Effect of the family life cycle on the family farm scale in Southern China

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Abstract: This study empirically analyses the impact of family life cycles on the family farm scale of rural households in Southern China. The ordered Probit modelling is applied to examine the survey data that comprise 2040 valid questionnaires distributed in 88 villages of the Fujian province in China. The family life cycle has a remarkable influence on the family farm scale as a whole. The numbers of children and farming people in a family have a positive significant effects on the family farm scale. In addition, the individual characteristics of female householders have significant effects on the family farm scale. Meanwhile, the family characteristics differ at five defined stages of the family life cycle. The study covers the gap in the literature on the effects of family structure on the rural household economic behaviour, in particular, on the impact of the family life cycles on the family farm scale.

Key words: farmland scale, ordered Probit modelling, rural Chinese households

Since 1978, China has carried out a 'household responsibility system' alongside with the 'decollectivizing production', by which it encourages people to develop the private sector and township enterprises. As such, agricultural operations and rural non-agricultural industries have returned to a production system based on the family (Walder and Zhao 2006). In other words, the family is the centre of the rural economic reform and transformation in China (Gao 1994; Jacka 1997). An important feature of the household responsibility system is to distribute the rural farmland proportionately to the population, taking the village as a unit in order to achieve the greatest degree of fairness from farmers' viewpoints. The average family farm scale of rural households was 7 mu in 1986 and 8.3 mu[1] in 1990, according to a survey of 5389 villages of 205 counties and 29 provinces in China (Chinese Ministry of Agriculture 1991). The Chinese government believes that the problem of small-scale family farms is that the income of farmers from agricultural production is low and the application of large agricultural machinery is limited.

The Chinese government first encouraged farmers engaged in non-agricultural industries to buy and sell farmland freely in 1987 in order to expand the family farm scale of rural households. This has been emphasized in each subsequent year. A large number of rural labourers shifted to non-agricultural industries from 1978. The highest number of rural labourers was 390 million in 1991, but they are reducing gradually and their number fell to 250 million in 2012. While rural labourers comprised 70.5% of the national labourers in 1978, they made up only 33.6% of the national labourers in 2012 (National Bureau of Statistics 2013). The target to expand the family farm scale of rural households has not been achieved and, in fact, the average family farm scale of rural households has declined steadily from 8.3 mu in 1990 to 7.78 mu in 1995, 7.43 mu in 2000, and 7.12 mu in 2009 (Chinese Office of Rural Fixed Observation Points 2010). One of the important reasons for the decreasing scale of the national farmland is that farmers engaged in non-agricultural industries are not willing to sell farmland. The phenomenon of part-time farming is widespread (Brosig et al. 2009). Questions arise as to why the phenomenon of part-time farming is widespread. Obviously, it is difficult to explain this phenomenon by the theory of scale economy in the neo-classical economics. Then, it should be considered whether it could be explained by the theory of the 'moral economy' proposed by J.C. Scott.

[1]'Mu' is a commonly used land unit in China; 1 mu equals 0.0666667 hectares.

In addition, researchers have found that the phenomenon of part-time farming is related to the 'pendulum' characteristics of China's rural labour flow, which means that rural labourers go to cities for non-agricultural work and then return to the rural areas for farming; this movement may occur several times back and forth (Li et al. 2009). Pickles and Davies 1991) believe the 'pendulum' characteristics of China's rural labour flow is related to the family life cycle, and the rural labour flow can be divided into two stages by the life cycle: going to cities for work when young and returning to rural areas for farming or business when old. According to Lin. et al. (2011), nearly 70% of labourers returning to rural areas are affected by the family factors. More than one half return to take care of the aged and children. Thus, the family life cycle factors are important reasons for the 'pendulum' characteristics concerning the rural labour flow.

Obviously, small-scale family farms, part-time farming, the 'pendulum' characteristics of the rural labour flow, and the family life cycle form a mutually related chain. Thus, further questions arise. Which factors of the family life cycle affect the scale of family farms? Why does the family life cycle affect the family farm scale choice? Can the theory of the 'moral economy' or 'substantive economics' explain the family farm scale choice of China's rural households? This study attempts to address these questions through an empirical analysis.

LITERATURE REVIEW

Family life cycle concept and classification

The family life cycle concept was first proposed by Sorokin et al. (1931). The classifications of the family life cycle stages are divergent, and the most widely accepted classification is that proposed by Glick (1947). The family life cycle can be divided into six stages: formation, expansion, stabilization, shrinkage, empty nest, and disintegration, which are arranged by Hohn (1987), as shown in Table 1.

