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To what extent can moneylending practices in the informal credit market be considered economically efficient?

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ABSTRACT

The essay aims to investigate the behaviour of rural credit markets by examining the lending mechanisms used by informal moneylenders. The first section discusses possible explanations for the significantly higher interest rates charged on loans to the poor and concludes that a combination of informational asymmetries and default incentives contribute to higher costs for lenders, a significant amount of which gets passed on to the borrowers. The following sections model the behaviour of the informal moneylending market and examine whether practices used by moneylenders to cope with the distortions in the credit market make a net contribution to economic welfare. The mechanism of credit rationing is explored as a tool for the moneylender to secure himself against strategic default and thus, precluding optimal consumer and producer surplus in the market. Similarly, the common practice of interlinkage is modelled theoretically to demonstrate its effectiveness in allowing borrowers to demand the optimal loan size thereby also maximizing lenders profit and ensuring optimal community surplus.

Keywords: *Rural Credit Market, Credit Rationing, Interlinkage, Allocative Efficiency, Cost Efficiency*

1. INTRODUCTION

Rural credit markets are significantly different in their operation relative to their industrialized counterparts. Governments of developing nations throughout the world have sought to eliminate the influence of informal moneylending in such markets, which is perceived to limit growth and innovation in rural areas thereby hindering the endeavour to free themselves of poverty traps that are characteristic of their life.[1] This can be attributed to significantly high interest rates that are charged to the rural poor by informal moneylenders in comparison to formal banks.[2] Government interventions have taken the form of systematic incentives and regulations that involve the opening of bank branches in rural areas, increased lending to the priority sector (usually comprising of agricultural and SME sectors in rural areas) and other initiatives that remove impediments and constraints on the access to credit for banks.[2] In spite of such efforts, informal moneylenders still play a crucial role in the lives of the poor, providing flexible short term credit solutions for consumption purposes that the bank does not offer due to collateral and enforcement constraints.

This paper seeks to establish a theoretical basis that identifies the role of significant informational asymmetry and constraints for the behaviour of informal moneylenders in rural credit markets and hence, is able to evaluate the economic costs and benefits of moneylending strategies in the informal credit market. The behaviour of moneylenders in devising loans is dictated by several inefficiencies characteristic of the rural credit market, such as the inability to guarantee repayment due to involuntary default, inability to provide collateral and the opportunist threat of strategic default on loans.[3] It has been argued that the failure of banks to replace informal moneylending in a meaningful way has been due to their inability to address these informational and enforcement inefficiencies.[4] This claim is strengthened by the seemingly smooth functioning of the informal credit market given the varying constraints to the moneylenders. The equilibrium enforced by the moneylenders through their credit schemes in response to the nature of demand is such that it presents a decreased risk of default at significantly higher interest rates charged to the poor in comparison to the high default rates in formal markets where interest rates are much lower and collateral and enforcement constraints are negligible.[4]

The following sections seek to model the credit market in concert with the data obtained from various studies. The first section investigates why the poor are victims of significantly higher interest rates by moneylenders compared to interest rates charged by commercial banks in rural areas. The next two sections examine in detail the theoretical models of common strategies used by moneylenders to secure their investments against default, namely, credit rationing and interlinkage and seek to explain their impact on the economic efficiency of the rural credit market.

2. USURY OR IMPLEMENTING SAFEGUARDS? : MODELING THE FUNCTIONING OF THE RURAL CREDIT MARKET

Given a theoretical open market as our basis, the price and the quantity of a particular product are set by the market forces of demand and supply. The demand of the consumers for credit and the supply of money intersects at an appropriate price and quantity at which consumer utility and producer benefit are both maximized. The interest rate for credit is thus, in other words, the price of borrowing money. The normative model discussed above does not apply to most rural credit markets. There are several factors that play a role in distorting market values and result in the rural credit market moving away from the open market model discussed above. Some of these factors are explored in greater depth than others.

While considering the rural credit market in most developing countries, certain practices have been found to deviate significantly from the model. The interest rates offered to the poor are in fact startlingly higher than those offered to households with higher incomes. The rural population does not have significant interaction with banks to borrow or to save their funds.[5] A 2006 survey of the Udaipur district in India concluded "…those living on less than $1 a day pay on average 3.84 percent per month for the credit they receive from informal sources. Those [consuming] between $1 and $2 dollar a day per capita pays…3.13 percent per month."[6] The data is similar for other developing countries where there is striking reliance on the informal moneylenders for loans and saving accounts with banks remain scarce.[7]

First, consider the problem of high interest rates. The poor are offered strikingly higher interest rates than their counterparts in high-income households who often take loans from banks. One possible explanation of this is the risk of default and the lack of collateral. Collateral is used by lending agencies as a tool to prevent the borrowers from *voluntary default* and restrict the usage of the borrowed funds to productive efforts. The rural poor have no significant assets to provide as collateral in case of a default, which makes the possibility of a default more likely. To cover their costs amidst their lending processes, informal moneylenders in rural areas increase the interest rates.[8]

In addition to the lack of collateral, the occupations of the rural poor makes them susceptible to significant fluctuations in earning. The farming yield is significantly dependant on the rainfall and weather conditions in the particular villages. Slight variations in topography and weather conditions can contribute to differing patterns of rainfall which in turn contribute to fluctuations in yield.[9] Other than farming, the rural poor in developing countries attempt to diversify their sources of income by having some members of the family do manual labour work in cities or neighbouring villages or start a small business. Manual labour work results in daily wage earnings and no job security. Hence, to some extent, the problem of high interest rates can be attributed to the problem of risk of default and the lack of collateral.

