THE EMERGENCE OF ISOLATION AND INTERLINKAGE IN RURAL MARKETS*

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I. Introduction

An interlinked deal is one in which two or more interdependent exchanges are simultaneously agreed upon. Not only do rural markets abound with examples of such deals, but it is increasingly being appreciated by economists, aided by the findings of social anthropologists, that interlinkage could be the key to understanding many puzzling characteristics of rural markets (Bharadwaj, 1974; Bardhan, 1980; Bailey, 1966).

A curious feature of rural markets in underdeveloped countries is that differences in factor prices often tend to persist indefinitely. In his study of agrarian markets, Griffin (1974, p. 17) observes, “In many instances, in fact, there is a multiplicity of markets within a locality for a single factor of production, e.g. credit. In these instances there may be no such thing as ‘the’ price of an input”: In one region in the Phillipines, a study showed, 15% of the rice farmers paid interest charges over 200%, while 20% of them took loans at a zero\(^1\) interest.\(^2\) Similarly in India one can find adjacent villages paying different wages to unskilled labourers. Some economists have suggested explaining the absence of arbitrage and migration in the face of such price dispersions in terms of two important and (in this context) new concepts: isolation and interlinkage. It has been postulated, notably by Bhaduri (1977), that rural credit markets are ‘isolated’ and thus each moneylender-landlord acts as a monopolist. It is argued here that while the reference to monopoly is misleading, isolation is indeed a salient feature of rural markets and is closely related to interlinkage.

This paper maintains that there are natural reasons for the emergence of isolation and interlinkage in less developed economies. It is argued that rural credit markets are characterised by ‘potential risk’, and this generates an inherent tendency for them to get interlocked with other markets. Based on this, a theory is developed which gives many results but, more importantly, provides some crucial conceptual insights.

Firstly, it shows that many concepts, which are well-defined in traditional market analysis, are ambiguous in this new framework. Thus a remark like “Factor prices in backward regions do not reflect social costs” is difficult to interpret if markets in backward regions are interlinked because ‘prices’

\(^*\) I am grateful to Jacques Drèze and Jan Gunning for some important criticisms.

\(^1\) In real terms this turns out to be around 16 percent because of implicit charges, but clearly that does not do much to destroy the observation that interest rates can take a wide range of values.

\(^2\) Griffin quotes these figures from a study by Jose Gapud. These figures for Philippines are by no means exceptional. Similar figures of divergent and usurious interest rates abound in India (see Reserve Bank of India, 1977).
then have a very different meaning. Many of the same people who have been responsible for this new perspective have, however, continued to use expressions which are borrowed from another realm and have thus contributed to a not inconsiderable amount of semantic confusion.

Secondly, many seem to believe that the interlinkage argument demonstrates that rural markets are imperfect. This however is not true. The interlinkage argument in fact shows that what appears to be imperfect is not always actually so: it may be quite perfect in a more fundamental sense. This of course demonstrates a limitation of the theory of interlinkage and not the existence of perfection in rural markets. It shows that to explain fundamental aberrations we need to go a step further than interlinkage, to the existence of transfer costs and exogenous barriers to factor movements.

II. Potential risk and the basis of interlinkage

It is the presence of potential risk in credit markets which gives rise to interlinkage. To appreciate this it is best to begin from the lender’s risk hypothesis (LRH), which is the traditional explanation of high rural interest rates.

In a nutshell, Bottomley’s (1975) version of the LRH could be stated as follows. Unlike the urban lender, the rural lender faces a risk of default when he makes a loan. Let \( q \) be the proportion of his loans which are defaulted on an average. Under such circumstances, if he charges an interest \( i \), his effective interest, \( d \), (i.e. what he actually recovers from one unit of money loaned) is less than \( i \). In particular,

\[
d = i(1 - q) - q.
\]

Arbitrage eliminates any difference between the effective interest rate and the urban or the organised sector rate, \( r \). Thus \( d = r \) in equilibrium; and clearly if \( q > 0 \) then \( i > r \). Hence the rural interest rate is above the urban organised interest in equilibrium.

Many economists have challenged this thesis on the empirical ground that typically when a rural landlord makes a loan, he faces very little risk (see, e.g. Bhaduri, 1977; Roth, 1979). The loans are repaid, if not in cash, in terms of confiscated land or bonded labour. It can be shown that there are good theoretical reasons for this. The LRH runs into difficulties as soon as we examine ‘\( q \)’ closely.

There can be little dispute that when we say that \( q \) is the average proportion defaulted we do not mean that for every loan given, a fraction \( q \) is not returned. Neither do we mean that no matter whom the loan is made to, there is a probability of \( q \) that he will default totally. Clearly if the debitor is the landlord’s tenant or employee, it is very unlikely that he will be able to get away; and if on the other hand the debitor is one who has no dealings with the landlord it is highly likely that he will not repay, there being hardly
any legal machinery in backward regions to enforce repayment.\(^3\) In fact, it is not very unrealistic and for analytical purposes very convenient to assume that for every landlord, among all potential borrowers there is a set of people from whom he can always recover his loans, in whatever form, and over the rest he has no control.

In order to keep the model constructed in the next section simple, it will be supposed that in the rural region all landlords act as owner-operators: in particular they employ labourers with a one year contract to work and pay them a fixed wage. It is then convenient to assume that every landlord can always ensure repayment from his employees but has no control over others.

