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RESEARCH NOTES

Interlinked Credit Transactions in Rural Punjab

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I

INTRODUCTION

The pattern and consequence of inter linked credit markets have been a subject of controversy for quite some time. There are two important arguments on the effect of inter linkages. One argument says that the inter linkage have been utilised as an exploitative device by the stronger parties to extract surplus out of the weaker ones (Bhaduri, 1986 and Bharadwaj, 1974). On the other hand, while rejecting inter-linkage being necessarily exploitative, explains it's rationale in terms of information asymmetry and uncertainty (Braverman and Stiglitz, 1982). It has been envisaged that it also acts as a screening device in the selection of customers (Braverman and Guasch, 1984). It is also used as an enhanced enforcement device for execution of contracts and reducing the transactions costs in the recruitment of wage labourers (Bardhan, 1984 and Ray, 1998). Furthermore, it is pointed out that inter linking is a flexible market response to growing commercialisation (Bell and Srinivasan, 1989).

The functioning of informal credit market in the rural credit system has linkage with other markets such as labour market, input market, output market and lease market (Bell, 1988 and Reddy, 1992). The nature of linkages depends on the relative bargaining power of the parties involved in the credit transactions, relative urgency of credit and availability of formal credit. Hence, the linkages may either be beneficial to both the parties involved in credit transactions or disadvantageous to the weaker party (Reddy, 1992).

The theoretical debate that continued on the issue of rationale behind interlinked transactions has remained by and large inconclusive as yet. Furthermore at the empirical level, not many attempts have been made to examine the incidence and types of interlinked contracts involving different parties. A few studies have attempted in a limited way to explain the characteristics of the households that are involved in inter linked credit transactions in the rural areas. This study addresses some of these issues with reference to rural Punjab. More specifically, the objectives of the study are: (i) to study the type and extent of linkages between credit services and marketing; and (ii) to examine the socio-economic status of the linked credit participants determining the linkage between credit and marketing function in Punjab.

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II

METHODOLOGY

The interlinked credit transactions vary according to the level of development of the economy of an area. Therefore, in place of the study in the proper perspective, the productivity at the district level of all the districts of Punjab state was taken into consideration. All the districts were categorised into two strata namely developed and less-developed based on value productivity per hectare. The districts which lie above the state average were referred as developed ones and those which lie below the state average are referred to as less developed. One district each was selected randomly from the developed and less developed category. Ludhiana district represented the developed region while the Bathinda district represented the less-developed region. At the next stage, a list of blocks along with the productivity for each block was prepared for which data were taken from the Office of the Chief Agriculture Officer (CAO) of the concerned districts. Again, all the blocks were categorised into developed and less developed blocks as done in the case of districts. At the third stage a list of villages for each block was prepared with the help of Agriculture Officer of the concerned block and two villages from each block were randomly selected.

Selection of Respondents

A complete enumeration of all the households in the selected villages was done. A complete list of all the farmers along with their operational land was prepared in consultation with the key informants of the selected villages. Then these farmers were arranged in ascending order of their operational land holdings and were categorised into small, medium and large category by applying the cumulative cube root frequency method (Table 1). A sample of 20 per cent of the farmers was selected at random without replacement from the farm size category for this study. Similar method was used for the selection of farmers in the less developed region. Keeping in view the time and resources, five non-farmers were also randomly selected from the list of non-farmers from each village. This gave a total sample of 20 non-farmers each in the developed and less developed regions.

Data Collection

After consulting relevant literature and views of experts, well structured questionnaires were framed for farmers and non-farmers separately. The schedule was designed so as to cover the household characteristics, resource endowment features, borrowing from formal and informal agencies, repayment in cash/kind with prices for inputs and outputs involved in interlinked transactions. A second questionnaire was framed for non-farmers which covered mainly labourers both permanent and casual, artisans, etc. and elicited mainly the terms and conditions relating to tenancy contracts of labourers, assets of non-farmers and other household characteristics, etc.

TABLE 1. DETAILS REGARDING THE SAMPLE DRAWN FROM THE SELECTED AREAS OF PUNJAB

Region	Farm size category (size limits in ha)	Total number of farmers	No. of farmers selected
(1)	(2)	(3)	(4)
Developed	Small (< 1.94)	128	25
	Medium (≥ 1.94 and < 4.46)	152	31
	Large (≥ 4.46)	45	10
	Total	325	66
Less developed	Small (<2.44)	113	22
	Medium (≥ 2.44 and < 6.49)	130	27
	Large (≥ 6.49)	55	10
	Total	298	59

The data were collected personally by administering the interview schedule to the respondents. The objectives of the study were explained to the farmers. Pre-testing of the questionnaire was done and suitable changes were made. Primary data were collected from the respondents for examining the issues related to inter linked credit transactions.

Statistical Analysis

The primary data collected were tabulated and analysed using simple statistical tools such as averages, percentages and proportions. The extent of linkage was estimated by computing the number of linked/non-linked transactions made by each selected respondents. The test of significance such as Z-test and Students't-test were applied to differentiate between linked and unlinked households and between linked households in the developed and less developed regions.

