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**A THEORETICAL APPROACH TO  
THE DYNAMICS OF RURAL  
INDEBTEDNESS: A REVIEW OF  
LITERATURE**

A DISSERTATION SUBMITTED TO THE  
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A study of indebtedness itself leads one to indebtedness. Luckily it is not financial here.

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## CHAPTER I

### INTRODUCTION

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The theoretical analysis of the problem of indebtedness now present in economic literature explains in isolation the various determining factors of demand for loans, the economic calculations that the lender makes before he /she extends a loan, the distinguishing features, structure and formation of the rural interest rates and to a certain extent the dynamics of rural indebtedness. This work is confined to critical review of the theories put forward by various authors to explain the problem of rural indebtedness. The demand and supply functions of loan, the formation of rate of interest in the rural areas, its role in the perpetuation of indebtedness and finally the dynamics of rural indebtedness are examined.

The focus of this study will be on the behaviour pattern of the small farmers in their management of loan transaction, though the theoretical formulation is and may be generalised for all the income / asset groups. By and large the analysis centers around the small income groups, though some studies don't specifically deal with the small income group per se. The studies that we shall review here

are about the transactions that take place in the informal sector.

The chapter scheme is as follows: The second chapter is devoted to an examination of the various formulations relating to the demand for loans . . . The third chapter examines the determinants of supply of loans by the money lenders to the groups under consideration. This chapter will also examine the determinants of rural interest rates. The fourth chapter is set aside for the analysis of the default/ repayment behaviour of the borrowers and of the dynamics of rural indebtedness. The last chapter gives the summary and conclusions.

## CHAPTER II

### The Determinants of Demand for Loan

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In the theoretical discussion of rural indebtedness one should examine all the forces that influence the peasant's demand for loans. This is required because the factors that affect borrowing may be able to explain the dynamic nature of rural indebtedness. In this chapter we shall discuss all those major forces that determine the demand for loan function.

It should be mentioned at the outset that the literature reviewed here is about the demand for credit by the small farmer, though the logic of the borrowing behaviour may be extended to all farmers irrespective of the size of operation. The literature on the demand for loan is mainly about the demand for production loans. In this chapter emphasis will be given to articles that have a theoretical model. Those articles that have both theoretical and empirical analyses, emphasis will be given to the former. We will examine only the salient results and see whether they support the hypothesis made by the

author in the theoretical model. We shall first critically examine the theoretical model in the article and then examine empirical results. The data in the empirical model, nor the results are reproduced here.

Pani.P.K.

Pani(1966), examines ,the nature of demand for credit in rural areas. He uses an econometric model to measure the propensities of different classes of cultivators to incur loan finance in relation to changing rates of interest on cash loans. His model is restricted by the availability of data provided by the Reserve Bank of India .

He assumes that the independent variables affect loan linearly and fits a regression equation without the stochastic error term as given below.

$$b = a_0 + a_1 R + a_2 C + a_3 F + a_4 A$$

Where,

B= loans during the Year( average per cultivating households

R= Average interest rate in the district at which loans are secured

C= capital expenditure in agriculture during the year ( average per cultivating household)



F= Family expenditure on selected items which are assumed to necessitate loans during the year ( average per cultivating household)

A= Value of important (selected) assets held by a cultivating household in the year.

Pani has taken cognizance of the importance of purpose of loan in the determination of borrowing . The farmers are forced to borrow when a deficit occurs, either for family expenditure which is not productive or for capital expenditure which is productive. it should be mentioned here that the classification for loans according to various purposes was done by the RBI while conducting the All India Rural Credit Survey. In equation, therefore, Pani includes two important items on which the households are likely to spend their income. These variables are capital expenditure (C) and Family expenditure(F). The first variable R is the rate of interest . As we shall see shortly, Pani has devised a method of calculating the rate of interest because of the existence of non -uniform interest rate over various regions . In this paper , he tries to show that the elasticity of demand for loan with respect to interest rate is different for different purpose of borrowing.

The fourth independent variable is used

by Pani to take into account partly the size of operation and partly the repaying capacity of the cultivators. Though Pani does not elaborate how this variable explains the size of operation and the repaying capacity, it could be assumed that the higher the asset higher will be the size of operation of the farmer and higher the operation, the higher will be the repaying capacity of the borrower. The parameters  $a_1, a_2, a_3, a_4$  are estimated by using least square method. He has not included the influence of outstanding debt on the levels of borrowing because when he examined, the simple correlation between loan and ratio of debt to the total value of assets, he found that it was small. Moreover, he did not have sufficient data to include it as an independent variable.

Pani admits the difficulty in estimating the interest rates prevailing in the rural areas. The difficulty arises because some loans are given free of interest charges but the lenders get produce from the borrower's land. Another reason is that though some loans are reported to be free of any interest but may involve an interest element which is difficult to evaluate.

He uses two rates of interest, one exclusive of loans at the "nil" rates of interest ( $R_1$ ) and another inclusive of it ( $R_2$ ). These two rates are used as average rate of interest prevailing in

each district under study. He computes the weighted average interest rate for a district in the following manner.

If  $B_i$  denotes loan and  $R_i$  the midpoint of the range of interest rates at which loans  $B_i$  are obtained in a district, the average rate of interest for a district is computed as the arithmetic average  $\frac{\sum B_i R_i}{\sum B_i}$ , the summation extending over all the ranges of interest rates.

Pani says that there is considerable amount of fragmentation in the rural money market with very little flow of funds between districts. There is very little link between organised and unorganised money markets resulting there by in a variation of average interest rates over districts. He also provides a table showing the variation of interest rate and the distribution of districts according to the average rate of interest (both  $R_1$  and  $R_2$ )

He states that the interest rate is influenced by the liquidity in the rural areas. With greater monetisation, the interest rates tend to be low. When institutionalized agencies provide loans, the gap between the rates at which credit is made available by the two sources, namely institutionalised and non institutionalised, tend to decline. If the share of cash receipts to total receipts (L) is taken as a measure of monetisation and the share of institutions

finance in the total loans to cultivators is denoted by  $I$ , in a district, Pani states that a linear relation of the type

$$R_1 = b_0 + b_1 L + b_2 I$$

between the rate of interest,  $R_1$  and the above mentioned two factors can be postulated. The parameters  $b_0, b_1$  and  $b_2$  are estimated by the method of least squares. (Pani has given the results in his article but as we said earlier we shall not present them here.)

Pani admits that the following variables were not included in his model because data relating to income were not collected during the Survey conducted by the RBI.

- 1) income in the current period
- 2) difference between expected income and actual income during the year.
- 3) liquid current resources.
- 4) Level of previous debt or debt burden charged on the asset at the beginning of the year.

The omission of these variables may influence the results because 1) borrowing could be influenced by the income that a farmer can get during the current period. If his income declines due to say, bad weather, the demand for loans will be high. Ignoring these variable, thus may not be advisable in theoretical formulation. 2) if the farmer expects certain level of income for the ensuing period but his actual

income has fallen short of what was expected say , because of a bad weather, he will be forced to borrow. So the deviation of actual income from the expected income also has an influence on the demand for loan function. 3) the liquid cash reserves and saving deposits with the post office may reduce the probability of borrowing in case of contingencies . Moreover, assets like gold and silver can easily be sold , and therefore such reserves also may reduce the need to borrow. 4) the farmers are influenced by the debt burden that is already present before fresh loans are taken. Farmers may also have to borrow to service their debt. Therefore one of the factors that influences the borrowing function is the debt burdens of the farmer.

We have to examine the variables used by Pani before we can conclude that the model is logically consistent . Pani has specified Borrowing as a function of capital expenditure, family expenditure , interest rate and value of assets . It could be possible that capital expenditure and family expenditure are determined by interest rates . Moreover , capital expenditure and family expenditure also could be influenced by the amount that a farmer may borrow. We see , therefore , a variety of interdependence among the variables used in the equation. This is a drawback in regression model because multicollinearity may affect

the reliability of the regression coefficients. Values of many of these variables are simultaneously determined and a single equation model will not be able to explain the system. However, Pani has not discussed this problem at all.

After having discussed the theoretical model presented by Pani, let us examine the results that he gets when he fitted the above equation on the data provided by RBI. He has also estimated the contribution of each additional variable to the variance of loans. This was done by omitting comparatively less significant variables from the regression equation. After examining the results, the author states that despite the fact that its standard error is high, if an additional variable increases the multiple correlation that variable can be considered as an explanatory variable. He has obtained the results that capital expenditure and family expenditure are positively associated with loans and interest rates and loans are negatively related

Pani has estimated the elasticity of demand for loan with respect to changes in the average rate of interest, capital expenditure on farm and average value of selected assets. He has constructed a scatter diagram, (which he has not given in his article) and he found that the loans and interest rate relationship is not exactly linear, in the data given by RBI for

both 1951-52 and 1956-60. The slope of the demand curve is seen to decline as the rate of interest goes up. Pani does not give any explanation for this phenomenon. However, Pani has used only a linear regression in his analysis.

Another result that Pani obtained was that, in developed agricultural regions, [measure of development was based on the level of commercialisation, monetisation and level of production i.e., whether the region had a subsistence level of production or not], the interest rates were low and the response of farmers to the change in interest rate was high. Interest rates were observed to be high where agriculture was less developed and in such places the cultivators were less responsive to changes in the rate of interest. This conclusion is in consonance with his earlier statement that demand for credit for household consumption may be interest inelastic. Where agriculture is not developed one may assume that loans are taken to a great extent for household expenditure.

Pani's model captures the fact that the aggregate figures to which regression is fitted will be influenced by the behavior pattern of the top classes of cultivators. In order to rectify this problem, Pani has fitted regression equations separately for different classes of cultivators. Pani observes, "The marginal propensity to borrow with respect to

changes in the interest rate shows a decline from the top group to the bottom group of cultivators..."[p. 192]. He has used  $R_1$  for this calculation, though he has not specified why he does so. It should be mentioned here that it would be better to explain in terms of elasticity of demand for loans with respect to changes in interest rate than using the marginal propensity to borrow, because the former shows the response of each group to changes in the interest rate whereas the latter does not. In fact this is what he does in the next sentence in which he says about the percentage change in the rate of interest and the loan demanded. He says that the top classes of cultivators have alternative sources of funds (eg. their own saving) which make their response higher whereas "In the case of bottom groups of cultivators, their, relatively lower credit rating and other factors which are responsible for the prevalence of high interest rate on their loans, seems to be responsible also for their being relatively less responsive to changes in the interest rate".[p.197]. However, Pani does not say what 'credit rating' and 'other factors' mean.

Pani has also noticed that there has been a divergence of trend in the marginal propensity to borrow with respect to changes in interest rate. To quote Pani:," In 1951-52, the elasticity of the bottom 50% of cultivators is quite small being -0.10, while



for the top 50% of cultivators it is -0.51. In 1956-60, however, the elasticities for the top 10 and top 30% of cultivators are 0.15 and -0.10 respectively, being smaller than 0.39 and -0.25 for the middle 40% and bottom 30% of cultivators." [p 197]. This divergence, Pani says, is possible because the marginal changes in loans are small in the top group of cultivators. However, Pani does not elaborate why there is change in elasticity over the period of time.

Pani's pioneering work quantitatively shows the relationship between various variables. His regression analysis showed a broad framework in which the loan transaction takes place in the rural areas. Moreover, he has calculated the multiple correlation for various sub groups using the two interest rates mentioned above.

However, Pani's empirical tests have certain shortcomings. As mentioned earlier, multicollinearity would pose a problem in econometric analysis of this sort. Though he has not discussed this problem in his theoretical model, multicollinearity was detected and he admits that this makes the estimates of the parameters uncertain.

As mentioned earlier, Pani has not gone into detail why the top class had a difference in elasticity of demand with respect to interest rate in the two surveys mentioned above. Though we cannot say

anything categorically about this because Pani has analysed top 50% in the first Survey and later in the second Survey the top 10% , we may postulate that the demand elasticity with respect to interest rate has declined over the period of time because the credit requirement of the top class for investment purpose , arising due to changes in agriculture scenario, became inelastic.

In spite of the shortcoming, Pani's work deserves credit because of its pioneering nature in quantifying various variables and their effect on total borrowing .As we shall see later, many others have relied on his model for further theoretical development.

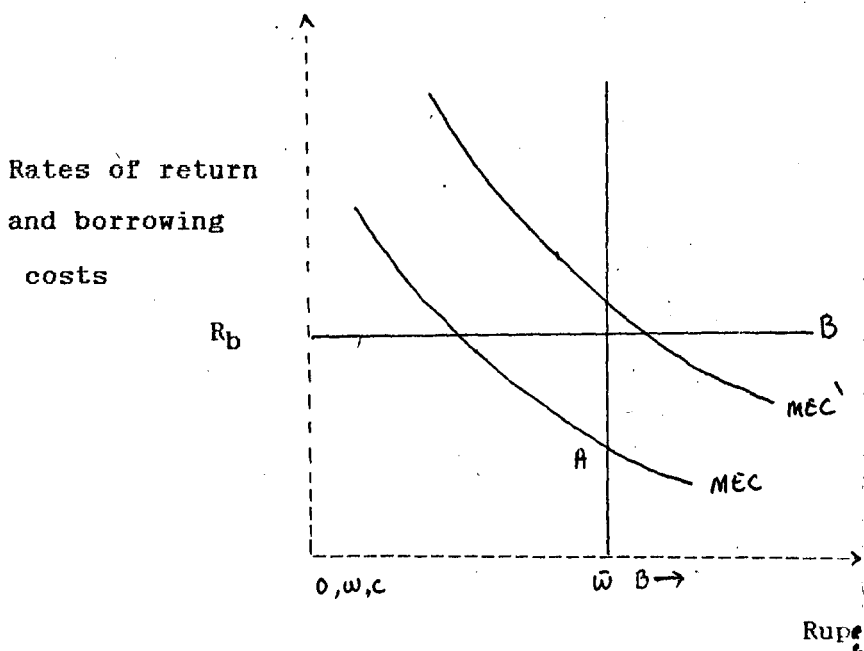
Millard Long

Long (1968) has analysed the demand for loan function in the risk - return framework. Firstly , he shows how the borrowing takes place under conditions of certain returns. Later on he develops a model with uncertainty elements incorporated. For simplicity , he assumes that there is only one crop and that in normal years the farmers produce surplus which they can sell in the market.

When there is certainty about the future yields , the farmer allocates his present wealth so, as to maximise his wealth available to him at the end of production period. The farmer allocates his original

wealth ( $\bar{w}$ ) in production capital ( $c$ ) in order to maximise his income ( $Y$ ). His borrowings are depicted by ( $B$ ). If investing in production capital is unfavourable, the farmer may hold cash ( $m$ ). In the model in which Long speaks of certainty, the cash holding is zero. In the following figure, Long depicts the case of a farmer who works under certainty and who may borrow at  $R_b$  rates of interest.

. Borrowing under certainty



$c = 0$

$c = \bar{w}$

$m = \bar{w}$

$m = 0$

$\bar{w}$  = original wealth

$c$  = production capital

B= borrowing schedule

MEC= Marginal efficiency of capital

m= cash

On the X axis , we have wealth , capital or borrowing , all in terms of rupee and on the Y axis rates of return and cost of borrowing are depicted . Long has taken borrowing costs and rates of return. It should be assumed that by costs he meant interest rate and not costs in absolute terms.

The MEC curve , which indicate decreasing returns on additional capital (c) stands for the marginal efficiency of capital. An improvement in technology may shift the MEC curve outward and this is depicted by MEC'. B indicates the borrowing schedule and  $\bar{w}$  indicates the farmers initial endowment . The among borrowed will be to the right of  $\bar{w}$ . Whatever the farmer does not invest will be held as cash. Here, Long does not analyse the lending behaviour of the farmers but only the borrowing behaviour. The farmer tries to maximise his income by equating his marginal return on capital invested with the marginal cost of borrowing

$$\begin{aligned} \text{Max } Y &= P \cdot q(c) - g(c) - R_b B \\ \text{Subject to } w &= c - B \end{aligned} \quad \parallel 9$$

Where,

P= the price of the output

q(c)= amount produced

g(c)= operating costs

B = the amount borrowed

$R_b$  = interest rate on borrowed funds

If  $\frac{dy}{dc} > R_b$  at  $\bar{w}=c$  then, the farmers will borrow. If  $\frac{dy}{dc} < R_b$  but greater than zero, the farmer will neither borrow nor hold cash but will invest all his wealth in production capital. This, he says, is because administration cost and risk will not make it profitable for the farmers to lend. This condition is shown in the diagram above. At point A, the farmer neither borrows nor lends. However Long has not explained why  $R_b$  would be more than MPC. When  $MPC > R_b$  farmers begin to invest more and more till both MPC and  $R_b$  are equalised. If  $R_b$  is more the farmers will not borrow at all.

We have already seen the possibility of shift in the MEC curve. This can occur when a farmer acquires new techniques or faces better terms of trade. This may induce the farmer to borrow more funds. It may also happen that when the farmer can get cheaper (subsidised loans) he may borrow more. The credit becoming cheaper will be shown by a downward shift in the borrowing schedule B which is drawn parallel to the X axis, showing that farmer can borrow indefinite amount at  $R_b$  rate of interest. The farmer may find it more rewarding to borrow than to hold cash with him throughout the year. This may be

because of the high yield that he has to forego on a long period of idle cash holding. Such a situation will induce the farmer to borrow.

A newly established farmer also may have to borrow for the initial large scale investment. Transaction cost may make borrowing a cheaper way to adjust to short run changes than selling assets. Under the above conditions the farmers are induced to augment their capital by borrowing.

In the next section, Long discusses borrowing under uncertainty. In the selection of an ex ante portfolio, the farmer, allocates his wealth possibly supplemented by borrowing, between production capital and money(m). The farmer has to forego income (either in way of interest or the income that he could have earned from production) if he holds liquid cash and on the other hand he has to meet the cost of illiquidity if he does not hold sufficient cash to meet contingencies. If the farmer meets unexpected outlays, he has to borrow and if he holds extra cash ex post, he will reallocate his wealth in a different manner in the next period. The maximising principle that the farmer follows is given below.

$$\max E(Y) = P \cdot q(c) - g(c) - \int_m^{\infty} r(s-m)(s-m)f(s)ds$$

$$\text{Subject to } M = w - c$$

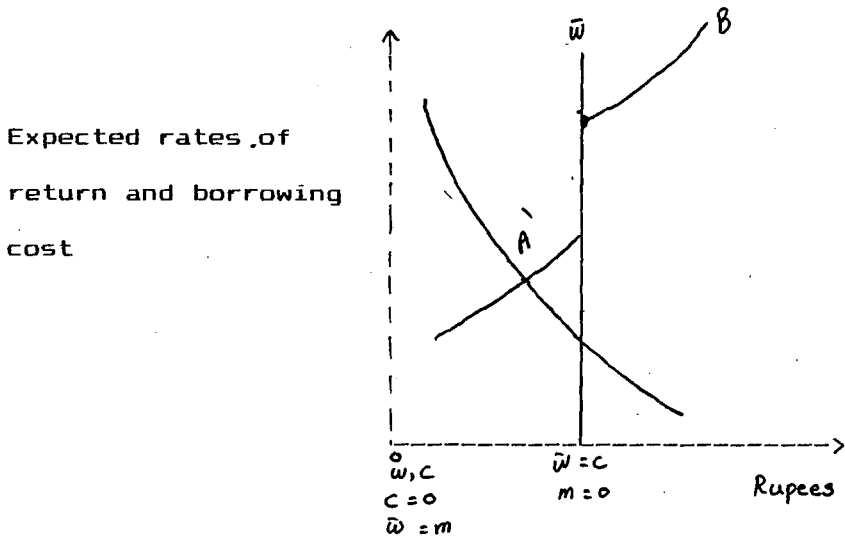
Where  $E(Y)$  = expected income . ,

$s$  = random expenditure variate with mean

zero

$r(s-m) =$  expresses the interest rate as function of the amount borrowed

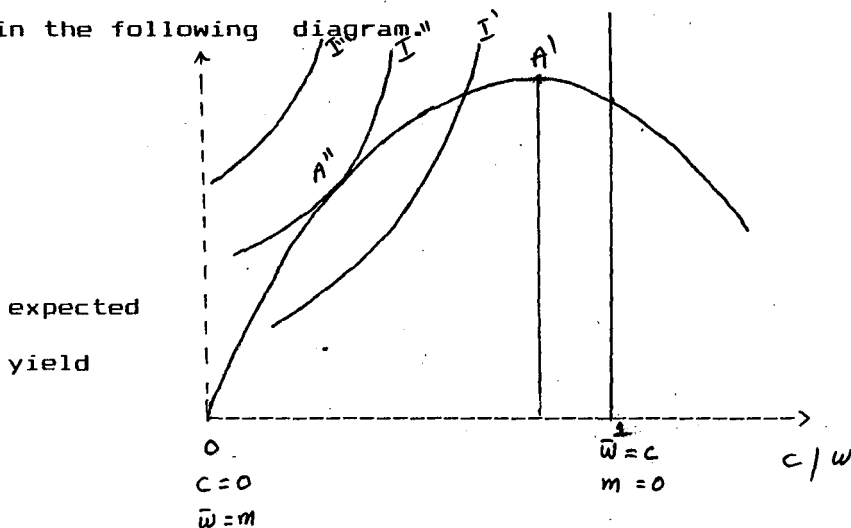
The maximizing principle is the case when the farmer tries to equate  $\frac{\delta E(Y)}{\delta C}$  with  $\frac{\delta E(Y)}{\delta m}$  where the former is the marginal return on capital and the latter is the expected costs of borrowing. The following diagram shows the behavior of the farmer who keeps cash ex-ante. It also shows the relationship between asset holding ex ante and expected returns.



The diagram depicts an ex ante cash holding farmer. The effect of risk is to give ex ante monetary holdings a positive expected return because if expenditure turns out to be greater than what was expected, the farmer will be forced to borrow. The B curve shows an upward slope indicating an

increasing cost of borrowing due to the presence of risk premium. At point A' the farmer is an ex ante cash holder and the rest of his wealth is invested in production capital.