Many scholars have amended and perfected the classification of the family life cycle based on the Glick's method. Lansing and Morgan (1955) conduct a classification of seven stages of the family life cycle using variables for a householder's age and the minimum age of a child. Wells and Gubar (1966) extend this classification and construct nine stages of the family life cycle. Murphy and Staples (1979) introduce the family life cycle concept into the non-traditional family and divide the family life cycle into 13 stages by adjusting the classification of Wells and Gubar (1966). Gilly and Enis (1982) redefine the family life cycle as 13 more complete stages in order to describe the changes of American families better.

Family life cycle, social relations, and farms

Debates about the future and influencing factors of small-scale agriculture can be traced back to the classical economics period. For example, K.J. Kautsky points out that the small-scale agriculture is flexible and easy to operate, and its viability is far beyond people's expectations. Dramatically, from the 1920s, there have been differences in opinion regarding the theory of the 'rational peasant' which is supported by the economists T. Schultz and S. Popkin. A.V. Chayanov, K. Polanyi, and Scott clearly oppose the universalization of economic rationality in Western economics. In addition, they emphasize that farmers are both production and consumption units and their economic behaviour is embedded in social relations. That is, their behaviour is geared to meet the consumption needs of the family members, and thus, they cannot be explained by the principle of profit maximization.

Table 1. Glick's classification of the family life cycle

Family life cycle stage	Beginning and end event	
	beginning event	end event
I formation	marriage	birth of the first child
II expansion	birth of the first child	birth of the last child
III stabilization	birth of the last child	leaving home of the first child
IV shrinkage	leaving home of the first child	leaving home of the last child
V empty nest	leaving home of the last child	death of one spouse
VI disintegration	death of one spouse	death of the other spouse

The Soviet economist Chayanov started to research the impact of family life cycles on small-scale family farms from the 1920s. In his view, the rural households' operational and farmland consumption decisions are not separated under the conditions of the small-scale peasant economy and self-sufficiency. Farm economy inputs are decided by the balance between 'the hard degree of labour' felt by producers and 'consumer satisfaction'. The number of labourers in a family can be viewed as operational supply and the number of consumers can be viewed as the consumer demand. Therefore, this labour-consumption ratio determines the amount of economic activity of the rural household as well as the scale of the farm; this is known as the 'labour-consumer equilibrium theory'. After much investigation and statistical analysis, Chayanov finds that the labour-consumption ratio changes cyclically at the circulatory family life cycle stages. Therefore, the changes of the family life cycle stages also determine the scale of farms (Chayanov 1921), which later is known as the 'family life cycle determinism'.

Some scholars argue that the small-scale farming is a widely embedded explanation for social relations. Polanyi criticizes the analysis method that pursues the market and profit maximization, and the utility of the 'rationalist' globalism. He points out that before the capitalist market economy appeared, economic actions were embedded in social relations, and thus, economic actions should be seen as a socially constructed nature, which is substantive economics (Polanyi 1944). Scott puts forward the concept of 'moral economy' in his studies of the Southeast Asian small-scale farms. He points out that farmers who are survival-oriented adhere to the 'safety first' principle. In average, they prefer to avoid the economic disaster rather than risk maximizing returns. They would rather choose a strategy of lower but more stable returns than the one of high income and higher risk returns. This 'survival ethics' constitutes the principles and basis of many technical, societal, and moral decisions in the pre-capitalism agricultural order. Reciprocity and the survival of moral rights are closely embedded in the village life (Scott 1977). F. Fukuyama researches small-scale family farms from a social trust perspective. He argues that China, South Korea, southern Italy, France, and Latin America have low trust societies in which the individuals regard their families as the core with a strong sense of 'family' (Fukuyama 1995). In addition, he believes that trust can make the operation of organizations more effective and family farms have

the same characteristics (Fukuyama 2001). Liu et al. (2010) finds that rural trust, rural specification, and rural networks play an important role in establishing and managing agricultural organizations. In most of these organizations, financing, product demand information, and product trading are easily obtainable by the relationships with rural acquaintances.