In this set-up, \(q\)—the average proportion defaulted—must be some kind of a weighted average of the two probabilities:\(^4\) 1 for the employees who can never default and 0 for the others. Given each landlord’s \(q\) and the fixed urban interest rate, \(r\), we can compute the equilibrium \(i\) for each landlord in accordance with the LRH. Suppose that each landlord is charging his equilibrium \(i\). The credit market is then in equilibrium according to the LRH. But in such a situation the peasants can do better very easily. They have to simply rearrange their creditors: each should go to another person’s employer for his loan and default totally.

Thus if a landlord does not discriminate between potential borrowers, he will end up attracting all the ‘lemons’ and eventually go bankrupt. In reality all landlords realise this. Indeed ‘natural selection’ ensures that they all do. So in reality we find that a landlord gives loans only to those over whom he has control, i.e. in this context, to his employees. Thus while there is a risk of default if a loan is made to a carelessly chosen borrower, a phenomenon which will be referred to as potential risk, there is no risk of default when a landlord actually gives a loan because he would have ensured that the debtor is one over whom he has control.

Risk can therefore not explain usurious interest rates in the fashion suggested by the LRH. Risk, nevertheless, plays a role but a much more indirect one. The presence of potential risk becomes a critical factor in the structuring of the rural market. It results in ‘isolation’. A labourer who is being charged an exorbitant interest by his landlord cannot turn to another peasant’s landlord for his loan, simply because he would not give him a loan and that in turn because if he did the labourer would not repay. It therefore follows that if the government could intervene and ensure that peasants always had to repay their debts along with interests, the isolation would break down and interest rates would come down.\(^5\)

Given that no such government machinery exists, what can a peasant do if

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\(^3\) The reduction in risk brought about by joint activities was observed by Long (1968) in his study of Indian and Thai credit markets. See Akerlof (1970 p. 499) and Wharton (1962).

\(^4\) Even if we had not made the polar assumption that ones employees can never default and others always do, \(q\) would continue to be a weighted average.

\(^5\) Whether bringing down interest rates in this way is worthwhile or not is another question which, as we shall see later, raises issues beyond the scope of this model.
he finds the interest rate too high? He has only one option, that is, to shift lock, stock and barrel: he has to go to another landlord and try to persuade him to employ him, and also to be his creditor. Whether the shift is worthwhile or not will depend not only on the interest charges of the new landlord but on the *package*, i.e. interest and wages that the landlord is willing to offer.

This is the beginning of interlinkage between markets and at the core of it lies the credit market with its potential risk. Given that peasants and landlords make interlinked deals, what will be the wages and interest rates that will persist in the rural region? The next section examines this question, first in a partial equilibrium framework and later in a general equilibrium one.

**III. The persistence of interlinkage and isolation**

**III.1. A partial equilibrium analysis**

Consider a rural region which has *I* landlords and *N* identical peasants. There is no legal machinery to ensure that a loan taken by a peasant will be repaid and thus, in keeping with the above analysis, it is supposed that the only way that a peasant can get a loan is to first tie himself for a year as an employee to a landlord. Then he can get as much loan as he wants but he cannot default. Let *w* be the wage for a year’s work that a peasant gets from his employer-landlord and *i* be the interest rate at which he can borrow. Let *u* be a utility index with a higher value of *u* implying a more acceptable package from the peasant’s point of view. We assume

\[ u = f(w, i); \quad f_1 > 0, \quad f_2 \leq 0 \ldots \]  

(1)

It is convenient to rewrite (1) as follows

\[ w = \phi(i, u), \quad \phi_1 \geq 0, \quad \phi_2 > 0 \ldots \]  

(2)

It is assumed that the amount borrowed by the peasant, *L*, depends on the interest rate:

\[ L = L(i), \quad L'(i) \leq 0 \ldots \]  

(3)

It is reasonable to expect that if we keep raising *i*, a rate \( \bar{i} \) is reached such that for all \( i \geq \bar{i} \), \( L(i) = 0 \) and for all \( i < \bar{i} \), \( L'(i) < 0 \). Given this, it is natural to assume that for all \( i > \bar{i}, \ f_2 = 0 \) and by implication \( \phi_1 = 0 \). This amounts to asserting that changes in the interest rate are inconsequential if the peasant is anyway not taking loans.

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6 Some may find the more general specification, namely \( L = L(i, w) \), more acceptable. Our simpler assumption may however be justified in two ways: It is possible to think of the peasant’s basic utility function suitably separable (e.g. \( \Omega = \Omega^1(L) + \Omega^2((1 + i)L) + \Omega^3(w) \)) so that \( L \) turns out to be a function of \( i \) only. Secondly, even if we begin with the more general form, \( L = L(i, w) \), since landlords ensure that peasants are on their reservation frontier, \( w \) depends on \( i \), and in effect \( L \) depends on \( i \) only.
To begin with, (1) (or alternatively (2)) and (3) are treated as primitives. This gives our analysis a certain amount of essential flexibility. The special case where (1) and (3) are both derived from one basic utility function and utility depends on intertemporal earnings is taken up later in Section III.4.

A partial equilibrium analysis can be undertaken at various levels. The choice of that level is not too important here as our aim is to eventually give a general equilibrium solution. We begin the partial equilibrium analysis by assuming that there is a reservation utility index, \( \bar{u} \), for all peasants. As long as a landlord offers a package, \((w, i)\), which has an index below \( \bar{u} \), no labourers come to him. But as soon as he gives \( \bar{u} \) or more, there is an endless supply of labour. Thus, for the time being, we ignore the fact that this region has only \( N \) peasants. In the general equilibrium analysis, the number becomes important, and it is used to determine endogenously the value of the utility index.

