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THE MARKET FOR LAND : AN ANALYSIS OF

INTERIM TRANSACTIONS

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The Market for Land : An Analysis of Interim Transactions

1. The Problem

In many less developed countries (LDCs) the market for buying and selling land distinguishes itself by its inactivity. It is true that historically the structure of land rights in LDCs has been extremely complex with different people having different kinds of rights on the same plot of land [1/]. But, as Bardhan (1983) points out, "Even with full property rights in land, the market for buying and selling of cultivable land is often rather inactive [2/]. Unless forced by extremely difficult circumstances a resident villager does not usually sell his land"[3/].

Several reasons for this have been discussed in the literature (see, e.g., Chaudhuri, 1975; Bhaduri, 1976). One popular explanation is based on the belief that the possession of land leads to power and prestige. While the belief is probably valid, the explanation is not so. The fact that possession of land leads to power explains why the demand for land is higher and supply lower than one would expect otherwise. Hence, this explains why the price of land is high and not why its turnover is low.

A more satisfactory argument I encountered in a conversation with- not surprisingly - a farmer from Midnapore, in West Bengal. On being asked whether he would sell his land if he got double the 'normal' price, he answered in the negative, arguing that he would not sell because he would not know what to do with so much cash and, unlike land, cash was a risky asset[4/]. I persisted : if he got double the normal price he could buy another larger plot. That, he regretted, is precisely what is not possible. In that region, he explained, land sales were very few - almost non-existent. So there was no guarantee of his being able to buy back land in the immediate future.

If all individuals reason in this way a very interesting possibility arises : Individuals hesitate to sell land because land turnover is low; and it is their hesitation which, in turn, reinforces the low turnover. It is this phenomenon which the present paper tries to model, abstracting, for the sake of clarity, from other features of the market for land[5/].

The above argument is based on the presumption that in LDCs when people sell land (because of a sudden need for cash or because he is getting a good price) they generally intend it to be an 'interim sale'. An interim sale is one where the seller intends to buy back the same commodity (not necessarily the same plot) in the near future. Hence, the model that follows - though developed in the context of land markets - would have relevance for any market in which interim transactions are important. Housing is an obvious example ; labour less so. Some possible applications are discussed below.

2. The Basic Framework

It will be assumed that land is available in indivisible units, with p denoting the price of each unit. At each price the total supply of land, S, is the aggregate of interim supply and 'regular' supply. Interim supply, as just explained, is undertaken with the hope of buying back land in the near future. Regular supply is the conventional once-and-for-all supply - for instance, from those who are planning to migrate or have just learnt about the greater advantages of shares and debentures. In order to focus attention on interim transactions, we shall assume that regular supply, $\hat{S}$, is given simply as :

$$\hat{S} = \hat{S}(p), \quad \hat{S}'(p) \geq 0 \qquad (1)$$

Aggregate demand, D, also has two components. Since interim sales are undertaken with the hope of buying back land, at any point of time there will be some demand for land which arises from interim sales of the near past. This will be referred to as <u>interim demand</u>. <u>Regular demand</u>, on the other hand, is the conventional demand of a fresh buyer. Once again, to keep attention away from the latter, it will be assumed that the regular demand, $\hat{D}$, is given in the following conventional manner :

$$\hat{D} = \hat{D}(p), \quad \hat{D}'(p) \leq 0, \quad \text{and} \tag{2}$$

$$\text{there exists, } \bar{p} \text{, such that for all } p \geq \bar{p},\ \hat{D}(p) = 0.$$

The indivisibility of land, coupled with the fact that individual purchasing power has limits, guarantees the existence of such a price, $\bar{p}$, beyond which demand is zero.