Logit Regression

In order to identify the socio-economic features influencing the probability of linkage, Logit regression analysis was done by applying the following algebraic equation:

$$\log \frac{P_i}{1 - P_i} = \beta_0 + \sum_{j=1}^k \beta_j X_{ij}$$

where P_i = Probability of being linked,

$1 - P_i$ = Probability of not being linked,

This dependent variable was taken as dummy variable,

1 if the household is linked; 0 otherwise

β_0 = Constant term

X_{ij} = Explanatory variable

β_j = Regression coefficient of X_{ij} .

The specification of the explanatory variables is as under:

Education : 1 for education; 0 otherwise.

Caste : 1 for others (SC/ST, BC, OBC, etc.); 0 general

Area under tenancy	: percentage of operational area leased-in.
Operational area	: Owned land + leased in – leased-out.
NFI: FI	: Non-farm income (Rs.) divided by farm income (Rs.).
NLIGA	: Per capita income generated by non-land assets/day/year
MW: TW	: Male workers divided by total workers.

III

RESULTS AND DISCUSSION

Type and Extent of Linked Credit Transaction

In this section various kinds of inter-linkages are discussed one by one which were prevalent in the study area.

1. *Credit-Product*: It was noticed that marketing of the farm products was interlinked with credit. In the present survey this is one of the most important forms of inter-linkages. Under this system the borrower obtains credit from the lender (commission agent) to fulfill production, consumption as well as other requirements. The repayment is done by selling of produce through them in the regulated markets. It was noticed that an explicit rate of interest of 24-36 per cent per annum was charged on a day-to-day basis. The commission agent or trader secures clients and business by advancing loans to the cultivators. It is often seen that in the less developed rural area, returns from cultivation are often low and insufficient for internal financing. Under such conditions the commission agents advance loan on the condition that the produce will be sold through them. As such this tied loan acts as collateral substitute.

TABLE 2. TYPE OF INTER-LINKAGES IN INFORMAL CREDIT MARKET IN DEVELOPED AND LESS-DEVELOPED REGIONS OF RURAL PUNJAB, 2000-01

Types of inter-linkages (1)	Developed					Less-developed				
	Small (2)	Medium (3)	Large (4)	Non-farmers (5)	Total/Overall (6)	Small (7)	Medium (8)	Large (9)	Non-farmers (10)	Total/Overall (11)
Credit (input) cash	23.08	14.63	20.00	-	17.17	10.53	11.11	15.38	-	10.00
Input product	15.38	19.51	20.20	-	16.16	15.79	15.56	23.08	-	14.54
Credit product	35.90	41.46	50.00	-	36.37	44.74	46.67	61.54	-	41.82
Credit rent land	15.38	17.07	10.00	-	14.14	5.26	15.55	-	-	8.18
Land tenancy	-	-	-	-	-	15.79	6.67	-	28.57	11.82
Credit land	10.26	7.32	-	-	7.07	7.89	4.44	-	-	4.54
Credit labour	-	-	-	100.00	9.09	-	-	-	57.14	7.24
Product labour	-	-	-	-	-	-	-	-	14.28	1.82
Sample size	39	41	10	9	99	38	45	13	14	110

* Some of the respondents have more than one inter-linkage.

In the developed region credit product type of inter-linkage turned out to be 36.37 per cent while it was 41.82 per cent in the case of less developed region. This shows the predominance of credit product inter linkage in the less developed region. It was also observed that credit product type of inter linkage was found to be directly proportional to farm size in both developed and less developed regions. As such the larger farm size has higher percentage of the inter-linkages as compared to small size households' category. It was found that 50 per cent in the developed region and 61.54 per cent in the less developed region farmers belonging to large category were tied into credit product linkages respectively. The corresponding figures for small and medium farmers were 35.90 and 41.46 in the developed region and 44.74 and 46.67 per cent in the less developed region respectively.

2. *Credit-(Input)-Cash*: In this type of inter-linkage, the farmer is supplied with inputs (like seeds, fertilisers, insecticides, pesticides, etc.) by the lending agency. The lending agency may be a co-operative society (formal sector) or be input-dealers and commission agents (informal sector). The borrower is liable to repay the loan amount in terms of cash only after the harvesting season. Thus, credit is provided in the form of inputs and repayment is realised in cash terms.

The informal agencies like commission agents and input dealers do not charge any interest explicitly, though it may involve some implicit costs. In the case of formal agencies like co-operatives an interest rate of 14.5 per cent is charged on the amount (in kind) advanced. Apart from agricultural inputs, commission agents and co-operative societies also provided daily household consumption goods, e.g., grocery items to their clients. It is evident from the results that commission agents and co-operatives cater to the needs of production as well as consumption loans.

The credit-(input)-cash was found to be the second most important form of inter linkage in the developed region, the share of credit-(input)-cash inter linkage was 17.17 per cent of the total, while in the case of less developed region it was 10 per cent. It is also observed that this form of inter linkage will grow with farm size except in the case of small category of farmers in the study area.

3. *Credit Input product*: Under this system of linkage, the lender is either input dealer-cum-trader or commission agent. The lending agency supplies loan in terms of inputs like seeds, fertilisers, pesticides, etc., to the borrower. The loan is realised from the sale proceeds upon the disposal of produce in the regulated market. No interest is explicitly charged from the borrower but the system contains an element of implicit interest or hidden cost such as over charging for inputs. The commission agent also supplies inputs on the condition that the farmer will dispose of his produce through him. This is some sort of tied loan.