In the immediate context the index is exogenously given, which means there is a frontier in the \((w, i)\)-space, given by \( \bar{u} = f(w, i) \), which defines the limits to which a peasant can be pushed. The reservation frontier is illustrated in Fig. 1.

The frontier is an important tool of analysis for interlinked systems. It will be argued that in bringing about an equilibrium, the frontier in an interlinked market plays the same role as does price in a conventional market. In other words, price is replaced by the reservation frontier and it is the
movement up and down of the entire frontier which brings about a general equilibrium.\(^7\)

The partial equilibrium approach can be rationalised by assuming that the rural region is a small one and workers are free to migrate to and from an adjacent sector where they can always get a package \((w, i)\) which gives them \(\bar{u}\).

Let us now look at the decision problem of the landlords. Assume that output, \(X_i\), produced by landlord \(j\) is a function of the number of employees, \(n_i\), that he has. Hence

\[
X_i = X_i(n_i); \quad X_i'(n_i) > 0, \quad X_i''(n_i) < 0
\]

A typical marginal product curve is shown in the north-east quadrant of Fig. 1. Assuming that each landlord has to pay the same wage to and charge the same interest from all his employees (in the case of landlord \(j\), \(w_i\) and \(i_j\)) and that these are given in real terms, landlord \(j\)'s yearly earnings from cultivation is \(X_i(n_i) - w_j n_i\).

The landlord has access to the organised credit market where he keeps his money at an exogenously given interest rate \(r_i\). While \(r_i\) is referred to as an organised sector interest rate, it is possible to give it a wider interpretation (e.g. it could be landlord \(j\)'s expected dividend from the urban share market). Given such an interpretation and also because credit markets—even in the organised sector—exhibit a variety of interest rates and different landlords have access to different ones, we do not assume \(r_i = r_j\), for all \(i, j\).\(^8\)

It is simply assumed that \(r_i\) (for all \(j\)) is parametrically given to the rural sector. It is supposed that the landlord has enough money to take care of the entire credit demand of his employees. The landlord’s net interest earning is therefore equal to \(n_i(i_j - r_j)L(i_j)\).

The landlord’s objective is

\[
\text{Maximise } \pi_i = X_i(n_i) - w_j n_i + n_i(i_j - r_j)L(i_j) \quad \text{subject to } w_j = \phi(i_j, \bar{u}).
\]

Dropping the subscript \(j\) wherever there is no possibility of confusion, and substituting the constraint in the objective function, the landlord’s objective may be restated as

\[
\text{Maximise } \pi = X(n) - \phi(i, \bar{u})n + n(i - r)L(i) \quad \text{subject to } w = \phi(i, \bar{u}).
\]

This implies the following first order conditions:

\[
X'(n) = \phi(i, \bar{u}) - (i - r)L(i)
\]

\[
L(i) + (i - r)L'(i) = \phi_1(i, \bar{u})
\]

\(^7\)The analogy is, however, more complex if peasants have non-identical indifference curves in the \((w, i)\)-space.

\(^8\)We are of course assuming that there is no inter-landlord borrowing.
Solving these two equations we get $i_j$ and $n_i$ in terms of the exogenous variables:

$$i_j = i_j(\tilde{u}, r_j) \quad (8)$$
$$n_j = n_j(\tilde{u}, r_j) \quad (9)$$

Once we get $i_j$, we can compute $w_i$ from the equation of the reservation frontier, i.e.

$$w_i = \phi(i_j, \tilde{u}). \quad (10)$$

An equilibrium vector $[i_j, w_j, n_j]$ is one which solves (8), (9) and (10). The rural sector is in equilibrium when each landlord, $j$, has chosen his respective optimal $[i_j, w_j, n_j]$. The total employment in the rural sector, in equilibrium, is $\sum_{i=1}^l n_j(\tilde{u}, r_j)$.

Observe that equations (6) and (7) are block recursive. We can first solve (7) and get the equilibrium interest rate and then using that solve (6) and get the equilibrium $n_j$. This characteristic makes it easy to represent our model geometrically. Actually the block recursion is obvious directly from the landlord’s objective function (5), which could be rewritten as

$$\pi = X(n) - n \cdot C(i, \tilde{u}, r) \quad (11)$$

where

$$C(i, \tilde{u}, r) = \phi(i, \tilde{u}) - (i-r)L(i). \quad (12)$$

Clearly $C(i, \tilde{u}, r)$ is the per worker cost (PWC) to the landlord. Note that for every given $n$, $\pi$ is maximised by minimising $C(i, \tilde{u}, r)$. Since $\tilde{u}$ and $r$ are exogenous to the landlord, he has to choose $i$ so as to minimise the per worker cost. Having done this, he could then maximise $\pi$ with respect to $n$.

