

Gender Issues in the Training Service Market: Peasant Household Labor Supply in China

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As the growth of agricultural economy continues and the employment structure transforms, gender issues become more and more important when considering the future agricultural development strategy in China. Based on the data collected from Sichuan and Anhui provinces, this paper analyzes the gender difference of labor supply in forestry, animal husbandry, planting and other non-agricultural sectors from different levels of the household life cycle, household affluence and education. Further, it discusses the importance of training services for women and the elderly. It suggests that gender division in the family is an alternative relationship to forestry, animal husbandry, planting and other non-agricultural sectors, which supports Becker's theory of family division comparative advantage. It provides some implications and suggestions to the labor training service providers in China in general and in the rural area in particular. Labor training service providers, such as government agents, NGOs, and private enterprises, should provide different kinds of vocational-skills training to male outdoor-workers, and basic agricultural science and technology training to females.

INTRODUCTION

Currently, the urban workforce training service in China is still less developed, and the rural workforce training service is almost not existent let alone to consider from a gender perspective. The issue of gender differences in the labor market has become one of the focuses of economics research since Becker (1957) proposed discrimination economics. In addition to much attention paid to the labor market participation (Altonji and Blank, 1999; Blau and Kahn, 2003), as well as wages and unemployment (Bowlus, 1997; Polachek, 2004; Azmat, Guell, Manning, 2006), there is a large literature body on gender differences from different sectors, including state-owned sectors (Bian et al., 2000), collective departments (Dong et al., 2004) and private departments (Liu et al., 2000; Fazio and Hughes, 2002; Summerfield, 1994).

Study of gender inequality problems usually adopts labor supply - demand model analysis (Anker, 1997). Judging from the supply side, women with low human capital led to lower labor

production rate, but enterprises needed higher labor skills and experience, so women have had significant limitations. Judging from the demand side, industrial structure and economic organization formats will have very strong effects on women. The rapid development of the third industry has become a positive factor for improving female employment participation (Goldin, 1990; Till and Scott, 1978).

These two aspects produced a mixed influence to women in the labor market. According to the theory of human capital, females usually have less experience and education than their male counterparts; therefore, business firms that pursue maximized profit are reluctant to employ women (Bauer et al., 1992). In addition, studies have shown how the unequal status in the family to affect non-agricultural participation of female. Women in rural areas focus more on agricultural production, and seldom participate in non-agricultural production activities compared with men (Entwisle et al., 1995). In the Chinese rural society, men are economically endowed with more important positions, while women fill the gaps of males.

This paper, from the perspectives of family life cycle, affluence level, and average education level, studies the gender division of family labor supply measures the complementary or substitution relationship of family gender division through an econometric model based on the survey data of 480 farmers' households from Sichuan and Anhui provinces. It will provide some suggestions for labor training services providers in China's labor market.

GENDER DIVISION OF FAMILY LABOR SUPPLY AS DIFFERENT LIFE CYCLE

There is a high-level of correlation between labor supply behavior and family organization, which, just like creatures, has clear stages in their life span as birth, development, shrinkage and death. According to marital status, age, number of kids, the working condition of family members, Family life cycle have several divide standard:

(1) The western economists divide family life cycles into seven stages: the unmarried stage: young, single; newly-married: starting a new family, no kids. "full nest stage 1": young couples with children under 6 years old; "full nest stage 2": the young couples with children above six years old; "full nest 3", mid-aged couples with unmarried children, "empty nest": the old couple separates from married children; "Wei Wang Ren": empty nesters live alone.

(2) Some Chinese scholars divide family life cycles into five stages. The unmarried period: both the young and single; newly-married stage: young couples; full rooms: husband and wife live with dependent children together; empty rooms: children live separates from elderly couple: lonely period: empty nesters live alone.

(3) Other scholars divide family life cycles into six periods: the single stage-unmarried young persons with independent work; newly-married stage-the new couples with no children; reproductive stages- the young couple with small children; children growth stage- gradually developing family with the children accepting education and heading adult; separation stage-retiring with children live independently; Single elderly stag-live alone.