A look at the results presented in Table 2 show that 15.38, 19.51, 20.20 per cent of the small, medium and large farmers were tied to input product linkages in the developed village. The corresponding figure for less developed village was 15.79, 15.56 and 23.08 per cent for the above-said categories respectively. It seems that the input product linkage was directly related to the farm size which indicates that as farm size increase the incidence of such linkages increases and vice-versa. The input dealers and commission agents were the main source of input supplier in the study area. The commission agents and input dealers have preference for large farm category not only for their having better repaying capacity as compared to the small

farmers but also more volume of business offered for transaction/linkage. Hence, this category of farmers was preferred by commission agents to advance credit in the form of inputs.

4. *Credit-labour*: Under this arrangement, the lender mainly offers cash loans to borrowers constituted mainly by the labour class. The repayment of the loan amount is done in terms of labour services only. This type of linkage acts as labour tying device on behalf of the landlords who mainly supply credit to the labourers and ensures labour availability during peak harvesting periods. The landless class or agricultural labourers possess nothing else but labour services which they can pledge to get a loan. The permanent as well as casual labourers both are tied under credit labour inter linkage. Out of the 20 labourers interviewed, 16 were found to be linked, which included both casual as well as permanent labour. A perusal of Table 2 show that the credit labour linkages were found to be 9.09 and 7.24 per cent in the developed and less developed regions respectively. It was informed that no interest explicitly was charged from the labourers; instead they are provided with meals, free home, clothing and other facilities like medicine, etc. The reliability and trustworthiness of a labourer plays an important role in getting the credit from the farmers as well as the amount of loan/credit.

5. *Credit-land*: In this type of inter linkage; credit is mainly linked with land. Under this system, land is mainly kept as security and the title of land is transferred to the lender. The borrower transfers the right of the ownership-cum-use of land to the creditor until he repays the amount of loan for the specific time period (principal amount only). As such there is no interest liability on the loanee. This is known as ordinary mortgage of land prevailing in our sample villages.

The credit-land linkages were more prevalent with the small farmers both in the developed (10.26 per cent) and less developed regions (7.89 per cent). The corresponding figures for medium farmers were 7.32 and 4.44 per cent in the above-said regions respectively. It was noticed that none of the large farmers have entered in the credit land linkages in the study area. The higher credit-land inter-linkage in the developed region and inversely related to farm size indicates relative inequality increasing with the development leading to relatively working economic conditions of the small farmers in the state.

6. *Credit-(land)-labour*: In this type of linkage, land is provided by the lessor/landlord and the tenant provides his labour services and cultivates the land. Inputs like fertilisers, pesticides, seeds, insecticides, etc. were shared equally on 50:50 basis. In local language this type of linkage is known as *hissa* or sharecropping. The other type of share cropping is known as fixed rent or *chautha hissa* in which the lessor receives fixed rent for half portion of his land and for the rest he receives one-fourth of the production, e.g., if one gives 10 acres under this system @ Rs. 10,000 per annum, then on fixed rent basis he will get Rs. 50,000 plus 2.5 acres of the produce to his creditor that makes one-fourth of the total produce. The sharecropping was prevalent in the less developed villages to the extent of 11.82 per cent. This system is more popular among the small and large farmers as the former acts as tenant and the latter acts as the lessor/landlord. The figures were 15.79 and 28.57 per cent for small and non-farmers respectively in the less

developed region. The participation of the medium farmers was found to the extent of 6.67 per cent (Table 2).

7. *Credit leased-in land*: Under this system the borrower leases-in certain portion of his land for which he pays fixed rent and the ownership rights are transferred to the borrower for one year. The rent may be paid in one instalment or 50 per cent at the time of entering into the contract and 50 per cent after harvesting of first crop. A perusal of Table 2 indicates that about 14 per cent of the farmers in the developed region preferred this system. The same was 8.18 per cent in the case of less developed region. This clearly shows that credit leased-in land inter linkage was more prominent in the developed region than in the less developed one.

8. *Credit (Product) labour*: In this case the lender supplies the farm produce in kind to the borrower with the condition that he will repay by providing labour services to the lender. The borrower meets his consumption needs whereas the lender mainly (landlord) secures his labour services. No case of credit (product) labour linkage was seen in the developed region of the study area whereas 1.82 per cent of the cases in the less developed region were that of credit (product) labour linkage (Table 2). This type was only prevalent with the farm labourers in the present study.

From the above discussion it can be concluded that there are eight types of linkages in our sample area connecting with land, labour, input, output and lease market. Credit-product linkage dominated in both the developed and less developed regions. Product-labour turned out to be least important in the study area. Tenancy relating linkages were common among the small farmers whereas input-product and credit-product were more prevalent with the medium and large farmers. Non-farmers preferred credit-labour and product-labour linkages.

IV

EXTENT OF INTER LINKED CREDIT TRANSACTIONS

In this section, an attempt has been made to examine the extent of interlinked credit transactions in sample villages from the selected districts of Punjab. A perusal of Table 3 shows that the percentage of households linked were found to be decreasing as the farm size increases. It was quite lower in the case of non-farmers (30 per cent). The figures for small, medium and large farmers were found to be 52.00, 45.16 and 40.00 per cent respectively. On the other hand, in the case of less developed villages the scenario is entirely different, as the credit linkage for small and large farmers was quite high. The corresponding figures were 63.64 and 70.00 per cent respectively. It was comparatively lower in the case of medium and non-farmers categories.