In the south-west quadrant of Fig. 1, plot two curves, $iL(i)$ and $rL(i)$. Recalling our assumption that for a sufficiently large $i$ demand for loans goes to zero, it is clear that for all $i \geq \tilde{i}$, $iL(i) = rL(i) = 0$. Since $L'(i) \leq 0$, $rL(i)$ falls monotonically as $i$ increases. The two curves intersect where $i = r$. The vertical gap between these two curves shows $(i-r)L(i)$. This is negative for $i < r$. Subtract this gap from the reservation frontier vertically (i.e. $ab = a'b'$) and we get the line marked cbd which shows $C(i, \tilde{u}, r)$. We refer to the cbd line as the PWC-curve. Since the landlord minimises $C(i, \tilde{u}, r)$, he chooses the lowest point on the PWC-curve. He therefore charges an interest of $i^o$. The wage he pays can be read off the reservation frontier and is shown in the diagram as $w^o$.

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9 In order not to get enmeshed in the problems of existence, it is simply assumed that equilibrium, both partial and general, always exists. As long as the assumptions of a model do not logically imply non-existence, a direct assumption that equilibrium exists is logically as consistent as the more indirect approach of deriving the existence from more basic assumptions. For those who prefer otherwise, continuity of $L(i)$ and $w = \phi(i, u)$ and the assumption that $\lim X'(n) = 0$ ensure the existence of this equilibrium.
Now, $n$ is chosen to equate $X'(n)$ to the minimum PWC. This is obvious from (6) and may be written as:

$$X'(n) = \min_{i} C(i, \bar{u}, r)$$

The equilibrium $n$ is denoted by $n^\circ$ in Fig. 1.

III.2. The general equilibrium

The fact that this region has $N$ peasants has so far been ignored. In the partial equilibrium analysis it was shown that given $\bar{u}$ the aggregate demand for labour was $\sum_{j=1}^{l} n_j(\bar{u}, r_j)$. There is no reason why this should be equal to the supply of labour, $N$, for a randomly chosen $\bar{u}$. However we could vary $\bar{u}$ so that demand equals supply. That is precisely the closing equation for a general equilibrium:

$$\sum_{j=1}^{l} n_j(\bar{u}, r_j) = N$$

Hence, $((i_j, w_j, n_j)_{j=1}^{l}, \bar{u})$ is an equilibrium configuration of interest, wage, employment and utility if and only if these values satisfy equations (8), (9) and (10), for all $j$, and equation (14).

In the next sections we explore the properties of our model, but before that it is worth pausing to examine the process which brings about this equilibrium and in particular the role of $\bar{u}$.

In the partial equilibrium analysis we pretended that $\bar{u}$ was given, i.e. the reservation frontier was fixed, and we asked the landlords how many workers they would demand. By changing $\bar{u}$ we could construct an aggregate demand schedule. A possible schedule is illustrated in Fig. 2. That this demand curve is downward sloping can be demonstrated diagrammatically from Fig. 1. To give a mathematical proof the standard approach would be by differentiating the first-order conditions (6) and (7). An intuitively more satisfying approach is as follows:

Consider landlord $j$, without using this subscript. Let $n^\circ, i^\circ$ be the landlord’s chosen values given $\bar{u}^\circ$; and $n^*, i^*$ be his chosen values given $\bar{u}^*$. Since, as argued above, the landlord chooses $i$ to minimise $C(i, \bar{u}, r)$,

$$C(i^*, \bar{u}^*, r) \leq C(i^\circ, \bar{u}^\circ, r)$$

10 It is assumed that labourers are willing to work no matter how much utility they get, i.e. the supply curve of labour vis-a-vis $\bar{u}$ is vertical at $N$. It is easy to relax this assumption.

11 The present model can be easily extended to explain the reported persistence of subsistence utility, $\bar{u}^\circ$, in many rural regions. Assume that the supply curve in Fig. 2 has a cut-off point at $\bar{u}^\circ$ and for any offer worse than this the supply of labour is zero. Then, if at $\bar{u}^\circ$ the demand for labour is less than the supply the equilibrium utility index will be $\bar{u}^\circ$ and the analysis would be similar to the above partial equilibrium one.
Let $\tilde{u}^* < u^\circ$. Then,

$$C(i^\circ, \tilde{u}^*, r) < C(i^\circ, u^\circ, r),$$

since $\phi_2 > 0$ (see equation (2)). These two inequalities together imply

$$C(i^*, \tilde{u}^*, r) < C(i^0, u^\circ, r).$$

Since $n$ is chosen so as to satisfy (13), the above inequality implies $X'(n^*) < X'(n^\circ)$. This in turn implies $n^* > n^\circ$ since $X''(n) < 0$ (see equation (4)). Thus $\tilde{u}^* < u^\circ$ implies $n^* > n^\circ$. Since this is true for all landlords, $\tilde{u}^* < u^\circ$ implies $\sum_{j=1}^{l} n_j^* > \sum_{i=1}^{l} n_i^\circ$. This establishes the downward slope of the demand curve.

That $\tilde{u}$ in this interlinked market plays the role which price plays in conventional market analysis is now obvious. If $\tilde{u}$ is set too high, $\sum n_i(\tilde{u}, r) < N$, i.e. labour is in excess supply. That means workers would be willing to accept a lower $\tilde{u}$, and competition will drive $\tilde{u}$ down till (14) is satisfied. If $\tilde{u}$ is initially very low, a reverse process establishes (14). Since $\tilde{u}$ represents a frontier in the $(w, i)$-space, it is clear that it is the movement of this frontier which brings about an equilibrium in an interlinked market.\(^{12}\)

### III.3. The structure of wages and interest

A number of characteristics of rural markets which have been observed in various field studies and have been casually theorised about by earlier authors is captured in this simple model.