Long also presents the case of risk averter who holds more cash and less production capital though another combination which yield more expected income, is possible. Such a case is presented in the following diagram."



Along the horizontal axis, to the right an increasing investment in production capital is indicated. Holding more capital increases yield up to a point but falls after that though risk continues to rise. The point of origin indicates a portfolio in which the farmer invests nothing but holds all his wealth in form of cash. Point 1 indicates a portfolio where he has no cash in hand at all. The yield curve



is concave from below because of the diminishing returns on both production capital and money. There is diminishing returns on cash because both the size of the expected borrowing ( $s-m$ ) and the rate of interest  $r(s-m)$ , defined above decline as cash holdings increase

The farmer represented above is a risk averter. The trade-off between risk and return are shown by the upward sloping utility curve. The ex ante portfolio chosen by the borrower is indicated by  $A'$  which contains more cash and less production capital though the portfolio  $A$  would maximise expected income. A farmer is not likely to be an ex ante holder of sufficient cash to meet all the cash requirements though the model says that the risk averting farmer holds cash. When contingencies arise, the farmer will be forced to borrow.

Before, we analyse the empirical results that Long gets, we should examine the theoretical model itself. It marks a definite improvement over the study conducted by Pani because of the introduction of the problem of uncertainty in to the theoretical discussion. Moreover, Long's model looks at the decision making of the farmer in the cost-return framework.

This gives a more theoretical base to the discussion, Though, his model based on the risk return framework is incomplete, one should remember that the portfolio analysis introduced by Markowitz(1958) was in its

infancy. Though Long's model has some innovative elements, it has certain pitfalls which we shall examine below.

Long argues that there is a particular portfolio in which the farmers, though they have excess cash reserves don't lend because of risk and administration costs. This may not be the case in reality. A different situation can also be visualised. It is one where the farmer as surplus cash holder also happens to have monopoly power in the credit market. Then they can earn profit by extending short term credit. There may be no risk and minimal administrative cost. -a possibility examined in the next chapter. Long has not acknowledged such possibility and recognized its implications.

In his second diagram, we see that B curve is a discontinuous function. Long doesn't explain why there is a sudden jump in the interest rate with the onset of borrowing. It may be assumed that risk premium and administration cost could make cost of borrowing higher. However, Long does not elaborate on this point.

Let us now consider the empirical results that Long got when he fitted regression equation to the data from India. He admits, however that sufficient data were not available especially to meas-

ure the transaction costs and risk aversion . Unlike Pani's model on borrowing ,in Long's first set of regressions the dependent variable is outstanding loans . The independent variables included in the model were interest rate ,transitory income,expenditure, capital outlays and wealth. It should be noted here that in his theoretical model he assumes that the interest rate is a function of  $(s-m)$ , that is, the amount borrowed. Such being the case , it is not clear to the reader of his article why he has used the interest rate as an independent variable .As we shall see below he has used interest rate as an independent variable even when he fitted regression equations to the borrowing function .

Long constructs an index of transitory income by finding the ratio of actual to the anticipated income . The ratio is constructed by finding the ratio of gross product (in value terms) to the value of land because price of land is correlated with the anticipated returns and the price of land is nothing but the present value of the expected future returns . The variable 'expenditure' included outlays on ceremonies marriages , death etc.. The value of capital assets minus outstanding debt was taken as the variable 'wealth'. The regression equation was fitted on to the data provided by the All India Rural Credit Survey and he got an  $R^2$  of about 0.4. All the regression

coefficients had the expected sign.

In the second set of regression equation , Long took the amount of borrowing as the dependent variable . The independent variables used here were the same as those that were used for the equation for outstanding loans. The explained sum of squares was found to be 0.5

The most important variable affecting both outstanding loans and the borrowing of the current year was observed to be investment in farm activities . Interest rate had a negative sign but the influence of this variable was not as important as capital outlay. The coefficients of the index of transitory income had a negative sign. A positive correlation between debt and wealth was observed . This is because, as the farm size increases, borrowing also will increase. (Long has also examined the implications of these results. <sup>Since</sup> they are less important here , they are not presented here.)

The first question that comes to the reader is the same as that which we raised against the regression model by Pani . The general criticism of regression methods and their weaknesses are relevant here also. The problem of multicollinearity is already hinted at when we discussed Long's theoretical model. Unlike Pani, Long has not subdivided the farmers into different groups . Under such circumstances, regression

model fitted to average values may not give the right picture, because the large farmeres may borrow large amounts for capital expenditure on farm and therefore the variable, capital expenditure, will appear to be the most important variable.

Long has introduced the role of saving in the maximisation of expected income (Y) but has not explained how saving is generated and what factors affect saving. Though Long has incorporated some important variables like transitory income , price of land etc. the  $R^2$  is only about 0.4 whereas Pani without incorporating these factors could get  $R^2$  more than 0.6 for almost all the regression equations he fitted . One can see that though they have used the same data, the explanatory variables were different. Pani's econometric model takes capital expenditure consumption expenditure interest rate and value of selected assets as the independent variables and borrowing as the dependent variable . The glaring difference of the two results could be because of the omission of consumption expenditure in Long's model . But it should be mentioned here that Long's model was a production model and therefore he has not included the consumption expenditure as an explanatory variable

The portfolio selection of the farmer has not received much emphasis in his empirical model . Much more analysis could be done , if his portfolio analysis

could incorporate the role of riskless assets and the various investment opportunities . Moreover, Long has not gone into the estimation of the probability distribution of many of the variables mentioned in the model dealing with uncertainty.

Subrata Ghatak

Ghatak(1975) also uses regression analysis to capture the demand for loan function of the farmers . He claims" It may however, be mentioned here that this type of quantitative study has not been made before in analysing Indian agricultural credit problem and in this respect our study may be regarded as different from others "[p.37]. Ghatak was apparently unaware of the studies conducted by Pani and Long which is surprising since these were published much earlier and in very well known journals . His theoretical analysis and empirical results are intertwined and therefore they are presented together . It should be mentioned here that there has been very little explanation of his theoretical base because his emphasis was on the empirical results. We shall try to interpret some of his theoretical formulations.

The data Ghatak uses is provided by the RBI Surveys conducted in 1951-52 and 1961-62 . He admits that there has been no more recent data for analysis

and comparison .

Firstly he tries to explain the borrowing during the year. The explanatory variables he used are family expenditure , capital expenditure on farm , current expenditure on farm and non farm business expenditure and these variables are obtained straight from the Survey. It should be noted here that interest rate is not included as one of the variables .Ghatak , like Pani, probes into the relative importance of various factors that influence the demand for loan function . But unlike Pani and like Long, Ghatak formulates separate equations for borrowing and outstanding debts. He used slightly different exogenous variables as it can be seen from the equations given below. It should be noted here that he has not given a separate theoretical explanation as his predecessors did but has given the empirical results .

Estimates for 1951-52

$$B = 26.3429 + 0.8015FA + 1.2190CA + 0.9089 cv + 1.0426N$$

(0.1229)      (0.1328)      (0.213)      (0.2506)

$$R^2 = 0.894$$

$$D.F = 50$$

$$D W = 1.98$$

$$D = 1.2534 + 1.571FA + 0.8781CA + 0.9702cv + 0.8665N$$

$$(0.1574) \quad (0.2254) \quad 0.3659) \quad (1.0773)$$

$$R^2 = .928$$

$$D.F. = 23$$

$$D.W. = 2.51$$

Estimates for 1961-62

---

$$B = -0.2976 + 1.1715FA + 0.8598CA + 0.9695cv + 2.3876R$$

$$(0.3308) \quad (0.1493) \quad (0.112) \quad (.788)$$

$$R^2 = .993$$

$$D.F. = 10$$

$$D.W. = 2.43$$

$$D = -0.6718 + 1.0856FA + 1.341CA + 0.999cv + 1.3757R$$

$$(0.0399) \quad (0.116) \quad (0.1452) \quad (0.4419)$$

$$R^2 = .98$$

$$D.F. = 10$$

$$D.W. = 2.37$$

Where

B = total borrowing

D = total loan outstanding

FA = family expenditure.

CA = capital expenditure on farm

cv = current expenditure on farm

N = non-farm business expenditure



DF = degrees of freedom

DW = Durbin- Watson test

R = Repayment

The figures in the paranthesis are standard errors.

The distinction between the various kinds of expenditure made by Ghatak is similar to that which is given in the Survey conducted by the RBI . The expenditure on unproductive purposes like marriage , death etc., were clubbed together under the heading Family expenditure. The productive expenditures were either capital and current expenditure or non farm business expenditure . In the Survey of 1961-62 , Repayment was included instead of expenditure on non farm expenditure. Ghatak says that this change we due to the nature of data available. But the economic implication of such a change in variable is not explained by him. The comparability of the equations for the two Surveys is reduced because the explanatory variables used are different. Moreover , inclusion of repayment as one of the explanatory variable is very likely to make the  $R^2$  nearly one Ghatak has not specified whether the repayment is of the borrowing of the current year or of the previous year. It could be assumed that Ghatak meant that the farmers might borrow in order to service the existing debt.

Ghatak observes that in both 1951-52 and 1961-62, capital expenditure and family expenditure accounted for the major changes in dependent variables B and the former accounted for the single most important variable for both the periods. He has come to this conclusion by running regression separately for each explanatory variable. In a similar fashion, he has also observed that only in 1951-52, family expenditure accounted for the major cause of outstanding debt. It could be assumed here that agricultural development was gradually setting in and the farmers began to borrow more for expansion of agricultural activities and therefore debt was determined more by capital expenditure on farm than by family expenditure.

Ghatak has examined whether multicollinearity was present in his equations. This, is done because the author suspected that the various exogenous variables could be correlated. For the equation fitted for the first Survey mentioned above he observed little correlation between FA and CA. Hence he concluded that the estimates were unbiased. He observed that Multicollinearity existed between CA and FA when these variables were used as explanatory variables for the borrowing function of 1961-62. This, he says, makes the coefficients of the explanatory variable highly unreliable. But there was little multicollinearity when loan outstanding was regressed on FA and CA

of the same year. However Ghatak does not explain why CA and FA are correlated in one set of equation and not in another of the same period (As we have mentioned earlier Ghatak has estimated the significance of each of the explanatory variable. However, the results will not be presented here.)

Ghatak's main conclusions are as follows:

a) The main explanatory variables of borrowing and loan outstanding functions appeared to be capital and family expenditure for both 1951-52 and 1961-62 .

b) The widely believed hypothesis that cultivators borrow and remain indebted mainly for incurring large family expenditure has not been substantiated on the basis of observations . It appeared that in most of the cases it was capital and not family expenditure which was the most significant variable affecting the demand side.

Except for the introduction of DW test and degrees of freedom , there has been little improvement of theoretical analysis of the problem of rural indebtedness in Ghatak's work. The regression analysis falls prey to the same shortcomings we have discussed earlier and therefore those are not repeated here.

Although Ghatak claimed that his was a pioneering work , one could see that his study was just a direct breaking up of the components of borrowings/debt

accounted by the Surveys. It is surprising to note that Ghatak has not incorporated any additional explanatory variables like interest rate and assets in the demand function whereas Pani and Long incorporated interest rate in their regression model and the influence of the asset holding estimated. In spite of these omissions Ghatak gets  $R^2$  higher than 0.89 in all the regression equations. It should also be noted that the  $R^2$ s that all the authors mentioned above get are different because they use different explanatory variable.

Kumar, Joshi and Muralidharan

The next model we shall examine is the model developed by Kumar, Joshi, and Muralidharan (1978). Their article is entirely based on the article by Lau and Yotopoulos (1972) titled "Profit, Supply and Factor Demand Function". This work by Lau et al will not be presented here since it doesn't deal directly with demand for funds.

The aim of the article by Kumar et al is to estimate the demand for credit by marginal farmers using a profit function approach with the assumption that the level of use of any input is determined by its profitability under given condition of production. They argue that productivity and prices of inputs and output determine the profitability. They use the following theoretical model to determine the demand for

loan . The production function in their model is given by the following equation:

$$Y = f(X,Z)$$

where Y = Physical output

X and Z are vectors representing variable inputs  $(x_1, x_2, x_3, \dots, x_m)$  and fixed inputs  $(z_1, z_2, z_3, \dots, z_n)$

Following Lau and Yotopoulos , Kumar et al define the Unit -Output Price (UOP) profit function corresponding to the production function given above, as follows:

$$\Pi' = G(q_1, q_2, \dots, q_m, z_1, z_2, \dots, z_n)$$

Where,

$$\Pi' = \frac{(PY - \sum p_i x_i)}{P} = \text{UOP profit}$$

$$q_i = \frac{p_i}{P} \quad \text{normalized price of input } i$$

( price of input is normalised with

respect to output price)

$p_i$  = price of the  $i$  th variable input and

P = price of the output

The authors , Kumar et al , argue that the usefulness of UOP profit function arises out of Shepherd's Lemma which states that the negative of the first derivative of the UOP profit with respect to the normalized price is the optimal variable input quantity or the factor demand curve. This demand is given by

$$-\frac{\partial \Pi}{\partial q_j} = X^*_j (j=1 \dots m)$$

where  $X_j$  = the demand for the the variable input

Here one needs a further elaboration of the formulation given by Kumar et al ; since they have not explained how  $\Pi'$  is arrived at. The procedure is as follows.

Profit  $\Pi$  is defined as

$$\Pi = P \cdot F(x_1, x_2, \dots, x_m, z_1, z_2, \dots, z_n) - \sum_{i=1}^m P_i x_i$$

Where ,  $P$  = price of a unit output

$P_i$  = price of the  $i$ th variable input

$X_i$  = viable inputs and

$z_j$  = Fixed inputs of production

The marginal productivity condition for a profit maximizing firm are

$$P \cdot \frac{\partial F(x, z)}{\partial x_i} = P_i$$

If  $\frac{P_i}{P}$  is defined as  $q_i$ , the above marginality condition can be written as  $\frac{\partial F(x_i, z_i)}{\partial x_i} = q_i$

Similarly if  $\Pi'$  is defined as  $\frac{\Pi}{P}$ , then the equation for  $\Pi$  given above can be written as

$$\Pi' = F(x_1, \dots, x_m, z_1, \dots, z_n) - \sum_{i=1}^m P_i x_i = \frac{\Pi}{P}$$

and  $\Pi'$  is defined as "Unit Output Price" profit or UOP profit

Kumar et al attempt to determine the demand for credit by introducing a Cobb -Douglas production function . Such a production function is given by

$$Y = AX^\alpha L^{\beta_1} N_f^{\beta_2} N_b^{\beta_3}$$

where  $\alpha < 1$ ,  $X$  is the total variable input in rupees  $L$  is the cultivated land,  $N_f$  is the family human labour,  $N_b$  is family bullock labour and  $Y$  is the production of crops. The UOP profit function of the above production function is given by

$$\Pi = A^{(1-\alpha)^{-1}} \left( \frac{q}{\alpha} \right)^{-\alpha(1-\alpha)^{-1}} L^{\beta_1(1-\alpha)^{-1}} N_f^{\beta_2(1-\alpha)^{-1}} N_b^{\beta_3(1-\alpha)^{-1}}$$

which in logarithmic form would be

$$\ln \Pi = \ln A^* + \alpha^* \ln q + \beta_1^* \ln L + \beta_2^* \ln N_f + \beta_3^* \ln N_b$$

where,

$$A^* = A^{(1-\alpha)^{-1}} (\alpha)^{-\alpha(1-\alpha)^{-1}}$$

$$\alpha^* = -\alpha(1-\alpha)^{-1} < 0$$

$$\beta_1^* = \beta_1(1-\alpha)^{-1}$$

$$\beta_2^* = \beta_2(1-\alpha)^{-1}$$

$$\beta_3^* = \beta_3(1-\alpha)^{-1}$$

$$\Pi = \frac{\Pi}{p}, \quad \Pi = PY - pX$$

$$q = \frac{p}{p}$$

The price of unit of variable input cost =  $p = (1 + \frac{i \cdot t}{1200})$ , which is equivalent to the unit of variable cost plus its interest. The unit of variable cost is a rupee and its interest is  $(\frac{i \cdot t}{1200})$ . Therefore,  $p = (1 + \frac{i \cdot t}{1200})$ , where  $i$  is the annual rate of interest

and  $t$  is the length of crop in months. [It should be mentioned here that the division by 12 is to convert the months into year. The interest rate is in

this equation is not written in the conventional manner , say, like 0.05%, but it is written as 5/100]

We have already seen that the demand for  $i$ th variable input is given by

$$x_j^* = - \frac{\partial \pi'}{\partial q_j} \quad . \text{Based on this, Kumar}$$

et al state that the total variable demand function can be written as follows;

$$- \frac{q x^*}{\pi'} = \alpha^*$$

, where  $X_i^*$  is the demand for variable input  $X_i$ , assuming that quantities of land and family labor are given. Though the authors have not given the derivation of this total demand function it is worth stating the same here.

$$x^* = - \frac{\partial \pi'}{\partial q}$$

Multiplying both sides by  $-\frac{q}{\pi'}$ , we have

$$- \frac{q x^*}{\pi'} = \frac{\partial \ln \pi'}{\partial \ln q} \quad , \quad \text{which for Cobb -}$$

Douglas production function becomes

$$- \frac{q x^*}{\pi'} = \alpha^*$$

Having stated the demand for variable input the authors have extended their arguments to show the credit requirements of the farmers. The capital available with the farmers is in direct proportion to the profit earned by them in the previous period. The own capital ( $X$ ) used for variable input may be



estimated with the help of the following model

$$\ln X^0 = a + b \ln \pi^*$$

where  $X$  is own variable input in rupees and  $\pi$  is the profit in the previous crop season. Using the above equation and the total variable input demand function, the estimate for credit may be stated as the following identity.

$$X^{*B} = X^* - X^0$$

where,  $X^{*B}$  is the demand for credit. It is worth mentioning here that the expression "variable input" is inappropriate, in their formulation because they are not accounting for all the non purchased variable inputs. The appropriate expression would be "purchased variable input". The authors have expressed the equation given above in the UOP framework as

$$X^{*B} = \ln A + (\alpha^* - 1) \ln q + \beta_1^* \ln L + \beta_2^* \ln N_f + \beta_3^* \ln N_b - \ln a - b \ln \pi^*$$

Since,  $q = \frac{P}{P}$  the equation above can be written as

$$X^{*B} = \ln A' + (\alpha^* - 1) \ln P + \beta_1^* \ln L + \beta_2^* \ln N_f + \beta_3^* \ln N_b + (1 + \alpha^*) \ln P - \ln a - b \ln \pi^*$$

Where,  $A' = A \cdot \alpha^*$

The equation given above will give the estimates for demand for credit at varying rates of

interest for given levels of land , family , human and bullock labour, and prices of agricultural commodities and a profit in the previous year. The advantage of this model , is that instead of solving a system of simultaneous equations as in the case of production function approach one can get the demand for variable input and subsequently the demand for credit from the derivative of the UOP profit function . The shortcomings of the model are discussed here before we analyze their empirical findings.

The model determines the effect of interest rate on the demand for credit by assuming fixed prices for the variable inputs and output . This assumption is highly questionable when there is high fluctuation in the prices of the inputs and output before and after the harvest and when the changes in the interest rates have impact on the prices of the commodities .

The model takes note of the profit of the previous year . But that is only one side of the story. The borrower's expectation of the future profit, changes in price and expected level of output do play important role in the determination of demand for loans . Even if they claim that their production function is the expected one they have not included the uncertainty factor in their equation.

After having analyzed their theoretical

model , let us now discuss their empirical findings.

The authors have estimated the demand for credit of the farmers of a village in Uttarpradesh using the above equation. They have also estimated the utilization of the credit on various crops . The parameters that appear in the equation were estimated by using least square method. They get the result that the amount borrowed is positively related to the expenditure on purchased inputs and the profitability of crop grown.

The authors have estimated the profit function and the variable input demand function using the model discussed above. The own capital ( $X^0$ ) used for variable input is also estimated. The profit function is found to be decreasing and convex in price of variable input and increasing in land and family labor. The demand for credit is seen to decline with the increase in the rate of interest. The average elasticity of demand for credit with respect to interest rate indicated that the demand for credit was inelastic. However , the authors have not given the computational procedures and one does not know how they got these results . Since they have not given the rate of interest as one of the variables in their model , they could have most probably computed the effect of interest rate indirectly. But then the question that crops up is this: If the price of a unit of variable input

cost incorporates the interest rate  $[p=(1+\frac{i-t}{1200})]$  , how can one assume that the price of the input to remain constant with the change in the rate of interest.

Neither in their theoretical model nor in their empirical analysis did the authors incorporate the productivity of land . They have incorporated the amount of land instead of productivity of land . Family labor appears to the authors free and opportunity cost of the same zero. If one imputes cost to the family labor one wonders how profit will increase with the increase of family labour as the authors have claimed. Labor productivity would have been a better measure than the mere number of labourers.

On the whole the article appears to be rather confusing due to lack of proper definitions. The reader is left with more questions than answers.

Faruq Iqbal

The models that we have analyzed so far have not specifically defined what the term borrowing is . They have assumed that the borrowing meant borrowing from external sources only.. Kumar et al incorporated own funds but they have not specified it as borrowing from internal source. Iqbal(1983) rectifies this shortcoming of his predecessors like Pani , Long and Ghatak . However, he makes no mention

of the method used by Kumar et al.

Iqbal argues that the authors who have analysed the demand for loan function earlier have not been able to capture the function appropriately because of the following reasons.

a) They have used an inappropriate definition of the demand for funds. A truncation bias at zero level is present in the dependent variable, Borrowing, because the conventional empirical definition of borrowing doesn't take into account borrowing from internal sources. (eg. saving account) or in other words the demand for loan function was restricted to borrowing from external sources only and the conventional definitions of borrowing can therefore be called a truncated one.

b) there is simultaneity bias arising from the endogeneity of the interest rate used to denote the cost of borrowing. Though Iqbal has not elaborated on this problem it may be worthwhile to see what he means by simultaneity problem. When interest rate is an endogenous variable, the determination of its value takes place simultaneously with the amount borrowed. Disregarding the variable, amount borrowed, while estimating the interest rate and disregarding the interest rate while determining the amount borrowed lead to simultaneity bias.

