

# Determinants of Farm Income, Employment and Wages in Rural China

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## Introduction

In China since the 1990s, income disparity has been worsening among urban and rural, as well as coastal and inland, society income groups [Xue and Wei 2003, Xue 2004]. Calculations based on a survey conducted by the People's Republic Ministry of Agriculture reveal declines in the overall growth of farm income from the 1990s on and negative growth among lower income groups [Yan 2002], indicating the impoverishment of agrarian society, despite rapid growth of the economy as a whole.

In spite of being placed under generally similar socioeconomic conditions, there tend to be regions that prosper and those that miss the boat. On the micro level, even in the smallest villages, we observe wealthy households standing beside poor ones. What is it that causes such disparity? Are individual effort and skill the most important determinants, or are there other factors? The labor of a typical farm family is usually devoted to such occupations as the cultivation of the family's land, self-employment in the commercial and industrial sectors and hired labor, performed either close by or out of the county, all in the interest of maximizing the family's income. Those individuals or households who find good jobs reap the benefits of good pay, while those who encounter institutional barriers or limited skills are forced to put up with low income lifestyles. If that is the case, then income disparity can be attributed to differences in employment opportunities and qualifications. So, in order to explain and understand the mechanism of income disparity, it would be necessary to start with an analysis of how people seek employ-

ment and how wages are determined.

The present article will offer an analysis of 1) the factors determining the income of farm families and 2) how their members search for employment using a micro-data set from a household survey designed for panel analysis.<sup>1</sup> The analysis will concern answering the following questions:

1. What is the relationship between total farm (household) income, agricultural or non-agricultural, and the degree to which farm families and their members are earning it?
2. What types of farm families become involved in commercial or industrial self-employment?
3. What is the basis on which an individual chooses to engage in both non-agricultural wage labor and/or working the family farm?
4. How are wages for hired labor determined?

### **1. The Mechanism Determining Farm Income: Hypotheses**

According to the analysis of the same data set by Sato Hiroshi [2004], income disparity among the farm families in the villages surveyed has widened considerably over the past ten years:

GINI Coefficients:

Anqiu	1992: 0.157→	2001: 0.439
Yongxing	1992: 0.329→	2001: 0.478
Tianchang	1993: 0.258→	2002: 0.370

As to the reason for such a change, first, farm income is thought to depend heavily on both the attributes of individual households and the overall conditions of the region in which they reside. Changes in these two factors will cause changes in the structure of farm management, the employment structure of household members and, of

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<sup>1</sup> The data set to be used here was originally obtained by a joint three-year farm family survey carried out by the Rural Economy Research Department of the State Council Development Research Center. It was compiled into panel data by a team of Japanese survey participants led by Sato Hiroshi from the information provided by Chinese participants and the staff of local Bureaus of Statistics. I have also personally done fieldwork in three of the prefectures under investigation, Liqun, Guiding and Xindou. There is also similar panel data from a survey conducted in the same area ten years ago, but that will not be used here. For more details on that survey, see Nakagane 1997.

course, the composition of a household's earnings. For example, household income of farm families involved in commercial or industrial self-employment in the seven counties surveyed was on the average 2.54 times larger than that of households not so occupied, and in Wucheng the difference reached a maximum of 9.36 times in favor of such non-agricultural income earning households.

Table 1 shows the results of a multiple linear regression analysis of the relationship between farm family income levels and household head and member attributes, the results of which will help introduce the hypotheses proposed in the present article. The Table takes per capita gross cash income as the independent variable and household attributes as the explanatory variables (defined in Table 2). The analysis produced the following three interesting statistical facts.

First, the attributes of household heads exert influence on the household's per capita income.<sup>2</sup> The income of households whose heads had experienced living outside the prefecture county for over a half a year was 17% higher than those who had not. This tendency is even more marked in the case of households earning non-agricultural income. Also, households headed by high risk/high return style managers earned 19% more income than those managed in a low risk/ low return style. The age of household heads was also significant in relation to income, while household registration and education level were not.

Secondly, compared to the attributes of household heads, however, the attributes of household members exerted greater influence over its annual income. The percentage of non-agricultural workdays, education level and self-employment all had positive significance. For example, all other conditions being equal, self-employed households earned 48% more income than those not engaged in commerce or industry. Similarly, the households of present local cadres earned 23% more income than other households, and for each additional year of education or one additional mu (6.6 ares) of land or 1% more non-agricultural workdays per member, income increased by 16, 12 and 1%, respectively. On the other hand, in households with Communist Party members or local cadres who work, labor participation rates (% of members 15 years and older) and the ratio of

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<sup>2</sup> Some 92% of the household head respondents were male.

**Table 1 Determining Factors of Annual Per Capita Household Income**

Explanatory Variables		ln (Total)		ln (Agricultural)		ln (Non-Agricultural)	
		Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
Household Head	Age	0.01	0.000	0.01	0.003	0.02	0.000
	Education	-0.02	0.124	0.00	0.867	-0.03	0.101
	Registration	0.02	0.895	-0.38	0.056	-0.27	0.160
	Travel	0.17	0.036	0.08	0.433	0.25	0.013
	Managerial Style	0.19	0.015	0.07	0.491	0.13	0.181
Household Members	CPC Affiliation	-0.06	0.431	-0.11	0.206	0.03	0.714
	former cadre	-0.01	0.898	0.06	0.614	-0.21	0.070
	Present cadre	0.23	0.023	0.24	0.058	0.09	0.499
	Per capita education	0.16	0.000	0.04	0.215	0.19	0.000
	Labor ratio	0.00	0.442	0.00	0.199	0.00	0.452
	Labor participation ratio	0.00	0.621	0.00	0.361	0.00	0.142
	Employment ratio	0.00	0.573	0.00	0.620	0.00	0.958
	Non-agricultural employment rate	0.01	0.000	-0.01	0.000	0.01	0.000
	Per capita arable	0.12	0.034	0.43	0.000	-0.21	0.008
	Self-Employment	0.48	0.000	-0.09	0.364	0.55	0.000
Adjusted R-squared		0.454		0.339		0.462	
No. of Observations		597		549		496	

Notes: 1. The regional dummy is not shown.  
 2. Age and education are in no. of years.

annual household workdays were not significant in raising their income.