Firstly, as is obvious from the diagram, in general equilibrium, $i_i$ need not be equal to $r_i$ and in particular can be greater than $r_i$. Thus ‘abnormally’ high

\(^{12}\) This conception of price is however not unique. For example, if $r_i = r$ for all $i$, we could use the iso-PWC (i.e. $C(i, \tilde{u}, r) =$ constant) frontiers in the $(w, i)$-space and conduct a similar exercise.
rural interest rates can persist without resulting in any arbitrage. On the other hand $i_j$ can also be less than $r_j$, a possibility demonstrated in Fig. 3, where $i_j = 0$. It is interesting to note that $i_j$ could never be zero in Bhaduri’s (1977) framework. This happened because in his framework loan demand was inelastic and while there was isolation in the credit market there was no explicit interlinkage. This paper shows how isolation naturally gives rise to market interlinkages and that once this happens rural interest can in certain situations be zero. The existing evidence (see, e.g. Bardhan and Rudra, 1978) validates this possibility. One should be warned, however, that a zero interest should not be taken as an indicator of peasants being “better off”. In interlinked markets peasants who pay no interest typically get lower wages, which could be well below the marginal product of labour. Equations (6) and (10) establish the more general proposition that

$$i_j < r_j \iff X_j'(n_j) > w_j$$

i.e. a landlord who charges an interest below his opportunity cost of money, necessarily pays a wage less than the marginal product of labour.

It would however be wrong to suppose that $i_j = r_j$ is merely a case of coincidence. An important special case of the above model arises if we assume that the peasant’s behaviour is the outcome of maximising utility which is a function of his intertemporal earnings profile. In that case, which is taken up in the next section, it can be shown that $i_j = r_j$ for all $j$.

What is possible here and continues to be possible in the intertemporal earnings approach is that different landlords charge different interest rates and pay different wages. What the theory of interlinkage tells us is that the dispersions in the prices of these two, i.e. credit and labour, are not arbitrary. In particular it suggests the following hypothesis: for all $j, k$,

$$i_j < i_k \iff w_j < w_k$$

This follows from the fact that at equilibrium $f(w_j, i_j) = f(w_k, i_k)$, for all $j, k$. 
This is one explanation of the frequent observation that in rural regions there often exists neighbouring villages paying different wages and this persists without causing any migration. Similarly for interest rates. Interlinkage makes it impossible for peasants paying a high interest rate to go only for credit to the neighbouring landlord who charges his workers a lower interest. To do so in the presence of potential risk, he has also to give up his earlier job and work for the neighbouring landlord. And that is not worthwhile because \( f(w_j, i_j) = f(w_k, i_k) \), for all \( j, k \).

One feature of interlinkage which is not always clearly understood is now clear. Having observed differing wages (or other prices) between villages many have sought to explain this inequality in terms of interlinkage. What is often not appreciated is that interlinkage explains these differences only by showing that in a more fundamental sense there is equality, i.e. all jobs are equally acceptable. In reality it is indeed often the case that peasants in one village are better off, in terms of utility, than workers in another village. An interlinkage theory in itself cannot explain this. Instead we need to resort to an old argument, one making use of the concept of transfer costs or exogenous barriers to entry. For example, if there are impediments to labour mobility for reasons of caste then utility differences may persist undisturbed. A number of barriers to entry in the labour market have been discussed by Sen (1975, pp. 53–5).

Dispersion in the price of a commodity, like wages, is caused by isolation in the market for that commodity, i.e. the labour market. Isolation in turn can be caused by both interlinkage of markets and the existence of transfer costs. If it is caused solely by interlinkage, then we would find that the wage differentials are offset by price differentials in other markets (in the present paper, interest). If on the other hand isolation is caused solely or additionally by the existence of transfer costs, then the wage differentials would not cause balancing differentials elsewhere.

A second conceptual issue that is highlighted by our model of interlinked markets is that many expressions which are quite standard in conventional market analysis are now extremely misleading. For example consider a general equilibrium where \( i < r \). This, as shown earlier, implies \( X'(n) > w \). Would we in this case say that the labour market is imperfect because workers are not getting their marginal product? The answer is not very obvious. While workers are not getting their marginal product they are getting credit at an interest below the organised sector rate. Moreover, if instead of wages we look at the per worker cost, we find that in equilibrium it is equal to the marginal product, \( X'(n) \). Actually when deals are interlinked, it is no longer correct to think of wages as payment for labour and interest as payment for loans. The \((w, i)\) vector jointly reflects the price of labour and loans. It may be misleading to separate the two and say how much which costs.

Another problem relates to the term monopoly. Consider the general equilibrium situation depicted in Fig. 1. There the rural interest, \( i \), is above
the organised market interest. This sort of a situation is often described by saying that the credit market is monopolistic. Now, one standard feature of a monopolistic market is that if the seller raises his price a little bit only, he does not face a zero demand. But consider a single landlord raising his interest ceteris paribus a little, beginning from the equilibrium in Fig. 1. This would imply a movement directly to the left beginning from the \((i_0, w_0)\) point in the north-west orthant. This would mean offering peasants a package \((w, i)\) which is less acceptable than what is available on the market. In other words the landlord loses all demand for credit. Thus he clearly cannot be described as a monopolist or monopolistic. On the other hand he can raise interest without losing customers if he also raises the wage rate, so as not to push \((w, i)\) below the reservation frontier. Thus he does have power to affect the interest rate unlike a competitive supplier of loans. The point is, if we consider the joint deals in labour and credit, the model we have constructed is a competitive one.\(^{13}\) But if we examine each ‘market’ separately, like the credit market or the labour market, then both descriptions, monopoly and competition, raise problems. It may thus be preferable to use the more neutral term ‘isolation’.