Family life cycle and rural household behaviour

Many scholars have studied the relationship between the family life cycle and the rural household behaviour over the last 20 years. On the relationship between the family life cycle and farmland operations, they find that farmland operations change with the changes of the family life cycle, family labour, capital accumulation, and consumption preferences (Perz 2001; Walker et al. 2002; Barbieri 2006). Clay and Johnson (1992) find that the farm scale and the household scale are causally related. When more farmland is operated, the higher income is used to support a larger family. In addition, a larger scale family needs more labour to operate the farmland. This is called the 'land-labour demand hypothesis'. Pichón (1997), Sydenstricker and Vosti (1993) and Walker et al. (2002) point out that the changes of the household scale, level of family property, and fixed residence time have an impact on the extent of deforestation and land coverage with changes in the family life cycle. In developed countries, such as those in Europe and North America, the family farm sector relies heavily on the intergenerational succession (Mishra et al. 2010). In addition, some scholars pay attention to the relationship between the successors and the family farm succession. Fischer and Burton (2014) argue that the family farm succession is by nature socially constructed rather than a matter of the 'rational' choices. The window of opportunity for constructing a 'natural' successor identity is to foster passion, pride, and connectedness to the farmland from the beginning of childhood.

THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

Classification of Chinese family life cycle

Glick's classification method with certain limitations does not adapt to the Chinese family life cycle (Yu and Liu 2007). First, in the rural China,

Table 2. Classification of the family life cycle stages

	Symbol	Stages
I	The household division with parents and without children	Young couple family
II	With children aged under 16 years and only two people aged 16–60 years	Growing nuclear family
III	With people aged 16–60 years	Mature nuclear family
IV	With children aged under 16 years, people aged 16 to 60 years, as well as in the 60-plus years	Extended family
V	Parents living alone after the household division	Empty nest family

the establishment of a new family begins with the property separation, not marriage. In general, parents are in charge of their children's marriage. In addition, the newly married couples live together with the parents for a long or short time after the marriage. During this period, the new family is not established because the married children have no independent income. The new family is established when the married children have achieved independent incomes after the separating from the original family. Second, in the disintegration process of a family, older parents will be incorporated into the family of married children that have the most ability to lose labour. This means that the original family has vanished, although the form remains. Third, the new family established from the married children achieves an independent income after living with parents for some time. Furthermore, the stages of the family life cycle overlap with the extended family when older parents live with their married children who are most able to lose labour. Thus, the stage changes of the family life cycles in rural China are more complex. The above-mentioned circumstances differ to Glick's classification.

In this study, the Chinese family life cycle is classified by five stages according to the actual situation of rural Chinese families and the purpose of this study (Table 2). The stages are: (I) young couple family; (II) growing nuclear family; (III) mature nuclear family; (IV) extended family; and (V) empty nest family.

Family life cycle, rural labour shifts, and family farmland scale

Most of the China's rural labourers have shifted to cities for non-agricultural work. However, they are not willing to sell their farmland. Women and older people comprise high proportions of rural agricultural workers under the widespread phenomenon of part-time farming (De Brauw et al. 2002). This is related to the pendulum characteristics of the

China's rural labour shifts (Haiguang et al. 2013). On the one hand, only some rural labourers in a family can go to cities for work and others must take care of the minors and elders. The remaining labourers can undertake part-time farming to increase income (Brosig et al. 2009). On the other hand, the reserved farmland and part-time farming thereon are considered as the last living security for the farmers in the event of losing work in the cities or needing to return to the rural areas for any reason (Lin et al. 2010). Thus, the phenomenon of part-time farming is mostly passive.

In fact, the most important factors behind instability and the pendulum characteristics of China's rural labour shifts are the different manners of implementing the household registration management system, social welfare, and the social security system in rural areas and cities, including compulsory education, children's medical insurance, and endowment insurance (Taylor et al. 2003). Rural labourers can freely go to cities for work and are free to live in the cities but they cannot enjoy the social welfare and social security benefits of cities, and the family's household registration cannot be moved to the cities. The most typical examples are as follows.

Case 1: The children of farmers working in the cities can receive nine years of the compulsory education but cannot participate in the college entrance examinations in the cities. Thus, the children have to return to the rural areas to participate in the college entrance examinations by the end of the high school stage. Accordingly, many farmers choose to return to the rural areas to take a better care of their children (Research Group of the State Council 2006).

Case 2: Endowment insurance has begun to spread in rural China in the recent years but the pension service facilities are lacking currently; thus, elderly people with self-care difficulties rely mainly on their adult children to care for them. It is both a cultural requirement and a legal obligation for children to care for their elderly parents. In order to reduce the

cost of caring for the elderly, many children have to return to the rural areas (Lin et al. 2011).

Case 3: Two different social security systems are implemented in the China's rural areas and cities. The medical insurance of farmers working in cities is limited and the cost of medical care is higher in cities than in rural areas. Because diseases increase with age, many farmers are forced to choose to return to the rural areas (Kung 2002).