Finally, the relationship between annual income and household member attributes was most noticeable in the case of non-agricultural income. That is to say, whether or not self-employment in commerce or industry and the character of non-agricultural employment greatly determined non-agricultural earnings. Furthermore, it would

**Table 2 Definitions of Variables Used in the Regression Analysis**

		Units	Definition
Independent Variables	① Gross Annual Income	Yuan	Per capita annual total, agricultural, non-agricultural income
	② Annual Workdays	days	No. of agricultural, non-agricultural and total workdays
	③ Self-Employment	2	Yes = 1, No = 0
	④ Choice of Employment	2	agriculture only = 1, mainly agriculture = 2, mainly non-agricultural = 3, non-agricultural only = 4
	⑤ Non-Agricultural Wages	Yuan	① Annual wage income divided by workdays. ② Annual wage income.
Personal Attribute Variables	① Gender	2	Male = 1, Female = 0
	② Age	Age Group; Age	Ten-year groups
	③ Registration	2	Household registered as non-agricultural = 1, Household registered as agricultural = 0
	④ Personal Political Affiliation	2	CPC member, or CCYL member = 1, No affiliation = 0
Human Capital Variables	① Educational Level 1	Years	Less than primary school = 3, Primary school = 6, Middle school = 9, High school = 12, higher education = 15
	Educational Level 2	2	Less than primary school (0), Primary, middle, high school or college (1)
	② Non-agricultural employment years	Years	Year of the survey less the year of employment
	③ Leadership experience	2	None (0), Present, former cadre (1)
	④ Householder travel	2	Lived outside county over half-year = 1, Has not = 0
Household Attribute Variables	① Household members	no. persons	Including migrating workers
	② Children	no. persons	Household members 14 years and under
	③ Working age members	no. persons	Household members between the ages of 15 and 59
	④ Elderly members	no. persons	Household members 60 year and over
	⑤ Per capita arable	mun	Including both paddy and dry fields under cultivation
	⑥ Per capita education	Years	Less than primary school = 3, Primary school = 6, Middle school = 9, High school = 12, higher education = 15
	⑦ Labor ratio	%	The percentage of house members who work
	⑧ Labor participation ratio	%	The percentage of workers among household members 15 years and older
	⑨ Employment ratio	%	Ratio of total annual household workdays to the regional average
	⑩ Non-agricultural employment rate	%	Percentage of non-agricultural workdays in total household workdays
	⑪ Management style	2	High-risk/high-return = 1, Low-risk/low-return = 0
	⑫ Political status	2	CPC member, or, CCYL member = 1, No affiliation = 0
	⑬ Leadership experience	2	None (0), Present (former) cadre 1
Regional & Enterprise Variables	① Survey Region	2	Comparison with Anqiu = 0; Yongxing, Guiding, Tianchang, Liqian, Wucheng or Xindou = 1
	② Non-agricultural industry	2	Food processing = 0; Manufacturing, construction, transport, commerce, services, education/sanitation = 1
	③ Non-agricultural jobs	2	Line worker = 1, Manager, professional, etc. = 0
	④ Non-agricultural business	2	Private sector self-employment = 0; Public sector enterprise = 1
	⑤ Non-agricultural employment	2	Permanent or long-term position = 0; Short-term contract or seasonal work = 1

be appropriate to assume that all households within each village are faced with the same natural and social environment and that the social infrastructure (roads, communications, etc.) are equally available to all. Therefore, we can assume that income disparity among the residents of any given village is determined by the initial conditions and attributes of each individual household.

To be more specific, 1) by “initial conditions,” we mean the way family labor is being utilized, the ability (educational level, political and social position) of the household’s decision-maker (head) with respect to investing in his family’s education, etc., the household’s economic condition and composition at the initial stage of market reform; 2) by “household attributes.” we mean quantitative characteristics that can be observed in the household unit as a whole, like educational level, arable land per capita, and the number of working members; and 3) personal attributes include such things as like the gender, age, education, political status, experience and consciousness of each household member. For example, the higher the education of and the more experience accumulated by a household head and his family, the more human resources they possess. We assume that the more human resources someone possesses the better access he or she will have to higher paying jobs, whether in the area of self-employment or wage labor. Based on the above assumptions, definitions and statistical results, we offer the following hypotheses.

1. *Whether households living in the same natural and social environment are engaged in high income self-employment or not will be determined by the attributes of their heads and members.*

Specifically, the more youthful and robust, the better educated, the better traveled and/or the more inclined toward high risk-high return endeavors a household head, the more probable that he will choose to engage in non-agricultural management. At the same time, self-employment is bound to effect the fundamental conditions of the household. If a member of the household happens to belong to the Communist Party (CPC) or Chinese Communist Youth League (CCYL) or is (or has been) a cadre in the local administration, the household will be able to exploit such valuable socio-political resources in choosing an occupation, gathering information and procuring capital [Sato 2003]. In other words, households that possess such attributes have a higher probability of becoming self-

employed than those who do not. In addition, the educational level of members, their absolute number and the amount of land the household cultivates also effects the choice of self-employment. For example, since the average education level of its members indicates a household's amount of human resources, the higher that amount, the higher the probability of self-employment. On the other hand, the higher the household's arable per capita, the lower will probably be its incentive to branch out into self-employment.

2. *Concerning any individual's job seeking behavior, the choice among cultivation only, specialization in a non-agricultural occupation, or jointly engaging in both is not only determined by individual attributes, but heavily influenced by the attributes of his or her household.*

Borrowing a page from human capital theory, within the process of choosing to transfer one's employment from the agricultural to the non-agricultural sector, or choosing the latter from the beginning, not everyone has the same probability of actually succeeding. While aging makes it more and more difficult to access non-agricultural employment opportunities, more years of education makes it easier. This is because younger, better educated persons have a more ability to adapt to and learn skilled jobs in the non-agricultural sector than older, less educated persons. As in the case of self-employment, choice of employment is also influenced by such household attributes as political affiliation and community leadership, family composition and amount of arable land. For example, in households with children and elderly members to care for, it would probably be more difficult to choose employment in the non-agricultural sector, since it usually requires leaving home.

Moreover, the attributes related to workdays of household members are probably also a determining factor in the choice of employment. According to the theory of subjective equilibrium to explain the behavior of farm families, groups that combine both livelihood and management into one entity [Ishida 1999], the choice of employment of the head of a household and that of his spouse and children are by no means independent. It is common for such a farm family not only to earn a lot of cash, but also to maximize the household's total income through a rational division of labor among its members into those adapted to non-agricultural jobs due to spe-

cial skill and those adapted to working the family farm. However, what is more essential to such a hypothesis is how well the labor market mechanism is functioning, which brings us to the next hypothesis.