III.4. The intertemporal earnings approach

Till now (1) and (3) have been treated as primitives. It is arguable and in most traditional analysis it is presumed that since these functions pertain to the peasant, they are derived from the peasant’s basic utility function. This in itself would not give us any interesting special cases. But if in addition we assume that the peasant’s basic utility depends on his intertemporal profile of earnings then we get a result which is at first sight rather surprising: At equilibrium \(r_j = i_j\) for all \(j\), i.e. each landlord charges his peasants an interest rate equal to his opportunity cost of money.\(^{14}\) In brief, usurious interest rates do not exist.

It should be clear that this special case imposes certain important restrictions on our characterisation of a peasant. Firstly a peasant attaches no significance to wages other than as a source of earnings. That is, the status and ‘recognition’ aspects of income are ruled out. And what is the other side of the same coin is that there is supposed to be no stigma attached to the taking of loans. Secondly, it is supposed that peasants do not overestimate or underestimate their loan demands.

The exact temporal profile of transactions is unimportant in this special case but for simplicity assume that the peasant takes a loan in period one and repays it in period two which is also the period in which he receives his

\(^{13}\) It is possible to construct a monopolistic model of joint deals, though that is not necessary to explain price dispersion and the divergence between wages and the marginal product of labour, as the present model demonstrates.

\(^{14}\) I am indebted to Jacques Drèze for this result and in fact for much that is contained in this section.
wage. Hence, since his utility depends on his earnings profile, \( \Omega = \Omega(L, w - (1 + i)L) \), where \( \Omega \) denotes his utility. The analysis is simpler if we assume the function is additively separable in which case we could represent it as

\[
\Omega(w, i, L) = \alpha(L) + \beta(w - (1 + i)L),
\]

\( \alpha' > 0, \quad \beta' > 0, \quad \alpha'' < 0, \quad \beta'' < 0. \)  

The peasant chooses \( L \) to maximise \( \Omega \). Hence

\[
\alpha'(L) - (1 + i)\beta'(w - (1 + i)L) = 0
\]

Let \( V(w, i) = \max \Omega \) and let \( \hat{V} \) be the reservation utility. Then the landlord chooses \( w \) and \( i \) so as to

\[
\min K = w - (i - r)L
\]

subject to \( V(w, i) \geq \hat{V} \), given that for each \( (w, i) \) the peasant chooses \( L \).

In this case it is never worthwhile for the landlord to charge usurious interest rates.\(^{16}\) We show this by contradiction. Let \( i^*, w^* \) and \( L^* \) be the equilibrium values and let \( i^* > r \). Now consider what happens if the landlord lowers \( i \) to \( i^0 = r \) and \( w \) to \( w^0 = w^* - (i^* - r)L^* \). Then \( w^* - (i^* - r)L^* = w^0 - (i^0 - r)L^0 \), where \( L^0 \) is the peasant’s loan demand when interest and wage are \( i^0 \) and \( w^0 \). Thus (17) implies that with \( i^0 \) and \( w^0 \) the landlord is as well-off as before.

Note that \( w^* - (1 + i^*)L^* = w^0 - (1 + i^0)L^0 \). Therefore, \( \Omega(w^0, i^0, L^*) = \Omega(w^*, i^*, L^*) \equiv V(w^*, i^*) \). Check that \( w^0, i^0, L^* \) does not satisfy (16) since \( w^*, i^*, L^* \) does satisfy (16). Thus given \( w^0 \) and \( i^0, L^* \) is not the optimum loan demand. Thus

\[
V(w^0, i^0) = \Omega(w^0, i^0, L^0) > \Omega(w^0, i^0, L^*) = V(w^*, i^*) = \hat{V}.
\]

Hence the peasant is better off than before. Therefore by lowering interest rate and wages as above the landlord remains equally well-off and the peasant is above the reservation utility. It is easy to see that the landlord can do better by lowering wages even further so as to push the tenant to the reservation frontier. Thus \( i^*, w^* \) is not the landlord’s optimum. This contradiction establishes that \( i \) cannot be greater than \( r \) in equilibrium. It is easy to show that equilibrium interest, \( i \), is in fact equal to \( r \). The result obviously carries over to the general equilibrium.

At first sight the result is a bit puzzling but it is not difficult to explain. Let \( r \) be the interest rate in the organised market where the landlord keeps his money. By lowering the rural interest to \( r \), the landlord allows the peasant to make greater use of money. That is always worthwhile for a landlord who is

\(^{15}\) The second-order condition is satisfied since \( \alpha'' < 0, \beta'' < 0. \)

\(^{16}\) See Braverman and Srinivasan (1981) for a similar result.
powerful enough to hold the peasant at his reservation utility, i.e. extract any utility in excess of that: If two individuals are sharing a cake and the amount that one person gets is fixed, it is clearly to the other person’s advantage to take any measure that would expand the cake.\(^{17,18}\)

Hence \(i = r\) is not a sign of the peasant’s well being. The landlord sets \(i = r\) only because markets are interlinked and he can extract all the advantages that accrue to the peasants by keeping \(i\) low. For analogous reasons, if monopolists were more powerful than what they are they would not charge monopoly prices. They would instead lower prices to the level that would prevail in competition and extract the additional consumer’s surplus by ‘flat’ charges or other mechanisms. One possibility is explored in the ‘tie-in sales’ literature (see Burstein, 1960).