It clearly shows that inter-linkages were quite dominating in the less developed region as compared to the developed region probably due to the lower education level, less infrastructure facilities, poor access to formal credit agencies etc., in the less developed region, the overall figures of linkage being 43.02 per cent for developed villages and 55.70 per cent for less developed villages (Table 3).

TABLE 3. EXTENT OF INTERLINKED CREDIT CONTRACTS AMONG RURAL HOUSEHOLDS OF DEVELOPED AND LESS DEVELOPED REGIONS IN PUNJAB, 2000-01

Household category	Developed region		Less-developed region	
	Linked households	Non-linked households	Linked households	Non-linked households
(1)	(2)	(3)	(4)	(5)
Small	13 (52.00)	12 (48.00)	14 (63.64)	8 (36.36)
Medium	14 (45.16)	17 (54.84)	15 (55.56)	12 (44.44)
Large	4 (40.00)	6 (60.00)	7 (70.00)	3 (30.00)
Non-farmers*	6 (30.00)	14 (70.00)	8 (40.00)	12 (60.00)
Overall	37 (43.02)	49 (56.98)	44 (57.70)	35 (44.30)

* Non-farmers are the persons of the household who are either wage earners, salaried persons or people self-employed in occupations other than farming.

Figures in parentheses are the percentages of the respective categories.

The data on the distribution of linked and non-linked credit contracts among various household categories is given in Table 4. For all villages combined, 74.76 per cent of the linked credit contracts were those involving a class of small farmers and 65.60 per cent being medium farmers. For large farmers and non-farmers linked credit contracts were 48.94 and 29.48 per cent respectively. The extent of non-linked credit contract for small, medium, large farmers' category and non-farmers were found to be 25.24, 34.40, 51.06, and 70.52 per cent respectively. An overall figure turned out to be 41.93 per cent. This shows that linked credit contracts outnumbered the non-linked contracts in the study area. The non-linked credit contract is one in which the borrower pays back in cash terms only.

TABLE 4. PATTERN OF CREDIT CONTRACTS AMONG THE BORROWING HOUSEHOLDS AT THE OVERALL LEVEL IN RURAL PUNJAB, 2000-01

Household category	Linked contracts		Non – linked contracts	
	Number	Percentage	Number	Percentage
(1)	(2)	(3)	(4)	(5)
Small	77	74.76	26	25.24
Medium	82	65.60	43	34.40
Large	23	48.94	24	51.06
Non-farmers	23	29.48	55	70.52
Total*	205	58.07	148	41.93

* Total number of credit contracts made by the selected respondents.

On the whole, the results clearly exhibit that the small farmers displayed a higher tendency to enter into credit contracts though large and non-farmers participation was also quite high. This may probably be due to the reason that the small farmers have poor access to formal credit as compared to the informal agencies which provide tied loans more easily with minimum hassles.

V

SOCIO-ECONOMIC CHARACTERISTICS OF THE SAMPLE RESPONDENTS

The results pertaining to the aggregate level and to each category of farmers in the developed and less developed regions are discussed separately as under:

Aggregate Level

The comparison of different socio-economic features are linked and unlinked farms at the aggregate level in the developed and less developed regions have been presented in Table 5. The tenancy was found to be significantly higher in linked farms (16.99 per cent) in the developed region while it was lower in the less-developed region and was non-significant. The mean difference in operational area and per capita non-land income generating assets (NLIGA) were significantly higher in unlinked farms in both the regions. The ratio of male workers to total workers did not show any difference significantly. The ratio of non-farm income (NFI) and farm income (FI) and education level were significantly higher on the unlinked farms as compared to linked farms in both the regions. The association of caste and family type with the linkages was found to be statistically significant in the above said regions. It reveals that the higher the level of income from non-farm activities, the education level, operational area and caste, lower is the level of linkages.

Small Farmers

It is clear from the results presented in Table 5 that the proportion of area under tenancy is significantly higher on linked households (20.38 per cent) in comparison to unlinked households (15.68 per cent). This shows that tenancy leads to credit linkages because tenancy gives birth to a number of constraints like inputs arrangements, land-rent payments, etc. The non-land income generating assets (NLIGA) were found to be lower in linked households as compared to the unlinked households. This clearly exhibits that non-land assets helps the small farms to break the linkage of credit with marketing. The coefficient relating to operated area, ratio of non-farm to farm income and ratio of male workers to total workers turned out to be statistically non-significant.

The analysis further revealed that education and caste played a significant role towards linkages. It was found that the proportion of educated on unlinked farms was higher (75 per cent) as compared to the linked farms (30.77 per cent). The difference in proportion was found to be statistically significant. This may be due to the easier access of the educated households to earning opportunities as compared to uneducated households.¹ Similarly the incidence of linked credit transaction was found to be lower in the case of general category (23.08 per cent) as compared to backward castes (66.67 per cent). General caste had less reference or credit linked contracts and linkages were found to be more when there was a shift from general to backward caste. The difference in proportion was found to be statistically significant. It shows that caste status do effect the linkage of credit with marketing. The type of family came to be non-significant factor statistically which show that it does not effect linkage of credit with marketing.