Questions arise regarding whether interest rests are likely to be eased in the future if the moneylender recognizes the farmers' work ethic and has significant information about his occupation and the discharge of borrowed funds towards economic activities. This claim is further corroborated with the statistics of defaults which are significantly rare in the urban poor demographic, contrary to our explanation earlier. There is significantly less default amongst the rural poor whose credit activities significantly rely on the informal practices of the moneylenders. Understanding why lending occurs at such high interest rates in spite of this requires understanding the risk moneylenders wish to insure themselves against. Given that moneylenders need to make a certain amount of profit (let us assume, for modeling purposes, this is the normal economic profit) to stay in business, and there is a probability of default on a percentage of the loans provided by the moneylender, in order to compensate then, the moneylenders needs to charge the ones likely to repay higher interest rates.

It must be noted default rates are a reflection of the nature of lending practices in the informal credit market that facilitate proper reimbursement of loans from the poor as opposed to an automatic occurrence. Moneylenders create loan contracts such that the poor find it hard to default. If we attempt to model the informal moneylenders' business to consider why the loan size and level of interest rates offered to poor households (families living below 2 USD a day), further facts come to the fore. Consider the moneylender exists in a perfectly competitive market and the profit he makes on a loan is non-existent, his aim through the business is to break even and give the capital back to his depositors/lenders.[10] Let us assume that 'R' is the gross interest rate on the loan by the moneylender where,

$$R = (1+ r)$$

Where 'r' is the percentage interest. Let us also assume that there is a chance of default 'd' with every dollar the moneylender lends.[11] Since we assume the the moneylender makes zero profit all the reimbursement from the borrowed funds is passed on to his depositors/lenders. We shall call this amount 'D', the cost of capital which is used to sustain lending actives of the moneylender. Hence, after default the moneylender will receive an amount (1- d)R which he will then forward to his depositors. Hence, the output generated per additional unit of capital, which in the moneylender's situation is the reimbursement per additional dollar lent must be equated to (1-d)R. Given that the cost of capital is fixed and the moneylender must repay the amount as promised to his depositors, it follows that to compensate for a larger default rate the only variable to be altered is the interest rate. Thus, if we were assume that poorer households living on less than 2 USD a day have higher default rates, our model would provide an elementary but suitable explanation.[11]

However, as identified previously, the poor are in fact less likely to default than those who have formal inexpensive loan access from banks. There is something more to account for in this lending process. The weak legal machinery in rural areas, be in the courts or the police enforcement in most developing countries allow for voluntary or strategic default on part of the borrowers. The possibility of a strategic default is another element to be included in the moneylender's valuation of the loan size and interest rate.

Consider a loan granted to a poor household for a business venture. The borrower attempts to grow his business by using the funds to purchase inventory. Let the output from this expansion be some function *F(k)* of the input *k*. The borrower has some wealth *w* and he must borrow (*k - w)* to achieve the desired quantity of input *k*. Assuming everything goes well, the amount of profit he would make would be *F(k) - R(k-w),* where *R* is the gross interest rate. However, if he chooses to default on his loan and escape with the funds, he would be left with the revenue from his business *F(k).* There would be costs to shut down his business requiring him to sell his fixed capital etc., an incremental cost depending on the quantity of input *(k).* Thus, we will be left with *F(k) - hk* if he chooses to default.[12] Hence, the borrower has two options:

Reimbursement:

$$F(k) - R(k-w)$$

Default:

$$F(k) - hk$$

For the moneylender to incentivize the borrower to repay, he must ensure that the profits from repayment are greater than the profits from default,

$$F(k) - R(k-w) > F(k) - hk$$

This equation can be rearranged to give the expression

$$\frac{k}{w} = \frac{r}{r+h}$$

Suggesting that given the interest rate is not variable due to the moneylender's obligation to repay the depositors or other institutional sources, the input needed and thus amount loaned (in our example, 'k-w'), will be in proportion to the amount of wealth possessed by the borrower. This accounts for the reason poor households find it inaccessible to borrow at a significant loan size given that there is a lack of significant collateral resulting in limited liability on defaulting. [13]

3. INFORMATIONAL ASYMMETRY AND INEFFICIENCY: COPING STRATEGIES FOR THE INFORMAL MONEYLENDER

3.1 Credit rationing

Credit rationing can be said to occur when *at the going rate of interest, the borrower is unable to seek additional funds in spite of willing to do so.*[14] In a traditional open market, excess demand is accommodated by an increase in output and upward pressure on the price (in this case, the premium or interest rate), however credit rationing distorts the open market due to informational asymmetries endemic to rural markets. To model this market behaviour, let us consider a moneylender wishing to maximise the return on his loan.[15] Assume, for argument's sake, that the competition amongst the lenders is such that the borrower can default and switch to another moneylender without significant barriers to exit their 'local monopoly'.