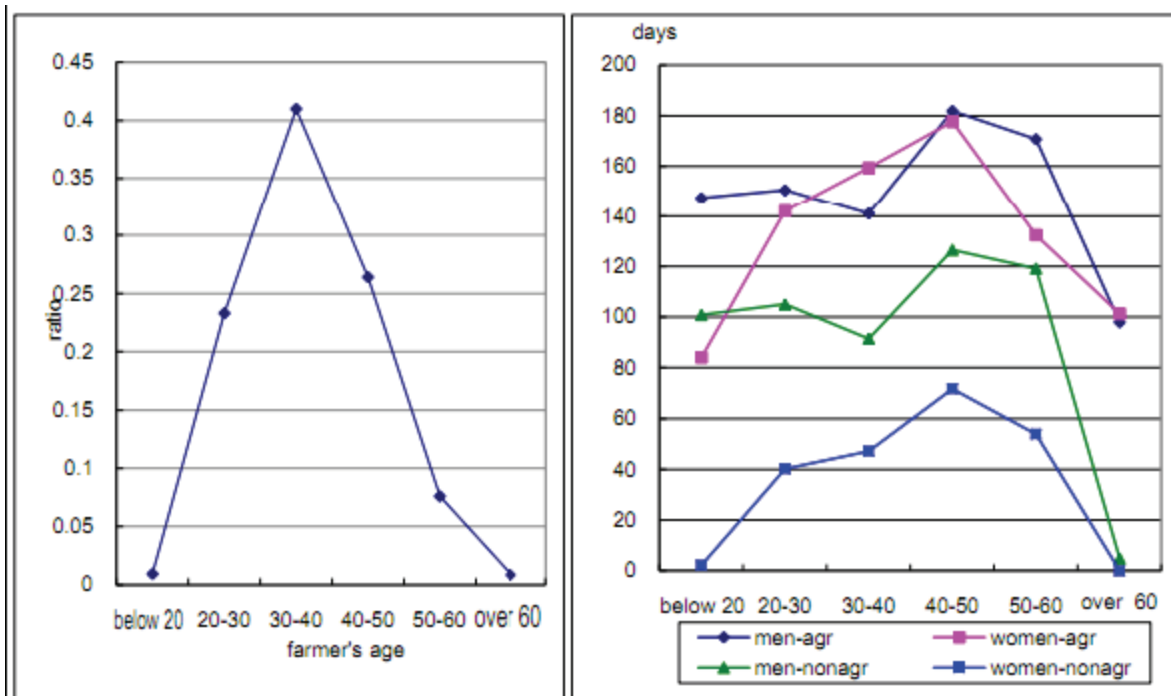
According to age of the head of the household (Shi, 2001), this paper describes life cycle as the following five stages: 1. Family formation stage (under 30 years), namely the age of married to the first child was born. 2. Family extension stages (30-40 years old), namely, all the children are born. 3. Family fostering phase (tending to 40-50 years), namely the last child was born to the first child leave home. 4. Family contraction stage (50-60 years old), namely the first child leave home to the last child leave home. 5. Family empty-nesting stage (60 years old), namely the last child leave home, one of the spouse die.

From the proportion of sample peasant family in different life cycle, it is easy to be seen that

there is normal distribution in different family life cycle. That is to say, the proportion of family formation stage and family contraction stage are less as the proportion of family expansion stage reach a level of 41%, which conforms to the social and economic development logic. In addition, the proportion of family structure meets the above divide methods. The first married age for sample region farm household is earlier as 19 averagely with 1 to 2 children. The average number of minors and labor are increasing in family extension and fostering stages, while the number shrinks to just elderly in empty-nesting stage.

**FIGURE 1
THE PROPORTION OF SAMPLES**

**FIGURE 2
GENDER DIVISION OF LABOR SUPPLY TIME AS DIFFERENT
FAMILY CYCLE**



GENDER DIVISION OF FAMILY LABOR SUPPLY STRUCTURE AS DIFFERENT LIFE CYCLE

The family forming stage, which has the same period of marring and giving birth, labor supply of women will be less than men will. Instead, the extension and fostering stage of family, the labor force will increase labor inputs because family will afford education-supporting and other expenses. In the family empty-nesting and shrinkage stage, labor supply will decrease.

As Figure -2 suggests, labor supply is in a trend of decreasing in whole family life cycle. In the family formation stage, labor inputs of women are far less than men are, only accounts 39% of men, because of raising children. After 30 years old, the family labor inputs rise gradually, at the age of 40-50, agriculture and non-agriculture time of male and female reaches a peak. In later family contraction stages, labor time of male and female declines rapidly as the non-agricultural

labor time tends to be zero. Male and female have different labor time contribution for forestry, planting, animal husbandry and non-agriculture in different stages of family life cycle. In the family formation, extension, fostering stage labor time for crop production and livestock feeding is declining while labor time for non-agriculture is rising.