We may now turn to a more detailed analysis of interim supply and demand. Assume there is a set, N, consisting of n individuals each of whom owns one unit of land and who are considering interim sales. Suppose person $i \in N$ has need for liquid money over the following year and let $a(i)$ (≥ 0) be the benefit he derives from each rupee of <u>cash</u>. It may be convenient to imagine that each person, i, has a black box such that if he puts 1 rupee into it now, it emerges at the end of the year as 1 rupee plus $a(i)$ units of benefit. Hence by selling land now he gets a net benefit of $a(i)p$. If i has no need for liquidity, $a(i) = 0$; if it is a drought year, and he needs cash for food, $a(i)$ will be very large. At the end of the year he recovers his solvency and, for simplicity, it is assumed that no further need for liquidity arises (i.e. the black box vanishes). From then on, he would like to hold his wealth for use only at retirement. In keeping with our assumption that land is the safest asset, it will be supposed that everybody would ideally like to hold his wealth in the form of land. This may be formalised by assuming that 1 rupee held as land has a value of 1, while 1 rupee held as cash has a value of $c(i)$ (< 1), for all $i \in N$ [6/].

In order to do away with the complication of time, I will collapse the 'year' in the above description to a 'moment' by assuming that these same benefits (i.e., $a(i)$, for all $i \in N$) accrue by selling land now and putting it in the black box, for just a moment. The trouble is that, once a person encashes (that is, sells) his land, he cannot be certain about being able to immediately buy back land. To keep the algebra simple, I will assume that he is either able to buy back land immediately or not at all. Suppose that an individual considers the probability of being able to buy back land to be ϕ .

Hence, i faces two options : he may sell land, pass money through the black box and then try to buy back land. The net benefit he earns from this option is $a(i)p + \phi p + (1 - \phi)\, c(i)p$. Alternatively, he could play it safe and not sell his land at all. This will ensure that his wealth will be held as land throughout (that is, up to retirement). The net benefit from this option is p . Therefore i will sell land if and only if

$$a(i)p + \phi p + (1 - \phi)\, c(i)p - p \geq 0 \text{ , or}$$

$$d(i) \equiv \frac{a(i)}{1 - c(i)} \geq 1 - \phi \qquad (3)$$

This implies that if the probability of being able to buy back land, ϕ , is high or if the preference for holding wealth as land is low (i.e., $1 - c(i)$ is low) or if the need for liquidity is high (i.e., $a(i)$ is large), then a person would be more likely to sell his land.

Given ϕ , the interim supply of land (which is equal to the total number of people willing to make interim sales) is

$$\#\{i \in N \mid d(i) \geq 1 - \phi\} \equiv T \tag{4}$$

Since those, who make an interim sale, immediately try to buy back land, the interim demand for land equals interim supply and is given by (4). Clearly, therefore, the volume of interim transactions depends on ϕ . Since it is not clear, a priori, as to how people decide what the probability of being able to buy back land, ϕ , is determined, it may be sensible to use alternative assumptions and develop different models.

3. A Model

This is a fixed-price model with excess demand, that is, price is fixed at p where $\hat{D}(p) > \hat{S}(p)$. Since interim supply always equals interim demand, $\hat{D}(p) > \hat{S}(p)$ implies aggregate demand exceeds aggregate supply. Since price is fixed, in this section I shall denote $\hat{D}(p)$ and $\hat{S}(p)$ as, simply, $\hat{D}$ and $\hat{S}$.

The distinguishing feature of this model is the assumption that people take the probability of being able to buy land as given by the ratio of demand and supply or, more precisely, their expectation of this ratio, which may be denoted as $(S/D)^e$. Hence,

$$\phi = \left(\frac{S}{D}\right)^e \tag{5}$$

Since aggregate supply, S , is the summation of regular supply, $\hat{S}$, and interim supply, T ; and similarly for demand, we have

$$\frac{S}{D} = \frac{\hat{S} + T}{\hat{D} + T} \tag{6}$$

The essence of our argument is now transparent. Let sellers conjecture an aggregate supply-demand ratio. That, by (4) and (5), immediately determines the interim turnover, i.e., T, and hence, by (6), the aggregate supply-demand ratio. If this corroborates the initial conjecture, then we have reached an equilibrium. In other words, at equilibrium,

$$\frac{S}{D} = \left(\frac{S}{D}\right)^{e}$$

This, coupled with (4) and (5), gives us

$$T = \#\{i \in N \mid d(i) \geq 1 - \frac{S}{D}\} \equiv T\left(\frac{S}{D}\right) \tag{7}$$

Therefore, equilibrium interim sales is a value of T which solves (6) and (7).

