utilization of institutional loans and the incidence of loan diversion. Also, to observe the variables that affect the probability of loan diversion with special reference to political participation and financial literacy in rural WB. To study this, the thesis considers Heckman Probit analysis. Next, the thesis discusses the joint occurrence of incidence of indebtedness and loan diversion, incidence of multiple borrowing, and loan diversion and incidence of indebtedness and institutional borrowing by using Bivariate Probit analysis. The fifth objective is to examine whether the religious and caste differences in the socio-economic variables mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India, the study uses multivariate logistic regression analysis followed by a decomposition analysis, Fairlie nonlinear decomposition technique.

The rest of the thesis is organized as follows: Chapter 2 briefly discusses the existing literature. Chapter 3 takes into account the first objective, which is to identify the socio-

economic variables that determine the probability of institutional borrowing for non-production purposes and also to examine the socio-economic determinants that affect the extent of institutional borrowing for non-production purposes in India. The next chapter, that is Chapter 4 deals with the second objective of our study which examines the household's decision to have institutional borrowing for physical and human capital investment purposes and to identify the socio-economic determinants of the intensity and size of the same. Chapter 5 considers the fourth objective of our study, which is to emphasize the utilization of institutional loans and incidence of loan diversion and also to observe the variables that affect the probability of loan diversion. Chapter 6 considers the fifth objective, which is to examine whether the religious and caste differences in the socio-economic variables mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India. Chapter 7 describes the policy implications and concludes with further discussion and potential issue

¹ Peasants or farmers

Chapter 2: Review of Literature

Literature on the rural credit market is vast and covers various issues. First, there exists the problem of credit rationing (Hodgman, 1960; Jaffee and Modigliani, 1969; Jaffee and Stiglitz, 1990) and credit rationing as a result of asymmetric information in the rural credit market (Stiglitz and Weiss, 1981; Jaffee and Russell, 1976; Williamson, 1986). Next, the access of credit for the rural poor has always been considered as a major instrument in the context of economic development within less developed and developing countries. Researchers and policymakers of the rural credit market were concerned in suggesting various measures to increase access to credit for the rural poor and also highlighted the reasons behind the lack of access to finance to the poor. These were insufficient collaterals, asymmetric information, moral hazards, high transaction cost due to monitoring and screenings, etc. (Nawai and Shariff, 2010; Yaron *et al.*, 1998; Stiglitz and Weiss, 1981; Hoff and Stiglitz, 1990). Another aspect of the rural credit market that dominates the literature is the issue of loan default. Studies had mostly concentrated on the forms and nature of credit contracts (Besley and Coate, 1995; Varian, 1990; Van Tassel, 1999; Banerjee and Duflo, 2010), innovative lending technologies (Ghatak, 1999; Navajas *et al.*, 2000; Morduch, 1999; Huppi and Feder, 1990) and different repayment strategies in cases of indirect and direct monitoring and enforcement (Field and Pande, 2008; Wydick, 1999) to avoid loan default.

Thus, it is evident that literature on the rural credit market is enormous and it is hardly possible to probe all the studies available on this issue. Hence, we have restrained our analysis to those dimensions related to the household borrowing that are relevant to the issues we have identified such as the different sources of borrowing, types of borrowing and its pattern, utilization of loan proceeds, and repayment performances of the borrowers.

2.1 Different Sources of Borrowing

Access to rural credit is considered to be a significant device for consumption smoothing as well as promoting production (Zeller *et al.*, 1998; Morduch and Armendariz, 2005; Swain *et al.*, 2008). Diagne *et al.* (2000) stressed that the accessibility of credit affects the welfare of the household in two ways; *first*, it removes the capital constraint among the rural households, and *second*, access to credit increases the risk-bearing capacity of the households. Removal of capital constraint in the agricultural sector improves the ability of the rural household to procure agricultural inputs.

Many studies revealed that formal and informal credit sources co-exist in the rural credit markets in the developing countries despite interest rate differentials among them (Boucher and Guirking 2007; Hoff and Stiglitz, 1990; Pradhan, 2013; Mohieldin and Wright, 2000), and there exist various key indicators that affect decisions regarding whether households should borrow from formal or informal credit sources.

Barslund and Tarp (2008) identified how the rural credit market operates in Vietnam using a survey of 932 rural households. They found that rural household in Vietnam obtains the loan from formal and informal sources. In Vietnam, the formal credit sector expanded though informal credit sector accounted for about one-third of the total loans. They also found that borrowers with bad credit histories tend to borrow from informal lenders. They also identified that formal loans are used for production and asset accumulation and informal loans are meant for consumption smoothing. This requires careful and well-designed government interference and action in the expansion of credit facilities.

Mohieldin and Wright (2000) surveyed a sample of 200 households from four villages of Egypt in 1992-93 to determine the factors that affect the rural households to borrow from the formal sector using Probit analysis. They found that the income of the household is the

key determinant for borrowing from the formal sector. In this regard, they argued that as income shows the household's ability to repay the loan and formal lending institutions are primarily concerned with the repayment of the loan, therefore households' with higher income received it. Thus, income is one of the key factors which determines whether the individual borrows from the formal or informal sector. The asset is another key determinant that affects borrowing from the formal sector in Egypt. Occupation status of the household also affects the borrowing from the formal sector as it is an indicator used by the bank to assess the individual's ability to repay. Their study also found that women are less likely to borrow from the formal sector. Also, larger families were more likely to borrow from formal lending institutions. In summary, Mohieldin and Wright (2000) found that financial variables like income of the households, assets, etc., the profession of individuals, the larger size of households, etc. were important determinants to borrow from the formal credit sectors in Egypt. They also studied the determinants of having a loan from the informal sector where they found that the individual with wage income is less likely to borrow from informal sources.

Tang *et al.* (2017) identified the socio-economic factors that influence farmer's decision to borrow from the formal sector instead of the informal using a household survey in Heilongjiang Province in northeast China in 2007-08. During the sample survey, 471 households were chosen randomly from 28 villages. The survey collected information on credit received during the year, amount of credit, the interest of the loan, terms of loan, purpose, and source of loan. Apart from these, a set of socio-economic and demographic variables, like the size of household, education of household head, age of household head, major occupation of the household head, household's assets and land endowment, etc. had been considered in the survey. Using Probit analysis they found that the size of the household, land endowment, and educational level of the household head significantly

increases the probability of borrowing. Transaction costs significantly affected credit demand as well as credit choice (whether to borrow from formal or informal). For example, an extra one-kilometer distance between the household's village and the nearest bank would decrease the probability of borrowing from formal sources by almost 1%. In summary, Tang *et al.* (2017) showed that the households' decisions on whether to borrow credit from formal or informal sources are mainly determined by households' socio-economic factors and the transaction costs.

Boucher and Guirkingner (2007) explored the link between collateral and borrowing from formal sources using three farm-household surveys in three countries in Latin America, viz. Peru, Honduras, and Nicaragua. They defined three categories of loan sectors. The formal loan sector consisted of regulated financial institutions like commercial banks, state development banks, credit unions in Honduras and Nicaragua, and rural and municipal banks in Peru. The informal loan sector consisted of money lenders, input suppliers, traders, relatives, and friends. The semi-formal sector included unregulated financial lending institutions like MFIs, loans offered by the local governments or ministries, and rotating savings and credit associations, namely ROSCAs. They argued that better access to local information allows the informal lenders to offer loan contracts without collateral. Direct monitoring permitted the informal lenders to reduce collateral requirement and thus, monitoring had been viewed as the substitute of collateral. On the other hand, formal financial institutions like commercial banks had limited local information and thus they had to rely on collateral to deal with the moral hazard and adverse selection problems that arise from any credit transactions. As a result, they identified that informal loans are demanded by individuals who are unable to fulfill the collateral requirements of the formal lending sectors. However, the data found that the size of the formal sector dominates the informal sector in all the three countries used in the study. This signifies that the households would search for

informal loans if they were denied in the formal sector. In this regard, data showed that at least 60% of total formal loans require physical assets like agricultural land as collateral. Boucher and Guirkinger (2007) also argued that informal loans allow consumption smoothing better compared to formal sources.

Pham and Lensink (2007) compared the lending policies for household lending from all the lenders in Vietnam. Lenders were categorized into three categories; formal, informal, and semi-formal lenders. Formal credit was the credit supplied by private and commercial banks, informal credit consists of credit supplied by private moneylenders, relatives, and credit associations. Semi-informal credit referred to the credit provided by credit cooperatives, poverty alleviation programs, job creation programs, banks for the poor, etc. The analysis was based on a household survey, namely, the Vietnam Living Standard Survey (VLSS) in 1998 covering a sample of 6002 households. Data showed that households use credit for different purposes such as production, housing, and consumption. In Vietnam, the use of informal credit was very high with 51.16% of the total credit volume. They applied the Multinomial logit model to identify the determinants of the probability of use of formal, informal, or semi-formal credit in Vietnam. The estimation showed that households with collateral were more likely to use formal and semi-formal credit. The findings also found that for the business loan, the probability of use of formal or semi-formal credit significantly increases. Also, the households with no collateral and the households who use the loan for consumption purposes were less likely to take the formal credit.

In the Indian context, since independence, various structural changes have been made in the rural credit system from time to time to make formal financial institutions more accessible to the rural population in India. These include the nationalization of commercial banks in 1969, the creation of other institutions such as the cooperative society and RRBs, etc. However, despite these efforts for the expansion of credit to the rural sector, there still

exists a considerable difference between the demand for and supply of rural credit in India (Agrawal *et al.*, 1997).

Literature also showed that informal lenders remain the major source of rural credit in India (Dandekar and Wadia, 1989; Bell, 1990). In this context, Bose (1998) showed that formal financial institutions did not consider the small cultivators as credit-worthy in the less developed countries which forced them to borrow from informal sources. As a consequence, money lenders became the only source of credit for the majority of cultivators in less developed countries. These informal lenders also had informational advantages, therefore, they enjoy lower enforcement costs and can also differentiate the borrowers with respect to the risk of default. According to Bose (1998), several governments of less developed countries had taken initiative to provide formal credit with a lower rate of interest than the informal sector for the agricultural sector and it was expected to reduce the rate of interest in the informal sector. However, literature (Bell, 1990; Hoff and Stiglitz, 1990; Siamwalla *et al.*, 1990) had pointed out that the accessibility of the formal financial sectors remains a major hindrance to achieve its desired results in this regard.

Pradhan (2013) explored the situation of the formal and informal credit sector in India after analyzing AIDIS data starting from 1951-52 (AIRCS) and 1961-62 (AIRDIS) conducted by RBI and further by NSSO from 1971-72 to 2002-03. It has been found that the co-existence of the formal and informal credit sectors is the main characteristic of the rural credit market in India. Formal credit has increased from 7.2% in 1951 to 57.1% in 2002 in India. Pradhan, (2013) assessed that contribution of informal credit on total outstanding debt had declined due to various financial inclusion initiatives taken by RBI from time to time. However, two-fifth of the rural population still depends on the informal credit in India which indicates that financial inclusion, financial literacy as well as education need to be prioritized in the financial policy decisions.

Drèze *et al.* (1997) presented a case study on the credit transactions in Palanpur village of Uttar Pradesh, India during the year 1983-84. The village had 143 households and 960 individuals. They found that indebtedness was high with respect to their income. It was quite worrisome that the interest rates in that village range from 0% to 300% per year and also surprising that almost 85% of the households were involved in credit transactions, either as borrowers, or lenders, or both as well. Public lending institutions accounted for almost 79% of the total debt outstanding. They also found that outstanding institutional debt includes accumulated past borrowing whereas private credit, more expensive, tends to be more repaid.

Pal (2002) analyzed the data from International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India from 1980-84. Three villages, Aurepalle, Shirapur, and Kanzara had been taken into account from different agro-climatic zones. Data revealed that 32% of the total sample households obtained loans only for consumption purposes, 19% for production purposes, and 16% for both production and consumption purposes. Considering the households with outstanding debts, these proportions would be 47%, 29%, and 24% respectively. Pal, (2002) discussed the sectoral choice with respect to the lending agencies and household characteristics. It had been found that lower caste households and those with lower levels of landholding tend to incur credit from the informal sector compared to the formal sector. It was also found that the proportion of credit taken for consumption purposes is not much different among the two sectors.

Banerjee *et al.* (2010a) identified the probability of borrowing from the primary household survey carried out in four villages, two from the district of North 24-Parganas and the other two from the district of South 24-Parganas in West Bengal, India during 2009-10. Using the bivariate probit model with sample selection they found that the political association of borrowers with the ruling party, landholding status, and education levels significantly increases the probability of formal loans.

The above literature showed that existing studies have separately investigated the borrowing from either commercial banks, co-operatives, or from MFIs. On the contrary, the present study takes into account formal (banks, co-operatives, etc.) and semi-formal (MFIs) credit sources together to define them as the institutional borrowing sources and tries to find out the socio-economic and political determinants of the probability of institutional borrowing in India.

Alam (2012) used data from Bangladesh Institute of Development Study (BIDS)/World Bank from 1991-92 with a follow up- in 1998-99. He examined the effect of returns to borrowing on intra-household resource allocation and ability of decision making for male and female self-employed in rural Bangladesh. He also studied how the returns to borrowing differ with different borrowing sources, viz., formal, semi-formal, and informal sources. The study used an IV estimation model with selection to control for endogeneity where the selection equation showed whether households borrow or not using the Probit estimation technique. The results displayed that the distance of the lending institutions, interest rate, village wages, and land have negative effects whereas household size and education levels have positive effects on the probability of borrowing.

2.2 Types of Purposes of Borrowing and its Pattern

Financial liberalization and innovation have led to the expansion of household borrowing by several times in many developing countries (Kelly and Menton, 2007). This holds in both absolute as well as relative terms to household incomes regardless of whether the increase is sustainable or not (Debelle, 2004). Another implication of an increase in household debt is that it will raise household financial fragility and thus lead to financial instability (Rinaldi and Sanchis-Arellano, 2006). Galor and Zeira, (1993) and De Gregorio, (1996) reported that household credit brings about economic growth when it is invested in the development of human capital and in microenterprises.

Pham and Lensink (2007) discussed household lending from formal, informal, and semi-formal lending institutions in Vietnam using a household survey, namely, the Vietnam Living Standard Survey (VLSS) in 1998 covering a sample of 6002 households. Data showed that the credit for business activities attracts almost 64.88% of the total lending. Consumption purposes and other household uses contribute 13.06% and 22.06% of total credit respectively. Almost half of the total credit taken for business activities (50.27%) was supplied by the formal credit sector. It was also found that the informal credit sector supplied 69.07% of the total credit taken for consumption purposes and 79.28% of the total credit taken for household uses. Semi-formal credit covered both production and consumption needs but overall it supplied only a small proportion of total credit. They also found that the majority of urban households borrow from informal sources and it accounts for almost 72.41% of total credit.

Singh and Singh (1968) interviewed ninety-six farmers in Agra district, India, and found that the purpose of borrowing varied according to the goal of the borrowers in the case of agricultural loan. They also showed that level of income did not affect the purpose of borrowing. It was also found that the majority of the farmers borrowed for the expansion of their production activities.

Bailliu *et al.* (2011) studied household borrowing in Canada during 1999-2010. Data showed that almost 40% of the total borrowings were used for consumption and home-renovation purposes, 34% of the funds were used for financial and non-financial investment, and the remaining 26% were used to repay previous debts.

Basavaraj and Bhattacharjee (2014) studied household-level data of 200 households to identify the patterns of borrowing and purposes of borrowing from Channarayapatna block, Hassan district, Karnataka, India. The study considered three types of lending agencies, formal, informal, and semi-formal separately. The study found that the majority of the loans

were taken from informal sources for non-income generating purposes, daily consumption requirements, repayment of previous debts, and medical purposes. The study also associated with the size of landholding and the purpose of borrowing from informal sources. The results showed that as the size of landholding increases the purposes of borrowing shifted from non-income generating to income-generating purposes. They also found that households having land, which can be used as collateral, tended to take loan from the formal sector. Also, households took loan from microfinance institutions for animal husbandry purposes.

Saraswat and Singh (2007) analyzed the structural changes in borrowing behavior in Kot village of Himachal Pradesh, India. The study explored the incidence of indebtedness, source as well as the purpose of lending at three points of time; 1959-60, 1989-90, and 2004-05. They found that the purpose of borrowing shifted from non-productive to productive purposes from 1959-60 to 2004-05. Also, the source of credit shifted from non-institutional to institutional sources which might be due to the easy availability of loans from institutional sources.

2.3 Utilization of Loan Proceeds

Various studies have found evidence that institutional borrowers often use or divert a part of productive credit for unproductive purposes to meet up their necessary consumption requirements, social obligations, and non-farm activities in different parts of the world. In this context, Johnson and Rogaly (1997) admitted the fact that as money is fungible there is a potential for the borrowers to use the borrowed funds for purposes other than that was stated.

Karlan and Zinman (2008) compared the self-survey reports with administered data and they found that almost 50% of borrowers did not report the consumer loans. Karlan *et al.*, (2016) measured the impact of liquidity shocks on the spending of loan proceeds, more specifically on consumption and investment decisions. They collected data with the

cooperation of two banks in the Philippines. Their survey design was unique in the sense that they have collected administrative data which is rarely available. Also, they admitted that surveys that merely ask respondents regarding their past purchases may produce noisy data and also measurement error due to the large recall period. Moreover, Karlan and Zinman (2008) showed that respondents did not want to disclose information regarding the use of loans for consumption purposes. After addressing these challenges, Karlan *et al.* (2016) compared results from three different methods, (i) Direct elicitation where the surveyor will ask the respondents how they will or did spend money out of a loan, that is shortly after loan disbursement. (ii) Indirect elicitation, a survey technique that indirectly elicits respondent's response two weeks after loan disbursement. (iii) Counterfactual analysis which will compare the cash flows of borrowers and non-borrowers after two weeks and two months' independent follow-up surveys. Survey data revealed that many respondents use loan proceeds to repay other debts but do not report this to the bank. Further, respondents reported very little regarding non-business uses of loan proceeds to the bank.

Molla and Alam (2008) analyzed the effectiveness of the microcredit program of microcredit providers in Bangladesh. They found that almost 24% of borrowers used microcredit exclusively for consumption and old debt repayment purposes. Only 48% of borrowers used microcredit exclusively for investment purposes. The remaining 28% used microcredit for both consumption as well as investment purposes. Thus, the borrowers not only used credit for investment purposes but also for consumption purposes which includes the marriage of children, rituals in the family, etc. This reveals the fact that borrowers utilized microcredit for non-productive purposes that do not generate any revenue to society.

Khaleque (2011) analyzed 2973 loan profiles from a rural household survey of 2810 households, drawn from five districts of the northwest region of Bangladesh. These loans were taken from semi-formal sources, that is from microfinance institutions in Bangladesh.

The study found intentional or non-intentional diversion of loan use among the borrowers. Illness of the husband, educational needs of the children, sickness, unemployment of the husband were some of the popular reasons for loan diversion in Bangladesh. The study revealed the fact that households mentioned income-generating activities as the purpose of borrowing from MFI. However, as MFIs had no proper monitoring system regarding the evaluation of usage, borrowers tended to divert it from the proposed activities. Thus, the diversion of loans to the non-productive sector was a major concern as it increases the risk of loan default and also becomes a threat to these microfinance programs in Bangladesh. This hindered the basic aim of the microfinance programs which is to create income sources for the poor households by giving them credit support. The study had also developed a Loan diversion index and weighted loan use diversion index against each loan profile of the survey and tried to identify the percentage of loans diverted from the proposed activity to other activities. It showed that almost 42% of loans were fully diverted and 22% were partly diverted from the proposed activities in loan applications. Almost 29% of the loans taken for agricultural purposes were diverted to use for consumption purposes. Again, 29.63% of the loan taken for small business purposes were diverted to use for consumption purposes. Three econometric models, Tobit, Probit, and Logit models had been used to identify the determinants of loan use diversion in Bangladesh. The econometric analysis shows a positive and significant association between wage employment and loan use diversion at a 1% level of significance in all three models. Household saving reduces the loan use diversion at a 10% level of significance in all three models. Any kind of shock has a positive and significant effect in all three models at a 1% level of significance.

Riaz *et al.* (2012) studied the utilization of agricultural credit by the farming community in Pakistan. A sample of 120 loans was selected randomly from the action area of the Zarai Tareeqati Bank Limited in Faisalabad district in 2008 using a cross-sectional survey

technique where purposive selection had been done in the first step and later simple random sampling technique was applied. Data revealed that almost 82.5% of respondents had taken short-term loans (duration was less than one year) mainly to purchase improved seeds, pesticides, fertilizers, and for payment of hired laborers. The study also revealed that a reasonable number of the respondents utilized agricultural loans for other purposes. Among them, almost 61% had fully and 39% had partly utilized agricultural loans for other purposes. Among the other purposes, the majority of the agricultural loans were used for household needs. The study also found that there exists a positive and significant association between the respondent's age and utilization of agricultural credit in an appropriate way.

Asnake (2015) studied the loan utilization and loan repayment of rural microfinance clients in Wereilu District-Amhara Regional State of Ethiopia. The study found that borrowing purposes deviated from actual loan utilization leading to the loan diversion among the rural microfinance clients. Besides quantitative data, the study also assessed the qualitative data to evaluate loan utilization patterns. Qualitative data was collected by focused group discussion with loan group leaders and in-depth interviews and analyzed intuitively. Focused group discussion revealed the divergence between the purpose of borrowing and actual loan utilization. Perception towards loan diversion increases for highly experienced microfinance clients in Ethiopia.

Sharma and Kumawat (2014) studied the purpose-wise agricultural loan utilization pattern in the Jaipur district of Rajasthan, India. Their study showed that almost 24% of the overall borrowed amount was diverted to other purposes. Diversion of credit is highest in the case of crop loans (almost 42%). Data also revealed that among the diverted amount almost 72% was used for non-productive purposes.

Kishore *et al.* (2009) evaluated the performance of Haryana Gramin Bank. Sixty farmer beneficiaries were selected based on multi-stage random sampling from the two

villages, the Hisar and Ambala districts of Haryana. These two villages were selected randomly from all the villages of the western and eastern zones of Haryana where the bank was in operation. They found that the bank disbursed loans to farmers for crop production, to buy livestock, farm implements, and tractors. But, loans taken for agricultural purposes were diverted to purchase daily consumption needs, expenditure for social ceremonies, repair and construction of the house, and also repayment of previous debts. In Hisar district, out of the total diverted loan, almost 40% was used for the celebration of social ceremonies, 31% used for repayment of previous debts, 12% utilized to buy daily consumption needs, and rest used for construction and repair of house, and other purposes. In Ambala district, out of the total diverted loan, almost 53% was used for the celebration of social ceremonies, 21% used for repayment of previous debts, 12% used to buy daily consumption needs, and the rest used for construction and repair of house and other purposes.

Chavan *et al.* (2016) analyzed the utilization and diversion pattern of crop loans in Karnataka, India. The study used a multistage sampling technique for the selection of the farmers and the total sample size was 120 farmers which combine larger and small farmers. Data revealed that the incidence of diversion was higher among small farmers (23.22%) than the large farmers (3%). This might be because that the small farmers faced hardship to maintain basic minimum needs, therefore they used crop loans for consumption purposes.

Banerjee *et al.* (2015) identified the association between various socio-economic and demographic characteristics of the borrowers and the incidences of loan diversion and the extent of such loan diversion based on a primary survey in four villages of two districts, North 24-Parganas and South 24-Parganas of West Bengal, India. *First*, complete enumeration was done of the households in each village. Each respondent was asked to reveal their borrowing profile for the previous year and also to classify the loans, e.g, consumption loan, loan for the working capital needs, long-term investment loans, loans to meet social

obligations, loans for educational needs and medical treatment, loans to repay previous debts, etc. *Second*, the final sample size was chosen by random sampling technique in such a way that fairly represents all the categories of loan as well as non-borrowers in that area. The final sample survey was done in the two rounds on the same set of households. The first round of the survey was conducted from May 2009 to January 2010 and the second round was conducted from Feb 2010 to November 2010. In this process, the loan profile of 812 households for consecutive years, 2008 and 2009 was collected after omitting the outliers. The study used probit regression with sample selection. Econometric results showed that the probability of loan diversion significantly decreases for the farmers as principal earners than self-employed as principal earners. Further, the likelihood of loan diversion significantly decreased for borrowers with zero-interest loans. Being supporters of a political party significantly increased the probability of loan diversion, according to their study. The study also analyzed the socio-economic factors that affect the proportion of loan diversion using the instrumental variable Tobit model. Econometric results found that farmers divert the fewer amount of loans than self-employed principal earners. The proportion of loan diversion significantly decreased for the borrowers with zero-interest loans. Family size significantly decreases the proportion of loan diversion.

Singh and Toor (2005) analyzed the indebtedness and its reasons among the Punjab farmers in India. Keeping in mind different agro-climatic regions in Punjab state, three districts were chosen for the primary survey. Ropar, Ludhiana, and Bathinda were selected from the semi-hilly region, central region, and south-western region respectively. The duration of the survey was 2002-03. Detailed information was collected regarding farm size, income sources, sources, and purposes of the credit, rate of interest, etc. Data showed that the majority of the debts were taken for unproductive purposes, like social ceremonies including marriages, daily consumption needs, and health care. The small, marginal and semi-medium

farmers borrowed mainly for daily consumption needs, health care, and educational purposes for their children while medium and large farmers borrowed for social ceremonies and to purchase farm machinery.

Sharma and Gupta (2005) studied the determinants of borrowing behavior along with the extent of borrowing and repayments in Himachal Pradesh. The study was based on a sample survey of 360 farmers from the four villages randomly selected in Himachal Pradesh. Data showed that institutional sources of credit were popular than non-institutional credit among the farmers. They borrowed from non-institutional credit sources (mainly from friends or relatives) mainly for sickness, social ceremonies, etc. These loans are risk-free and usually carry no interest. Logistic regression was applied to identify the determinants of borrowing. Econometric results presented that the probability of borrowing significantly increased for the farmers with non-farm income.

Singh *et al.* (2005) examined the credit needs, utilization pattern and also identified factors that affect indebtedness in the Varanasi district of Uttar Pradesh. The study interviewed seventy farmers. It was observed that the majority of farmers borrowed short-term and medium-term loans. They also found the diversion of borrowed funds from productive to unproductive purposes among the farmers. Other literature (Sinha, 2005; Rao, 2005; Lahiri, 2005) also stressed the use of credit for income-generating purposes.

Literature (Eswaran and Kotwal, 1990; Pearlman, 2012) also pointed out that consumption smoothing may be a cause for loan diversion. Asnake (2015) and Awoke (2004) reported that loan diversion is one of the reasons for loan default as it inevitably reduces the production potential.

2.4 Repayment of Loan Proceeds

Another strand of literature has discussed the repayment of the loan and their associated issues. Stiglitz and Weiss (1981) stressed the adverse selection aspect of interest rate in the credit market. They hypothesized that there exists adverse selection that causes different borrowers to have different probabilities to repay their loans. Interest rate plays a major role in such cases as it acts as a screening device. According to them, for borrowers who were willing to pay higher interest rates, their probability of repayment was low. Besley and Coate (1995) investigated the impact on repayment in the case of group lending where group members are jointly liable for repayment. Ghatak (2000) also proposed that joint liability contracts attain high repayment rates even if borrowers do not have the collateral to pay. Literature (Armendariz and Gollier, 2000; Laffont and N'Guessan, 2000; Bhole and Ogden, 2010; Conning, 1999; Udry, 1990) had discussed the association between asymmetric information, adverse selection, group lending vs. individual lending in repayment or default of loans.

Makorere (2014) examined the factors that influence loan repayment behavior in Tanzania using a pilot study of 100 respondents. The study found that there exists the moral hazard problem in the credit market as some of the borrowers are not trustworthy and they tend to diversify or miss-utilize the loans to meet household consumption needs such as to purchase food, to pay electricity or water bills, etc. Data showed that almost 14% of respondents, borrowed from financial institutions, gave wrong information while borrowing, and diversified or misused loans for other purposes.

Bhattacharjee and Rajeev (2013) examined the loan use pattern and loan repayment behaviour for short-term loans (loan advances for less than one year) from formal as well as informal in India using NSS 59th round survey data which is also known as All India Debt and Investment Survey. The study had considered three types of states of India based on their

level of development as features of the credit market differ across the regions. Punjab and Haryana as developed states, West Bengal and Karnataka as middle-performing states, and Chattisgarh and Madhya Pradesh as less developed states were selected. In the formal credit market, there existed asymmetric information and moral hazard which leads to non-repayment among the borrowers. The informal credit market was characterized by high interest rates and inter-market loan contracts. The study used the double hurdle model to identify the factors that affect repayment of loans. The econometric results found that repayment of working capital loans was less because of the expectation of loan waiver in India.

Onyeagocha *et al.* (2012) investigated socio-economic determinants of loan repayment in the Southeast states of Nigeria. Using the multi-stage sample technique, 144 loan beneficiaries were randomly selected from the formal, semi-formal, and informal credit sectors and interviewed. The ordinary least square method was applied to find out the determinants of loan repayment. The econometric analysis found that the size of the loan, level of education, profitability, and portfolio diversity were the important and significant determinants for loan repayment.

In the Indian context, Hatai *et al.* (2005) analyzed the availability and utilization of credit by farmers and identified major causes of loan overdue using the multi-stage random sampling technique. Shivappa, (2005) examined the credit utilization pattern and loan repayment performances among the borrowers of Chitradurga Gramina Bank, Pallahatti branch of Davangere district of Karnataka, India. 60 borrowers were randomly selected and interviewed in 2004-05. The study revealed that non-repayment of loans was due to crop failure, low levels of yield, low income, etc. Sale *et al.*, (2005) also examined the utilization and repayment pattern of agricultural credit in Western Maharashtra. Singh *et al.*, (2005)

examined the utilization pattern and identified the factor that causes loan overdue for farmers in the Varanasi district of Uttar Pradesh.