Entering shrinkage and empty-nesting stage, labor time for crop and livestock is rising while non-agriculture time contribution is declining. This reciprocal relationship with Planting and non-agriculture show that the relationship of family life cycle and planting is “U”-shaped while, for non-agriculture, is inverted "U"-shaped. It should be emphasized that householder aged under 20 contributes most of his time to planting with the reasons as the lack of necessary skills and funds to engage in planting. When the householder aged above 60 years, they are very unlikely to engage in long-term employment especially non-farm work, crop and livestock become preferred. Working time for forestry changes slightly with no exceed 2%, probably because it requires less time contribution.

From the time contribution proportion of different gender, labor supply time in forestry, planting and non-agriculture of male presents a U curve and just opposite to female. It shows the fact that female contributes more time in planting, forestry and non-agriculture in the stage of expansion, fostering and contraction, while in the stage of family formation and empty-nester stage women spends less time.

TABLE 1
FAMILY LIFE CYCLE AND LABOR SUPPLY STRUCTURE

| householder's age | under 20 years old | between 20 and 30 years old | between 30 and 40 years old | Between 40 and 50 years old | Between 50 and 60 years old | Above 60 years old |
|-------------------|--------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------|
| forestry | 0.11 | 0.13 | 0.13 | 0.11 | 0.11 | 0.11 |
| planting | 0.35 | 0.30 | 0.30 | 0.30 | 0.33 | 0.37 |
| livestock | 0.27 | 0.23 | 0.24 | 0.25 | 0.23 | 0.28 |
| Non-agriculture | 0.27 | 0.34 | 0.33 | 0.34 | 0.28 | 0.25 |
| male | | | | | | |
| forestry | 0.77 | 0.67 | 0.64 | 0.69 | 0.78 | 0.84 |
| planting | 0.69 | 0.64 | 0.63 | 0.66 | 0.66 | 0.78 |
| livestock | 0.13 | 0.19 | 0.15 | 0.19 | 0.18 | 0.16 |
| Non-agriculture | 0.98 | 0.77 | 0.73 | 0.71 | 0.80 | 0.92 |
| female | | | | | | |
| forestry | 0.23 | 0.33 | 0.36 | 0.31 | 0.22 | 0.16 |
| planting | 0.31 | 0.36 | 0.37 | 0.34 | 0.34 | 0.22 |
| livestock | 0.87 | 0.81 | 0.85 | 0.81 | 0.82 | 0.84 |
| Non-agriculture | 0.02 | 0.23 | 0.27 | 0.29 | 0.20 | 0.08 |

Explaining labor inputs from the angle of family life cycle embodies the amount of labor input for children's birth and education. The more children and the longer children are educated, the more parents contribute to support them. From the economic perspective, family labor supply is influenced by costs and benefits of child-fostering. But in fact, raising children is far from a simple economic problem, it involves social ethics and social culture, traditions, habits and the influence of social legal system, and therefore a complicated social problem.

GENDER DIVISION OF FAMILY LABOR SUPPLY AS DIFFERENT AFFLUENCE LEVEL

Methods to Classify Family Affluence

(1)The Engel coefficient method: the ratio of food expenses to the living expenses. According to the Engel coefficient family affluence can be divided into 5 levels. The Engel coefficient lies above 59% are least poor families; at 50-59 poor families; at 40-50, average wealthy families; at 30-40%, well-off families; below 30%, wealthy families. But Engel's coefficient is questioned when using to identify family affluence since many factors affect the results, survey suggests that some farmers' Engel coefficient is very low which should be considered to the rich family level, but its actual income is low since some children do not separate their food expenses with their parents though the income is separated. Another reason is that farmers try their best to minimize the food expenses, so Engel's coefficient do not work well here (liu, 2005).

(2)Five equivalent parts method to divide income: order the net income from low to high, the lowest 20% is poor families; at the top 20% are wealthy families, low-income, middle-income and high-income household lies in the middle respectively.

Family net income per person = [(income of forestry -input -tax expenses) + (income of farming -tax expenses – input) + (income of livestock - tax expenses -input) + (income of non-agriculture - expenses)]/number of family members.