Iqbal tries to free the estimate of demand

function from these shortcomings ,. The first one is corrected by redefining the dependent variable to include adjustments in assets and liabilities .The second bias is rectified by imputing unobserved interest rates This is done because in rural areas the interest rates are not always charged explicitly on loans but the borrowers will have to bear some costs which are not accounted . This may be in the form of selling the borrowers' produce to the lender at a reduced price. The imputation is done in a procedure suggested by Heckman(1970) . Iqbal has not gone in detail into the computation procedure in his article and neither shall we .The imputation procedure is advocated by Iqbal because such a procedure allows the possibility of the simultaneous determination of the interest rate and the amount borrowed and thus simultaneity bias is corrected. "

According to the new definition of borrowing Iqbal defined borrowing as an identity as given below.

$$B = EB - EL - FA - CD + TI$$

Where, B= net demand for loans

EB= External borrowing

EL= External lending

FA= changes in financial assets

CD= changes in household stack of consumer durables

TI= net transfer of income in the form of

remittance and gifts to and from the farmers.

We observe here that net demand for loan is the independent variable and not external borrowing, whereas Pani, and Ghatak had used external borrowing as the dependent variable.

In his model, Iqbal says that the effect of technical changes have impact on the demand for loans and this is discussed in detail in his empirical model.

With the foregoing background, Iqbal builds an empirical model which consists of demand for loan function and interest rate function. Firstly, he analyses the latter function which relates the interest rate to its determinants, the supply of funds.

In a competitive market the nominal interest rate ( $R$ ) is influenced by the following three cost.

- 1) the opportunity cost of providing loan
- 2) the administrative cost of lending and
- 3) the risk premium

Iqbal writes the nominal interest rate function as follows

$$R_{\eta} = r_1 Z + r_2 B + r_3 X$$

Where,  $Z$  and  $X$  are vectors of variables that affect opportunity cost and risk of lending respectively. and  $B$  is the variable that denotes levels of borrowing and proxies for the administrative (as well as risk) cost of lending and  $r_1$   $r_2$   $r_3$  are

parameters. Iqbal, however, does not explain here, how the variable in the various vectors are aggregated.

Opportunity cost of fund, according to Iqbal, varies in accordance with source of loan and the proximity of the villages to market/urban centres. If the source from where the farmer gets loan is government agency, the interest rates are usually subsidised and the presence of such an agency will reduce the monopoly power of the village money lender. The interest rate faced by the borrower is lower than the interest rate prevailing in the village when there are no government agencies.

Distance from the town will affect the cost of lending because, the money lender may have to borrow from bigger money lender in the city and this causes a cost of transportation, loss of time etc. Moreover, if the village is far away, there is a likelihood of idle cash with the village money lender. This will again increase the opportunity cost of lending. As we shall see in the next chapter, idle cash may not necessarily mean that the rate of interest should be high. However Iqbal has not delved deep into this problem.

The variable B stands for the size of the loan and the administration cost is related to the size of the loan. The larger the loan size the smaller well be the per unit administration cost. But



larger the size of the loan , larger will be the risk involved in lending . So there has to be higher risk premium for lending larger amounts. Iqbal says that this phenomenon renders the expected sign ambiguous .It should be mentioned here that Iqbal 's assumption that larger loan will carry a higher risk premium need not be correct. An irrigated farmer borrower borrows larger amount of production credit than the dry farmer . The risk that the lender takes in lending to the dry farmer may be larger than the lending to the irrigated farmer though the amount lent in the latter case may be larger

Iqbal also hypothesises that larger population in a village means, lower administration cost because the money lender can spread the overhead cost and reduce the per unit cost of lending . He also hypothesises that opportunity cost is negatively correlated to the village size. This,he says, just like the remoteness of the village makes the opportunity cost higher, the largeness of the village population reduces it. However ,Iqbal does not elaborate on this point. But the question that arises is: Should large population necessarily mean large borrowing . ? Large population and small borrowing also may prevail in a village . Under such condition the per unit cost of lending need not be small.Since , Iqbal assumes that the size of the population has an influence on

the cost of lending , he has incorporated it in his model as a proxy for opportunity cost and administration cost.

All those factors like quality and quantity of land owned other assets owned, wage rate faced age , family size and investment opportunities that affect the repayment probability are taken to proxy for the risk cost of lending . However , Iqbal does not say anything about the expected sign of the risk factor.

The borrowing function is given by the following equation .

$$B = b_1 Y + b_2 R_0 + b_3 TY$$

where, Y is a vector of factors such as age of farmer's initial endowments , current and expected wage current and expected output prices and measures of investment opportunity . However , he does not include current and expected prices on the assumption that they are invariable in the cross section given a competitive output market. The same argument is applied to input prices also. The proxy for initial endowment is a measure of the total area owned by the farm household, He has also used the district proportion of irrigated land which would give additional information about the quality of land. Family size and the dependency ratio were also taken into consideration.

Proxy for those variables that reflect investment opportunity differences across region and over

time was derived from the annual expenditure by the government . (Since he analysed the Indian condition he included the expenditure of both the state governments and Central government on major crops). The underlying assumption used by him was that research expenditures in a region produce enhanced investment opportunities.

The variable  $TY$  is a measure of transitory income which accounts for the variation in demand for funds that arises simply because of transient and unpredictable variation in income . This variable can be calculated as the difference between current income and permanent income The variable  $R$  has already been explained and  $b_0$  and  $b_1$  are parameters

Iqbal put together the demand equation and cost equation and obtained the structural model as given below.

$$B = b_0 + b_1 X + b_2 R_1 + b_3 TY + U$$

$$R_1 = r_0 + r_1 Z + r_2 B + r_3 X + U$$

The  $R_1$  function is firstly estimated by using the exogeneous variables  $Z, B,$  and  $X$  , then this variable is used in the estimation of demand for loan function . However Iqbal does not explain how  $B$  is treated as an exogeneous variable when it is determined by interest rate .

Iqbal argues that  $Y$  and  $X$  are identical because, the variables in the  $Y$  vector that affect the house-

hold demand for funds ( except  $R_{\eta}$  and  $TY$ ) are also likely to affect the credit-worthiness of the borrower and hence he has omitted the  $Y$  variable in the equation .

Before we go to the result of empirical test of his hypotheses we should examine his theoretical model to see whether the theory is logically consistent or not and whether it is relevant to a developing economy.

It would be noticed that the term borrowing is better defined in this article than in the earlier articles and the truncation bias is removed. As explained earlier the simultaneity bias has also been removed and therefore theoretically Iqbal's study has more logical base than his predecessors like Pani and Ghatak. Moreover, he has incorporated variable like size of population , effect of technical change , age of the borrowers etc., in the analysis . This makes his study more comprehensive.

However, it should be mentioned here that variables like investment opportunity and the initial endowment could be correlated because as the investment opportunity increases, the farmers try to acquire more and more land . It could also be postulated that the larger land holders have greater investment opportunity . Under such condition , there may be multicollinearity among the variables and the estimat-

ed parameters become unreliable.

In his equation for the loan demand function, Iqbal uses Y vector which contains the variable current and expected prices. But he says he does not use these prices in his theoretical as well as empirical formulation because he assumes that they are invariant in the cross section given a competitive output and input market. This is not true in reality. Those wealthier farmers who have better access to traders can always get a better price than the smaller farmers. This is the case with inputs also. The larger farmers who are also lenders may have a greater command over the borrowers who may be forced to render labour service at reduced wage rate. Therefore the exclusion of prices renders the formulation by Iqbal non comprehensive.

Let us now see the empirical findings and see whether they support the hypotheses of Iqbal.

Using the data provided by National Council for Agricultural and Economic Research (NCAER), India, Iqbal fitted the regression equation explained above. In the case of the equation for interest rate he observed that land owned, proportion of irrigated land, research expenditure and proximity of banks have negative impact on interest rates.

While analysing the borrowing function, Iqbal uses the conventional definition of external borrowing

as well as the definition which incorporates borrowing from internal sources . He observes that the results that he obtains confirm the importance of correcting both for simultaneity and truncation bias .Concerning the simultaneity problem , Iqbal finds that when interest rate is entered as an exogenous variable the sign of its co-efficient in the borrowing function appeared to be negative. Theoretically, one would expect a negative relation between interest rate and the amount borrowed . On the other hand ,when interest rate is entered as a predicted variable , the sign of the co-efficient becomes negative. Iqbal also claims that, by correcting the truncation bias, the degree of precision with which the interest rate effect is measured, is raised to 99% level of confidence.

He also gets a negative relation between the amount borrowed and wage rate . However, he does not explain why this would be so.

Another result that Iqbal gets is a negative relationship between borrowing and initial endowment(land) and between transitory income and borrowing. He has not given any theoretical explanation why this could happen so. Research expenditure which stands as proxy for investment opportunities has positive co-efficient when borrowing is regressed on it. Of the two life cycle variables included , namely family size and age, the former is a significant one

where as the latter is not.

Despite the improvements that Iqbal introduced in his studies the  $r^2$  turned out to be very low a phenomenon , which he could not explain. He says it could be because of inappropriate specification .However, his results don't improve very much by introducing alternative equations .

As we have mentioned earlier , the problem of multicollinearity may exist in the regression model developed by Iqbal . However there has been no test of multicollinearity in his empirical work.

One of the results that is ambiguous is the negative relationship between borrowing and the initial endowment proxy, namely , the size of the land owned . Iqbal does not give a categoric statement why this relationship exists . In reality we may assume that debt- asset ratio may fall but absolute amount borrowed may increase as the size of the land owned by the farmer increases . The larger farmers may have higher demand for loans for investment purposes. More puzzling is the case, when Iqbal analyses the demand for loan by farm size. He finds that initial endowment proxy, land owned, is positively related to borrowing for small farmers and negatively for the large. Here again Iqbal has not given any conclusive answer to this problem.

Though Iqbal has attempted to incorpo-

rated) both life cycle and permanent income hypothesis, in his model, one finds that various aspects of both these hypotheses have not been discussed., For example the expenditure pattern, the saving pattern , the expected income, etc are not incorporated in his study

Though Iqbal's study has made improvement over the existing theoretical framework his study also has certain shortcomings and one realizes that there is much more to be done with respect the analysis of rural indebtedness than what has been done by iqbal.

In this chapter we have seen the various theoretical models that are put forward to capture the demand for loans by farmers, especially the marginal farmers. Pani's work has paved way for a number of regression analyses that try to quantify certain parameters and we find that there has not been any conclusive study in this field . Many questions as we have already seen, remain unanswered . Moreover, we don't know whether such models can be used when various variables are interrelated and when sufficient and reliable data are not available. Moreover , as we have already noted , fitting regression to average figures, as many authors have done, may not give the right picture. ~~Though various authors have used the same data and the same average figures, the results they get are different and at times contradictory.~~ So, one does not know whether to rely on the regression analysis



followed by the various authors or not.

The portfolio analysis has great relevance in the analysis of rural borrowing but has not been developed fully. Though one has attempted to capture the borrowing function the risk- return framework, his work has not captured many factors that determine rural indebtedness.

It was also seen that various authors use different definitions of terms like borrowing and therefore comparative study of the theories put forward by these authors become difficult.

What we have seen in this chapter was the demand for loans by the farmers especially the marginal ones. However, the literature is silent about the process in which the borrowing farmers fall in a debt trap. How the dynamic factors affecting the demand for loans lead to rural indebtedness has not been explained. Moreover, there has been scanty literature on the loans that the farmers take for consumption purpose. Consumption loans have greater propensity to push the farmers into indebtedness. How the farmers get into a debt trap, and how they come out of it, will be discussed in the third chapter when we deal with the dynamics of rural indebtedness.

## CHAPTER III

### Determinants of Supply of Loan

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We have seen in the first chapter the various forces that determine the demand for loans and how these forces in turn determine rural indebtedness. But it is quite possible that some factors that determine the supply of loan may also influence the rural indebtedness. Loan supply function is akin to the supply function in production sector. Therefore it will be useful to analyze the cost of production while determining the supply function of loan. This will be our objective in this chapter. We shall analyze the theories put forward by various authors who examined the interest rate formation in the unorganised sector of rural areas. Even though in the various articles, the interest that the borrowers have to pay to the organised sector has been discussed, we shall not emphasize it.

In this chapter firstly we shall review the literature that deals with the supply of production loans and then that which deals with the supply of consumption loans. As we have mentioned in the first chapter, we shall give emphasis to the theoretical formulation rather than the empirical findings.

Tun Wai

Tun Wai (1957) has discussed the problem of rural interest rate in great detail. It would be seen that his study is mainly empirical but we shall give a detailed account of his findings and hypotheses because his article is the basis on which some later theoreticians have developed their theories. However, as mentioned already we shall not present most of his statistical figures.

In the first part of his article, he discusses the nature and size of the unorganised money markets, source of credit link between unorganised and organised money markets. In the second part he discusses in detail the level and structure of interest rates, causes of high interest rates, evaluation of measures to reduce interest rates and outline of a programme for lowering interest rates. Though the first part is a closely related aspect of rural interest, it is beyond the scope of our present study. We shall concentrate only on the level and structure of rural interest rate and causes of high interest rate.

While discussing the level of interest rates Tun Wai admits that it is difficult to determine precisely the weighted average rates of interest which prevail in the unorganised money markets of under developed countries. He says that even when data are available the rates quoted can not always be taken at the face value. This is because many

hidden charges are not accounted for in the loan transaction. The common practices which increase the effective rates , as against nominal rate, include deduction of the interest at the time the loans made , charging interest on the original amount lent rather than on the unpaid balance , not keeping proper books or giving receipts so that the borrower can be made to pay more than agreed, demanding additional services for the favour of giving loans, lending money against the security of standing crops but demanding repayment in kind and undervaluing the commodity used, etc.

Tun Wai states that all the interest charges which the money lender levies do not accrue as net income to him . A number of administration charges have to be met by the lender and hence these have to be deducted from the interest that he gets on loans. He may have to pay taxes on the standing crops which are given as collaterals and he may have to supervise the harvesting . These administration costs have to be deducted from the interest paid by the borrower. Tun Wai however does not include here the cost of court cases to recover loans, the use of men ( musclemen) for timely recovery , and ultimately interest and principal lost due to variety of reasons.

Yet another difficulty that in determining the level of interest is the variation of interest rates

from region to region. This aspect is substantiated by Tun Wai by data from Ceylon, Thailand and India. The reason for this variation is stated at a later stage. While reporting the data for interest rate, Tun Wai defines interest rate as "Interest earned during the year expressed as percentage of advances outstanding at the end of the year" (Footnote p.99). Tun Wai does not explain why the computation is based on the loan outstanding at the end of the year and not at the beginning of the year. The regional variation, mentioned above is partly due to differences in demand conditions and partly due to differences in the supply of funds. The level of interest rate is also influenced by the presence of organised credit institution. He states that the rates tend to be low if organised money markets are present.

Next, he discusses, the determination of real interest rate in organised money market, ie, the real rate at which the organised credit markets lend money. However, this as we explained earlier will not be discussed here.

The weighted average rate of interest charged by both institutional and non institutional sources in the unorganised money market depends upon the relative importance of the two sources and the average rates charged by each source.

The next aspect that Tun Wai discusses is the structure of interest rate. He says that non

institutional sources vary from region and this variation is due to the differences in the accessibility of rural areas to an organised money market.

He also claims that the interest rates in unorganised money markets vary with the size of the loan, being generally low as the loan gets larger. This claim has been substantiated with data from various underdeveloped countries.

Tun Wai also notes: "The structure of rates in the unorganised money markets in under developed countries, however, differs from that of the organised money markets in both developed and under developed countries in so far as the short term rates charged by credit institutions seem to be higher than the long term rate". (p.104) The next paragraph begins with the statement "The rates charged by money lenders follow similar patterns". (p.104). The two statements are contradictory because in the earlier statement it is seen that the credit institutions differ from the unorganized money market because the former charges high interest rate on short term loans but the next statement suggest that the money lenders also charge high interest rates on short term loans. One is not clear why Tun Wai states that the structure of interest rate in the unorganised money market differs from the structure in the organised money market. Tun Wai

gives the reason why there is high rates of interest on short term loan in the organised sector. He claims that it is partly because of government policy and partly because the collateral offered for long term loans is agricultural land which is much superior to the collateral used for short term loans namely cattle , crops etc. He also gives the reason why there is higher rates on short duration loans in the unorganised sector. He says it is partly due to the same reason given for the high interest on short term loans of the credit institution and partly due to the reason that money lenders find it difficult to find new lenders and hence there is a chance of funds lying idle . However,he doe not give any data to support the existence of idle cash with the money lenders.

The author then examines the effect of seasonal and cyclical fluctuation on the interest rate . He assumes that there should be no seasonal fluctuations in the unorganised rural money market as in the organised money market because most of the borrowing and lending is for short term production purpose which takes place in one season of the year. He also assumes that the quantity borrowed before the beginning of the agricultural season should be sufficient for the entire period. But Tun Wai states that for the market as a whole there may be some seasonality in the rate of interest because some farmers borrow at

high rates of interest just before harvest. This seasonality however, is not induced by an expansion in demand at the busy season but at a time when demand is small. The interest rates are high because of lack of funds and the credit standing of the borrowers is much below the average. It is obvious that the author has not been clear about the problem of seasonality. We shall discuss this at a later stage.

The cyclical fluctuation in the rate of interest in the unorganised money market is opposite in nature when compared to the cyclical fluctuation in the interest rate in the organised money market. In the case of the unorganised sector, during the upswing of a business cycle and when the prices of agricultural products are rising, land values also tend to rise. In such a situation the value of the collateral that the farmer can offer increases and this will enable the money lender to increase the supply of loanable funds at the usual rate of interest. Since the interest rate tends to be low for the loans with collaterals, the weighted average rate of interest paid by agriculturists as a whole tends to fall. In the organised money market, on the other hand, the interest rate goes up with a boom. These arguments are substantiated by examples of Burma and Ceylon. He also observed that the weighted average rate of interest is seen to rise whenever there is a crop failure. He also assumes that long run



trend in the interest rates in the unorganised money market would be downward. But he has no evidence to support this assumption nor does he specify whether it is nominal or real interest rate.

The next aspect that Tun Wai examines is the cause of high rate of interest in the unorganised sector. He says that the theory which says that interest rate is conventionally fixed as high is not adequate because the theory does not say why the custom of high rates was developed.

One of the causes, according to him, is the large demand in relation to supply. The demand for fund is large because the average borrower in an unorganised money market has a very low income and therefore has no surplus funds to finance his business operations. On the supply side there is general shortage of capital in under developed countries and an inadequate level of domestic savings.

Another cause is the institutional factor. A number of institutional factors play important role in pushing the interest rate upward. The size of the loan is usually small and thus the fixed handling charges are relatively high. Tun Wai does not explain what these handling charges are, but we can assume that it is the overhead cost like, the account books, accountants, etc., that the money lender has to maintain in order to run his business. Yet

another factor that causes high interest rate is the rate of default which tends to be large in unorganised money markets. Default is due to fluctuations in prices and income derived from agricultural products, which reduces the ability of agriculturists to repay debt.

Another factor causing high interest rate is inflation. The lender, in order to guard against the possible loss of purchasing power when the loans are repaid, would ask the borrower to pay higher interest rate to offset the inflationary rate. However, Tun Wai does not say anything about the loans in kind and inflationary pressures. Both the supply factors and demand factors have to be taken into account while one discusses high rates of interest in the rural areas. Tun Wai wanted to know which of these two is more important in determining the rural interest rate. In order to arrive at some conclusion he constructed two hypothetical tables, one focusing attention on demand and the other on supply. In the first table, the estimates of interest rates that lenders would have to charge to compensate for various levels of default is presented. How, he arrives at these figures is not discussed.

On the demand side, he shows the rates of interest which the farmers are willing to pay if they take no account of interest earned on their own capital

and consider only the necessity of obtaining borrowed capital to finance their total agricultural operations. The interest rate which the borrower is willing to pay is calculated on the assumption that he is willing to pay the lender as interest the full product of the total capital (that is the borrowed money plus his own capital)

The situations on the demand and supply side are then compared by Tun Wai. He comes to the conclusion that high interest rates in the unorganised money market are due to more to excessive demand than to premium to ensure lenders against the risk of default. After having discussed the causes of high interest rates, he concludes that the urgent and inelastic demand of borrower for loans and the absence of alternative sources of credit are the principal factors that enable money lenders to extract very high rates of interest.

As we shall see later, Tun Wai's article set a trend in the thinking in the field of rural interest rate. Though it highlighted some of the aspects, all his assumptions are not consistent with reality. A brief critique of his article is given below.

Though Tun Wai emphasized much on the limited supply of funds in the rural areas, as a cause of high interest rate, he did not consider the monopoly power of the village money lenders in determining

the rate of interest. This omission is serious especially when he assumes that flow of fund from one region to another is limited. This implies that the village money lender is well protected from competition from without.

A related problem on which he was silent was, the reason why there was no flow of fund from urban to rural areas, even though the interest rates in rural areas are high due to high demand.

Though Tun Wai enumerates a number of administration charges that the lender faces, he did not say what percentage of rural interest rate constituted by these charges. Moreover, he says that administration charges per unit of loan decreases when the size of loan increases. But he did not consider whether there is an accompanying increase in risk in lending large volumes of loans.

We have seen that Tun Wai has defined interest as that which is earned during the year expressed as percentage of advances outstanding at the end of the year. He has not explained why the loan outstanding at the end of the year as the denominator. It should be in fact based on the loan extended at the beginning of the year. However, the expression is not clear to the reader.