The graph in Figure 1 illustrates this constraint on the moneylender. The curve representing the total output of the borrower as a function of loan size '*L'* is upward sloping up to a point after which it slopes downward due to the emergence of diminishing marginal (because of lack of fixed capital to enhance working capital operations). The cost line for the borrower is the loan '*L'* administered at a premium'*i* '.The marginal cost of the borrower is the component of the interest he must repay per additional unit of output. Given that the loan from competing moneylenders in the market yields a profit of '*A*' for the borrower and the lender wishes to maximise the rate of return by charging an increased premium, the moneylender's choice is constrained in that the interest rate hike must at least allow the borrower for a profit '*A'* for the moneylender to remain competitive in the market. [16]

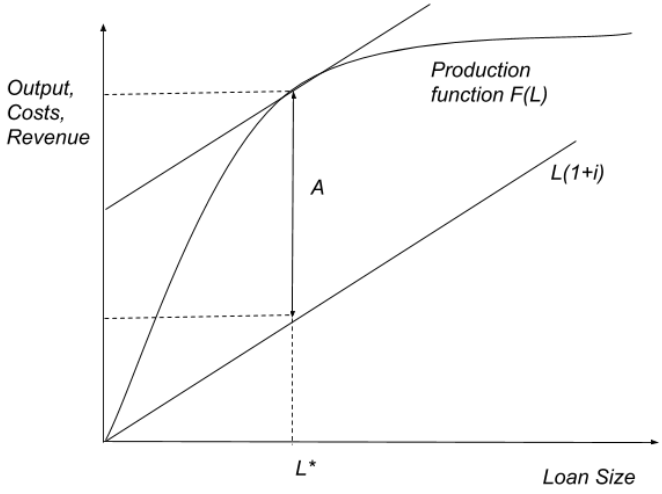

Fig. 1: Output and Costs Curves for borrower in informal credit market [17]

'*A*' is thus the profit that is set by the competitive market and serves as the opportunity cost for the borrower. Thus, in order to charge an interest rate that is sufficient to yield a profit of '*A*', *which will occur at the profit maximising output for the borrower,* the moneylender must make sure that the marginal costs *(1+i)* does not exceed the marginal revenue. Hence the interest rate '*i**' must be such that it allows for the marginal revenue to equal marginal cost and yield a profit of '*A*'. On the graph, this can be found at the output where the gradient of the curve equals the gradient of the cost line. Consider the graph, if the moneylender was to charge an interest rate greater than '*i**' it would result in a steeper cost line and a profit that is lesser than '*A'* (since the marginal revenue equals the marginal cost at a smaller level of output, so the borrower starts losing money at a point where profits are less than *A*). Similarly, a lower interest would mean larger profits than *'A'* and the moneylender would be sacrificing the opportunity to charge higher interest.[18] Hence, at a loan of size *L** provided at an interest rate of *i*,* the lender is able to maximise the return on his loan while accounting for the profits of the borrower that equal his opportunity cost.

In the aforementioned scenario, the possibility of strategic default has been ignored. If the moneylenders wishes to hedge himself against such an occurrence, he would seek to create in-built incentives in the loan that prevent default.[19] The likelihood of default is dependent significantly on the mental horizon of the borrower. Assuming that the borrower thinks '*N'* days in advance, the profits he stands to make from abiding by the loan 'contract' are:

$$N \times (F(L) - (1+i^*)L^*)$$

However, while choosing to default leads to termination of future loans, the borrower escapes with $F(L)$ and earns a profit of '*A'* from the new moneylender for a time (N-1). To avoid this possibility, the moneylender must ensure [20]:

$$N \times (F(L) - (1+i^*)L^*) > F(L) + (N-1)A$$

4. CREDIT RATIONING TO PREVENT HIGH-RISK INVESTMENTS

Credit rationing also occurs when asymmetrical information about the risk of a lending investment results in attracting higher risk borrowers.[23] As previously discussed, there are a variety of factors contributing to the risk assessment of clients, some of which are observable to the lender and others that require significant screening and investigation. For example, a landless laborer in poor health can be considered an apparent risk, however indeterminable factors such as mental acumen and work ethic, which may be able to sway the lender's perception in either direction, remain much harder to take into account. Significant screening and investigation is likely insufficient to invariantly yield accurate results and erase suspicion. In this situation, the rational moneylender is forced to consider options to maximize his return and avoid high-risk clients. Let us consider a scenario where a moneylender is confront by two potential clients both demanding a loan size *L* but having significantly different levels of risk in their investments.[24] The first client (Client 1) has a lower risk. His investment is going to yield a return of *R* with certainty. The second higher risk client (Client 2) is going to yield an uncertain profit: it is possible with a chance *p* that his investment is going to yield a return of R', where R'>R and it is also possible with probability *1-p* that the return is zero. To establish this in more practical terms, consider a farmer whose crop is more profitable but also more prone to damage due to fluctuating weather conditions.

The return for Client 1 from his investment is $R-(1+i)L$.[25]

Thus, the maximum interest rate he is willing to pay is $\frac{R-L}{L}=i_1$ [26] which in turn gives,

$$\frac{R}{L}-1=i_1$$

The return of Client 2 is $p(R'-(1+i)L)$. Consider the maximum interest rate Client 2 is willing to pay, given the return on the investment : $\frac{R'}{L}-1=i_2$. Since we know $R'>R$, hence $i_2>i_1$.