The index of family net income per capita comprehensively considered the input and output and the family size, and therefore better reflect the true family affluence level.

FIGURE 3
THE LABOR SUPPLY GENDER DIFFERENCES
AS FAMILY AFFLUENCE LEVEL

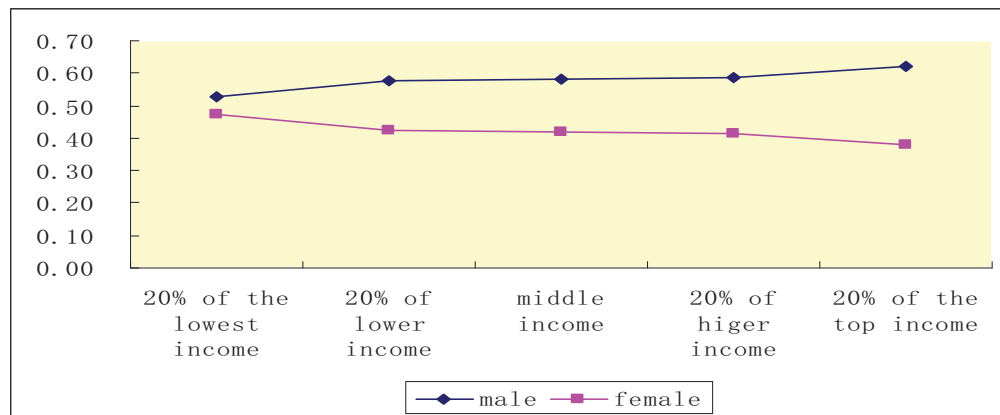


FIGURE 4
FAMILY AFFLUENCE LEVEL AND LABOR SUPPLY STRUCTURE

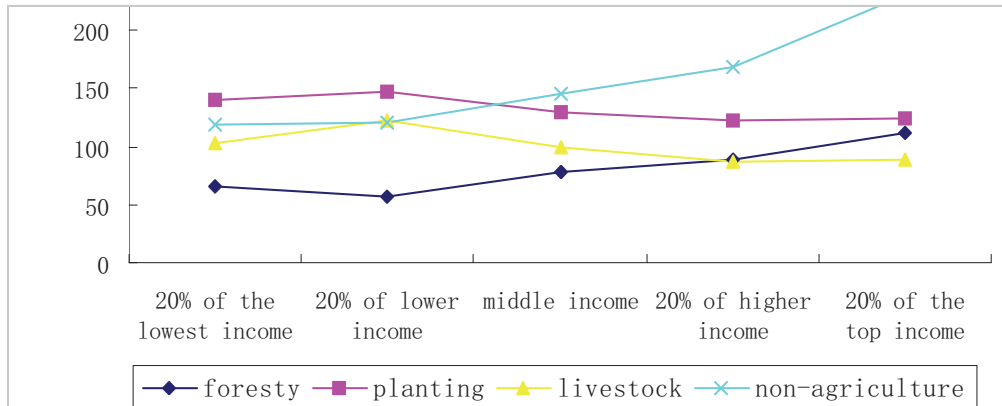


Figure 3 shows labor inputs of men and women in different family affluence level are constantly expanding, that is to say, labor inputs is less when the family income is low. While labor inputs are increasing with family income rising, but labor input of men increase more than women do. The proportion of women is in decline, which is in accordance with Douglas-rule, which indicates the fact that the higher income of the husband, the less labor contribution of the wife. Boserup (1970) pointed out that, in all developing countries, the labor input amount of women is inversely proportional to the family income. The poorer the households are, the longer. The women supply their labor in the agriculture.

Family Prosperity and Labor Supply Structure

Figure 4 suggests that labor inputs of forestry and non-agriculture are gradually increasing while labor inputs of crop and livestock shows the opposite trend from the lowest income households to the highest. For the lowest income households, labor inputs rankings from high to low are as follows: farming, non-agriculture, animal husbandry, forestry. For the highest income households, labor inputs rankings from high to low are as follows: non-agriculture, farming, forestry, animal husbandry. In light of this we can easily conclude that the non-agriculture and forestry have comparative advantages in sample region, low-income families should increase labor inputs of these two industries.

