Land Tenure Insecurity and Labor Allocation in Rural China*

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An important part of China's development is the continued movement of the rural labor force into non-agricultural employment. Off-farm sources of income in China have been a major component of rising rural incomes over the last 20 years. Non-farm income also lowers income risk for rural households by decreasing farm household's exposure to the arbitrary shocks of agricultural income. As industrialization advances, unobstructed movement of labor out of agriculture will help keep wages low so that China's industries can maintain labor intensive practices and continue to bring labor into the industrial sector.

Scholars debate the extent to which China's rural labor market operates without obstruction. Some scholars point to the fact that over 100 million rural workers have gained off-farm employment over the last 20 years as evidence that China's rural labor market is well developed, especially when compared to other rural markets (Rozelle, et. al., forthcoming; Parish, Zhe and Li, 1996). China's high inequality between agricultural and non-agricultural incomes and a disproportionate share of labor in agriculture, however, suggest that there are obstructions to the free flow of labor out of agriculture. In light of these observations, some scholars argue that institutional restrictions, inhibit rural worker's access to off-farm employment (Yang and Zhou, 1996; Carter, Zhong and Cai, 1996).

The objective of this paper is to determine whether China's land management system deters workers in farm households from off-farm employment participation. Farmer's in China may lose the rights to farmland if they find off-farm employment (Yang, 1997). This potential loss can be viewed as a fixed cost to exiting agriculture and the size of this cost is correlated with the degree of tenure insecurity facing the household. Farmers may also be able to lower their tenure insecurity by maintaining high agricultural production on their land. In this paper, I

include variables that represent village-level land insecurity in empirical models of off-farm employment participation and test for whether the off-farm labor market participation for households in villages with a higher degree of insecurity is significantly different than those in relatively secure villages.

Land Policy and Off-Farm Labor in China

Farmers do not own the rights to their land in China, instead, land is nominally owned by organizations above the household (usually the *xiaozu*, or the village) and the rights to farm land are allocated by local leaders to households. Occasionally, local leaders decide to carry-out village-wide reallocations of farmland. In these reallocations, rights to land are taken away from some households and given to others. This introduces an element of land tenure insecurity for farm households in rural China. Households may lose rights to the land they currently farm in future village-wide reallocations.

The reasons why village leaders conduct village-wide reallocations vary from village to village, as does the criteria for who gains and who loses in these reallocations. The original allocation of land in the early 1980s (following the adoption of the Household Responsibility System) was intended to provide an egalitarian land distribution: each household was allocated land according to the number of persons in the household. As the number of persons in each household changed over time, land allocations no longer represented an egalitarian distribution. One reason village leaders reallocate rights to farmland, therefore, is to reflect changes in household composition that occur over time.

Recent research has identified other possible reasons village leaders choose to reallocate farm land from one household to another. Li and Rozelle (1998) explore a variety of potential

explanations of village leaders reallocation behavior and conclude that village leaders pursue three objectives: 1) they protect their own personal interests; 2) they minimize the administrative costs of fulfilling policy objectives; and 3) they seek to improve land-use productivity and efficiency. Benjamin and Brandt (1999) echo this last objective and argue that village land reallocations serve to maintain high levels of agricultural production. Both these studies find evidence that off-farm employment is a significant determinant of land reallocation and negatively impacts a household's overall land allocation. This may be because households with off-farm employment farm their land less intensively than do those without (efficiency motivation), or because households with off-farm labor have alternative sources of income (equity motivation).

The fact that households with off-farm labor are more likely to lose land in village reallocations raises the question of whether this is viewed as a cost of exiting agriculture and is considered in farmer's labor allocation decisions. If so, farmers facing high tenure insecurity may be discouraged from finding off-farm sources of income. This exacerbates the inequality between agricultural and non-agricultural incomes and deters farmers from spreading income risk over several different income sources. In the following section, I discuss how land tenure insecurity may affect the labor allocation decisions of farmers in rural China and the empirical implications of this effect.