In this circumstance, given excess demand for L amount of funds, in a traditional open market the moneylender would increase the price to till one borrower dropped out. However, the high risk nature of one of the borrowers complicates matters. If the moneylender decided to raise interest rates beyond i_1, the low risk client will drop out and the moneylender will be forced to lend to the higher risk client. [27] If he chooses to lend at i_1 however, there is a fifty percent chance that he administers the loan to a high risk borrower. The question arises, under what condition will the moneylender choose this alternative. It follows intuitively, that if the chance of repayment is in fact lower than the chance of potential higher return the moneylender should persist with a lower interest rate and consider a fifty percent chance that he ends up lending to the safe low risk borrower.[28] An algebraic representation of this condition

can be found bellow $P_{I_1} > P_{I_2}$ [29] (for derivation, please refer to Appendix 1) which yields the following equation after some algebraic manipulation

$$R + pR > p(2R')$$

$$\frac{R}{2R' - R} > p$$

5. INTERLINKAGES IN THE RURAL CREDIT MARKET

An interlinkage credit transaction occurs when the credit component of a loan cannot be disentangled from another good or service that the borrower may provide, often labor and output in rural households.[30] Interlinkages are useful in combatting informational asymmetries as they tend to reduce the cost of screening and contract enforcement on part of the moneylender, whose primary occupation is often as a shopkeeper or a landowner-farmer.[31] As part of the 'contract', the repayment is divided in terms of output or labour services on part of the borrower which can be claimed by the moneylender while executive their primary occupations without significant administrative costs. Consider a scenario where a moneylender trader gets to claim his choice of output at a paddy plantation in repayment for the credit he extended to the farmer for working capital. This serves to reduce additional admin costs for the moneylender as well as provide him a certain section of output according to his preference. [32] An interlinked contract also serves to incentivise the borrower as the additional 'surplus' preventing volunteer default. The threat of no further dealings with a trader in a segmented market has value that the interlinkage contract can leverage. In this section, we analyse the efficacy of interlinkages as a behavior of the rural credit market.

6. EMPIRICAL EVIDENCE ON THE EFFICIENCY OF INTERLINKED CONTRACTS

Measurement of Allocative and Cost Efficiencies under Different Types of Interlinkage Pattern in Interlinked and Non-interlinked Holdings (All Crops Cultivation)

Items	Credit-Input	Credit-Labour	Credit-Product
Interlinked Holdings			
Number of Holdings	168	70	54
Allocative Efficiency			
Mean	0.852	0.799	0.845
Range	0.257-1.000	0.182-1.000	0.278-1.000
Standard Deviation	0.179	0.179	0.190
Cost Efficiency			
Mean	0.302	0.241	0.277
Range	0.024-1.000	0.004-1.000	0.006-1.000
Standard Deviation	0.113	0.128	0.097
Non-interlinked Holdings			
Number of Holdings	135	233	249
Allocative Efficiency			
Mean	0.735	0.630	0.535
Range	0.116-1.000	0.128-1.000	0.116-1.000
Standard Deviation	0.202	0.215	0.201
Cost Efficiency			
Mean	0.154	0.151	0.156
Range	0.002-1.000	0.002-1.000	0.002-1.000
Standard Deviation	0.133	0.131	0.172

Source: Field Survey 2006-07.
Note: The statistical analysis has been made using *DEAP* statistical package.

Fig. 2: Measurement of Allocative and Cost Efficiency for Interlinked vs Non-interlinked Holdings (West Bengal, India) [33]

Figure 2 illustrates the allocative and cost efficiencies for interlinked holdings of farmers relative to non interlinked counterparts in a district in West Bengal. The allocative efficiency was calculated as the ratio of cost efficiency (CE) to technical efficiency (TE) while cost efficiency was measured as the trio of minimum production costs to production costs as measured by the researcher. The following conclusions can be drawn from the data: allocative efficiencies for the various interlinked holdings (credit-input, credit labour and credit output) are higher in interlinked than in non interlinked holdings. Allocative efficiency in interlinked holdings for credit-input (0.852), credit-labour(0.799) and credit output (0.845) is higher than credit input (0.735), credit-labour (0.630) and credit-output(0.535) contracts in non interlinked holdings. The range and standard deviation for interlinked holdings across all three categories is lesser relative to the statistics for non interlinked holdings showing the data points measured to be closely concentrated around the mean value for interlinked holdings relative to the non interlinked holdings. Similarly,

The Optimal Input Quantities with Respect to Cost Minimisation and the Observed Input Quantities in Paddy Cultivation

	Credit-Input		Credit-Labour		Credit-Product	
Inputs	Cost Minimising Input qt.	Observed Input qt.	Cost Minimising Input qt.	Observed Input qt.	Cost Minimising Input qt.	Observed Input qt.
Interlinked Holdings						
Land (Acre)	1.013	1.420	0.542	0.740	1.305	1.609
Labour (No/Acre)	40.498	41.925	26.25	30.323	41.923	42.588
Fertiliser(Kg/Acre)	125.283	152.89	112.235	112.493	152.885	163.51
Non-interlinked Holdings						
Land (Acre)	0.625	1.823	0.653	1.874	0.567	1.657
Labour (No/Acre)	39.973	43.89	39.97	45.40	39.97	42.45
Fertiliser(Kg/Acre)	39.508	85.89	39.505	105.545	39.505	110.71

Source: Field Survey 2006-07.
Note: The statistical analysis has been made using *DEAP* statistical package.