The author also says that interest on short term loans are high and on long term loans low. If the

loans are given for short term, the lender takes less risk because the predictability of the repayability of the borrower gets smaller and smaller as the duration of loan increases. This is not considered in his analysis. Moreover, Tun Wai says that the problem of idle cash causes high interest on short term loans. If the village is perennially short of funds, as he himself claimed, the interest elasticity of demand for loans with respect to interest rate may be high and in such a case the lender can lower the interest rates a little and lend out all his money without keeping his funds idle.

While analyzing the seasonal fluctuations interest rate Tun Wai assumes that loans are for production purpose and therefore there would not be any seasonal fluctuations. This is because production loans are taken at one season of the year only. He seems to ignore the huge debt that farmers incur for consumption purpose.

Dealing with the problem of cyclical fluctuation, Tun Wai asserts that during a boom period that interest rate will come down because of an increase in supply of funds. However, he does not say from where exactly these funds would come. He says that the idle cash that was not loaned out would be given out. Is it an unlimited supply? Surely it can not be. Otherwise he himself would not have admitted that

high demand coupled with scarcity of fund causes high interest rate in rural areas . . . Yet another related factor is the increase in cost of production during a boom period . If costs of production also increases, one cannot say a priori that interest rate will come down. Demand for loans will increase and this may push the interest rate up.

While constructing the hypothetical tables to show the interest rate both from demand side and supply side , Tu Wai has not explained in detail how he arrived at these figure. He assumes that the farmer who borrows for production purpose, gives the lender all the produce in the form of interest and loan repayment. This formulation appears to be highly unrealistic because the farmers in that case will not produce at all . Moreover, how he measured the productivity of capital , is not explained.

As we have mentioned earlier Tun Wai's study paved the way for further theoretical analysis , though his study itself had many shortcomings. We shall see below how his ideas were further developed.

Anthony Bottomley

Bottomley (1963a) ,(1963b),(1964a) ,(1964b) has analyzed the rural interest rate formation in great detail. He discussed the premium of risk as a determinant of rural interest rate, the cost of administering loans in rural areas, the opportunity cost of

capital in the rural areas and the monopoly profit as a determinant of rural interest rate in the above articles. He synthesized his arguments in Bottomley (1964c) and we shall discuss only this article here.

Bottomley takes for granted that a micro-economic analysis would be apt for the analysis of rural interest rate formation. He assumes that the money lender will either be an imperfect competitor or an outright monopolist. The demand curve the money lender faces will be downward sloping from left to right, with the vertical axis showing the interest rate and the vertical axis the amount loaned.

Bottomley then looks at the cost side. The money lender will have an average cost curve, which indicates the unit cost of lending. The money lender will lend at a point where his marginal cost of lending and the marginal revenue from his loans are equal. Given the demand for credit this will be optimal volume of lending which will maximise his net returns. The discussion of interest rate determination takes one to the costs that will have to be covered by the interest rates that the money lender gets. These are

- 1) the unit opportunity cost of money
- 2) an administration charge on each unit loaned
- 3) the unit premium for risk
- 4) an element of monopoly profit ( if the interest charges exceed the sum of the above three cost)

Bottomley discusses the forces that determine the size of these components, in this article.

While discussing the opportunity cost of money lender's money, Bottomley says that the lender may have two competing outlets for his funds. The first is to find alternative investment rather than lending it to farmers and the other is to satisfy his own demand for liquidity. He argues that if competitive situation prevails, apart from the money lending within the village then the return from the alternative investment should be forced down to equality with the rate of return on investments without either risk or administration cost such as government bonds ( This he says, appears to have happened in India ) Bottomley does not give any reason for this but we can suppose this happens, if alternative investments of the money lender yields a higher return than the government bonds, more and more investments will take place in that particular alternative and the rate of return will tend to fall. There will be a crowding in until the return on it equals the return on government bonds. He says monetary authority can not reduce this pure rate of interest. Why he calls it a pure rate of interest is not explained in the article. The reason why monetary policy can not reduce the interest rate is because, an increase in money supply may raise the going interest rate. This is because there may not be excess capacity



in agriculture and industry in the underdeveloped countries to expand production and therefore a general increase in price level will ensue. A higher price level will induce the interest rates to go up because the loss of purchasing power of the loaned money due to inflation is compensated by the higher interest rate.

Bottomley suggests a fiscal measure which may enable the reduction of the opportunity cost of the money lender's cash. This, he says, is because of the following reason. The money lender's money lies idle for some duration during the year, because the loans are generally of short duration. If short term government loans are made available the money lender can earn interest during the idle period. He also suggests that if farmers are induced to diversify their cropping pattern, the demand for credit may be spread throughout the year. Moreover, diversification also may reduce variation in income and thus reduce risk of default.

Concerning the liquidity preference of the lender Bottomley says that parting with liquidity may be more painful to the lender than the return he will get in the form of the going rate of return on outside investment. This is true when the lender has slender reserves or if he meets a sudden increase in the demand for his funds, say because of harvest failure. Here Bottomley is not very clear whether the

demand is own demand or demand from the other farmers.

Bottomley suggests that by enabling the money lender to have access to the institutionalized or urban money markets, the elasticity of supply of loans by the rural money lenders with respect to the rate of interest will increase.

The next component that constitute the rural interest rate is administration cost on loans . Bottomley argues that the moneylenders in rural areas are likely to be under employed as money lenders and therefore the unit cost of administering loan is high .If he has to remain in business the per unit cost of administering loan has to be high. Administration costs per unit can be reduced by spreading the cost over larger volume of lending. This can be understood better if we follow the following three approaches .

Firstly , more individual loans will reduce the per unit cost of transaction of each loan. If the borrowers borrow more often , the per unit administration cost will go down.

Secondly , if loans are made in large volumes, then the cost of administering each unit will be reduced.

Thirdly , if the farmers are made to borrow for long periods instead of short periods the administration cost on loan will decrease. This is true especially when the money lender is fully employed.

However , Bottomley does not elaborate on this aspect. It is quite unclear from his presentation how the borrowers can be induced to borrow for longer period especially when repayment is related to harvesting which takes place at a particular season, a short period after borrowing. Moreover, how duration of loan and administration costs are related is also not explained in the article.

The third component of rural interest rate is the premium for risk . He claims, "Risk charges taken with unit administration costs, are largely responsible for high interest rates in underdeveloped countries "(p.380)." However, he does not say which one is more important in rural interest rate formation. He argues that a reduction in the risk premium is necessary to reduce rural interest rates. To understand this ,one has to discuss the situation of secured and unsecured loans. Whenever a loan is secured the premium for risk will move inversely with the market value of the collateral against which it is made .Also,if the market for the collateral against which it is made ,is rendered more liquid, this will bring down the risk premium. Wider markets and few social and legal restriction on the sale of collateral are necessary for the reduction in the risk premium

When there are no security to offer, the loans are made against the verbal promise of the

farmer to repay. Social forces work in favour of the money lenders so that they have a hold over the borrowers and this insures repayment.

Bottomley says, "Any solution to the problem of reducing the premium for risk will therefore hinge upon increases in the value of the farmer's collateral assets; ie, on over all economic growth, including the betterment of the social, legal and market conditions in which this collateral can be sold"(p.381). Whenever the lender has a hold over his clients, the risk premium can be reduced by ensuring a stabilised income of the borrower which will in turn ensure repayment.

The last component of the rural interest rate is the monopoly profits. Bottomley states that though there is a common belief that monopoly profit is the main cause for high interest rate, in actuality, it may not account for more than a negligible proportion of the rates which the cultivators will have to pay.

The reduction in rural interest rate is closely associated with the reduction in the money opportunity cost, administration cost and risk premium. This will require the augmentation and proper certification of the farmer's collaterals. This will enable the farmers to approach the organised sector with better collaterals and this will reduce the monopoly power of the rural money lender. As competition

increase , the less efficient money lenders will have to leave the business. This will increase the market share of the remaining money lenders and therefore administration cost per unit of loan given will be reduced. When the collaterals are reliable , the risk premium will also get reduced.

Bottomley's article has comprehensively explained all the four components of rural interest rate. By distinguishing each factor from the other , the relative importance of each factor shown and the measures that could be taken to reduce the rural rate of interest thus became obvious . Bottomley's article however, has a few shortcomings which are discussed below.

We had seen that Tun Wai hypothesized a downward trend in rural interest rate in the long run . Bottomley says that the rural interest rate will go up with an increase in money supply. There has been increase in money supply in India during the last few decades in which case rural interest rate should have gone up but this result would be contrary to the hypothesis that Tun Wai made . Since Bottomley does not provide any data to support his claim we do not know whether the real interest rate would have a downward trend or upward trend. Bottomley does not specify whether it is the real interest rate that will rise with increase in money supply or the nominal interest

rate.

A problem emerges while one discusses the opportunity cost of the lender's money. Bottomley equates it with the return on government bonds. The question that arises in the mind of the reader is: how pure is the pure rate of interest which Bottomley is talking about ? Couldn't these returns on bonds be administered or distorted. The shadow price for the lender's money can be looked at in a different manner as follows. In under developed economy, capital scarcity is acute and the marginal productivity of capital tends to be high. The opportunity cost of capital can be best understood as the return on capital in agriculture in the rural areas. This is all the more true when the money lender himself has a farm and he would get a higher return on his capital if he had invested it on his farm other than lending it out, or investing in government bonds.

While considering the administration cost, Bottomley assumes that larger volume of loan will reduce the per unit administration cost. But the accompanying increase in risk, as we have explained ~~con-~~ sidered earlier, is overlooked by the author. Yet another aspect is that, if the money lenders are cultivators, and if they lend money to their labourers, or tenants, the administration of loans will not be a major preoccupation for the money lender. So adminis-

tration cost in general will be negligible. In reality most of the money lenders, link their lending activity with other activities like, trade, cultivation etc., so that administration will not be a major problem to the lender. In this case , administration as component of rural interest rate will be very insignificant and this will be contrary to the claim made by Bottomley.

While analysing the risk premium, the discussion was centered around secured and unsecured loans . If the loans are secured the problem of risk does not arise unless the security is non marketable .The lender would not have accepted a non marketable collateral as security in the first place. Moreover, when the lenders have hold over their clients, repayment is assured . So unsecured loans also do not have a risk. Then how does the question of risk premium arise? A very closely related question is this: if the loan is secured and suppose the borrower's actual income falls below the expected income, in which case the borrower is forced to surrender his collateral to the lender, In much a situation, it is the borrower who takes the risk and not the lender. The borrower takes a risk of losing his collateral, which may be the land on which he depends for his livelihood.

While discussing the monopoly profit , Bottomley assumes that monopoly profit may be a very

negligible component in relation to other components of rural interest rate. This a highly debatable question. With limited flow of funds from outside the village and with very few farmers with surplus products, it is quite natural that the money lenders gain some monopoly power. Moreover, Bottomley himself admits that the lender has certain hold over the borrowers. This also will give rise to certain amount of imperfection in the rural money market because free movement of borrowers from one lender to another is restricted. The risk involved in lending to persons who are unknown and who offer securities that are not readily marketable, prevent new entrants into the rural money lending business. This also add to the monopoly power of the lenders.

However, it has to be mentioned here that monopoly may not be the real situation in any village but certain amount of imperfection may prevail instead. This will enable the lender to charge a rate more than that which covers lending cost.

Bottomley, while analysing the components of interest rate, took each component separately. This procedure may not give a correct picture of the scenario. Most of these components are interrelated. For instance, the more time that a money lender spends in administering the loan, i.e., pursuing the borrowers, and giving them reminders, the less may be the rate of



default. Therefore risk premium and administration costs should be negatively correlated. If volume of loan is increased, the per unit cost of administering loan will be reduced. But as we have seen already the risk that the lender takes by lending large volume may increase. We can not say , that the risk will necessarily increase because those who borrow large loans may have greater security to offer .However , one may postulate that administration cost and risk premium may be negatively or positively correlated . All what we want to show here is that the explanatory variables may be correlated and each of these variable should not be taken in isolation .

Now let us look at the problem of monopoly power of the lender and the interest rate. Suppose the money lender is a monopolist and charge extraordinarily high interest rate. This may induce default and therefore risk premium and monopoly profit should be positively correlated. If we assume that the hold of the lender on the borrowers is the source of monopoly power , the question of risk premium does not arise at all .

What we see here is a series of interrelations . One can not say a priori which of these components has more weight in determining the interest rate. Looking at each component in isolation , therefore will not give us comprehensive picture of rural inter-

est rate.

Chandarvarkar

Chandarvarkar (1965) could not digest the claim of Bottomley that monopoly profit is only a negligible component of rural interest rate. Armed with data from India, he decided to fight it out. He argues that Bottomley gave too much importance to administration cost and premium for risk in the formation of rural interest rate. He states that elements of monopoly and oligopoly in the lending business may be even more important explanation for high interest rate than the factors that Bottomley pointed out.

Chandarvarkar based his arguments on the data from India, provided by the All India Rural Credit Survey (1957). He says that the density of money lenders as a professional class is very low and as such highly conducive to monopoly. He says that 11.5% of the Indian villages, there is pure monopoly whereas in other villages there was a situation of oligopoly. This conclusion was reached by looking at the number of resident money lenders in the village. He says, "The category with four or more resident money lenders which may be regarded as the nearest to being competitive amongst all the five groups accounts for only 10.3% " (p.322). He has classified the villages into five groups according to the number of resident money lenders. He has also observed that 64% of the

villages do not have resident lenders. He believes that the socio-economic structure of rural society in India prevents competition.

Chandarvarkar also states that in addition to the fewness in relation to the number of actual and potential borrowers, the money lender is well placed to function as a monopolist, because he is not purely a money lender but combines a number of other activities. The money lender may also be a businessman, middleman or a landlord who controls the borrower in some other respects other than as creditor. This combination of occupation naturally implies that the lenders' pure rates of interest must necessarily be higher than the transfer earnings of his capital in alternative uses. The non specialised character is substantiated by the evidence from India. The money lender can not only over-price the produce of loan but also under price the produce to the cultivator borrower, if the former is also a trader in agricultural produce.

Chandarvarkar says " The limited loanable funds under monopolistic or oligopolistic control in conjunction with the fiercely competitive demand for credit, creates an environment ideal for a highly discriminating monopoly" (p 324) . However, Chandarvarkar does not explain, how the above mentioned factor influence the discriminatory power of the lender, nor does he

explain whether only these factors would be sufficient to create an environment for discriminatory monopoly.

Chandarvarkar , also states some of the aspects that Bottomley highlighted. He says that the borrower in rural area tend to develop customary and traditional dependence on particular money lenders. This enables the money lender to charge a high interest rate. "The unequal economic capacity means unequal bargaining power between lenders and borrowers"( p.324) . This inequality also enables the lenders to charge a high rate of interest on the loans made to their clients. The wide gap between risk and actual interest charge is largely explained by the monopoly profit of the money lender.

The multiplicity of customer rates of interest individually negotiated with each borrower indicates the existence of discriminating monopoly in the rural money market. Due to lack of interaction between different segments of the rural money market, there may arise a random cluster of interest rates. However, he does not explain what this random cluster of interest rate is. Chandarvarkar concludes that the monopoly profit may exceed the sum of other components namely risk and liquidity premia and administrative charges.

Chandarvarkar observed that in 11.5 % of the Indian villages there is only one resident money

lender each. But this does not imply monopoly power in money lending. There may be money lenders from neighbouring villages who lend to the village under consideration. So mere number of lenders in village need not be an indication of monopoly. Moreover, Chandarvarkar himself admits that personal ties enable the lender to charge discriminatory rates. So indirectly he admits that it is not the number alone that gives monopoly power to the lender. He has also shown that 64% of the villages did not have resident money lenders. This does not mean that there is no lending in the villages. So Chandarvarkar's reliance on the number of villages for the determination of monopoly power is not quite realistic. He has also not thought that money lenders would not have admitted that they are lenders. Moreover, his claim that monopoly profit may exceed the sum of other components namely risk and liquidity premia and administrative charges, substantiated neither by logical reasoning nor by data.

Charles Nisbet

Nisbet(1967) tries to test the hypothesis that the high rural interest rates are largely due to rural lender's semi-monopolistic position, through an empirical study. In his article he shows that 1) there exists an informal credit market in rural Chile 2) informal lenders can be classified according to their

motives of lending into two basic types: commercial and non-commercial (the former consists of money lenders, store keepers etc. and the latter consists of friends, neighbors etc) 3) informal commercial lenders exhort usurious real interest rates and the non-commercial lenders lend at a negative real interest rates 4) there is little or no competition among lenders and high interest on commercial loans are due in large part to imperfect competition.

In the first section of his article Nisbet shows the statistical evidence for the existence of informal money market in rural Chile and he explains the nature of this market. He also shows in this section the characteristics of the various lending agencies. Our interest here is to see how imperfection in rural market affects the interest rate and therefore, the first section will not be discussed here.

In the second section Nisbet examines the differentiation of interest rate among various kinds of lenders. He presents statistical evidence to show that interest rates vary from lender to lender. He classified the lenders into two groups: the informal non commercial lenders and the informal commercial lenders. The data shows that non commercial lenders charge low real interest rate when compared with the high interest rates of informal commercial lenders. This difference in interest rate exist because the former

group does not lend for the purpose of receiving a satisfactory return on loan capital while the latter group lends primarily for this reason. However, Nisbet does not say what this satisfactory return is .

In the next section , loans in kind and loans in cash are discussed. Nisbet presents the various kinds of loan arrangements like, lending in cash and repayment in cash and lending in kind and repaying in kind. He says that lending in kind takes place because of the following reasons.

- 1) lack of well organised markets for goods
- 2) inflationary trends prevents lenders from holding cash
- 3) if no interest is charged , the lenders do not want to be losers because of inflation.

Nisbet also says that there are a number of hidden charges which would increase the effective rate of interest charged if they are properly accounted. Some of the hidden practices are given below.

- 1) The lender requires that the borrower pays a premium for the privilege of receiving a credit . The premium is usually deducted from the loan but the interest will have to be paid on the amount inclusive of the premium.

- 2) Lending in form of cheque that must be passed on to a third party to be cashed for an additional charge when borrower has no accounts in the

banks .

3) Demanding repayment in kind even though the loan was given in cash and undervaluing the commodity received from the borrower.

4) Demanding labour services for the favour of giving a loan .This occurs when the loan is given by a landowner to his tenants or to a share cropper. This way some landowners (Nisbet calls them patrones) escape from negative interest rate ie, if the loan is given free of interest.

5) Giving no receipts so that borrower can be required to pay more than the original amount. This is mainly because the borrowers are ignorant and many can not read and write.

In the next section Nisbet gives an account of the size , terms and purposes of loans. He says that informal credit market loans were small relative to the loans taken from the commercial banks in the formal sector. The term for which a loan is taken in the informal market is longer in relation to the loans taken in the formal sector.He also examines the alleged purpose of the loans. He found in the empirical work that half of the loans were taken for consumption purpose. He substantiates the above characteristics of loans , with data from rural Chile and as we mentioned earlier we shall not present them here.

In the next section Nisbet looks at the



structure of the informal credit market in an attempt to identify factors responsible for the high rates .He discusses the following aspects.

- 1) number of lenders.
- 2) lenders' and borrower's' degree of knowledge of the market
- 3) lenders degree of market control
- 4) form of competition among lenders.

1) Nisbet examined the kinds of lenders in rural Chile and their effective geographical zone of operation. He found that the number of informal commercial lenders within a rural area ranged from zero to seven with a mean of two lenders .He comes to the conclusion that there is imperfection in the money market , imperfection ranging from monopoly to duopoly to oligopoly.

2)The rural credit market areas are so small that the money lender cum store-keeper has intimate knowledge of the farmer's circumstances. He knows the size of the borrower's farm, the number of animals the borrower has and the output of the farm in the previous year.

The borrowers on the other hand were ignorant of the terms and conditions offered.They were also unaware of the other informal markets.This enables the lenders to exploit the borrowers.

Though Nisbet has spoken about the rural loan

market he has not explained her how these markets are demarcated. One does not know whether these markets are demarcated by geographical area or whether they are markets within a geographical area but differ in their characteristics.

3) lenders in rural Chile appear to have various control over the borrowers. The borrowers can not shift from one lender to another and they can not sell their products to outside traders because of these controls. Moreover, since some of the lenders hold important positions in the society they can use socio-economic sanctions to oppress the borrowers. These factors also enable the lenders to extract more interest from the borrowers.

4) Nisbet states that no active competition exist between commercial and non commercial lenders in the informal credit market. However, Nisbet does not state the basis for such a claim. Nor does he say why he says "no active competition exists" between these two groups. His statement implies that there may be non-active (passive) competition among these two groups.

The next step that Nisbet takes is to examine whether competition existed among money lenders, among village stores and competition between money lenders and village stores.

With statistical evidence, Nisbet shows that the

borrowers did not shift from lender to lender because of interest rate competition. The market share of each lender is seen to be given. He says that there are three reasons why money lenders operate in a small scale and do not compete with each other. 1) the money lenders do not have detailed knowledge of a broad market so their business demands a small scale operation. 2) the lending activity being illegal, the lenders do not want to have any encounter with authority 3) the money lenders have very limited reserves to extend loans in large scale.

He observed that there has been no price competition among village stores but considerable evidence of uniform pricing within any given village. He also observed that in some regions, the store owners finance each other at lower rate of interest than they lend to farmers. He says the store keepers are legal while the money lenders are and these two have different market areas. So they act as market sharing duopolists rather than as competitors.

In his concluding paragraphs he suggests various measures to reduce the interest rates but they will not be discussed here since it is beyond the scope of our study.

Nisbet's study was primarily empirical but it is of significance here because it has answered some of the problems raised by Tun Wai, Bottomley and Chandar-

varkar. He has shown the level of imperfection in rural Chile's credit market and its impact on interest rate formation. Some of the short comings of his article are discussed below.