While the above discussion, for aesthetic reasons, suppresses the landlord subscript \(j\), what we have actually shown is that for each landlord \(j\), \(i_j = r_j\). This in turn implies that \(X'_j(n_j) = w_j\), i.e. each landlord equates wages to the marginal product of labour. However, as long as different landlords have different opportunity costs of money (and given the imperfections of capital markets there is no reason to believe otherwise), barring coincidences, \(i_j \neq i_k\) and \(w_j \neq w_k\) given \(j \neq k\). Thus even in this special case, interlinkage helps explain price dispersion. Of course, as before, those paying higher interests get higher wages such that utility levels across peasants happen to be the same.

The last statement is the same as one of the results in Braverman and Srinivasan (1981) which asserts that ‘All contracts are utility equivalent’. This equivalence results is not a surprising proposition but a certain amount of importance has been attached to it because of its differences with Marshall’s (1920, 8th edition) analysis of tenancy. Observe that in its present form this proposition hinges on the assumption of identical preferences of its peasants. Consequently it is preferable to state it in the following weaker form: At equilibrium no worker \(t\) would prefer to work in place of worker \(s\) at the terms (i.e. \(i\) and \(w\)) that \(s\) is receiving.

IV. Responses to exogenous changes

This section examines the consequences of certain exogenous changes on wages, interest and welfare.

First consider the consequences of technological change, which is of particular interest because it has been the source of some debate and discord in a related literature (Bhaduri, 1973; Newbery, 1975; Griffin, 1974). Though that discussion was in the context of sharetenancy, it has some parallels with the present model.

\(^{17}\) In the general model \(i\) can be greater than \(r\) because the greater benefit accruing to a peasant by lowering \(i\) cannot always be extracted by the landlord without loss of value.

\(^{18}\) It is, however, not necessary that landlords will be better off in the general equilibrium if they all lower \(i\) to \(r\), though each landlord is better off by doing so.
First consider a single landlord who has the choice of making an innovation which will shift the marginal product of labour curve upwards. It is reasonable to assume that a single landlord cannot change the prevailing utility levels of peasants.\(^{19}\) Thus to a single innovating landlord the reservation frontier is given, which means, and this is obvious from the left hand diagram of Fig. 1, that the per worker cost remains unchanged to the landlord. So with an innovation which shifts \(X'(n)\) curve to the right, he employs more labour. Therefore he benefits unambiguously from the innovation and the benefit has two sources: his existing labour force becomes more productive and he employs more people.

This argument captures a part of Newbery’s (1975) and also Griffin’s (1974)\(^{20}\) critique of Bhaduri’s (1973) thesis of stagnation in semi-feudal societies. What is happening here is that as a single landlord innovates he ensures that he keeps his peasant pushed against the reservation frontier, the position of which is determined by the behaviour of all landlords and peasants taken together and is unaffected—for all practical purposes—by the actions of a single landlord. He therefore reaps the full benefits of his innovation.

If all landlords innovate together the consequences are very different though. It is clear from Fig. 1 that for a given \(u\), innovation would result in each landlord demanding a greater amount of labour. This implies a rightward shift of the aggregate demand curve for labour in Fig. 2. Hence equilibrium \(u\) rises. It is easy to translate this into algebra. Thus peasants become better-off if all landlords innovate together. The status of landlords’ welfare is however ambiguous. It is possible to construct upward shifts of the marginal product curve in different ways and show that the landlords may or may not be better off.

Another exogenous change worth examining is an organised market credit squeeze. Since the credit market in this analysis is not rationed, a natural way to define a credit market squeeze in the organised sector is in terms of a rise in its interest rates. Let \((r_0^*, \ldots, r_l^*)\) be the original structure of interest faced by the \(l\) landlords and let \((r_1^*, \ldots, r_l^*)\) be the new structures. We assume that there is a credit market squeeze, i.e. \(r_j^* \geq r_j^0\), for all \(j\) and \(r_k^* > r_k^0\) for some \(k\). The consequences of this in the rural sector is as follows: The peasants are worse off as a consequence of changes in the structure of rural interest and wages. In the generalised model there is no definite \textit{a priori} directional effect on rural interest: it could rise or fall. In the utility-theoretic special case however a credit squeeze in the organised sector gets directly transmitted to the rural sector for the obvious reason that \(r_j = i_j\) for all \(j\). All this is obvious from the diagram. For a particular landlord, if \(r\) goes up, with

\(^{19}\) In other words, single landlords are reservation frontier takers just like in conventional market analysis individual agents are supposed to be price takers. It is well known that a rigorous explanation of this in a general equilibrium framework raises problems.

\(^{20}\) The argument in Braverman and Stiglitz (1982) and Braverman and Srinivasan (1981) is the same, though less visible.
constant, his PWC will rise and thus the demand for labour will fall. Hence the aggregate demand curve for labour shifts left in Fig. 2, implying a fall in $\bar{u}$.