Working Hypothesis

The way in which land tenure insecurity enters farmers off-farm work decisions depends largely on the reasons village leaders reallocate land. If land is reallocated from households with off-farm employment to households without because village leaders want to maintain relative

income equality, then the potential loss enters the households' decision as a fixed cost. If village leaders reallocate land away from households with off-farm employment in order to increase overall labor input into agriculture, then households may be able to maintain tenure security by maintaining high levels of production on the land allocated to them while also participating in off-farm emplyment.

If households are likely to lose land regardless of their agricultural production, then they face a pure fixed cost to exiting agriculture. Following Cogin (1981), these fixed costs deter household's from allocating labor off the farm unless they can be assured of a fixed number of days (reservation days) of off-farm employment sufficient to cover the costs of potentially losing some land. These reservation days give rise to the following two hypothesis:

Hypothesis 1: Households facing tenure insecurity are less likely to allocate labor off-farm.

Hypothesis 2: Households facing tenure insecurity that do allocate labor off-farm tend to work more hours off-farm than household's with relative tenure security.

Alternatively, village leaders may reallocate land away from households with off-farm employment because those households allocate less labor to agriculture and allow production on their plots to decline. To maintain high agricultural output, village leaders may decide to take land from these households and give it to households who will farm the land more intensively. In this case, households may freely allocate labor off-farm, as long as they allocate a high level of labor to agriculture. Under these circumstances, hypothesis 1 would still be true but hypothesis 2 would not. Farm households facing tenure insecurity would tend to allocate fewer

days to off-farm employment. In addition, the requirement that households maintain high agricultural production may affect the type of off-farm work households choose. Some forms, such as migration or working in a local factory, may not provide enough flexibility for households to allocate sufficient labor to agriculture during periods of peak labor demand.

Empirical Approach

Empirical studies of farm household's off-farm labor participation generally model off-farm participation as a function of household demographic and human capital variables, variables that represent transaction costs (such as distance from towns and transportation infrastructure) and the local wage. The empirical models I use include both household- and village- level variables to capture these effects. The specific variables used and their means are given in Table 2.

I estimate this function using two types of off-farm labor market participation variables as the dependent variable. The first is a probit estimate of the probability of working off-farm and uses an off-farm labor market participation dummy (one if the household has an off-farm worker). The second estimate is the number of days the household allocates to off-farm work. This is an OLS regression estimated only on the households participating. I also estimate these functions for participation and number of days working off-farm in two sub-categories, local self-employment and local worker and I estimate participation in migration (the number of days for migrants is not included in the survey data).

To test for the effects of village policy, I include a village-level measure of land insecurity. I use is the percent of village households that have had their land holdings change (either increase or decrease) in a village-wide reallocation to capture the effects of village land

management policy. Households in villages where many households have been affected by village-wide reallocations feel a higher likelihood that they could lose land in a village-wide reallocation. The level of tenure insecurity faced by households, therefore, is positively correlated with the proportion of households previously affected by village-wide reallocations. Table 1 shows the percent of households affected by village-wide reallocations in the 31 villages in the sample and reveals that some villages have had no village-wide reallocations while in other villages, more than seventy percent of the households have experienced changes in their land endowments due to village-wide reallocations. The empirical question is whether heterogeneity between villages' land management practices affects household's off-farm work decisions.

While land is usually not included in empirical models of off-farm participation in developed countries, it is in empirical work on low-income developing economies. Low-income developing economies often exhibit high transaction costs for most employment other than farming and the amount of household land is an important component of the marginal product of labor in agriculture. For these reasons, a household's land endowment will affect the household's off-farm employment participation decisions.