Family Prosperity and Labor Supply Structure Similarity

Given the farmer labor supply behavior in impoverished area is rational, they will transfer from the department of low productivity to high productivity, labor supply structure from different family affluence will have "convergence" feature. In order to compare labor supply structure similarity and changes of different family affluence, the structural similarity indicators is introduced here.

$$S_{ij} = \frac{\sum_{k=1}^4 x_{ik} x_{jk}}{\sqrt{\sum_{k=1}^4 x_{ik}^2 \sum_{k=1}^4 x_{jk}^2}}$$

For women, similarity of labor supply structure in Type (1), x_{ik}, x_{jk} indicate k income proportion from i income group and j income groups, s_{ij} indicate labor supply structure similarity accord to the i and j income group, $K = 1, 2, 3$, on behalf of the forestry, farming and animal husbandry, non-agriculture labor supply in total labor time. From 0 to 1, the higher the coefficient indicates the more similarity, $s_{ij}=1$ mean same structure, $s_{ij}=0$ mean completely different.

According to similarity measurement results, it can be concluded labor supply structure "convergence" or "divergent" feature between the different income groups. Table 2 shows that there are big disparity in labor supply structure of male in 1990. Labor supply structure of high income group (IV and V) are similar more than low-income groups, and low similarity of labor supply structure between I and II, I and II, I and III, I and IV show that family income level and labor supply structure are closely linked. Thus, labor supply structure of different income groups shows a "divergent" feature obviously in 1990.

But from male labor supply structure in 2001, similarity are higher, from 0.91 to 0.99, than that in 1990, in addition, the similarity between adjacent group shows "convergence" feature, similarity of I and II, II and III, IV, III and IV and V, are 0.99, 0.99, 0.98, 1 respectively. The similarity of lowest income and the highest income group are increased from 0.85 to 0.91 between 1990 and 2001. The trend of Labor supply structure of male from different income group is "convergence". For women, similarity of labor supply structure in 1990 is higher than that of men. Female labor supply structure similarity is improving from 0.93 in 1990 to 0.95 in 2001 with more "convergent" feature than men are.

The above analysis show that the labor supply structure of male influence family income more than female in the family labor division. Most of the work done by women in rural area is unpaid, their labor or production is for family instead of market exchange. The unpaid work is in order to meet the needs of the whole family. In the rural society men are the major cash income makers for families.

GENDER DIFFERENCE OF LABOR SUPPLY AS AVERAGE EDUCATION LEVEL

According to the theory of human capital, in a well-functioning labor market, the return of labor supply is determined by its personal labor quality, education process is actually the human capital production process. Education affects not only the performance of individual in the labor market, but also the whole family labor resources allocation and family labor supply structure. Based on the average education level data of the chosen households, we can see 88% of them only received elementary school and junior high school education, while 6% received higher education. Education degree and family net income per capita have a positive correlation, that is to say, the higher average level of family education, the higher net income of family. The net income of the families with more than 9 years education is much higher than others, though labor supply of this group of families is not the longest.

TABLE 2
LABOR SUPPLY STRUCTURE SIMILARITY IN DIFFERENT WEALTHY FAMILIES

| 1990 | | | I | II | III | IV | V |
|------|--------|-----|------|------|------|------|------|
| 1990 | male | I | 1.00 | 0.88 | 0.77 | 0.85 | 0.85 |
| | | II | 0.88 | 1.00 | 0.93 | 0.81 | 0.89 |
| | | III | 0.77 | 0.93 | 1.00 | 0.91 | 0.79 |
| | | IV | 0.85 | 0.81 | 0.91 | 1.00 | 1.00 |
| | | V | 0.85 | 0.89 | 0.79 | 1.00 | 1.00 |
| | female | I | 1.00 | 0.95 | 0.94 | 0.93 | 0.93 |
| | | II | 0.95 | 1.00 | 0.97 | 0.95 | 0.93 |
| | | III | 0.94 | 0.97 | 1.00 | 0.99 | 0.96 |
| | | IV | 0.93 | 0.95 | 0.99 | 1.00 | 0.99 |
| | | V | 0.93 | 0.93 | 0.96 | 0.99 | 1.00 |
| 2001 | male | I | 1.00 | 0.99 | 0.98 | 0.93 | 0.91 |
| | | II | 0.99 | 1.00 | 0.99 | 0.95 | 0.93 |
| | | III | 0.98 | 0.99 | 1.00 | 0.98 | 0.97 |
| | | IV | 0.93 | 0.95 | 0.98 | 1.00 | 1.00 |
| | | V | 0.91 | 0.93 | 0.97 | 1.00 | 1.00 |
| | female | I | 1.00 | 0.99 | 0.99 | 0.97 | 0.97 |
| | | II | 0.99 | 1.00 | 0.98 | 0.95 | 0.97 |
| | | III | 0.99 | 0.98 | 1.00 | 0.99 | 1.00 |
| | | IV | 0.97 | 0.95 | 0.99 | 1.00 | 0.98 |
| | | V | 0.97 | 0.97 | 1.00 | 0.98 | 1.00 |