Mpogole *et al.* (2012) examined the multiple borrowing and its effect on loan repayment in Tanzania. 250 microfinance borrowers were considered for a survey from 6 MFIs of Iringa municipality, Tanzania. Survey participants were randomly selected when they went to repay their loan or to negotiate to extend the loan repayment date. Descriptive statistics showed that almost 71% of respondents have two or more loans from different MFI at the same time in the survey area. Different reasons for multiple borrowing included family obligations, loan recycling, delayed loan disbursements, small loans for MFIs, etc. The study admitted the fact that multiple borrowing is one of the major causes for non-repayment of loans on time. A regression analysis was performed to determine the factors that affect multiple borrowing. Econometric analysis showed that the level of education and the number of dependents in the family significantly affect the multiple borrowing.

According to Johnson (2004) and Krishnaswamy (2007), the fast growth of microfinance service is one of the main causes of multiple borrowing among the clients. Taylor (2011) discussed the microfinance crisis in Andhra Pradesh, India in 2010. He reported that households borrowed from multiple MFIs and used one loan to repay another. It also created a cycle of indebtedness among the borrowers in Andhra Pradesh. Srinivasan, (2010), Vogelgesang, (2003), Chichaibelu and Waibel, (2015) also addressed the issue of extensive multiple borrowing and notified that it has become a common practice which is creating over-indebtedness or debt-trap among the borrowers.

Research Gap

The above literature review indicates the fact that borrowing in the credit market and its various aspect has been a matter of concern for a long time. It is also evident that outstanding credit poses a major concern as it increases the risk of loan default. Available literature has mainly focussed on the economic consequences of outstanding credit instead of finding the underlying reasons. Addressing this research gap is necessary to understand why such outstanding credit arises in the credit market. This present dissertation focuses on this issue. Proper utilization of loan proceeds benefits the economy in various ways but the mis-utilization of loan proceeds is harmful and might be a reason for outstanding credit. Therefore, the present dissertation discusses the intended as well as actual utilization of the loan proceeds in India and West Bengal (WB) respectively. The loan utilization behaviour of the households from the existing literature shows the contribution of the formal or semi-formal borrowing sources. Thus the study also emphasizes the institutional borrowing from formal and semi-formal sources

This dissertation focuses on the purpose of taking loans, that is, the intended use of loans in India and its determinants using NSSO data. Further, the study highlights the issue of multiple borrowing which is also alarming as it creates indebtedness or debt-trap among the borrowers and discusses the purpose of taking institutional loans to repay the previous debts which is one of the reasons for the multiple borrowing and its determinants using NSSO data. Both of these contribute to the existing literature as no literature has been found to explore the NSSO data in this regard. Next, the study concentrates on the diversion of institutional loans after analysing the actual utilization of loan proceeds using a primary sample survey in the two districts of the WB, a state in India. Few literature has been found to discuss the consequences of loan diversion and its determinants. However, this study focuses on loan diversion with special reference to financial literacy. Also, existing literature mostly

concentrates either on formal or semiformal (MFI) loans but this thesis deals with institutional borrowing which combines both formal and semi-formal loans.

Motivation of the Thesis

The above discussion signifies that it is important to emphasize the reasons behind the outstanding credit among the borrower households. Mis-utilization of the household credit has been regarded as the main cause of the outstanding credit in this thesis and therefore, the purpose of borrowing and utilization of the loan proceeds have been studied to suggest policies that may mend dovish policy structures of the Indian rural credit market.

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India¹

3.1 Introduction

Financial stability is of great importance for the rapid and sustained economic progress of developing and under-developed countries. One important indication of instability or bad health of the financial system of any country is the size of non-performing assets (NPA). As per RBI (2001), “A non-performing asset (NPA) was defined as a credit facility in respect of which the interest and/or installment of principal has remained ‘past due’ for a specified period of time”. Now, in a developing country like India, a major challenge faced by the institutional lenders in recent years is the major upsurge of NPA² leading to the severe financial loss of these institutions (Balasubramaniam, 2012). Therefore, effective regulation of NPA is essential for sustainable growth in the banking sector of any country (Bhattacharjee and Rajeev, 2013).

Various literature (Gill and Singh, 2006; Kishore *et al.*, 2009; Vadakarasseril, 2009; Sharma and Kumawat, 2014; Banerjee *et al.*, 2015; Chavan *et al.*, 2016) had pointed out the misuse of institutional as well as non-institutional loans for social ceremonies, illness and house construction, etc. Therefore, the purpose of borrowing is an important aspect from the point of view of the borrowers as well as the lending institutions as improper utilization of loan proceeds not only increases the probability of default of the borrowers, it also jeopardizes the feasibility of the lending institutions or programmes in the long-run by generating NPA in the economy (Banerjee *et al.*, 2015). However, the studies on borrowing for non-agricultural purposes to the best of our knowledge are very few (Makorere, 2014;

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

Asnake, 2015; Banerjee *et al.*, 2015). Thus, the present chapter considers the issues and borrower characteristics related to loans taken for non-agricultural purposes, more specifically loans taken for ‘non-production purposes’. This new nomenclature is used in view of the points raised by Gill and Singh, (2006) who questioned the traditional categorization of productive and unproductive use of loan. According to them, the spending of loans for survival (for essential consumption, medical expenses, and housing) cannot be considered unproductive. Keeping this in mind, this chapter has termed the purpose of the loan under these heads as ‘non-production purposes’ instead of ‘unproductive purposes’

Usually, the non-production loans bear higher probability of defaults compared to borrowing for income-generating purposes. Given the mounting pressure of NPA on institutional lending institutions, this chapter contributes to the existing literature by identifying the set of borrowers who belong to the non-income generation/ non-production purpose category. This chapter will have interesting implications for policies aimed at curbing the growth of NPA, at the household level.

The existing literature has separately investigated the borrowing either from the commercial banks and co-operatives or from the MFIs. On the contrary, the present chapter has combined formal (banks, co-operatives, etc.) and semi-formal (MFIs) credit sources together to define them as the institutional borrowing sources. Institutional credit is usually advanced to the borrowers with an objective of income generation, capacity creation, and asset formation. Institutional borrowing fails its mission when used for non-production purposes. Therefore, we take a holistic approach and consider the formal and semiformal loans together while considering the issue of the non-production loans. We are keeping non-institutional credit sources (informal credit sector) out of the purview of the study as they are very flexible as the borrowers are not legally answerable to the lender for the type and mode of utilization of such loans (Banerjee *et al.*, 2015).

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

This chapter also contributes to the existing literature by linking the issues related to non-production loans with the infrastructural development³ in the states of India as well as the consumption and asset inequality condition present in India, which are not considered in the existing studies so far. The inclusion of these variables in this study will give a new dimension to the economic literature.

We have identified another methodological research gap in the economic literature relating to the selectivity bias in the credit market. While analyzing the problem of non-production use of institutional loans, sample selection bias arises if we choose only the institutional borrower as the existing non-institutional borrowers might be potential institutional borrowers in the future. To avoid this sample selection bias in the econometric methodology, Heckman Sample Selection Model has been used in this study.

The broad objective of this chapter is (1) to identify the socio-economic determinants of institutional borrowing for non-production purposes in India using NSS (National Sample Survey) 59th and 70th round survey data known as All India Debt and Investment Surveys (AIDIS). (2) The chapter also examines the factors that influence the probability of taking institutional loans for non-production purposes as well as the actual size of such loans⁴ in India. The NSS survey does not provide the data of actual usage of loan proceeds after borrowing. Thus, this study concentrates only on the purposes of institutional borrowing in India. However, the first objective will deal with the likelihood of taking institutional loans for non-production purposes. In this respect, this study can be used as a benchmark model where borrowers' intended use of institutional credit towards non-production purposes has been studied in India. The econometric findings show that the probability (as well as the extent) of institutional borrowing for non-production purposes is higher for urban, literate, and formally employed households whereas it is lower among the households in the states with higher levels of consumption inequality. In addition, the households in the states with

higher infrastructural development are more prone towards institutional borrowings for non-production purposes.

The rest of the chapter is organized as follows. Section 3.2 outlines the data and summary statistics and methodology. Section 3.3 presents the empirical methodology. Estimation results with discussions are given in Section 3.4. Section 3.5 provides policy implications and section 3.6 concludes with further discussion and potential issues.

3.2 Material and Methods

3.2.1 Empirical Data

3.2.1.1 All India Debt and Investment Survey

The present chapter uses 59th (2002-2003) and 70th (2012-13) round NSS data of AIDIS to find out the pattern of the purpose of borrowing across the households of various states in India. The total sample size after merging two data sets was 253753. After deleting the outliers, the final sample size is 241131 households covering the States of India excluding the UTs. Among the total sample size, 57.58% are borrowers of which 48.46% of households have taken institutional credit. Among the institutional borrowers, approximately 51% have taken institutional credits for non-production purposes. That means the majority of the institutional borrowers have intentions to use institutional credits for non-production purposes. This poses a major concern from the policy perspective as non-production use of institutional credit implies diversion of financial assets away from productivity enhancement purpose.

3.2.2 Description of NSS 59th and 70th round survey data

3.2.2.1 Different Purposes of Borrowing in India

First, we classify the lenders into two broad categories: 1) Institutional lenders: constituting formal lenders (banks and co-operative credit societies) and semi-formal lenders (MFIs and

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

SHGs). Non-institutional lenders are informal lenders (moneylenders, landlords, relatives, friends, input suppliers, and others, etc.). Loans generated from the formal and semi-formal lenders are termed institutional loans; all other loans are taken as non-institutional loans. Next, we classify the pattern of borrowing as (i) Non-production purposes (household expenditures, repayment of debt, financial litigation, housing, medical treatment, education, etc.) which do not contribute to the immediate and direct production needs and (ii) Direct Production purposes (working and physical capital needs, that is, capital and current expenditures for farm and non-farm business, etc.). In NSS 59th round survey (2003), education, medical treatment, and housing are not separately mentioned and are clubbed under the code 'household expenditure', whereas, in NSS 70th round survey (2013), education, medical treatment, and housing are separately coded along with 'household expenditure' that takes into account of the expenditure on daily households' consumption needs.

Table 3.1 shows the relative frequency of the purpose of borrowing among credit agencies in 2003 and 2013. In general, for a sufficiently large sample size, the probability of an event is measured by the relative frequency or proportion of times that the event occurs. Here, the proportion of non-production purpose of the institutional loan is 0.46 and 0.55 in 2003 and 2013 respectively.

Table 3.1: Relative Frequency of Purpose of borrowing across various Credit Agencies in 2003 and 2013

Sl no.	Purpose of Borrowing	Credit Agency in 2003			Credit Agency in 2013		
		Institutional Lenders	Non-institutional Lenders		Institutional Lenders	Non-institutional Lenders	
		(0.44)	(0.56)		(0.53)	(0.47)	
1.	Direct Production Purposes	0.54	0.97	0.78	0.45	0.91	0.66
2.	Non-Production Purposes	0.46	0.03	0.22	0.55	0.09	0.34

Source: NSS 59th round and 70th round

Note: Row-wise data in parenthesis.

3.2.3 Summary Statistics

Table 3.2 depicts the summary statistics of the data. The sample consists of households from both rural areas and urban areas. The incidence of institutional borrowing for non-production purposes is higher in urban areas (55.74%) than in rural areas (44.26%). It is also higher (42.61%) among the highly educated (secondary and more) household heads in India. Among all the employment categories, the incidence of institutional borrowing for non-production purposes is higher among the informally employed household-heads (37.55%). This is also higher for land-owning (85.4%) and male (89.14%) household-heads. Over time, from 2003 to 2013, the incidence of institutional borrowing for non-production purposes has increased.

Table 3.2: Summary Statistics (Column wise percentage)

Variables	Categories	Total	Institutional Borrowing for non-production purposes	Institutional Borrowers
Sector Dummy	Rural	62.02	44.26	62.62
	Urban	37.98	55.74	37.38
Religion Dummy	Hindu	77.91	78.42	79.50
	Non-Hindu	22.09	21.58	20.50
Education Status	Not Literate	45.38	28.48	43.90
	Less than Secondary	29.16	28.91	30.22
	Secondary and more	25.46	42.61	25.88
Occupation Status	Self-employment	13.51	14.72	11.19
	Formal	46.79	31.66	49.71
	Informal	18.16	37.55	18.29
	Not employed	21.54	16.07	20.81
Land Owning dummy	Yes	86.08	85.40	88.54
	No	13.92	14.60	11.46
Sex dummy	Male	88.15	89.14	90.44
	Female	11.85	10.86	9.56
State dummy Infrastructural Development Index	Category 1	33.77	19.08	31.48
	Category 2	22.13	21.67	23.23
	Category 3	21.98	22.67	21.27
	Category 4	22.11	36.59	24.02
State dummy Asset Gini Coefficient	Category 1	20.43	20.06	19.89
	Category 2	26.12	20.94	24.97
	Category 3	29.27	29.05	29.00
	Category 4	24.18	29.95	26.14
State dummy MPCE Gini Coefficient	Category 1	23.23	17.25	20.75
	Category 2	10.26	10.76	10.41
	Category 3	35.91	34.96	36.44
	Category 4	30.60	37.03	32.40
Time dummy	2003	57.19	39.67	50.28
	2013	42.81	60.33	49.72
Total Households (In numbers)	241,131		38,340	138,855

Source: NSS 59th and 70th round

Note: Institutional borrowing for non-production purposes has been calculated among institutional borrowers

3.3 Empirical Methodology

3.3.1 Heckman Sample Selection Model

3.3.1.1 Heckman Probit Analysis

The first objective of the study identifies the factors that affect the probability of institutional borrowing for non-production purposes. The choice of whether to take institutional loans for non-production purposes is conditioned upon taking institutional credits. Therefore, the purpose of institutional borrowing is observed only for those households who have decided to borrow from institutional credit sources. Thus, choosing just the households, who borrowed from institutional sources and use of Probit model on them implies we are dealing with a selected sample which might lead to the sample selection bias (Heckman, 1979) as the existing non-institutional borrowers might be potential institutional borrowers in the future. To avoid this sample selection bias we use the Heckman Probit model using the maximum likelihood method by fitting the regression model with the selection that they had borrowed from institutional sources⁵. It involves two steps. First, it estimates the selection equation and then the outcome equation.

- a) Selection Equation: This is a probit regression and the binary dependent variable Y_{iH}^S = 1 if the household borrows from institutional sources and zero otherwise. The selection equation is as follows:

$$Y_{iH}^S = \alpha_1 X_{iH} + u_1 \quad (A)$$

Where, $u_1 \sim N(0, 1)$ and X_{iH} represents the vector of exogenous explanatory variables.

- b) Outcome Equation: This is also a probit regression and binary dependent variable Y_{iH}^* = 1 if the household borrows institutional loan for non-production purposes and zero otherwise to model the decision process of institutional borrowing for non-production purposes. The outcome equation is as follows:

$$Y_{iH}^* = \alpha_1 X_{iH} + \varepsilon_1 \quad (B)$$

Where, $\varepsilon_1 \sim N(0, 1)$ and $\text{corr}(u_1, \varepsilon_1) = \rho$. Here, X_{iH} represents the vector of exogenous explanatory variables.

To avoid the identification problem, it is required to exclude at least one of the independent variables from the estimation of the outcome equation that is used in the selection model.

3.3.1.2 Heckman Tobit Analysis

The second objective of this study has attempted to identify the factors influencing the extent or amount of institutional loans borrowed for non-production purposes in India. For this purpose, the study considers the Heckman Tobit model using the maximum likelihood method of estimation.⁶ It also involves two stages.

a) Selection Equation: This is a probit regression where the binary dependent variable $Y_{iH}^L = 1$ if the household borrows from institutional sources for non-production purposes, otherwise it is zero. This is the same as the outcome equation of the Heckman probit model. The selection equation is as follows:

$$Y_{iH}^L = \beta_1 X_{iH} + u_2 \quad (C)$$

Where, $u_2 \sim N(0, 1)$ and X_{iH} represents the vector of exogenous explanatory variables.

b) Outcome Equation: It identifies the factors that affect the actual size of institutional loans borrowed for non-production purposes in India. Here the dependent variable, Y_{iH}^T represents the actual amount of institutional loans borrowed for non-production purposes, is continuous and has been censored for the observations at value zero and only positive observations have been taken into consideration. The same exclusion restriction as that of Heckman probit analysis also applies here.

The outcome equation, here, can be written as:

$$Y_{iH}^T = \beta_1 X_{iH} + \varepsilon_2 \quad (D)$$

Where $\varepsilon_2 \sim N(0, 1)$, $\text{corr}(u_2, \varepsilon_2) = \rho$.⁷

3.3.2 Explanatory and Response variables used in this study

A household may borrow from the institutional sources for non-production purposes and the variables described in Table 3.3 may influence the household's decision:

3.3.2.1 Socio-economic and demographic factors

Socio-economic and demographic factors are selected from prior research. Regional differences, whether the household resides in the rural or urban sector, may affect the probability (as well as extent) of institutional borrowing for non-production purposes. Hundie *et al.* (2004) and Purkayastha (2001) already showed that the rate of loan repayment/indebtedness varies across the regions. Education level increases respondents' ability to acquire and process and utilize available information (Hundie *et al.*, 2004). Therefore, *ceteris paribus*, education level is expected to reduce the probability (as well as the extent) of institutional borrowing for non-production purposes as respondents' education may affect their perception regarding the consequences of non-production use of institutional loans. Banerjee *et al.* (2015) showed that the family income categories and occupation categories have a significant impact on the probability of loan diversion as well as the probability of borrowing. Gender differentials can be related to access to credit (Hundie *et al.*, 2004). Thus, place of residence, education, employment status, and sex of the household head has been included as the explanatory variables.

Next, Banerjee *et al.* (2015) also showed that land has a significant impact on the probability of borrowing as it can be used as collateral. The asset value of the respondent

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

might also play a pivotal role in receiving formal loans. Therefore, the landowning status and asset value have been included in the analysis. Large households are of lower credit risks because they may have more diversified sources of income (Hundie *et al.*, 2004). Family size or household size, which refers to the number of people living in the same residence, has been included as explanatory variables. However, the religion of the household head⁸ is included in the selection equation but not in the outcome equation in both the models to avoid the identification problem.

3.3.2.2 Time factor

Next, to control the effect of various changes that occur over time from 2003 and 2013, a time dummy has been included as an explanatory variable in the study. Time dummy partially captures the policy shifts or other developments, not mentioned between the two periods.

3.3.2.3 Inequality Measures

According to Cingano (2014), higher inequality gives the incentives to undertake risky projects or high rates of return. In this view, this study has included the inequality measures (Gini coefficient⁹) across the states of India, in terms of consumption and asset inequality. The state-wise Gini coefficient¹⁰ of monthly per capita consumption expenditure (MPCE) (30 days recall period) has been calculated, as per NSSO 61st (2004) and NSSO 66th (2009) round survey of Consumption expenditure¹¹. Further, state-wise Gini coefficient of the asset has been calculated from the NSSO 59th round (2003) and 70th round (2013) survey data sets¹².

Next, the states of India have been categorized into four different groups with respect to the MPCE-Gini coefficient and Asset-gini coefficient (Table 3A.1 and Table 3A.2). Category 1 corresponds to the states with the lowest quartile whereas category 4 corresponds to the upper-most quartile of the same. Category 2 and category 3 correspond to the inter-

quartile ranges respectively for the MPCE-Gini coefficient¹³ and Asset-Gini coefficient¹⁴.

These state categories with respect to the MPCE-Gini coefficient and Asset-Gini coefficient have been considered as explanatory variables in both models.

3.3.2.4 Infrastructural Development

Public infrastructure constitutes one of the foundations for a country's productive activities and economic growth (Gibson and Rioja, 2020). Literature had discussed the relationship between public infrastructure with economic growth (Glomm and Ravikumar, 1994; Gibson and Rioja, 2020) and income distribution (Calderón and Chong, 2004; Calderón and Servén, 2014). Therefore, it will be interesting to identify if infrastructural development has an impact on the probability (as well as the extent) of institutional borrowing for non-production purposes. In this regard, a state-wise infrastructural development index (IDI) has been calculated for 2003 and 2013. The detail calculation methodology of IDI is given in Appendix 3. A.1. Next, the states of India have been categorized into four different groups with respect to this infrastructural development index. Category 1 corresponds to the states with the lowest quartile whereas category 4 corresponds to the upper-most quartile of the same. Category 2 and category 3 corresponds to the inter-quartile ranges respectively regarding the infrastructural development in India in 2003 and 2013.

Thus, a total of twelve variables have been used as the explanatory variables in both models.

Next, the Credit-agency dummy has been used as the response variable in the selection equation and the Borrowing-purpose dummy has been considered as the response variable in the outcome equation of the Heckman Probit analysis. Borrowing-purpose dummy has been considered as the response variable in the selection equation and the continuous variable Loan-amount (borrowed for non-production purposes) has been considered as the response variable in the outcome equation in the Heckman Tobit model.

Table 3.3: Description of Explanatory and Response Variables

Variable Name	Variable Description	Mean	Standard Deviation	Min	Max
1. Set of Explanatory Variables					
A. Socio-economic Factors					
Sector Dummy	Dummy variable representing the place of residence is equal to 1 if household resides in the urban area, 0 otherwise	0.38	0.49	0	1
Religion Dummy	Dummy variable equal to 1 if Hindu, 0 otherwise	0.78	0.41	0	1
Education Status	A categorical variable of household head's level of education; three categories-illiterate, less than secondary level and secondary and higher level. Illiterate is the reference category	0.29	0.45	0	1
		0.25	0.44	0	1
Occupation Status	Household head's type of occupation; four categories-No-employment, Self-employment, formal, informal employment. No employment is the reference category	0.47	0.5	0	1
		0.18	0.39	0	1
		0.22	0.41	0	1
Asset owned	Natural log of (1+ total asset value owned by the households, taken at 2012 prices as a base). Total asset value combines total land value, the value of building, and value of other financial assets.	11.9	2.71	0	17.0
Land Owning dummy	Dummy variable equal to 1 if the household owns the land, 0 otherwise	0.86	0.34	0	1
Household size	Natural log of (1+ total size of household).	1.7	0.42	0.70	3.66
Sex dummy	Dummy variable equal to 1 if household head is male, 0 otherwise	0.89	0.32	0	1
B. Time Factor					
Time dummy	Dummy variable equal to 1 if the household is in 2013, 0 otherwise.	0.43	0.49	0	1
C. State-level Indicators					
Four categories for all three state-level indicators. Category 1 corresponds to the states with the lowest quartile whereas category 4 corresponds to the upper quartile of the same. Category 2 and category 3 corresponds to the inter-quartile ranges respectively. Category 1 is the reference category.					
State dummy MPCE Gini Coefficient	A categorical variable of states of India with respect to MPCE- Gini coefficient.	0.10	0.30	0	1
		0.36	0.48	0	1
		0.30	0.46	0	1
State dummy Asset Gini Coefficient	A categorical variable of states of India with respect to Asset-Gini coefficient.	0.26	0.44	0	1
		0.29	0.45	0	1
		0.24	0.43	0	1
State dummy Infrastructural Development Index	A categorical variable of states of India with respect to Infrastructural Development Index (II).	0.22	0.42	0	1
		0.22	0.41	0	1
		0.22	0.42	0	1

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

Variable Name	Variable Description	Mean	Standard Deviation	Min	Max
2. Set of Response Variables					
Borrowing-purpose dummy	Dummy variable equal to 1 if the household borrows from institutional sources for non-production purposes.	0.16	0.37	0	1
Credit-agency dummy	Dummy variable equal to 1 if the household borrows from institutional sources.	0.28	0.45	0	1
Loan-amount	Natural log of (1+ amount of institutional loans borrowed for non-production purposes) among the surveyed households	1.68	3.92	0	14.43
	Loan amount among the institutional borrower households	5.45	5.46	0	14.43
	Loan amount among the borrower households who take institutional loans for non-production purposes	10.60	1.59	0	14.43
Total Surveyed Households (In numbers)	241,131				
Total Institutional Borrower Households (In numbers)	67296				
Total Borrower Households who takes institutional loans for non-production purposes	38340				

Source: NSS 59th round and 70th round

3.4 Econometric Results and Discussions

Van de Ven and Van Praag (1981), Gambardella *et al.* (2007), Berger *et al.* (2008), Das (2015) had used marginal effects whereas Walton *et al.* (2008), Deressa (2010) had discussed the coefficients as well as marginal effects simultaneously to interpret Heckman sample selection model. We also present the econometric results of Heckman Probit analysis and Heckman Tobit analysis in terms of coefficients (to discuss the signs) as well as the marginal effect¹⁵ (to evaluate the magnitudes) in Table 3.5 and 3.6 respectively. The selection equation of the Heckman Tobit model is the same as the outcome equation of the Heckman Probit analysis. Therefore, the selection equation of the Heckman Tobit analysis will not be reported.¹⁶

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

The correlation matrix among the explanatory and response variable is given in Table 3.4.1-3.4.2. The tables show that state categories, in respect of IDI, consumption, and asset inequality are not highly associated with each other, so these state categories can be retained altogether in the model. Further, Table 3.4.3 represents the Tetrachoric correlation among the binary variables, considered in the study. The table reflects that these variables are not highly associated with each other, except that sector dummy and land-owning dummy are moderately associated.

Table 3.4.1: Cramer's V of Institutional Borrowing for non-production purposes and Borrowing between the explanatory variables

Variables	Borrowing-Purpose Dummy	Credit-agency Dummy
Sector Dummy	0.36	-0.014
Religion Dummy	-0.08	0.04
Education Status	0.22	0.04
Occupation Status	0.47	0.09
Land Owning Dummy	-0.18	0.08
Time Dummy	0.08	0.16
Household Size	0.19	0.18
Sex Dummy	-0.10	0.08
State dummy with respect to IDI	0.26	0.07
State dummy with respect to Asset Gini Coefficient	0.12	0.06
State dummy with respect to MPCE Gini Coefficient	0.02	0.07

Source: NSS 59th round and 70th round survey.

Note: Institutional borrowing for non-production purposes has been calculated among institutional borrowers

Table 3.4.2: Kendell's tau-b among the dummy of states

	State dummy with respect to IDI	State dummy with respect to Asset Gini Coefficient	State dummy with respect to MPCE Gini Coefficient
State dummy with respect to IDI	1	----	----
State dummy with respect to Asset Gini Coefficient	0.30	1	----
State dummy with respect to MPCE Gini Coefficient	0.20	0.33	1

Source: Directorate of Economics & Statistics of respective State Governments, and for All-India --Central Statistics Office and NSS 59th 61st, 66th & 70th round

Note: MPCE at 30 days recall period has been considered

Table 3.4.3: Tetrachoric - correlation among the binary variables

	Institutional Borrowing for non- production purposes	Institutional Borrowing	Sector Dummy	Religion Dummy	Land Owning Dummy	Time Dummy	Sex Dummy
Institutional Borrowing for non- production purposes	1	----	----	----	----	----	----
Institutional Borrowing	1	1	----	----	----	----	----
Sector Dummy	0.29	-0.02	1	----	----	----	----
Religion Dummy	0.01	0.08	-0.09	1	----	----	----
Land Owning Dummy	-0.02	0.16	-0.58	0.0005	1	----	----
Time Dummy	0.29	0.26	0.12	-0.01	0.07	1	----
Sex Dummy	0.03	0.17	-0.01	0.03	0.07	-0.009	1

Source: NSS 59th round and 70th round survey.

Note: Institutional borrowing for non-production purposes is calculated among institutional borrowers.

The following sections report the results of Heckman Probit and Heckman Tobit model. The chapter will discuss the results of coefficients as well as marginal effects of both models.

3.4.1 Results of the Heckman Probit Analysis

We report the results (Table 3.5) of the selection equation and outcome equation in terms of marginal effects and signs of the coefficients simultaneously. All the coefficients and marginal effects reported here are found to be significant at a 1% level of significance.

3.4.1.1 Results of Selection Equation

In the urban sector, the probability of institutional borrowing is 5% lower as compared to the rural sector. The likelihood of institutional borrowing significantly increases by 5% for Hindu and 4% for male household heads. Further, the higher the educational levels of the household-head, the higher the probability of borrowing from the institutional sources. The likelihood of institutional borrowing significantly increases for self-employed (by 4%) and

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

formal-employed household head (by 9%), but decreases by 2% for informally employed household-heads compared to unemployed. A possible reason for this may be that the self-employed and formally employed household-heads have better access to formal financial credit sources vis á vis informally employed household-heads.

A borrower may use land and asset as collateral if needed to borrow from institutional sources. The probability of institutional borrowing significantly increases for asset-owned households (by 4%). However, it significantly decreases for land-owning household-heads (by 7%) indicating that yet now not all land-owning agriculturalist families are under the purview of formal credit institutions. Further, household size also significantly increases the probability of institutional borrowing by 10% indicating that the larger size of household imposes greater liability on the household head, thereby increases the credit requirements as well.

Further, the likelihood of borrowing from the institutional sources significantly increases by 9% over time¹⁷ in India from 2003 to 2013. This is a good indicator for the economic welfare as a whole. Further, households in the states with the higher levels of consumption inequality (West Bengal, Orissa, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, etc.) in terms of MPCE and the states with higher asset inequality (Punjab, Bihar, Sikkim, Meghalaya, West Bengal, Andhra Pradesh, Tamil Nadu, etc.) are significantly more likely to borrow from institutional sources. This implies that inequality does not pose any constraint among the households to borrow from the institutional sources. Also, households in the states with higher levels of infrastructural development (Himachal Pradesh, Punjab, Mizoram, Karnataka, Goa, Kerala, Tamil Nadu, Gujarat, Maharashtra, etc.) are significantly more likely to borrow from institutional sources. This is consistent with the hypothesis.

3.4.1.2 Results of the Outcome Equation

We found that the probability of institutional borrowing for non-production purposes is significantly higher by 21% in the urban sector compared to the rural sector in India whereas they are 5% less likely to borrow from institutional sources compared to rural households. This is alarming from the policy point of view as this may increase the incidence of default in the urban sector. The Report of NSS 68th round (2011-12) survey of consumer expenditure showed that the per capita monthly expenditure on durable goods which are relatively expensive (including furniture, entertainment goods, household ‘comfort’ goods, like, motor car, PC/laptop, television, refrigerator, gold ornaments, etc.) was higher in the urban area compared to rural area (based on Mixed Reference Period) in 2011-12 (NSS 2011). This points out that the growth of consumerism and love for luxurious products induces the urban population to borrow from institutional sources for non-production purposes.

