Tenant Characteristics and the Choice of Tenurial Contracts in Rural India*

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Abstract

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JEL Classification: 012, C35, J43

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Abstract

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1. Introduction

Tenancy relationships in agriculture can be classified into two broad categories. (1) Owner cultivation where the landowner cultivates the land himself with hired labour paid on the basis of a fixed hourly or daily wage rate. (2) Land lease where the land owner leases the land out to a tenant and in turn asks for either (a) a fixed up front rental payment (fixed rent contract) or (b) a pre-determined share of the output (sharecropping) (or sometimes a combination of both (a) and (b)). One often observes all three contractual forms co-existing in close proximity. Shaban (1987) in his study of eight Indian villages finds different contractual forms on adjoining plots of land.

There exists a large body of literature, which addresses the issue of land tenure contracts. See Singh (1989), for a comprehensive survey.[1] There are two issues here. The first is the co-existence of all three forms of contract. Why do we not observe the same contract in a given region or the same contract for a given landlord? The second issue deals with the choice of sharecropping contracts. Here the debate revolves around the Marshallian view that sharecropping is inefficient since it distorts the incentives to provide effort and other inputs as opposed to the Cheungian view that if effort levels are enforceable then sharecropping is efficient as well. Basu (1984, 1996) provides an excellent overview of the salient issues. As he points out, in the Cheungian analysis of sharecropping, which assumes enforceable effort, sharecropping and fixed-rent contracts are analogous.

The co-existence of multiple contracts is often explained by appealing to the so-called "screening models of agricultural tenancy"(see Hallagan (1978), Allen (1982, 1985), Eswaran and Kotwal (1985) among others). The main insight of the screening models is the following. If a landlord is faced with workers of various skill levels and the landlord is incompletely informed about the same then the landlord should offer a menu of contracts. Such menus would consist of hiring the lowest skill workers for fixed wage, the intermediate ones as sharecroppers and the highest skilled ones on the basis of cash-rent. However since the skill level of an agent is private information, the landowner has to use some observed

[1] Similar issues arise in other areas as well – the best example would be business format franchising. See Lafontaine (1992) and Bhattacharyya & Lafontaine (1995). Hsiao, Nugent, Perrigne & Qiu (1998) talk of

characteristic of the worker as a proxy for the skill level. The best proxy for skill is likely to be the age of the agent. The idea is nothing new. A version of this was alluded to Spillman (1919) in his "agricultural ladder" hypothesis where he argued that the youngest agents would be employed as wage labourers, the oldest would be employed as cash renters while those in the middle would be employed as sharecroppers.

In this paper we undertake an empirical investigation of this theoretical postulate using data from rural India. While the Marshall versus Cheung debate about the inefficiency of sharecropping has received a lot of attention, less attention has been given to analysing the co-existence of multiple contracts. To the best of our knowledge the only paper that has examined the existence of co-existence of multiple contracts is Allen & Lueck (1992) who use data from the U.S. Midwest. Our paper uses data from three Indian villages to map from the set of agent and plot characteristics to the set of contracts offered on each plot. The empirical strategy we use is as follows. We look at the contract offered on each plot of land. If the screening model of agricultural tenancy holds, we expect to see tenancy contracts (fixed-rent or sharecropping) for high type agents. That raises the obvious question how do we identify the type of an agent? One proxy for a high type worker is years of farming experience. But lacking data on years of farming experience, we use the tenant's age and the square of his age as the proxy for experience and type.[2] We expect older tenants to be offered tenancy contracts and younger tenants to be offered wage contracts. Our regression results are fairly consistent with theory and we find that a one-year increase in the age of the agent is associated with a 7% increase in the probability of being offered a tenancy contract.

The rest of the paper is organised as follows. Section 2 describes the econometric framework that we will use. Section 3 presents the estimation results and Section 4 concludes.

2. Econometric Methodology

Contract choice is modelled as a binary choice problem. The landlord has to decide whether to cultivate the plot on his own (using hired labour) or lease it out to a tenant. We define a variable *TENANT* such that

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similar issues in the Chinese Township and Village Enterprises. Alston, Dutta & Nugent (1984) discuss crop sharing in 19th century cotton production in the US.