Nisbet shows that the borrowers did not shift from lender to lender due to interest rate competition. This statement is superfluous once he assumes that the lender has various control over the borrowers which prevent them from changing the lender. Moreover, the statement does not say clearly whether there is competition or not. If the interest rates were same for all lenders, there is more scope for competition. A shift from one lender to another does not mean either interest rate equality or inequality. Movement from one lender to another could be because of other reasons like terms of repayment, duration of loan, size of loans etc.

He argues that the money lenders did not operate on large scale because of lack of detailed knowledge of a broad market. The term 'broad market' is not clear to reader especially when he has stated that monopoly power of the lender is strengthened by his personal knowledge of the borrower's income, expenditure etc. The money lenders do have broad knowledge of the market conditions. We are not sure whether he means the administrative knowledge of the lender or the market forces.

Nisbet has shown that imperfect market exists in rural Chile .But he has not shown the relationship between imperfection and interest rate. This was one of the objectives of his article.What percentage of interest rate is attributable to imperfection is left to the imagination of the reader.

Nisbet , while calculating the interest rate has removed the inflationary rate, to get the real interest rate.He himself admits that inflationary trend prevails in Chile. He does not say what percent of rural nominal interest rate is to guard against the risk of inflation . If inflationary rate is 82% ,as he himself stated in he article,this should be included in the nominal interest rate.

Millard Long

Long(1968) takes up the problem of monopoly condition in loan transaction in rural areas .In his article ,he uses the term monopoly to describe any markets that are less than competitive.He argues that for monopolistic prices and profit to be maintained in a credit market for any length of time, three conditions must prevail. They are

- 1) the number of creditors from whom the debtor can borrow must be small.
- 2) existing lenders must be able to protect themselves from the competition of new entrants into the market and

3) the lenders must have control not only over cash loans but over other forms of credits which might be substituted for cash borrowing.

In the first section of his article he analyses these conditions and in the second section he discusses the influence of these factors on the rate of interest.

1) Number of firms

Interest rate that arises out of an imperfection in market can exist if there are only a few lenders. He criticises Chandarvarkar's conclusions about the monopolistic nature of Indian money market. He states that the latter's conclusions are misleading because according to Chandarvarkar's observation 64% of the villages did not have money lenders. Long, therefore asks, whether this means no lending takes place in these villages or not. He says that the farmers in such villages borrowed from outside the village. However, it should be mentioned here that Chandarvarkar stated that there were no resident money lenders in 64% of the villages and thus he did not deny borrowing and lending in these villages. Long's criticism therefore, is a misguided one.

Long argue that the figures of total lenders in an area understates the degree of concentration for, seldom would a borrower have access to all lenders, The lesser accessibility of the borrower to a lend-

er, greater will be the concentration of monopoly power. Moreover, if one takes only the cash credit, the number of lenders would be small. He suggests that lending in kind also should be taken into consideration.

It would be noted here that, Long is stating two aspects simultaneously. At one instance he says that there is 'fewness' of lenders and at the other he says the potential lenders are more if lending in kind is taken into account. Though he does not say conclusively what situation with regards to the number of lenders, prevails in the rural market, he states that when one looks at the number of lenders in the rural market, he /she should not be looking merely at the number of lenders who lend in cash only but should look at the number of lenders to whom the farmers have access and those who lend in kind.

## 2) Barriers to entry

Long combines, the problem of barriers to entry and the forms of credit other than cash, under one heading. He does not discuss the latter problem separately in the article. In the first part of this section he says that the money lenders do not specialize in lending activity. He argues that merchants operating as both lenders and middlemen are so common in the villages of under developed countries that the unspecialised form of organisation must reflect

profit advantage. But this form of organisation is not to enable them to earn high interest income. Lack of specialisation can be because of the following reasons;

a) In markets of small size there exists economies from combining functions.

b) Joint activities reduce the costs and risks of administering and collecting loans.

c) Some farmers and some merchants may at times find themselves with reserves due to random fluctuations. They may find it advantageous to make short term loans.

d) In areas where cropping is seasonal so is the demand for credit. In these regions merchants who purchase crops are likely to have seasonal credit requirements which are the reverse in time of the farmers. To keep their capital employed throughout the year they may make loans.

Long further states other barriers to entry such as social or religious prohibition against lending at interest, familiarity may induce farmers to deal with a particular middleman, coercive measures against new entrants, costs of obtaining information, and lack of liquidity of the lender in the short run.

In the next section Long lists the factors affecting agricultural interest rates and uses available data to assess their effect in India and Thailand.

He says that the Indian farmers were paying



12.3% per annum for the credit , a rate which was 8.9% higher than then prevailing government bond rate of 3.4 % .He explains this differential in terms of risk, administrative cost and seasonal factors. He assumes that the average administrative cost amounted to only 3% rather 12.3% on consumer loans in the U.S. He does not give any reason why he chose 3% as administration cost. The average risk of default was taken as 3.3% but again he does not say what the basis for his assumption is. He says both these cost that he assumes are relatively low. He also assumes that the premium to cover the possibility of default and administration costs were fixed charges independent of the time for which the loans are made . Again , he does not provide any data to substantiate his assumption.

Long argues that the seasonality in both the demand and supply for credit causes rates to fluctuate over the year , he also assumes the idle cash theorem explained earlier and says that the fear of loss of income over the idle cash pushes the interest rate up. With these assumptions long constructed a schedule of rates that an Indian lender dealing in competitive market would charge for loans of various risks and duration. He also assumes that all short term loans would have low risk of default because of the greater accuracy with which lender could predict the prospects for repayment. By analysing the annual

interest rate and the volume of loans given out in India in 1951-52, he concludes that the differential between agricultural rates and those on government bonds can be explained by competitive factors and monopoly power of lenders in the agricultural loan market was not very great.

Analysing the data from Thailand he says that the interest rates prevailing there were higher than those in India in 1951-52 he examines the factors which affected interest rate by means of multiple regression analysis. However, he does not give the regression equations in this article. He argues that the factors which did have a significant influence on interest rates were, the type of lender, the duration loans the area of the country and whether the loan was repaid in cash or kind. The factors which did not show significant influence were, the size of the loan, the income of the borrower, the borrower's total debts and whether security was given on loan. He says that the prevalent way of calculating interest on loans in kind is erroneous because this method does not take into account the fluctuation in the price of the commodity. Moreover, transaction costs also should be taken into account. Therefore, high interest rates charged on loans repaid in kind may be a spurious one.

Next, Long observes that there are substantial differences in interest rates among the major

areas in Thailand. He gives the following reasons for this phenomenon.

1) Capital flow is not sufficient to equalise the rates in various regions.

2) There is more risk in undertaking agricultural activities in some regions because of climatic conditions.

Long says that the interest rates on agricultural loan in Thailand above 60% per annum may still be consistent with competitive conditions, if these rates prevail only on short term loans of small size or on loans with high probability of default. The monopolistic excess profit will be insignificant in such cases. He says that usury laws have adversely affected farmers because such laws controlled the supply of credit. He suggests ways in which government agency can solve the problem of scarcity of rural credit. Since these suggestions are beyond the scope of this study we shall not discuss them here.

The conclusion that Long arrives at is this: Interest rate in developing countries is high, possibly because of some monopoly in the credit markets but primarily because capital is scarce, because farm loans are costly to administer, because the uncertainties of agriculture result in considerable loss through default and because the demand for loan is seasonal.

It could be seen that Long's study corroborates Bottomley's claim and opposes Chandarvarkar's findings. His formulations did help in improving the theoretical base and to emphasise the problem of scarcity of credit as the source of high interest rate. This again corroborates the claim made by Tun Wai. However, Long's analysis has some shortcomings and they are discussed below.

While discussing the barriers to entry Long states that lack of specialisation is a barrier to entry. Long, however, does not explain the link between lack of specialisation and barrier to entry. Lack of specialisation does not necessarily mean that new lenders can not emerge in the rural market.

While discussing the conditions for the continuance of monopoly Long has concentrated only on three conditions. If source of loan is segregated according to purpose and if a borrower can not borrow for consumption purpose from a source which gives loan for production purpose, there will be isolation of markets and therefore monopoly may prevail. This aspect has not been captured by Long.

In the second section Long assumes various rates for administration and risk on which we have already commented. One factor which deserves a special attention is his assumption about the fixed nature of administration and risk charges irrespective of the

period for which the loans are made. We have already seen in Bottomley (1965) that the per unit cost of administration would be lower if the loan is made for longer period, in which case the term of the loan and administration charges are negatively correlated and they are not fixed charges irrespective of the term. Moreover, we have also mentioned earlier that long period loans have higher risk because, the lender is less sure of the remote future income of the borrower. He can predict the income of the borrower, if the period for prediction is short.

#### Subrata Ghatak

Ghatak (1976) has discussed the interest rate formation in rural areas in great detail. The first part of his discussion is mainly a review of literature and therefore it will not be presented here. His discussion on rural interest rate in case of capital rationing, risk and uncertainty will be presented here.

According to Ghatak, capital rationing means that "the borrower is unable to get all the capital funds which he wishes to obtain at going or possible interest rate" (p.88). He says that rationing takes place if the lending agency is sensitive to risk.

Before we proceed further with Ghatak's arguments we would take note of a few things. Ghatak does not specify that by rationing he does not mean a

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control of price or quantity by a public authority .  
What a reader has to assume is the limited availability of credit to the farmers. He specifies that the rationing takes place because of the supplier's sensitivity to risk. However Ghatak does not explain what he means by 'possible interest rate'

In the next paragraph he explains how rationing takes place . Capital rationing takes place from the borrower's side if he is a risk averter. In such a case the farmer who borrows limits the use of capital even at a point less than the "point at which marginal value productivity of credit is equal to marginal cost"(p.88) .Why Ghatak used the term marginal value productivity instead of marginal value product is not clear.

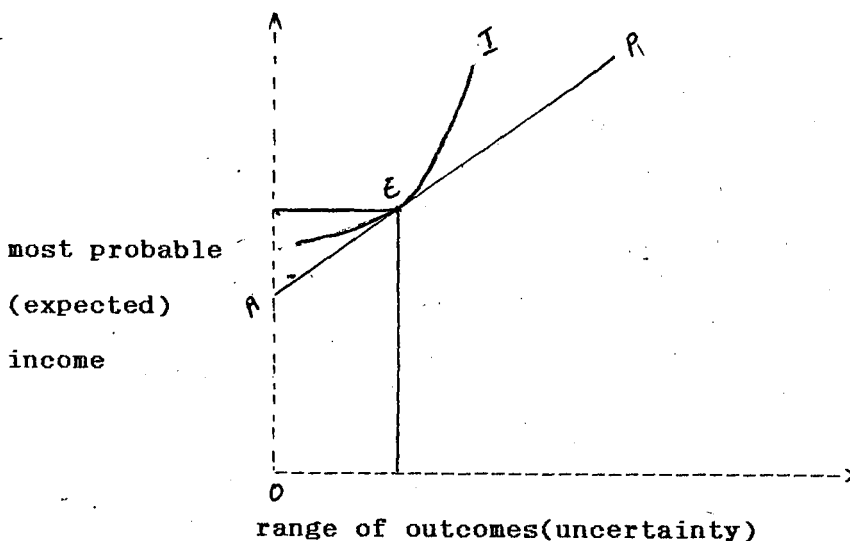
From the lender's side , credit rationing can take place if the lender, because of technical , technological and price uncertainties restricting his lending activities.

It is worthwhile to note here that in an earlier paragraph Ghatak stated that rationing takes place because the supplier is risk averse. In the preceding two paragraphs we saw that Ghatak admits that rationing can be both from borrowers and lender's side. The statements appear quite inconsistent.

After explaining how credit rationing takes place , Ghatak says why the farmers may be risk

averters. They may be so because of fear falling in debt trap or because of the social stigmas attached to indebtedness. The lenders may be risk averters because they do not get additional amount even if the farmers who borrow gain an extraordinary profit. On the other hand the lenders will lose if the farmers default.

The optimum lending of a money lender is shown in the diagram given below.



Ghatak measures the amount of possible returns on the vertical axis and the range of outcomes, i.e., uncertainty of possible magnitude of loss on the horizontal axis. He does not say in what unit this variable is measured i.e., whether it is in percentage or in absolute amount. AP indicates the opportunity possibility curve. He says that when the

money lender lends nothing the prospective return is nil and the chance of loss is also nil. However, he does not say what the opportunity possibility curve means. He says that AP starts from point showing that money lender may have alternative uses for his money. These may be in the form of deposits in post office saving bank. Here again we see an inconsistency. Earlier he states that when the money lender lends nothing he return is nil. He should have specified that the return from 'lending' is nil because the positive intercept shows that even if he does not lend to the farmers he has a positive return from alternative uses of his fund

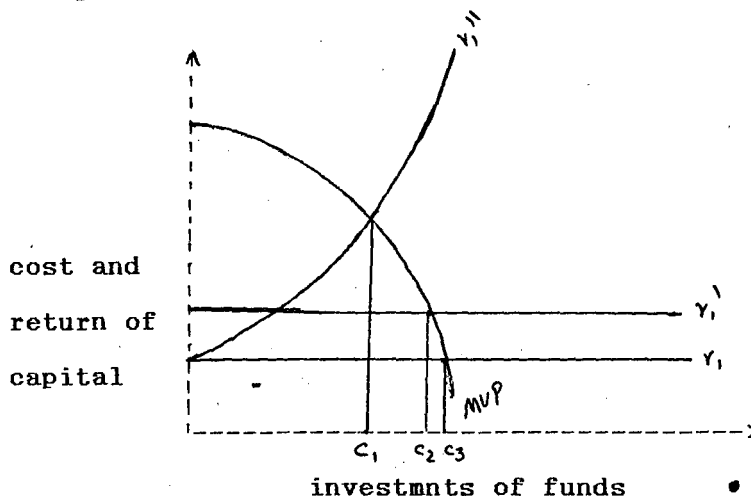
The AP curve slopes upward because the returns on the uncertain investments are higher than the certain alternatives. It should be mentioned here that this need not necessarily be true. The returns from certain investments can be lower than the return on deposits in, say, post office saving bank. The logic behind the curve is that investments in risky assets have higher risk and higher expected returns. Unless the expected returns are higher than the returns on certain investment, investors do not take up more and more risk. Ghatak has not clearly explained these relations.

Ghatak, then depicts the indifference curve of the lender by I. The curve slopes upward because



the compensation for taking up greater amount of risk, has to be large. The point at which the indifference curve is tangent to the AP curve, gives the equilibrium point of lending. In the diagram it is given by point E.

The effect of uncertainty on the interest rate is explained with the help of the diagram give below.



The MVP curve is the expected marginal rate of profit curve from the money investment of the lender. The curve slopes downward because of diminishing marginal returns. The interest rate is given by  $r_1$  and Ghatak says "let the money lender add a discount (at constant rate) in the face of uncertainty to the interest rate. This discounted marginal cost of capital then becomes  $r_1''$ " (p.91)

It should be mentioned here that Ghatak does not say how the  $r$  is determined nor does he say why a constant rate and not a varying rate is added and how

this constant rate is obtained.

Ghatak says that the equilibrium is reached when MVP curve intersects the  $r_1$  curve. This is because, it is at such a point that the marginal cost is equal to marginal revenue. In such an equilibrium condition  $c_2$  of capital is used.

When the money lender considers that there is greater amount of risk involved in greater amount of lending, the cost of capital will be depicted by an upward sloping curve. In the diagram it is given by  $r_1''$ . In such a case the equilibrium lending will be given by the point  $OC_1$  instead of  $OC_2$ .

Ghatak says that if rationing takes place from the part of the lenders, and the borrowers have not rationed their use of funds, the interest rate will go up. Where both the rationing takes place the change in interest rate depends on the extent to which both the curves shift.

Failure of the interest rate to clear the money market is because of the differences in the views of lender and borrower about a project. Ghatak says that the lender may be hesitant to lend for any project of the borrower because of the following reasons.

a) the lender will not know the nature of the investment.

b) the borrowers may be dishonest and incom-

petent

c) the lender will take a more objective view of the situation .

d) the lender views the loan transaction with a profit motive whereas the borrower has a personal interest apart from profit motive.

Some of the reasons given by Ghatak are not clear because (c) and (d) do not tell a reader anything specific. If the lender is able to get a high risk premium, what is the relevance of 'objective and dispassionate view of the situation.? Whatever might be the 'interest' of the borrower, it has no relevance to the lender's decision, provided the lender gets an interest and the loan is repaid. It is the ability to repay that is taken into consideration.

In the next section Ghatak presents a simple model for determining an equilibrium rural interest rate in Indian economy.

He postulates the following functional relationship.

$$R = f(Y)$$

$$Y = \bar{y}$$

$$r = g(y)$$

$$r = \psi(R)$$

where,

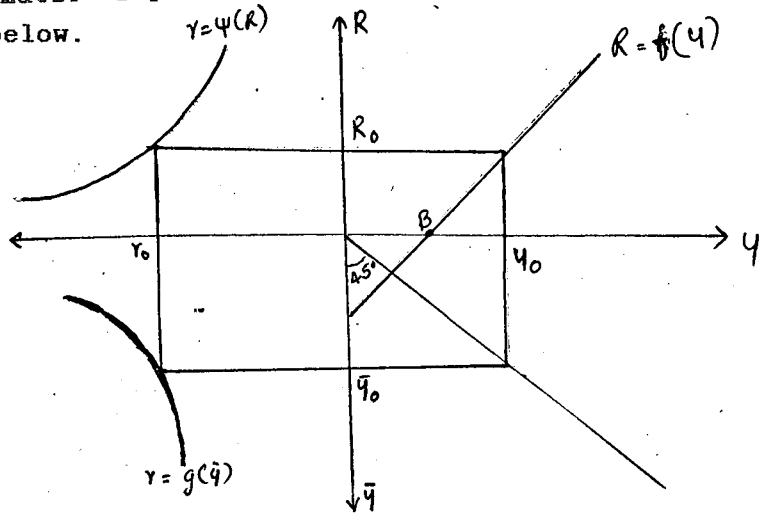
R = repayment by the cultivators as percentage of loan

Y = farmer's income

$\bar{y}$  = output of the cultivators

$r$  = rural rate of interest

The second equation is an identity and therefore only three equations and three unknowns are left for the solution of the system. Ghatak also presents a diagrammatic representation of these relation. it is given below.



The curve  $R = f(Y)$  slopes upward because Ghatak believes that greater the income, the greater will be the repayment. This curve has negative intercept because when the income of the farmer is zero, he has to borrow. OB is the subsistence level of income. Ghatak argues that the increase in repayment is expected to reduce the probability of default and therefore interest rate is negatively correlated with repayment, income and output of the farmer. The figure above shows that when income rises (falls) repayment rises (falls) and interest rate falls (rises) The equilibrium interest rate achieved when income is  $y^0$

,output is  $\bar{y}^0$  and repayment is  $R^0$

After having stated his theoretical framework, Ghatak tests his hypotheses empirically using data from India . He uses simple regression equation in the test of his basic assumptions. With the help of the results he asserts that his assumptions have been confirmed. (As we have mentioned earlier our interest is mainly to analyse the theoretical model and empirical results are of less importance here. Therefore the latter is not presented here).

Ghatak's theoretical work has improved the literature on rural indebtedness . This is primarily because he has introduced the marginal productivity of capital in comparison with cost of capital. The functional relations were explicitly stated and diagrammatically presented . Though Ghatak has introduced new concepts, as we already noted earlier, his theoretical formulations has a number of pitfalls. They are discussed below.

Ghatak assumes that repayment by cultivators as percentage of loan (R) is positively correlated to farmers income. It may be true that absolute amount of repayment may be higher with an increase income but why should the percentage of repayment increase with an increase with an increase in income is not clear in the presentation by Ghatak.

Ghatak also states, "when income rises, output

risers, repayment rises and interest falls"(p.94) .We have already seen in the preceding paragraph that the percentage of repayment need not rise with income. Besides that criticism, one should also look at the causal relation that Ghatak postulated. It is not clear why when income rises output should rise. It should have been "when output rises income may rise".

Moreover, by income, if Ghatak meant nominal income ( Ghatak was not specific about this) interest rate need not fall with rise in income .As we have seen already, inflationary rate will have to be incorporated in the nominal interest rate to compensate for the inflation and the subsequent loss of purchasing power of money.

Ghatak has equated  $Y$  and  $\bar{y}$  . He has not given any explanation for doing so. one can say that  $Y$  is proportionate to  $\bar{y}$  but one cannot say categorically that  $Y=\bar{y}$

In the empirical testing Ghatak used the data provided by the RBI . One should remember that the regression equations were fitted to aggregate figures . The interest rates , income, repayment of loans etc. were aggregate figures .As we have seen in the first chapter, aggregate figures can give us very misleading result, if they are used for regression analysis

Faruq Iqbal

It has been observed in the preceding analysis that in the development of literature on the formation of interest rate in rural areas, the impact of the development of agricultural activity on the formation of interest rate, did not get adequate attention. Ghatak has veered round this point when he admitted the importance of the marginal efficiency of investment on the formation of rural interest rate but he did not elaborate how marginal efficiency of investment can be affected by technological changes. Technological changes and the spread of institutionalised and subsidised credit service have important impact on the formation of rural interest rate. Iqbal (1988) has emphasized the aforementioned variables in the analysis of rural interest rate. He uses a econometric model to establish the interest rate function. We shall discuss his model below.

In the first section of his article, he describes the rural finance market in India and in the next section he discusses the determination of money lender interest rates. We shall discuss his findings below.

While discussing the characteristics of Indian rural finance market, Iqbal says that the technical changes in Indian agriculture over 1960's and growth of

government sponsored subsidized credit has several implications especially in the case of rural interest rate formation. He also states that agricultural innovations raise production and income risk .What he means is that when innovations are introduced variance of income will be larger. This could happen because of the sensitivity of the innovation to the timely availability and proper application of complementary inputs or to the fluctuation in weather. he says that income may also fall, if the demand for the produce is inelastic and subsequently the price of the produce falls.