The impact of the credit squeeze on landlords is necessarily heterogeneous: some lose and some gain. It is obvious from the diagram that everybody cannot lose or be better off. Consider a single landlord. His profit can be represented in Fig. 1, in the north-east quadrant, as the area under the marginal product curve and above the PWC line. In the situation depicted in the diagram this is equal to the area above $AB$. Since technology is unchanged, the only way the profits can rise is if the PWC line (i.e. $AB$) shifts down. Therefore it is obvious from the diagram that a rise in profit of landlord $j$ is necessarily accompanied by a rise in the number he employs, $n_j$. Hence, if starting from an equilibrium, as urban interest rates rise every landlord is better off, then \( \sum_{j=1}^{l} n_j \) rises which means the general equilibrium condition (14) cannot be satisfied. Therefore, (i) landlords as a group cannot be better off in the Paretian sense, and by the same argument (ii) they cannot all be worse off.\(^{21}\)

Finally it is worth examining the consequences of removing potential risk. Of course, in order to remove potential risk institutional changes would be required. For example, values may be inculcated which make people desist from defaulting or the government’s legal machinery in the rural sector may be strengthened. However it be achieved, the question which concerns us here is that once potential risk is ruled out what happens to wages and interest rates. Assume that landlords $j$ and $k$ were charging interest rates of $r_j$ and $r_k$ and $r_j > r_k$. Once potential risk is removed a worker of landlord $j$ can go to landlord $k$ and ask for credit at a rate $r^*$ which is between $r_j$ and $r_k$. This he can do while retaining his job with $j$. Such trades will continue till only one interest rate prevails in the rural sector. And of course by the equivalence result only one wage prevails in the rural sector. This is of course valid even for the utility-theoretic special case. The existence of a single interest rate implies that landlords, who have a high opportunity cost of money, cease to give loans on the rural markets and those with a low opportunity cost of money earn super-normal profits from the rural credit market.\(^{22}\) In short, a conventional market equilibrium emerges and this is not surprising because interlinkage in this theory had germinated from the presence of potential risk.

It is difficult to explore formally the welfare effects of removing potential risk. This is because working for rural owner operators and feudal landlords is not the only opportunity open to the peasants. In reality there exist other

\(^{21}\) (ii), however, hinges on our assumption of a vertical supply curve. If the supply curve is upward sloping, (i) continues to be valid, but it becomes possible for landlords as a group to be worse off.

\(^{22}\) In order to have a non-trivial solution, i.e. more than one moneylending landlord, it is necessary to assume that landlords have a finite amount of money to give out as loans.
more anonymous forms of employment opportunities where however credit is not available as from a feudal landlord. A feudal landlord may pay poorly but he provides the peasant with some insurance. To quote from Breman (1974, p. 193): “The allowance he [the farm servant] receives is not sufficient for him to cope with eventualities such as ... illness [or] continuous rain during the monsoon ... On such occasions the master cannot refuse too often to come to his assistance ... [Hence], the farm servant has at least a possible source of credit ... Aside from the security of a minimal income this is for the [farm servant] the compensatory side of servitude.” In the original situation, with potential risk in the credit market, it was the need for insurance (i.e. money on a rainy day) which brought the peasant to the rural landlord and consequently in our main analysis we could ignore these other opportunities. Once the government removes potential risk, the two functions of finding a job and having an insurance are no longer intertwined. The peasant can then work in the more anonymous capitalist farms and turn elsewhere for his loans. This, in effect, would mean a drop in the supply of labour in the sector we are considering and if this was the only change it would imply a rise in peasants’ welfare. But of course the above analysis provides only half the picture and that too in descriptive terms. Its main purpose was to illustrate how certain features of an economy, which could be omitted in the main analysis as inconsequential, need to be brought into the model if one wants to analyse thoroughly the economic consequences of institutional change.

V. Conclusions

V.1. Extensions

It was assumed in this model that the landlord–labour relation is a simple one involving a one-year contract at a fixed wage. It will be interesting to extend the model to allow for other tenure relations. For example, if we assume that to enter into credit relations with a landlord a peasant needs to attach himself to the landlord as a sharetenant (instead of a wage labourer as in the above model) then what will be the nature of outcome? The answer will depend on the form of sharetenancy system we consider. The analysis is straightforward if we assume a very simple form (see Stiglitz, 1974) where each of the n peasants employed receive a fixed proportion t of the average output X(n)/n (I am ignoring the landlord subscript j). The landlord is therefore offering the peasant the package (t, i). The peasant’s ‘wage’, w, (in equations (1) and (2)) could now be thought of as a derived variable, with w = tX(n)/n and the landlord’s control variables are t, i and n. It is easy to check that the equilibrium in this kind of a framework is similar to our earlier one.

More sophisticated forms of tenurial systems would give different results. No attempt is however made to pursue the consequences of different systems as that would be contrary to the motivation of the present paper.
V.2. Final remarks

A market characterised by potential risk has an innate tendency to seek another market with which to get interlocked. This is, of course, a consequence of individual rationality, in particular the urge to find insurance in the face of uncertainty. An obvious example of a market with potential risk is the credit market and this was the cornerstone of the above analysis. It is however not true that the credit market is the only one embodying potential risk. A whole range of our economic transactions, including the purchase of consumer goods, entail different degrees of potential risk. In a modern society, large departmental stores and elaborate legal systems are the institutions which provide cover against such risks. In backward regions, interlinked deals are the obvious answer. This is corroborated by an increasing pile of evidence that a broad range of rural transactions are characterised by interlinkage. To that extent my choice of credit and labour markets, for constructing a theory of interlinkage, is purely for reasons of illustration.

REFERENCES