TABLE 5. SOCIO-ECONOMIC FEATURES OF LINKED AND UNLINKED FARMS IN DEVELOPED AND LESS DEVELOPED REGIONS, 2000-01

Variables (1)	Small farmers				Medium farmers			
	Developed		Less-developed		Developed		Less-developed	
	Linked [@] (2)	Unlinked (3)	Linked (4)	Unlinked (5)	Linked [@] (6)	Unlinked (7)	Linked (8)	Unlinked (9)
Area under tenancy (per cent)	20.38 (0.43 ^{NS})	15.68 (2.80 ^{***})	19.46	21.44 (0.88 ^{NS})	16.10 (2.85 ^{***})	10.97 (4.53 ^{***})	12.50	13.81 (1.12 ^{NS})
Operational area (ha)	1.27 (0.61 ^{NS})	1.31 (0.22 ^{NS})	1.36	2.01 (3.17 ^{***})	3.19 (3.80 ^{***})	3.71 (2.39 ^{**})	4.07	5.87 (5.20 ^{***})
NFI: FI (Ratio)	0.35 (5.89 ^{***})	0.41 (1.66 ^{NS})	0.18	0.24 (1.74 ^{NS})	0.31 (3.95 ^{***})	0.37 (1.41 ^{NS})	0.19	0.24 (1.51 ^{NS})
NLIGA (Rs./day/person)	43.34 (4.07 ^{***})	155.60 (24.64 ^{***})	33.24	86.98 (17.20 ^{***})	83.21 (9.39 ^{***})	252.94 (22.45 ^{***})	49.77	98.65 (11.39 ^{***})
MW: TW (Ratio)	0.70 (0.71 ^{NS})	0.79 (1.40 ^{NS})	0.74	0.82 (1.04 ^{NS})	0.77 (0.27 ^{NS})	0.81 (0.58 ^{NS})	0.79	0.84 (0.51 ^{NS})
Education (Educated per cent)	30.77 (0.12 ^{NS})	75.00 (2.21 ^{**})	28.57	75.00 (2.10 ^{**})	21.43 (0.72 ^{NS})	70.59 (2.73 ^{***})	33.33	75.00 (2.15 ^{NS})
Caste (General per cent)	23.08 (0.10 ^{NS})	66.67 (2.19 ^{NS})	21.43	75.00 (2.46 ^{NS})	28.57 (0.11 ^{NS})	70.59 (2.33 ^{***})	26.67	66.67 (2.08 ^{**})
Family type (joint per cent)	38.46 (0.15 ^{NS})	66.67 (1.41 ^{NS})	35.71	62.50 (1.21 ^{NS})	42.86 (0.16 ^{NS})	58.82 (0.89 ^{NS})	40.00	58.33 (0.95 ^{NS})

Variables (1)	Large farmers				Aggregate			
	Developed		Less-developed		Developed		Less-Developed	
	Linked [@] (10)	Unlinked (11)	Linked (12)	Unlinked (13)	Linked [@] (14)	Unlinked (15)	Linked (16)	Unlinked (17)
Area under tenancy (per cent)	9.09 (0.27 ^{NS})	6.99 (1.35 ^{NS})	9.48	11.63 (1.39 ^{NS})	16.99 (0.67 ^{NS})	11.90 (2.42 ^{***})	14.62	16.18 (0.93 ^{NS})
Operational area (ha)	5.12 (2.73 ^{***})	6.82 (2.82 ^{**})	6.63	8.86 (2.82 ^{**})	2.63 (0.78 ^{NS})	3.42 (0.42 ^{NS})	3.51	4.92 (4.15 ^{***})
NFI: FI (Ratio)	0.29 (1.54 ^{NS})	0.36 (0.60 ^{NS})	0.19	0.23 (0.63 ^{NS})	0.32 (7.23 ^{***})	0.38 (1.79 ^{**})	0.19	0.24 (1.98 [*])
NLIGA (Rs./day/person)	207.50 (16.29 ^{***})	481.67 (17.99 ^{***})	52.41	110.64 (8.66 ^{***})	82.53 (5.13 ^{***})	258.78 (30.15 ^{***})	43.86	96.15 (20.25 ^{***})
MW: TW (Ratio)	0.82 (0.14 ^{NS})	0.88 (0.34 ^{NS})	0.84	0.91 (0.45 ^{NS})	0.75 (0.82 ^{NS})	0.82 (1.67 ^{NS})	0.78	0.84 (1.42 ^{NS})
Education (Educated per cent)	0.00 (1.18 ^{NS})	66.67 (2.11 ^{**})	28.57	100.00 (2.07 ^{***})	22.58 (0.74 ^{NS})	71.43 (3.98 ^{***})	30.55	78.26 (3.60 ^{***})
Caste (General per cent)	0.00 (1.18 ^{NS})	83.33 (2.58 ^{**})	28.57	100.00 (2.07 ^{***})	22.58 (0.29 ^{NS})	71.43 (3.98 ^{***})	25.00	73.92 (3.70 [*])
Family type (joint per cent)	25.00 (0.59 ^{NS})	66.67 (1.29 ^{NS})	42.88	66.67 (0.69 ^{NS})	38.71 (0.23 ^{NS})	62.86 (1.95 ^{**})	38.89	60.86 (1.63 [*])

Figures in parentheses are calculated t-values and Z-values pertaining to linked and non-linked farmers.