The urgency and frequency of the above-mentioned problems are different at different stages of the family life cycle. In addition, the following factors will change the family life cycle of the China's rural households: the average life expectancy is growing; the compulsory education is universal; the higher rate is dropping sharply because of the China's birth control policy. These factors, in turn, will affect the rural labour shifts and the family farm scale (Chen and Liu 2009).

Social relations, return of labourers, and family farm scale adjustment

In Chinese cities, the discrimination against migrant workers is widespread. Migrant workers find it difficult to integrate into urban societies and this is an important reason why the migrant workers return to rural areas. Based on the questionnaire survey in Fujian province, we find that the close friends of rural migrant workers in their cities of employment are mostly the fellow townspeople. Such migrant workers account for 52.38% of the sample. Migrant workers whose close friends are mostly other migrant workers account for 17.26%, and migrant workers with close friends who are mostly urban residents account for only 14.29%. Migrant workers with no close friends account for 16.07% (Lin et al. 2012).

Only 14.85% of migrant workers who return to rural areas choose to engage in the entrepreneurship or business; most choose farming. Most of those engaged in farming cultivate only their own land, cultivate a small amount of land from other farmers, or reacquire their transferred farmland. However, a few purchase more land from other farmers to establish a professional profit-making agricultural enterprise. In order to restrict the urban industrial and commercial enterprises or residents from acquiring rural land, the Chinese government encourages rural farmers to buy farmland from other farmers to establish specialized agricultural enterprises and also encourages farmers to sell farmland to others.

However, the establishment of agricultural enterprises requires farmers to master the advanced technologies. More importantly, the farmer should accumulate good social relations in order to obtain loans from the local credit cooperatives or rural banks. Zhang (2008) surveys 397 farmers in the Henan province and evaluates the farmers' social capital according to the rules and specifications of social interaction, mutual benefit, and trust. Farmers are delineated according to the high, medium, and low social capital groups. Zhang finds that the high social capital group obtains the highest loans and has the highest loan probability from the formal financial institutions, while the low group obtains the opposite.

Farmer participation and the labour-consumption model

The family has been the decision-making centre for family farm scale during the 30 years of the economic reform in China's rural areas. The extent of the farmers' participation in rural markets is deepening, in agricultural operations and other aspects. However, the China's rural production and consumption is far from complete and the farmers simply participate in the 'part of the imperfect market' (Ellis 1993). This means that the farmers in rural Chinese households can be regarded simultaneously as the units of production and the units of consumption. In addition, production and consumption can be divided into two parts, the subsistence and commercial; in this regard, only the commodity production and consumption can engage in marketing activities (Zhang 1997). The average proportion of the commodity grains to the national grain output is 55%, but in the Southern areas, this proportion is 30%.

Farmers participate in part of the imperfect market in China's rural areas. The decision of each family's farm scale does not depend entirely on the cost and profit accounting, but partially takes into account the family demand for agricultural products. The family farm scale is relatively larger if the family population is higher at some stages of the family life cycle, and vice versa.

Research hypotheses

The impact of the family life on the family farm scale is from the farm labour and consumption (Figure 1). Therefore, this study proposes the following research hypothesis.
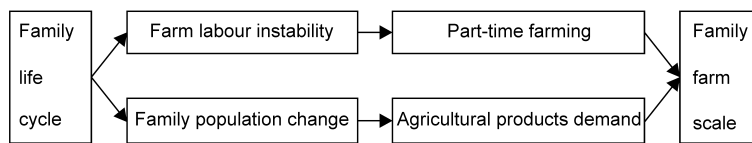
Figure 1. Impact of the family life on the family farm scale

Hypothesis 1: Different stages of the family life cycle have a significant influence on the family farm scale.

We draw the next three hypotheses according to the number of farm labourers and the agricultural product demand.

Hypothesis 1a: The number of family members has significant positive effects on the family farm scale.

Hypothesis 1b: The number of children has significant positive effects on the family farm scale.

Hypothesis 1c: The number of family farm labourers has significant positive effects on the family farm scale.

Hypothesis 2: The female householder's age, the age at first marriage, the education level, and other individual characteristics have significant effects on the family farm scale.

When children return to the place of the household registry to go to school, they must be taken care of, alongside the elderly, at various stages of the family life cycle. The female householder may choose to return to the rural area to care for the children and elderly, while the male householder may remain in the city for work. At this time, the engagement in part-time farming becomes a common choice of the female householders. Thus, their age, the age at first marriage, the education

level, and other individual characteristics may have significant effects on the family farm scale.