The interesting feature of this model is that there can be many equilibria. In particular, it is quite possible that both high and low turnovers are equlibrium activity levels. I shall merely give an intuitive argument here, since the example below establishes this formally : suppose S/D is lowered from an initial equilibrium level. Then people have less hope of being able to buy back land and so - as is evident from (7) - T is smaller. This, in turn, implies (from (6)) that S/D is lower and the new S/D may, therefore, well be an equilibrium.

The workings of the model are easier to illustrate if we assume that $d(\cdot)$ is defined on the interval $[o,n]$ (instead of merely on the integers in this interval), and suppose that the people are so arranged that $n_1 > n_0$ implies $d(n_1) < d(n_0)$ 7/. Now, the function $T(\frac{S}{D})$ in (7) may be rewritten as

$$T = T\left(\frac{S}{D}\right) = \begin{cases} 0 \quad , & \text{if} \quad d(0) \le 1 - \frac{S}{D} \\ n \quad , & \text{if} \quad d(n) \ge 1 - \frac{S}{D} \\ d^{-1}(1 - \frac{S}{D}) \quad , & \text{otherwise} \end{cases} \tag{8}$$

Hence equilibrium interim sales is a value of T which solves (6) and (8).

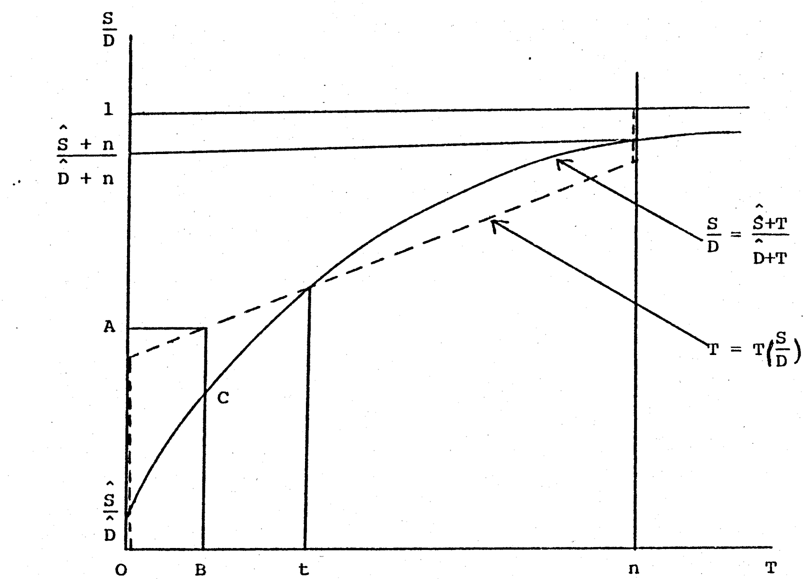

Figure 1

In Figure 1, the smooth curve represents (6), where S/D is the dependent variable. In the same space we represent (8) by a broken line, remembering that in this case T is the dependent variable. If $d(\cdot)$ is continuous, the existence of an equilibrium is ensured: note that the conintuity of $d(\cdot)$ implies the continuity of $T(\cdot)$. If the broken line lies above curve (6) everywhere on (o,n) then $T = O$ is an equilibrium. If it lies everywhere below, $T = n$ is an equilibrium. If it lies somewhere above and somewhere below (which is the case illustrated in Figure 1), then continuity ensures the existence of $t \in (o,n)$ where the two curves intersect and thereby represent an equilibrium point.