@ Figures in parentheses under linked are calculated t-values and Z-values pertaining to the small, medium and large linked farmers in developed and less-developed regions.

*** and ** Significant at 1 and 5 per cent levels respectively ; NS - Non-significant.

A perusal of Table 5 shows that in the less developed region unlinked farms have large operated area (2.01 ha.) as compared to linked farms (1.36 ha.). The difference in operated area turned out to be statistically significant. This shows that large farm size led to higher earning and lower level of linkages. The per capita non-land income generating assets (NLIGA) such as incomes from dairy, poultry, hiring-out machinery, etc., were lower with linked farms (Rs. 33.24) as compared to unlinked farms (Rs. 86.98) and the difference was found to be statistically significant. This shows an augmentation of income resulting into breaking off the linkages of credit with marketing. The coefficient of tenancy in the less developed area was found to be statistically non-significant. The ratio of non-farm's income (NFI) to farm income (FI) and the ratio of male workers (MW) to total workers (TW) did not display any significant difference as shown by the calculated t-values. The results further reveal that the proportion of education and caste depicted a significant difference between linked and non-linked respondents belonging to small category of farm in the less developed region. The said proportion turned out to be statistically significant. On the other hand, family type did not show any association between linking of credit with marketing.

Medium Farmers

The comparison of different socio-economic features of linked and unlinked medium farms in the developed region have been presented in Table 5. The tenancy was found to be significantly higher in linked farms (16.10 per cent). The mean difference in operational area and per capita non-land income generating assets (NLIGA) were significantly higher in unlinked farms (3.71 ha.). This shows that agricultural as well as non-agricultural income helped to reduce the incidence of linkage of credit with marketing. The households belonging to lower castes were tied to the linked credit because of lower level of earnings to sustain their living. This may be because of poor access to employment opportunities and illiteracy among lower castes and uneducated respondents. The ratio of non-farm income to farm income, ratio of male workers to total workers and family type did not show any difference significantly.

The data presented in Table 5 show that the operational area (4.07 ha.) and NLIGA (Rs. 49.77) were significantly lower in linked farms as compared to the unlinked medium farms in the less developed region, the respective figures being 5.87 ha. and Rs. 98.65. This indicates that the lower level of income forced them to link credit transactions with marketing services. The tenancy pattern, ratio of non-farm incomes to farm income and ratio of male workers to total workers did not display any significant differences. The difference which came across may be due to random factor. The association of education and caste with the linkages was found to be statistically significant. It reveals that higher the level of education and caste, lower is the level of linkages.

Large Farmers

The different socio-economic variables of linked and unlinked large farms in the developed region are compared in Table 5. The analysis shows that the operational

area was significantly higher on unlinked farms (6.82 ha.) as compared to the linked farms (5.12 ha.). Similarly NLIGA were also significantly higher in the unlinked farms (Rs.481.67) as that of linked farms (Rs. 207.50). This revealed that larger the farm size and non-farm resources, lower will be the incidence of tied linked transactions. Tenancy though was higher in linked farms but was non-significant in comparison to the unlinked farms. The difference in the ratios of non-farm incomes to farm incomes and ratio of male workers to total workers was also found to be non-significant statistically. The analysis further revealed that a vast majority of the unlinked households were more educated (66.67 per cent) and belonged to higher castes (83.33 per cent). The difference in these ratios was found to be statistically significant. Family type did not display any difference between linked and unlinked farms.

The results given in Table 5 clearly exhibit that in the case of linked farms operational farm size (6.63 ha.) and NLIGA (Rs. 52.41), the corresponding figures were significantly lower on the unlinked farms as compared to those on linked farms in the less developed region (8.86 ha. and Rs. 110.64 respectively) in the less developed region. This shows that lower level of agricultural as well as non-farm assets lead to the linkage of credit with marketing. Tenancy, ratio of non-farm income to farm income and ratio of male workers to total workers were, although, higher on unlinked farms yet their coefficient turned out to be statistically non-significant. So the difference in these variables on linked and unlinked farms may be due to random error. The analysis further revealed that all the unlinked farms were educated and belonged to higher castes and their mean difference was found to be statistically significant.

Linked Farmers in the Developed and Less-developed Regions

The results presented in Table 5 compare the socio-economic characteristics of linked farms in the developed and less developed regions. The results at the aggregate level exhibit that the ratio of non-farm income (NFI) to farm income (FI) and difference in NLIGA were significantly higher in the developed region. The results further reveal that the remaining socio-economic factors did not display any difference statistically between developed and less-developed regions. The results further show that among the small farmers the ratio of non-farm income to farm income was significantly higher in the developed region (0.35) than in the less developed region (0.18). Similar trend was observed in the case of NLIGA, where the difference was found to be statistically significant. The difference between tenancy, operated area, ratio of male workers to total workers, education, caste and family type were found to be statistically non-significant between the developed and less developed regions.