Another characteristic feature of Indian rural money market is the credit market dualism.He says that the rural money market consists of official lending agencies and an informal sector. He points out with the help of data from the National Council of Applied Economic Research (India) , this dual nature and the share of each of this sectors in the rural finance market .He also shows that small farmers do most of their financial business with money lenders who in turn do most of their business with small farmer. (Note: The statistical details are given in tabular form in the article but we are not reproducing them here due to the same reason we have given earlier).He examines the impact of the formal sector, on the rural interest, in this article. He does it in the next



section.

In the second section, the determinants of the money lender interest rates are discussed. According to Iqbal, the nominal interest rate can be expressed in the form of the following equation.

$$R_n = R_e + R_a + R_p + R_m$$

Where,

$R_e$  = opportunity cost of providing loan

$R_a$  = administrative cost of handling a loan

$R_p$  = risk premium

$R_m$  = monopoly surcharge.

The data for these variables were not directly available. So Iqbal uses proxies for estimating the cost of lending. No proxies are developed for opportunity cost component because he assumes that at any given time the opportunity cost is same for all money lenders and hence it not considers as a variable in the cross section analysis. However, he admits that opportunity cost may vary from village to village but this is due to the remoteness of the village from towns and market centres. If the village money lender has to get money from the towns the procurement cost will depend on the distance of the village from the village from the town. This may cause the opportunity cost to vary from village to village. But Iqbal assumes that most village money lenders lend from their own savings and hence the opportunity cost will be

equal to the return that he will get on the deposits in the village post office or bank.

With regards to the administration cost, Iqbal says that it can be proxied by the loan size with the assumption that the larger the loan, the smaller the unit cost of administering it. But loan size could be simultaneously determined by the interest rate and hence a simultaneity bias may arise. He says "because of some problems involved in including truncated endogenous variables in the econometric procedure adopted in this study the proxy used here is an alternative measure of credit demand given by the population size of the borrower's village".(p.369). Again, he says, "The lack of an econometric and computational procedure that would solve both simultaneity and selectivity problems made it necessary to ignore loan size as an independent regressor..."(p.372). (Note: By selectivity problem he means the problem that arises when one takes only the borrowing households instead of all the households ~~available~~ for the analysis). However, he does not elaborate on what the econometric and computational procedure he is referring to. He claims that the size of population is a substitute for loan size because it reflects the size of the market faced by village money lenders and as such introduces the demand side into the model. With these assumptions he chooses the size of population as a proxy for adminis-

tration charges.

The determinants of the risk premium is discussed next .This premium is proxied by those variables that will determine the probability of repayment . But he says the best single proxy for risk premium is the permanent income of the borrower. Since the money lender can not determine the permanent income of the borrower, the former forms his judgments based on a number of variables like land owned , other assets and education of the borrower. The quality of soil and weather also are also taken as proxies. The quality of soil is proxied by the proportion of irrigated land (of the district) and the average rainfall of the district as a measure of weather . Even though Iqbal makes a distinction between permanent weather characteristics and transient ones , he does not elaborate how weather conditions can affect the permanent income . it may be presumed that if an area has scanty rainfall for a number of consecutive years , it likely that the farmers of that area face a lower permanent income than if it had a normal rainfall.

Profitability arising out of new technology may also increase the permanent income of the farmer and this will also reduce the risk of lending to those farmers who use the new technology.

The technical change is proxied in Iqbal's

study by the proportion of irrigated land in the farmer's district.

While discussing the monopoly power of the money lender as a component of rural interest rate, Iqbal says that the tendency of the previous studies on rural interest rates was to make reasonable assumptions about opportunity costs, risk premium and administrative costs and estimate the monopoly profit by subtracting the above components from the actual interest received. But he says that as long as calculations are based on hypothetical cost estimates and definition of 'reasonableness' that vary, the previous methods are not likely to shed much light on the issue of monopoly profit. Moreover, since very little is known about the costs incurred by the monopoly lender and therefore comparing it with the costs of the formal sector will not give the monopoly profit. The earlier studies give average rates of interest and not the marginal rate. Iqbal argues that the latter is a more appropriate measure of interest rate.

Iqbal suggests that the measure of monopoly surcharge can be made by measuring the quantitative effect on the informal interest rate of the presence of a formal lending agency in the village. The presence of a formal agency is an important factor influencing the rural interest rate. He says that if a

non profit maximising , government subsidised lending agency enters the competitive informal credit market, the borrowers flock to it. If this government agency has limited funds, limits itself to certain target groups and lends at a lower rate than the interest rate in the competitive rural money market , some of the competing money lenders will have to quit the business because it may not be profitable for them to remain in the business . He says, "As long as competitive conditions prevail in the informal market, the rate of interest charged by money lenders can stay constant or rise. The important point here is that the rate can not fall because that would drive the competitive money lender out of business"(p.371).He says that the interest rate might rise because the less risky clients are absorbed by the formal agency and the more risky ones are left to the money lenders. However, Iqbal does not specify the criterion for classifying the clients of the formal agency as less risky clients. Moreover, he does not explain clearly why the interest rate can not fall when the formal agency enters the market. If the presence of the formal agency is strong and many borrowers flock to it , the demand for the money lender's money is likely to be reduced in which case the money lender is left with surplus liquidity . The interest rate which he charges is forced to be reduced in such a situation. Moreover Iqbal admits that some money

lenders have their average interest rates lower than the market interest rate .This is evident from the statement that some lenders will leave the business because lending becomes unprofitable to them when the formal agency enters the market . The effect of the entry of formal agency ,its impact on the cash reserves of the money lender ,on the demand for loans by the farmers and on the supply of loan function are not explained adequately by Iqbal.

Iqbal has tested the hypothesis on the interest rate formation, empirically. He claims that the results confirm his prior expectations .(Note: As we have mentioned earlier , we shall not discuss his empirical findings here since it is beyond the scope of this work )

Iqbal's analysis has a stronger theoretical base because he has incorporated in his work variables like , permanent income, effect of technical change and the influence of formal credit agency on the money lender interest rate. It should be mentioned here that these variables were not included in the earlier studies. Though his study has contributed significantly to the debate on the formation of rural interest rate, his study has a number of shortcomings They are discussed below.

One of Iqbal's main objectives was to analyse the impact of formal credit agency on the money lender

interest rate . However, Iqbal has not specified whether these markets, ie., the formal and informal could be isolated from each other. Isolation can occur if the formal agency has certain specific groups of clients .It may also occur if personal ties between the borrower and lender, (such as tenant and the land owner ) can not break the transaction between the money lender and the borrower. There may be isolation within the informal sector itself, if each money lender has certain group of farmers as his clients. However, Iqbal has not specified these factors and one knows, these factors do play an important role in the interest rate formation.

Iqbal assumed that the village money lender usually lend from their own funds. This need not be true. Money lenders may get money from the towns, either from the organised money markets, or from urban money lenders and on lend to the farmers in the village. If this is the case, his assumption that opportunity cost of his money is equal to the rate return he gets on deposits from the post office, bank etc., is untenable. Moreover, Iqbal assumes uniform opportunity cost for all the lenders. The lenders may be different in managing their funds and if the lenders invest their funds in augmenting agricultural production, the returns each money lender gets may be different. It depends on the efficiency in the management of

the farm. In fact in a capital scarce economy, the marginal productivity of capital tends to be high and in such case the productivity of capital, instead of the rate given by the post office or banks, should be taken as the actual opportunity cost of money lender's money.

Iqbal has taken the size of population as a substitute for loan size under the assumption that the size of the population would reflect the size of the market faced by the village money lender. This assumption may not be realistic. A small population, with high economic activity may borrow heavily. On the other hand, if investment opportunities are low despite a large population, there will be a low level of borrowing. So a large population does not necessarily mean large borrowing.

Iqbal has taken technical change and the entry of formal credit agency as two of the variables that affect rate of interest in rural areas. When there is a technical progress, there is likely to be a larger demand for funds and gradually over the period of years the interest rate may undergo changes, in which case we see a correlation between two of the explanatory variables. When these two correlated variables are used to regress on the rural interest rate, the problem of multi-collinearity may be expected. This would make the coefficients of the explanatory varia-



bles inefficient. However, Iqbal has not discussed this problem in his theoretical formulation .

Iqbal has not considered the importance of collaterals in the formation of interest. When easily marketable collaterals are offered against a loan , the lender may lend at a lower rate . He has also not considered the difference of interest rate according to the duration of loan . It was seen in earlier studies that short term loans bear a higher rate of interest rate. Similar analysis was not done by Iqbal.

What we have seen so far is the interest rate formation in rural areas when loans are given for production purpose. There have been a few studies about the interest rate formation when loans are given for consumption purpose. We shall present these studies below and see whether the interest rate formation differs when the loan is given for production purpose and consumption purpose.

Amit Bhaduri

Bhaduri (1977) analyses the interest rate formation when loans are given for consumption purpose and looks at this problem from the angles of the risk of default, the collateral requirements and the monopoly power of the lender due to isolation of market. Later, he refined his article because of comments from various writers and published the same ideas in Bhaduri ( 1984) after making necessary modifications.

we shall discuss here the latter work.

The first task of Bhaduri (1984) was to discredit the conventional theories that we have discussed earlier. Bottomley had explained that the lenders should be given a premium for taking risk. He also assumed that the default rate and opportunity cost are exogeneously given. Bhaduri says that both these assumptions seem invalid in the particular context of the unorganized credit market in rural areas. The assumption of equalization of opportunity cost of finance is untenable because the rural credit market is isolated from the organised money market and highly fragmented. This isolation of credit market primarily depends on the security of the loan because the credit worthiness of a borrower depends on the security that he can offer. Bhaduri claims that the lenders in rural areas accept a whole range of securities that are apparently non-marketable in organised market. The money lender accepts securities such as standing crops, future labour service etc. though these are not marketable in an organised market. This is possible in rural money market because of the highly personalised nature of credit arrangements and the personal power that the lender enjoys over the borrowers. The money lender can also under value the collaterals offered by the borrowers. This enables the former to cover the capital loss of defaulted loan

and make a capital gain through transfer of the collateral in case of default. This situation indicates a borrower's risk of losing his means of livelihood in case of default.

The formation of rural interest, according to Bhaduri, is formally presented as given below.

The lender's gain can consist of two parts namely, 1) his monopoly power in valuing the collateral below their normal market value and 2) the differing personal valuation of an asset to the lender and borrower.

Since the money lender has a higher economic power, he has access to the organised market which is not the case with the poorer peasants. This enables the former to compare his personal valuation of the collateral with its market value. These ideas can be written as given below.

Let,  $\Pi$  = the normal market (organised) price of an asset.

$\Pi'$  = the price of the same asset accepted by the lender as collateral for advancing loans where  $\Pi' < \Pi$

$\Pi^L$  = the personal valuation of placed on the same asset by the lender:

$\Pi^L$  and  $\Pi$  may differ because, a collateral, say land, may have a certain value in the market. But if the money lender has some special advan-

tage if the land is annexed to his plot, his personal valuation may be higher than what the same plot would be valued in the market. Special advantage could be a road that would connect the money lender's residence to his farm.

Since personal valuation and the market value may differ, the value of collateral transferred to the money lender, for every nit of loan defaulted would be given by the ratio  $K^L$ , where,

$$K^L = \frac{\max(\Pi, \Pi^L)}{\Pi}$$

The borrower also has a personal valuation of the collateral that he offers. Though market value may be low, (say, of land), his personal valuation of the same collaterals will be very high, if his livelihood depends on that collateral. Let the personal valuation of the collateral be given by  $\Pi^B$ . The money lender is likely to undervalue the collateral in which case

$$\max(\Pi^B, \Pi) = \Pi^B$$

As a result, from the borrower's point of view, the value of asset transferred from his, for every unit of defaulted loan, is given by the ratio:

$$K_B = \frac{\max(\Pi^B, \Pi^L)}{\Pi^L} = \frac{\Pi^B}{\Pi^L}$$

The gain per unit of loan defaulted, for the lender is  $(K_L - 1)$  and the loss for the borrower is  $(K_B - 1)$ . The effective rate of interest from the lenders point of view is  $\delta_L$ , where,

$$\delta_L = i(1 - \mu) + (K_L - 1)\mu$$

The effective rate of interest from the borrower's view will be given by  $\delta_B$ , where,

$$\delta_B = i(1 - \mu) + (K_B - 1)\mu$$

where,

$i$  = interest rate charged by the lender

$\mu$  = proportion of the loan defaulted

The assumption, Bhaduri makes here is that there is no interest payment on that portion of the loan that is defaulted.

The interest charged,  $i$ , is a choice variable for the lender. Unlike the earlier theories that assumed that there is an interest rate which is exogenously given, Bhaduri claims that  $i$  is determined within the system itself. Bhaduri claims that with an increasing  $i$  there will be a higher degree of default, i.e.,

$$\mu = F(i) \quad \text{and} \quad F'(i) = \frac{d\mu}{di} > 0$$

Bhaduri argues that  $u$  is not a choice variable of the borrower but induced by the high interest rate. If the interest rate is too high, the borrower may find it convenient to default. If  $u=1$ , then

$$o_B = \delta_B = (K_B - 1)$$

Under such a condition

$$\mu = F(i), \quad F'(i) > 0, \quad 1 > \mu > 0, \quad \text{if } i < o_B$$

$$\mu = 1 \quad \text{if } i > \delta_B$$

When the loan demand is relatively inelastic, the lender will choose  $i = i^*$  which will maximise his effective rate of interest per unit of loan advanced. The maximisation principle requires that

$$\frac{d\delta_L}{di} = 0$$

which can be simplified into

$$F'(i) \Big|_{i=i^*} = \frac{(1-\mu^*)}{(1+i^* - K_L)}$$

and the corresponding second order condition requires

$$\frac{d^2\delta_L}{di^2} = -2 \frac{d\mu}{di} - (1+i-K_L) \frac{d^2\mu}{di^2}$$

where,

$$\delta_L = (\delta_L) \max$$

$$i = F(i^*)$$

such that,  $1 > \mu^* > 0$ , postulating an interior solution

Since  $F'(i)$  is already defined as greater than zero we get

$(1+i^*) > K_L$  which means that, unless repayment of principal plus interest at the optimal level  $(1+i^*)$  exceeds the value of transferred collateral  $K_L$ , per unit of loan defaulted, default will continue to be profitable to the lender as to rule out an interior solution of  $1 > \mu > 0$

But we have seen that  $i^* < o_B$  which implies that  $(1+i^*) < k_B$

Thus we have

$$K_B > (1+i^*) > K_L$$

With the help of the earlier equation one can also get the following result

$\Pi_B > \max (\Pi, \Pi_L)$ , which is the underlying economic condition for an interior solution (ie.  $1 > \mu^* > 0$ ) to hold.

Since the asset which is given as collateral is an essential means of livelihood for the borrower he places a very high personal valuation on the same and may continue to pay a very high interest rate. The lender will take advantage of this situation and will push the interest rate so high that the repayment of

principal plus interest will exceed the valuation he places on the collateral.

It can be inferred from the foregoing arguments that the higher the value of the parameter  $K_L$ , the higher will be the lower bound on the optimal interest rate, because  $i^* > (K_L - 1)$ . From these conditions we know that the lender will charge an interest rate in comparison with the personal valuation and the market value of the collateral. A collateral which can easily be marketed by the borrower will not be grossly undervalued by the lender and therefore the rate of interest charged on the loans with highly marketable collateral is likely to be less than one in which a less marketable collateral is involved.

Bhaduri argues that consumption loans, obtained by the poor peasants at high interest rates against undervalued collaterals, transfer the entire risk of capital loss to the borrower in case of default. He also says that the emphasis in the analysis was on partial default because full default is deliberate retaliation on the part of the borrower and occurs only in extreme situation. He admits that his analysis has been that of a static situation but the actual situation of usury is dynamic. This aspect will not be discussed because his analysis deals with the accumulation of land by the land lord and subsequent exploitation



Bhaduri's analysis was definitely different from the earlier studies and threw significant light on the working of the rural money market. His study has been a significant improvement over the existing studies, since it shows how the default rate and interest rate are endogenously determined. The importance of personal valuation is emphasised in this study, which was not given any attention in the earlier studies. However, Bhaduri's analysis has several shortcomings. They are discussed below.

Bhaduri says that default is induced by the high rate of interest and simultaneously he argues that the borrowers may find it convenient to default a loan. In one instance, the default appears to be voluntary and in another it appears to be involuntary. It may happen that it may be advantageous for the borrower to repay than default even if the interest rates are fixed very high, because the borrower might require loans in the future.

Bhaduri's analysis depends heavily on personal valuation of collaterals without delving deep into the method through which the personal valuation can be quantified. The valuation of collateral becomes very arbitrary when personal valuation is introduced. How much market forces will be relevant in valuing an asset which has some sentimental values, will be a puzzling question. Moreover, differing personal valuation for

various assets imply that for each collateral there would be a different interest even though the loan amount is same. The size of the loan and duration of the loan seem to have not got adequate attention in Bhaduri's analysis.

A problem which did not get adequate attention in Bhaduri's analysis is the case in which the personal valuation of the asset by the lender is more than the personal valuation of same asset by the borrower.

In the determination of interest rate in the rural areas, the opportunity cost of capital of the lender has to play an important role. When the lender is a producer, he definitely will see the earning that will accrue to him in a productive activity. This return will have to be incorporated in the cost of lending, if the money lender decides to lend. However, Bhaduri has not captured this aspect in his work.

Basu (1989) has discussed the problem of rural interest rate but has not specified whether the loans are taken for consumption purpose or production purpose. In his paper, Basu discusses some of the issues that were already raised by Tun Wai and Bottomley but were not subjected to rigorous theoretical analysis. Basu takes up issues such as the efficiency of the monopolist money lender, the relation between interest rate and size of loan and the relationship between

interest rate and the duration of loan.

At the outset of his paper, Basu says that using terms like 'per cent' and 'per annum' to refer to interest rate can be misleading. These terms may be reasonable in organised credit markets where interest rates are relatively invariant with respect to loan size and duration. When these terms are used to describe backward markets, they can be misleading because different findings can be made to look deceptively similar. Suppose a person, A, takes a loans of say Rs. 100 for one month and returns Rs. 120, one would say that the interest rate per annum is 790 per cent. Suppose another peasant B, borrows Rs. 100 for one year and returns Rs. 890 at the end of the year. Again one could say that both A and B face the same predicament. Basu argues " Yet it is very likely that A and B face very different credit situation. From empirical findings and theoretical models we know that interest rate per annum on shorter duration loans are usually higher than those on long loans" [p.147]. (Note: Basu's reference is to Sarap(1986) ch .6 (Ph.d.Thesis, University of Delhi) A borrower may have to pay more on short term loans but this aspect will be ignored if one tries to use term 'per annum', while discussing the rate of interest in unorganised market. Therefore one can not say that both A and B pay the same interest rate. This problem arises

because one tries to convert 'one month' rate into an annual rate or in other words, when one tries to have a 'normalised description'

Basu describes yet another problem. When two borrowers have to repay the amount in kind at a particular time irrespective of the time when the loan in kind is taken, the normalised description again poses a problem. If the normalised description used, even though the borrowers have to face the same option, of repaying at a particular time, the interest rate would be enormously higher for a person who borrows just one week before repayment than for the person who borrows an year before repayment. So Basu states that two persons confronting same option could be made to appear as if they face different situations.

Basu analyses the relationship between loan size and interest rate and duration of loan and interest rate in this paper. The aim of the paper is to construct a model which will capture some of the problems raised in the introduction and which we have presented above.

He has also given a brief summary of the theoretical discussion of the problem of rural interest rate formation, which we have already seen in the earlier discussions.

In the second section of his paper, Basu

analyses the monopoly power of the rural money lender who can appropriate all the surplus that a borrower has. His analysis is similar to the familiar micro-economic analysis of a perfect discrimination. He argues that a credit market which is fully exploitative is efficient. Though his discussion is not directly relevant to our analysis of rural interest rate formation, it is necessary to see what would be the interest rate in a fully exploitative credit market. His arguments about exploitation and efficiency are discussed at first. Subsequently the problems mentioned earlier are taken up.

Suppose a poor peasant can convert  $L$  units of paddy loan into  $X(L)$  units of paddy.

$$X = X(L), \quad X' > 0, \quad X'' < 0$$

The money lender who has  $M$  units of paddy can convert each of the  $M$  units into  $(1+r)$  units of paddy.