[2] This is common in both the labour and development literature.

$$TENANT = \begin{cases} 0, \text{ if the plot is cultivated by the owner} \\ 1, \text{ if the plot is cultivated by a tenant} \end{cases}$$

Let us assume that there is an underlying response variable $TENANT^*$, which is unobservable and has a linear specification of the form

$$TENANT^* = \beta X + u, u \sim IN\left(0, \sigma_u^2\right) \quad (1)$$

While $TENANT^*$ is not observable what we do observe is a dummy variable *TENANT* such that

$$TENANT = \begin{cases} 0, \text{ if } TENANT^* \leq 0 \\ 1, \text{ otherwise} \end{cases}$$

The probability that *TENANT = 0* (the land is cultivated by the owner herself) is $\Phi(-\beta X)$ while the probability that *TENANT = 1* (the land is cultivated by a tenant) is $\Phi(\beta X)$ giving us the log likelihood function

$$L(\beta) = \sum_{TENANT=0} \ln \Phi(-\beta X) + \sum_{TENANT=1} \ln \Phi(\beta X)$$

Indexing plots by *p* and households by *h*, the estimating equation is

$$TENANT_{ph} = \beta_0 + \beta_1 X_{1h} + \beta_2 X_{2p} + u_{ph} \quad (2)$$

Here X_{1h} represents household characteristics and X_{2p} represents plot characteristics.

There is a second stage to this problem. Once the landlord has decided to lease out the land she has to decide whether to lease it out on the basis of a fixed rent contract or a sharecropping contract. Define a variable *TENANT2*, such that

$$TENANT2 = \begin{cases} 0, \text{ if the plot is under fixed rent} \\ 1, \text{ if the plot is under sharecropping} \end{cases}$$

Let us assume that the underlying response variable for *TENANT2* is $TENANT2^*$ which has the form

$$TENANT2^* = \gamma Z + e, e \sim IN\left(0, \sigma_e^2\right) \quad (3)$$

As in the first stage the estimating equation can be written as

$$TENANT2_{ph} = \gamma_0 + \gamma_1 Z_{1h} + \gamma_2 Z_{2p} + e_{ph} \quad (4)$$

where Z_{1h} represents household characteristics and Z_{2p} represents plot characteristics.

The problem is that *TENANT2* is observed only when *TENANT = 1*, and so at the second stage of the problem, we have a censored sample. Since TENANT2 is not a continuous variable, the standard Heckman's two-step procedure to correct for sample selection will not lead to consistent estimates. However (1) and (3) together constitute a bivariate qualitative dependent variable model that is characterised by partial observability. The set-up is as follows:

$$TENANT^{*} = \beta X + u, TENANT = \begin{cases} 0, \text{ if the plot is cultivated by the owner} \\ 1, \text{ if the plot is cultivated by a tenant} \end{cases}$$

$$TENANT2^{*} = \gamma X + e, TENANT2 = \begin{cases} 0, \text{ if the plot is under fixed rent} \\ 1, \text{ if the plot is under sharecropping} \end{cases}$$

and *TENANT2* is observed only when *TENANT = 1*.

The model is one of partial observability, because we only observe three possible outcomes

(1) *TENANT = 0*

(2) *TENANT = 1, TENANT2 = 0*

(3) (3) *TENANT = 1, TENANT2 = 1*.

The corresponding log likelihood function for the sample of $P, (p = 1...., P)$ plots and $H(h = 1,...., H)$ households can be written as (see Meng & Schmidt (1995))

$$L(\beta, \gamma; \rho) = \sum_{h} \sum_{p} \begin{bmatrix} TENANT_{ph} TENANT2_{ph} \ln F(\beta X_{ph}, \gamma Z_{ph}; \rho) + \\ TENANT_{ph}(1 - TENANT2_{ph}) \ln[\Phi(\beta X_{ih} - F(\beta X_{ph}, \gamma Z_{ph}; \rho))] \\ + (1 - TENANT_{ph}) \ln[1 - \Phi(\beta X_{ih})] \end{bmatrix} \quad (5)$$

where $F(.)$ and $\Phi(.)$ denote the bivariate standard normal cumulative distribution function and the univariate standard normal cumulative distribution respectively. Estimates of the parameters are obtained by maximising the log likelihood function in equation (5). The joint approach accounts for the potential correlation between the two error terms $\rho_{u.e}$ and corrects for potential bias in sample selection that would be incurred by estimating (1) and (3) separately.