Tenancy was found to be significantly higher in the developed region (16.10 per cent). The mean difference in operational area and per capita non-land income generating assets (NLIGA) were significantly higher in unlinked farms (3.71 ha.). This shows that agricultural as well as non-agricultural income helped to reduce the incidence of linkage of credit with marketing. The households belonging to lower castes are having higher incidence of tied credit linked transaction due to lower level

of earnings. The ratio of non-farm income to farm income, ratio to male workers to total workers and family type did not show any difference significantly and whatever are the differences in these variables may be due to random error.

The comparison between linked farms of developed and less developed regions show that the linked medium farms had higher level of tenancy in the developed region (16.10 per cent) in comparison to that in the less developed region (12.50 per cent), which was found to be statistically significant. This may be due to larger size of owned holdings in the less developed region. Similarly, the ratio of non-farm income to farm income and non-land income generating assets (NLIGA) were also significantly higher in the developed region while operational farm size was significantly higher in the less developed region. This pointed towards the increased role of these features in the linkages of credit.

A comparison of different socio-economic features of linked large farms related to developed and less developed farms is made in Table 5. The operational area was significantly higher in the less developed region as compared to the area in the developed region, while the NLIGA was significantly higher in the developed region. The coefficients of tenancy, ratio of non-farm income to farm income and ratio of male workers to total workers were found statistically non-significant. The differences in the proportion of education, caste and family type were also found to be the non-significant.

Linked Non-farmers

There are only five socio-economic characteristics which were taken into account in the case of non-farmers households, because tenancy, operational area, ratio of non-farm income to farm income were not related to the non-farmers. The data presented in Table 6 indicate that NLIGA was significantly higher in the developed region (Rs. 92.67) as compared to that in the less developed region (Rs. 71.43). This is the only factor, which differentiates the linked farmers between the developed and less developed regions. The other variables such as ratio of male workers to total

TABLE 6: COMPARISON OF SOCIO-ECONOMIC FEATURES OF LINKED NON-FARMERS IN DEVELOPED AND LESS DEVELOPED REGIONS, 2000-01

Variables (1)	Unit (2)	Linked		t-value/Z-value (5)
		Developed (3)	Less developed (4)	
NLIGA	Rs./household	92.67	71.43	5.63***
MW: TW	Ratio	0.72	0.76	0.42 ^{NS}
Education (educated)	Percentage	16.67	25.00	0.38 ^{NS}
Caste (general)	Percentage	16.67	12.50	0.22 ^{NS}
Family type (joint)	Percentage	33.33	37.50	0.16 ^{NS}

*** and ** Significant at 1 and 5 per cent level respectively. NS: Non-significant.

workers, education, caste and family type were found to be statistically non-significant. Overall it can be concluded that the augmentation of income, either farm assets or non-farm assets help the creditors to break the linkage of credit with inputs, product, cash, labour, etc. These farms entered into linked credit transaction due to

the higher level of tenancy. The respondents having higher level of education and higher caste generally does not enter into linked credit transactions rather they get the credit from the commercial banks and pay back in cash terms. This may be due to the easy access to formal institutions for credit transactions. The results reveal that in the developed regions the linked households were having more NLIGA and less operated area as compared to the linked households in the less developed regions.

VI

SOCIO-ECONOMIC FACTORS AFFECTING PROBABILITY OF LINKAGES IN DEVELOPED REGION

The factors affecting probability of linkages were identified by applying Logit form of regression. The results for different categories of respondents in the developed region are presented in Table 7. The value of R^2 ranged between 0.6181

TABLE 7. LOGIT REGRESSION ANALYSIS SHOWING REGRESSION COEFFICIENTS IN DEVELOPED AND LESS DEVELOPED REGIONS OF PUNJAB, 2000-01

Variable (1)	Small		Medium		All farmers		Non-farmers	
	Develop- ed (2)	Less- developed (3)	Developed (4)	Less- develop- ed (5)	Develop- ed (6)	Less- developed (7)	Developed (8)	Less- develop- ed (9)
Constant	124.17 ^{NS} (1.71)	11.37 ^{NS} (0.96)	91.57 ^{**} (2.06)	23.17 ^{**} (2.35)	108.33 ^{NS} (1.67)	18.64 ^{**} (2.11)	126.41 ^{NS} (0.96)	16.37 ^{NS} (1.45)
Education								
Educated=1	-0.041 ^{**} (2.28)	-0.061 ^{**} (2.24)	-0.372 ^{***} (6.64)	-0.041 ^{***} (3.74)	-0.318 ^{***} (5.51)	-0.046 ^{***} (4.88)	-0.167 ^{***} (3.67)	-0.072 ^{**} (1.98)
Uneducated=0								
Caste								
General = 0	+0.037 ^{**} (2.76)	+0.040 ^{**} (2.36)	+0.063 ^{***} (3.67)	0.037 ^{***} (3.81)	+0.058 ^{**} (3.97)	0.039 ^{***} (3.96)	+0.063 ^{**} (2.11)	+0.076 ^{**} (2.55)
Others = 1								
Area under tenancy	0.037 ^{***} (2.95)	0.061 ^{NS} (0.71)	0.058 ^{NS} (0.855)	0.026 ^{NS} (1.03)	0.051 ^{***} (4.03)	0.034 ^{NS} (1.18)	--	--
Operational area	-0.43 ^{NS} (0.51)	-0.391 ^{**} (2.56)	-0.077 ^{**} (2.26)	-0.289 ^{**} (2.48)	-0.69 ^{***} (3.55)	-0.304 ^{**} (2.53)	--	--
NFI: FI	-0.26 ^{NS} (0.63)	-0.016 ^{NS} (0.38)	-0.39 ^{NS} (1.57)	-0.078 ^{NS} (1.23)	-0.36 ^{NS} (0.97)	-0.081 ^{NS} (0.96)	--	--
NLIGA	-0.091 ^{***} (2.83)	-0.032 ^{**} (3.19)	-0.096 ^{***} (2.91)	-0.047 ^{**} (1.97)	-0.088 ^{**} (2.51)	-0.051 ^{**} (2.34)	-0.045 ^{**} (2.87)	-0.053 ^{**} (2.67)
MW : TW	-0.004 (0.18)	-0.003 ^{NS} (0.47)	-0.011 ^{NS} (1.07)	-0.002 ^{NS} (0.59)	-0.009 ^{NS} (0.98)	-0.003 ^{NS} (0.87)	-0.003 (0.89)	-0.003 ^{NS} (0.67)
R^2	0.7184	0.7328	0.8107	0.7835	0.8619	0.8115	0.6181	0.6041