From the view of average family education and labor supply structure, we can conclude that the higher the average family education, the more time contribute to non-agriculture and the less time to farming, while not much difference in forestry and animal husbandry. It can be said that education is not main factors to influence family labor supply of forestry and animal husbandry.

MALE AND FEMALE OF FAMILY LABOR SUPPLY

The above analysis illustrates that gender division is obvious within families, male mostly engaged in economic activities of higher remuneration, while women are mainly engaged in lower-income economic activities and housework. There are two kinds of theory to explain the relationship between male and female within family labor supply. One is family division theory as a representative of Becker who suggests family division is in accordance with the principle of comparative advantage of labor between men and women, internal differences of comparative advantage are important reason of family internal division, but do not think gender division is on the women's "exploitation", namely men leave not paid work to women.

Another theory is that women have affiliated status in the family; there is no alternative between men and women in many family tasks. Female for economic activity of time is restricted by the obligation of keeping family daily chores, gender division within family limits personal work time. There is rigid labor division between men and women. Men are dominant in the family, so always engaged in economic activities of higher pay economic activities, and leave low or no pay activities to women, such as care for children, old man, housework and so on, which refer to the "first male after female" theory.

In poor areas, which kind of form is gender division either "comparative advantage theory" or "first male after female" theory? In order to answer the above problem, we need to do some experience, there can be show a correlation in rural family labor utilization degree of men and women regardless of hypothesis. It involves at least two such issues: First, are there substitute mutually or complementary relationship of employment time between men and women? If there are substitute mutually relationships, the principle of comparative advantage is more important, conversely, if there are complementary indicating that the "first male after female" play the role. Second, are there alternative or complementary each other between men and women engaged in agricultural labor time and non-agricultural labor time? In order to answer the above questions, we separately analyze the following five regression models (Gong XY,2010):

$$Y_m = Y_f + N \quad \text{①}$$

$$Y_{am} = Y_{af} + Y_{nm} + Y_{nf} + N \quad \text{②}$$

$$Y_{af} = Y_{am} + Y_{nm} + Y_{nf} + N \quad \text{③}$$

$$Y_{nm} = Y_{af} + Y_{am} + Y_{nf} + N \quad \text{④}$$

$$Y_{nf} = Y_{af} + Y_{am} + Y_{nm} + N \quad \text{⑤}$$

Y_m 、 Y_f 、 Y_{am} 、 Y_{af} 、 Y_{nm} 、 Y_{nf} 、 N respectively represent male all labor time, female all labor time, male agricultural labor time, female agricultural labor time, male non-agricultural labor time, women non-agricultural work time, and family labor number N as control variable, Table 3 shows the regression results:

TABLE 3
THE RELATIONSHIP BETWEEN MALE AND FEMALE OF FAMILY LABOR SUPPLY

| variables | Y_m | | Y_{am} | | Y_{af} | | Y_{nm} | | Y_{nf} | |
|-----------|--------------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|--------|
| | coff | T | coff | T | coff | T | coff | T | coff | T |
| Y_f | -0.47 *** | -26.37 | — | — | — | — | — | — | — | — |
| Y_{am} | — | — | — | — | -0.51 *** | -38.45 | -0.16 *** | -7.80 | -0.17 *** | -10.35 |
| Y_{af} | — | — | -0.55 *** | -38.45 | — | — | -0.07 *** | -3.11 | -0.20 *** | -12.14 |
| Y_{nm} | — | — | -0.10 *** | -7.80 | -0.04 *** | -3.11 | — | — | -0.19 *** | -15.58 |
| Y_{nf} | — | — | -0.17 *** | -10.35 | -0.19 *** | -12.14 | -0.32 *** | -15.58 | — | — |
| N | 24.27 | 13.06 | 9.14 | 7.83 | 11.79 | 10.56 | 14.35 | 9.66 | 16.96 | 15.09 |