Fig. 3: Measurement of Optimal Input Quantities vs Observed Input Quantities for Interlinked vs Non-interlinked Holdings (West Bengal, India) [34]

Figure 3 represents the differences in observed input quantities used by the farmers in the study area as opposed to the cost minimising input quantity. The results of this table suggest that farmers cultivating paddy in the area of West Bengal where the study was conducted, can produce the same level of profit while reducing the quantity of inputs to facilitate a purchasing price which minimises costs. Since the rural market in question shares significant salient features with rural markets in developing countries, its results can be extrapolated to hypothesis such evidence in future. While the optimal level of input is distinct from the observed input in cases of both interlinked and non interlinked holdings, the interlinked holdings seem to be operating at a quantity much closer to the optimal level of input rather than the non interlinked. Interlinkages can thus be viewed as an institution that incentivise borrowers to avoid strategic default and get closer to the optimal surplus. In the next section, the essay aims to theoretically validate the efficacy of interlinkages by examining two different forms of interlinkage: credit-labour and credit-output/credit-product.

7. REPAYMENT IN LABOUR

Let us consider an interlinked contract that sets up repayment in labour terms. Suppose that a rural labourer, who wishes to finance the consumption of her household, is confronted by the prospect of unemployment during the slack season where harvesting is low. She intends to finance her family's consumption by working on a rich farmer's land during the 'peak' or the harvesting season and loaning funds 'L' during the slack season. [35] The farmer-landowner wishes to lend funds to her in a way that maximises his surplus return. Consider that his opportunity cost of funds is '*i'*, meaning he is unlikely to lend below this interest for his next best alternative provides a risk-free return of L(1+*i*). [36] This can be seen on Figure 4 as represented by the downward sloping cost line L(1+i). Let the wage earned by the labourer independent of any lending contract be *w*. The landowner now has two options, considering that he wishes to maximise return on his loan. He could perform two independent transactions, one credit based and one based on compensating for the labourer's services, or he could finance an interlinked transaction which would extract the interest from the wages of the labourer. [37]

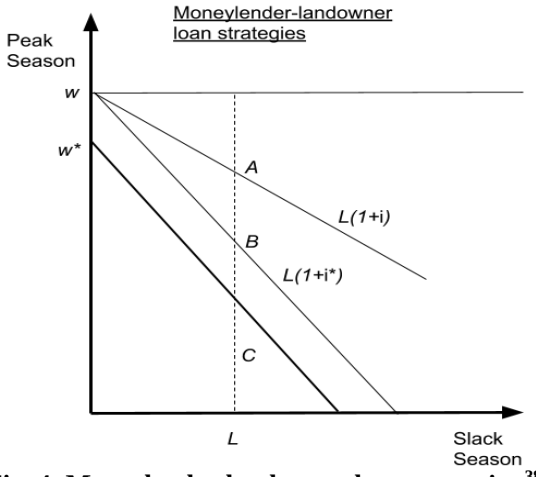

Fig. 4: Moneylender-landowner loan strategies [38]

Given that *w* is the amount of wage earned by the worker in her financial year independent of the loan, she must make a trade off in terms of spending it in the slack and peak seasons. However, since has access to a loan, we assume she spends *w* in the peak season (represented by the horizontal line in the graph) and utilises the entire funds from the loan in the slack season. If the loan contract is interlinked, will be an explicit part of the contract. The moneylender-landowner thus has two variables to manipulate in his aim to maximize return on his loan. Let us denote these parameters as (*w**,*i**) where *w* and *i* are the interlinked wage rate and interest rate respectively. [39] The moneylender can distribute the burden of repayment across labour and cash. In the first diagram (Figure), the interest rate charged i* is greater than the opportunity cost i and the wage rate is reduced from *w* to *w**. This suggests that there is repayment in terms of a deduction from the wages and remaining repayment in cash as interest. From the moneylenders perspective, the net return on the loan is represented as AC. AB is the repayment in currency on the interest rate while BC is the deduction in wage. [40] The second diagram (Figure 5), displays a different approach to repayment where the interest rate charged is in fact less than the opportunity cost (i*< i) resulting in economic loss for the moneylender and the deduction in wages is significantly higher to compensate for the loan. The net return on the loan is still AC.