To be able to talk about the process by which equilibrium is brought about I shall suppose (ignoring the deeper problems of 'stability') that if at some T, the dotted line lies above (below) the smooth one, T will tend to fall (rise). This is based on the standard 'phase diagram' argument: suppose, to start with, S/D ratio is given by point A. This would result in B interim sales. This would lead the S/D ratio to be lower than A - namely C. This leads to a lower interim sales, and so on. From this discussion it is clear that $T = t$ is an unstable equilibrium. What is interesting and easy to check is that in this model there must exist at least one stable equilibrium.

In the case illustrated in Figure 2 there are three equilibria - at O, t and n. Of these, O and n are stable. Hence, ignoring the unstable case, we could assert that the market would be either very inactive, with zero interim sales, or be very active with n interim sales. Which equilibrium actually occurs or whether there are any institutional factors which make one of these equilibria more likely are issues beyond the ambit of the present investigation, the main aim of which is to demonstrate how hyperactivity and inactivity of land transactions could both be though of as equilibrium situations.

It is of course obvious that different equilibrium configurations are possible depending on the nature of functions (6) and (8). The taxonomy is easy to work out (see Kaldor, 1940 for an analogous taxonomy) and is, therefore, ignored here.

An Example : This example illustrates how the situation depicted in Figure 1 may actually occur.

Let $n = 300$, $\hat{S} = 0$, $\hat{D} = 100$

Let the function $d(\cdot)$ to be as follows :

$$d = \frac{3}{4} - \frac{i}{1200}$$

From (6), we have

$$\frac{S}{D} = \frac{T}{100 + T} \tag{6'}$$

From (8), we have

$$T = \Omega \left\{0,\ 1200 \left[\frac{S}{D} - \frac{1}{4}\right],\ 300\right\} \tag{8'}$$

where $\Omega\{\cdot\}$ is an operator which picks out the middle number, i.e., $\Omega\{a, b, c\} = x$ means x is a, b or c such that $\min\{a, b, c\} \leq x \leq \max\{a, b, c\}$.

Note that if $T = 0$, then $\frac{S}{D} = 0$. And if $\frac{S}{D} = 0$, then by (8'), $T = 0$. Thus $T = 0$ is an equilibrium. It may be checked that there are two other equilibria in this example : $T = 300$ and $T \simeq 40$. Of these, $T = 0$ and $T = 300$ are the obly two stable equilibria. Since $\hat{S}$ is assumed to be zero, in this example we would either expect the equilibrium to settle down at a level of total inactivity with no land sales, or a large activity level with 300 sales.

4. Extensions and Alternatives

The above model is one of no friction and perfect foresight. If $S = D$, then everybody is certain (see (5)) about being able to buy back land. Without being able to fully explain why, we know that in reality the volume of transaction is usually a good indicator of one's chances of being able to make a transaction. Thus when one asserts - as is often done in India - that it is easy to rent a flat in Delhi but not in Bombay, one is not really saying that there is an excess demand for flats in Bombay but not in Delhi. What one is probably saying is that the turnover in Delhi is larger. One way of capturing this is to assume (in contrast to (5) above) that

$$\phi = \phi(S^e), \quad \phi' \geq 0 \tag{9}$$

where S^e is the expected volume of aggregate supply.

If price is fixed at p, and expected total supply is S^e, then actual total supply will be

$$S \equiv \hat{S}(p) + \#\{i \in N \mid d(i) \geq 1 - \phi(S^e)\} \tag{10}$$

Equilibrium is obtained when

$$S = S^e \tag{11}$$

With this alternative specification of the subjective probability function (i.e. (9) as opposed to (5)), it is easy to extend the analysis to one with flexible prices. With flexible prices, at equilibrium, aggregate supply (i.e. (10)) must be equal to aggregate demand. Since interim supply always equals interim demand, this means that regular supply must be equal to regular demand :

$$\hat{S}(p) = \hat{D}(p) \tag{12}$$

Thus a <u>flexible price equilibrium</u> is obtained when (10), (11) <u>and</u> (12) are true.