Within the process of the growth and spread of market economy in rural China since the 1990s, the human capital of farm laborers engaged in non-agricultural occupations is being properly evaluated through labor markets, meaning that the latent ability of those who choose non-agricultural employment reflects the level of wages. According to Jacob Mincer's theory of the determination of wages, wage levels for individuals increase up to a certain age, then begin to decline. Moreover, such representative variables expressing human capital as years of education and work experience also improve the wage levels. Therefore,

- 3 *Farm family income level is deeply tied to its engagement in non-agricultural occupations, be they self-employment or not. Given generally the same socioeconomic conditions, the ability of a portion of farm families to earn higher income than others is due to different household and household member attributes; and one factor working to increase income level is proper evaluation through the market mechanism.*

## **2. Data, Variables and the Model**

Regarding the data to be used in attempting to support the above three hypotheses, there is qualitative data, such as gender, registration and political affiliation and quantitative data like age, years employed and income, both drawn from questionnaires. There is also more subjective information about production and management styles. While the accuracy of the qualitative data is acceptable, such quantitative data as income and days worked has to depend on how accurate the information contained in daily journals not kept by the researcher may be and therefore must be suspect as to the possibility of over- or understatement of the true figures.

One method of eliminating inaccuracy in questionnaire data is to convert the absolute number of responses to ranked variables, by making a fixed range of response data into one category in order to limit the influence of responses that deviate too much from the actu-



al values, thus enabling a correct overall view of the situation.

The ranked variables to be used in our quantitative analysis are contained in Table 2. The independent variables are management style per household, individual choice of employment and wage levels for non-agricultural work, in accordance with our three hypotheses, but they include both qualitative and ranked variables. The explanatory variables may be divided into the four categories of individual attributes, individual human capital, household attributes and regional/enterprise characteristics. They include both quantitative (years of experience, number of household members, etc.) and dummy (0 or 1) variables. The inclusion of many dummy variables are very useful in qualitatively controlling the characteristics of regions and employing enterprises by assuming similar patterns and showing important relations between independent and explanatory variables. For example, by introducing the dummy variable for householders' experience away from home as a determining variable for self-employment patterns makes it possible to compare subjects with similar experience. Without introducing such an influential element in determining this kind of behavior, we would be forced to rely merely on such directly unrelated information as age and education.

As to the model for supporting our hypotheses, if the independent variables were all quantitative data, we could clarify the presence or absence, weakness and strength of variable relationship through multiple regression analysis. However, the use of dummy variables makes it necessary to use the Probit and Logit models. The analysis will therefore use the regression model best suited to the character of the independent variable in question.

### **3. Employment Seeking among Farm Family Workers**

This section will try to prove hypotheses 1 and 2 through a quantitative analysis of employment choices made by farm family members of working age. That is to say, we will examine what type of farm family engages in self-employment in commerce or industry and what elements influence access to non-agricultural employment opportunities. First, let us clarify employment conditions faced by farm families.

### 3.1 Employment Conditions

Table 3 classifies the four possible family farm employment patterns according to gender, average age, and level of education. These patterns are based on the relative weights of agricultural and non-agricultural work done by each respondent, irregardless of total workdays. The Table reveals that first, despite the low figure of 16.8% of workers involved solely in non-agricultural work, some 44.3% of the total are involved in such work to some extent, indicating a growing trend towards part-time farming. Next, with respect to age, we find that workers become younger as we move down the list of patterns, indicating that the younger the job-seeker, the better the opportunity for finding a non-agricultural position. Finally, concerning education level, although there is a year of difference between male and female respondents on the whole, the longer one's educational experience, the higher the possibility of non-agricultural employment, regardless of gender. Altogether, such facts point to a higher probability that women will become engaged in agriculture, but the younger and better educated the job seeker is, whether male or female, the greater the probability that he or she will become engaged in non-agricultural work to some extent.

Next, let us examine differences in region, gender and education

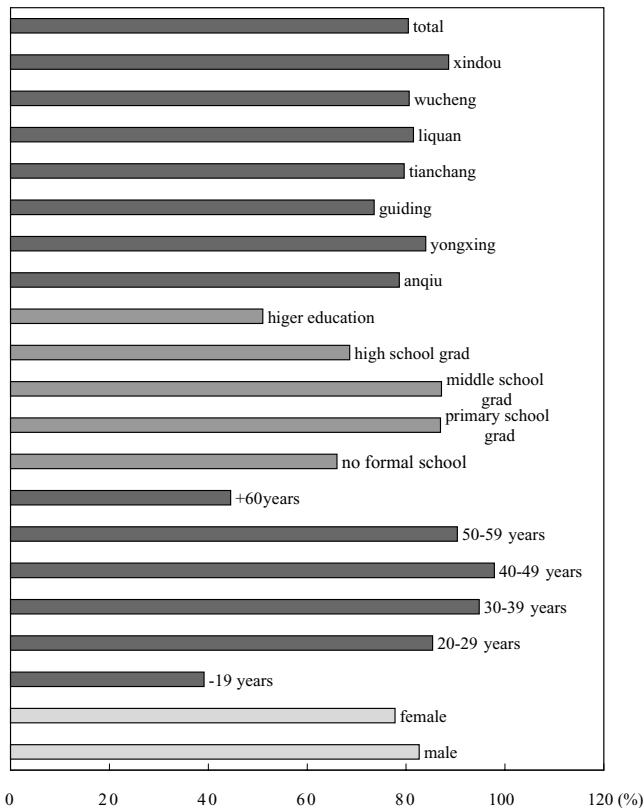
**Table 3 Employment Pattern in Relation to Gender, Age and Education**

(%)

	Total	Gender		Average Age			Years of Education		
		Male	Female	Total	Male	Female	Total	Male	Female
Agriculture Only (0)	46.4	18.4	28.1	42.9	45.3	41.5	6.9	7.3	6.7
Mainly Agriculture (I)	9.3	6.6	2.7	38.7	38.7	38.8	8.0	8.1	7.6
Mainly Non-Agriculture (II)	27.5	17.0	10.5	35.9	37.3	33.8	8.2	8.5	7.7
Non-Agriculture Only (III)	16.8	9.6	7.2	32.5	33.6	31.1	9.0	9.3	8.7
Total	100.0	51.5	48.5	38.9	39.6	38.2	7.7	8.2	7.3