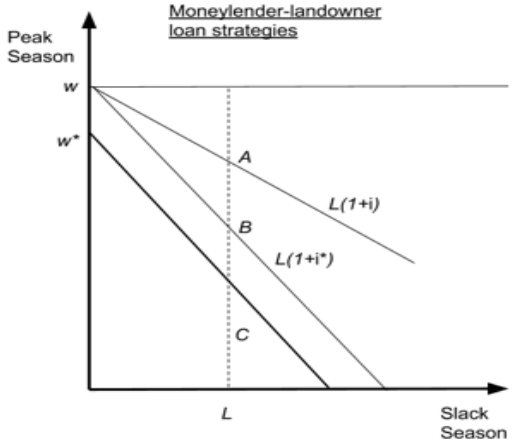

Fig. 5: Moneylender=Landowner Loan Strategies [41]

In order for the moneylender to optimise the interlinkage contract, thereby attaining maximized profit, we must identify the scope of the moneylender to manipulate the two different parameters. As identified previously, *' i '* is the opportunity cost of lending for the moneylender-landowner. Thus, he is unwilling to lend at a rate lesser than *i*. [42] As identified in Figure 5, the maximum difference attainable in theory, between the opportunity cost and the indifference curve is at a loan size L^. [43] This can be understood in terms of the profit maximisation theory. If we consider the interest rate on the loan as the marginal cost (1+i) and the marginal rate of substitution in the indifference curve the marginal product, the loan size that allows for MR=MC can be found at the point where the gradient of both the indifference curve and the cost line are the same. This is denoted by L^. [44]

It must be noted that all other loan sizes irrespective of interest rate will allow for a decreased return on the loan relative to L^. As can be seen in the case of loan L*, while the repayment is in terms for currency and labour (AC), the return is still less than A^C^. Since we have established the optimum loan size it would follow that the moneylender must provide the loan at his opportunity cost and extract the repayment in labour terms. A change in the interest rate will result a new cost line and a different profit maximization point, which would inevitably yield a profit lesser than the maximum surplus A^C^. [45] Thus, an interlinked contract such that it extracts repayment solely in terms of labour effectively acts as a lump sum tax on her wages and is the most allocative efficient response to the constraints in the rural credit market.[46] An interlinkage that is repaid in labour terms has the added advantage of not distorting the incentive to borrow with a change in interest rate.

8. REPAYMENT IN OUTPUT

Negotiating an interlinkage contract while seeking repayment in terms of output also demonstrates the efficacy of rural credit markets. Interlinkages can be shown to maximize consumer utility and producer benefit that would have been otherwise neglected in a traditional credit transaction wherein repayments are made in currency.

Consider a farmer who requires a loan to finance the inputs of production. Assume that the per unit price of the crop (net of transportation costs and distribution costs) is denoted by 'p'. Assuming the costs of inputs for production are relatively fixed we can conclude that the output of farming can be modeled as a function of the loan size. [47] This would mean that production would increase as the loan size increases up to the point when diminishing marginal returns are observed due to limitations imposed by fixed capital. Thus, the optimal level of profit can be derived when the marginal revenue equals the marginal cost (this is represented as the distance between the two parallel tangents), at a loan size we will denote by '*L^'*. Let us identify the profit generated thus as 'S'. [48]

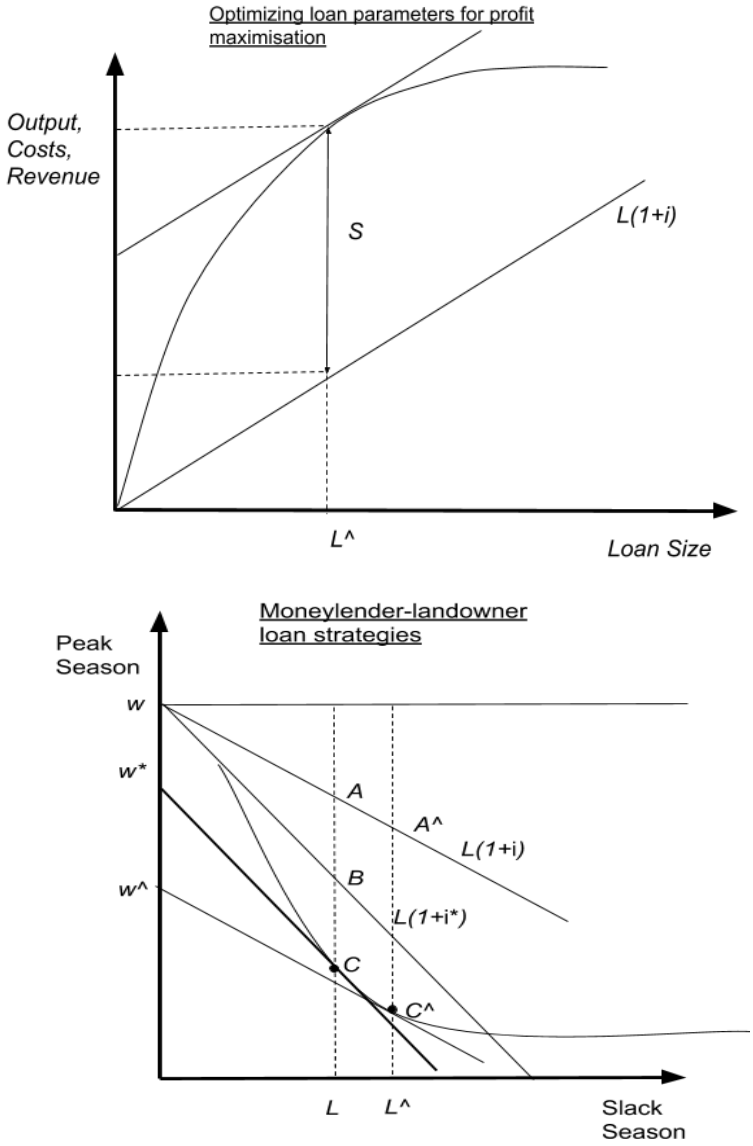

Fig. 6: Optimizing loan parameters for profit maximization [50]