| | | | | | | | | | | |
|--------------------|--------|-------|--------|------|--------|-------|--------|------|--------|-------|
| | *** | | *** | | *** | | *** | | *** | |
| | 63.01 | 10.71 | 24.22 | 6.39 | 38.53 | 10.66 | 46.63 | 9.70 | -30.04 | -8.08 |
| con | *** | | *** | | *** | | *** | | *** | |
| F | 653.24 | | 496.18 | | 488.81 | | 118.76 | | 193.14 | |
| obs | 3702 | | 3702 | | 3702 | | 3702 | | 3702 | |
| Prob > F | 0 | | 0 | | 0 | | 0 | | 0 | |
| Adj R ² | 0.26 | | 0.35 | | 0.35 | | 0.35 | | 0.17 | |

Using equation ①, we tried to verify correlation of employment time between male and female. In the equation, male all labor time is the dependent variable, female all labor time is the independent variable, meanwhile we introduce family labor force number as the control variable. Estimation results show that, (1) variable coefficient of female all labor time is negative, and statistically highly significant, which shows that there is substitute each other of employment time between male and female labor. That is to say, increasing of male labor employment time will decrease of female labor employment time, and vice versa.

We use equations ②-⑤ trying to verify the relationships of male non-farm labor time, male farm labor time, female non-farm labor time, female farm labor time. We found that farm and non-farm labor time for men and women are with all alternative relationship, also statistically highly significant; the substitution role of female farm labor time for male farm labor time is bigger than that of female non-farm labor time for male non-farm labor time and vice versa.

For example in other conditions under the same, if male agricultural labor time increased 100 days, female agricultural labor time will reduce 55 days accordingly; male non-agricultural labor time adds 100 days, female non-agricultural labor time only decreases 32 days. If female agricultural time increased 100 days, male agricultural labor time will reduce 51 days, and female non-agricultural time increased 100 days, male agricultural labor time only decreases 19 days. (3) The same gender in agricultural labor time and non-agricultural labor time are existing substitution relationships within family, namely increasing agricultural labor time will reduce non-agricultural labor time, and vice versa.

From the above analysis, we can conclude that comparative advantage is more important than complementary. Family division is mainly based on the market relative price of family members, though the assumption is not practical at different rates to replace. This division and "character difference" is produced, because efforts to ascend family life quality will inevitably suffer limitations of complementary and alternative relationship of family production process, and restriction by the family members owned different skills and earn ability generated by the comparative advantage.

CONCLUSION AND SUGGESTIONS

Gender division of family labor supply reflects different life cycle. Labor supply of male in the forest, planting and non-agriculture presents a modality feature with big at both ends and small in the middle while women are opposite. Women spend less time in the family startup period because of the burden of giving birth and fostering children. Gender division of family labor supply illustrates different affluence level. The labor inputs of men and women in different family affluence level are in accordance with Douglas -rule, which indicates the fact that the

higher income of the husband, the less labor contribution of the wife. Households' affluence level is relevant with not only the amount of labor supply of men but with the structure of it. Men play more important role in family income than women.

The same and different gender in agricultural labor time and non-agricultural labor time are existing substitution relationships. We can conclude that comparative advantage is more important than complementary. Family division is mainly based on the market relative price of family members, though the assumption is not practical at different rates to replace. This division and "character difference" is produced, because efforts to ascend family life quality will inevitably suffer limitations of complementary and alternative relationship of family production process, and restriction by the family members owned different skills and earn ability generated by the comparative advantage. However, governments, NGOs, and private labor tainting institutions should provide different kinds of vocational skills training for male outdoor-workers, such as electrician, welder, fitter. As to women, they need more basic agricultural science and technology training, such as advertising agricultural varieties, teaching agriculture new planting technology.

Gender division within family is to realize the family utility maximization. In order to allocate labor resources and implement rural policy effectively, women and elderly need more attentions to be paid. This of course creates good opportunities for labor training service marketers. It is suggested that all the labor training service institutions, regardless government agents, NGOs, or private training firms, should strengthen education and training for female and elderly, whose role in agricultural production is becoming more and more important in the contemporary China. Most of the rural women do not have systematically accepted regular training in modern agricultural science and technology. The ability to understand and master modern agriculture by women is not competitive, which is obviously against agricultural modernization and new rural construction development, thus strengthening rural women and elderly agriculture technology training is not only the need of agriculture modernization, also the need of new rural construction and harmonious society.

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