If the money lender does not have access to the technology that converts  $L$  into  $X(L)$ , he has to lend the paddy to the poor peasants. In order to arrive at an interior solution Basu assumes that

$$X'(M) < (1+r) \quad \text{and} \quad X'(0) > (1+r)$$

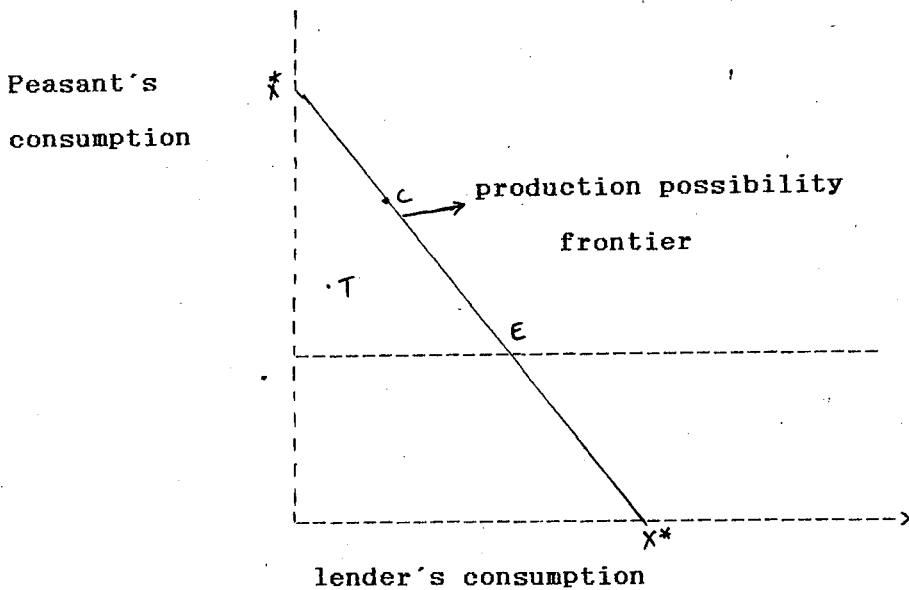
Assuming that the money lender has given a loan of  $l$  to the peasant the maximum production in the economy will be

$$\text{Max } X(L) + (1+r)(M-L) = X^*$$

L

This happens when  $L = L^*$  and  $X'(L^*) = (1+r)$

The technologically feasible production curve under the above conditions, is given below



Basu assumes a one commodity production sector and he says all the points on  $X^* X^*$  axis frontier are efficient. After establishing the production frontier, Basu analyses the case of a perfectly exploitative money lender. If a money lender is perfectly exploitative, he can ensure that the borrowing peasant get nothing more than a subsistence consumption, say  $x$ , and the former gets all the rest. In that case the lender's income is given by  $\Pi(L)$ , where,

$$\Pi(L) = (1+r)(M-L) + X(L) - x$$

The lender chooses such an  $L$  that maximises his profit. The first order condition of the above function then is given as follows:

$$X'(L) = (1+r)$$

In the diagram given above, the equilibrium occurs at point  $E$  and this point indicates that the perfectly exploitative money lender would leave nothing more than subsistence level consumption to the borrowing peasant. At equilibrium the lender's income equals

$$\text{Max}_L (1+r)(M-L) + X(L) - x = X^* - x$$

$L$

The total output is  $X^*$  and the efficiency in production is guaranteed in this equilibrium condition. After having established the equilibrium condition when a money lender is perfectly exploitative, Basu compares this case with the equilibrium conditions when the money lender acts like a traditional monopolist.

The demand function that faces the monopolist is determined by the desire of the borrower to maximise

$X(L) - (1+i)L$ , where  $L$  is the amount borrowed and  $i$  is the rate of interest. The demand for credit, then, is determined by the first order condition of the above function. This is given below.

$$X'(L) = (1+i)$$

The money lender chooses  $i$  and  $L$  so as to

maximise his profit  $(1+r)(M-L) + (1+i)L$ , subject to the constraint place by the demand constraint given above.

The Lagrangian for the above maximising problem is

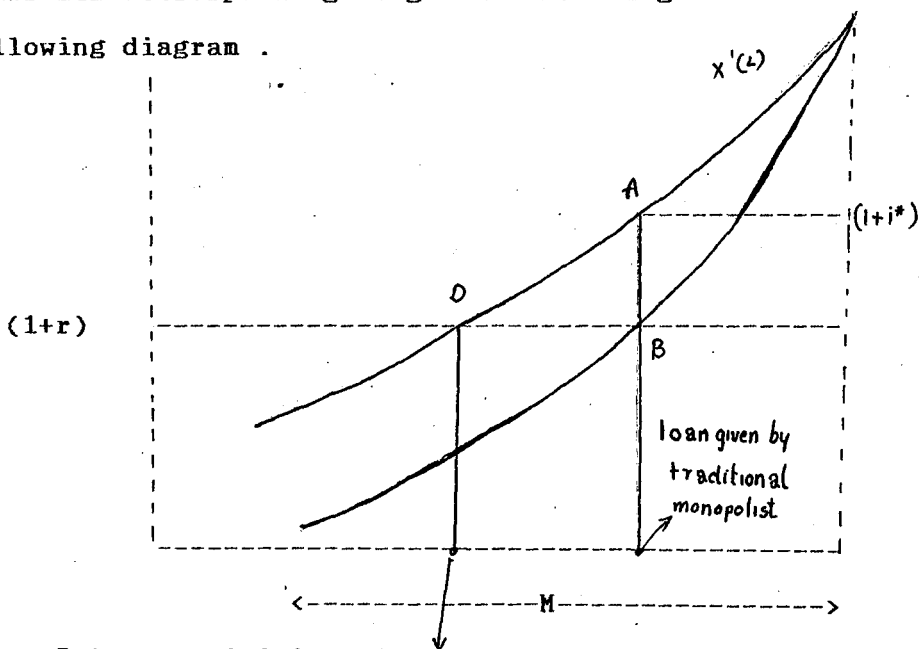
$$Z = (1+i)(M-L) + (1+i)L + \lambda [ X'(L) - (1+i) ]$$

After deriving the first order conditions we can obtain

$$(1+r) = X'(L) + L X''(L)$$

This is the familiar marginal revenue equals marginal cost conditions.

Basu treats  $X'(L)$  as an average curve and draws its corresponding marginal curve as given in the following diagram .



Output maximising loan given = loan given by  
exploitative monopolist

If we follow the traditional analysis of non-exploitative monopolist the lender will charge (



$1+i^*$ ) for the loan, whereas when a product maximising monopolist lends, he lends in such a way that the borrower is given just the subsistence level of products. The interest charged would be  $(1+r)$  under such condition.

The product loss in a non exploitative system would be given by the area ABD. Basu argues that the perfectly exploitative money lender will charge  $r$  which is the competitive interest rate and will extract the surplus through other interlinked markets.

In the next section Basu examines the relation between interest rates and duration of loan. He admits that the perfect exploitation explained in the earlier section may not be possible for two reasons; Firstly the lender may not have adequate information about the borrower and the transaction cost of such elaborate bargaining may be too high. Secondly, such a procedure may violate the social and political norms of an economy and may for the reason be impossible to implement. If a money lender wants to discriminate among the borrower, this may inflict costs on the lender. Basu says that if the lender wants to charge different interest rates, he has to couch it in some universalisable principle. Though Basu does not specifically explain what a nonuniversalisable principle is what he means is this; if a money lender can not dis-

discriminate between borrowers A and B, just because Mr. A is A and Mr. B is B, he can discriminate between them on some principles. The borrowers A and B may have different credit requirements. Mr. A may require short term loans and Mr. B may require long term loans. The money lender can then make a principle that the interest rate varies according to the duration of the loan. With such a principle, he can discriminate between the borrowers and this may reduce dissension among borrowers. Basu examines the case where people's need for credit varies over time and the impact of such variation interest rate.

Let  $C_t$  be borrower's consumption for period  $t$  and the utility function of the borrower can be written as follows

$U = U(C_0, C_1, C_2, \dots, C_n) = U(\{C_t\}_t)$  Where,  $0, 1, 2, \dots, n$  denote  $n+1$  periods. The assumption here is that the borrowers do not save anything. It is also assumed that

$$\frac{\partial U}{\partial C_k} > 0 \text{ for all } k.$$

Let the endowment of the borrower be denoted by  $W$

$$W = (W_0, W^1, \dots, W^n)$$

Let  $L^{kt}$  denote the loan taken in period  $k$  for  $t$  periods i.e. it has to be paid back with interest in the period  $k+t$ . Every vector  $L^{kt} = (L^{01}, \dots, L^{0n})$ ,

$$L^1_1 \dots L^1_{n-1} \dots L^{(n-1)}_1$$

where  $L_{kt} > 0$  for all  $k, t$ , will be called a credit plan

The interest rate structure is given by

$$[i_t] = (i_1, \dots, i_n)$$

Where  $i$  denotes the per period interest rate payable for loan taken for one period,  $i_1$  denotes the per period interest rate payable for a two period loan and so on. With the help of the above notations, Basu writes the utility function of a borrower in the following manner.

$$\bar{u}([L_{kt}], [i_t], w) = u\left(\left\{w_k + \sum_{t=1}^{n-k} L_{kt} - \sum_{t=0}^{k-1} (1+i_{k-t})^{k-t} L_{t(k-t)}\right\}_t\right)$$

The present value of the lender's total profit  $\bar{\Pi}$  is defined in the following manner.

$$\bar{\Pi}([L_{kt}], [i_t]) = \sum_{k=1}^n \left[ \frac{\sum_{t=1}^k \left\{ (1+i_t)^t - (1+r)^t L_{(k-t)t} \right\}}{(1+r)^k} \right]$$

Here the assumption is that moneylender is able to get funds from the organized sector at a rate equal to  $r$  and this rate is used for discounting.

The next task before the author is to state and prove the theorem that short term loans entail higher interest rates the theorem is stated as given below: "In a three period model (ie.  $n=2$ ) with homogeneous borrowers 1) the short term interest rate (ie.  $i_1$ ) is never less than long term interest rate (ie.  $i_2$ ) in

equilibrium and 2) there are parametric configurations such that in equilibrium short term interest rate exceeds the long term rate" [p.158].

This theorem states a condition about homogeneous borrowers. According to basu two homogeneous borrowers are those who have the following kind of utility function

$$\bar{U}^1([L_{kt}], [i_t], W^t) = \bar{U}^2([L_{kt}], [i_t], W^t)$$

If their utility functions are different they are heterogeneous borrowers.

The first part of the theorem is obvious because, if the short term interest was less than the long term interest, no borrower would take a two period loan. The lender also would not gain by setting  $i_2 > i_1$ . Whatever profit the money lender earns, is earned by choosing an interest structure  $(\bar{i}_1, \bar{i}_2)$  such that  $\bar{i}_2 = \bar{i}_1 = i_1$ .

The second part of the theorem is proved in the following manner. If the interest rate is uniform and less than or equal to  $\bar{i}$ , the borrower would borrow in period 0 and repay in period 1, and will not take any other loans. If the interest rates are non uniform, the borrower would borrow for two period when  $i_2 < i_1$ . With this preference of the borrower interest rate can be shown as non uniform. Suppose that the equilibrium interest rate is uniform and equal to  $i^*$ . This must be less than  $r$ . Otherwise the lender will be a loser.

If the interest rate is uniform, the borrowers would be borrowing in period 0 for one period. If the lender offers  $i_1$  such that  $i_1 \geq i^* + e$  ( $e$ , is a small, positive number) and  $i_2 = i^*$  then the borrower will take a loan of the same size ( $L$ ) as before but for two periods. This would enhance lenders profit by

$$\frac{\{(1+i^*) - (1+r)\} L}{(1+r)} - \frac{\{(1+i^*) - (1+r)\} L}{(1+r)}$$

$$= \frac{(1+i^*)(i^*-r)L}{(1+r)}, \text{ provided he induces the}$$

borrowers to borrow for two periods instead for one period.

Basu concludes that a uniform interest structure will not be an equilibrium and from part (1) of the theorem, we know that the interest rate for short term loans must exceed the interest rate for long loans. Basu also states that there will be some borrowers (heterogeneous) who take short term loans but their loans will be of very small magnitude, so as not to affect lender's profit considerably.

In the second theorem, Basu states the case of heterogeneous borrowers with more than 2 periods. The theorem runs like this "The equilibrium interest structure in an  $(n+1)$  period model in which

borrowers may be heterogeneous, has the following property: for all  $k=2,3,\dots,n$ , or all positive integers  $h$  and for all non negative integers  $t_1, \dots, t_h$  such that  $t_1 + \dots + t_h = k$

$$(1+i_{t_1})^{t_1} (1+i_{t_2})^{t_2} \dots (1+i_{t_h})^{t_h} > (1+i_{t_h})^{t_h}$$

There are parametric configuration where strict inequality holds" [p.160]. The proof of this theorem is similar to that of the first one. The theorem states that by breaking up a loan into short duration loans, the consumers do not gain anything, but on the contrary, non-uniformity of interest rates arising out of the variation of duration, can be used by the lender to extract consumers surplus from the borrower.

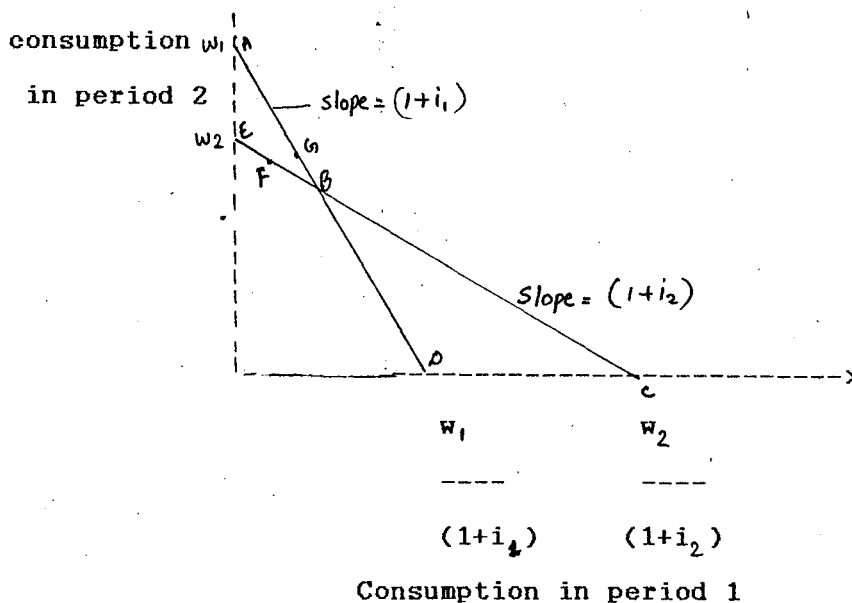
In the last section of the article, Basu examines the relation between interest rate and size of the loan. His arguments are given below.

Suppose the lender offers a sequence of wage-interest packages to the borrowers,  $\{(w_1, i_1), \dots, (w_n, i_n)\}$ , leaving each borrower to pick any package he likes and borrow any amount of loan he wants at the rate of interest. Let the consumption stream of the borrower be  $(L, C)$ , where  $L$  and  $C$  represent consumption in period 1 and 2 respectively. If a labourer chooses  $(w_j, i_j)$ , then he can have a consumption stream such that

$$C = w_j - (1+i) L$$

Let  $[(w_j^*, i_j^*)]$  be the sequence of packages

that maximises the lender's profit. This implies that a certain relation between loan size and interest rates. The theorem is formally stated in the following words. "If the size of the loan taken by person  $i$  is greater than the one taken by person  $j$ , then the interest rate paid by  $i$  is less than or equal to the interest paid by  $j$ " [p.162]. The proof of the theorem is explained with the help of the following diagram.



Let the first two of the set of sequences offered by the money lender be  $(w_1, i_1)$  and  $(w_2, i_2)$ . The budget constraints are depicted by AD and EC respectively. The borrower would settle somewhere on ABC, if he is given these two options. Suppose, he chooses F, he would be better off if he moves north east, to say a point like G. If among two workers one

takes a larger loan , ie, if the consumption in period 1 is larger , then he is on the flatter budget constraint . In other words , he pays a lower interest.

Basu's rigorous analysis of the relationship of interest rate with the duration and size of loan gave a stronger theoretical base to the discussion of the determination of loan . The problems raised by Bottomley and Tun Wai have been more analytically discussed in this article. Both these writers have argued that short term loans carry a heavier interest rate because of the compensation that has to be paid for the cash that lies idle once the loans are repaid. Basu also comes to the conclusion that short term loans bear a higher rate but his analysis is different from that of his predecessors. Though his discussion has a strong theoretical base , there are a number of shortcomings in his studies which we shall discuss below.

Basu states that the short term loans bear a higher interest rate because if the long term interest rate were higher nobody would borrow for a long term. This is only one side of the coin . When we look at the risk element in the transaction a different result emerges. The lender knows the borrower's income ( and therefore the repayability ) of the borrower when the period of prediction is short . When the period of prediction is long, accuracy of prediction



is reduced. What it means is that when long terms are given, the risk that the lender takes is higher. So the risk premium has to be higher for long term loans. Moreover, when the transaction period is large, the per unit administration cost of the loan tends to be small. This would drive the interest rate low. Analysing these two aspects, one can not say a priori, which will have a greater weight and this needs empirical analysis. If the risk premium outweighs the lower administration charges, the interest rate tends to be higher for long term loans. However, Basu argues that short term loans have a higher interest rate than the long term loans. One is not sure of the net result of various factors that affect the cost of lending and hence one can not say a priori that duration of loan alone would determine the interest rate.

Yet another factor that Basu overlooked was this: Even if the interest on the short term loan is smaller than the interest on long term loans, the farmers who require funds for long term investment can not take short term loan because the gestation period of the investment may be long. So interest rate per se can not explain the demand pattern of the borrowers.

Basu has analyzed the relationship between the size of the loan and the interest rate and argued that the larger loans have a lower rate of interest. In the

preceding paragraph we have mentioned the administration aspect of the loan. Larger loans tend to have a low per unit administration charge. This reinforces Basu's argument. . But again this is only one side of the coin . Larger loans may have a higher risk element though this need not necessarily be the case .But one can not rule out this factor altogether. From the lender's point of view , a large amount parted with has greater risk. In case of a default , the loss will be large though one may argue that the larger loans may have a greater security. As we have seen in the previous paragraph , once again the problem is one of determining which of the factors has greater weight. Basu's analysis has not taken risk factor into account. The problem of the size and interest rate relation need empirical test and it may be inappropriate to make a priori statements about loan size and interest rate relationship without taking into consideration other factors that affect the rate of interest.

In the analysis that preceded , we have seen various factors that determine the supply of loan in the rural area. The theoretical base was laid by Tun Wai. He has discussed various aspects of the interest rate formation and the supply conditions in the rural money market. Bottomley has contributed substantially to the discussion, but we know that the elaborations were on the points that were already raised by Tun Wai.

Introduction of the concepts of productivity of capital in rural areas and the presence of uncertainty in the rural money market gave an impetus to the discussion but various aspects have been left unraveled . The portfolio selection of the lender and the rate of substitution between risk and return have not been discussed by the various authors.

The problem of monopoly profit is confusing to the reader because various authors have diametrically opposite conclusions. There are studies that claim that there is very little monopoly profit in the rural money market and there are also studies that claim that the major share of the interest rate is composed of monopoly profit. Both could be true depending on the geographical areas under study but theoretically one can not say a priori that monopoly profit constitutes the major share of the rural interest rate.

The borrower's risk hypotheses , is a deviation from the traditional thinking and looking at the power that the money lender wields over the borrowers one can say that , the former can impose an interest rate which will induce default. However, this theory also has not captured all the aspects of rural interest rate because the emphasis was on consumption loan, without taking into account the productivity of capital.

Though, the period of loan is important in the

formation of interest , one should also look at the lenders time preference. The lender may have a time horizon in which he prefers to lend short because he requires money after short period for his own investment. In such a case he may give short loans at a low interest rate. The time preference of the money lender has not been discussed in the literature on rural indebtedness.

One of the factors that has been discussed off and on in the literature is the theory of idle cash as determinant of high interest rate in the rural areas. It is quite doubtful whether the rural money lenders have idle cash. There are a number of channels through which funds can be diverted for short time period and this will earn an income. Therefore one has to empirically test whether there is in reality , idle cash which can not earn any income at all, when the loans are repaid.

One can conclude on the basis of the preceding discussion that the theoretical formulation about rural loan supply requires much more systematic thinking because the present literature neither has coherence nor logical consistency.

## CHAPTER IV

### Repayment , Default and Dynamics of Indebtedness.

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The loan transaction takes place under the assumption that the borrower would repay the principal and interest within the stipulated time. But when the lender wants to take possession of the collaterals offered as security , he may not insist on the repayment of the principal and the interest or, when the lender wants the borrower to render labor services at a very low rate , the lender may not insist on the servicing of the debt. This is particularly true when the borrowers are ignorant of the interest rates and the terms of repayment. In both chapters that preceded we have discussed briefly , the repaying capacity of the borrower . From the demand side, the magnitude of loans demanded is seen to be related to the repaying capacity of the borrower . On the other hand, the lender would take into consideration the ability and willingness of the borrower to repay the loan. The lender incorporates the default rate in the interest rate so that the loss arising out of a default is minimised . In this chapter, literature that deals with the factors that affect repayment/default will be discussed. In the last sec-

tion , the dynamics of rural indebtedness will be analysed.

#### Factors that determine default

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In the second chapter, while analysing the formation of interest rate, the role of interest in the default function was discussed. It should be admitted that default and repayment are determined by a number of factors . Various studies have highlighted the causes for default. They are discussed below.

The All India Rural Credit Survey(AIRCS)1951-52 states that repayment , in any time, must be related to two sets of conditions

a) Repayment is influenced by the ability of the borrower to repay during the year. This ability would depend on the results of his economic activity during the year or the sale of his assets. The sale may be either voluntary or forced.

b)Repayment is also related to the term and purpose of debt. The loan is related to the time required for the gestation period of the economic process that the borrower undertakes . If the yield from the investment flows after, say five years, the repayment will also begin after five years.

The Survey analysis emphasised primarily the pro

ductive loans as it is evident from the preceding statements. It also mentioned the importance of variation in the nature of season in the determination of the repayment function. An unfavourable season and subsequent crop failure may force the farmer to borrow either to repay the outstanding loans or to supplement his consumption and /or production. It is true that the Survey has not delved into all the aspects of the repayment function . But it paved the way for subsequent studies as will be evident in the following sections.

Tun Wai(1957) holds the view that higher defaults are not so much due to a lower standard of morality and willingness to repay but because of fluctuations in prices and incomes derived from agricultural products which reduce the ability of the agriculturists to repay. Once again it is seen that the income stream is an important determinant of the repaying capacity of the borrower. Tun Wai's article was discussed in the previous chapter and therefore we shall not discuss it here.