However in running these regressions we found that the correlation coefficient between the two-error terms *u* and *e* $(\rho_{u.e})$ is not significant. This implies that the error terms

from equations (1) and (3) are not correlated and hence we could estimate the equation for *TENANT2* separately by running a binary probit. However one might note from Table (1) that only 23 of the 1235 plots are cultivated under fixed rent tenancy. So *TENANT2 = 0* for only 23 (12.6%) of all plots under tenancy. Hence the results for *TENANT2* must be interpreted with some reservation (irrespective of how we estimate). We estimate *TENANT2* given the above caveat.

The vector of explanatory variables consists of household and plot-level characteristics. Household characteristics include the following: age, sex and marital status of the household-head (*AGE*, *AGESQ*, *SEX*, *MARITAL*). The age of the household head and the square of the age (AGESQ) will be our proxy for the level of experience of the tenant. We also include dummies for the disability status of the adult members in the household (*MALEILL* and *FEMILL*)[3] and the amount of outstanding debt of the family (*CREDIT*). The regressions also control for the composition of each household and also include village dummies to account for other unobserved heterogeneity.[4]

Plot characteristics include value of the plot in rupees (*VALUE*), dummies for the main source of irrigation (*IRRD0*), and for alternative soil types (*SOILD1*, *SOILD3*, *SOILD5*, *SOILD6*) and the percentage of total cultivated area that is irrigated (*IRR*).[5] *VALUE* is the monetary value of a plot and is a proxy for land quality. Per-acre estimated value of the plot in Rs. 100 were recorded based on information obtained from either the patwari (land assessor) or some other knowledgeable person in the village. While recording the value of the plot, potential sale value of the plot, location of the plot, irrigation and topography are taken into account. [6]

However the data poses one problem. We have data for cultivating households – which could be the landlord (when the plot is under owner cultivation) or the tenant (when the plot is under tenant cultivation). For the empirical analysis to be consistent with the theory, we need only agent characteristics. We have the following regression

[3] The reference category is that an old member of the household is ill (OLDILL).
[4] See Table A1 in the appendix for a description of the dummy variables.
[5] SOILD2 is the reference dummy in case of soil type.
[6] Table 1 (below) presents some relevant summary statistics for both the agent and plot characteristics used as explanatory variables in our regressions.

$y = \beta X + u, X = [1, X_1, X_2]$. Here X_1 are agent characteristics and X_2 are plot characteristics. The data has the following structure:

	Y	X_1: Agent Characteristics	X_2: Plot Characteristics	N
Owner Cultivated Plots	y_A	-	X_{2A}	N_A observations with missing X_{1A}
Tenant Cultivated Plots	y_B	X_{1B}	X_{2B}	N_B complete observations

What we have here is that only some of the observations on some of the variables are missing - what is missing is agent characteristics on plots cultivated by the owner.[7] We can increase the efficiency of our estimates by using some additional information that we have. We do not have one to one mapping of hired workers on owner-cultivated plots. Instead of X_{1A} (which is missing) we use the village-year average of household characteristics of households who participate at least once (during the year) as farm labour, in the daily wage labour market. These are the set of households who act as hired labour on owner-cultivated land.