Farm households usually can choose the amount of land they farm by purchasing or renting land on the land market. In China, however, there is no private land ownership and very little land renting. The price at which farmers are willing to rent out land is above the price farmers are willing to pay. This also may be due to tenure insecurity (renting out land is a signal to village leaders that the land is not needed by the household and therefore invites dispossession) or due to the egalitarian distribution and small size of land holdings.

Due to the rigidity in the amount of land farmed by rural households in China, land size could be considered as fixed and included in an empirical model of off-farm employment participation. If farmers can choose land, however, then land size is endogenous to the household's utility maximization decision. In addition, past labor market participation by the household may have already brought on dispossession of land, and off-farm labor market participation is often serially correlated. This introduces an additional source of potential endogeneity whereby household's land holdings are a function of past off-farm employment which, in turn, is strongly correlated with current off-farm employment.

To address these potential endogeniety problems of household's land endowment, I estimate the models using an instrumented variable for household's land holdings. The instruments used reflect village and township level and political and policy characteristics and average household land endowments in the village.[1] The political and policy characteristics are intended to reflect the level of government meddling in land allocations. Households in villages with a high degree of local meddling in land allocation are more likely have a correlation between past employment and current land holdings. Local meddling in land policy does not, by itself, affect the household's off-farm employment decisions.

In addition to the policy instruments, I also include village average land per household as an instrument. There is significant variation in the average land per household in the 31 villages surveyed and no inter-village land transfers. The amount of land farmed by the household is largely determined by whether they are in a land rich or land poor village. Variations around the village mean are the part that is determined by village reallocation policy or land rental transactions. One may argue that either land rich or land poor villages are more (or less) likely

[1] The political and policy variables used are the number of Party members in the village and the percent of households involved in village-wide reallocation in other villages within the township

to have high levels of off-farm employment, and that this implies that village average land holdings are correlated with the dependent variable. Descriptive statistics and multivariate analysis using this data set, however, find no evidence of a correlation.

The empirical analysis is based on a survey of 787 households from 31 villages in Hebei and Liaoning Provinces in the northeast part of China conducted in 1995. The survey collected detailed information on household human capital, demographic characteristics, wealth and off-farm employment. Village-level variables were also collected by a community-level survey of the same villages in 1996. Of the 787 housholds surveyed, 766 had farm land and of these 605 had off-farm employment. The analysis is restricted to the households with farmland.

Results

Table 3 reports my econometric results for the participation decision. The negative and significant coefficient on the insecurity variable in columns 1 and 2 suggests that households in villages with relatively high insecurity are less likely to participate in off-farm employment. These results also hold for local self-employment, but not for local workers or migration (columns 3-8). This is a somewhat surprising result. Migrant workers are often viewed as having left the household so invite dispossession more than other types of off-farm employment while self-employment should offer more flexibility in working schedules to allow for sufficient labor allocation to agriculture.

Village land policy appears to affect off-farm labor participation decisions and the effect is sizeable. A 20 percent decline in the percent of households affected by village-wide reallocations increases the probability of working off-farm by about six percent. This is about the same as the effect of having one more worker in the household. It is impossible to estimate

what the results would be under total tenure security, but the evidence is that the effect could be sufficient to explain some of the agricultural versus non-agricultural income gap.

Land tenure insecurity does not appear to affect the number of days households allocate to off-farm employment. Table 4 reports the results from regressing the number of days spent in the various off-farm categories on the independent variables. The insecurity variable is insignificant in all the specifications. Township level features and policies generally have a more significant affect on household's labor decisions than village level land management policy does. This provides little evidence that households are prevented from participating more in off-farm employment because they must allocate a high amount of labor to agriculture.

Conclusion

Understanding the reasons why more rural workers do not participate in off-farm employment in China is important. The movement of labor from agriculture to non-agricultural sources of income is a major feature in China's economic transformation from an agricultural to an industrial economy. Off-farm sources of income are the primary means for rural households to increase their living standards.