Further, the probability of institutional borrowing for non-production purposes in India is high for educated household heads compared to the reference category of illiterate. The reason might be that the household with proper education can successfully diversify their institutional loan proceeds, thereby increasing the probability of institutional borrowing for non-production purposes. However, efficient diversification might reduce the risk of repayment difficulties even if institutional loans are taken for non-production purposes.

The probability of institutional borrowing for non-production purposes significantly increases by 28% for household-heads employed in the formal sector compared to that of unemployed as the formal labor force with a regular income source, can repay their loans even in case of non-production loan use. In this context, Khaleque (2011) also confirmed that wage-earning household-heads are significantly more prone towards the diversion of loan use. Next, the self-employed households (either in the agriculture or non-agriculture sector)

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

who are in constant need of working capital are less likely to borrow (by 23%) from institutional sources for non-production purposes.

We earlier observed land-owning households are 7% less likely to take institutional credit. However, if they borrow from institutional sources they are 7% less likely to borrow for non-production purposes as land-owning agriculturalist households have constant working capital needs to carry out the production process. The probability of institutional borrowing for non-production purposes has increased significantly over time by 15%. Thus, improved financial access and innovation over the years in India raised the likelihood of institutional borrowing on one hand but it also increases the probability of institutional borrowing for non-production purposes.

The household size that significantly raises the probability of institutional borrowing however decreases the probability of taking such loans for non-production purposes by 7%. The larger households, on one hand, has higher consumption requirement, but they also have more earning members to raise funds in need. Hence, they are less likely to access the formal credit sources as well as take such loans for non-production purposes. However, this result is interesting in the context of some related literature (Wongnaa and Awunyo-Vitor, 2013; Ugbonmeh *et al.*, 2008) that showed household size is negatively related to the farmers' ability to repay their loan at a 1% level of significance. However, Banerjee *et al.* (2015) showed that households with larger family size divert a lower proportion of loans.

Results show that the male household-heads who avail institutional loan more, are less prone (by 9%) towards the borrowing for non-production purposes compared to female household-heads in India. This result is interesting in regards to the existing literature that points out to the equal trustworthiness of female borrowers compared to male borrowers (Aggarwal *et al.*, 2015 and D'espallier *et al.*, 2011).

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

The effect of state dummy representing infrastructural development index on the probability of institutional borrowing for non-production purposes is very alarming from the policy point of view. It depicts that households in the states with higher infrastructural development (Himachal Pradesh, Punjab, Mizoram, Karnataka, Goa, Kerala, Tamil Nadu, Gujarat, Maharashtra, Haryana, Kerala, etc.) are more prone towards institutional borrowing for non-production purposes compared to less developed states (like Assam, Bihar, Manipur, Meghalaya, etc.). Households in the comparatively developed states with respect to infrastructure are expected to focus on the proper utilization of institutional credits instead of aiming at non-production intended use of these credits.

Further, households in the states with the higher levels of consumption inequality (West Bengal, Orissa, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, etc.) in terms of MPCE are less likely to take institutional loans for non-production purposes. This result is substantive from the policy point of view as it acts as a good indicator for the economy as a whole.

On the other hand, the effect of state dummy with respect to asset inequality on the probability of institutional borrowing for non-production purposes is a bit puzzling. Households in the states with the highest level of asset inequality (states in category 4 Punjab, Bihar, Sikkim, Meghalaya, West Bengal, Andhra Pradesh, and Tamil Nadu) are significantly more likely to take institutional credits for non-production purposes as compared to states having the lowest level of asset inequality. However, households in category 3 states (Madhya Pradesh, Chattisgarh, Gujrat, Maharashtra, Karnataka, Orissa, etc.) are less likely to institutional borrowing for the non-production purposes as compared to the households in category 1 states (Arunachal Pradesh, Nagaland, Manipur, Assam, Jharkhand, Himachal Pradesh, etc.). The implication might be that a small handful of households with higher asset levels are creating this significant impact on non-production institutional borrowing in India.

Table 3.5: Estimations of Heckman Probit Regressions in 2003 and 2013

Explanatory Variables	Selection Equation		Outcome Equation	
	Coefficient (1)	Marginal Effect (2)	Coefficient (3)	Marginal Effect (4)
Sector Dummy (Reference category: Rural)	-0.15*** (0.006)	-.05 [-22.36]***	0.53*** (0.02)	.21 [22.22]***
Religion Dummy (Reference category: Non-Hindu)	0.17*** (0.007)	.05 [22.04]***	-	-
Education Status (Reference category: Not-literate)				
Less than Secondary	0.14*** (0.007)	.04 [19.06]***	0.06*** (0.01)	.02 [4.15]***
Secondary and more	0.27*** (0.008)	.08 [32.87]***	0.20*** (0.02)	.08 [11.73]***
Occupation Status (Reference category: No employment)				
Self-employment	0.12*** (0.009)	.04 [12.99]***	-0.61*** (0.02)	-.23 [-18.33]***
Formal	0.26*** (0.01)	.09 [23.92]***	0.75*** (0.02)	.28 [21.85]***
Informal	-0.08*** (0.01)	-.02 [-6.90]***	0.04 (0.02)	.02 [1.78]
Asset owned	0.13*** (0.002)	.04 [58.74]***	0.004 (0.007)	.001 [0.60]
Land Owning dummy (Reference category: No holding)	-0.2*** (0.01)	-.07 [-16.19]***	-0.14*** (0.01)	-.07 [-6.45]***
Household Size	0.3*** (0.007)	.10 [39.85]***	-0.18*** (0.02)	-.07 [-7.82]***
Sex Dummy (Reference category: Female)	0.13*** (0.01)	.04 [12.28]***	-0.23*** (.02)	-.09 [-9.11]***
Time Dummy (Reference category: 2003)	0.3*** (0.007)	.09 [43.05]***	0.38*** (0.02)	.15 [27.49]***
State dummy MPCE Gini Coefficient (Reference category: Category 1)				
Category 2	0.02 (0.01)	.004 [1.30]	-.40*** (0.02)	-.15 [-14.63]***
Category 3	0.23*** (0.008)	.07 [28.35]***	-0.09*** (0.02)	-.03 [-3.93]***
Category 4	0.18*** (0.10)	.06 [17.44]***	-0.14*** (0.02)	-.06 [-6.17]***
State dummy Asset Gini Coefficient (Reference category: Category 1)				
Category 2	0.15*** (0.008)	.05 [17.24]***	-0.00 (0.01)	-.000 [-0.05]
Category 3	0.23*** (0.01)	.07 [22.20]***	-0.14*** (0.02)	-.05 [-5.39]***
Category 4	0.09*** (0.009)	.03 [9.69]***	0.09*** (0.02)	.04 [4.65]***
State dummy Infrastructural Development Index (Reference category: Category 1)				
Category 2	0.23*** (0.008)	.07 [25.63]***	-0.00 (0.02)	-.000 [-0.09]
Category 3	0.19*** (0.008)	.06 [21.42]***	0.32*** (0.02)	.12 [18.25]***
Category 4	0.36*** (0.009)	.12 [39.10]***	0.80*** (0.02)	.31 [45.82]***
Constant	-3.15 (0.027)			
rho ¹⁸	0.18 (0.06)			
Wald test of indep. eqns. (rho = 0) ¹⁹				
chi2(1) = 7.29				
Prob > chi2 = 0.00				
Log pseudo-likelihood -162990.9				
Number of observations = 241131				
AIC ²⁰ = 326069.9				
BIC ²¹ = 326527.1				

Significant at 5%, * Significant at 1%

Source: NSS 59th round and 70th round.

Note: Institutional borrowing for non-production purposes has been calculated among institutional borrowers

Robust Standard errors are in parenthesis in columns (1) and (3). Z statistic are in parenthesis in columns (2) and (4)

3.4.2 Results of the Heckman Tobit Analysis

In this sub-section, results (Table 3.6) of the outcome equation of the Heckman Tobit with marginal effects and slope coefficients have been discussed. All the reported variables are significant at a 1% level of significance model. As discussed earlier, the selection equation of the Heckman Tobit model is the same as the outcome equation of the Heckman Probit analysis. Therefore, we do not report the results of the selection equation of the Heckman Tobit analysis separately.

3.4.2.1 Results of the outcome equation of Heckman Tobit Analysis

We have found that for the five variables out of twelve variables, the signs and explanations of the Heckman Tobit analysis are the same as in the case of Heckman Probit analysis. This implies that the variables, for which the probability of institutional borrowing for non-production purposes increases (decreases) significantly, are also responsible for the larger (lower) size of institutional loans borrowed for non-production purposes. The remaining variables discussed below depict different signs than that of Heckman Probit analysis.

Among the occupation categories, self-employment and formal employment depict the same sign in outcome equations of both Heckman Tobit and Heckman Probit models. However, informally employed household-heads, has no significant effect in the Heckman Probit model but Heckman Tobit analysis shows that size of institutional loans borrowed for non-production purposes significantly decreases (by 52%) for these household-heads compared to unemployed. Thus, the household-heads employed in the informal sector have no significant inclination towards institutional borrowing for non-production purposes and the extent of such borrowing is also significantly small for them. The reason may be that these households have less access to formal financial instruments vis-à-vis the household-heads employed in the formal sector. This in turn points out the scope of further policy

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

intervention to raise the accessibility of formal financial instruments to the informally employed population.

Next, asset-ownership raises the amount of institutional loan borrowed for non-production purposes by 21% in Heckman Tobit even if it does not have any significant impact on the probability of borrowing such loans. Thus, rich asset-owning borrower households take a larger amount of institutional loans for non-production purposes.

Heckman Probit model shows that the male household head is less likely to have institutional borrowing for non-production purposes but Heckman Tobit analysis shows that if they borrow then the extent of such loan significantly increases for male household-heads by 8% compared to female household-heads.

From Heckman Probit model it is observed that the larger sized households are less prone towards institutional borrowing for non-production purposes, but the present result shows if they borrow, the size of the loan is 8% larger as compared to the smaller sized households in India. This again implies that large families with more earning members have higher borrowing due to higher credit requirements.

The impact of the state dummy with respect to the infrastructural development index is positive and significant for all the three state categories in the Heckman Tobit model. The households, in developed states like Maharashtra, Karnataka, Tamil Nadu, Madhya Pradesh, Kerala, Gujarat, etc., have higher per capita income which is giving them financial strength to borrow more for non-production purposes from institutional sources. The Heckman Tobit analysis shows that the households in states like Uttar Pradesh, West Bengal, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka, etc. with high consumption inequality borrow a significantly lower amount of institutional credits for non-production purposes. The effect of state dummy in terms of Asset-Gini coefficient is positive and significant for state

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

categories 2 and 3 (Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Punjab, West Bengal, Andhra Pradesh, etc.) in Heckman Tobit model. Thus, the households in the states with moderate asset inequality borrow a lower size of the institutional loan amount for non-production purposes.

Further, the intercept term is the expected mean value when all predicted variables are valued zero; therefore, in the Heckman Tobit analysis with more than one binary predictor variable, intercept or constant term captures the effect of the reference group of those binary predictor variables on the predicted variable. However, we have compared the average of the natural log of amount of loan by comparing the predicted mean value (10.4) and actual mean value (10.6) of the variable ‘Loan-amount’ among the borrower households who take institutional loans for non-production purposes. The predicted and actual value of the variable is also moderately associated (0.66)

Table 3.6: Estimations of Heckman Tobit Regressions in 2003 and 2013

Explanatory Variables	Outcome Equation Coefficient (1)	Outcome Equation Marginal Effect (2)
Sector Dummy (Reference category: Rural)	0.53*** (0.02)	0.51 [35.36] ***
Religion Dummy (Reference category: Non-Hindu)	-	-
Education Status (Reference category: Not-literate)		
Less than Secondary	0.21 *** (0.02)	0.19 [11.61] ***
Secondary and more	0.86*** (0.02)	0.82 [44.40] ***
Occupation Status (Reference category: No employment)		
Self-employment	-0.17*** (0.02)	-0.14 [-6.30] ***
Formal	0.22*** (0.02)	0.16 [7.20] ***
Informal	-0.52*** (0.02)	-0.52 [21.58] ***
Asset owned	0.23*** (0.006)	0.21 [42.16] ***
Land Owning dummy (Reference category: No holding)	-0.44*** (0.02)	-0.42 [-18.25] ***
Household Size	0.10*** (0.02)	0.08 [4.10] ***
Sex Dummy (Reference category: Female)	0.07*** (0.02)	0.08 [3.30] ***
Time Dummy (Reference category: 2003)	0.91 *** (0.02)	0.86 [58.56] ***

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

Explanatory Variables	Outcome Equation Coefficient (1)	Outcome Equation Marginal Effect (2)
State dummy MPCE Gini Coefficient (Reference category: Category 1)		
Category 2	0.2 (0.02)	0.04 [1.67]
Category 3	-0.17*** (0.02)	-0.19 [-10.19] ***
Category 4	-0.30*** (0.02)	-0.31 [14.30] ***
State dummy Asset Gini Coefficient (Reference category: Category 1)		
Category 2	0.09*** (0.02)	0.07 [3.71] ***
Category 3	0.16*** (0.02)	0.16 [6.79] ***
Category 4	0.01 (0.02)	-0.003 (-0.15)
State dummy Infrastructural Development Index (Reference category: Category 1)		
Category 2	0.11*** (0.02)	0.08 [3.68] ***
Category 3	0.36*** (0.02)	0.31 [15.21] ***
Category 4	0.36*** (0.02)	0.26 [13.88] ***
Constant	6.28 (0.16)	
Rho	0.13 (0.03)	
Sigma	1.2 (0.006)	
Lambda	0.16 (0.05)	
Wald test of indep. eqns. (rho = 0) ⁵ chi2(1) = 11.38 Prob>chi2 = 00.00		
Log pseudo-likelihood -151052.5		
Number of observations = 241131 AIC ²² = 302194.9BIC ²³ = 302662.6		

Significant at 5%, * Significant at 1%

Source: NSS 59th round and 70th round.

Note: Institutional borrowing for non-production purposes has been calculated among institutional borrowers

Robust Standard errors are in parenthesis in column (1). Z statistic is in parenthesis in the marginal effect column (2)

3.5 Policy Implications

Our study shows that the likelihood of institutional borrowing is high in the rural sector and the urban population borrows more institutional credit for non-production purposes. According to the 2011 census on India (Chandramouli, 2011), around 68% of the population is from rural areas. Thus, we conclude that policies towards financial inclusion must aim at the provision of financial services to a vast section of the rural population who are more inclined to take the institutional loan for production purposes. In addition, subsidized interest

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

rates should prevail for the priority sector lending in rural areas to promote the loan taken for production purposes only. Bhattacharjee and Rajeev (2013) had also stressed the lowering of interest rate in the formal sector to induce a borrower in repaying their loan in time and obtain the benefits of taking the formal loan using the NSS 59th round AIDIS (2003) survey. On the contrary, the interest rate for the institutional loan taken for consumption purposes should increase for the urban population, so that the society can eliminate the improper utilization of resources.

Another important aspect that has been resulted from the study is that the likelihood of institutional borrowing as well as taking larger institutional loans for non-production purposes significantly decreases among the households in the states having higher consumption inequality. This augurs well for the Indian economy as a whole. To encourage these households in the states of higher consumption inequality, easier terms of institutional loans can be initiated. As mentioned earlier Bhattacharjee and Rajeev (2013) had also emphasized the issue of favorable terms of formal loans by lowering the interest rate in the formal credit sector.

We observe in states with higher asset inequality the tendency to borrow institutional loans for non-production purposes is high. Therefore, the reduction in asset inequality is also very crucial in terms of the institutional borrowing pattern in India. In this context, Banerjee *et al.* (2015) argued that if the permanent shifting of loans for purposes other than the stated purpose was driven by genuine economic needs like securing food, medical facilities, or education, then, it acts as a substitute to the non-existent social security system. So, although inequality may initially lead to higher institutional borrowing for non-production purposes, the result, in the long run, may bring less inequality. From this result, the priority sector lending in the states with asset inequality can be strengthened.

We observe that the households in states with better infrastructure are more likely to borrow institutional credit as well as taking a larger amount of institutional loan for non-production purposes. This is alarming from the policy point of view as households in rich states are diverting production capital towards non-production use. To curb this situation, proper monitoring is required for the comparatively richer states in India to avoid non-production use of institutional credits.

3.6 Conclusions

This chapter has investigated broadly the probability of borrowing from the institutional sources and the probability and extent of institutional credits for non-production purposes. The empirical results give some stimulating facts regarding the probability of borrowing from institutional sources. These are, 1) the likelihood of borrowing from the institutional sources significantly increases over time, 2) households in the states, with the higher levels of consumption inequality in terms of MPCE and asset inequality, are significantly more likely to borrow from the institutional sources. Both of these results point out the expansion of the institutional credit sources in India over time and across the states with higher asset and consumption inequalities. The results are in line with the increased rate of banking and micro-finance penetration in the country.

The empirical results are alarming in some cases regarding the probability and extent of institutional borrowing for non-production purposes. These are: 1) urban population is significantly more likely to borrow a larger amount of institutional credit for non-production purposes than their rural counterpart. 2) A higher education level of the household-heads not only increases the probability of taking institutional credits for non-production purposes significantly but also increases the size of such loans. 3) Formally employed household heads are significantly more likely to borrow larger institutional loans for non-production purposes. 4) The probability of institutional borrowing for non-production purposes

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

significantly increases among the households in the states with higher levels of infrastructural development. From the above analysis, we observed that urban-based rich, formally employed and educated households are significantly more likely to borrow and in large amount for non-production purposes from the institutional sources.

Further, from the analysis, we observe that households with landholding and households in the states with higher levels of consumption inequality have lower intensity of borrowing institution credit for non-production purposes. These results indicate the expansion for institutional lending sources towards the agricultural land holding families and across states with higher consumption inequality.

Appendix 3A

3.A.1 Calculation Methodology of Infrastructural Development Index (IDI)

IDI combines three dimensions²⁴.

1) Physical Capital Index (PCI)

2) Human Capital Index (HCI)

3) Bank Branches Index (BBI)

Now, PCI combines three-dimension indices, namely; road length per sq km in India (RLI), telephone facility per 1000 population in India (TFI), electricity facility per 1000 population in India (EFI). HCI combines two-dimension indices, namely; rural health infrastructure per 1000 population (RHI), Net Enrolment Ratio in upper primary level (NERI). BBI has only one dimension; bank branches per 1000 population

Firstly, we compute the dimension index using the following formula:

$$\text{Dimension Index (DI)} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$$

Once the dimension indices have been calculated, PCI and HCI can be determined by weighted average with equal weights.

$$\text{Thus, PCI} = 1/3 (\text{RLI}) + 1/3 (\text{TFI}) + 1/3 (\text{EFI})$$

$$\text{HCI} = 1/2 (\text{RHI}) + 1/2 (\text{NERI})$$

Now, IDI can be calculated by taking the weighted average of PCI, HCI, and BBI with equal weights.

$$\text{IDI} = 1/3 (\text{PCI}) + 1/3 (\text{HCI}) + 1/3 (\text{BBI})$$

Tables in Appendix

Table 3.A.1: States with respect to Gini coefficient based on MPCE in 2004 and 2009

	States	Gini Coefficient (MPCE) in 2004	States	Gini Coefficient (MPCE) in 2009
Category 1	J&K	0.26	J&K	0.27
	Haryana	0.30	Uttaranchal	0.31
	Rajasthan	0.30	Rajasthan	0.31
	Bihar	0.28	Nagaland	0.24
	Sikkim	0.30	Manipur	0.21
	Nagaland	0.24	Mizoram	0.28
	Manipur	0.20	Tripura	0.30
	Mizoram	0.28	Meghalaya	0.29
	Tripura	0.30	Assam	0.30
	Meghalaya	0.24		
	Assam	0.28	Goa	0.27
Category 2	Himachal Pradesh	0.31	Himachal Pradesh	0.33
	Punjab	0.31	Punjab	0.32
	Uttaranchal	0.31	Haryana	0.33
			Bihar	0.32
	Arunachal Pradesh	0.31	Sikkim	0.32
			Gujrat	0.33
Category 3			Uttar Pradesh	0.34
	Uttar Pradesh	0.33	Arunachal Pradesh	0.34
	West Bengal	0.33	Jharkhand	0.35
	Orissa	0.34	Kerala	0.35
	Madhya Pradesh	0.34	Tamil Nadu	0.35
	Gujrat	0.33		
	Andhra Pradesh	0.34		
	Goa	0.33		
	Kerala	0.34		
Category 4	Jharkhand	0.35	West Bengal	0.36
	Chattisgarh	0.35	Orissa	0.36
	Maharastra	0.37	Chattisgarh	0.37
	Karnataka	0.35	Madhya Pradesh	0.36
			Maharastra	0.36
			Andhra Pradesh	0.36
	Tamil Nadu	0.36	Karnataka	0.36

Source: NSS 61st round (2004) and 66th round (2009)

Note: MPCE at 30 days recall period has been considered

Table 3.A.2: States with respect to Gini coefficient based on the Asset value of Households in 2003 and 2013

	States	Gini Coefficient (Asset) in 2003	States	Gini Coefficient (Asset) in 2013
Category 1	J&K	0.52	J&K	0.51
	Himachal Pradesh	0.58	Himachal Pradesh	0.58
	Rajasthan	0.59	Uttar Pradesh	0.60
	Arunachal Pradesh	0.53	Arunachal Pradesh	0.60

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

	States	Gini Coefficient (Asset) in 2003	States	Gini Coefficient (Asset) in 2013
Category 2	Nagaland	0.54	Nagaland	0.41
	Manipur	0.58	Manipur	0.56
			Assam	0.59
	Jharkhand	0.59	Kerala	0.57
	Uttaranchal	0.63	Uttaranchal	0.62
	Uttar Pradesh	0.62	Haryana	0.63
	Bihar	0.63	Rajasthan	0.61
	Sikkim	0.62	Mizoram	0.63
	Assam	0.61	Tripura	0.63
	Madhya Pradesh	0.63	Jharkhand	0.60
Category 3	Goa	0.60	Orissa	0.63
	Kerala	0.62	Goa	0.61
	Tripura	0.67		
	Meghalaya	0.67	Chattisgarh	0.64
	West Bengal	0.68	Madhya Pradesh	0.65
	Orissa	0.67	Gujrat	0.64
	Chattisgarh	0.68	Maharastra	0.65
	Gujrat	0.65		
	Maharastra	0.68		
	Karnataka	0.67	Karnataka	0.65
Category 4	Punjab	0.71	Punjab	0.67
			Bihar	0.66
	Haryana	0.70	Sikkim	0.66
	Mizoram	0.71	Meghalaya	0.66
	Andhra Pradesh	0.73	West Bengal	0.66
			Andhra Pradesh	0.72
	Tamil Nadu	0.75	Tamil Nadu	0.69

Source: NSS 59th (2003) & 70th (2013) round survey

Table 3.A.3: Calculation of Infrastructural Development Index (IDI) in 2003

States	Dimension Indices for PCI			Physical Capital Index (PCI)	Dimension Indices for HCI		Human Capital Index (HCI)	Banking Index (BI)	IDI
	Dimension Index of road length per sq km in India (RLI)¶	Dimension Index of telephone facility per 1000 population in India (TFI)¶	Dimension Index of electricity facility per 1000 population (EFI)¶		Dimension Index of rural health infrastructure per 1000 population (RHI)¥	Dimension Index of Net Enrolment Ratio in upper primary level (NERI)©		Dimension Index of bank branches per 1000 population (BBI) #	Weighted average of PCI, HCI and BBI
Andhra Pradesh	0.18	0.48	0.67	0.44	0.12	0.59	0.35	0.19	0.32
Arunachal Pradesh	0.03	0.08	0.53	0.21	0.50	0.52	0.51	0.15	0.29
Assam	0.56	0.17	0.17	0.30	0.11	0.28	0.20	0.08	0.19
Bihar	0.21	0.11	0.00	0.11	0.00	0.14	0.07	0.06	0.08
Chhattisgarh	0.13	0.12	0.51	0.25	0.13	0.67	0.40	0.09	0.25
Goa	0.76	0.00	0.99	0.58	0.16	0.15	0.15	1.01	0.58
Gujarat	0.18	0.66	0.83	0.55	0.14	0.31	0.22	0.20	0.32
Haryana	0.16	0.53	0.86	0.51	0.04	0.03	0.04	0.21	0.25
Himachal Pradesh	0.14	0.72	1.00	0.61	0.38	0.97	0.67	0.46	0.58
Jammu & Kashmir	0.00	0.21	0.82	0.34	0.17	0.58	0.38	0.24	0.32

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

States	Dimension Indices for PCI			Physical Capital Index (PCI)	Dimension Indices for HCI		Human Capital Index (HCI)	Banking Index (BI)	IDI
	Dimension Index of road length per sq km in India (RLI)¶	Dimension Index of telephone facility per 1000 population in India (TFI)¶	Dimension Index of electricity facility per 1000 population (EFI)¶		Dimension Index of rural health infrastructure per 1000 population (RHI)¥	Dimension Index of Net Enrolment Ratio in upper primary level (NERI)©		Dimension Index of bank branches per 1000 population (BBI) #	Weighted average of PCI, HCI and BBI
Jharkhand	0.02	0.14	0.17	0.11	0.10	0.00	0.05	0.11	0.09
Karnataka	0.27	0.57	0.81	0.54	0.16	0.51	0.33	0.29	0.39
Kerala	1.00	0.96	0.71	0.88	0.12	0.68	0.40	0.37	0.54
Madhya Pradesh	0.13	0.26	0.71	0.36	0.09	0.48	0.29	0.13	0.26
Maharashtra	0.23	0.52	0.80	0.51	0.08	0.66	0.37	0.17	0.35
Manipur	0.14	0.08	0.59	0.26	0.17	0.55	0.36	0.02	0.21
Meghalaya	0.10	0.08	0.38	0.18	0.15	0.16	0.16	0.22	0.18
Mizoram	0.04	0.08	0.70	0.27	0.99	0.83	0.91	0.27	0.48
Nagaland	0.33	0.08	0.63	0.34	0.18	0.69	0.43	0.03	0.26
Odisha	0.37	0.19	0.20	0.25	0.10	0.20	0.15	0.14	0.18
Punjab	0.20	1.00	0.97	0.72	0.07	0.33	0.20	0.36	0.42
Rajasthan	0.09	0.30	0.53	0.30	0.16	0.45	0.30	0.14	0.24
Sikkim	0.06	0.00	0.80	0.28	0.25	0.36	0.31	0.27	0.28
Tamil Nadu	0.34	0.53	0.80	0.55	0.16	1.00	0.58	0.22	0.45
Tripura	0.58	0.08	0.37	0.34	0.09	0.77	0.43	0.12	0.30
Uttarakhand	0.16	0.36	0.26	0.26	0.16	0.49	0.33	0.33	0.30
Uttar Pradesh	0.28	0.18	0.59	0.35	0.04	0.26	0.15	0.09	0.19
West Bengal	0.26	0.16	0.32	0.24	0.05	0.51	0.28	0.12	0.21

Source: ¶ Statistical Year Book India 2015, Ministry of Statistics and Programme Implementation, Govt. of India

© DISE Flash Statistics of 2005-06.

¥ Health & Family Welfare Statistics in India, MoH&FW, 2015. Rural Health Statistics 2014-15

Bank Branches Statistics, Reserve Bank of India.

Note: Dimension Index = $\frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$

Table 3.A.4: Calculation of Infrastructural Development Index (IDI) in 2013

States	Dimension Indices for PCI			Physical Capital Index (PCI)	Dimension Indices for HCI		Human Capital Index (HCI)	Banking Index (BI)	IDI
	Dimension Index of road length per sq km in India (RLI)¶	Dimension Index of telephone facility per 1000 population in India (TFI)¶	Dimension Index of electricity facility per 1000 population (EFI)¶		Dimension Index of rural health infrastructure per 1000 population (RHI)¥	Dimension Index of Net Enrolment Ratio in upper primary level (NERI)©		Dimension Index of bank branches per 1000 population (BBI) #	Weighted average of PCI, HCI and BBI
Andhra Pradesh	0.00	0.54	0.85	0.46	0.28	0.62	0.45	0.21	0.37
Arunachal Pradesh	0.17	0.97	1.00	0.71	0.42	0.88	0.65	0.40	0.58
Assam	0.38	0.95	1.00	0.77	0.11	0.79	0.45	0.39	0.53
Bihar	0.20	0.13	0.88	0.40	0.25	0.71	0.48	0.33	0.40
Chhattisgarh	0.17	0.71	0.92	0.59	0.08	0.77	0.43	0.27	0.42
Goa	0.10	0.65	0.63	0.46	0.26	0.69	0.48	0.11	0.34
Gujarat	0.35	0.53	0.25	0.37	0.04	0.64	0.34	0.07	0.26
Haryana	0.42	0.42	0.00	0.28	0.00	0.89	0.44	0.03	0.25
Himachal Pradesh	0.16	0.00	0.95	0.36	0.36	0.67	0.52	0.35	0.41

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

States	Dimension Indices for PCI			Physical Capital Index (PCI)	Dimension Indices for HCI		Human Capital Index (HCI)	Banking Index (BI)	IDI
	Dimension Index of road length per sq km in India (RLI)¶	Dimension Index of telephone facility per 1000 population in India (TFI)¶	Dimension Index of electricity facility per 1000 population (EFI)¶		Dimension Index of rural health infrastructure per 1000 population (RHI)¥	Dimension Index of Net Enrolment Ratio in upper primary level (NERI)©		Dimension index of bank branches per 1000 population (BBI) #	Weighted average of PCI, HCI and BBI
Jammu & Kashmir	0.03	0.10	0.61	0.25	0.41	0.99	0.70	0.13	0.35
Jharkhand	0.46	0.10	0.81	0.45	0.37	0.83	0.60	0.07	0.37
Karnataka	0.16	0.10	0.64	0.30	0.21	0.00	0.10	0.01	0.14
Kerala	0.07	0.10	0.84	0.34	1.00	0.94	0.97	0.24	0.51
Madhya Pradesh	0.60	0.10	0.65	0.45	0.30	0.00	0.15	0.14	0.24
Maharashtra	0.08	0.10	0.55	0.24	0.15	0.73	0.44	0.15	0.27
Manipur	0.76	0.43	0.26	0.48	0.12	0.86	0.49	0.05	0.34
Meghalaya	0.72	0.50	0.47	0.56	0.08	0.82	0.45	0.09	0.36
Mizoram	0.06	0.00	0.37	0.14	0.07	0.89	0.48	0.09	0.23
Nagaland	0.35	0.56	0.33	0.41	0.16	0.71	0.44	0.13	0.32
Odisha	0.10	0.00	0.73	0.27	0.26	0.86	0.56	0.09	0.31
Punjab	0.12	0.50	0.63	0.41	0.10	0.85	0.47	0.08	0.32
Rajasthan	0.14	0.81	0.92	0.62	0.17	0.77	0.47	0.17	0.42
Sikkim	0.38	0.68	0.84	0.63	0.11	0.85	0.48	0.15	0.41
Tamil Nadu	0.16	0.71	0.94	0.60	0.18	0.70	0.44	0.06	0.36
Tripura	0.31	0.84	0.92	0.68	0.25	0.93	0.59	0.25	0.50
Uttarakhand	0.64	0.00	1.00	0.54	0.41	1.00	0.71	1.00	0.74
Uttar Pradesh	1.00	0.89	0.97	0.94	0.27	0.92	0.60	0.35	0.62
West Bengal	0.36	1.00	0.96	0.76	0.21	0.86	0.53	0.21	0.50

Source: ¶ Statistical Year Book India 2015, Ministry of Statistics and Programme Implementation, Govt. of India

© DISE Flash Statistics of 2013-14.