Anthony Bottomley

Bottomley (1975) has discussed the causes for default while discussing the risk premium which forms a part of rural interest rate. He states that the following factors determine the default function:

a) Volume of loan will affect the default rate

because , other things being equal the more a person borrows , the larger will be the probability of his being unable to repay. The default rate according to him , is a positive function of the volume of the loan , if the latter is taken in isolation . However, it should be mentioned here that this strictly applicable given the expected income stream of the borrower. Otherwise , the higher the expected income, higher can be the borrowing . Bottomley has not discussed this aspect of the problem.

b) Borrower's net income

As the AIRCS and Tunwai pointed out , Bottomley also has suggested that there appears to be a systematic tendency for the larger farmers with greater asset values and higher income to borrow than the small farmers .If their net income increases more rapidly than the cost of borrowing (ie.  $MVP > MC$ ), then the ability to repay will automatically increase. He postulates that there will often be a correlation between increases in borrower's net income and levels of repayment.

c) Debt-equity ratio

A very closely related factor is the debt-equity ratio of the borrower,. The debt equity ratio will probably be lower for the high income farmers, even though the better -off farmers may borrow more in



absolute terms. He assumes that the lower the ratio, lower will be the probability of default. This point is related to both the previous point(b) and the next factor (d), which we shall discuss below.

d) Value of collaterals

The total value of the collaterals which can be offered will be greater for the higher income, higher asset farmer. As borrower's income rises, it is normal that the debt-equity ratio falls. These considerations lie behind the assumption of an inverse relationship between borrower's income and default rate and the value of assets and default rate is also assumed to be similarly related. However, Bottomley has not discussed this more elaborately.

e) Defaulters brought to court

The percentage of defaulters brought to court will have considerable bearing on wilful default. If the borrowers know that they will be penalised, they will be forced to repay.

f) Income variance

Variance around mean income of the borrower may be a major cause of inability to pay and it may well get larger in absolute terms as borrower's income grows, unless countervailing influences like improved irrigation, pest control etc., are present. If

the fall in income is large and the borrowers can not meet the contingencies or their normal expenditure, their repayability is reduced.

g) Loan administration Cost

The cost of administration of loan may have some bearing on the rate of default. Time spent on pursuing defaulters may have a cost. If the lender spends more time in pursuing the borrowers, he may incur greater costs but this may reduce default.

h) Real interest rate

If the real rate of interest that the borrower has to pay falls over the period of time due to inflation, the borrowers will be in a better position to repay the loans because they will gain by taking fresh loans. This, Bottomley says, is particularly true of institutionalised lenders whose nominal interest rates usually remain stable.

i) The lender

Default varies depending on whether the lender is a village money lender, institutional agency or a lender from outside the village. Bottomley claims that there will be the lowest default if the money is borrowed from the village money lender

Bottomley's analysis is quite comprehensive but it has certain shortcomings. It can be seen that volume of loan need not necessarily have a positive

correlation with the rate of default. Those who have large debt may have large repaying capacity in the future. Volume of loan should not be taken in isolation as he assumed in (a). The volume of loan is always related to the economic activity of the borrower about which Bottomley has not said anything. Moreover, volume of loan alone can not act as an explanatory variable. Neither can asset position nor income act as independent explanatory variables. All these variables are highly correlated with each other. Bottomley, was concerned only with the value of collateral. Land, a collateral, may have high value but may have a low level of liquidity. The lender or the borrower may not be able to sell the collaterals in order to service the loan

An important factor of repayment, which received attention in AIRCS analysis was the purpose of loan. Bottomley admitted with caution that consumption loan is more likely to be defaulted than the productive loans but he did not elaborate on it. It could be said here that, despite the controversy over productive and unproductive purpose (namely, what is productive and unproductive), loans taken for festivals, marriages etc., are more likely to be defaulted because such expenditures do not augment the borrower's income.

Yet another factor which one should examine

is the movement of relative prices and the subsequent effect on the terms of trade between agriculture goods and non agricultural goods. Though the nominal income of both agriculturists and rural labourers may rise due to a general price rise, it may happen that the cost of living may increase more than proportionately, when compared to the rise in income. Such circumstance may induce the farmers to default the loans.

Mortenson, David and Leitritz.

After having examined the various factors that affect the loan repayment / default function, one could examine a model that estimates the crucial financial characteristics of farmers that determine loan delinquency. Mortenson et al (1988) developed a multivariate logistic regression model that would predict the probability of loan default. This model is discussed below. (Note: Only the relevant portion of the article is presented here.)

Mrtenson et al classified the borrowers into two classes :1) current and 2)delinquent.The authors categorised, those farm operators, who paid interest and principal of the annual debt obligation as current.The delinquent farmers were the defaulters. The dependent variable in this regression model (denoted as  $Y$ ), equals 0 if a farm operator was current

and equals 1 if the operator was delinquent.

The variables that thought to affect repayment or delinquency were , age of the operator, years of farming experience ,ratio of rented acres to a total acres , gross cash farm income, net cash income /gross cash farm income, production expenses / gross cash farm income, net cash farm income/person in household, viability (defined as net cash income and intermediate debt payment and other income divided by family living allowances and long term debt payment) net cash income /total assets, interest paid/ gross cash farm income, current debts/current assets, non farm income / total debt, debt-asset ratio at the beginning of year and total debt/ total acres farmed.

The lenders will take into consideration the farm operation and the profitability of the same before they extend loans to the farmers. Variation of borrower's income below the mean income will not endow him with sufficient funds to meet the debt service obligation . This will reduce his repayability and the lenders keep this in mind when they extend loans.

The authors used a logit model to estimate the bivariate events ( current or delinquent) . The cumulative logistic probability function is specified as

$$P = F(Z_i) \\ = F(a + b_1 x_1 + b_2 x_2 + \dots + b_n x_n + E_\gamma)$$

$$= \frac{1}{1+e^{-Z_i}}$$

Where,

$P_i$  = probability of dependent variable Y takes the value 1

$Y_i = 0$  when farm operator is current

$Y_i = 1$  when farm operator is delinquent

$Z_i = a + b_1 x_1 + b_2 x_2 + \dots + b_n x_n + E\epsilon$

$x_j$  = attributes of the individual farm operator under consideration

and  $j = 1, \dots, n$

$a$  = intercept parameter

$b_1, b_2, b_3, \dots, b_n$  are parameters associated with attributes  $x_1, x_2, x_3, \dots, x_n$  respectively

In the binomial case the probability of one choice is  $P$  and the probability of the other choice is  $1-P$ . The model above can be further derived as follows.

$$(1 + e^{-Z}) P = 1$$

$$\ln \left( \frac{P_i}{1-P_i} \right) = Z_i = a + b_1 x_1 + b_2 x_2 + \dots + b_n x_n + E\epsilon$$

The authors have also defined a breaking point which indicates the condition of default. It is argued that  $Z_i$  takes the role of breaking point ( $Z_i^*$ ) where

$Y = 0$  when  $Z_i \leq Z_i^*$  and

$Y = 1$  when  $Z_i > Z_i^*$

Here mention should be made that  $Z$  is the natural log of the probability of occurrence of a certain event and not the probability directly and  $e^{Z_i}$  gives the probability of the event occurring.

The model described above has the following desirable characteristics

- a) the probability is bounded by 0 and 1
- b) The concept of a breaking point is present
- c) The magnitude of the logit coefficient can be ranked so as to say that a particular coefficient has greater effect on the probability than those ranked below it

The model described above, may have very little predictive capacity in the developing countries, since it was developed for an economy where accurate accounting system prevails and monetisation is almost perfect. Lack of accurate information and poor monetisation may act as hurdles while using this model. Moreover, the locational specific and individual specific factors may act contrary to the behaviour predicted by the model. (eg. fear of "losing face" or fear of physical assault may prevent default—such practices are common in India—). Therefore the break-even point may not be applicable in all cases. Moreover, the model is applicable only when the farmer is either delinquent or

current. Partial default is a common phenomenon. Under such conditions the dependent variable can be treated either as zero or one. So the model become ambiguous.

#### Dynamics of Rural Indebtedness

In the preceding section the default function was examined and one can hypothesise that continuous default may lead a farmer to fall into a debt trap. In this section we shall examine the process through which the borrowers either get ruined completely or come out of the debt trap. Farmers may sell their assets to pay the principal and interest and the labourers may become boded if they are unable to service the debt. In the first chapter we have seen situation when the borrowers have to borrow a certain amount in a particular year for production purpose. In this section we shall see how a peasant falls in a cycle of debt and year after year he is forced to borrow. However, it has to be mentioned here that this cyclic effect is analysed only in the consumption loan framework. There has been no literature to show the debt trap of peasants who borrow for production purpose. It may be because the loans taken for production purpose usually don't lead a farmer to debt trap.

In this section we shall first analyse a static situation and then proceed to the dynamic aspect of rural indebtedness. Then we shall see whether the debt



trap envisaged in a consumption loan framework is applicable to the production loans as well.

Amit Bhaduri

The static equilibrium or a perpetual debt-trap has been explained both in Bhaduri(1973) and Bhaduri(1984). However it should be mentioned here that both these models are developed in contexts which are very vast and less relevant to our discussions here. The entire model will not be presented here. Since our interest here is to capture the static model of indebtedness we shall examine only the static model developed in Bhaduri (1973), which portrays the constant amount of loan taken by the peasant. We shall not examine here the landlord's income, the effect of technical changes etc that have been explained in Bhaduri(1973).

The assumptions of the model are as follows.

- 1) paddy is the only commodity in the model .
- 2) only consumption loans are considered here
- 3) risk and uncertainty are ruled out
- 4) the area operated by the peasant is assumed to be fixed
- 5) the net paddy available to peasant after repayment of previous years debt and interest is less than the minimum consumption level he is used to and he is caught in a perpetual debt trap

6) The length of production cycle of paddy is treated as unit of time in the model

The model is developed as follows. Assume that a peasant produces  $x$  units of paddy each year and a portion  $\alpha$  is kept for himself and  $(1-\alpha)$  is given to the landlord as rent. It is assumed that  $\alpha$  is determined by the technology known to the peasant at a given period of time and  $\alpha$  is decided by custom and  $(0 < \alpha < 1)$ .

The peasant's borrowing in period  $t$  is given by  $b_t$  and his consumption is given by  $c_t$ . Let  $i$  be the interest rate and it is assumed that the peasant does not save. The demand for loan is given by the equation

$$b_t = c_t - [x - (1+i)b_{t-1}]$$

A stationary state is in which the values of  $c$  and  $b$  are assumed to be constant. If stationary values are used the above equation can be written without subscript as

$$b = \frac{\alpha}{i} x - \frac{c}{i}$$

If one assumes that technology does not change so that  $x$  will be a constant  $\bar{x}$  and  $c$  is at a subsistence level  $\bar{c}$ , the above equation can be solved as

$$\hat{b} = \frac{\alpha}{i} \bar{x} - \frac{\bar{c}}{i}$$

where,  $\hat{b}$  indicates the debt of the peasant in the initial equilibrium situation and from which the peasant can not escape

Bhaduri says that the stationary state of perpetual indebtedness is governed by a highly unstable dynamic mechanism. This is because, if there is permanent change in the output level, it will disrupt this equilibrium position. If output level increases, the peasant will be freed from the debt trap and if the output falls and the peasant is plunged into deeper and deeper debt.

Though Bhaduri's model tried to capture the debt-trap which is quite realistic in the rural areas, the theoretical model has certain shortcomings. They are given below.

Bhaduri does not say how the initial equilibrium is established. To be precise, the model does not say how the peasant initially incurred the debt.

The model has very restrictive assumption. It assumed that the peasants do not have any saving and the subsistence level  $\bar{c}$  is given. However, there has been no definition of the subsistence level. In reality the poor peasants try to cut their expenditure (even in food) to save some money to service the loan. So there is no fixed subsistence level as such.

Omission of risk and uncertainty is a major drawback in the model because risk and uncertainty are very much linked with rural indebtedness. It could have been possible that an unforeseen bad weather caused the initial debt. Moreover, if the actual income

of the peasant is higher than the expected income, say, because of good weather, the peasant can heave himself out of debt-trap.

A question that crops up is this: Who will lend to the farmer who is perpetually indebted? If the farmer is economically weak, the lender will be cautious when he lends money.

What we have seen above is a very simplistic model which assumes constant amount of debt, year after year. We know that this is not the only case in reality. What happens in reality may be more dynamic and the peasants either get ruined fully or come out of the debt-trap. This will be discussed below.

Bhaduri(1984) argues that the pattern of indebtedness is constantly changing through time, with particular peasant households moving up or down the debt ladder. The distress buying and selling of any one period, arising out of indebtedness, its implication in terms of indebtedness for the next period. The spiral of debt may lead to mounting debt until they are hopelessly ruined [case 1]. For the fortunate ones the spiral may lead to their release from debt-trap eventually [case 2]. Or, as explained earlier, there may be cases of stagnant debt-level [case3]. Before going to analyse case 1 and 2 a few definitions are required.

$Y_t$  = the balance of paddy available to the peas-

ants after basic commitments (of rents and debt) and requirements (of subsistence food and non food of a peasant are met

$$c_t = U + b Y_t \quad 1 > b > 0 \quad \text{for } Y_t > 0 \text{ for period } t$$

$$U \text{ otherwise}$$

and  $c_t$  = consumption in period t

$U$  = Subsistence level of paddy

$$m_t = V + a P Y_t \quad 1 > a > 0 \quad \text{for } Y_t > 0 \text{ for period } t$$

$V$  otherwise

$m_t$  = basic non food cash expenditure

$V$  = subsistence non food cash expenditure

$P$  = price of paddy

$x$  = constant amount of paddy harvested in every period.

$d_t$  = borrowings of period t

The amount of cash available for repaying debt is given by the following equation

$$r_t = P x - P c_t - m_t \quad \text{for period } t$$

Let the debt obligation be given by

$$(1+i) d_{t-1}$$

The present debt generated ie, of period t, will be,

$$d_t = (1+i) d_{t-1} - r_t$$

or

$$d_t = (m_t - V) + P (c_t - U) - P Y$$

The maximum value that r can take, if m

and  $c$  are the subsistence level, is given by

$$r_{max} = Px - PU - V$$

Now assume that initial debt,  $d = d_0$

Now one can differentiate between the two cases.

case 1

-----

When the peasant falls in a debt trap he may gradually ruin himself with the dynamic working of indebtedness. under such a situation

$$id_0 > r$$

ie., if the peasant finds that the interest payment alone is greater than cash available for repayment of debt, even though he reduces himself to  $r$ . When  $r$  is seen as recurring phenomenon due to the reduction of the farmers expenditure to subsistence level  $r$  can be considered time independent, in which case

$$d_t = -r + (1+i) d_{t-1}$$

The above equation can be solved to yield

$$d_t = \frac{r}{i} + ((1+i)^t (d_0 - \frac{r}{i}))$$

In the case we are dealing with  $d_0 > \frac{r}{i}$  and therefore the second term in the RHS will always be positive and will go on increasing till the peasant is ruined completely.

case 2

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There may be cases when there is a chance for

the peasant to escape from the debt trap, i.e.,

$$(1+i)d_0 > r > id_0$$

In this particular situation the peasant is able to reduce his debt burden over time because he can pay the interest and some part of the principal in a period of time and hence the debt burden decreases over time. Since  $\frac{y}{c}$  is greater than  $d_0$ , the term  $(d - \frac{y}{c})$  becomes greater negative and hence  $d_t$  will become negative over the period of time and therefore the peasant will come out of debt at a period say  $t^*$  and in  $t+1$  the peasant will be a net saver. This implies that

$$r > (1+i)d_{t-1}, \text{ for } t > t^*$$

It can also be shown that

$$\theta_{t+1} > \theta_t$$

where,

$$\theta = - \frac{\log(1 - \frac{id_0}{y})}{\log(1+i)}$$

As debt burden gradually falls, the consumption level will rise above the subsistence level and the dynamics of indebtedness work in such a way that the peasant will turn a net saver. Bhaduri, without explaining much, briefly mentions that, demographic features like dependency ratio has certain

influence on the dynamics of indebtedness.

It is true that Bhaduri has thrown some light into the dynamics of rural indebtedness. He has shown how a peasant may get ruined or come out of the debt trap. But his model has certain shortcomings. They are discussed below.

Bhaduri assumed that debt trap is created by the lender by setting a high rate of interest. This need not be the case. A debt trap may exist even without any power of the landlord. It may happen just because of the expenditure pattern of the peasants. Interest rate is only one of the components that may perpetuate indebtedness.

As we have seen earlier, it is highly simplistic to assume that  $d_0$  and its interest payment are the causes of indebtedness and the ruin of the peasant. It is quite probable that the base itself will increase over the period of time.

Bhaduri assumes a subsistence level but does not define it clearly. Does this level mean that, the farmer can not reduce consumption any further? As mentioned earlier, in reality peasants do not have a fixed subsistence level and therefore taking it as a criterion for analysing the dynamics of indebtedness is erroneous. In such case, the concept of  $r$  becomes, meaningless.

The model assumes,  $x$  to be constant,



prices to be constant and the level of debt to be constant. The dynamic model which Bhaduri develops turns out to be not that dynamic. A comprehensive model would have incorporated changes in these variables over the period of time. While accepting the dynamics of indebtedness Bhaduri has neglected the dynamics of many other variables.

Kaushik Basu

Basu(1984) shows that a peasant who is in a debt trap can come out of it if he has a slightly better harvest in a particular year. Basu also suggests that if the peasant has some foresight, and reduce his loan in a particular year by getting alms or interest free loans from relatives, he can come out of the debt trap eventually. He also gives a numerical example to show this. This is not reproduced here.

Basu's arguments too are simplistic. It is unrealistic to think that, getting alms large enough to get out of the debt trap is easy. If it was that easy, the peasant would not have fallen in the debt trap at all. Moreover, what is the surety that instead of getting alms, the farmer is not forced to borrow again if a further contingency arises? Basu does not explain any of these problems.

In this chapter we have seen the factors that affect the default of loans. We have also seen

the dynamic aspect of indebtedness in the context of consumption loans . The models we have discussed is seen to be highly inadequate to capture the various forces that lie behind the dynamics of rural indebtedness . As we have mentioned elsewhere the loans that are incurred for production purpose are not discussed at all . We can postulate here that the analysis has to be different in the case of production loans because such loans will augment the income of the borrowers and may become capable of repaying the loan with interest , though this need not necessarily be the case.. The dynamics of indebtedness when both production loan and consumption loan are present is not analysed by the authors.

Though some of the reasons for default have been discussed , it is seen that theoretical and analytical rigour has been lacking in all the articles that we have reviewed here. The forces that cause default have been discussed in isolation but how these forces work together, what opposing factors are present to nullify these forces, what effect rural debt has on other economic variables like consumption saving etc . have not been discussed at all. The dynamics of rural debt needs much more analysis than what we have seen in this chapter.

## CHAPTER V

### Summary and Conclusions

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The theoretical discussions on rural indebtedness have brought to light many factors that determine the demand and supply of loans and the dynamics of rural indebtedness. The various elements that determine the demand for loans was discussed in the first chapter and it has been seen that various authors have used different explanatory variables to determine the demand function and there has been no uniformity in their studies.

Some of the explanatory variables used by the various authors were similar to that which were used by the All India Rural Credit Survey (AIRCS). Pani and Long introduced interest rate in the regression models besides the variable that were incorporated by the AIRCS. Ghatak has added precious little to the theoretical discussion .

It was only with the article of Iqbal that the term borrowing got a proper definition, while the earlier writers have used the term borrowing to

express external borrowing only . Iqbal redefined the term in order to remove the truncation bias

Most of the studies that analysed the demand for loan function relied heavily on regression models. The only exception was the article by Kumar et al. The regression analysis followed by the authors on the whole appeared to be rather unconvincing because of the contradictory results that emerged from their studies. Explanatory variable used by the various authors were seen to highly be correlated and the results therefore turned out to be unreliable. Moreover many of them used average figures for the regression equations. This again renders the regression equations unreliable because the extreme values in the population would influence the averages.

The UOP profit model by Kumar et al had something different since it could find the demand for credit indirectly without solving a set of simultaneous equations. However, as we have seen this model too cannot capture the problem of rural indebtedness.

The analysis of the demand side was mainly concentrated on the demand for production loans . . . But as we have seen the loans for non-production purpose have greater propensity to push the borrowers into a debt trap. In the third chapter we have seen a simple model that explains this but the model concentrated too much on the importance of interest rate that it could

not capture the various aspects of consumption loans. This model has not explained the saving capacity and income generation of the borrowers that will enable them to come out of the debt-trap

The analysis of the supply side has focussed only on the cost side of lending . The various authors we have discussed concentrate mainly on the four components of rural interest rate namely , the opportunity cost of the lenders money, administration cost, risk premium, and the monopoly profit . In this chapter, we see that there has been no conclusion about the role of each of these components in the determination of rural interest rate. There has been contradictory results about the importance of these components.. One of the factors that determine the supply of loans is the productivity of the lenders' capital in agriculture or in alternative investments. The studies that we have examined have taken the interest rate that prevail in the organised sector as the opportunity cost of money lenders' capital. Agricultural productivity would be a better measure of the opportunity cost of money lenders' capital.

There is contradictory opinion about the role of monopoly profit in the formation of interest rate . The studies by Bhaduri has questioned the claim by the authors that risk premium is an important component of rural interest. Bhaduri's claim that it is the

borrower who takes risk has some realistic base because many borrowers risk their land while borrowing. Thus we see utter confusion in the literature about the role of the various components of rural interest rate.

It should be mentioned here that there has been practically no improvement in the concept of rural interest rate over the ideas put forward by Tun Wai. The various authors who tried to explain the determination of rural interest rate have said what Tun Wai had to say in different words. A stagnation in the discussion is evident from the fact that the authors have not explored the possibility of seeing the problem in any other framework say, like the portfolio analysis or in the time preference analysis.

The last chapter is starved of literature. Except for Bhaduri's model, there has been no studies to show the process of rural debt-trap. Basu's (1984) study was too simplistic and non-analytical. The model for predicting default needs much adaptation for Indian conditions.

One of the problems that has not been analysed is the process through which saving takes place after the peasants fall in the debt trap. The subsistence farmers do not have any saving to meet contingencies, but after they incur a debt they have to

save forcefully. How does the farmer save under such conditions? What are the heads of expenditure that are affected when the farmers begin to save? Does debt-trap have any impact on the production and consumption behaviour of the peasant? What are the macro-economic parameters that are influenced by the prevalence of indebtedness? Does rural debt affect the rural income distribution? Is there a possibility of rural degradation if indebtedness prevails? Will a writing-off of loans of the farmers really help them to come out of the tendency to be in debt? The questions are many but the literature scanty.

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