3. Results

We use data provided by the International Crops Research Institute for Semi Arid Tropics (ICRISAT). The data was collected as part of ICRISAT's longitudinal Village Level Survey. While data exists for the villages of Aurepalle, Shirapur & Kanzara over the periods 1975 – 1984 the labour market data exists only for the period 1979 – 1984 and this is the period that we use in our analysis. The three villages of Aurepalle, Shirapur and Kanzara are situated in south-central India and are predominantly agricultural with more than 94% of the households dependent on agriculture as the main source of income (either as cultivators or as farm labourers). Even by Indian standards these villages are poor with a monthly per capita income of Rs. 700 (averaged over the survey period at 1977 prices) compared to the All-India

per capita monthly income of Rs 1080 using the same base year. The data is a stratified sample of 40 randomly chosen households in each village, 10 in each of the four categories: (1) large farmers owning more than 3.2 acres in Aurepalle and more than 5.3 acres in Shirapur and Kanzara; (2) medium farmers owning between 1.2 and 3.2 acres in Aurepalle, between 2 and 5.3 acres in Shirapur and between 1.8 and 5.3 acres in Kanzara; (3) small farmers owning between 0.2 and 1.2 acres in Aurepalle, between 0.2 and 2.0 acres in Shirapur and between 0.2 and 1.8 acres in Kanzara; and finally (4) landless laborers who own less than 0.2 acres. The richness of the data from these surveys, both in terms of the breadth of information conveyed and the level of detail pertaining to each aspect of household decision making is amply illustrated by the numerous studies that have been conducted by economists around the world using this data set. Walker & Ryan (1990) and Singh, Binswanger & Jodha (1985) provide details of the region and the survey. Selected descriptive statistics are presented in Table 1.

Table 1:
Selected Descriptive Statistics

	Entire Sample			Plots Under Tenancy		
Variable	**N**	**Mean**	**Count**	**N**	**Mean**	**Count**
AGE	1235	48.66		210	49.71	
AGESQ	1235	2488.94		210	2548.19	
TOTMAL	1235	2.13		210	1.94	
TOTFEM	1235	1.75		210	1.81	
TOTCHILD	1235	2.97		210	2.86	
TOTOLD	1235	0.44		210	0.23	
CREDIT	1235	4192.56		210	3976.02	
SEX	1235		1168 (= 0)	210		201 (= 0)
			67 (= 1)			9 (= 1)
MARITAL1	1235		131 (= 0)	210		15 (= 0)
			1104 (= 1)			195 (= 1)
MALEILL	1235		1066 (= 0)	210		187 (= 0)
			169 (= 1)			23 (= 1)
FEMILL	1235		1224 (= 0)	210		209 (= 0)
			11 (= 1)			1 (= 1)
VALUE	1235	1906.8		210	1624.29	
IRR	1235	8.79		210	2.14	

[7] This is the ignorable case in missing data problems.

Our interest is in investigating the nature of the contract under which each plot is cultivated and to this end we examine data from each plot of land under cultivation. We will use data for 375 plots of land in Aurepalle, 256 plots in Shirapur, and 604 plots in Kanzara, giving us data on a total of 1235 plots of land.

Table 2 presents the distribution of ownership status across villages. As is clear from the Table, 83% of plots are under owner cultivation, and only 23 out of the total 1235 plots are under fixed rent cultivation. The rest are under sharecropping. Except in Shirapur where 65% of the plots are owner cultivated and the remaining 35% are under sharecropping, there is a preponderance of owner cultivation in the other two villages of Aurepalle and Shirapur.

Table 2:
Number of Plots, Classified by Ownership Status

Ownership	**Aurepalle**	**Shirapur**	**Kanzara**
Owner-operated (Wage)	344 (91.73%)	165 (64.45%)	516 (85.43%)
Fixed-rent	13 (3.47)	0	10 (1.66%)
Share-cropping	18 (4.80%)	91 (35.55%)	78 (12.91%)
Total under Tenancy	31 (8.27%)	91 (35.55%)	88 (14.57%)
Total	*375*	*256*	*604*

In Table 3 we present the results from the first stage binary probit for *TENANT*, using equation (3.1). Column (2) contains the estimated coefficients and column (3) the standard errors, calculated robustly to account for arbitrary heteroskedasticity. A positive sign on the estimated coefficient indicates that the variable increases the probability that the plot is under tenant cultivation, while a negative sign indicates that the variable increases the probability that the plot is under owner cultivation. An average plot has a 12% probability of being under tenant cultivation.