¥ Health & Family Welfare Statistics in India, MoH&FW, 2015. Rural Health Statistics 2014-15

Bank Branches Statistics, Reserve Bank of India.

Note: Dimension Index = $\frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$

Table 3.A.5: States with respect to Infrastructural Development Index (IDI) in 2003 and 2013

	States	IDI in 2003	States	IDI in 2013
Category 1	Assam	0.19	Uttar Pradesh	0.26
	Bihar	0.08	Bihar	0.25
	Jharkhand	0.09	Manipur	0.14
	Manipur	0.21	Tripura	0.24
	Meghalaya	0.18	Meghalaya	0.27
	Odisha	0.18	Jharkhand	0.23
	Uttar Pradesh	0.19	Chhattisgarh	0.31
	West Bengal	0.21		
Category 2	Chhattisgarh	0.25	Rajasthan	0.34
			Arunachal Pradesh	0.35
	Haryana	0.25		
	Madhya Pradesh	0.26	Assam	0.34
	Nagaland	0.26	West Bengal	0.36
	Rajasthan	0.24	Orissa	0.32
	Sikkim	0.28	Madhya Pradesh	0.32
			Andhra Pradesh	0.36

Chapter 3: An economic analysis of the determinants of pattern of institutional borrowing in India

	States	IDI in 2003	States	IDI in 2013
Category 3	Andhra Pradesh	0.32	J&K	0.37
	Arunachal Pradesh	0.29	Uttaranchal	0.40
	Gujarat	0.32	Haryana	0.42
	Jammu & Kashmir	0.32	Sikkim	0.41
	Maharashtra	0.35	Nagaland	0.37
	Mizoram	0.48	Gujrat	0.42
	Tripura	0.30	Maharastra	0.41
	Uttarakhand	0.30		
Category 4	Goa	0.58	Himachal Pradesh	0.58
	Himachal Pradesh	0.58	Punjab	0.53
	Karnataka	0.39	Mizoram	0.51
	Kerala	0.54	Karnataka	0.50
	Punjab	0.42	Goa	0.74
	Tamil Nadu	0.45	Kerala	0.62
			Tamil Nadu	0.50

Source: Author's own calculation

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²According to the RBI's Financial Stability Report (December 2016), the ratio of gross non-performing advances (GNPA) to total advances of Scheduled Commercial Banks (SCBs) had increased to 9.1% in September 2016 from 7.8% in March 2016.

³Infrastructural development has been taken as a proxy of per capita NSDP.

⁴This study being empirical in nature does not dwell on the ethical aspect of whether such characterization of 'non-production' loans is justified

⁵Robust standard errors have been applied.

⁶Robust standard errors have been applied.

⁷The maximum likelihood method of estimation has been used with robust standard errors.

⁸To avoid the identification problem, it is required to exclude at least one of the independent variables from the estimation of the outcome equation that is used in the selection model. In this respect, the religion of the household head has been excluded from the outcome equation.

⁹ Gini coefficient measures of statistical dispersion. It represents the income and wealth distribution of a nation and is used to measure inequality.

¹⁰ The formula used to measure the Gini coefficient is

$$G = 1 + (1 / N) - [2 / (m \cdot N^2)] [\sum (N - i + 1) Y_i]$$

Where G represents the Gini coefficient. It has been considered a population $i = 1, \dots, N$ with arithmetic mean of income is m .

¹¹The scenario of consumption inequality in India in 2003 might get reflected in prospective data of NSS 61st (2004) round survey of consumption expenditure. However, to get the reflection of the consumption inequality in India in 2013, the study has to take the retrospective data of NSS 66th (2009) round survey of consumption expenditure due to non-availability of the next round survey data of consumption expenditure in India

¹²The data shows that inequality in India in terms of the Gini coefficient of MPCE at 30 days recall period has increased from 0.35 in 2004 to 0.36 in 2009. On the contrary, inequality in India in terms of the Gini coefficient of the asset has decreased from 0.67 in 2003 to 0.66 in 2013.

¹³ The lowest (highest) quartile value of MPCE-Gini coefficient in 2004 is 0.30 (0.35). The inter-quartile region ranges from 0.31-0.35. In 2009, the lowest (highest) quartile value of the MPCE-Gini coefficient is 0.31(0.36). The inter-quartile region ranges from 0.32-0.35.

¹⁴ The lowest (highest) quartile value of Asset-Gini coefficient in 2003 is 0.59 (0.70). The inter-quartile region ranges from 0.60 – 0.69. In 2013, lowest (highest) quartile value of Asset-Gini coefficient in 2013 is 0.60 (0.66). The inter-quartile region ranges from 0.61-0.65.

¹⁵ For the dummy variables, reported marginal effect is the difference between predicted value for the respective explanatory variable for value 1 and 0, with all other explanatory variables at their means. For the continuous explanatory variables, the marginal effect depicts the derivatives of the predicted response variable with respect to small changes in the explanatory variables. For categorical variables with more than two possible values, the marginal effects show the difference in the predicted probabilities for cases in one category relative to the reference category

¹⁶ Results are available on request,

¹⁷ In this context, it is to be mentioned that according to the RBI Monetary Policy Statement (2012-13), penetration of the banks in rural areas has increased, with the 138502 outlets providing the banking services in rural areas in 2012-13. According to Status of Microfinance in India, published by NABARD in various years, it has been seen that number of SHG has increased from 11, 05,749 to 12, 20, 000 during 2006-07 to 2012-13 in India. Also, SHG availed loan has increased from 6,570.3 crores to 20585.36 crores during the same time frame in India.

¹⁸ rho indicates the correlation coefficient between the error terms in two equations; selection equation and outcome equations. Results show that it is positively correlated in all three models.

¹⁹ Wald test indicates that correlation between the errors terms of selection and outcome equation is very significant, thereby null hypothesis of $\rho = 0$ can be rejected. Hence, simple probit analysis is inapplicable under this circumstance. Thus, Heckman's technique should be used.

²⁰ Akaike information criterion

²¹ Bayesian information criterion

²² Akaike information criterion

²³ Bayesian information criterion

²⁴ The Principal Component Analysis (PCA) hasn't been used in constructing the state-wise IDI

Chapter 4: What determines the household decision to borrow for investment or repayment of old debt?

The Indian story¹

4.1 Introduction

In this era of globalization, a healthy financial system acts as a catalyst for the broader goal of a nation's economic development. Formal financial institutions play a crucial role in accumulating savings and then transmitting those savings in productive activities by extending loans for the enhancement of production capacity or production efficiency. This not only leads to higher future income but also enables consumption smoothing and faster economic growth. In this connection, the existing literature has primarily focused on the institutional borrowing taken for non-production purposes (Poddar *et al.*, 2019; Gill and Singh, 2006; Karlan *et al.*, 2016) and the issue of loan diversion of institutional borrowing (Banerjee *et al.*, 2015; Chavan *et al.*, 2016; Sharma and Kumawat, 2014; Khaleque, 2011; Asnake, 2015). However, Galor and Zeira (1993) and De Gregorio (1996) reported that household credit brings about economic growth when it is invested in the development of human capital and microenterprises. Access to credit has been considered an important tool in promoting production and smoothing consumption (Zeller *et al.*, 1998; Swain *et al.*, 2008). In this regard, this study defines growth-enhancing borrowing in a broader sense, namely - when the borrowing that takes place to meet working or physical capital needs as well as human capital needs. This, in turn, leads to an increase in capacity creation and income generation in the economy. Thus, borrowing for growth-enhancing purposes is always socially desirable as it leads to optimal utilization of society's resources. The present chapter focuses on borrowing from the formal and semi-formal sources, that is, institutional borrowing in India. Given the backdrop of the existing literature, it is important to identify

whether institutional borrowing² is growth-enhancing or not. The motivation of this chapter lies here.

This chapter also focuses on another aspect of institutional borrowing. An increase in household debt will raise household financial fragility and thus lead to financial instability (Rinaldi and Sanchis-Arellano, 2006). Faruquee and Khalily (2011) discussed that the increase in multiple borrowing among MFI clients may lead to over-indebtedness and defaults. Taylor (2011), Srinivasan (2010) and Chichaibelu and Waibel (2015) also addressed the issue of extensive multiple borrowing and cautioned about the fact that it has become a regular practice to borrow from the multiple MFIs and households are using one loan to repay other loans, thereby creating over-indebtedness or debt-trap among the borrowers. However, the evidence showed the contradictory relationship between multiple borrowing and over-indebtedness among the borrowers (Chichaibelu and Waibel, 2015). Vogelgesang (2003) and Mpogole *et al.* (2012) found a positive correlation between multiple borrowing and over-indebtedness whereas Krishnaswamy (2007), Gonzalez (2008) and Schicks (2014) did not observe any such relation. These observed facts make it imperative to identify the multiple institutional borrowings which are perpetual in nature. We define the multiple institutional borrowings that are taken while previous loans are not fully repaid as ‘Institutional Loans in perpetuity’. In a nutshell, institutional loans in perpetuity might make a significant difference in the repayment practices among the borrowers.

The objective of this chapter is to study are as follows:

First, the study identifies the socio-economic demographic determinants of the intensity and size of institutional borrowing for growth-enhancing purposes in India.

Second, the study relates the level of financial inclusion of the states of India to growth-enhancing borrowing in India. The states with a high level of financial inclusion

have a better financial infrastructure. Thus, the objective is to observe if better availability of financial instruments leads to a higher incidence of growth-enhancing borrowing of institutional loans. To this end, the study creates a financial inclusion index (FII) at the state level and tries to identify to what extent, financial inclusion level affects the size of growth-enhancing borrowing of institutional loans.

Third, the asset inequality in India has been taken into account in the study. In this regard, state-wise Gini-coefficient with respect to asset inequality has been calculated to identify if asset inequality among the states in India has led to a lower incidence of growth-enhancing borrowing of institutional in India.

Finally, the study examines the determinants of institutional loans in perpetuity in India.

Inclusion of these two variables; FII and asset inequality in the study related to borrowing for growth-enhancing purposes will also contribute to the existing literature. Also, to identify the determinants of institutional loan for growth-enhancing purposes, the study uses the double hurdle model, which is also a methodological contribution to the literature

The rest of the chapter is organized as follows. The following section outlines the data and methodology. Estimation results are given in Section 4.3 with discussions of the results. Section 4.4 provides policy implications Section 4.5 concludes with further discussion and potential issues.

4.2 Material and Methods

4.2.1 Empirical Data

The chapter uses NSS 70th round survey data which is popularly known as All India Debt and Investment Surveys (AIDIS). This survey of NSS is the primary source of data on various indicators of stock of assets, the incidence of indebtedness, capital formation, and other

indicators of rural and urban economy of India. The survey year of NSS 70th round was the calendar year of 2013. After deleting the outliers, the final sample size is 103216 households covering the states of India excluding the UTs. Among the surveyed households, 66.88% are borrowers. Among the borrowers, 58.57% have taken institutional loans.

4.2.2 Description of NSS 70th round survey data

4.2.2.1 The classification of Purpose of borrowing in India

AIDIS data provides information on household debt by credit agency (formal, semi-formal, and informal), various purposes, etc. The study has classified the purpose of borrowing as (i) Fixed and working capital needs or physical capital needs (Capital and current expenditures for farm and non-farm business, expenditure on housing and financial investment expenditure, etc.), (ii) Human capital needs (education and medical treatment) and (iii) Other purposes which comprise of household expenditures, repayment of the debt, financial litigation, etc. The first two categories of borrowing constitute borrowing for the economy's growth-enhancing purposes in this study. Borrowing for physical and human capital needs, in turn, lead to capacity creation in the economy, thus growth-enhancing as well. Table 4.1 shows row-wise and column-wise summations among the different credit agencies and various types of purpose of the borrowings in 2013. Column-wise percentage shows the different purposes of borrowing for a given lender in 2013. Row-wise data (in parenthesis) shows the percentage distribution between institutional and non-institutional lenders for a given purpose of borrowing.

Table 4.1: Purpose of borrowing across various Credit Agencies in 2013 (In Percentages)

Sl no.	Purpose of Borrowing	Categorization of Purpose of Borrowing	Credit Agency in 2013			
			Formal Lenders	Semi-formal Lenders	Informal Lenders	Incidence of borrowing across the various purpose of borrowing
1.	Capital expenditure in farm business	Fixed and working capital needs or physical capital needs	12.77 (73.98)	5.42 (4.97)	3.58 (21.05)	7.94 (100)
2.	Current expenditure in farm business		24.50 (78.32)	8.01 (4.05)	5.43 (17.63)	14.39 (100)
3.	Capital expenditure in non-farm business		8.26 (57.87)	9.59 (10.64)	4.42 (31.49)	6.56 (100)
4.	Current expenditure in non-farm business		3.76 (40.73)	11.60 (19.88)	3.58 (39.40)	4.25 (100)
5.	Financial investment expenditure		0.18 (40.40)	0.26 (9.27)	0.22 (50.33)	0.21 (100)
6.	Housing		17.47 (55.07)	10.35 (5.16)	12.42 (39.77)	14.59 (100)
Total (1-6) column-wise percentages	Total borrowing for physical capital purposes		66.94	45.23	29.65	47.94
7.	Household expenditure	Other purposes	16.98 (25.90)	35.35 (8.53)	42.31 (65.56)	30.16 (100)
8.	Expenditure on litigation		0.01 (13.16)	0.04 (5.26)	0.09 (81.58)	0.05 (100)
9.	Repayment of debt		1.33 (43.76)	2.95 (15.34)	1.22 (40.90)	1.4 (100)
10.	Others		8.39 (46.83)	6.91 (6.11)	8.30 (47.06)	8.24 (100)
Total (7-10) column-wise Percentages	Total borrowing for other purposes		26.71	45.25	51.92	39.85
11.	Education	Human Capital needs	3.70 (49.17)	3.31 (6.94)	3.25 (43.89)	3.46 (100)
12.	Medical Treatment		2.63 (13.81)	6.21 (5.17)	15.17 (81.02)	8.75 (100)
Total (11-12) column-wise percentages	Total borrowing for Human capital needs		6.33	9.52	18.42	12.21
Total column-wise			100	100	100	
Incidence of borrowing across various lenders in numbers			33,460 (45.99)	5,297 (7.28)	33,996 (46.73)	72,753 (100)

Source: NSS 70th round. Row percentages are in the parenthesis**4.2.2.2 The pattern of Institutional loans in perpetuity 2013**

As stated earlier, institutional loan in perpetuity is defined as the multiple new loans taken by the institutional borrowers while all the previous institutional loans are not fully repaid in the

reference period of the survey. Data shows that the incidence of institutional loans in perpetuity (16.3%) occurs among the incidences of multiple institutional borrowing (43%).

4.2.3 Econometric Methodology

4.2.3.1 To Study the Extent of Institutional Loans for Growth-enhancing Purposes: Box-Cox Double Hurdle Model

The first objective of this chapter is to identify the determinants of the loan size borrowed for growth-enhancing purposes in India. In a simple Tobit model, censoring is assumed to represent a standard corner solution (Eakins, 2016), which in itself is a restrictive assumption. Also, zero users in the simple Tobit model exist not by self-selection or choice. Heckman corrects this. But Heckman's outcome equation leaves out those who have zero responses (through the same process of Tobit type censoring) which rules out the possibility that they may be potential borrowers of institutional loans for growth-enhancing purposes in the future. These zero observations pose difficulties whenever analyzing microdata (Eakins, 2016). Newman *et al.* (2001) and Keelan *et al.* (2009) already discussed that presence of zero observations can be attributed to different factors such as corner solutions, non-participation in the market, or purchase infrequency. Thus, the motivation for this study is to present an alternative econometric approach.

In this context, the double hurdle model, originally designed by Cragg (1971)³ is the most appropriate as it is distinctly different than a truncated normal regression because the truncated normal regression only allows for the dependent variable to be kept above zero because the data is truncated. In estimating both the Cragg model and the Heckman model, Johansson-Stenman (2002) found some evidence to indicate that the Cragg model fits the data better. Thus, the double hurdle model is an improvement over the Heckman sample selection model as it takes into account both the actual as well as potential borrowers.

The double hurdle model considers that the borrower households must pass through two separate hurdles. Firstly, in the participation stage, the decision on whether or not to borrow from institutional sources for growth-enhancing purposes is made, which is termed as the Selection equation.

$$Y_j^* = Z_j \mu + \varepsilon_j \quad (j = \text{number of borrower households}) \text{ [Participation decision]}$$

Where Y_j^* is a latent variable describing a household's decision to participate in the institutional credit market to borrow for growth-enhancing purposes. ε_j is the error term which is assumed to be independently distributed with bivariate normal distribution, $\varepsilon_j \sim N(0, 1)$. Z_j is the vector of control variables explaining the participation decision of j^{th} borrower households

Secondly, the decision is made with respect to the level of institutional loan amount taken for growth-enhancing purposes, which is termed as the Outcome equation.

$$\hat{Y}_j = X_j \gamma + v_j \quad \text{[Outcome decision]}$$

$$Y_j = \hat{Y}_j (\text{if } \hat{Y}_j > 0)$$

$$= 0 \quad (\text{otherwise})$$

Where $\hat{Y}_j$ is the latent variable describing institutional borrower's extent of institutional credit for growth-enhancing purposes. Y_j is the observed dependent variable describing the borrower's extent of institutional credit for growth-enhancing purposes. X_j is the vector of variables explaining the outcome decision. v_j is the error term assumed to be independently distributed with bivariate normal distribution, $v_j \sim N(0, 1)$.

Cragg's double hurdle model is a two-step approach with a probit model for the probability of participation in the first stage and truncated normal regression in the second stage.

The model of this nature depends on the assumption of normality in the error terms. If this assumption does not hold then the maximum likelihood estimates will be inconsistent (Keelan *et al.*, 2009). The Box-Cox transformation is applied to account for the non-normality of errors. The study follows standard Box-Cox transformation (Box and Cox, 1964) defined as

$$Y^{(t)} = \frac{Y^\lambda - 1}{\lambda}$$

In particular,

$$Y^{(t)} = \begin{cases} Y - 1 & \text{if } \lambda = 1 \\ \ln(Y) & \text{if } \lambda = 0 \\ 1 - \frac{1}{Y} & \text{if } \lambda = -1 \end{cases}$$

4.2.3.2 To study the Institutional loans in perpetuity: Instrumental Variable Probit Model

The second objective of this chapter is to examine the pattern of institutional loans in perpetuity among the institutional borrowers in India and classify the socio-economic determinants that affect the probability of institutional loans in perpetuity in India. The study uses an Instrumental variable (IV) estimator for the dichotomous dependent variable with continuous endogenous regressor on the assumption that one of the regressors is correlated with the error term. It fits the probit model with maximum likelihood estimation where one of the regressors is endogenously determined.

The model can be written as

$$Y_{1i}^* = Y_{2i}\beta + X_{1i}\mu + u_i \quad (1)$$

$$Y_{2i} = X_{1i}\Pi_1 + X_{2i}\Pi_2 + v_i \quad (2)$$

Where $i = 1, 2, \dots, N$

Y_{1i}^* is not directly observable, instead, Y_{1i} is observable, where,

$$Y_{1i} = 0 \text{ if } Y_{1i}^* < 0$$

$$= 1 \text{ if } Y_{1i}^* \geq 0$$

Y_{2i} = vector of endogenous variable

X_{1i} = vector of exogenous variables

X_{2i} = vector of additional instruments

β and μ = vector of parameters

Π_1 and Π_2 = matrices of reduced-form parameters

The equation of Y_{2i} is written in reduced form.

Thus, it is clear that Y_{2i} appears in equation (1) but Y_{1i}^* does not appear in equation (2).

This model is derived under the assumption that the error terms (u_i, v_i) is independent and identically distributed multivariate normal for all i .

4.2.4 Explanatory and Response variables used in both the Models

Eight socio-economic determinants have been used as explanatory variables in both the models from NSS 70th round survey data (AIDIS). These factors are selected from prior research and the reason behind the selection of the variables with detailed description is presented in Table 4.2. and 4.3. These are Sector dummy, Religion dummy, Education status, Occupation status, Asset owned, rural land owned by rural as well as urban households, household size, Sex dummy.

In addition to these variables, two state-level dummy variables have been used in the Box-Cox double hurdle model only. These are state categories for Asset-Gini coefficient and

state categories for Financial Inclusion Index. For Asset-Gini coefficients^{4,5}, for each state of India has been calculated from the existing data itself. Then the States has been categorized into four different groups⁶. The Financial inclusion index (FII) has been calculated state-wise to following the methodology used by Sarma (2008). Three dimensions have been considered in preparing state-level FII, motivated by Goel and Sharma (2017). The detailed calculation of FII has been described in Appendix (4.A.1). The states of India have been categorized into four different groups with respect to FII⁷.

Credit agency dummy is the binary response variable of the selection or participation equation which measures the probability of institutional borrowing and loan amount is the continuous response variable of the outcome equation of the Box-Cox double hurdle model. In Instrumental Variable Probit Model, we assume that unobservable shock that affects institutional borrower's decision to induce himself/herself in perpetuity also affects the outstanding institutional loan amount. Therefore, outstanding loan amount, a continuous variable, has been treated as an endogenous regressor and, the study uses the occupation status of the household head⁸ as an instrument. Institutional Loan in perpetuity is a binary response variable which is unity if there exist institutional loans in perpetuity in Instrumental Variable Probit Model. Table 4.4 shows percentages of various categories of all the explanatory variables.

Table 4.2: Explanatory variables used in the study

Variable Name	Reason for selection	Related Studies
A. Socio-economic Indicators		
Place of Residence (RESI_HH)	Whether institutional borrower resides in the rural or urban sector may affect the size of institutional loan for growth-enhancing purposes and the tendency of institutional loans in perpetuity may vary across the regions in India	Hundie <i>et al.</i> (2004), Purkayastha (2001) and Poddar <i>et al.</i> (2019)
Religion of Household Head (REL_HH)	Whether institutional borrower belongs to Hindu or Non-Hindu may affect the research questions of the study.	Kumar <i>et al.</i> (2017), Duy <i>et al.</i> , (2012,) and Poddar <i>et al.</i> (2019)
Education Level of Household Head (EDU_HH)	Education level influences institutional borrowers' ability to assess risk in case of multiple borrowing and the educated	Hundie <i>et al.</i> (2004),Duy <i>et al.</i> , (2012), and Poddar <i>et al.</i> (2019)

Variable Name	Reason for selection	Related Studies
	borrower may utilize available information regarding the effective diversification of available loan amount for growth-enhancing purposes	
Occupation Status of Household Head (OCCU_HH)	Occupation status of the household is an important indicator in decision making over the available resources in terms of institutional loan	Banerjee <i>et al.</i> (2015) and Poddar <i>et al.</i> (2019)
Asset value owned (ASSET)	The asset level of the household is an important indicator in the case of institutional borrowing as asset level can be used as financial strength in case of decision making.	Banerjee <i>et al.</i> (2015) and Poddar <i>et al.</i> (2019)
Rural land value owned (RURALLAND)	Like asset level, land-owning status has a significant impact on institutional borrowing in India	Banerjee <i>et al.</i> (2015) and Poddar <i>et al.</i> (2019)
Sex of Household Head (SEX_HH)	Gender differentials are also an important aspect in this regard.	Hundie <i>et al.</i> (2004), Duy <i>et al.</i> , (2012) and Poddar <i>et al.</i> (2019)
Household size (SIZE_HH)	It will be interesting to see how household size affects the research question of this study	Hundie <i>et al.</i> (2004),Duy <i>et al.</i> , (2012) and Poddar <i>et al.</i> (2019)
B. State Level Indicators		
State dummy Asset Gini Coefficient (ASSETGINI)	It will be interesting to identify to what extent the institutional borrowers in asset inequality states borrows institutional loans for growth-enhancing purposes	Poddar <i>et al.</i> (2019)
State dummy Financial Inclusion Index (FII)	The Reserve Bank of India had undertaken several new initiatives during the year for strengthening credit delivery mechanisms and also enhancing financial inclusion. It will be interesting to see whether the expected size of institutional loan for growth-enhancing purposes have increased or not among the institutional borrower in financial inclusive states in India	RBI (2018)

Note: Variable names used in this study are in parenthesis

Table 4.3: Summary Statistics of Explanatory and Response Variables

Variable Name	Variable Description	Mean	Standard Deviation	Min	Max
3. Set of Explanatory Variables					
D. Socio-economic Factors					
RESI_HH	=1 if household resides in the urban area, 0 otherwise	0.42	0.50	0	1
REL_HH	=1 if Hindu, 0 otherwise	0.80	0.42	0	1
EDU_HH	A categorical variable of household head's level of education; three categories-illiterate, less than secondary level and secondary and higher level. Illiterate is the reference category	0.28	0.45	0	1
		0.30	0.46	0	1
OCCU_HH	Household head's type of occupation; four categories- = 0 if No-employment, = 1 if Self-employment in agriculture and non-agriculture, = 2 if Regular salary/ wage earner and = 3 if Casual labour. No employment is the reference category	0.48	0.5	0	1
		0.18	0.39	0	1
		0.19	0.40	0	1
ASEET	Natural log of (1+ total asset value owned by	12.6	2.87	0	17.0

Variable Name	Variable Description	Mean	Standard Deviation	Min	Max
	the households). Total asset value combines the value of building, live stocks, transport, agricultural machinery, business equipment gold and ornaments, and financial assets like shares and debentures.				
RURALLAND	Natural log of (1+ total land value owned by the rural as well as urban households).	7.78	6.14	0	17.0
SEX_HH	Dummy variable equal to 1 if household head is male, 0 otherwise	0.88	0.33	0	1
SIZE_HH	Natural log of (1+ total size of household).	1.67	0.40	0.70	3.66
E. State-level Indicators					
Four categories for all three state-level indicators. Category 1 corresponds to the states with the lowest quartile whereas category 4 corresponds to the upper quartile of the same. Category 2 and category 3 corresponds to the inter-quartile ranges respectively. Category 1 is the reference category.					
ASSETGINI	A categorical variable of states of India with respect to Asset-Gini coefficient.	0.18	0.38	0	1
		0.25	0.43	0	1
		0.28	0.45	0	1
FII	A categorical variable of states of India with respect to Financial Inclusion Index (FII).	0.23	0.42	0	1
		0.32	0.47	0	1
		0.10	0.30	0	1
4. Set of Response Variables					
PROB_GEIB	Probability of growth-enhancing institutional borrowing = 1 if the household borrows from institutional sources for growth-enhancing purposes	0.72	0.45	0	1
LOANSIZE_GEIB	The expected size of institutional loans borrowed for growth-enhancing purposes. Natural log of (1+ amount of institutional loans borrowed for growth-enhancing purposes) among the institutional borrowers taking loans for growth-enhancing purposes	10.77	1.86	0	14.43
PROB_ILP	Probability of Institutional Loan in perpetuity among institutional borrowers =1 if there exist institutional loans in perpetuity	.03	0.16	0	1
LOANSIZE_OUT	Size of outstanding Institutional loan as on date of the survey. Natural log of (1+amount of outstanding institutional loans)				
Total Surveyed Households (In numbers)	103,216				
Total Institutional Borrowers (In numbers)	40,433				
Total Institutional Borrowers, taken loans for growth-enhancing purposes	27,946				

Source: NSS 70th round except for FII. Data sources for FII are RBI, 2013 and Handbook of Indian Insurance Statistics, 2012-13

Table 4.4: Column-wise percentages of categories of Explanatory variables in 2013 (Column-wise percentages)

Variables (1)	Categories (2)	Total respondents (3)
RESI_HH	Rural	56.39
	Urban	43.61
REL_HH	Hindu	77.73
	Non-Hindu	22.27
EDU_HH	Not Literate	41.33
	Less than Secondary	27.88
	Secondary and more	30.79
OCCU_HH	Self-employment	14.17
	Regular salary/ wage earner	47.57
	Casual labour	19.26
	Not employed	18.99
SEX_HH	Male	87.88
	Female	12.12
FII	Category 1	34.83
	Category 2	23.06
	Category 3	32.09
	Category 4	10.02
ASSETGINI	Category 1	27.32
	Category 2	16.83
	Category 3	28.49
	Category 4	27.36
Total Households (In numbers)	103,216	

Source: NSS 70th round except for FII. Data sources for FII are RBI, 2013 and Handbook of Indian Insurance Statistics, 2012-13

The correlation matrix among the explanatory and response variables is given in Table 4.5-4.6. The tables show that state categories, in respect of FII and asset inequality are not highly associated with each other, so these state categories can be retained altogether in the model. Further, Table 4.7 represents the Tetrachoric correlation among all the binary variables, considered in the study. The table reflects that these variables are not highly associated with each other, except that place of residence and land-owning status are moderately associated.