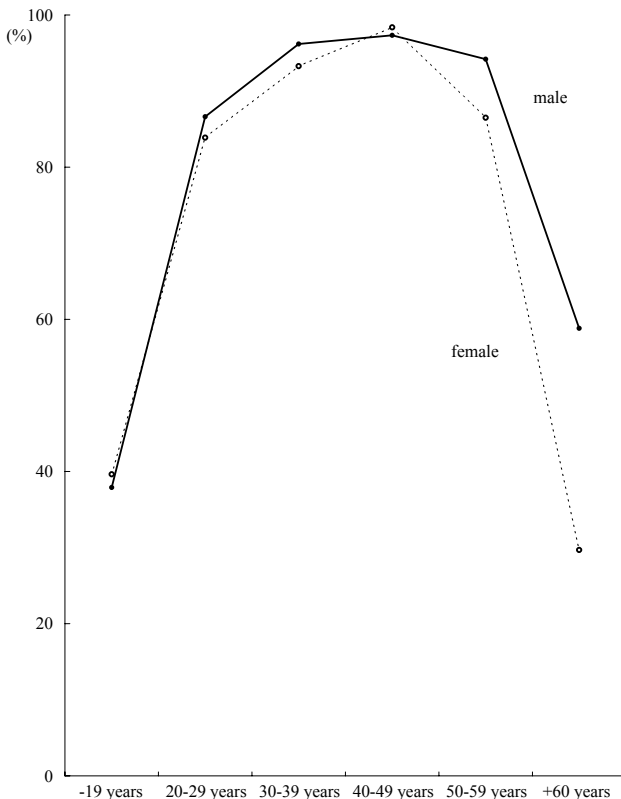
with respect to labor participation rates (percentage of working members over the age of 15). Figure 1 summarizes the questionnaire data on labor participation. The labor participation rate of all the respondents is 80%, and with the exception of Xindou and Guiding counties, they conform with the average level. While there are no discernable differences in labor participation between genders, marked differences exist with respect to age group and level of education in the form of lower rates of participation by primary school and high school and above graduates, and age groups 19 and below and 60 and above.

**Figure 1 Comparative Labor Participation Rates**



Labor participation rates with respect to age and gender is plotted in Figure 2. As seen in Figure 1, participation by groups 19 years or less and 60 years or more is low for both men and women, and the female vs. male participation rates for groups between 20 and 59 years are almost identical. It is usually the case that due to childbirth, labor participation by women in their 30s and 40s tends to drop, giving an M-shaped graph. However, such is not the case for women in Chinese rural areas, according to our results, at least. This is probably because under family farm management, there is no marked unemployment among household members, since they can

**Figure 2 Labor Participation Rates by Age and Gender**



not only be engaged in cultivation on a daily basis, but are also influenced by general Chinese employment practices.<sup>3</sup>

On the other hand, we do find gender and age differences with respect to the number of days worked annually: women (226 days) tend to work about one month less than men (258) do. The difference in the 20 to 59 age brackets ranges from 34 to 43 days, while that in the 19 and below and 60 and above brackets is one month and two months less, respectively. Also, from the findings that men do not work for three months and women four months out of the year, we can assume the existence of latent unemployment (surplus labor), leading to the conclusion that it is not necessary for women to devote all their time to housework and child rearing, but that women do spend more time in these tasks than men.

### **3.2 The Determinants of Days Worked Annually**

Let us turn to the question of what determines the choice among the four categories shown in Table 3. To answer this question, we performed a multiple regression analysis of the influence of individual household member attributes on the number of days worked annually, in particular workdays devoted to agricultural and non-agricultural work, and also non-agricultural workday ratios. In order to eliminate regional differences we introduced a regional dummy model (comparison with Anqui Prefecture) and came up with the figures appearing in Table 4.

To begin with, the Table shows marked regional differences in annual workdays among the seven counties under examination. Compared to Anqui, the figure for Yongxing is more, while the rest are less, a fact that matches the results in Table 1. However, the results are a bit different regarding agricultural and non-agricultural workdays per year, indicating large regional differences in employment

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<sup>3</sup> After the rise of the People's Republic, which encourages the advance of women into the workforce, both men and women have been guaranteed equal employment opportunities, in principle. However, in the midst of the present day spread of market economy, women are suffering disadvantages in competitive labor markets, but once women do find jobs, they seldom quit them for reasons of marriage or childbirth, due in part to the fact that a husband alone usually cannot support a family on the wages he earns alone.

**Table 4 Detemining Factors of Days Worked Annually by Farm Families**

Explanatory Variables	Total Work-days		Agricultural Workdays		Non-Agricultural Work-days		Non-Agricultural Ratio	
	Coef-ficient	Signif-icance	Coef-ficient	Signif-icance	Coef-ficient	Signif-icance	Coef-ficient	Signif-icance
Constants	49.91	0.053	-88.55	0.000	137.76	0.000	62.22	0.000
Gender	35.29	0.000	-11.69	0.013	44.69	0.000	13.88	0.000
Age	48.40	0.000	46.78	0.000	1.33	0.844	-2.20	0.314
Age Square	-2.97	0.000	-2.22	0.000	-0.76	0.052	-0.14	0.270
Registration	-27.25	0.019	-47.56	0.000	22.06	0.096	11.19	0.009
Party Affiliation	-4.59	0.563	-18.59	0.013	16.82	0.068	4.59	0.121
Primary School Grad	16.79	0.036	-7.91	0.290	24.78	0.008	5.34	0.071
Middle School Grad	21.75	0.010	-20.19	0.011	41.56	0.000	11.43	0.000
High School Grad	36.58	0.001	-31.12	0.003	69.00	0.000	18.45	0.000
Higher Education	35.93	0.117	-29.78	0.165	75.56	0.004	22.16	0.010
Leadership Experience	9.04	0.450	-5.75	0.608	16.88	0.228	5.48	0.211
Present Leader	-5.32	0.705	11.51	0.383	-19.13	0.242	-7.85	0.127
yongxing, Hunan	23.32	0.009	107.31	0.000	-84.04	0.000	-28.19	0.000
guiding, Guizhou	-15.60	0.074	66.05	0.000	-76.47	0.000	-24.46	0.000
tianchang, Anhui	-13.96	0.113	-37.29	0.000	25.78	0.012	6.80	0.036
liquan, Shanxi	-12.46	0.206	50.97	0.000	-55.86	0.000	-22.09	0.000
wucheng, Shandong	-24.37	0.026	40.07	0.000	-66.35	0.000	-18.07	0.000
xindou, Sichuan	-73.94	0.000	-52.27	0.000	-18.94	0.065	0.20	0.951
Adjusted R-squared	0.169		0.266		0.327		0.236	
No. of Observations	1679		1647		1686		1694	
Averages (Days; %)	242.77		129.19		114.68		38.75	

structure.

Secondly, *ceteris paribus*, men were working 35 days longer than women each year, but 12 shorter in agricultural work and 45 days longer in non-agricultural occupations. Also, the male non-agricultural worker ratio was 14% more than the female ratio. It seems that differences exist between rural Chinese men and women not only in days worked, but also what they work at.