It is interesting to note that (10)-(12) is a recursive system. The equilibrium price, p^*, is determined entirely by the regular market. Once this is determined, the volume of transactions is determined by the interim sales behaviour (i.e. (10) and (11)).

Once again it is convenient if we assume $d : [o, n] \to R$ and $n_1 > n_0$ implies $d(n_1) < d(n_0)$. Hence, the equilibrium condition may be rewritten as follows. Price, p^*, and interim supply, T^*, comprise a flexible price equilibrium if

$$\hat{S}(p^*) = \hat{D}(p^*), \quad \text{and}$$

$$\left.\begin{aligned} d(T^*) &= 1 - \phi(\hat{S}(p^*) + T^*) \\ \text{or,} \quad T^* &= 0 \text{ and } d(0) < 1 - \phi(\hat{S}(p^*)) \\ \text{or,} \quad T^* &= n \text{ and } d(n) > 1 - \phi(\hat{S}(p^*) + n) \end{aligned}\right\} \tag{13}$$

It is easy to check that if $d(\cdot)$ and $\phi(\cdot)$ are continuous, the existence of an equilibrium (in fact, a stable one) is guaranteed. The reasons are analogous to the ones used in section 3 and can be reconstructed using Figure 2 which is self-explanatory. Note that p^* is solved by the regular-market conditions, i.e., (12), and then used to derive the curves in Figure 2.

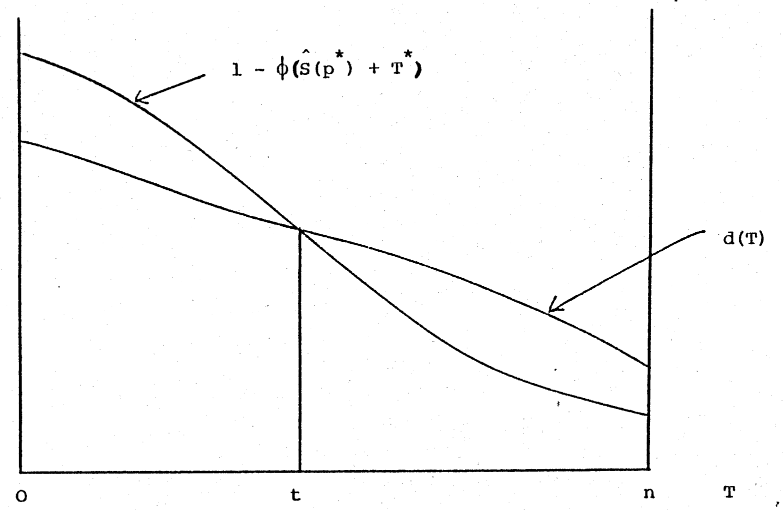

Figure 2

The figure depicts a case with three equilibria, at o, t and n.

While the subjective probability function used in this model, i.e. (9), is in some ways more realistic than (5), it has an important analytical lacuna. Given (9), it is possible to have (i) $S = D$ and (ii) $\phi(S) < 1$. (i) and (ii) are, however, difficult to reconcile. (i) is usually taken to assert that all those who want to buy land can do so. In that case, it is difficult to see why individuals feel that the probability of being able to buy land, $\phi(S)$, is less than 1. One way of reconciling (i) and (ii) (and thereby making (9) acceptable) is to interpret (i) differently. We could assume that it merely says that intended supply equals intended demand, though because of friction, not every buyer (seller) necessarily finds a seller (buyer). A direct use of this approach would run into difficulties as not much is known about markets with this kind of friction, other than their widespread existence. Also, we would have to cope with the problem of uncertainty about being able to sell land, in addition to the uncertainty about being able to buy. However, this is a line which may be worth pursuing in future.