Figures in parentheses indicate calculated t-values.

*** and ** Significant at 1 and 5 per cent level respectively; NS: Non-significant.

for non-farmers to 0.8619 for all the farms. This showed that the variables included in different equations explained 61.81 to 86.19 per cent of variations to the probability of linkages. The regression coefficient of education and caste were statistically significant in all the situations. This indicated that increase in education would lead to decline in the probability to be linked. Likewise the general caste had lower possibility of linkage. Similar is the case of NLIGA. The ratio of non-farm income and the ratio of male workers to total workers were found to be non-significant contributors towards the probability of linkages on all the respondents' categories. The role of operational area came to be negative but non-significant on

small farms and significant on medium, and all the farms together. This showed that the probability of linkages is diminishing with the increase in the operational farm size.

The educated persons and general caste households may be in a better position to capture the earning opportunities as compared to the uneducated and lower caste persons. Similarly the operational area is a negative contributor towards probability of linkages. This shows that as farm size increases the level of income is also increased. Hence the probability of the linkage is reduced. As the level of tenancy increases, the probability of linkages of credit with marketing on small as well as at the overall level also increases. This may be due to the payment of land rent and additional expenditure on inputs on tenanted land. The medium and large farms may have the surplus amount with them to meet their requirements.

VII

SOCIO-ECONOMIC FACTORS AFFECTING PROBABILITY OF LINKAGES IN LESS DEVELOPED REGIONS

The results presented in Table 7 also show the Logit regression on all the categories of respondents in the underdeveloped region. The value of coefficients of Multiple Determination (R^2) ranged between 0.6041 on non-farms to 0.8115 on all the farms together. Thus, the independent variables included in the equations could explain the variation in the probability of linkages from 60.41 to 81.15 per cent. The contribution of education and caste being unlinked due to the better access to the work opportunities as compared to the uneducated and low caste persons. Similarly, operated area and NLIGA were also found to be significant contributors towards breaking of linkages of credit market. The increase in operation area leads to the increase in agricultural income while increase in NLIGA helps to supplement the farm family income. Therefore both these income generating assets help the households to do away with linked credit market and to get loan independent of any type of links. In the less developed region tenancy emerges to be the non-significant factor for the probability of linkages. Similarly, the regression coefficients of ratio of non-farm income to farm income and ratio of male workers to total workers are found to be non-significant.

To sum up, the education, caste, operational area and NLIGA emerged as the negative factors towards probability of being linked credit or in other words these factors contribute positively towards the doing away with the linkages of credit on all the categories of households in the developed as well as less developed region. Education and caste played its role in being able to provide better and easy access to work/job market while land and non-land assets played its role being direct factors of production and realisation. This also pointed towards the better social status of educated and high caste households in the society but the tenancy emerged as the significant factor contributing towards being linked in the developed region while the same was non-significant in the less developed region. This may be due to the high rate of land rent and input cost in the developed region as compared to those in the less developed region.

VIII

POLICY IMPLICATIONS

The various types of linkages in the credit transactions were found to ensure business security for the players involved in lending. However, these were borrower friendly but only at a cost. The operational cost of these linkages was to the disadvantage of the borrowers. This needs to be institutionalised in a way that shares the incremental costs between the borrowers and lenders appropriately. The clients of these linkages had small resource endowments and lacked education, awareness and access to institutional finance. Although, an attempt was made by the co-operatives to link input credit supply with product marketing in the 1960s but it did not succeed because of the lack of stakeholders' participation in the formulation, planning, execution and their awareness. The study points to strengthening these aspects for development-oriented lending systems. The results of this investigation form a basis to plan these linkages through institutional mechanism and save the resource weak farmers and non-farmers from the exploitation by informal agencies. No doubt, self-help groups and micro credit is a step in this direction, but its development and dimensions need a fast rate of expansion.

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NOTE

1. Educated respondents are the persons who have received formal education with a primary level as the minimum and uneducated are those who have received no formal education.

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