Village level land management practices appear to be among the reasons some households find off-farm jobs while others do not. The threat of losing land if household workers find off-farm employment deters workers from accessing these jobs. This restricts labor supply to the non-agricultural demanders of labor and increases the number of workers relying on agricultural employment. These effects may in part explain the gap between agricultural versus non agricultural incomes in rural China.

Table 1. The Percent of Households Affected by Village-Wide Reallocations in 31 Villages

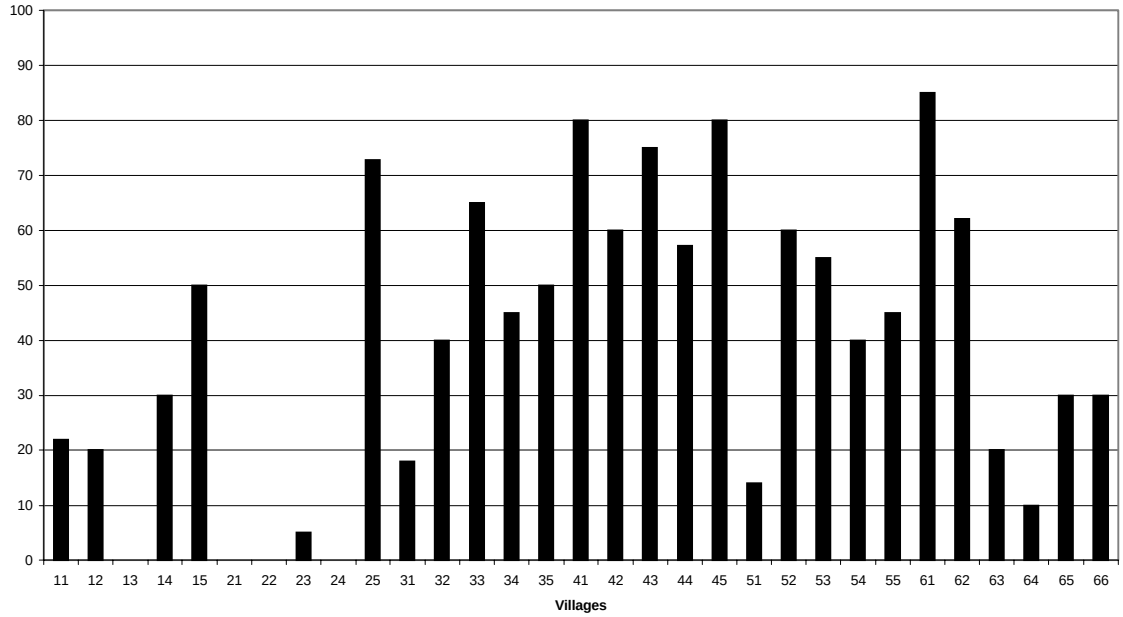

Table 2. Description and Means of Independent Variables used in Multivariate Analysis

Variable Name	Variable Description	Mean	S.D.
Household			
Household Size	Number of Persons in the Household	3.98	1.14
Household Workers	Number of Workers in the Household	2.76	1.08
Gender	Percent of Female Workers	.48	.16
Tech Training	Number of Workers with Technical Training	.23	.50
Apprenticeships	Number of Workers with Apprentice Training	.22	.47
Education 1	Most Educated persons Level of Education	7.8	2.3
Education 2	The Percent of Adults who are Literate	.57	.25
Experience	Average Worker's Age (minus 15)	12.5	8.2
Experience Squared	Average Worker's Age Squared	225	495
Wealth	Current Value of Non-Productive Assets	2333	3641
Total Land	Land Allocated to Household	18.5	12.8
Village			
Wage	Village Average Wage Rate (Daily)	9.1	4.7
Ag. Prices	Village Average Corn Price	.62	.17
Distance 1	Distance to Nearest Periodic Market	5.9	5.0
Distance 2	Distance to County Seat	15.9	16.7
Insecurity	The Percent of Households with Land Changes Due to Village-Wide Reallocations	.37	.27