5. Welfare Implications

Between a high-activity equilibrium and a low-activity equilibrium, which one is socially more desirable ? Given the partial equilibrium nature of our model, no more than some tentative remarks are possible. By using the example in section 3, I shall try to sketch the kind of considerations that go into evaluating alternative equilibria.

Consider the high-turnover equilibrium (T = 300) - using E_H to denote it and compare it with the low-turnover equilibrium (T =0) which I shall denote E_L. At E_H, 300 people sell their land. Since at equilibrium $\phi = 3/4$, of these 300 people, 225 manage to buy back land and 75 do not. These 75 are clearly worse off than they would have been at E_L. But, for these 75 people who have lost land and are forced to hold cash, there must exist 75 people who have got land. So the net benefit on this could could be more or less depending on the interpersonal valuation of land. If the variations in such valuation are small, it may not be too wrong to suppose that the net benefit here cancels out with 75 people losing and 75 people gaining. Consider now the 225 people who sell land and manage to buy back. For one such person i, the net benefit of being in E_H compared to E_L is a(i). Let $\bar{a}$ be the average of the a(i)'s of those 225 people. Then their net gain in E_H is $225\bar{a}$. Since the loss of the other 75 people could be supposed as approximately offset by the gains of those who acquire their land, we may suppose that the net gain to society of being at E_H is $225\bar{a}$.

Moving away from the specific example, if we consider a case where there are two equilibria - one more active than the other, we may suppose the active equilibrium is more advantageous with its additional benefit equalling the sum of a(i)'s of all i who sell and buy back land in the active equilibrium minus the sum of those who sell and buy back land in the inactive equilibrium.

What is interesting to observe is the nature of the benefit that confers with larger interim sales. Recall that a(i) is the advantage that i gets from liquidity, that is, from being able to cash his land asset temporarily. Thus a higher land turnover confers the same benefit which comes with greater liquidity. Thus, in some sense, the benefit of a high turnover is similar to the benefit of having more credit in an economy. In the absence of a high turnover, unless a person's need for cash is very high - i.e., a(i) very large - he does not sell his land. He tries, instead, to manage without this liquidity.

6. An Application : Recessions and Lay-offs

Interim transactions are significant in several markets and hence our model, in abstraction, could be applicable beyond the market for land. An obvious application is to the decision-making of firms over business cycles. During a cycle, firms often have to take decisions (regarding, for instance, the buying and selling of inputs) which they know they will soon have to reverse, when the cycle turns. The decisions are therefore interim ones and they bring with them some of the considerations discussed in this paper.

Consider the problem of lay-offs. During the trough of a business cycle. ideally firms would like to lay-off workers. But knowing that this is an usual business cycle, the firms will be aware that they will soon have to rehire labour. And, as with all interim transactions, their decision to lay-off will crucially depend on how good they reckon the chances are of being able to rehire workers. If these are poor, they may not lay-off workers even though there is not enough work for them. As Kornai (1983, p.67) argued, "If there are shortages, supplies are uncertain. If supplies are uncertain, it is only rational behaviour to hoard inputs ... You don't fire workers because maybe you can't find replacements tomorrow ... It is all a vicious circle".

To formalise this very simply assume that there are 100 firms and 700 labourers. All firms produce the same good using the same fixed coefficient technology. By suitable choice of units we could assume that 1 unit of labour (the sole factor of production in this model) produces 1 unit of output. It is a fix-price model and the price of the good, p, is 5 and the wage rate, w, is 2. Prices being fixed, markets are cleared by rationing. Each business cycle consists of two periods : a slump and a boom. During a boom each firm finds that it can sell up to 10 units of output and during a slump it can sell up to n units. It will be assumed that $n < 7$. Hence, during a slump the total need for labour $(100n)$ will be less than the total supply of labour $(700 = 100 \times 7)$, and during a boom there is excess demand for labour, since total labour demand (10×100) is greater than labour supply (700).