Let us consider that the farmer has access to the rural credit market and is able to obtain a loan for purchasing inputs that generates an output such that the profit obtained is '*A'*. [48] The farmer is likely to experience informational and collateral based constraints in obtaining the optimal loan size and hence profit '*A'* is inevitably going to be lesser than the optimal profit of 'S'. Hence, the prospect of the farmer accessing the credit market restricts the trader-moneylender's premium such that it allows for a minimum economic profit of 'A'. This in turn limits the maximum profit the moneylender can accommodate to 'S-A'.[49] Assuming that the opportunity cost of lending is '*i* ' (the moneylender's next best alternative offers a risk free return at this interest rate), lending profitably to the farmer would demand an increased interest rate. We shall denote this as '*i** ' where i*> i and the moneylender's economic profit thus generated is L*(i*-i) given by CD in Figure 7. At the same time, there are factors constraining the premium rate on the moneylender-trader's loan.

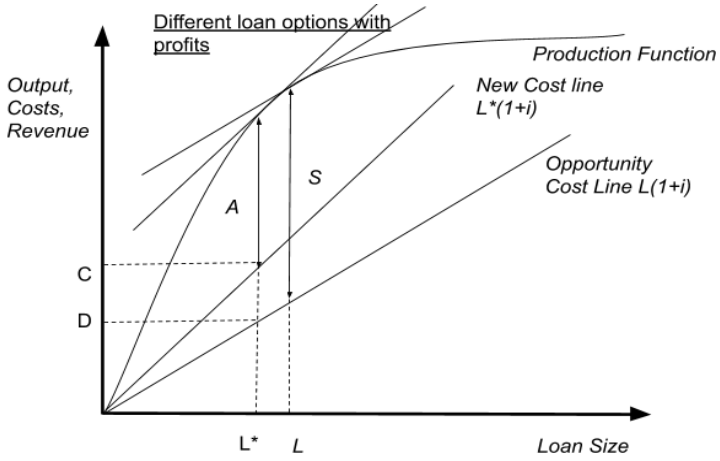

Fig. 7: Different Loan options for the borrower with profits [51]

The question arises whether fulfilling this condition is feasible with the loan constituting a singular credit component that requires repayment in currency. The moneylender is able to manipulate the interest rate to increase profits while allowing the farmer a profit level of 'A'. This is executed by offering the farmer a loan at one such interest rate 'i*', represented by the steeper cost line L(1+i*). As can be inferred from Figure 7, a higher interest rate would mean a higher marginal cost for production which would in turn result in a smaller profit maximizing output and thus a decreased loan size. This is because in effect, an increased cost on every additional unit of output results in an overall decrease in the number of units produced when marginal revenue converges with marginal cost (profit maximizing output). [52] It would also decrease the earnings of the moneylender-trader on the loan. In Figure 7, the profits made by the moneylender and farmer are represented by CD and '*A*' respectively. While the farmer is allowed a profit equal to his opportunity cost, there is a loss of total welfare derived from the inability of the market to facilitate the optimal transaction and allow a profit of 'S'.

However, if the transaction would be interlinked such that repayment be accounted for in terms of crop output as opposed to cash repayments, total surplus can be maximized. The optimal contract, as discussed above occurs when a loan size of L^ is borrowed at interest rate 'i'. This allows for the largest possible profit maximization quantity and hence maximizes total profits for the farmer. The moneylender's interlinked contract must have two components 1) the credit component 2) the output competent for repayment and hence will have two parameters (p*,i*) that the moneylender can manipulate.[53] The moneylender has the power to manipulate the parameters such that he can divert some of the repayment in the form of price discount on the purchase of the farmer's output. If she chooses to pay the market price for the output she purchases from the farmer, it results in a traditional cash repayment scheme. The optimal transaction that results in the highest surplus, as we have seen, occurs at interest rate '*i'*. Thus, if the moneylender seeks to achieve maximum profit of S-A, the only way to achieve it is to lend at the opportunity cost and derive the interest from discounts while purchasing the output. [54] Since the repayment now comes from the output, the profit derived by the moneylender is maximized as well. Hence, the optimum credit transaction is one in which the moneylender trader lends to the farmer at her opportunity cost while seeking repayment in terms of the output. [55] This allows the market to facilitate the maximum surplus possible for the farmer while generating the maximum profit for the moneylender. In the end, the farmer is left with a profit of *A* while being exempt from interest repayments due to the interlinkage.

9. CONCLUSION

The essay has sought to examine the complex functioning of informal credit markets by exploring theoretical models to describe behavior of borrowers and lenders in such markets. The essay has found that the informal credit market has significant inefficiencies originating from information and collateral based constraints. These constraints include but are not limited to segmentation that necessitates higher costs of borrowing from lenders that are not catering to one's particular locality, the inability to provide collateral and enforcement of contracts to avoid repayment given limited liability on part of the borrower. Moreover, the high probability of involuntary and strategic default further contributes to the risk of moneylending.