Thirdly, the number of days worked increases up to a certain age, reaching a peak, then begins to decline, showing a significant relationship between age and workdays. However, such a relationship is not very marked in the area of non-agricultural employment. Given the existence of surplus labor in farm families, workers tend to retire from their agricultural endeavors fairly early on, enabling many of them to be employed in housework, while those working for wages in the non-agricultural sector, probably work up to the usual age of retirement, quitting at a more leisurely pace.

Fourth, regarding household registration, those persons who were registered as non-agricultural households worked less days than those who were; however, the opposite was true in the case of non-agricultural employment and ratios of total workdays. In other words, individuals registered as non-agricultural household members spend more time in non-agricultural pursuits. This is only natural because there were survey respondents who were members of farm families, but not registered as “non-agricultural:” mainly local cadres, school teachers and the like.

Next, the relationship between educational level and employment was not surprising. The higher one’s educational level, the more days worked: *ceteris paribus*, primary school graduates worked 17 days more than those with a lower educational level, middle school graduates 22 days more and high school graduates 37 days more. In other words, lower levels of education result in less employment for farm family labor and cause latent unemployment there. Also, education is negatively related to the number of agricultural days worked and positively related to non-agricultural workdays. The higher the education level, the less the number of agricultural days and vice versa in the case of non-agricultural employment.

Finally, the results show that there is no significant difference between the employment behavior of rural cadres (present or past)

and that of the local rank and file. It is also difficult to discern any influence of political affiliation on the total number of days worked, although CPC and CCYL members did work less agricultural and more non-agricultural days than non-politically oriented household members. The fact that neither local cadres nor party members work less than anyone else during any one year is indeed a surprising (unexpected) finding.

The above analysis quantitatively verifies the descriptive analysis offered by Table 3 concerning the employment patterns of farm household members and shows a great deal of influence being exerted on them by gender, age and educational level. Regarding the fact that education has proven to be a crucial factor in finding non-agricultural work, we can conclude that raising education levels in rural China is an important key to solving the problem of underemployment among that country's rural human capital.

### **3.3 The Determinants of Non-Agricultural Self-Employment**

Of the total 614 respondent households, some 158 said that they were self-employed in either commercial or industrial endeavors. It is a fact that personal income in any Chinese village greatly varies depending on whether its farm families are engaged in such industries as commerce, services, transport and manufacturing, to such an extent the income can differ several times over. Needless to say, self-employment is indeed a very important element of income disparity within any village community.

To begin with, let us look at what causes differences between self-employed households and others. Here we will use a Probit model to estimate how our household and regional attributes influence the independent variable, self-employed. (See Table 2.) The results are shown in Table 5. As indicated by the R-squared figure, the model explains 21% of the choice of self-employment. This not a very large figure, but it is tolerable in analysis using cross-sectional micro-data. Also, the probability of predicting with 50% or more accuracy is 77.85%.<sup>4</sup>

Turning to the main factors determining self-employment sug-

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<sup>4</sup> The accuracy of predicting self-employed and not so employed households from the entire sample is 93% and 36%, respectively.



**Table 5 Determining Factors of Self-Employment (Probit Model)**

Explanatory Variables		Coefficient	Significance	Marginal Probability
Constants		-1.22	0.003	-0.320
Household Head Attributes	20-29 Years	0.92	0.019	0.240
	30-39 Years	1.13	0.000	0.296
	40-49 Years	0.89	0.001	0.233
	50-59 Years	0.42	0.134	0.111
	Household Head	-0.21	0.555	-0.056
	Primary School Grad	0.06	0.782	0.016
	Middle School Grad	0.27	0.281	0.070
	High School Grad	0.13	0.705	0.034
	Higher Education	-0.71	0.364	-0.186
	Travel	0.38	0.005	0.099
	Management Style	0.28	0.068	0.072
Household Member Attributes	Political Affiliation	0.18	0.227	0.047
	former Leadership	0.06	0.738	0.016
	Present Leader	-0.61	0.007	-0.159
	Education	0.07	0.218	0.017
	No. of Members	0.03	0.560	0.007
	Arable Per Capita	-0.32	0.007	-0.084
	Labor Participation	-0.70	0.075	-0.002
Region	yongxing, Hunan	-0.95	0.000	-0.250
	guiding, Guizhou	-0.23	0.331	-0.060
	tianchang, Anhui	-0.37	0.136	-0.096
	liquan, Shanxi	-0.08	0.727	-0.021
	wucheng, Shandong	0.06	0.837	0.016
	xindou, Sichuan	-0.26	0.233	-0.067
Adjusted R-squared		0.210		
Estimated Accuracy		77.85		
No. of Observations		158 out of 614		

gested by the model, first, let us consider the regional aspects. Self-employment in Yongxing was significantly lower than in Anqui, while there was no significant difference in the other regions. This leads us to believe that regional attributes do not influence the choice of self-employment very much. Regarding household head attributes,<sup>5</sup> first, a farm family's household head is the main decision-maker in its daily production and consumption activities; therefore, the allocation of any household's capital and labor depends on his objective abilities and subjective perceptions. Table 5 supports such an assumption in part. Also, *ceteris paribus*, household heads in their 20s, 30s and 40s are 24.0%, 29.6% and 23.3% more likely to be self-employed than those in their 60s. Also, household heads who have spent at least a half-year residing outside their home counties are 9.9% more likely to be self-employed, as are high-risk/high-return household managers, to the tune of 7.2%. However, the educational level of a household manager has absolutely no influence on his choice of self-employment, nor is household registration a significant factor.

As to the what type of self-employment farm families are engaged in, four occupations take up 80% of the cases: commerce and services (41%), transport (14%), food processing (9%) and other forms of manufacturing (15%). The scale of these occupations measured by the number of workers employed in them (cases of employing extra hired labor in parentheses), were 6.2 (9), 2 (1), 2.7 (3) and 18 (15) respectively. In other words, self-employment amounts to no more than extremely small farm family-owned and operated enterprises. In development economics terminology, these enterprises make up an informal sector requiring no high technology with relatively easy entry. Therefore, youth (physical strength), fortitude and outlook are more important than education and skilled training in the choice of self-employment.