Table 3. Explaining the Determinants of the Participation Decision for the Given Off-Farm Employment Categories*

	All Off-Farm Employment		Local Self-Employment		Local Worker		Migrant	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Household								
Household Size	0.02 (1.13)	0.05* (1.66)	0.04** (2.20)	0.05 (1.60)	-0.01 (0.41)	0.11 (0.31)	-0.02* (1.87)	0.017 (0.76)
Household Workers	0.05*** (3.08)	0.07*** (3.08)	-0.015 (0.82)	-0.01 (0.42)	0.09 (4.01)	0.11*** (3.55)	0.06*** (4.78)	0.09*** (4.79)
Gender	0.09 (1.17)	0.08 (1.07)	0.79* (1.79)	0.198 (1.80)	0.00001 (0.00)	-0.002 (0.02)	-0.10* (1.81)	-0.10* (1.80)
Tech Training	0.09** (2.31)	0.08* (1.78)	-0.009 (0.31)	-0.11 (0.42)	-0.004 (0.12)	-0.017 (0.41)	0.04* (1.95)	0.018 (0.75)
Apprenticeships	0.15*** (3.53)	0.15*** (3.36)	0.03 (1.05)	0.03 (0.98)	0.19 (0.49)	0.014 (0.35)	0.02 (1.08)	0.013 (0.61)
Education 1	0.02*** (3.50)	0.02*** (2.67)	-0.001 (0.18)	-0.002 (0.30)	0.004 (0.42)	0.001 (0.10)	0.004 (0.90)	0.002 (0.37)
Education 2	-0.02 (0.25)	0.05 (0.62)	0.07 (0.96)	0.0* (0.94)	-0.007 (0.07)	0.055 (0.40)	0.034 (0.70)	0.14 (2.01)
Experience	-0.005 (1.12)	-0.003 (0.77)	-0.006 (1.03)	-0.005 (0.96)	-0.014** (2.15)	-0.013** (2.00)	0.007** (2.26)	0.009*** (2.75)
Experience Squared	0.0001 (1.07)	0.0001 (0.98)	0.00004 (0.37)	0.00003 (0.37)	0.0001 (1.34)	0.0002 (1.33)	-0.00004 (0.85)	-0.00005 (0.93)
Wealth	$2x10^{-6}$*** (2.87)	$2x10^{-6}$*** (2.91)	$2x10^{-6}$*** (4.34)	$2x10^{-6}$*** (4.35)	$1x10^{-6}$ (1.06)	$1x10^{-6}$ (0.97)	$-2x10^{-6}$*** (3.10)	$2x10^{-6}$*** (3.13)
Total Land	-0.003*** (2.47)	-0.02 (1.50)	-0.0002 (0.13)	-0.004 (0.33)	-0.003* (1.71)	-0.013 (0.91)	0.001 (1.04)	-0.02** (1.99)
Village								
Wage	0.01** (2.52)	0.01 (0.98)	0.004 (0.74)	0.003 (0.41)	0.004 (0.59)	0.0004 (0.05)	-0.001 (0.21)	-0.01* (1.68)
Ag. Prices	0.86* (1.70)	1.44* (1.93)	0.75 (1.15)	0.95 (1.06)	0.66 (0.85)	1.1 (1.06)	0.23 (0.50)	1.18* (1.85)
Distance 1	-0.01 (1.27)	-0.01 (1.50)	-0.017 (1.63)	-0.018 (1.64)	-0.006 (0.55)	-0.008 (0.68)	-0.007 (1.20)	-0.013** (2.05)
Distance 2	0.01 (1.27)	0.003 (0.37)	0.007 (0.70)	0.006 (0.48)	0.007 (0.56)	-0.01 (0.79)	0.003 (0.53)	-0.005 (0.78)
Insecurity	-0.35*** (3.03)	-0.26* (1.95)	-0.38** (2.51)	-0.36** (2.22)	0.012 (0.07)	0.03 (0.16)	-0.06 (0.66)	0.05 (0.47)
Township Dummies**	40.7***	40.9***	23.2	23.2	33.8***	33.4***	205***	502***
Pseudo R-Squared	0.27	0.26	0.14	0.14	0.15	0.15	0.22	0.22