Suppose, to start with, each firm has 7 labourers. The period now confronting the firms, i.e. period 1, is a slump period and this will be followed by period 2 - the boom. If each firm was sure of being able to hire as many labourers at it needs in period 2 (namely 10 labourers) it would employ n labourers in period 1. In other words it would lay-off $7 - n$ workers, and the total lay-off unemployment would be $(7 - n)100$. But of course firms are aware that period 2 will be a period of excess demand for labour and by laying-off in period 1 it may suffer in period 2 for want of more workers. Consequently, it may not wish to lay-off $7 - n$ workers in period 1. Let us denote the number of workers employed by firm i in period 1 by n_1^i. What we want to analyse here is the determination of n_1^i.

It seems reasonable to assume that the firm's decision to lay-off would depend on its expectation of total lay-off, i.e. unemployment, in period 1 [8/]. If this is high, it would expect rehiring in period 2 to be easy and would therefore be more prone to lay-off unwanted labour in period 1. Thus high aggregate lay-off encourages high individual lay-off and thus get corroborated. It is the same for low aggregate lay-off. This gives rise to the possibility of multiple equilibria. Let us formalise this now.

Let U be the unemployment level in period 1 (U is also the total lay-off in period 1, since, to start with, there is full-employment in our model).

$$U = 700 - \sum_{i=1}^{100} n_1^i$$

Let V be the number of vacancies at the beginning of period 2. Since in period 2 each firm wants to employ 10 labourers,

$$V = 1000 - \sum_{i=1}^{100} n_1^i$$

Clearly not all vacancies can be filled. Let us make a very simple assumption about the success rate of firms. Assume that each firm takes U and V to be parametrically given and expects to be able to fill up

U/V of its vacancies. Hence firm i's expected level of employment in period 2, n_2^i, is given by

$$n_2^i = (10 - n_1^i)\frac{U}{V} + n_1^i$$

Note, firm i's profits in periods 1 and 2, denoted by π_1^i and π_2^i, are given by :

$$\pi_1^i = p \min\{n, n_1^i\} - wn_1^i$$

$$\pi_2^i = (p - w)\left[(10 - n_1^i)\frac{U}{V} + n_1^i\right],$$

It is easy to check that it is never worthwhile choosing n_1^i to be less than n. Hence $\min\{n, n_1^i\} = n$. Substituting the values of p and w, we see that firm i's total profit, $\pi^i (\equiv \pi_1^i + \pi_2^i)$ is given by

$$\pi^i = 5n - 2n_1^i + 3\left[(10 - n_1^i)\frac{U}{V} + n_1^i\right],$$

or
$$\pi^i = 5n + 30\frac{U}{V} + \left[1 - 3\frac{U}{V}\right]n_1^i \tag{14}$$

The firm's aim is to maximise π^i subject to $n_1^i \in [n, 7]$. As pointed out above, it is never profitable to choose n_1^i below n. Since, to start with, there is full employment, it is assumed that firms cannot hire more labour than they have. This explains why n_1^i is constrained to within $[n, 7]$.

It is obvious from (14), that if $\left[1 - 3\frac{U}{V}\right]$ is positive, the chosen n_1^i is 7 and if $\left[1 - 3\frac{U}{V}\right]$ is negative, n_1^i is n.

Suppose, no one lays off labour. Then $U = 0$, and, hence, $U/V = 0$. Hence $n_1^i = 7$, i.e. firm i does not lay-off any labour. Since all firms are identical, no one lays off labour and this confirms the intial conjecture $U/V = 0$. Hence $U = 0$ is an equilibrium.