We have sought to explain why moneylenders in such markets have to a large degree, successfully managed to sustain their business and maintain their market shares. The rates of default among rural households are significantly lower in comparison to their urban counterparts due to incentive and enforcement mechanisms used by moneylenders in their moneylending schemes. We have examined how the inability to offer significant collateral leads to loans of smaller size and that fixed screening costs spread over a small loan cause a multiplying effect that results in an upward spiral for interest rates.

Moneylenders also attempt to counteract the effects of informational asymmetry in rural credit markets through credit rationing and interlinkages while practicing severe screening and leveraging social bonds. The moneylender must ration credit in order to prevent a strategic default on part of the moneylender and avoid the problem of attracting high risk borrowers with potentially higher returns. The market behavior involving credit rationing does not maximize the utility of the consumer, by precluding the marginal consumer from credit that he is willing to buy. Hence, excess demand is often met with no response from the lender. In other words, the informational asymmetries in the market contribute to a loss of total utility in the form of credit rationing.

Contrarily, interlinkages serve to achieve the maximum surplus available to the borrower and lender. This is because constructing a contract consisting of interdependent components of credit and labor/output that seeks repayment of interest in forms other than cash do not distort the incentive the borrower has to take a loan. On the other hand, a singular credit contract results in a change of loan size depending on the premium. An interlinkage avoids this possibility and thus allows the borrower to be granted a loan size that would otherwise, in a singular credit contract, be disadvantageous to the lender.

10. REFERENCES

[1] Banerjee, Abhijit V., and Esther Duflo. 2013. *Poor Economics: Rethinking Poverty and the Ways to End It*. India: Random House India.
[2] Besley, Timothy. 1994. "How Do Market Failures Justify Interventions in Rural Credit Markets?" *The World Bank Research Observer* 9 (1): 27–32. https://doi.org/ Oxford University Press.
[3] Ray, Debraj. 2015. *Development Economics*. Princeton, NJ: Princeton University Press.
[4] Banerjee, Abhijit V., and Esther Duflo. 2006. "The Economic Lives of the Poor ." MIT. 2006. https://economics.mit.edu/files/530.
[5] Duflo, Esther, and Abhijeet V. Banerjee. n.d. "The (Not so Simple) Economics of Lending to the Poor ." *The (Not so Simple) Economics of Lending to the Poor* . Accessed May 16, 2020. https://doi.org/MIT Open Courseware.
[6] Banerjee and Duflo. "The Economic Lives of the Poor ."
[7] Banerjee and Duflo. "The Economic Lives of the Poor ."
[8] Duflo and Banerjee. *The (Not so Simple) Economics of Lending to the Poor*.
[9] Banerjee and Duflo. 2013. *Poor Economics*
[10] Duflo and Banerjee. *The (Not so Simple) Economics of Lending to the Poor*.
[11] Ibid, -
[12] Ibid, -
[13] Ibid, -
[14] Ray, Debraj. *Development Economics*
[15] Mookherjee, Dilip, Debraj Ray, and Parikshit Ghosh. 2000. "Credit Rationing in Developing Countries:" *A Reader in Development Economics*, 3–5. https://www.nyu.edu/econ/user/debraj/Papers/Gmr.pdf.
[16] Ray, *Development Economics*
[17] Ray, *Development Economics*, 444-446.
[18] Ibid.
[19] Ibid.
[20] Ibid.
[21] Ibid
[22] Ibid
[23] Ibid, 447-451
[24] Ibid.
[25] Ibid.
[26] Ibid.
[27] Ibid
[28] Ibid
[29] Ibid
[30] Ibid.
[31] Ray, *Development Economics*
[32] Ibid.
[33] Laha, Arindam, and Pravat Kumar Kuri. 2011. "Interlinked Factor Markets and Allocative Efficiency: Evidence from Rural West Bengal." The Pakistan Development Review 50 (1): 29–40. https://www.jstor.org/stable/pdf/23617432.pdf?ab_segments=0%2Fbasic_search %2Fcontrol&refreqid=excelsior:b58adf36dcc627b72ed3140d925d0fb8.
[34] Ibid.
[35] Ray. *Development Economics*, 455-458
[36] Ibid.
[37] Ibid.
[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] Ibid.

[46] Ibid.
[47] Ray. *Development Economics,* 459-463
[48] Ibid.
[49] Ibid.
[50] Ibid.
[51] Ibid.
[52] Ibid.
[53] Ibid.
[54] Ibid.
[55] Ibid.

APPENDIX 1

$$P_{i_1} = (\frac{1}{2}(1+i_1)L + \frac{1}{2}p(1+i)L) - L$$

$$P_{i_2} = p((1+i_2)L) - L$$

$$P_{i_1} > P_{i_2}$$

$$(\frac{1}{2}(1+i_1)L + \frac{1}{2}p(1+i)L) - L > p((1+i_2)L) - L$$

$$(\frac{1}{2}(1+i_1)L + \frac{1}{2}p(1+i_1)L) > p((1+i_2)L)$$

$$(\frac{1}{2}R + \frac{1}{2}pR) > pR'$$

$$R + pR > p(2R')$$

$$\frac{R}{2R' - R} > p$$