Table 4.5: Cramer's V of Amount of Institutional Borrowing for growth-enhancing purposes and Institutional Loan in perpetuity between the explanatory variables

Explanatory Variables	Institutional borrowing for growth-enhancing purposes (GEIB)	Institutional Loan in perpetuity (ILP)
RESI_HH	-0.11	0.02
REL_HH	0.05	0.0004
EDU_HH	0.01	0.04
OCCU_HH	0.22	0.02
SEX_HH	0.07	0.004
FII	0.05	-
ASSETGINI	0.07	-

Source: NSS 70th round except for FII. Data sources for FII are RBI, 2013 and Handbook of Indian Insurance Statistics, 2012-13

Table 4.6: Kendell's tau-b among the state dummy

	FII	ASSETGINI
FII	1	----
ASSETGINI	0.26	1

Source: NSS 70th round except for FII. Data sources for FII are RBI, 2013 and Handbook of Indian Insurance Statistics, 2012-13

Table 4.7: Tetrachoric - correlation among the binary variables

	GEIB	ILP	RESI_HH	REL_H H	SEX_H H
GEIB	1	----	----	----	----
ILP	0.78	1	----	----	----
RESI_HH	-0.18	-0.02	1	----	----
REL_HH	0.10	-0.03	-0.13	1	----
SEX_HH	0.15	-0.02	-0.06	0.06	1

Source: NSS 70th round

The following sections will report the results of the Box-cox double hurdle model and Instrumental variable probit model.

4.3 Results of the Econometric Analysis

4.3.1 Results of the Box-Cox Double Hurdle Model to estimate size and probability of growth-enhancing borrowing

The coefficients estimated in the outcome equation of the Box-Cox Double Hurdle model are not directly interpretable. To obtain the effects of covariates on the model, we report the marginal effects that give the conditional mean estimates of the dependent variable (y) with respect to different explanatory variables (x). Thus, conditional mean estimates of the extent of institutional credits used for growth-augmenting purposes with respect to different socio-economic determinants will be captured by the marginal effects. Here, the study first discusses the results of the participation or selection equation and then in the next subsection, the marginal effects of the outcome equation will be discussed. Column 2 and 3 of Table 4.8 depicts the results of selection and outcome equation respectively. We report only the explanatory variables that affect the response variable at a 1% level of significance.

4.3.1.1 Results of Selection Equation

It shows that the PROB_GEIB significantly increases for RESI_HH, which means urban households are more prone towards growth-enhancing institutional borrowing compared to their rural counterpart in India. SIZE_HH and EDU_HH also significantly increases PROB_GEIB. Literate households might have acquired proper financial knowledge which leads them to growth-enhancing institutional borrowing in India.

Further, PROB_GEIB significantly increases for REL_HH, SEX_HH, ASSET, and RURALLAND. That means, the likelihood of institutional borrowing for growth-enhancing purposes significantly increases for Hindu and male household heads as well as for the asset and rural land-owning household heads in India. The plausible explanation might be that asset level and rural land ownership give the financial strength to the institutional borrowers to borrow institutional loans for growth-enhancing purposes. These can be used as collateral while borrowing from institutional sources.

Self-employed household heads are more likely to take institutional credits for growth-enhancing purposes as they are always in constant need of working capital. On the other side, household heads, employed as casual labourers are less likely to take institutional borrowing for growth-enhancing purposes indicating that access to institutional credit might be very limited for these household heads (Verick, 2006).

ASSETGINI and FII also significantly increases PROB_GEIB. That means, the likelihood of institutional borrowing for growth-enhancing purposes significantly increases among the borrowers in states with higher levels of financial inclusion than the borrowers in category 1 states. The better availability of the financial instruments in the financially inclusive states (Punjab, Gujrat, Madhya Pradesh, and Maharashtra, etc.) encourages borrower households to borrow institutional credit for growth-enhancing purposes. Also, the probability of taking institutional credit for growth-enhancing purposes significantly

increases for the households in all the states with a higher level of asset inequality (Bihar, West Bengal, Andhra Pradesh, Tamil Nadu, etc.) than the reference category (category 1) in India.

4.3.1.2 Results of Outcome Equation

We find that the expected size of institutional loans borrowed for growth-enhancing purposes (LOANSIZE_GEIB) significantly increases for urban households by 72% than their rural counterpart in India. This result is in accordance with the results of the selection equation. The LOANSIZE_GEIB is also higher for Hindu and male household heads by 52% and 58% than non-Hindu and female household heads respectively. This is in contrary to the common belief that women household heads invest borrowed funds more efficiently in productive activities (Brau and Woller, 2004; Pitt and Khandker, 1998). In this regard, Duy *et al.* (2012) showed that the loan amount is positively related for male borrowers in rural Vietnam.

ASSET and RURALLAND significantly increase the LOANSIZE_GEIB by 12% and 8% respectively. Earlier, Duy *et al.* (2012) showed that asset level positively affects loan amount in rural Vietnam and the loan sizes in group-based schemes are higher for the households with more land. Thus, we can conclude that wealthy rural land-owning households prefer to finance their expenditure for growth enhancement purposes from the borrowed fund without exhausting their own assets but through borrowing against these assets.

In line with the observations from selection equation estimation, the outcome equation shows that SIZE_HH significantly increases LOANSIZE_GEIB by 143%. Earlier Duy *et al.* (2012) showed that the individual borrower's loan size is positively affected by smaller family size. Although Poddar *et al.* (2019) showed that household size significantly increases the size of institutional loans borrowed for non-production purposes. The possible explanation might be that with the increase in household size, the liability for consumption

smoothing of the household will increase. Because of this liability, these households might only take institutional credit for growth-enhancing purposes.

EDU_HH also significantly increases LOANSIZE_GEIB. A higher educational level of the household head also increases the expected size of growth-enhancing institutional credit in the outcome equation. This indicates that the education level of the household head is an important determinant for the households to borrow their institutional loans for growth-enhancing purposes.

LOANSIZE_GEIB significantly increases for self-employed household heads by 131% and decreases for household heads, employed as casual labourers by 38%, compared to that of the unemployed household head. In this regard, Williams and Gurtoo (2011) and Webster and Fidler (1996) addressed the issue that casual labourers lack access to formal credit and savings services. This might be the reason that likelihood as well as the extent of institutional credit borrowed for growth-enhancing purposes significantly decreases for casually employed household heads. On the other hand, the explanation is the same for the self-employed household heads as in the selection equation. Thus, the occupational status of the household head plays an important role in this context.

Next, LOANSIZE_GEIB significantly increase for the borrower households residing in the states with higher levels of financial inclusion in India than that of the reference category (category 1). Combining this result with the selection equation, we conclude that the higher the financial inclusion level of the states, the greater is the likelihood and extent of growth-enhancing institutional borrowing. Basically, due to financial inclusion, access to institutional credit in India has increased rapidly (RBI, 2018) which in turn leads to an increase in better availability of formal financial instruments across India.

Lastly, LOANSIZE_GEIB significantly increases among the households in the states with higher asset inequality. This may be because, in the states with higher asset inequality, there exists a few institutional borrowers who are the major asset holders and they are contributing to this positive result.

Table 4.8: Estimations of Box-Cox Double Hurdle Model

Response Variables (1)		PROB_GEIB (2)	LOANSIZE_GEIB (3)
Explanatory Variables	Reference Category	Selection Equation	Outcome Equation
		Coefficient	Marginal Effects (dy/dx)
RESL_HH	Rural	.11*** (.013)	.72*** (.06)
REL_HH	Non-Hindu	.14*** (.010)	0.52*** (.04)
SEX_HH	Female	.13*** (.014)	0.58*** (.06)
RURALLAND	-	.02*** (.001)	.09*** (.004)
ASSET	-	.03*** (.0007)	0.12*** (.003)
SIZE_HH	-	.33*** (.010)	1.43*** (.045)
EDU_HH	Not Literate		
Less than Secondary		.07*** (.010)	0.35*** (.04)
Secondary and more		.07*** (.011)	0.58*** (.05)
OCCU_HH	Unemployment		
Self-employment		.34*** (.013)	1.31*** (.05)
Formal		-.01 (.015)	.03 (.06)
Informal		-.04*** (.016)	-0.38*** (0.06)
FII	Category 1 (Less than 25%)		
Category 2		.11*** (.013)	0.38*** (.05)
Category 3		.10*** (.011)	0.54*** (.05)
Category 4		.19*** (.015)	0.88*** (.07)
ASSETGINI	States with the lowest inequality (Less than 25%) Category 1		
Category 2		.03*** (.015)	0.23*** (.06)
Category 3		.19*** (.013)	0.81*** (.05)
Category 4		.19*** (.012)	0.76*** (.05)
Constant			-1.81 (.027)
Insigma ⁹ _cons			0.21 (.027)
/sigma			1.24 (.003)
Wald chi2(17)			17227.69 Prob> chi2 = 0.00
Log pseudo-likelihood			-134241.5
	Number of observations = 103,216		AIC ¹⁰ = 268557 BIC ¹¹ = 268910.1

Notes: *** Significant at 1% (p < 0.001)

Robust Standard errors are in parenthesis in the selection equation.

Delta-method standard error in parenthesis in the outcome equation

Source: NSS 70th round except for FII. Data sources for FII are RBI, 2013 and Handbook of Indian Insurance Statistics, 2012-

4.3.2 Results of Instrumental Variable Probit Model to estimate the probability of incidence of Institutional Loan in Perpetuity

The estimated result of the Instrumental variable probit model among the institutional borrowers has been summarized in Table 4.9. In this case, the size of outstanding loans (LOANSIZE_OUT), a continuous variable, has been treated as an endogenous regressor and OCCU_HH acts as an instrument in the model. Column 2 reports first-stage regression results of the parameters of reduced-form equations that depict relationships between endogenous variable (LOANSIZE_OUT) and instruments and column 3 shows the factors that affect the probability of Institutional Loan in perpetuity among institutional borrowers (PROB_ILP). Only the explanatory variables that affect the response variable at a 1% level of significance will be reported here. Here, the coefficient denotes the partial effects of the explanatory variable on the response variable, after controlling all other explanatory variables.

Column 2 in Table 4.9 is the first stage regression showing that all the instruments significantly affect LOANSIZE_OUT. More specifically, the size of the outstanding loan significantly increases for urban, Hindu, male, asset, and rural land-owning as well as an educated, self-employed and regular wage earner or salaried household heads.

Column 3 in Table 4.9 is the second stage regression which shows that PROB_ILP significantly increases for RESI_HH. That means the urban population is more prone to institutional loans in perpetuity vis-à-vis the rural population. The implication might be that in rural areas, mostly, institutional loans are taken by agriculturalists for agricultural purposes. Now, in India, farm loan waiver packages have been implemented by both the central as well as state governments to provide relief to farmers in case of crop failure (Mitra *et al.*, 2017) and to insulate the agriculture sector from any kind of crisis (Subbarao, 2009). Before 2012, the Agricultural Debt Waiver and Debt Relief (ADWDR) Scheme has been announced by the central government in 2008. Owing to these schemes, agricultural loans are

usually written off in India which results in no unpaid institutional loans for the rural population. Thus, this kind of policy intervention may have resulted in the above findings. EDU_HH significantly increases PROB_ILP for both categories. This means the higher educational level of the household head has a positive impact on institutional loans in perpetuity. Both of the above results are very alarming from the policy point of view. Next, REL_HH, ASSET as well as RURALLAND plays a positive and significant impact on PROB_ILP. Finally, LOANSIZE_OUT significantly decreases PROB_ILP. That means, institutional borrowers who have a higher level of the outstanding loan, are less prone to borrow new institutional loans, keeping their previous institutional loans unpaid. The reason might be that the need for a new institutional loan may have decreased and this also lowers the level of debt trap among the institutional borrowers.

Table 4.9: Estimations of Instrumental Variable Probit Model

Response Variable (1)		LOANSIZE_OUT (2)	PROB_ILP (3)
Explanatory Variables	Reference Category	Coefficient	Coefficient
RESI_HH	Rural	2.06*** (.05)	1.28*** (.04)
REL_HH	Non-Hindu	.10*** (.04)	-.04 (.03)
SEX_HH	Female	.26*** (.06)	-.03 (.04)
RURALLAND	-	.01*** (.004)	.01*** (.002)
ASSET	-	.009*** (.003)	.03*** (.002)
SIZE_HH	-	.20*** (.05)	.005 (.03)
EDU_HH	Not Literate		
Less than Secondary		-.23*** (.04)	.10*** (.03)
Secondary and more		.45** (.04)	.19*** (.03)
LOANSIZE_OUT		-	-0.32*** (.02)
OCCU_HH	Unemployment		
Self-employment		0.12*** (.05)	
Regular salary/ wage earner		.41*** (.06)	
Casual labour		-.57*** (.07)	

Response Variable (1)		LOANSIZE_OUT (2)	PROB_ILP (3)
Explanatory Variables	Reference Category	Coefficient	Coefficient
Constant		7.62 (.11)	.48 (.25)
Wald test of exogeneity (corr = 0):		chi2(1) = 22.04 Prob > chi2 = 0.0000	
Wald chi2(9)		2473.58 Prob> chi2 = 0.00	
Log pseudo-likelihood		-112959.35	
Number of observations = 40433		AIC ¹² = 225966.7	BIC ¹³ = 226173.3
Instrumented	LOANSIZE_OUT		
Instruments	RESI_HH, REL_HH, SEX_HH, RURALLAND, ASSET, SIZE_HH, OCCU_HH, EDU_HH		

Notes: *** Significant at 1% ($p < 0.001$)
Robust Standard errors are in parenthesis
Source: NSS 70th round

The second stage regression has common variables as in the first stage IV regression (to avoid omitted variable bias), but one needs to interpret the signs of these common variables carefully. The influence of these common variables on the probability of institutional loans in perpetuity (PROB_ILP) comes either indirectly through outstanding loan size or directly. As a result, a variable may influence outstanding loan positively (hence seems to influence PROB_ILP negatively too since ILP has a negative relation with outstanding loan size), but once this influence is taken care of, the residual influence of that variable (or the direct effect) may show a different sign on the PROB_ILP (for example sex or religion variables).

4.4 Policy Implications

The present chapter identifies the socio-economic determinants that affect the expected size of institutional borrowing for growth-enhancing purposes using the Box-Cox double hurdle model.

The results of the Box-cox double hurdle model indicate that the probability, as well as the expected size of growth-augmenting institutional borrowing significantly increases for urban households in India. This indicates the fact that policymakers should take some policies to encourage the growth-enhancing institutional borrowing in rural India, which comprises

almost 68.9% of the Indian population according to the latest 2011 census of India (Chandramouli, 2011). Coupled with this, it has been found that financial inclusion in states also improves growth-enhancing institutional borrowing among the households in those states in India. Thus, access to institutional credit in all parts of India needs to be encouraged. Also, commercial banks should encourage all sections of the population to take credit for capacity creation needs. A possible way may be the simplification of the loan application process to attract all sections of the population. Also, the expected size of institutional credit borrowed for growth-augmenting purposes significantly increases for self-employed household heads. Thus, access to institutional credits should be encouraged for the self-employed household heads in India.

The second research question of this study has dealt with an important aspect of the institutional credit system and it questions whether multiple borrowing is beneficial or not because multiple borrowing raises the possibility of the institutional loans in perpetuity. Results of Instrumental variable probit model shows that several socio-economic variables, like the place of residence, religion, and most importantly education level of the household head have a positive impact on the institutional loan in perpetuity in India. These results pose a serious concern for India regarding the consequences of multiple borrowing and institutional loans in perpetuity. Also, the asset level, as well as rural land value of the household head plays a positive and significant impact on the institutional loan in perpetuity. In this regard, institutional credit sources should be careful enough before disbursing new loans to the asset and rural land-owned households so that the same collateral cannot be used as a mortgage or security to the different institutional credit agencies.

4.5 Conclusions

This study has strengthened the literature on institutional credit by addressing two important issues. These are the size of institutional borrowing for growth-enhancing purposes and

institutional loans in perpetuity in case of multiple institutional borrowing. Escalation of both of these issues may contribute to the debt trap and then loan default among the institutional borrowers. The limitation of this study is that the incidence of loan default is beyond the scope of the study as the NSS data does not give any data in this regard. Therefore, an extensive study taking into account both of these issues and loan default may frame better policies to curb the bad loans in India.

Appendix 4A

4.A.1 Calculation Methodology of Financial Inclusion Index (FII)

To construct state-level FII, this study has followed the methodology used by Sarma, (2008). Three dimensions have been considered in preparing state-level FII, motivated by Goel and Sharma, (2017).

FII combines three dimensions¹⁴.

- 1) Banking Penetration Index (BPI) = Number of deposit accounts per 1000 population
- 2) Availability Index (AI) = Bank branches per 1000 population
- 3) Access to Insurance Index (AII) = Number of Life Insurance Offices per 1000 population

Firstly, we compute the dimension index using the following formula:

$$\text{Dimension Index (D)} = w \left[\frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}} \right]$$

Where W is the weight attached to the dimension, indicating the relative importance of the dimension in quantifying the inclusiveness of the financial system (Sarma, 2008). It ensures that $0 \leq D \leq W$. Higher the value of DI, the higher India's achievement in a particular dimension.

Following Sarma, (2008), in the n-dimensional space, the point $O = (0, 0, 0, \dots, 0)$ represents the point indicating the worst situation while the point $W = (w_1, w_2, \dots, w_n)$ represents the highest achievement in all dimensions. The index of financial inclusion index, FII, for a country, is then measured by the normalized inverse Euclidean distance of point D from the ideal point $I = (w_1, w_2, \dots, w_n)$.

$$FII = 1 - \frac{\sqrt{(W_1 - D_1)^2 + (W_2 - D_2)^2 + (W_3 - D_3)^2}}{\sqrt{W_1^2 + W_2^2 + W_3^2}}$$

The numerator of the second component is the Euclidean distance of D from the ideal point W, normalizing it by the denominator and subtracting by 1 gives the inverse normalized distance. The normalization is done to make the value lie between 0 and 1 and the inverse distance is considered so that a higher value of the FII corresponds to higher financial inclusion. The study has considered all dimensions to be equally important in measuring FII in India, so $W = 1$ for all dimensions. In this case, the ideal situation will be represented by the point $I = (1,1,1,...,1)$ in the n-dimensional space

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² Loan extended by formal credit sectors like banks, co-operative institutions, and semi-formal credit sectors like micro-finance institutions (MFIs), self-help groups (SHGs) constitutes Institutional loans.

³ Limitations of the Tobit model results in the development of the number of generalizations of the Tobit model, one of them is the double hurdle model, designed by Cragg (1971)

⁴ Gini coefficient measures of statistical dispersion. It represents the income and wealth distribution of a nation and is used to measure inequality.

⁵ The formula used to measure the Gini coefficient is

$$G = 1 + (1/N) - [2/(m \cdot N^2)] [\sum (N - i + 1) Y_i]$$

Where G represents the Gini coefficient. It has been considered a population $i = 1, \dots, N$ with arithmetic mean of income is m .

⁶ Category 1 corresponds to the states with the lowest quartile whereas category 4 corresponds to the upper-most quartile of the same. Category 2 and category 3 correspond to the inter-quartile ranges

⁷ Category 1 corresponds to the states with the lowest quartile whereas category 4 corresponds to the upper-most quartile of the same. Category 2 and category 3 correspond to the inter-quartile ranges

⁸ The order condition for identification requires that the number of instrument variables needs to be at least as great as the number of endogenous variables.

⁹ It reports the estimated standard deviation of the error term in the outcome model.

¹⁰ Akaike information criterion

¹¹ Bayesian information criterion

¹² Akaike information criterion

¹³ Bayesian information criterion

¹⁴ The Principal Component Analysis (PCA) hasn't been used in constructing the FII

Chapter 5: Borrowing & Spending behaviour: Evidence from Rural West Bengal, India

5.1 Introduction

The present chapter discusses the borrowing and spending behaviour of the borrower households. The chapter also explores the role of financial literacy of the households on their spending behaviour of loan proceeds. Financial literacy emerges as a growing concern now-a-days (Hilgert *et al.*, 2003). The relationship between financial literacy with financial behaviour and financial planning has been well established in the existing literature (Lusardi and Mitchell, 2008; Lusardi and Mitchell, 2011; Lusardi, 2012; Jappelli and Padula, 2013). Thus, it can be hypothesized that financial literacy will be an important determinant to affect the spending decisions of the loans taken by the households.

5.2 Background

5.2.1 Borrowing behaviour

An increase in household debt raises financial fragility as well as instability among the borrower households (Rinaldi and Sanchis-Arellano, 2006). Mpogole *et al.* (2012), Taylor (2011), and Srinivasan (2010) discussed that multiple borrowing has become a very common phenomenon. Johnson (2004) and Krishnaswamy (2007) hypothesized that the households are borrowing from multiple microfinance institutions (MFIs) and using one loan to repay others. Thus, the incidence of multiple borrowing is creating over-indebtedness among the households. In this regard, Poddar *et al.* (2020) found that urban, educated, land-owning household heads are more prone to borrowing to repay existing and old debt.

5.2.2 Spending Behaviour of loan proceeds

Johnson and Rogaly (1997) admitted the fact that as money is fungible there is a potential for the borrowers to use the borrowed funds for purposes other than that was stated. Literature (Sharma and Kumawat, 2014; Kishore *et al.*, 2009; Oboh and Ekpebu, 2011; Chavan *et al.*, 2016) found evidence of loan diversion by the institutional borrowers to meet up daily consumption requirements, social commitments, sickness of the respondent, illness, and unemployment of the respondent's spouse, and educational needs of the children. Asnake (2015) showed that borrowers with longer borrowing experiences (more than seven years) perceived loan diversion as a very common phenomenon. Khaleque (2011) and Banerjee *et al.* (2015) identified the association between various socio-economic and demographic characteristics of the borrowers and the incidences of loan diversion. Poddar *et al.* (2019) also showed that urban, literate and formally employed household heads are more prone towards institutional borrowing for non-production purposes. Literature (Eswaran and Kotwal, 1990; Pearlman, 2012) also pointed out that consumption smoothing may be a cause for loan diversion. Asnake (2015) and Awoke (2004) reported that loan diversion is one of the reasons for loan default as it inevitably reduces the production potential.

The analysis is based on a household survey covering two districts of West Bengal, India. The objective of the chapter is (1) to identify the socio-economic and political determinants of the probability of loan diversion among the institutional borrowers, (2) to find out whether any association exists between financial literacy and probability of loan diversion, and (3) To investigate joint occurrences of incidence of indebtedness and loan diversion (Model 1), the incidence of multiple borrowing and loan diversion (Model 2), the incidence of indebtedness and institutional borrowing (Model 3) and its socio-economic and political determinants.

In this chapter, loan diversion refers to the incidence where the institutional borrowers¹ use an entire loan or part of it for purposes other than that was stated at the time of borrowing. It occurs when there exists a clear deviation between the stated purpose of borrowing and actual loan utilization. Institutional loans are given for specified purposes, e.g., to meet working capital, investment needs in the farm as well as in non-farm business with the strict presumption that they will be used for the stated purposes only. These purposes can be referred to as ‘*productive*’ as they directly relate to the enhancement of production capacity or production efficiency. In this regard, the incidence of loan diversion refers to the use of a *productive* loan taken from the formal sources for non-production purposes such as household expenditures, the celebration of social ceremonies as well as repayment of old loans. Thus, the issue is important because misuse of productive loans due to diversion may increase the incidence of loan default. Its decline is therefore not only desirable but also indirectly signals an improvement of the loan repayment rate and thereby smooth functioning of the credit market of a country. Therefore, the issue is important from the policy perspective of a developing country

This chapter makes four important contributions to the existing literature. *First*, we have found a few studies (Banerjee *et al.*, 2010a; Banerjee *et al.*, 2015) that identifies the association between political participation with individual borrowing. In addition to identifying the association between political participation with individual borrowing, this chapter also analyzes the relationship between political participation and spending behaviour. *Second*, the study will identify whether deprivation, as represented by a suitable index has any effect on individual borrowing and spending behaviour as well as indebtedness or not. *Third*, it will establish a strong link with financial literacy and spending behaviour of loan proceeds of the institutional borrowers. *Fourth*, the chapter will capture the effect of deprivation on borrowing and spending behaviour among the borrowers.

The rest of the chapter is organized as follows. The following section outlines the data and methodology used in the study. Section 5.4 represents the estimation results along with discussions of the results. Section 5.5 concludes with further discussion and potential issues.

5.3 Materials and Method

The chapter uses a primary rural household sample survey data of 1438 households drawn from the four villages randomly selected from two districts, North 24-Parganas and South 24-Parganas of West Bengal (WB), India. Villages Takipur and Sankchura from North 24-Parganas and villages Herobhanga and Chakchata from South 24-Parganas were randomly selected from the complete list of villages for each district. The survey design and sampling process are explained in Appendix 5.A.1. The duration of the survey was August 2015-July 2016. The survey questionnaire includes questions on socio-economic, financial, and political information. Demographic information of the respondents such as age, education, gender, religion, caste, whether hold BPL (below poverty line) card or job card, etc. has been collected. Economic information includes the occupation status, income, expenditure, and savings profile of households, household asset profile including agricultural landholding pattern. Financial information includes questions regarding financial planning, use of financial services like debit card, credit card, cheque book, internet, and mobile banking, etc. Apart from these, detailed information regarding the bank or post office account, deposit schemes, various insurance schemes, other savings deposit schemes like RD (recurring deposit), EPF (employee provident fund), PPF (public provident fund) etc. has been collected. In addition, details of loans taken from January 2014-July 2015 along with their actual uses have been captured. More specifically, the purpose of the loan taken, its sources, amount, interest rate, duration, collateral status, repayment status, etc. has been explored. To collect the information regarding loan diversion, actual uses of loan and percentage of loan used for the specified purposes have been collected. Political information of the respondents

such as whether an active supporter of political parties, participation in political rallies or meetings, etc. had been gathered.

The total sample size was 1438. After deleting the outliers using Mahalanobis multivariate² outlier detection technique, the final sample size was 1405. Among 1405 households, 923 (65.7%) household resides in South 24-Parganas and remaining 482 (34.3%) households are from North 24-Parganas district of WB. Among the total sample size, 39% household turns out to be borrowers. Among the borrower households, 34% are institutional borrowers. The incidence of loan diversion turns out to be 43% among the institutional borrowers. The data shows that the incidence of loan diversion poses a major concern from the policy perspectives as it indicates the diversion of productive financial assets.

5.3.1 Description of Data

Table 5.1 depicts socio-economic, demographic, and financial features across the sample. Here, it is to be noted that all the four villages belong to the rural sector. The socio-economic features of the above table are prepared based on the information collected from the principal earner of the sample households. Table 5.2 depicts the loan profile among the institutional borrowers. The data also shows that MFIs are the major source of institutional borrowing (65.22%) in the surveyed villages. Also, most of the institutional loans (82.07%) are given without any collateral. Finally, 43.48% of institutional borrowers are involved in the diversion of institutional loan use. Thus, it shows an alarming situation.

Table 5.1: Socio-economic, demographic, and financial profile across the sample

	Categories	Total (1)	Takipur (2)	Sankchura (3)	Herobhanga (4)	Chakchata (5)
Education of Principal earner	Illiterate	27.62	0.77	11.22	79.85	8.16
	Up to primary	28.19	17.86	22.14	48.81	11.19
	Up to secondary	33.88	31.32	15.87	32.36	20.46
	Up to higher secondary	3.84	26.79	10.71	41.07	21.43
	Higher secondary above	6.47	22.41	13.79	51.72	12.07
Occupation	Agricultural _Self	19.79	11.51	6.83	81.29	0.36

	Categories	Total (1)	Takipur (2)	Sankchura (3)	Herobhanga (4)	Chakchata (5)
categories of Principal earner	employed					
	Non -griculture_ Self-employed	21.78	19.32	17.61	35.23	27.84
	Regular wage salary	13.38	18.46	12.31	40.51	28.72
	Casual in Agriculture	6.33	34.83	46.07	19.1	0
	Casual in non- Agriculture	38.72	18.91	13.08	54.12	13.88
Caste of Principal earner	General	16.30	44.1	0	33.62	22.27
	SC/ST	28.11	9.9	0	54.06	36.04
	OBC	55.59	14.83	29.03	55.75	0.38
Religion of Principal earner	Hindu	55.52	22.69	14.74	37.82	24.74
	Muslim	44.48	12.64	17.92	68.96	0.48
Sex of Principal earner	Male	91.96	18.73	16.41	50.93	13.93
	Female	8.04	11.50	13.27	60.18	15.04
Job Card holding Status	No	55.44	23.36	12.71	39.28	24.65
	Yes	44.56	11.82	20.45	67.09	0.64
BPL card holding status	No	73.74	18.15	19.4	51.54	10.91
	Yes	26.26	18.43	7.05	52.03	22.49
Residence Status	No	1.42	10.00	10.00	45.00	35.00
	Yes	98.58	18.27	16.25	51.77	13.72
Agricultural land holding Status	No	77.58	16.88	11.47	55.41	16.24
	Yes	22.42	22.54	32.38	38.73	6.35
Toilet Facility	No	18.93	4.89	1.88	80.08	13.16
	Yes	81.07	21.25	19.49	45.04	14.22
Electricity Facility	No	15.73	5.43	2.26	81.45	10.86
	Yes	84.27	20.52	18.75	46.11	14.61
Use of ATM cum Debit Card	No	80.71	14.99	11.02	62.35	11.64
	Yes	19.29	31.37	37.64	7.01	23.99
Savings account holding Status	No	22.63	15.72	7.23	73.90	3.14
	Yes	77.37	18.86	18.77	45.17	17.20
Insurance holding Status	No	20	9.25	3.56	75.09	12.10
	Yes	80	20.37	19.31	45.82	14.50
Loan holding Status	No	61.21	5.70	8.95	70.81	14.53
	Yes	38.79	37.80	27.52	21.47	13.21
Total No. of Households		1405	255	227	726	197

Source: Primary Sample Survey

Note: (i) Column (1) and Column (2) to (5) provides column-wise and row-wise percentages of each parameter respectively

(ii) classification of occupation categories of the principal earner has been done on the basis of NSS (National Sample Survey of India) classification.