Looking at the household characteristics, we see that an increase in the age of the head of the agent household (*AGE*) increases the probability that the plot is under tenancy. The marginal results (not presented in the paper) show that a year increase in *AGE* increases the probability of the plot being cultivated by the tenant by 7%. As we have argued, the age of the agent is a measure of his experience. This implies that experienced agents are more likely to be employed as tenants. Notice that the square of the age (*AGESQ*) is negative. This implies

that there is some non-linearity in the relationship between the age of the household head and the probability of the plot being under the cultivation of the tenant. So for older agents, the probability of being a tenant actually decreases. However, given the average age of 48.6 years for tenants, we believe that we are operating in the upward sloping part of the agents' productivity curve. Finally *CREDIT* is positive and significant. So an increase in outstanding household debt leads to an increase in the probability that the agent is hired as a tenant. We will come back to this issue later.

Table 3:
First Stage Maximum Likelihood Probit Results for Cultivation Status

Variable	Coefficient	Robust Standard Error
CONSTANT	-14.11*	1.69
AGE	0.38*	7.08E-02
AGESQ	-3.17E-03*	7.47E-04
SEX	1.93*	0.63
MARITAL	2.31*	0.39
TOTMAL	-0.41*	0.13
TOTFEM	0.15	0.13
TOTCHILD	0.47*	6.29E-02
TOTOLD	-1.60*	0.2
MALEILL	0.66	0.39
FEMILL	-1.11	1.17
CREDIT	2.32E-04*	3.35E-05
IRRD0	9.25E-02	0.39
SOILD1	-0.34	0.31
SOILD3	0.62*	0.15
SOILD5	-3.97E-01*	0.19
SOILD6	-0.39*	0.23
VALUE	-1.196E-04*	6.20E-05
IRR	-0.83	4.50E-01

Notes:
Dependant Variable: *TENANT*:
TENANT = 0 if the plot is under owner cultivation, 0 otherwise
*: Significant using the 95% confidence interval
N = 1235
$\chi^2(18) = 455.29$*
Pseudo $R^2 = 0.4$
Log Likelihood = -335.27
Restricted Log Likelihood = - 562.91
Using village-year average for household characteristics of owner operated plots.

Turning to plot characteristics, we find that if the plot has excessive gravel content (SOILD6) then the probability that the plot is cultivated by a tenant goes down. Plots

characterised by gravelly soil are likely to be difficult to cultivate and it might be difficult for owner to lease out such a plot. The most interesting result concerns the sign and significance of *VALUE*, which is a measure of the land quality of a particular plot. We find that the coefficient of *VALUE* is negative and significant which implies that an increase in plot quality reduces the probability of the plot being cultivated by a tenant. This also implies that the owner prefers to cultivate the higher quality plots rather than leasing them out to be cultivated by tenants. We will come back to this issue shortly. One could argue that the value of a plot is determined (at least partly) by the soil type of that plot and hence it is meaningless to include both the soil dummies and the value of the plot as explanatory variables. Therefore we examined an alternative specification where we included only *VALUE* and excluded all the soil dummies. We do not report the results, because the results remain the same - *VALUE* is still negative and significant, which implies that an increase in the quality of a particular plot reduces the probability of the plot being cultivated by a tenant. Note that the irrigation dummy (*IRRD0*) is not significant, neither is *IRR*, the proportion of the plot that is irrigated.[8]

Table 4:
Second Stage Maximum Likelihood Probit Results for Tenancy Status
No Sample Selection

Variable	Coefficient	Standard Error
CONSTANT	67.05	270.45
AGE	-2.41**	1.67
AGE2	2.18E-02	1.58E-02
SEX	-1.58	208.58
MARITAL	-5.43	161.81
TOTMAL	-0.92*	0.45
TOTFEM	0.51	0.68
TOTCHILD	0.66	0.56
TOTOLD	2.16	4.81
MALEILL	6.00	5.73
FEMILL	-2.9	501.12
CREDIT	-1.12E-04*	5.91E-05
IRRD0	4.42	2.13E+02
SOILD1	5.87	8.81E+01
SOILD3	-2.14	1.31
SOILD5	-8.77	6.04

[8] The FIML estimates of TENANT are presented in Table 5. The results are similar to those obtained from the binary probit in stage 1. This is not surprising since the FIML estimates do not provide any additional information given that $\rho_{u,e}$ is not significant. We do not discuss the FIML estimates.