Turning to the influence of household member attributes, again education is not an important factor, nor are political affiliation or local leadership. As a matter of fact, the households of present cadres were 15.9% less likely to be self-employed as other house-

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<sup>5</sup> Out of 640 "household head" respondents, 92% (582) were male; therefore, the factor of gender was not considered in the present model.

holds. This is surprising, because cadres and Party members not only possess considerable social position, but also have access to outside information with which to take advantage of non-agricultural employment opportunities. However, Table 5 belies such an assumption. Could it be that “political capital” in the form of local cadres, party members and their households<sup>6</sup> is gradually losing its influence on local society within the process of the growth and spread of market economy? If so, the political power symbolized by cadres and party members may be said to be declining in rural China in the midst of the rise “market power.”<sup>7</sup>

Although the number of household members had no significant effect on self-employment choices, arable per capita and the percentage of working members 15 years and older (labor rate) were attributes negatively affecting such choices. Households with relatively large amount of arable are ensured employment opportunities in the agriculture, resulting in weak incentives to start businesses in the non-agricultural sector. Also, while one can understand why household size would not be related to self-employment choice in village communities, where is it easy to procure outside labor, we are at a loss to explain the rationale behind the probability of self-employment dropping as the household labor rate rises.

### **3.4 Non-Agricultural Employment Choices**

As shown in Table 3, the 1700 farm family laborers in our survey who were employed have been divided into four patterns according to the degree of involvement in agricultural and non-agricultural occupations. The problem we will take up here is what determines the allocation of a household’s work hours among these four patterns. For this purpose, we will quantitatively analyze employment seeking behavior of farm family workers using a Logit model. Specifically, we will attempt to clarify the influence of individual and regional attributes on the choice of each of the four patterns.<sup>8</sup> The results are shown in Table 6; however, since information regard-

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<sup>6</sup> See Sato 2003: pp. 9-12.

<sup>7</sup> This includes a growing non-agricultural labor market, both in the hired and self-employed sectors.

<sup>8</sup> Non-agricultural employment here includes both self-employed and wage labor.

**Table 6 Choice of Employment by Farm Family Workers  
(Multi-Item Logit Model)**

Explanatory Variables	mainly agriculture			mainly non-agriculture			non-agriculture only		
	Coef-ficient	Sig-nifi-cance	Mar-ginal Proba-bility	Coef-ficient	Sig-nifi-cance	Mar-ginal Proba-bility	Coef-ficient	Sig-nifi-cance	Mar-ginal Proba-bility
gender	0.72	0.000	0.016	1.46	0.000	0.081	1.12	0.000	0.106
19years and under	1.64	0.000	0.069	0.45	0.458	-0.040	2.85	0.000	0.334
20-29 Years	1.64	0.000	0.045	0.94	0.048	-0.009	3.23	0.000	0.382
30-39 Years	0.66	0.071	-0.079	0.99	0.030	0.008	3.35	0.000	0.440
40-49 Years	-0.07	0.852	-0.132	0.90	0.039	0.026	2.57	0.000	0.359
50-59 Years	-0.49	0.187	-0.128	0.31	0.499	0.005	1.52	0.003	0.234
registration	0.99	0.002	0.115	0.05	0.913	-0.013	0.08	0.821	-0.032
Primary School Grad	0.09	0.774	-0.021	0.49	0.131	0.027	0.55	0.035	0.068
Middle School Grad	0.63	0.032	0.036	0.54	0.107	0.018	0.75	0.005	0.073
High School Grad	1.17	0.001	0.092	0.73	0.078	0.022	0.87	0.011	0.064
Higher Education	1.35	0.029	0.125	-0.06	0.956	-0.041	0.89	0.218	0.072
Political Affiliation	0.36	0.128	0.030	-0.12	0.717	-0.020	0.34	0.148	0.036
former Leadership	0.53	0.146	0.071	-0.02	0.969	-0.007	-0.16	0.665	-0.045
Present Leader	-0.90	0.068	-0.082	-0.31	0.535	-0.001	-0.49	0.227	-0.027
yongxing, Hunan	-1.56	0.000	-0.101	-0.15	0.637	0.047	-1.99	0.000	-0.219
guiding, Guizhou	-0.97	0.000	-0.040	-0.05	0.875	0.041	-1.78	0.000	-0.215
tianchang, Anhui	-0.79	0.012	-0.118	-1.37	0.010	-0.110	1.04	0.000	0.207
liqian, Shanxi	-1.40	0.000	-0.118	-0.68	0.077	-0.015	-0.93	0.001	-0.063
wucheng, Shandong	-0.96	0.004	-0.088	0.28	0.443	0.049	-0.73	0.021	-0.070
xindou, Sichuan	-0.57	0.039	-0.064	-1.66	0.002	-0.126	0.49	0.039	0.124
Log likelihood	-1663.91								
Scaled R-squared	0.429								
No. of Observations	287 out of 1700			155 out of 1700			466 out of 1700		

Notes : (1)The coefficient of farm labor only has been standardized at 0 and only the coefficients associated with patterns including non-agricultural work have been predicted.  
(2)No constants have been indicated.

ing the household factors attributed to individuals could not be extracted, the Table does not reflect the influence of those factors on employment choice.

Let us begin with the influence of region, indicated by dummy variables. From the conformity and significance of the coefficients, we find that in all the regions surveyed, the least popular pattern was not farm labor only (Pattern 0), but mainly farm labor (Pattern I). In addition, compared to our standard, Anqui, the choice of non-agricultural only (Pattern III) is higher in Tianchang and Xindou and lower in Yongxing, Guiding, Liquan and Wucheng. In other words, the choice mechanism is different here than in the case of self-employment, in that individual-based choices are heavily influenced by region.

Secondly, it seems clear that not only gender and age, but also political and human capital (education, etc.) have significant influence on the choice of non-agricultural employment. This also differs from the determining mechanism seen in the case of self-employment. To be more specific,

1. Regarding gender, whose dummy coefficient is positively significant, men are 1.6%, 8.1% and 10.6% more likely to choose Pattern I, mainly non-agricultural work (Pattern II) and Pattern III, respectively, than women.
2. Regarding age, almost all of whose coefficients are significant, its effect on the choice of Patterns I and II is relatively weak, while in the choice of Pattern III, its influence is extremely heavy (judging from the marginal probability figure.) For example, compared to those 60 years and older, family members in their 50 years and younger are between 23 and 44% more likely to choose to work only in the non-agricultural sector.
3. With regard to education (human capital), almost all of whose coefficients are significant and positive, we notice an encouraging affect on the choice of either Pattern II or III. Although the more education one has the higher probability of choosing Pattern I, we cannot observe any gradual increase in education linked to moving from Patterns I to II to III. For example, those with schooling are only 7% more likely to choose Pattern III than those without any formal education. Nevertheless, the level of one's human capital represented by education is no doubt an

important factor in employment choices.