Table 5.2: Institutional loan profile among the institutional borrowers (data in percentages)

	Categories	Total (1)	Takipur (2)	Sankchura (3)	Herobhanga (4)	Chakchata (5)
Amount of Money Borrowed	Less than Rs. 6750	25	78.26	0.00	8.70	13.04
	Greater than Rs. 6750 and less than 12000	21.74	35.00	0.00	45.00	20.00
	Greater than Rs. 12000 and less than 20000	24.46	17.78	2.22	66.67	13.33
	Greater than 20000	28.8	5.66	1.89	50.94	41.51
Source of	MFI	65.22	20.83	0.00	45.83	33.33

	Categories	Total (1)	Takipur (2)	Sankchura (3)	Herobhanga (4)	Chakchata (5)
borrowing	Co-operatives	11.41	62	0.00	38	0.00
	Banks	23.37	53.49	4.65	37.21	4.65
Period of Borrowing	Less than 1 year	10	94.74	0.00	5.26	0.00
	1 year and above	90	26.06	1.21	47.27	25.45
Whether deposited any collateral	No	82.07	19.87	1.32	50.99	27.81
	Yes	17.93	93.94	0.00	6.06	0.00
Loan Diversion	No	56.52	6.73	0.00	73.08	20.19
	Yes	43.48	67.50	2.50	3.75	26.25
Total No. of Institutional borrower		184	61	2	79	42

Source: Primary Sample Survey

Note: Column (1) and Column (2) to (5) provides column-wise and row-wise percentages of each parameter respectively

Table 5.3: Difference in Stated use and Actual use of Institutional loan (In numbers)

		Stated Use	
		Fixed Investment	Working capital in agriculture and non-agriculture
Actual Use	Fixed Investment	11	2
	Working capital in agriculture and non-agriculture		1
	Household Expenditure	5	9
	Medical		1
	Education	1	
	Social Obligation	1	
	Both Working capital and Fixed Investments		6
	Both Working Capital and Household Expenditure		21
	Both Working capital and Medical expenses		5
	Both Working Capital and Social Obligation		4
	Both Working Capital and Education		10
	Both Working Capital and Repayment of old debt		1
	Misc. use other than stated one		2

Source: Primary Sample Survey

Column percentages are in parenthesis

Table 5.3 shows that the use of institutional loans is not limited in the stated purposes according to their loan applications. It demonstrates that institutional loans taken for working capital needs are mostly diverted either partly or fully. Moreover, most of the loan diversion occurs to meet up household expenditure. Interestingly, the incidence of loan diversion is

lower if institutional loans are taken for fixed investment purposes (new construction and repair of houses, investment to buy land, investment to construct a toilet, investment to buy business equipment, etc.).

Further, the two-sample proportion test (Table 5.4) reveals that proportions of multiple borrowing differ among those who have diverted loans and who do not at a 1% level of significance. Next, the t-test (Table 5.5) shows that mean of annual household expenditure and asset holding are significantly higher for the groups who have diverted loans than others at a 1% level of significance. Annual household savings is significantly higher for groups without incidence of loan diversion at a 1% level of significance. The economic rationale may be: the group who are diverting loans are involved in multiple borrowing and also have high average household expenditure and low savings compared to those who do not divert institutional loans even if they have higher asset levels. This indicates that this asset-rich group is more involved in conspicuous consumption leading to high expenditure and low savings financed by taking the number of loans as well as diverting production loans for non-production purposes. This consumerism along with the low level of savings leads to the lower level of formation of the productive asset for the economy. Also, diversion of production loan to non-production purposes coupled with multiple borrowing may lead these families towards a debt trap in the long run.

Table 5.4 Sample Proportion Test for Incidence of multiple borrowing among those who have diverted loans and who do not

Variable	Mean	Standard Error
Do not divert loan (0)	0.19	0.02
Diverted loan (1)	0.04	0.02
Ho: proportion of X_{1i} (having no loan diversion) – the proportion of X_{2i} (having loan diversion), where X is the incidence of multiple borrowing. 1 and 2 subscripts denotes no diversion and diversion groups respectively	Z value = 3.36 $\Pr(Z < z) = 0.9996$ $\Pr(Z > z) = 0.0008$ $\Pr(Z > z) = 0.0004$	

Source: Primary Sample Survey

Table 5.5: Two-sample t-test of relevant variables among those who diverted loans and who do not

Variables	Null Hypothesis	t value	Alternative Hypothesis		
	Ho: mean of Y_{1i} (having no loan diversion) – mean of Y_{2i} (having loan diversion), where Y = relevant identifying variable, 1 and 2 subscripts denote no diversion and diversion groups respectively.		Ha: diff < 0	Ha: diff $\neq$ 0	Ha: diff > 0
Annual Household Expenditure		-2.0108	Pr(T < t) = 0.0229	Pr(T > t) = 0.0458	Pr(T > t) = 0.9771
Total asset holding		-3.2480	Pr(T < t) = 0.0007	Pr(T > t) = 0.0014	Pr(T > t) = 0.9993
Annual Household Savings		2.6590	Pr(T < t) = 0.9957	Pr(T > t) = 0.0085	Pr(T > t) = 0.0043

Source: Primary Sample Survey

5.3.2 Econometric Methodology

5.3.2.1 Heckman Sample Selection Model

Institutional loan diversion is conditioned upon taking an institutional loan. Therefore, choosing only institutional borrowers among the sample households might lead to the sample selection bias (Heckman, 1979). The implication is that the household who did not borrow in the reference period can be a potential institutional borrower in the future. So, omitting these potential institutional borrowers underestimate the overall situation of institutional loan diversion in India by giving biased results. The Heckman sample selection model assumes that there exists an underlying relationship; the latent equation is given by

$$Y_j^* = X_j \beta + \epsilon_{1j} \quad (1)$$

Such that only the binary outcome given by the probit model is observed

$$Y_j^{Probit} = (Y_j^* > 0) \quad (2)$$

Now, the dependent variable is observed only if j is observed in the selection equation

$$Y_j^{Select} = Z_j \delta + \epsilon_{2j} \quad (3)$$

$$\epsilon_1 \sim N(0, 1)$$

$$\epsilon_2 \sim N(0, 1)$$

$$\text{Corr}(\epsilon_1, \epsilon_2) = \rho$$

Where X and Z are the vector of regressors that affect the probability of diversion and probability of institutional borrowing respectively. The model allows two equations simultaneously: a selection equation that runs probit regression to identify the probability of institutional borrowing by a household with a binary dependent variable; and a response equation that also runs a probit regression to identify the probability of loan diversion for those who had actually borrowed.

5.3.2.2 Bivariate Probit Model

The present chapter investigates joint occurrences of incidence of indebtedness and loan diversion (Model 1), the incidence of multiple borrowing and loan diversion (Model 2), the incidence of indebtedness and institutional borrowing (Model 3) using bivariate binary choice model (Greene, 1993). This chapter uses the Seemingly Unrelated bivariate probit model as regressors do not include endogenous variables in the model. Two simultaneous equations are specified as:

$$Y_1^* = X_1\beta_1 + u_1 \quad (Y_1^* \text{ is a latent variable}) \quad (1)$$

$$Y_1 = 1 \text{ if } Y_1^* > 0$$

$$= 0 \text{ otherwise}$$

Where X_1 denotes observed independent variables explaining the occurrence of a binary outcome, β_1 represents the respective parameters associated with the independent variables and u_1 denotes the random error term.

$$Y_2^* = X_2\beta_2 + u_2 \quad (Y_2^* \text{ is a latent variable}) \quad (2)$$

$$Y_2 = 1 \text{ if } Y_2^* > 0$$

= 0 otherwise

Where, X_2 denotes observed independent variables explaining the occurrence of binary outcome, β_2 represents the respective parameters associated with the independent variables and u_2 denotes the random error term.

It should be noted that as two binary dependent variables are explained by the same set of independent variables, thus, the error terms are dependent, and bivariate standard normal distribution applies (Benlagha and Karaa, 2017). Therefore, we obtain

$$E(u_1)=E(u_2)= 0, \text{var}(u_1) = \text{var}(u_2) = 1 \text{ and } \text{cov}(u_1, u_2) = \rho$$

To test whether the two models have to be jointly estimated, Wald test for the null hypothesis $\rho = 0$ will be applied (Benlagha and Karaa, 2017).

5.3.3 Explanatory and Response variables used in the Models

The summary statistics of all explanatory and response variables used in these models are depicted in Table 5.6. In addition to the socio-economic variables, two indices have been constructed. The Financial literacy index (FLI) and Deprivation score or index (DI) has been calculated and used in the Heckman Sample Selection model and Bivariate Probit model respectively. Detailed description with calculation is described in 5.A.2 and 5.A.3 respectively. Next, the correlation matrix between the explanatory and response variable is given in Table 5.7 and 5.8.

Table 5.6: Summary Statistics of Explanatory and Response Variables

Variable Name	Variable Description	Mean	Standard Deviation	Min	Max
Set of Explanatory Variables					
REL_PE	=1 if Hindu, 0 otherwise (Muslim)	0.56	0.50	0	1
CASTE_PE	=1 if SC/ST, OBC 0 otherwise (General)				
EDU_PE	Principal earner's educational level; three categories-	0.64	0.48	0	1

Chapter 5: Borrowing & Spending behaviour: Evidence from Rural West Bengal, India

Variable Name	Variable Description	Mean	Standard Deviation	Min	Max
	=0 if illiterate =1 if secondary and less than secondary level =2 if higher secondary and upper level	0.08	0.27	0	1
OCCU_PE	Principal earner's type of occupation; four categories- = 0 if Self-employment in agriculture = 1 if Self-employment in non-agriculture, = 2 if Regular salaried/ wage earner = 3 if Casual labor in agriculture = 4 if Casual labor in non- agriculture	0.22	0.41	0	1
		0.13	0.34	0	1
		0.06	0.24	0	1
		0.38	0.48	0	1
SEX_PE	= 1 if Male = 0 otherwise	0.92	0.27	0	1
AGE_PE	Continuous variable	42.06	12.74	18	88
AGRILAND	= 1 if agricultural land holds = 0 otherwise	0.22	0.42	0	1
SUPPOL	= 1 if support political parties = 0 otherwise	0.59	0.49	0	1
ANNUALINC	Natural log of (1+ annual family income)	10.78	0.60	0	12.39
DISTRICT	= 1 if South 24-Parganas = 0 if North 24-Parganas	0.66	0.48	0	1
DI	Continuous variable where 0 means 'most deprived '	0.75	0.23	0	1
FLI	Continuous variable	0.21	0.15	0	0.96
Set of Response Variables					
PROB_ID	Probability of indebtedness =1 if outstanding loan amount exists	0.54	0.50	0	1
PROB_MB	Probability of multiple borrowing =1 if multiple borrowing exists	0.07	0.26	0	1
PROB_LD	Probability of Institutional loan diversion = 1 if the institutional loan is diverted from one purpose to another	0.06	0.23	0	1
PROB_IB	Probability of institutional borrowing = 1 if borrower is an institutional borrower = 0 otherwise	0.13	0.34	0	1
Total number of Institutional Borrowers	184				
Incidence of institutional loan diversion	80				

Source: Primary Sample Survey

Table 5.7: Cramer's V and Tetrachoric-Correlation among Loan diversion and Institutional borrowing with the explanatory variables

Explanatory Variables	Loan diversion (LD)		Institutional borrowing (IB)	
	Cramer's V	Tetrachoric-Correlation	Cramer's V	Tetrachoric-Correlation
REL_PE	0.11	0.31	0.08	0.16
AGRILAND	0.07	0.18	-	0.07
SUPPOL	0.04	0.12	0.06	0.13
OCCU_PE	-	-	0.28	-
DISTRICT	-	-	0.00	0.00

Source: Primary Sample Survey

Table 5.8: Tetrachoric-Correlation among all binary explanatory variables

	REL_PE	AGRILAND	SUPPOL	DISTRICT
REL_PE	1	----	----	----
AGRILAND	-0.02	1	-----	----
SUPPOL	-0.30	-0.15	1	----
DISTRICT	-0.11	-0.39	0.26	1

Source: Primary Sample Survey

5.4 Results and Discussion of Econometric Analysis

5.4.1 Results of Heckman Sample Selection Model

Table 5.9 presents the results of the Heckman probit model. At first, we report the results of the selection equation which identifies the probability of institutional borrowing. All the results, otherwise reported, are at a 1% level of significance

5.4.1.1 Results of Selection Equation

The result shows that REL_PE has a positive significant effect on the probability of institutional borrowing. More specifically, respondents belonging to the Hindu (Muslim) community are more (less) prone towards institutional borrowing in WB. A possible explanation might be that the Muslim population has religious prohibitions on interest (Banerjee *et al.*, 2010b).

Next, ANNUALINC has a significant positive effect on the probability of institutional borrowing. The reason behind this is that higher annual family income gives financial strength to the respondents to borrow more for institutional loans. In this regard, Park and

Rodrigues, (2000) showed that consumer borrowing is an increasing function of permanent income but decreasing of current income. Further, Hopkins and Todorova, (2014) discussed that with the emergence of two-income earner households in the U.S economy, the willingness to borrow has increased. Taking a lesson from that, it is likely family income has a pivotal role in the increase in the probability of institutional borrowing in WB.

From the regression results, it appears that the probability of institutional borrowing significantly increases for those principal earners who are self-employed in non-agriculture activities. The likelihood of institutional borrowing significantly decreases for self-employed in agriculture (at a 5% level of significance), casual labor in non-agriculture and for large business, contractors, etc., in West Bengal. Poddar *et al.* (2019) and Banerjee *et al.* (2010b) also showed that the probability of institutional borrowing significantly increases for self-employed household heads. However, both of these studies did not segregate the self-employed respondents into self-employed in agriculture and self-employed in non-agriculture.

Further, agricultural landholding status significantly influences the probability of institutional borrowing. The reason behind this positive result might be that agricultural land can be used as collateral for institutional borrowing, thereby, it increases the likelihood of institutional borrowing.

Next, the principal earners who are supporters of the political party are significantly more prone to institutional borrowing. This finding establishes our hypothesis that political participation has a significant role to play in the spending behavior of institutional borrowers. Finally, the district dummy shows that the probability of institutional borrowing is significantly higher in South 24-Parganas than that of North 24-Parganas at a 1% level of significance.

5.4.1.2 Results of Outcome Equation

The outcome equation identifies the probability of loan diversion among institutional borrowers. The result of the outcome equation shows that REL_PE has a positive significant effect on the probability of loan diversion. This means the Hindu principal earner is significantly more prone to the probability of loan diversion than the Muslim counterpart. Further, the age of the principal earner (AGE_PE) significantly affects the probability of institutional loan diversion at a 5% level of significance. More specifically, the higher the age of the principal earner, the higher the probability of institutional loan diversion. Similar results have been found in Kheleque (2011) which also shows that probability as well as magnitude of diversion of loan use significantly increases with increase in age of household head in Bangladesh.

Further, the result depicts that support for a political party (SUPPOL) significantly increases the probability of loan diversion at a 5% level of significance. This implies that the principal earners who openly reveal their support for a political party are significantly more prone to institutional loan diversion in West Bengal.

Finally, from the outcome results, it appears that the Financial Literacy Index (FLI) has a positive and significant role to play in the probability of loan diversion. That means, among the principal earners who also have financial literacy are more prone to institutional loan diversion in West Bengal. Financial literacy induces the ability to use and manage financial instruments effectively (Stolper and Walter, 2017). It makes the respondents more confident towards effective diversification of institutional loan proceeds. Thus, this positive but perverse and significant role of FLI in the probability of loan diversion has important implications from the policy perspective.

Table 5.9: Estimation of Heckman Probit Model

Response Variables (1)		PROB_IB (2)	PROB_LD (3)
Explanatory Variables	Reference Category	Selection Equation	Outcome Equation
		Coefficient	Coefficient
REL_PE	Muslim	.28*** (.10)	0.58*** (.20)
ANNUALINC	-	.35*** (.12)	-
OCCU_PE	Regular salaried/ wage earner		
Self-employment in agriculture		-.35** (.18)	-
Self-employment in non- agriculture		.47*** (.15)	-
Casual labor in agriculture		-.19 (.22)	-
Casual labor in non- agriculture		-.42*** (.16)	-
others (Large businesses, Contractors etc.)		-5.07*** (.16)	-
AGRILAND	No	0.24*** (.11)	.25 (.18)
SUPPOL	No	.31*** (.10)	.35** (.19)
AGE_PE	-	-	.01** (.007)
DISTRICT	North 24- Parganas	.28*** (.10)	-
FLI	-	-	2.30*** (.82)
Constant		-5.51	-2.87
Rho		.71 (.17)	
Wald test of indep. eqns. (rho = 0): chi2(1) = 6.92 Prob> chi2 = 0.00			
Wald chi2(5)		18.74 Prob> chi2 = 0.00	
Log pseudo-likelihood		-579.7794	
	Number of observations = 1405		AIC ³ = 1195.559 BIC ⁴ = 1290.019

Note: ***Significant at 1%, **Significant at 5%, * Significant at 10%

Rho is the correlation coefficient among the error terms of two equations; selection and outcome equations.

Wald test shows that the null hypothesis of rho = 0 can be rejected which indicates that the correlation between the errors terms of selection and outcome equation is significant. Hence, Heckman's technique should be used instead of the Simple Probit model (Banerjee *et al.*, 2015).

Source: Primary Sample Survey

5.4.2 Results of Bivariate Probit Analysis

Table 5.10 represents the results of Model 1, 2, and 3 of Bivariate probit analysis. All the results, otherwise reported, are at a 1% level of significance. It shows that political participation positively affects the probability of indebtedness and loan diversion as well as institutional borrowing. Thus, political participation has a major role to play in borrowers' borrowing and spending behavior as well as indebtedness. In this context, Bardhan and Mookherjee (2012) extensively discussed political clientelism and its welfare consequences. From an empirical survey in rural WB, Bardhan and Mookherjee (2012) found that clientelistic relationship with political parties favours the political supporters in terms of distribution of benefits, allocation of public services, and overall welfare generation. Banerjee *et al.* (2010a) also found that the political identities of borrowers significantly affect the access to institutional borrowing in rural West Bengal.

Table 5.10 also shows that the probability of indebtedness (Model 1), probability of multiple borrowing (Model 2), probability of indebtedness (Model 3) significantly decreases for educated borrowers up to the secondary level. Deprivation Index (DI) significantly increases the probability of loan diversion (Model 1 and 2). This means less deprived principal earners are significantly more prone to the probability of loan diversion. The caste of principal earners also significantly affects the response variable with various signs. Principal earners belong to SC/ST and OBC are less prone to the probability of loan diversion (Model 1 and 2) and probability of institutional borrowing (Model 3). Model 2 shows that the probability of multiple borrowing significantly increases for SC/STs and OBCs.

Next, the probability of indebtedness (Model 1 and 3) and probability of institutional borrowing (Model 3) significantly increases for the households belonging to the South 24-Parganas district. Further, the probability of multiple borrowing significantly decreases for the households belonging to the South 24-Parganas district. The occupation status of the

principal earner also significantly affects the response variable with different signs. The probability of multiple borrowing (Model 2) and probability of institutional borrowing significantly decreases for self-employed principal earners in the agricultural sector. On the other side, probability of multiple borrowing and loan diversion (Model 2) and probability of indebtedness and probability of institutional borrowing (Model 3) significantly decreases for Principal earners engaged as casual labor in the non-agricultural sector

Table 5.10: Estimation of Bivariate Probit Model

		Model 1		Model 2		Model 3	
Response Variable		PROB_ID	PROB_LD	PROB_MB	PROB_LD	PROB_ID	PROB_IB
Explanatory Variables	Reference Category	Coefficient		Coefficient		Coefficient	
EDU_PE	Illiterate						
Up to secondary and less than secondary level		-0.37*** (0.17)	0.03 (0.25)	-0.54*** (0.20)	-0.26 (0.24)	-0.37*** (0.17)	0.35* (0.21)
higher secondary and upper level		-0.30 (0.30)	-0.40	-0.83*** (0.41)	-0.56 (0.37)	-0.38 (0.29)	-.06 (0.31)
DI	Most Deprived	-0.27 (0.37)	1.10*** (0.50)	-0.19 (0.43)	1.61*** (0.50)	-0.38 (0.37)	0.31 (0.37)
CASTE_PE	General/ Unreserved	0.07 (0.15)	-0.37*** (0.17)	0.79*** (0.20)	-0.28* (0.16)	0.07 (0.15)	-0.37*** (0.16)
SEX_PE	Female	0.05 (0.25)	0.38 (0.37)	0.03 (0.30)	-0.02 (0.34)	0.13 (0.24)	.08 (0.25)
SUPPOL	No	0.28*** (0.12)	0.52*** (0.14)	-0.35*** (0.13)	0.51*** (0.14)	0.31*** (0.12)	0.76*** (0.13)
DISTRICT	North 24-Parganas	0.79*** (0.13)	-0.17 (0.16)	-0.56** (0.16)	-0.12 (0.17)	0.80*** (0.13)	0.98*** (0.14)
OCCU_PE	Regular						
Self-employment in agriculture	salaried/ wage earner	-0.28 (0.24)	-0.02 (0.28)	-1.00*** (0.36)	.05 (0.27)	-0.32 (0.24)	-0.47* (0.28)
Self-employment in non-agriculture		0.02 (0.22)	.003 (0.25)	-0.33 (0.25)	-0.08 (0.23)	0.33 (0.21)	0.12 (0.20)
Casual labor in agriculture		-0.29 (0.27)	-0.27 (0.31)	-0.37 (0.31)	-0.19 (0.31)	-0.31 (0.27)	-0.41 (0.29)
Casual labor in non-agriculture		-0.35 (0.22)	-0.41 (0.25)	-0.45** (0.26)	-0.45** (0.24)	-0.38** (0.22)	-0.82*** (0.22)
Constant		0.30 (0.50)	-2.18 (0.70)	-0.30 (0.60)	-2.02 (0.68)	0.32 (0.50)	-1.42 (0.52)
/athrho		0.75 (0.13)		-0.46 (0.13)		0.95 (0.11)	

		Model 1		Model 2		Model 3	
Response Variable		PROB_ID	PROB_LD	PROB_MB	PROB_LD	PROB_ID	PROB_IB
Explanatory Variables	Reference Category						
		Coefficient		Coefficient		Coefficient	
Rho		0.63 (0.08)		-0.43 (0.13)		0.74 (0.05)	
Wald test of rho=0:		chi2(1) = 33.2777 Prob> chi2 = 0.0000		chi2(1) = 12.5308 Prob> chi2 = 0.0004		chi2(1) = 74.377 Prob> chi2 = 0.0000	
Number of observations = 545		AIC = 1031.59 BIC = 1138.18		AIC = 880.96 BIC = 988.48		AIC = 1102.99 BIC = 1209.57	

Note: ***Significant at 1%, **Significant at 5%, * Significant at 10%

5.5 Conclusions and Policy Implications

The above study captures the incidence of loan diversion in rural WB. It identifies socio-economic, financial, and political determinants that affect the likelihood of loan diversion. The results show that financial literacy, the religion of principal earner, and support of political party significantly increase the probability of institutional loan diversion in West Bengal after taking into account the sample selection bias. *Secondly*, it identifies socio-economic and political determinants of the probability of loan diversion, multiple borrowing, and indebtedness among the borrowers. It concludes from both the empirical results that political participation has a major role to play.

Now, if we are interested in identifying the possible reasons behind this institutional loan diversion then we need to focus on whether the diversion is intentional or unintentional. Our study showed that institutional loans taken for working capital needs are mostly diverted (Table 3). That means resources that are supposed to be used for production purposes are now being used for other purposes. Moreover, most of the diverted loans are used either exclusively or partly for household expenditure purposes. This reflects the misuse of financial resources, its desirability from economic well-being perspective notwithstanding, as discussed by Banerjee *et al.* (2015).

The data in Table 3 reveals the fact that most of the institutional loan taken for working capital needs are partly diverted, that means, a portion of loan proceeds are used for the stated purpose and the other portion is diverted for some other purposes. Now, this triggers another question whether these borrowers have applied and got more loan proceeds than is required to meet up true working capital needs. If this is the case, then it is alarming for policy perspectives and leaves scope for further research.

As said earlier, the data shows that the incidence of loan diversion is lower for institutional loans taken for fixed investment purposes and higher for the loan taken for working capital needs. This is also an important concern from policy perspectives. But the study cannot provide an appropriate answer to this issue. There remains scope for future research by comparing supply-side and demand-side data to pinpoint this issue.

The study also shows that institutional borrowers involved in loan diversion are also significantly involved in multiple borrowing. The reason might be that after using a production loan for non-production purposes, they fail to generate sufficient income from that loan. This in turn compels them to take multiple loans which may lead to the debt trap. In this regard, Poddar *et al.* (2020) already discussed the adverse effects of multiple borrowing when multiple loans are taken to repay old debts. Therefore, the association between loan diversion and multiple borrowing is alarming from policy perspectives.

Lastly, econometric analysis shows that financial literacy has a positive and significant impact on the probability of loan diversion. We have already discussed that financial literacy may give financial strength to take financial decisions. But it should be noted that knowledge of efficient management of financial resources will also require financial literacy, *inter alia*. Thus, it is imperative to make institutional borrowers knowledgeable enough regarding efficient management of financial resources.

Appendix 5A

5.A.1 Survey design and Sampling Process

At *first*, a complete enumeration of the population of the four villages was carried out using the voters' list as a sampling frame. The total number of households in these four villages was 1839. Now based on the population proportion, the targeted sample size was 1550. *Second*, all the households of each village were divided into three groups based on the information acquired on ownership of financial instruments. Group A comprises the households who own both insurance and a bank or post office account. Group B comprises the households who either own a bank or post office account or insurance. Lastly, Group C comprises the households who neither own a bank or post office account nor insurance. *Third*, each group is again divided into four subgroups based on household income quartiles. Household income quartiles have been calculated from the distribution of household income of each group. Subgroup 1 takes into account the families who have family income $\leq$ first income quartile. Subgroup 2 takes into account families who have family income falling between the first and second income quartile. Subgroup 3 comprises families who have family income falling between the second and third income quartile. Subgroup 4 comprises families who have family income $>$ third income quartile.

Next, the proportion of the population belonging to each group has been calculated from which samples are to be drawn from each group. Finally, in each group, the proportion of each subgroup has been calculated. Now, the final sample to be drawn from each group was distributed based on the proportion of each subgroup. The survey design and sampling process are similar to Banerjee-Chatterjee *et al.* (2021)

5.A.2 Calculation Methodology of Financial Literacy Index (FLI)

FLI, a latent variable, is constructed based on the information collected from the respondents on various indicators of financial planning and financial awareness⁵. According to Remund, (2010), “Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions.” (page number 284). Each indicator consists of various information, depicted in the following table (Appendix Table1).

- 1) Indicator of Financial Planning
- 2) Indicator of Awareness and knowledge about the use of formal banking instruments
- 3) Indicator of Awareness and knowledge of services of Insurance Instruments
- 4) Indicator of Awareness and knowledge regarding Credit instruments
- 5) Indicator of Awareness regarding different pension schemes

Table 5.A.1: Indicators used to measure FLI

Indicators of Financial Planning			
(1)	(2)	(3)	(4)
Whether respondent plan for home repair	Whether respondent plan for children's education and marriage	Whether respondent plan for medical expenses	Whether respondent plan for expenses after retirement
Indicators of financial awareness			
(1)	(2)	(3)	(4)
Awareness and knowledge about the use of following formal banking instruments	Awareness and knowledge of services of following Insurance Instruments	Awareness and knowledge regarding Credit instruments	Awareness regarding different pension schemes
ATM/Debit Card/Rupay Card	Life insurance	Bank loans	Employee Provident Fund (EPF)
Credit card	AamAdmiBimaYojana	MFI and SHG loans	Public Provident Fund (PPF)
Cheque Book	RastriyaSwasthabimaYojana (RSBY)	Kisan Credit card (KCC) and Artisan Credit card	National Pension Scheme
Internet Banking	Health insurance scheme	LaguUdyami credit card Weavers credit card	Swavalamban Pension Yojana
Prime Minister Jan DhanYojana	crop insurance		Indira Gandhi National Old Age Pension Scheme
	Other insurance		

Note: The methodology to construct FLI is motivated by Banerjee-Chatterjee *et al.* (2021)

Firstly, five separate dimension indices for the indicator of financial planning and indicators of financial awareness (Table 6) are computed using the following formula

$$\text{Dimension Index (D)} = w \left[\frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}} \right]$$

Where w is the weight attached to the dimension, which indicates the relative importance of the dimension (Sarma, 2008). It should be noted here that all the information in an indicator is binary in nature. So, the mere multiplication of binary values with the same weight given to each information gives the dimension indices for five indicators. Higher the value of D represents higher attainment of each household in a particular dimension. Following Sarma (2008), individual-level FLI is calculated by the normalized inverse Euclidean distance of the point D from the ideal point $I = (w_1, w_2, \dots, w_n)$.

$$\text{FLI} = 1 - \frac{\sqrt{(W_1 - D_1)^2 + (W_2 - D_2)^2 + (W_3 - D_3)^2}}{\sqrt{W_1^2 + W_2^2 + W_3^2}}$$

Here, $W = 1$ for all dimensions since all dimensions are treated equally important to measure individual-level FLI. Therefore, ideal point is $I = (1, 1, 1, \dots, 1)$ in the n -dimensional space (Sarma, 2008). The value of FLI lies between 0 and 1 and a higher value of FLI relates to higher financial literacy at the individual level.

5.A.3 Calculation Methodology of Deprivation Index (DI)

Townsend (1987) separates two forms of deprivation index: material and social. Material deprivation takes into account the deprivation of goods and convenience that is needed in daily modern life (Pampalon *et al.*, 2010). This chapter combines four indicators in the measurement of the Deprivation index (DI)⁶.

- 1) Housing (H)
- 2) Toilet facility (T)
- 3) Electricity (E)

- 4) Asset ownership (1 if does not own more than one of the following items- Television, Refrigerator, Motorcycle or Scooter or Moped, Cycle, Car or Jeep or Van) (A)

Each of these four indicators is binary in nature and we assume that each of them carries equal weightage in the measurement of the index. Now, DI has been calculated by taking the weighted average of H, T, E, and A with equal weights.

$$DI = \frac{1}{4}(H) + \frac{1}{4}(T) + \frac{1}{4}(E) + \frac{1}{4}(A)$$

¹Borrowing from formal credit sources like banks, co-operative institutions, and semi-formal credit sectors like micro-finance institutions (MFIs), self-help groups (SHGs), etc.