SOILD6	2.07	71.12
VALUE	2.14E-03*	1.03E-03
IRR	-0.82	232.91

Notes:
Dependant Variable: *TENANT2*:
TENANT2 = 0 if the plot is under fixed rent, 0 otherwise
*: Significant using the 95% confidence interval
N = 210
$\chi^2(18) = 101.54$*
Pseudo $R^2 = 0.7$
Log Likelihood = -21.79
Restricted Log Likelihood = - 72.56

Next, we turn to the second stage where we try to identify factors, which affect the choice between fixed rent and sharecropping. As we mentioned already, we present two sets of results. In Table 4 we present the results from the simple binary probit for *TENANT2*, where we do not correct for sample selection. In Table 5 we present the FIML results from the joint estimation of *TENANT* and *TENANT2* where we correct for sample selection.

Table 5:
FIML Estimation of Cultivation Status and Tenancy Status

Variable	**Coefficient**	**Standard Error**
Selection Model		
CONSTANT	17.66	12.75
AGE	-0.45	0.31
AGESQ	2.47E-03	2.07E-03
MARITAL	-3.75	3.62
MALEILL	3.67*	1.75
CRED	-4.72E-05	6.76E-05
SOILD3	0.77	0.66
SOILD5	-1.29	1.25
IRR	-0.04*	0.02
VALUE	1.88E-03**	1.03E-03
Full Model		
CONSTANT	-14.05*	4.59
AGE	0.39*	0.20
AGESQ	-3.43E-03	2.10E-03
SEX	1.93	1.23
MARITAL	2.39*	0.75
MALEILL	0.50	0.55
FEMILL	-0.31	2.89
CREDIT	2.19E-04*	3.38E-05
IRRD0	-0.16	0.30
SOILD1	-0.51	0.34
SOILD3	0.28	0.18

SOILD5	-0.07	0.23
SOILD6	-1.13*	0.24
IRR	-0.01*	3.61E-03
VALUE	-1.57E-04*	9.70E-05
μ	0.61	0.96
ρ	0.54	0.67

Notes:
*: Significant using the 95% confidence interval
N = 1235
Number Censored: 1025
Number Uncensored: 235
Log likelihood: -351.98
$\chi^2(14) = 109.69$*
Wald Test for $\rho = 0$: $\chi^2(1) = 0.40$
The regressions also controls for household composition and includes village dummies to account for unobserved heterogeneity

As noted before the correlation coefficient between the two-error terms u and e $(\rho_{u,e})$ is not significant. Hence a binomial probit in stage 2 is a good benchmark in this situation. As we see from Table 4, *AGE*, *AGESQ*, *VALUE* and *IRR* significantly affects $\Pr\{TENANT2 = 1 \mid TENANT = 1\}$. First *AGE* is negative and significant. This implies that a household where the head is more experienced is less likely to be offered a sharecropping contract. *VALUE* is positive and significant implying that as the value of a plot increases, the conditional probability, that it is cultivated by a share-tenant, increases. See Dean & Lueck (1992) for a similar result. Finally *CREDIT* is negative and significant.

Looking at the results from the FIML (Table 5) estimates, we see that very few explanatory variables significantly affect the probability of the plot being cultivated by a share tenant (conditional on the plot being cultivated by a tenant). In particular the age of the household head has no effect on the type of tenant choice. An increase in the value of the plot however significantly increases the probability that the plot is under shared tenancy.

Our analysis provides a link between the experience of the agent and the type of contract offered. We see from Table 3 that tenancy contract are offered to agents who are more experienced (*AGE* is positive and significant). From Table 4 however we find that *AGE* is negative and significant – conditional on the agent being offered a tenancy contract, less experienced tenants are offered a sharecropping contract.