4. Political capital represented by CPC and CCYL membership does have a positive affect on the choice of Patterns I and III; but such capital represented by local leadership does not indicate any significance in accessing non-agricultural work patterns. As a matter of fact, holding a cadre position seems to hinder such access, compared to ordinary villagers. Indeed, “cadre” implies leadership on all levels of local government, and that may be the reason why it has little influence on actual employment choice.

In sum, the probability is highest that relatively well-educated, younger men will choose non-agricultural jobs, and although politically connected householders would seem to have easier access to such jobs, those with cadre experience do not necessary enjoy the same benefit, and those holding cadre positions are actually prevented from such access.<sup>9</sup>

#### **4. Wage Determination in Non-Agricultural Employment**

In this section we will seek the reason why farm family workers with relatively abundant human capital actively seek employment in the non-agricultural sector by constructing a wage model for that sector to see if individual ability is being correctly evaluated through the market. Our wage function will add to Mincer’s basic theorem several elements reflecting Chinese society, such as household registration, political activism and cadre experience. In order make comparisons *ceteris paribus*, it is necessary to include in the model both employment patterns and the character, type and job status within the

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<sup>9</sup> According to a multinomial Logit model analysis of 591 household heads, experience accumulated in places outside their home counties heightened the possibility of gaining non-agricultural employment; however, that possibility was lowered as the number of non-working age household members and arable per capita increased.

<sup>10</sup> An attempt was made to determine a wage function for those who commute to work from home and those who live and work outside of the village, but it was too troublesome to include in the table. The differences between the two types will be discussed in the text when appropriate.

**Table 7 Wage Determination for Non-Agricultural Employees (OSL Model)**

Explanatory Variables		Overall Daily Wage		Overall Yearly Income	
		Coefficient	Significance	Coefficient	Significance
Individual Attributes	gender	0.32	0.000	0.31	0.000
	years	0.37	0.000	0.31	0.002
	years squared	-0.02	0.000	-0.02	0.001
	registration	-0.02	0.880	-0.04	0.741
	Political Affiliation	0.07	0.368	0.02	0.832
Human Capital	Primary School Grad	0.29	0.017	0.33	0.022
	Middle School Grad	0.25	0.046	0.36	0.013
	High School Grad	0.31	0.031	0.41	0.015
	Higher Education	0.54	0.013	0.49	0.056
	Non-agricultural employment years	0.02	0.001	0.02	0.004
	former cardre	0.05	0.722	0.07	0.661
	present cardre	0.60	0.001	0.22	0.268
Pat-tern	mainly non-agriculture	0.07	0.435	0.92	0.000
	non-agriculture only	0.06	0.538	1.09	0.000
Industry	Manufacturing	-0.02	0.818	0.03	0.737
	Construction	0.07	0.436	-0.06	0.589
	Transport	-0.20	0.204	0.06	0.748
	Commerce/Services	-0.02	0.877	0.16	0.206
	Education/Health	-0.19	0.145	-0.21	0.175
Job	Manager/Profession	-0.28	0.000	-0.24	0.001
Term	Short Contract	-0.01	0.904	-0.13	0.222
	Seasonal	-0.06	0.399	-0.19	0.026
Enterprise Type	Xiang-Owned	-0.09	0.439	0.16	0.231
	Village-Owned	-0.25	0.135	-0.11	0.584
	Joint Household-Owned	0.41	0.101	0.48	0.103
	County-Owned & Above	-0.08	0.402	0.08	0.450
Region	yongxing, Hunan	0.24	0.037	-0.12	0.369
	guiding, Guizhou	0.14	0.282	0.09	0.560
	tianchang, Anhui	0.05	0.647	0.09	0.443
	liquan, Shanxi	-0.01	0.961	0.11	0.545
	wucheng, Shandong	0.25	0.056	0.17	0.289
	xindou, Sichuan	0.41	0.000	0.18	0.153
Adjusted R-squared		0.298		0.337	
No. of Observations		494		501	
Average Wages (Yuan)		24		6229	

enterprises where respondents are working. Table 7 shows the results of the multiple regression analysis.<sup>10</sup>

To begin with, the overall average daily wage (calculated by dividing yearly cash income including bonuses by the number of days worked) was 24 yuan. While not shown in the Table, the average wages of non-commuters (migrants) and commuters (see Note 10) were 21 and 27 yuan, respectively; however, the difference was not statistically significant.<sup>11</sup>

Second, the analysis shows regional wage disparity, in which average wages in Yongxing, Wucheng and Xindou were 20% to 40% higher than those in Anqiu. (Guiding, Tianchang and Liquan showed no such disparity.) Furthermore, only the Xindou dummy variable was significant in the function for daily and annual wage discrepancies between migrants into out-county labor markets and in-county commuters. It seems that now ten years after the deregulation of population movement in rural China, regional wage differences are disappearing and that the adjustment function of free labor markets is improving within an economy characterized by an almost unlimited labor supply.<sup>12</sup>

Third, wages did not significantly differ depending on employer and terms of employment. That is to say, whether hired on a long-term or short-term basis, or working in different industries for differently managed enterprises, no significant differences in wages could be discerned. Also, the size of an enterprise (number of employees) and how workers entered enterprises had no significant influence on wage levels.<sup>13</sup> However, seasonal workers earned about 20% less annual income than permanent and long-term employees, but that should be expected by the nature of the work.

Fourth, it should also be expected that an employee's status within the enterprise should have an important influence on wage

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<sup>11</sup> The average number of days worked by migrants and commuters came to 237 and 216, respectively, bringing annual income to 4646 and 5189 yuan. Variance analysis showed the difference to be insignificant.

<sup>12</sup> This conclusion matches the information we have obtained from rural surveys all over the country.

<sup>13</sup> 62.4% of our respondents worked in small and medium sized enterprises: 25.1% with 10 or less employees; 22.1% with 10–29 and 15.1 with 30–59.



levels. We found that those employed as managers and specialists earned 20 to 30% more daily and annual income than ordinary workers.

Fifth, regarding the influence of individual attributes on daily wage discrepancy, 1) neither political capital nor household registration were significant factors; 2) men earned 30% or more wages than women; 3) wages increased up to a certain age, then began to drop off (as Mincer theorized); and 4) individual attributes were significant in explaining wage discrepancy between out-county migrants and in-county commuters.

Six, compared to employment pattern II, patterns II and III allowed workers to enjoy 92% and 109% higher annual incomes, respectively; however, there were no significant differences in daily wages among the three, given similar gender, age group and education level.