²We have applied Mahalanobis multivariate outlier detection method as it helps to identify multivariate outliers which are combinations of unusual scores for at least two variables and can be identified as the points in the scatter diagram that move away from the general pattern followed by other points in the Euclidian space (Hubert et. al, 2005)

³Akaike information criterion

⁴Bayesian information criterion

⁵ The Principal Component Analysis (PCA) hasn't been used in constructing the FLI

⁶ The Principal Component Analysis (PCA) hasn't been used in constructing the DI

Chapter 6: Religious and Social group diversity in Borrowing and Spending behaviour: Analysis of Survey Results from Rural West Bengal, India

6.1 Introduction

In India, there exists an amalgamation of different culture and religion. According to Deshpande (2002; 2015) in India there exists multifaceted interstate disparity which includes religion, language, gender, and caste. This Chapter tries to figure out whether religious and social group diversity has any impact on the borrowing and spending behaviour in India. More specifically, we find out the borrowing and spending pattern of the population for religion and social group/caste. This issue is important as in India where the Muslim population is the second largest after the Hindu population (Chandramouli, 2011). Also, Scheduled Caste and Scheduled Tribe constitutes almost 29% of the total population in India (SECC, 2011). Therefore, it is imperative to bring these sections of the population within the ambit of formal financial services in India.

6.1.1 Religious diversity

India has a rich social composition in terms of religion. It is a land of various religions, namely, Hinduism (80.5%), Islam (13.4%), Christianity (2.3%), Sikhism (1.9%), Buddhism (0.8%), Jainism (0.4%) and others (0.7%) (SECC, 2011). According to NSS 70th round survey, popularly known as, All India Debt and Investment Survey (AIDIS), only 34% of the Muslim population are involved in institutional borrowing. Being the second highest population in India according to Census, 2011, it is essential to spread financial services among them. In this regards, Banerjee *et al.* (2010b) mentioned certain rules regarding operations in the credit market for the Muslim population which might cause low institutional

borrowing¹ among them. Literature on Islamic finance had discussed that *Riba* or interest is forbidden in Islam (El-Gamal, 2000; Chapra, 2008; Uddin, 2015; Demircuc-Kunt *et al.*, 2014). Uddin (2015) explained that Islamic finance is a complete rule-based financial system, originated from Holy Quran. According to him, “Prohibition of Riba, Gharar, and Maysir in financial transactions is the fundamental of Islamic finance which distinguishes it from conventional finance”² In this view, the motivation of this chapter is to identify the financial behaviour, specifically, access to banking facilities, borrowing, and spending behaviour, etc. in terms of religions.

6.1.2 Social Group diversity

In India, the traditional social system was constituted around the caste structures (Kothari, 1995). Article 341 of the Indian Constitution characterized certain underprivileged tribal and caste populations in India as *Scheduled Castes* (SC) and *Scheduled Tribes* (ST) (Dunn, 1993). Another section of the Indian population is termed as Other Backward Class (OBC) who are educationally or socially disadvantaged (Yadav, 2002; Nayar, 2007). OBCs are entitled to get certain benefits as they are disadvantaged but less deprived than SCs and STs (Elder, 1996). Thus, Indian society is broadly categorized into four social groups- SC, ST, OBC, and General, where the general category includes most of the higher castes in India. Azam (2012) explained that exclusion of these deprived sections of the population from certain economic and social spheres had resulted in inequality in India. According to AIDIS report, 2014 incidence of indebtedness (IOI) is highest among OBCs both in rural (35.7%) and urban (26%) India. SC population is the second highest in terms of IOI both in rural (30.9%) and urban (23.5%) India. In this regard the motivation of the chapter is to identify the financial behaviour, specifically, access to banking facilities, borrowing, and spending behaviour, etc. in respect to different social groups/caste in India.

6.2 Background

6.2.1 Spending loan proceeds for what purposes?

The issues related to access to credit among rural households have attracted the attention of researchers and policymakers. It has been considered an important tool in promoting production and smoothing consumption (Zeller, 1999; Swain *et al.*, 2008). But a few literature studies the uses of institutional loan proceeds exclusively by rural households. Ravi (2003) showed that the most common reason for borrowing for rural households is for consumption needs in Kerala and Uttar Pradesh, two states in India. According to the study, it includes the purchase of durable goods and loans taken for festivals and ceremonies. Loans are also taken on a day-to-day basis for consumption. Ravi (2003) also discussed that the second most common cause for rural borrowing is for agricultural inputs. Bell (1990) and Udry (1990) mentioned that formal loans are taken for short-term consumption and working capital needs in rural Africa. Therefore, rural households have choices to make- whether to use loans for production purposes or not.

The analysis is based on a household-level survey that covers two districts of West Bengal, India. The objective of the chapter is to identify the role of different socio-economic characteristics to examine the disparity in the use of banking services, institutional borrowing, and the use of institutional loans for production purposes by religious and caste groups in rural India. More specifically, the chapter examines whether the religious and caste differences in the socio-economic variables mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India. This chapter makes important contributions to the existing literature by reviewing the religious and caste differences in the use of banking services, institutional borrowing, and use of institutional loans for production purposes.

The rest of the chapter is organized as follows. The following section outlines the data and methodology used in the study. Section 6.4 represents the estimation results along with discussions of the results. Section 6.5 concludes with further discussion and potential issues.

6.3 Materials and Methods

We used data from a rural household survey from two districts, namely, North 24-Parganas and South 24-Parganas of WB, India, the same survey as mentioned in the previous chapter.

6.3.1 Description of data

Table 6.1 shows the descriptive statistics of the use of financial services among the surveyed as well as borrower households. It depicts that among the total surveyed households, 77.37% are holding a saving bank account, 38.8% are borrower households. Among the borrower households, 33.78% borrows from institutional sources, 21.42% use their loans for production purposes, whereas 17.37% uses for consumption purposes. Table 6.2 and 6.3 describe the descriptive statistics of the use of financial services across social groups and religions respectively. Table 6.4 shows the socio-economic and demographic profile of the surveyed as well as borrower households. The majority of surveyed (33.88%), as well as borrowers (45.14), have educational levels up to secondary level. The occupational status of the majority of the surveyed (38.72%) and borrowers (35.06%) is casual labour in the non-agricultural sector. Among the caste of the principal earner, the OBC population is the majority both in the surveyed (55.59%) and borrowers (53.03%). The sample villages consist of only Hindu and Muslim populations. The annual income level of the principal earner has been categorized based on quartile distribution in four categories.

Table 6.1: Descriptive Statistics of use of financial services across the surveyed and borrower households (Column wise in percentages)

	Categories	Surveyed Households (1)	Borrowers (2)
Use of ATM cum Debit Card	No	80.71	72.66
	Yes	19.29	27.34
Savings account holding Status	No	22.63	13.94
	Yes	77.37	86.06
Insurance holding Status	No	20	11.93
	Yes	80	88.07
Loan Status	No	61.21	-
	Yes	38.79	-
Institutional borrowing Status	No	87	66.24
	Yes	13	33.76
Use of loan for production purposes	No	78.58	73.21
	Yes	21.42	26.79
Use of loan for consumption purposes	No	82.63	78.17
	Yes	17.37	21.83
Total No. of Households		1405	545

Source: Primary Sample Survey

Table 6.2: Descriptive Statistics of use of financial services across the social groups (Column wise in percentages)

	Categories	General	SC/ST	OBC
Use of ATM cum Debit Card	No	72.93	85.06	80.79
	Yes	27.07	14.94	19.21
Savings account holding Status	No	9.17	18.48	28.68
	Yes	90.83	81.52	71.32
Insurance holding Status	No	13.54	30.38	16.65
	Yes	86.46	69.62	83.35
Loan Status	No	40.17	69.87	63.00
	Yes	59.83	30.13	37.00
Institutional borrowing Status	No	75.11	84.30	91.68
	Yes	24.89	15.70	8.32
Use of loan for production purposes	No	74.24	74.43	81.95
	Yes	25.76	25.57	18.05
Use of loan for consumption purposes	No	79.04	82.78	83.61
	Yes	20.96	17.22	16.39
Total No. of Households		229	395	781

Source: Primary Sample Survey

Table 6.3: Descriptive Statistics of use of financial services across the religion (Column wise in percentages)

	Categories	Muslim	Hindu
Use of ATM cum Debit Card	No	86.08	76.41
	Yes	13.92	23.59
Savings account holding Status	No	31.84	15.26
	Yes	68.16	84.74
Insurance holding Status	No	20.16	19.87
	Yes	79.84	80.13
Loan Status	No	70.08	54.10
	Yes	29.92	45.90

	Categories	Muslim	Hindu
Institutional borrowing Status	No	89.92	84.49
	Yes	10.08	15.51
Use of loan for production purposes	No	80.96	76.67
	Yes	19.04	23.33
Use of loan for consumption purposes	No	83.04	82.31
	Yes	16.96	17.69
Total No. of Households		625	780

Source: Primary Sample Survey

Table 6.4: Socio-economic and demographic profile across the surveyed and borrower households (Column wise in percentages)

	Categories	Surveyed Households (1)	Borrowers (2)
Education of Principal earner	Illiterate	27.62	9.72
	Up to primary	28.19	34.31
	Up to secondary	33.88	45.14
	Up to higher secondary	3.84	3.67
	Higher secondary above	6.47	7.16
Occupation categories of Principal earner	Agricultural _Self employed	19.79	10.83
	Non-Agriculture_ Self-employed	21.78	32.11
	Regular wage salary	13.38	11.56
	Casual in Agriculture	6.33	9.91
	Casual in non-Agriculture	38.72	35.60
Caste of Principal earner	General	16.30	25.14
	SC/ST	28.11	21.83
	OBC	55.59	53.03
Religion of Principal earner	Hindu	55.52	65.69
	Muslim	44.48	34.31
Sex of Principal earner	Male	91.96	94.68
	Female	8.04	5.32
Annual Income level	Income Class 1 (Income $\leq$ ₹37000) (First Quartile Point)	26.55	16.51
	Income Class 2 (₹37000 < Income $\leq$ ₹48000) (Median value)	25.77	24.40
	Income Class 3 (₹48000 < Income $\leq$ ₹60000) (Third Quartile)	22.78	26.97
	Income Class 4 (Income > ₹60000)	24.84	32.11
	Total No. of Households	1405	545

Source: Primary Sample Survey

6.3.2 Study Variables

6.3.2.1 Outcome Variables

The outcome variables used in this study are – (1) Savings bank account holding status (*SBPE*). It has been used as a proxy of access to banking services. (2) Institutional borrowing status (*IBPE*) – whether principal earner borrows from institutional sources or not. (3) Loan used for production purposes (*PPPE*) – This depicts whether the loan has been used for production purposes or not. All these variables are binary.

6.3.2.2 Predictors

Occupation status of the Principal earner(OCUPE)

The chapter has considered the occupation status of the principal earner as one of the important determinants that might affect the use of financial services. Occupation has been categorized into five categories- Self-employed in agriculture, Self-employed in non-agriculture, Regular wage earner, Casual labour in agriculture, Casual labour in non-agriculture.

Financial Literacy Index (FLI)

We have used the Financial literacy index which contains information on various indicators of financial planning and financial awareness. The calculation is the same as in the previous chapter.

Income class of the Principal earner (IPE)

The annual income level of the principal earner has been categorized based on quartile distribution in four categories. Details of the range of each category can be found in Table 4

Age of Principal earner (APE)

Age of principal earner, a continuous variable has been taken into consideration.

Sex of Principal Earner (SPE)

The sex of the principal earner is used as a response variable. It is a binary variable, 1 if male and 0 otherwise.

As stated earlier, we examine whether the religious and caste differences in the socio-economic variables mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India. For the sake of the analysis, we have generated a binary variable of the caste of principal earner- 1 if SC, ST, and OBC and 0 otherwise. The sample survey has found only two types of religion, Hindu and Muslim. We have again generated it as a binary variable, 1 if Muslim and 0 otherwise. All independent variables were tested for possible multi-collinearity before inserting them into the logistic regression model.

6.3.3 Econometric Modelling

We conduct a multivariate logistic regression analysis to assess the effect of independent factors on each of the binary outcome variables. We also conduct a decomposition analysis to evaluate the religious and caste differences in the socio-economic variables that mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India. Blinder–Oaxaca decomposition technique (Blinder, 1973; Oaxaca, 1973) is a commonly used technique in decomposition analysis (Karhina *et al.*, 2019), that is, to find the factors associated with the inter-group differences in the mean level of outcome (Bora *et al.*, 2018). However, if the outcome variable is binary, then Blinder–Oaxaca decomposition technique is inapplicable (Fairlie, 2005; Bora *et al.*, 2018). Thus, we use the Fairlie nonlinear decomposition technique which is the most appropriate technique to decompose the gap between social groups as well as religions in institutional borrowing, use of institutional loans, and use of banking services that can be attributed to different socio-

economic factors. The decomposition method partitions the differences in religious groups (Hindu and Muslims) and social groups (reserved and unreserved) in the institutional borrowing, use of institutional loans and use of banking services arising from different socio-economic characteristics in one part (the explained component) and a second part based on the differential effects of the characteristics of both the religious groups and social groups (Fairlie, 1999, 2005; Karhina *et al.*, 2019).

For the decomposition analysis, we have combined the social group predictor, SC, ST, and OBC and termed as ‘*reserved*’ and another group (General) is referred to as ‘*unreserved*’. Religion has two categories, Hindu and Muslim. Firstly, we assume that the sample size of ‘*reserved*’ and ‘*unreserved*’ populations and Hindu and Muslim populations are equal and there exists a natural one-to-one matching. But, in reality, the sample size of these two groups differs; the number of ‘*reserved*’ and ‘*unreserved*’ population among the social group and Hindu and Muslim population among the religion group are not identical, for example, ‘*unreserved*’ population is substantially smaller than the ‘*reserved*’ sample size. Also, the Muslim population is smaller than the Hindu sample size. However, a one-to-one matching of cases between two groups is required for decomposition (Fairlie, 2005). Therefore, it is needed to draw the random sub-sample of ‘*unreserved*’ (Muslim) equal in size to the ‘*reserved*’ (Hindu). Each observation in the ‘*unreserved*’ (Muslim) subsample and ‘*reserved*’ (Hindu) is separately ranked by the predicted probabilities and then matched by their respective rankings (Fairlie, 2005). For decomposition analysis, we have used 1000 random subsamples and the result is based on the mean value calculated from the decompositions over these sub-samples (Fairlie, 2005; Ghosh and Choudhury, 2019). The independent contribution to each variable in the decomposition analysis depends on the order in which the variables are presented in the model, therefore there is a need to randomize the order of the variables to get robust estimates (Fairlie, 2005; Karhina *et al.*, 2019).

6.3.3.1 Fairlie Decomposition (2005)

Following the standard Blinder–Oaxaca decomposition technique, the gap between ‘reserved’ vs ‘unreserved’ and Hindu vs Muslim in the mean value of the dependent variable, Y (here, institutional borrowing, use of institutional loans, use of banking services) can be expressed in equation (1) and 2) respectively as

$$\hat{Y}^R - \hat{Y}^{UR} = [(X^R - X^{UR}) \hat{\beta}^R] + [X^{UR} (\hat{\beta}^R - \hat{\beta}^{UR})] \quad (1)$$

$$\hat{Y}^H - \hat{Y}^M = [(X^H - X^M) \hat{\beta}^H] + [X^M (\hat{\beta}^H - \hat{\beta}^M)] \quad (2)$$

Where X^i and X^j in (1) and (2) is mean values of independent covariates respectively and $\hat{\beta}^i$ and $\hat{\beta}^j$ is vector of coefficient estimates for the dependent variable.

The extension of this decomposition of a non-linear equation, $Y = F(X\hat{\beta})$, can be written as

$$\hat{Y}^R - \hat{Y}^{UR} = \left[\sum_{i=1}^{N^R} \frac{F(X_i^R \hat{\beta}^R)}{N^R} - \sum_{i=1}^{N^{UR}} \frac{F(X_i^{UR} \hat{\beta}^R)}{N^{UR}} \right] + \left[\sum_{i=1}^{N^{UR}} \frac{F(X_i^{UR} \hat{\beta}^R)}{N^{UR}} - \sum_{i=1}^{N^{UR}} \frac{F(X_i^{UR} \hat{\beta}^{UR})}{N^{UR}} \right] \quad (3)$$

Where N^j is the sample size for social group j (R-Reserved, UR = Unreserved), $\hat{Y}^j$ is the mean probability of the binary outcome variable for social group j. F is the cumulative distribution function from the logistic distribution. X_i^j and $\hat{\beta}_j$ are the vectors of independent variables and coefficient estimates including the constant term respectively. The first term captures the part of the social group gap that is attributed to the group differences in the independent variables and the second term represents the part due to the differences in the coefficients. In equation (3) we have used reserved coefficient estimate ($\hat{\beta}^R$) as the weights of the first term and unreserved coefficient estimate ($\hat{\beta}^{UR}$) as the weights of the second term. But an equally valid expression of decomposition can be written if we use unreserved

coefficient estimate ($\hat{\beta}^{UR}$) as the weights of the first term and reserved coefficient estimate ($\hat{\beta}^R$) as the weights of the second term. Thus, equation (3) can be rewritten as –

$$\hat{Y}^R - \hat{Y}^{UR} = \left[\sum_{i=1}^{N^R} \frac{F(X_i^R \hat{\beta}^{UR})}{N^R} - \sum_{i=1}^{N^{UR}} \frac{F(X_i^{UR} \hat{\beta}^{UR})}{N^{UR}} \right] + \left[\sum_{i=1}^{N^R} \frac{F(X_i^R \hat{\beta}^R)}{N^R} - \sum_{i=1}^{N^{UR}} \frac{F(X_i^{UR} \hat{\beta}^R)}{N^{UR}} \right] \quad (3')$$

Similarly, decomposition expression for religion group can be written as:

$$\hat{Y}^H - \hat{Y}^M = \left[\sum_{i=1}^{N^H} \frac{F(X_i^H \hat{\beta}^H)}{N^H} - \sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^H)}{N^M} \right] + \left[\sum_{i=1}^{N^H} \frac{F(X_i^H \hat{\beta}^M)}{N^H} - \sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^M)}{N^M} \right] \quad (4)$$

Here, N^j is the sample size for religion group j (H-Hindu, M= Muslim). $\hat{Y}^j$ is the mean probability of the binary outcome variable for religion group j . F is the cumulative distribution function from the logistic distribution. X_i^j and $\hat{\beta}_j$ are the vectors of independent variables and coefficient estimates including the constant term respectively. In equation (4) we have used the Hindu coefficient estimate ($\hat{\beta}^H$) as the weights of the first term and the Muslim coefficient estimate ($\hat{\beta}^M$) as the weights of the second term. But an equally valid expression of decomposition can be written if we use and Muslim coefficient estimate ($\hat{\beta}^M$) as the weights of the first term and the Hindu coefficient estimate ($\hat{\beta}^H$) as the weights of the second term. Thus, equation (4) can be rewritten as

$$\hat{Y}^H - \hat{Y}^M = \left[\sum_{i=1}^{N^H} \frac{F(X_i^H \hat{\beta}^M)}{N^H} - \sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^M)}{N^M} \right] + \left[\sum_{i=1}^{N^H} \frac{F(X_i^H \hat{\beta}^H)}{N^H} - \sum_{i=1}^{N^M} \frac{F(X_i^M \hat{\beta}^H)}{N^M} \right] \quad (4')$$

However, to identify the total contribution to the social group and religious group differences in the outcome variable, we need to calculate two different sets of predicted probabilities for *reserved* and *unreserved* population and Hindu and Muslim population and take the difference between the mean values as shown in equation (3) and (4). But the contribution is not direct. As the sample size differs among the *reserved* and *unreserved* population and Hindu and Muslim population, we need to run the regression for the pooled data and calculate the predicted probabilities for each *reserved* and *unreserved* population

and Hindu and Muslim population in the sample. Since the *reserved* (Hindu) population is larger than the *unreserved* (Muslim) population, a random subsample of the *reserved* (Hindu) population equal in size to the full *unreserved* (Muslim) sample needs to be drawn. Each observation in the *reserved* (Hindu) population sample and full *unreserved* (Muslim) sample is then separately ranked by the predicted probabilities and matched by their respective rankings. This procedure matches the *reserved* (Hindu) population by their respective rankings in the predicted probabilities with the *unreserved* (Muslim) population. Now we assume that N^R and N^{UR} (N^H and N^M) and a natural one-to-one matching of *reserved* and *unreserved* (Hindu and Muslim) population exists.

Now, to calculate the independent contribution of response variables, we assume that X includes two variables, X_1 and X_2 . Using coefficient estimates from logistic regression for a pooled sample, $\hat{\beta}^*$, the independent contribution of X_1 to the group difference can be expressed as –

$$\frac{1}{N^{UR}} \sum_{i=1}^{N^{UR}} F(\hat{\alpha}^* + X_{1i}^R \hat{\beta}_1^* + X_{2i}^R \hat{\beta}_2^*) - F(\hat{\alpha}^* + X_{1i}^{UR} \hat{\beta}_1^* + X_{2i}^R \hat{\beta}_2^*) \quad (5)$$

Similarly, the contribution of X_2 can be expressed as

$$\frac{1}{N^{UR}} \sum_{i=1}^{N^{UR}} F(\hat{\alpha}^* + X_{1i}^{UR} \hat{\beta}_1^* + X_{2i}^R \hat{\beta}_2^*) - F(\hat{\alpha}^* + X_{1i}^{UR} \hat{\beta}_1^* + X_{2i}^{UR} \hat{\beta}_2^*) \quad (5)$$

The contribution of each variable is thus equal to the change in the mean predicted probability from replacing *unreserved* (Muslim) distribution with *reserved* (Hindu) distribution while holding the distribution of the other variables constant.

In summary, since the *reserved* (Hindu) sample is substantially large, an enormous number of random sub-samples of the *reserved* (Hindu) (equal size to total *unreserved* (Muslim) sample) are drawn to match each of them to the *unreserved* (Muslim) sample and then calculate separate decomposition. Finally, the mean value of all these decomposition

estimates is used as an approximate decomposition for the entire *reserved* (Hindu) sample. We have used 1000 replications of such decomposition and will present the average result. The increase in the number of replications will improve the stability of the results.

But, before conducting the “Fairlie non-linear decomposition” technique, we need to carry out a chi-square test for categorical variables and a t-test for continuous variables to examine the differences between *reserved* and *unreserved* and Hindu and Muslim in terms of predictor variables (Ghosh and Choudhury, 2019). The results of both the test have been given in the Appendix. The result of the t-test denotes that there exists a significant difference between *reserved* and *unreserved* respondent’s age and also Hindu and Muslim respondent’s age at a 1% level of significance. Among the predictor variables, *FLI* is another continuous variable. The result of the t-test represents that there is no significant difference between *reserved* and *unreserved* respondent’s *FLI* but between Hindu and Muslim respondent’s *FLI* the difference exists at a 1% level of significance. Among the categorical variables, the results of chi-square show that *OCUPE* and *IPE* are significantly associated with religion at a 1% level of significance. Income level 4 and regular wage earner, casual labour in non-agricultural sector is significantly associated with a social group at 1% level of significance.

6.4 Results and Discussion

Firstly, we show the results of binary logistic regression and Fairlie decomposition analysis for social group differences (Table 6.5), and then we represent the results of binary logistic regression and Fairlie decomposition analysis for religious group differences (Table 6.6).

6.4.1 Results of Econometric Analysis for Social Group Differences

6.4.1.1 Results of Binary Logistic Regression for Social Group Differences

We carried out binary logistic regression to examine the socio-economic determinants to affect the probability of holding a savings bank account, institutional borrowing and use of

loan for production purposes. Results of logistic regression (Table 6.5) show that the probability of holding a savings bank account, institutional borrowing, and use of loan for production purposes significantly decreases for the population belonging to the *reserved* category. Age of principal earner significantly increases the probability of holding a savings bank account and use of loan for production purposes. Regular wage earners are more likely to hold a savings bank account. Financial literacy among the principal earner significantly increases (decreases) the likelihood of holding a savings bank account (institutional borrowing). The income of the principal earner significantly increases the probability of holding a savings bank account and institutional borrowing.

6.4.1.2 Results of Fairlie Decomposition Analysis for Social Group differences

The study has used Fairlie non-linear decomposition analysis to quantify the contribution of different socio-economic predictors explaining the gap in Savings bank account holding status (*SBPE*), Institutional borrowing status (*IBPE*), and Loan used for production purposes (*PPPE*) between *unreserved* and *reserved* population are depicted in Table 6.5³. The positive contribution of covariates indicates that it widens the gap between *unreserved* and *reserved* population and the negative contribution indicates that it reduces the gap (Bora *et al.*, 2018). Table 5 indicates that the gap in *SBPE*, *IBPE*, and *PPPE* between *unreserved* and *reserved* populations are 0.16, 0.14, and 0.05 respectively. The gap in *SBPE* and *IBPE* between *unreserved* and *reserved* populations is significant at a 1% level of significance. However, the gap in *PPPE* between *unreserved* and *reserved* populations is significant at a 10% level of significance.

This positive gap implies that the *unreserved* population is 14% more likely to hold savings bank account than their *reserved* counterparts. The social group differences in regards to *SBPE* could be mostly explained by the determinants (-6.25%) but none of the

factors contributed significantly to the differences in holding savings bank account between *reserved* and *unreserved* in the study. The social group differences for *PPPE* could be mostly explained (-100%) by the occupation status of the principal earner of which agricultural and non-agricultural self-employed (-100%), regular wage earners (100%), and casual labour in non-agriculture (60%) were significant at 1% level of significance. Thus, agricultural and non-agricultural self-employed are contributing to reducing the gap as the signs are negative, and regular wage earners and casual labour in non-agriculture are contributing to increasing the gap as the signs are positive.

Table 6.5 also depicts that 27.27% of the gap in *IBPE* between *unreserved* and *reserved* population are explained by the factors included in the analysis. Now, having found this positive gap, we analyze the extent to which predictors explain these results. The social group differences for *IBPE* could be mostly explained (27.27%) again by the occupation status of the principal earner of which casual labour in the non-agricultural sector (42.86%) and regular wage earners (28.57%) were significant at a 1% level of significance. Income class 4 that is, respondents with the highest income group contribute 35.71% of the explained gap of *IBPE* at a 1% level of significance. This implies that casual labour in the non-agricultural sector, regular wage earners, and the utmost level of income of the principal earners are contributing towards increasing the gap as the signs are positive.

On the other hand, the gap in *unreserved* and *reserved* population in institutional borrowing and use of loan for production purposes reduces for self-employed in agriculture (-42.86%) and non-agriculture (-21.42%) and also for the casual labourer in agriculture (-7.14%). This signifies that self-employed in agriculture and non-agriculture, the casual labourer in agriculture are significantly contributing towards reducing the gap as their signs are negative.

From the above analysis, it is evident that the occupation type of principal earner is the most important contributor to the social group gap in holding a savings bank account, contracting institutional borrowing, and use of loan for production purposes. Among all occupation categories, regular wage earners and casual labourer in non-agriculture have a positive contribution in *IBPE* and *PPPE*. The unexplained gap might be due to the other factors that are not covered in our survey data.

Table 6.5: Fairlie Non-linear Decomposition of Social Group Differences

	<i>SBPE</i>		<i>IBPE</i>		<i>PPPE</i>	
Response Variable	Logistic Results (Coefficient)	Decomposition (Coefficient)	Logistic Results (Coefficient)	Decomposition (Coefficient)	Logistic Results (Coefficient)	Decomposition (Coefficient)
Caste of Principal Earner (Reference category: Unreserved)	-1.05***	NA	-0.78***	NA	-.35***	NA
Sex of Principal Earner (SPE)	0.11	.003	0.39	-.002	-.04	-.001
Age of Principal earner (APE)	0.30***	.002	.0008	-.02	.01***	.003
Agricultural_Self employed	0.01	.01	12.8	-.06*** (-42.86%)	14.8	-.05*** (-100%)
Non Agriculture_Self-employed	0.97	-.003	14.6	-.03*** (-21.42%)	15.05	-.05*** (-100%)
Regular wage salary	1.99***	Omitted	13.6	.04*** (28.57%)	14.45	.05*** (100%)
Casual in Agriculture	-0.79	.00008	13.4	-.01*** (-7.14%)	15.00	-.01** (-20%)
Casual in non-Agriculture	-0.90	-.01	12.7	.06*** (42.86%)	14.88	.03*** (60%)
Financial Literacy Index (FLI)	4.70***	-.007	-5.30***	-.00008	.71	-.002
IncomeClass 1	.00005***	.01	.00006***	.006	8.08e-06	-.02
IncomeClass 2	.00003***	.002	.00005***	-.02	-1.09e-06	-.006
IncomeClass 3	.00002***	-.02	.00004***	.01	-3.80e-06	-.002

	SBPE		IBPE		PPPE	
IncomeClass 4	.0002***	-.005	.00003***	.05*** (35.71%)	3.27e-08	.005
Group (Unreserved)		0.91		.25		.26
Group (Reserved)		0.75		.11		.21
Difference/gap		0.16***		.14***		.05*
Explained Gap		-.01 (-6.25%)		.03 (27.27%)		-.05 (-100%)
Unexplained Gap		0.17		0.11		1
Constant	-1.26		-17.04		-16.4	
Observations	1405	1405	1405	1405	1405	1405
LR chi2(10)	249.23		197.51		30.19	
Prob > chi2	0.00		0.00		0.00	

*Significant at 10%, **Significant at 5%, *** Significant at 1%
Source: Primary Sample Survey

6.4.2 Results of Econometric Analysis for Religious Differences

6.4.2.1 Results of Binary Logistic Regression for Religious Differences

Results of binary logistic distribution show that the probability of holding savings bank account (institutional borrowing) significantly increases (decreases) for the Hindu population. Age of principal earner significantly increases the probability of holding a savings bank account as well as the probability of using the loan for production purposes. The probability of holding a savings bank account significantly increases for the principal earners who earn a regular wage, have financial literacy. All levels of income class significantly increase the probability of holding savings bank account and institutional borrowing. Surprisingly, Financial literacy significantly decreases the probability of institutional borrowing.