The sign and significance of *CREDIT* and *VALUE* in steps 1 and 2 require further explanation. Notice from Table 3 that *CREDIT* is positive and significant, while notice from Table 4 that *CREDIT* is negative and significant. Remember that *CREDIT* is defined as the amount of outstanding debt of the household. Using the ICRISAT data set we find that there is a positive correlation between the size of the farm and the amount of outstanding debt. Therefore following Morduch (1990), *CREDIT* can be interpreted as the capacity of the household to borrow. The fact that in step 1, *CREDIT* is positive implies that the greater the borrowing capacity of the household, the higher is the probability that the household is employed as a tenant. The fact that in step 2 *CREDIT* is negative and significant implies that an increase in the borrowing capacity of the household decreases the conditional probability that the household is hired as a share tenant. This result has some implications. It has long been argued that one of the reasons one does not observe more fixed rent contracts in less developed countries is the fact that they tend to put the entire production risk on the tenant. In a country like India where agriculture is still dependant on the vagaries of nature and markets for credit or insurance are incomplete, if not non-existent, tenants are unwilling to accept fixed rent contracts because then they have to bear the entire production risk. Very often defaulting on the rental payment means having to take a loan from the land-owner and in most cases such loans come at a high cost (interest rates exceeding 100%), with the tenant gradually getting caught up in a never ending cycle of debt. It has been suggested that one observes a preponderance of share contracts in the developing countries because of it risk sharing attributes. Shetty (1988) among others have suggested that one would observe a shift towards more fixed rent contracts if the tenant had access to credit, because in that case he would be more willing to bear the risk since the penalty from defaulting is not as high. We find empirical validation of this claim - an increase in the availability of credit leads to a shift towards more fixed rent contracts. There is an efficiency argument as well. It has been argued that fixed rent contracts are Pareto efficient while sharecropping contracts lead to sub-optimal resource usage. Shaban (1987) argues that output is lower in sharecropped plots compared to plots under fixed rent tenancy, so an increase in the incidence of fixed rent contracts will

therefore result in an increase in output. We should, however, point out that given the small number of plots under fixed rent, this result should be interpreted with some caution.

Notice that *VALUE* is positive and significant in step 2 (see Table 4). It implies that as the value of a plot increases, the conditional probability of the plot being cultivated by a share tenant increases. This result, combined with the fact that *VALUE* is positive and significant in stage 1 (see Table 3) implies the following. First, highest quality plots are cultivated by the owner. Second, conditional on the plot being leased out, the higher quality plots are cultivated by a share tenant. So essentially the highest quality plots are cultivated by the owner, the lowest quality plots are cultivated by a fixed rent tenant and the medium quality plots are cultivated by a share tenant.

4. Concluding Remarks

This paper tests the hypothesis that when a landlord may not possess complete information about the type of the tenant, he offers a fixed wage contract to low skill workers and tenancy contracts to high skill workers. The paper therefore provides empirical corroboration for the co-existence of multiple contracts in close proximity. We argue that the experience of an agent is a proxy for his type. Using data from rural India we map from the set of agent and plot level characteristics to the set of contracts offered on each plot.

We find that the less experienced agents are offered wage contracts, while tenancy contracts are offered to the more experienced agents. We also find that tenancy contracts are offered to tenants with greater borrowing ability. While there has been quite a bit of work on the Marshallian inefficiency of sharecropping, there has been a conspicuous void in empirical work analysing factors affecting the choice of contracts. In this paper we move away from the traditional emphasis on market conditions and risk factors and focus on factors internal to the tenant in defining contract choice.

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Table A1:
Definition of Dummy Variables

Dummy	Explanation
SEX	= 1, if household head is female
MARITAL	= 1, if the household head is married
MALEILL	=1, if any adult male member of the household is disabled
FEMILL	=1, if any adult female member of the household is disabled
IRRD0	=1, if source of irridation is well with traditional device
IRRD3	=1, if source of irrigation is well with electric motor
IRRD4	=1, if source of irrigation is well with oil engine
SOILD1	=1, if soil type is deep black
SOILD2	=1, if soil type is medium black
SOILD3	=1, if soil type is medium to shallow red
SOILD5	=1, if soil type is shallow red
SOILD6	=1, if soil type is gravelly