DATA SOURCES AND ANALYSIS

Data sources

The data in this study are obtained from the questionnaires prepared and organized by our research group in the Fujian province.

We adopt a three-stage random sampling method to select the valid subjects. In the first step, we randomly select one district in the Xiamen city and three counties in each of the other eight cities of the Fujian province. There is the total of 24 counties plus 1 district chosen randomly. In the second step, among these 25 counties and district, we randomly select 4 villages in every county in which the population exceeds 0.5 million, and 3 villages in every county in which the population is less than 0.5 million. There are in total 88 villages chosen randomly. In the third step, we randomly select 27 interview subjects in each of the 88 villages, giving a total of 2376 interview subjects chosen randomly. There are a total of 2323

Table 3. Independent variables grouping and explanation

Groups	Variables	Explanation
Family characteristic variables	Total population of family X_1	Measures the size of the family scale
	The number of labourers in family X_2	Measures the family labour supply
	The number of farming people in family X_3	Reflects the status of engaged in farming
	The number of children in family X_{10}	Reflects the child-rearing situation in the family
	The family life cycle stages X_{11}	Young couple family = 0; Growing nuclear family = 1; Mature nuclear family = 2; Extended family = 3; Empty nest family = 4
	The number of minors in family X_{12}	Reflects pure consumers in the family
Individual characteristic variables	*The male householder age X_4*	The existing age
	The first marriage age of the male householder X_5	Reflects the family life cycle length
	The education years of the male householder X_6	Reflects the education of the male householder
	The female householder age X_7	The existing age
	The first marriage age of the female householder X_8	Reflects the family life cycle length
	The education years of the female householder X_9	Reflects the education of the female householder
	The education years of the largest children X_{13}	Reflects the education of the children

Table 4. Family farm scale of rural household samples

Family farm scale (mu)	Households	Percentage (%)	Cumulative percentage (%)
< 2	1 408	69	69
2.01–5	416	20.4	89.4
5.01–10	144	7.1	96.5
>10.01	72	3.5	100

questionnaires taken back, and 2040 questionnaires are valid after rejecting the invalid questionnaires.

The consideration of variables

Willing grades for the land scale operation of rural households are chosen as the dependent variable and include the four grades of the discrete variables. If $Y = 1$, grade 1 indicates the existing operational land scale is less than or equal to 2 mu; if $Y = 2$, grade 2 indicates the existing operational land scale is more than 2 mu but less than or equal to 5 mu; if $Y = 3$, grade 3 indicates the existing operational land scale is more than 5 mu but less than or equal to 10 mu; and if $Y = 4$, grade 4 indicates the existing operational land scale is more than 10 mu.

The independent variables can be divided into two groups: the family characteristic variables and the individual characteristic variables, according to our family life cycle concept definition and the research required (see Table 3).

In particular, the education years of the male and female householders and the oldest children are tested in the model because levels of consciousness and

Table 6. Statistics of the family life cycle stages

Stages	Number	Percentage (%)	Cumulative percentage (%)
Young couple family	116	5.69	5.69
Growing nuclear family	426	20.88	26.57
Mature nuclear family	1 096	53.73	80.29
Extended family	378	18.53	98.82
Empty nest family	24	1.18	100.00

culture within the rural household greatly influence the family farm scale. The first marriage ages of the male and female householders can reflect the family life cycle length. In general, the younger the age at first marriage is, the longer is the family life cycle and the greater is the impact on the family farm scale.

The status of family farm scale

Most family farms in the Fujian rural areas are very small. According to the agricultural census data of the Fujian Province in 2006, the average family farm scale of rural households is 5.27 mu and up to 78.1% of rural households have family farms of less than 5 mu. We find from the survey data that the majority of family farms of rural households are very small (Table 4).

Descriptive statistics

The basic characteristics of the selected variables are described in Table 5, including their maximum, minimum, average, and standard deviation. The sta-

Table 5. Descriptive statistics of the variables

Variables	Minimum	Maximum,	Average	Standard deviation
Total population of family X_1	2	10	4.64	1.285
The number of labourers in family X_2	0	8	2.74	1.245
The number of farming people in family X_3	0	4	1.09	0.872
The male householder age X_4	25	69	44.40	7.563
The first marriage age of the male householder X_5	17	46	23.43	3.308
The education years of the male householder X_6	0	13	6.83	3.347
The female householder age X_7	23	65	42.20	7.180
The first marriage age of the female householder X_8	14	46	21.55	3.125
The education years of the female householder X_9	0	15	4.76	3.593
The number of children in family X_{10}	0	6	2.58	1.269
The number of minors in family X_{12}	0	17	8.84	4.084
The education years of the largest children X_{13}	0	4	0.83	0.872

tistical results reflect the reality of rural China at present. Table 6 shows statistics for the family life cycle types. The cumulative percentage of growing nuclear families and mature nuclear families is 74.61%, but the cumulative percentage of young couple families plus empty nest families is less.