6.4.2.2 Results of Fairlie Decomposition Analysis for Religious differences

The study has again used Fairlie non-linear decomposition analysis to quantify the contribution of different socio-economic predictors explaining the gap in Savings bank account holding status (*SBPE*), Institutional borrowing status (*IBPE*), and Loan used for production purposes (*PPPE*) between Hindu and Muslim population⁴. The positive contribution of covariate indicates that it widens the gap between the Hindu and Muslim

population and the negative contribution indicates that it reduces the gap (Bora *et al.*, 2018). Table 6.6 indicates that the gap between the Hindu and Muslim populations in *SBPE*, *IBPE*, and *PPPE* are 0.17, 0.05, and 0.04 respectively. The gap in *SBPE* and *IBPE* between the Hindu and Muslim populations is significant at a 1% level of significance. That means the Hindu population is significantly 17% and 5% more likely to hold a savings bank account and to have institutional borrowing. However, the gap in *PPPE* between the Hindu and Muslim populations is significant at a 5% level of significance. That means the Hindu population is significantly 4% more likely to use the loan for production purposes than the Muslim population. After it is evident that there exists a religion gap, we now analyze the extent to which response variables explain these results.

The religious differences in regards to *SBPE* are mostly explained (41.18%) by FII (-23.53%), APE (-5.88%), and income level II (11.76%). Thus, among the explained gap of *SBPE*, -23.53% and -5.88% are explained by the differences in the distribution of financial literacy, age of principal earner respectively between Hindu and Muslim population. The negative gap signifies that gap in Hindu and Muslim population in holding saving bank account reduces for aged principal earners and also who have financial literacy. Income class II contributes 11.76% of the explained gap between the Hindu and Muslim populations. This positive gap indicates that the gap in Hindu and Muslim population in holding saving bank account expands for income class II.

The religious differences in respect to *IBPE* is explained by 8% by the various types of occupation status of principal earner, financial literacy and all level of income class considered in this study. Among the explained gap of *IBPE*, 60%, 80%, 200%, 40%, and 160% is explained by the differences in the distribution of self-employed in non-agriculture, regular wage earners, casual labour in non-agriculture, and for income class level 3 and 4 respectively between Hindu and Muslim population. This positive gap means gaps between

the Hindu and Muslim populations in institutional borrowing widens for these response variables. On the other hand, the negative gap means the gap between the Hindu and Muslim population in institutional borrowing reduces for self-employed in agriculture, casual labour in agriculture, those having financial literacy, and for income class 1 and 2.

Lastly, the religious differences for *PPPE* could be mostly explained (22.5%) by age of principal earner (17.5%), self-employed in agriculture (-375%), regular wage earners (175%), casual labour in non-agriculture (200%). The positive (negative) gap signifies the gap between the Hindu and Muslim population in using the loan for production purposes widens (reduces) for respective response variables. The unexplained gap might be due to the other factors that are not covered in our survey data.

Table 6.6: Fairlie Non-linear Decomposition of Religious Differences

Response Variable	<i>SBPE</i>		<i>IBPE</i>		<i>PPPE</i>	
	Logistic Results (Coefficient)	Decomposition (Coefficient)	Logistic Results (Coefficient)	Decomposition (Coefficient)	Logistic Results (Coefficient)	Decomposition (Coefficient)
Religion of Principal Earner (Reference category: Muslim)	.56***	NA	-.37**	NA	-.20	NA
Sex of Principal Earner (SPE) (Reference category: Female)	.09	-.00007	.43	.0001	-.03	-.001
Age of Principal earner (APE)	.03***	-.01*** (-5.88%)	.001	-.003	.01***	.007*** (17.5%)
Agricultural_Self employed	.17	-.007	12.6	-.15*** (-300%)	14.8	-.15*** (-375%)
Non-Agriculture_Self-employed	.98	-.006	14.4	.03*** (60%)	15.05	.001
Regular wage salary	2.04***	-.01	13.4	.04*** (80%)	14.5	.07*** (175%)
Casual in Agriculture	-.63	-.003	13.2	-.03*** (-60%)	15.04	.002
Casual in non-	-.04	.0003	12.4	.10*** (200%)	14.9	.08*** (200%)

	SBPE		IBPE		PPPE	
Agriculture						
Financial Literacy Index (FLI)	4.23***	-.04*** (-23.53%)	-5.78***	-.02*** (-40%)	.55	-.005
IncomeClass 1	.00005***	-.004	.00006***	-.03*** (-60%)	7.75e-06	.003
IncomeClass 2	.00004***	.02** (11.76%)	.00005***	-.03*** (-60%)	-6.15e-07	-.0001
IncomeClass 3	.00003***	.0009	.00004***	.02*** (40%)	-3.09e-06	.002
IncomeClass 4	.00003***	-.03	.00003***	.08*** (160%)	5.37e-07	-.002
Group (Hindu)		.85		.15		.23
Group (Muslim)		.68		.10		.19
Difference/gap		.17***		.05***		.04**
Explained Gap		.07 (41.18%)		.004 (8%)		.009 (22.5%)
Unexplained Gap		.10		.046		.031
Constant	-2.43		-17.7		-16.6	
Observations	1405	1405	1405	1405	1405	1405
LR chi2(10)	243.04		187.29		28.2	
Prob > chi2	0.00		0.00		0.00	

*Significant at 10%, **Significant at 5%, *** Significant at 1%
Source: Primary Sample Survey

6.5 Conclusion and Policy Implications

India is a land of various castes and religions. This chapter tries to figure out the disparity in the use of banking services, institutional borrowing, and the use of institutional loans for production purposes by religious and caste groups in rural India. Binary logistic analysis shows that the probability of holding a savings bank account and having institutional borrowing significantly decreases for the population belonging to the *reserved* category. It has been already shown that the *reserved* category (SC, ST, and OBC) constitute almost 84% of the total population in the sample survey, thus, it is alarming to note that they are not within the ambit of financial services. The use of loans for production purposes also significantly decreases for these segments of the population which is also worrisome from the policy point of view. The econometric result depicts that an increase in income significantly increases the probability of holding savings bank account and institutional borrowing which

is a good sign and we may conclude that income distribution does not play any role in the accession to financial services.

In addition, to identify the socio-economic determinants using binary logistic model, we have also used Fairlie non-linear decomposition analysis to quantify the contribution of different socio-economic predictors explaining the gap in Savings bank account holding status, Institutional borrowing status, Loan used for production purposes between *reserved* and *unreserved* population and Hindu and Muslim. Results showed the types of occupation of principal earners remain an important determinant in both cases. The gap in *reserved* and *unreserved* population in case of institutional borrowing and use of loan for production purposes widens for regular wage earners and casual labourers in non-agriculture. Similarly, the gap in *reserved* and *unreserved* population in institutional borrowing and use of loan for production purposes reduces for self-employed in agriculture and non-agriculture and also for the casual labourers in agriculture. Surprisingly, it is also found that the gap in Hindu and Muslim population in institutional borrowing and use of loan for production purposes widens for regular wage earners and casual labourers in non-agriculture. This result is again frightening as regular wage earners are those who have a continuous flow of income. Thus, access to financial services to all sections of the population is very necessary for India to become self-reliant in financial aspects.

Appendix 6A

Table 6.A.1 Statistical Significance of Social Group differences in Principal Earner's Age

Group	Observations	Mean	Standard Error	Standard Deviation	[95% Conf. Interval]	
Unreserved	229	43.9	.87	13.1	42.2	45.6
Reserved	1,176	41.7	.37	12.6	41.0	42.4
Combined	1,405	42.06	.34	12.7	41.4	42.7
Difference		2.23	.94		.38	4.08
Diff = mean(0) - mean(1)					t = 2.37	
Ho: diff = 0				Welch's degrees of freedom = 316.4		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.99		Pr(T > t) = 0.02		Pr(T > t) = 0.00		

Source: Primary Sample Survey

Table 6.A.2 Statistical Significance of Social Group differences in Principal Earner's Financial Literacy Index (FII)

Group	Observations	Mean	Standard Error	Standard Deviation	[95% Conf. Interval]	
Unreserved	229	.08	.01	.17	.06	.10
Reserved	1,176	.09	.004	.15	.08	.10
Combined	1,405	.09	.004	.15		
Difference		-.008	.01		.03	.02
Diff = mean(0) - mean(1)					t = -0.6	
Ho: diff = 0				Welch's degrees of freedom = 303.1		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.25		Pr(T > t) = 0.50		Pr(T > t) = 0.75		

Source: Primary Sample Survey

Table 6.A.3 Statistical Significance of Religious differences in Principal Earner's Age

Group	Observations	Mean	Standard Error	Standard Deviation	[95% Conf. Interval]	
Hindu	780	43.6	.45	12.5	42.7	44.5
Muslim	625	40.1	.51	12.8	39.2	41.2
Combined	1,405	42.06	.34	12.7	41.4	42.7
Difference		3.42	.68		2.08	4.75
Diff = mean(0) - mean(1)					t = 5.02	
Ho: diff = 0				Welch's degrees of freedom = 1321.5		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 1.00		Pr(T > t) = 0.00		Pr(T > t) = 0.00		

Source: Primary Sample Survey

Table 6.A.4 Statistical Significance of Religious differences in Principal Earner's Financial Literacy Index (FII)

Group	Observations	Mean	Standard Error	Standard Deviation	[95% Conf. Interval]	
Hindu	780	.11	.006	.16	.10	.12
Muslim	625	.06	.005	.13	.05	.07
Combined	1,405	.09	.004	.15	.08	.10
Difference		.05	.008		.03	.06
Diff = mean(0) - mean(1)					t = 6.08	
Ho: diff = 0				Welch's degrees of freedom = 1403.33		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 1.00		Pr(T > t) = 0.00		Pr(T > t) = 0.00		

Source: Primary Sample Survey

Table 6.A.5 Chi-Square Test of Association between Social Group and Discrete Explanatory Variables

Explanatory Variables					
1. Income Class 1 (First Quartile Point)					
Social Group	Income Class 1 Dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	176	53	229	1.6257 Pr = 0.202	
Reserved	856	320	1,176		
Total	1,032	373	1,405		
2. Income Class 2(Median Value)					
Social Group	Income Class 2 Dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	178	51	229	1.7466 Pr = 0.186	
Reserved	865	311	1,176		
Total	1,043	362	1,405		
3. Income Class 3 (Third Quartile)					
Social Group	Income Class 3 Dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	172	57	229	0.6958 Pr = 0.404	
Reserved	913	263	1,176		
Total	1,085	320	1,405		
4. Income Class 4					
Social Group	Income Class 4 Dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	161	68	229	3.4534 Pr = 0.06	
Reserved	895	281	1,176		
Total	1,056	349	1,405		

Explanatory Variables					
5. Sex of Principal Earner					
Social Group	Sex dummy				
	Female	Male	Total	Pearson chi2(1)	
Unreserved	16	213	229	0.4124 Pr = 0.52	
Reserved	97	1,079	1,176		
Total	113	1,292	1,405		
6. Occupation of Principal Earner: Self-employment in Agriculture					
Social Group	Self-employment in Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	184	45	229	0.0032 Pr = 0.95	
Reserved	943	233	1,176		
Total	1,127	278	1,405		
7. Occupation of Principal Earner: Self-employment in Non-Agriculture					
Social Group	Self-employment in Non-Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	181	48	229	0.1076 Pr = 0.743	
Reserved	918	258	1,176		
Total	1,099	306	1,405		
8. Occupation of Principal Earner: Regular Wage Earners					
Social Group	Regular Wage Earners dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	171	58	229	33.6904 Pr = 0.000	
Reserved	1,046	130	1,176		
Total	1,217	188	1,405		
9. Occupation of Principal Earner: Casual in Agriculture					
Social Group	Casual in Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	220	9	229	2.6658 Pr = 0.103	
Reserved	1,096	80	1,176		
Total	1,316	89	1,405		
10. Occupation of Principal Earner: Casual in Non-Agriculture					
Social Group	Casual in Non-Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Unreserved	162	67	229	8.0784 Pr = 0.00	
Reserved	715	461	1,176		
Total	877	528	1,405		

Source: Primary Sample Survey

Table 6.A.6 Chi-Square Test of Association between Religion and Discrete Explanatory Variables

Explanatory Variables					
1. Income Class 1 (First Quartile Point)					
Religion	Income Class 1 Dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	551	229	780	7.1049 Pr = 0.00	
Muslim	481	144	625		
Total	1,032	373	1405		
2. Income Class 2(Median Value)					
Religion	Income Class 2 Dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	601	179	780	7.2718 Pr = 0.00	
Muslim	442	183	625		
Total	1,043	362	1405		
3. Income Class 3 (Third Quartile)					
Religion	Income Class 3 Dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	622	158	780	6.3278 Pr = 0.01	
Muslim	463	162	625		
Total	1085	320	1405		
4. Income Class 4					
Religion	Income Class 4 Dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	567	213	780	5.7199 Pr = 0.01	
Muslim	489	136	625		
Total	1056	349	1405		
5. Sex of Principal Earner					
Religion	Sex dummy				
	Female	Male	Total	Pearson chi2(1)	
Hindu	68	712	780	1.0810 Pr = 0.30	
Muslim	45	580	625		
Total	113	1292	1405		
6. Occupation of Principal Earner: Self-employment in Agriculture					
Religion	Self-employment in Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	667	113	780	31.0250 Pr = 0.000	
Muslim	460	165	625		
Total	1127	278	1405		
7. Occupation of Principal Earner: Self-employment in Non-Agriculture					
Religion	Self-employment in Non-Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	582	198	780	13.3782 Pr = 0.000	
Muslim	517	108	625		
Total	1099	306	1405		
8. Occupation of Principal Earner: Regular Wage Earners					
Religion	Regular Wage Earners dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	634	146	780	43.0940 Pr = 0.000	
Muslim	583	42	625		

Chapter 6: Religious and Social group diversity in Borrowing and Spending behaviour:..

Total	1217	188	1405		
9. Occupation of Principal Earner: Casual in Agriculture					
Religion	Casual in Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	740	40	780	4.3005 Pr = 0.04	
Muslim	576	49	625		
Total	1316	89	1405		
10. Occupation of Principal Earner: Casual in Non-Agriculture					
Religion	Casual in Non-Agriculture dummy				
	0	1	Total	Pearson chi2(1)	
Hindu	506	274	780	4.4937 Pr = 0.03	
Muslim	371	254	625		
Total	877	528	1405		

Source: Primary Sample Survey

¹ The institutional loan takes into account loans from formal financial institutions like banks etc. and semi-formal institutions like Microfinance institutions.

² In Islamic finance, *Riba* means interest, *Gharar* means uncertainty, hazard, or risk and *Maysir* means gambling (Uddin, 2015)

³We have checked the gap in the loan used for consumption purposes between *reserved* and *unreserved* population but the difference is not significant, therefore we do not report it here.

⁴We have checked the gap in the loan used for consumption purposes between *reserved* and *unreserved* population but the difference is not significant, therefore we do not report it here.

Chapter 7: Summary, Findings, and Policy Implications

7.1 Summary and Major Findings

In today's globalized world, finance plays a pivotal role in the development of a nation and the welfare of households. But the stability of the credit sector, as well as the financial system, is imperiled when the size of non-performing assets (NPA) rises in an economy. A major upsurge of NPA leads to significant loss to the financial institutions, which is detrimental to financial stability for a developing country. In this thesis, we have highlighted the rural credit system in India that has gained importance after independence. At that time, several policies were taken to build up the institutional framework of the rural credit system in India. These are the nationalization of commercial banks followed by the setting up of RRBs and then the formation of NABARD. After that, in the late 90s, the concept of MFIs and SHG-SBL models emerged to cater to rural borrowers. Surveys conducted firstly by RBI (AIRCS) and then by NSSO (AIDIS) on India's debt situation reported the incidences of under-reporting of outstanding debt in India. Indebtedness or debt trap is also a severe concern for the rural population in India. Multiple borrowing from several financial institutions poses a major risk for these financial institutions in India.

Chapter 2 discusses the literature in four sections. The first section highlights how access to credit improves the welfare of the household as well as society. It discusses the different sources of borrowing, viz formal, semi-formal, and informal sectors of borrowing and their co-existence in the economy. Further, the study has emphasized the socio-economic and demographic factors that affect the decision to borrow as well as the decision to borrow from formal or informal sectors. It was found that the household's income, asset, land endowment, occupation status, size of household, etc. are the important determinants for

borrowing. The next section shows the variety of purposes of borrowing. It has been argued that household credit leads to economic growth if it is invested in the development of human capital and microenterprises. However, existing literature shows that the majority of the informal loans are taken for non-income generating purposes, daily consumption requirements, repayment of previous debts, and medical purposes. Households have taken loans from formal financial institutions mainly for business and consumption purposes. The third section of Chapter 2 discusses the utilization of the loan proceeds. Literature shows that borrowers often use or divert a part of the productive credit, taken from formal sources, for unproductive purposes to meet their daily consumption requirements and social obligations. Consumption smoothing is an important cause of loan diversion. Repayment of previous debt by taking new loans and multiple borrowing from different financial institutions become a common practice among the borrowers. Studies have found that loan diversion and multiple borrowings are the major reasons for loan default among borrowers. The next section emphasizes the incidence of loan default, that arise mainly from misuse of loans to meet daily consumption needs. This section also highlights the fact that there exists adverse selection that causes different borrowers to have different probabilities to repay their loans. Also, in the formal credit market, there exists asymmetric information and moral hazard which leads to non-repayment among the borrowers. Multiple borrowing turns out to be major causes for non-repayment of debt on time.

Against this background, the present study analyzed the purpose of borrowing and its actual utilization in the Indian context using secondary as well as primary data. In Chapter 3, a secondary data source, the AIDIS survey of 2003 and 2013 has been used to identify the factors that affect the probability as well as the intensity of loans taken for non-production purposes (household expenditures, repayment of the debt, financial litigation, etc.). In Chapter 4, AIDIS survey data of 2013 has been used to examine the factors that affect the

probability as well as the intensity of loans taken for physical (capital and current expenditures for farm and non-farm business, expenditure on housing, and financial investment expenditure like shares, etc.) and human capital investment purposes (investment for education and medical treatment). This part of the study is unique from the previous part of the study as AIDIS survey data of 2003 does not separately show the purposes of borrowing for medical treatment, housing, and educational expenses. However, the AIDIS survey of 2013 includes this segregation, and owing to this, it becomes possible to study the purpose of borrowing for human capital investment (investment for education and medical treatment) purposes along with the loans taken for physical capital purposes. Using this dataset (AIDIS, 2013), the study also discusses the issue of multiple borrowing and figures out the socio-economic variables that affect the household's decision to repay the outstanding debt by taking new institutional loans. From the above discussion, it is clear that NSS surveys do not provide the data of actual usage of loan proceeds after borrowing. Therefore, to find out the actual usage after borrowing and to identify the extent of loan diversion in India, a primary sample survey has been carried out in four villages from the two districts of West Bengal. In Chapter 5, using this dataset, the study emphasizes the determinants that affect the probability of loan diversion with special reference to political participation and financial literacy. In Chapter 6, using this dataset of the primary survey, the present study conducts a decomposition analysis to evaluate the religious and caste differences in the socio-economic variables that mostly contribute to the disparity in institutional borrowing, use of institutional loans, and use of banking services in rural India.

Chapter 3 analyzes the probability of institutional loans (both formal and semi-formal loans) taken for non-production purposes (household expenditures, repayment of the debt, financial litigation, etc.) and its extent using AIDIS survey data of 2003 and 2013. The study revealed that 46% and 55% of institutional loans are taken for non-production purposes

respectively. The study also identifies the factors that affect the likelihood and intensity of institutional loans taken for non-production purposes in India using Heckman Probit and Heckman Tobit analysis. This chapter makes an important contribution to the existing literature. *First*, it associates the institutional loans taken for non-production purposes with the infrastructural development in the states of India as well as the consumption and asset inequality condition present in India, which are not considered in the existing studies so far. *Second*, the study has taken into account sample selection bias and uses the Heckman sample selection model which deals with another methodological research gap in the economic literature relating to the selectivity bias in the credit market. *Third*, the existing studies have separately investigated the borrowing either from the commercial banks and co-operatives or from the MFIs. On the contrary, the present study has combined formal (banks, co-operatives, etc.) and semi-formal (MFIs) credit sources together to define them as the institutional borrowing sources. The econometric result gives some exciting facts which are as follows. *First*, the likelihood of Institutional borrowing significantly increases from 2003 to 2013. *Second*, the likelihood of Institutional borrowing significantly increases for households in the states with higher consumption and asset inequality in India. *Third*, the households in the states with higher levels of infrastructural development are significantly more likely to borrow from institutional sources. However, there are some alarming facts also. *First*, the urban population is significantly more likely to borrow a larger amount of institutional credit for non-production purposes. *Second*, the higher educational level of the household head not only increases the probability of taking institutional credit for non-production purposes but also increases the size of the loan. *Third*, the formally employed household heads are significantly more likely to borrow a larger amount of institutional credit for non-production purposes. *Fourth*, the probability of institutional borrowing for non-

production purposes significantly increases among the households in the states with a higher infrastructural development index (IDI).

Chapter 4 has two parts. In the first part, it identifies the socio-economic demographic determinants of the intensity and size of the decision to have institutional borrowing for physical and human capital investment purposes in India using AIDIS survey data of 2013. In the econometric analysis, the study has used the Box-Cox Double Hurdle model. Using this methodology, the study makes an important contribution to the existing literature of the credit market. Some of the highlights of the important results are as follows. *First*, higher financial inclusion in states also encourages households to borrow more for investment. *Second*, the expected size of institutional credit borrowed for investment significantly increases for self-employed household heads. *Third*, casual labourers are less likely to take institutional loans for investment purposes. The second part of Chapter 4 points out the fact that multiple new loans are being taken by the institutional borrowers even when all the previous institutional loans are not fully repaid in the reference period of the 70th AIDIS survey. This is termed as the institutional loan in perpetuity. This is an important contribution to the existing literature. Data shows that among the institutional borrowing, multiple borrowing occurs in 43% of cases. Among the incidences of multiple institutional borrowing, almost 16.3% of new loans are being taken by the institutional borrowers keeping their previous loans unpaid. Therefore, the later part of Chapter 4 examines the determinants of institutional borrowings that are taken to repay outstanding debt using the Instrumental Variable Probit model for the dichotomous dependent variable with continuous endogenous regressor (which is the size of outstanding Institutional loan as on date of survey) in India. Some of the important findings are as follows. *First*, the urban households are prone to multiple borrowing to repay previous debts. *Second*, the likelihood of multiple borrowing to repay previous debts significantly

increases for households with a higher level of education. *Third*, asset and rural landowning household heads are prone to multiple borrowing to repay previous debts.

Chapter 5 focuses on the actual utilization of loan proceeds and explores the borrowing and spending behaviour using a primary rural household sample survey data of 1438 households in two districts of West Bengal, India. While studying the actual utilization of loan proceeds, the existence of loan diversion has been found. Data shows that the use of institutional loans is not limited to the stated purposes according to their loan applications. Institutional loans taken for working capital needs are mostly diverted either partly or fully. Also, most of the loan diversion occurs to meet up household expenditure. This chapter also has two parts. In the first part, the study identifies the socio-economic and political determinants of the probability of loan diversion among the institutional borrowers using Heckman probit analysis. Some of the important findings from the econometric results are as follows. *First*, the Hindu principal earner is significantly more prone to the probability of loan diversion than the Muslim counterpart. *Second*, political participation plays an important role in the probability of institutional loan diversion. *Third*, financial literacy has a positive and significant impact on the probability of loan diversion. This part makes an important contribution to the existing literature by associating political participation with spending (only a few work have been found) and borrowing behaviour. By taking into account whether deprivation, as represented by a suitable index, has any effect on an individual's borrowing and spending behaviour as well as on indebtedness or not also contributes to the literature. Further, by establishing a strong link between the financial literacy and spending behaviour of loan proceeds of the institutional borrowers this study contributes to the existing literature. The second part of this chapter investigates the joint occurrences of incidence of indebtedness and loan diversion (Model 1), the incidence of multiple borrowing and loan diversion (Model 2), the incidence of indebtedness and institutional borrowing (Model 3) using the bivariate

binary choice model. Some of the important findings are as follows. *First*, Political participation plays a major role in all the models. *Second*, the borrowers involved in loan diversion are also significantly involved in multiple borrowing. *Third*, the less deprived principal earners (in terms of deprivation index) are significantly more prone to the probability of loan diversion. *Fourth*, SC/ST and OBC principal earners are less prone to the probability of loan diversion but more prone to the probability of multiple borrowing.

Chapter 6 examines whether the religious and caste differences in the socio-economic variables contribute to the disparity in institutional borrowing, use of institutional loans for production purposes, and use of banking services in rural India through a decomposition analysis. As the outcome variable is binary, the commonly used Blinder–Oaxaca decomposition technique is inapplicable. Therefore, the study uses Fairlie nonlinear decomposition technique. This chapter makes important contributions to the existing literature by reviewing the religious and caste differences in the use of banking services, institutional borrowing, and use of institutional loans for production purposes. Some of the important findings in terms of social group differences are as follows. *First*, the *unreserved* population is significantly more likely to hold a savings bank account, go for institutional borrowing, and use the loan for production purposes than *reserved* counterparts. *Second*, the occupation type of principal earner is the most important contributor here. The gap in *unreserved* and *reserved* population in institutional borrowing and use of loan for production purposes widens for regular wage earners and casual labourers in non-agriculture. On the other hand, the difference between *unreserved* and *reserved* population regarding institutional borrowing and use of loan for production purposes reduces for self-employed in agriculture and non-agriculture and also for the casual labourer in agriculture. Some of the important findings in terms of religious group differences are as follows. *First*, the Hindu population is significantly more likely to have a saving bank account, institutional borrowing, and loan for

production purposes than the Muslim population. *Second*, the difference between the Hindu and Muslim population in holding saving bank account reduces significantly for aged principal earners and also who have financial literacy. *Third*, the difference between Hindu and Muslim population to have institutional borrowing widens significantly for self-employed in non-agriculture, regular wage earners, casual labour in non-agriculture, and for higher levels of income. On the other hand, the gap reduces for self-employed in agriculture, casual labour in agriculture, those having financial literacy, and for lower levels of income.

7.2 Policy Implications and Suggestions

As discussed earlier, several initiatives have already been taken to institutionalize the rural credit system in India. Also, RBI as well as the government has taken numerous measures to achieve greater financial inclusion in India since independence. For example, opening up no-frill accounts or zero balance accounts, expansion of financial technology, electronic benefits transfers, SHG-SBL models, etc. are some of the measures that have made financial products and services more accessible to the Indian population. In the context of this study, it has been found that the higher the financial inclusion level of the states, the greater is the likelihood and extent of growth-enhancing institutional borrowing in India. Thus, financial inclusion is an important dimension for economic growth in a developing country like India.

Next, the policymakers should focus on the self-employed population in India. As per Census 2011, in rural India, among the male workers, almost 54.5% are self-employed and almost 59.3% of the female workers are self-employed. Thus, self-employment turns out to be an important occupation in India. Now, this study has found that the likelihood, as well as intensity of institutional loans taken for non-production purposes, significantly decreases for self-employed households. In Chapter 4, it has also been found that the expected size of institutional credit borrowed for investment significantly increases for self-employed

household heads. Thus, access to institutional credits should be encouraged for the self-employed household in India.

Chapter 3 of this study has found that the likelihood, as well as intensity of institutional loans taken for non-production purposes, significantly increases for the urban population. This might be due to the fact that the growth of consumerism and love for luxury products induces the urban population to borrow from institutional sources for non-production purposes. The Report of NSS 68th round (2011-12) survey of consumer expenditure also indicates this. Now, this is quite alarming from the policy point of view. Chapter 4 of this study also indicates that the debt trap significantly increases for the urban population. To curb this, strict monitoring is very much desirable. In this context, it has also been argued in the literature (Boucher and Guirking, 2007) that in the case of informal borrowing, strict monitoring by the lenders applies. Informal lenders have better access to local information. This even allows them to offer loans without collateral. Direct monitoring by the informal lenders even reduces the incidences of loan default. Therefore, strict monitoring is suggested for the formal as well as semi-formal credit institutions in urban areas to reduce the likelihood as well as intensity to take loans for non-production purposes.

Chapter 3 shows that households in the states with the higher levels of consumption inequality (West Bengal, Orissa, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, etc.) are less likely to take institutional loans for non-production purposes. This acts as a good indicator for the economy as a whole. To encourage these households, easier terms of institutional loans can be initiated where consumption inequality is higher in India.

From the econometric analysis of Chapter 5 of this study, it has been found that the FLI (financial literacy index) has a positive and significant role in the probability of loan diversion. Chapter 4 also shows that the debt trap significantly increases for households with higher education. In this context, literature (Stolper and Walter, 2017) has shown that

financial literacy makes borrowers more confident towards effective diversification of loan proceeds. Regardless of these results, financial literacy and effective education towards financial awareness are always necessary. However, strict monitoring is again advisable given these results.

Finally, Chapter 6 of this study has found that the occupation status significantly attributes to the difference among social and religious groups to hold a savings bank account, to have institutional borrowing, and to use loans for production purposes. Given this result, it is advisable to improve the access to financial products services for all sections of population in India.

7.3 Scope for further research

The present study proves the existence of loan diversion as well as borrowing for non-production purposes for institutional loans in India. However, the loan default might be an inevitable consequence of this. But, the present study does not throw any light on this issue as AIDIS survey data of 2003 and 2013 does not provide the necessary information. Information is only available regarding the outstanding loans of the respondents for the reference periods of both surveys. Information on loan repayment was not pursued in the primary survey also due to time and fund constraints as it requires a visit of respondents regularly to collect that information. Therefore, a comprehensive study taking into account both of these issues, loan diversion as well as loan default will provide possible solutions to avoid bad loans in India. However, the non-production use of institutional loans may reduce the formation of physical capital but may enhance human capital, especially when the distinction between expenditure on consumption and that of health and education is blurred. Such segregation is theoretically possible but empirically difficult to measure. Future work and survey data need to focus on these aspects to frame better policies.

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