Alternatively suppose every firm expects all firms to go in for maximum lay-off. Then $\frac{U}{V} = \frac{7 - n}{10 - n}$. Therefore $1 - 3\frac{U}{V} = 1 - 3\left[\frac{7 - n}{10 - n}\right]$. The sign of this depends on n. If $n < 5.5$ then $n_1^i = n$. If $n > 5.5$, then $n_1^i = 7$. These may be summed up in a chart showing the optimum n_1^i under different configurations.

	n	
	less than 5.5	more than 5.5
zero unemployment expected	$n_1^i = n$	$n_1^i = n$
maximum unemployment expected	$n_1^i = n$	$n_1^i = 7$

Hence if $n < 5.5$, then there is only one equilibrium, namely one involving a total lay-off of 700-100n. If $n > 5.5$, there are two equilibrium lay-offs : zero and 700-100n. This means that recessions may not be reflected at all by the level of unemployment. Despite slackness in demand, firms may not lay-off any labour. There is another interesting way of looking at this result. Suppose firms always expect maximum lay-off during recessions, and recessions can be of differing magnitude - a deeper depression being reflected in a smaller n. As is then obvious from the above chart, small depressions would not be reflected on the labour market. But if the depression goes beyond a certain critical level (in our example $n \leq 5.5$) then suddenly there will be massive redundancies in the labour market.

These are the results we get from our specific example. As was earlier pointed out, in interim markets a large variety of possibilities can arise depending on the parameters of the model. While it would be out of place in this paper to pursue such variants, it is a direction worth pursuing. It could give insights into the short-run business cycle and open up interesting policy questions of how to engineer an economy into one equilibrium rather than another given the possibility of multiple equilibria during a recession as demonstrated above.

Footnotes

1. Writing about land rights in East Bengal under the Permanent Settlement of 1793, Raychaudhuri (1969, p.163) notes, "... rights of the various categories of interest in land were enmeshed in an incredible maze of crisscross relationships so that it is impossible to determine with any precision who was who or what was whose. Descriptions in the settlement reports indicate that those who owned land very often did not know what land it was they owned, and those who cultivated land often did not know the title or estate of their landlords."

2. (My footnote) It is important to clarify that the market for <u>renting</u> land is far from inactive in LDCs. All references to the market for land in this paper are to the market for full land rights.

3. That the selling of ones land is a last resort in situations of distress has been widely noted. In devising an empirical test for fertility behaviour, Cain (1981), in fact, treats this as axiomatic.

4. This view has had more scholarly adherents than my Midnapore farmer. Thus Raj (1970, p.1) observes, " [Land] is the main form in which wealth is desired to be held in these economies. ... In societies exposed to various kinds of risk, ... land is an attractive asset to hold even if the pecuniary rate of return on the investment happens to be low." In a historical context, Chaudhuri (1975) argued that land was the most convenient form of wealth because "of the very limited existence of 'other objects of speculation or investment' and also in view of land possessing 'the quality of immovability' - ' a very desirable quality when the system of police was defective, and the possession of valuable moveables was sure to tempt the cupidity of the numerous gangs of dacoits, which infested the country' " (the sub-quotes are from Field,1884). It would, however, be an error to suppose that this was always the case. In India, before the establishment of British rule, land was in fact a very risky asset because of the absence of clear titles and rights. As Bernard Cohn (1969, p.82) observed, "One needed military force to support a claim to land and had to be willing to fight for it."

5. No attempt is made to deny that there may be other valid reasons for the inactivity of land markets. For instance, it is quite reasonable to expect that asymmetric information, as in Akerlof's (1970) used-car markets, plays a significant role.

6. Suppose i expects to retire and cash his assets after t years, he has no time discount and he expects prices to remain unchanged. While land has no decay, cash has an expected decay rate of 100b $(b > 0)$ per cent per annum (perhaps because of expected thefts). In this case the value of holding land is p and the value of holding cash, instead, is $p/(1 - b)^t$. Using this interpretation $c(i) = (1 - b)^t$. In my model, however, I treat $c(i)$ as a 'primitive'.

7. I am ruling out the possibility of two persons having the same d's. This is a harmless assumption.

8. Problems of adjustment cost or the costs of employing new hands in place of old ones - issues which have been discussed in the considerable literature on lay-offs (see, e.g., Baily, 1977) - are being ignored here.

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