Finally, regarding human resources, education level and skill (both measured in terms of years of experience) did influence strongly how wage levels were determined. Primary school, middle school, high school and college graduates earned 29, 25, 31 and 54% higher daily wages than those with less or no formal schooling. Also, among the four groups of graduates, middle school grads earned 33%, high school grads 36%, and college grads 41% more than those with less or no formal education. These figures lead us to conclude that the higher a worker's education level, the more likely he or she is to choose non-agricultural employment and increase work-days in that capacity, a fact that matches other analytical results concerning the influence of education.<sup>14</sup> Skill (accumulated work experience) had a similar affect on daily wages and annual income as education, a fact suggesting that Mincer's theory may be extrapolated to explaining how wages are determined for farm family workers. Furthermore, those presently in cadre positions earned daily wages 60% higher than ordinary villagers, but there is no significant discrepan-

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<sup>14</sup> The wage determination model for out-county and in-county workers showed large economic effects of education. The positive relationship between educational level and wages was 10% significant for in-county workers; but barely significant for migrants, probably because the level of formal education is not valued very highly in the menial labor markets of urban areas where many of them seek employment.

cy in annual income, since cadres work less days than anyone else. (Having former cadre experience was meaningless in explaining wage levels.)

The above analysis has shown that in China, which is gradually becoming embedded in market-based economy, it is the level of human capital possessed by farm family workers that determines (reflects) the levels of the wages they earn in the non-agricultural sector. When combining this finding with that of Hypothesis 2 concerning choice of employment, we can only conclude that the division of labor in any farm household is geared to maximizing its total income.

## Summary

In the present article, we have focussed on the rapid increase over the past 10 years in income disparity among farm families in rural China and tried to analyze quantitatively the causes of such a widening gap using data obtained from questionnaires received from individual farm households. Our task was to investigate the determining factors of four independent variables deemed important in explaining income disparity: total number of days worked per household, the choice of self-employment, the choice of non-agricultural employment (self and hired) and non-agricultural wage levels. As for possible determining factors, we chose three groups of explanatory variables (regional, household and individual) and performed regressions to see how they influenced the above four independent variables. The results are shown in Table 8 and can be summarized as follows.

1. Gender is statistically significant in relation to total workdays, employment patterns and non-agricultural wage levels. Men not only work more days than women, but also tend more to choose non-agricultural occupations. All other conditions being equal, men earn as high as 30% more than women in the non-agricultural sector. Within the division of labor between men and women in the farm family, how employment is sought is one underlying way of maximizing the household's total income. In other words, the theory of subjective equilibrium is applicable to the Chinese rural household.

**Table 8 Relation Between Farm Income, Employment, Wage and Explanatory Variables**

	Explanatory Variables	Per Capita Annual Income	Annual Work-days	Self-Employment	Non-Agricultural Job	Non-Agricultural Wages
Individual Attributes	① Male(Female=0)		+/**		+/**	+/**
	② Age	+/**	+/**	-/**	-/**	+/**
	Age-Squared		-/**			-/**
	③ Non-Agricultural Household (Agricultural=0)	×	-/**	×	×	×
	④ Party Member (Non-Member=0)		×		+/**	×
Human Capital	① Education Level		-/**	×	+/**	+/**
	② Years on the Job					+/**
	③ Cadre Experience (None=0)		×		×	×
	④ Present Cadre (Non-Cadre=0)		×		-/**	+/**
	⑤ Travel Experience (None=0)	×		+/**	+/**	
Household Member Attributes	① No. of Members			×		
	② No. of Adolescents				-/**	
	③ No. of Workers				-/**	
	④ No. of Elderly Members				×	
	⑤ Arable Per Capita	+/ $\Delta$		-/**	-/**	
	⑥ Total Years of Education	+/**		+/ $\Delta$		
	⑦ Labor Ratio	×		-/**		
	⑧ Labor Participation Ratio	+/**				
	⑨ Employment Ratio	+/**				
	⑩ Non-Agricultural Employment Rate	+/**				
	⑪ Management Style	+/ $\Delta$		+/**		
	⑫ Party Membership (None=0)	×		×	×	
	⑬ Cadre Experience (None=0)	×		×	×	
	⑭ Present Cadre Member (None=0)	+/**		-/**	×	
	⑮ Self-Employed (Not=0)	+/**				

Key to Statistical Significance Level:

- \*\*\* 1% or Less
- \*\* 5% or Less
- \* 10% or Less
- $\Delta$  15% or Less
- ×
- not significant
- blank unrelated

Note: +’s and -’s indicate the relationship between the explanatory and independent variables.

2. Age is an individual attribute with important significance in choosing employment and determining wages. We have proved statistically that the hypothesis stating that total workdays and wages increase with age to a certain point then begin to drop off holds for rural China. On the other hand, as age increases, becoming self-employed in the non-agricultural sector is less likely and non-agricultural employment opportunities decrease. Human capital theory seems to apply to how Chinese farm families choose employment.
- 3a. The more years of education a person accumulates, the more days he or she works, especially in the non-agricultural sector, at the cost of time spent working in agriculture. Education is positively significant regarding access to non-agricultural jobs in the case of household members, but insignificant in the choice of non-agricultural self-employment on the part of household heads. The rampant underemployment of farm family labor can therefore be attributed in great part to low levels of education, implying that if measures are not taken to improve educational opportunities in rural China, no alleviation or elimination of its huge supply of surplus labor is in sight.
- 3b. Education is also a significant determinant of wage levels as shown by results using Mincer's wage determination function. Not only are higher education levels related to higher daily wages, but are also important in giving priority to non-agricultural over agricultural workdays, thus leading to higher annual income. The economic effects of education are becoming apparent both in rural labor markets and urban-based menial labor markets formed by rural migrant laborers. Unfortunately, however, educational opportunities available to household members are not always equal. There is a strong tendency to marry within groups having the similar educational level as their parents; therefore, married couples from well-educated families will educate their children likewise, leading to rising educational levels among household members. In other words, educational experience is passed on through generations, a topic that will taken up at another time.
4. The number of years spent working in the non-agricultural sector is also positively significant in the determination of wage

levels, which together with the results concerning education, shows clearly that the market mechanism is functioning well in the allocation of human resources in rural China.

5. Experience of a household head having resided outside his home county for a relatively long period of time was strongly significant both in choosing self-employment and gaining access to jobs in the non-agricultural sector. Such experience constitutes human capital in the broad sense and shows again the normal functioning of the market in allocating resources.
6. On the other hand, political capital (activism) and social capital (cadre positions), which have played important roles in rural China, have lost their influence at least in gaining access to non-agricultural jobs and determining wage levels. Such a phenomenon may be attributable to reliance on economics in the form of marketization replacing reliance on political connections.

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