* probit regressions (dF/dx reported), a-unistrumented, b-instrumented, absolute value of t-stats in parenthesis

** Chi-Squared statistic testing the joint significance of township dummy variables

Table 4. Determinants of the Number of Days Spent in the Given Off-Farm Employment Categories

	Total Off-Farm		Local Self-Employed		Local Worker	
	(a)	(b)	(a)	(b)	(a)	(b)
Household						
Household Size	-3.8	-18.5	-28.0	-58.1	1.8	-7.0
	(0.31)	(0.94)	(1.19)	(1.51)	(0.13)	(0.31)
Household Workers	64.9***	56.2***	52.3**	27.7	36.5**	30.7*
	(5.15)	(3.54)	(2.12)	(0.84)	(2.48)	(1.74)
Gender	15.9	-18.0	327*	325*	-206**	-215***
	(0.23)	(0.26)	(1.97)	(1.93)	(2.55)	(2.65)
Tech Training	67***	75.5***	63.2*	75.3*	7.64	13.5
	(3.60)	(3.63)	(1.71)	(1.81)	(0.35)	(0.53)
Apprenticeships	4.07	6.4	8.18	-1.8	21.8	23.9
	(0.22)	(0.34)	(0.24)	(0.05)	(1.08)	(1.15)
Education 1	10.1**	12.2**	8.9	12.4	7.8	9.6
	(2.13)	(2.33)	(0.90)	(1.09)	(1.26)	(1.47)
Education 2	199***	159.5**	-78.5	-114	100*	69.5
	(3.94)	(2.46)	(0.72)	(0.81)	(1.77)	(0.91)
Experience	-6.56*	-7.20*	-4.9	-6.3	-8.1*	-8.2*
	(1.75)	(1.88)	(0.58)	(0.72)	(1.68)	(1.67)
Experience Squared	0.10	0.10	0.14	-114	0.08	0.07
	(1.62)	(1.63)	(0.94)	(0.81)	(0.97)	(0.88)
Wealth	0.0003	0.0004	-0.0002	-0.0001	0.003	0.003
	(0.13)	(0.16)	(0.05)	(0.04)	(0.71)	(0.72)
Total Land	-1.3	6.03	-5.3**	12.0	-1.79	3.0
	(1.31)	(0.77)	(1.99)	(0.69)	(1.38)	(0.35)
Village						
Wage	1.14	3.6	2.94	8.14	13.4**	15.0**
	(0.30)	(0.75)	(0.36)	(0.81)	(2.47)	(2.48)
Ag. Prices	123.6	-234	-264	-813	-197	-473
	(0.30)	(0.43)	(0.27)	(0.62)	(0.35)	(0.74)
Distance 1	-3.5	-1.13	1.06	7.17	-0.73	0.42
	(0.58)	(0.18)	(0.06)	(0.39)	(0.09)	(0.05)
Distance 2	1.7	3.96	17.7	20.9	-12.2	-11
	(0.27)	(0.57)	(1.16)	(1.18)	(1.29)	(1.15)
Insecurity	-30.3	-55.0	-23.2	-8.67	-35.7	-35.0
	(0.34)	(0.58)	(0.10)	(0.03)	(0.32)	(0.31)
Township Dummies (F)	3.32***	3.33***	0.87	0.97	2.7***	2.25***
Adjusted R-Squared	0.28	0.28	0.13	0.11	0.29	0.28

* OLS regressions on the households participating in the given category, a-unistrumented, b-instrumented, absolute value of t-stats in parenthesis

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