MODEL CONSTRUCTION AND ANALYSIS

Model construction

We choose the Probit model (McKelvey and Zavoina 1975). The general expression for the ordered Probit model is as follows.

$$Y_i^* = aX_i + \varepsilon_i$$

where Y_i^* is the estimate value of the dependent variable, a is the coefficient of X_i, $X_i(i = 1, 2, 3, 4)$ is the independent variables vector, and ε_i is the random entry meeting the standard normal distribution.

Empirical results and analysis

Table 7 shows the test results for the impact of the family life cycle on the family farm scale of rural

households using the statistical software SPSS16.0. In this test, we remove the small sample size of the empty nest family stage in order to make the family life cycle phase samples representative.

From Table 7, we see that the effects of most variables on the family farm scale are very significant, which shows that the family life cycle has a remarkable influence on the family farm scale as a whole. Our analysis of the estimation results of Table 7 is as follows.

The individual characteristics of the female householders have significant effects on the family farm scale. Table 7 shows that the effects of the remaining variables for the male householders on the family farm scale are not significant, except for the male householder's age, but the effects of all variables for the female householders on the family farm scale are significant. The effect of the education years of children on the family farm scale is not obviously significant (sig. = 0.064).

The total family population has a negative correlation to the family farm scale, and the number of children in a family has a positive correlation to the family farm scale. The higher the family population is, the smaller the family farm scale is. This is mainly

Table 7. Estimation results for the impact of the family life cycle on the family farm scale of rural households

Variables	Coefficient	Standard deviation	Wald value	Significant
Total population of family X_1	−0.102	0.028	13.592	0.000
The number of labourers in family X_2	0.074	0.028	7.005	0.008
The number of farming people in family X_3	0.188	0.034	30.98	0.000
The male householder age X_4	−0.036	0.016	4.797	0.029
The first marriage age of the male householder X_5	−0.007	0.02	0.121	0.727
The education years of the male householder X_6	−0.015	0.011	1.965	0.161
The female householder age X_7	0.044	0.017	6.899	0.009
The first marriage age of the female householder X_8	−0.056	0.02	7.615	0.006
The education years of the female householder X_9	0.05	0.011	19.988	0.000
The number of children in family X_{10}	0.063	0.03	4.249	0.039
The number of minors in family X_{12}	−0.017	0.009	3.441	0.064
The education years of the largest children X_{13}	0.215	0.049	19.577	0.000
Young couple family ($X_{11} = 0$)	0.125	0.412	0.092	0.762
Growing nuclear family ($X_{11} = 1$)	−0.823	0.278	8.78	0.003
Mature nuclear family ($X_{11} = 2$)	−0.878	0.237	13.74	0.000
Extended family ($X_{11} = 3$)	−0.773	0.254	9.234	0.002
Threshold 1	−1.164	0.46	6.394	0.011
Threshold 2	−0.372	0.46	0.653	0.419
Threshold 3	0.191	0.461	0.171	0.679

because there may be people from multiple generations in the family with more members. Young children are more pressured to go to cities for work, while the older parents stay in the rural area for farming; thus, the family farm scale is smaller. The number of children in the family is positively correlated to the family farm scale, but the positive effect is smaller when the regression coefficient is relatively smaller. The effect of the number of minors in a family on the family farm scale is positively significant, and the regression coefficient for the number of minors is far greater than that for the number of children.

The number of labourers in a family, especially the number of farming people, has a significant positive correlation effect on the family farm scale. The will to operate the farm is stronger when there are greater numbers of labourers and farming people in a family.

From the impact of the family life cycle stages on the family farm scale, the remaining stages have a significant negative impact on the family farm scale, except for the young couple family stage. The effect of the young couple family on the family farm scale is not significant; this indicates that the attitudes of the newly married independent young people to the family farm scale differ.

CONCLUSION AND DISCUSSION

This study empirically analysed the relationship between the family life cycles and the family farm scale. The results support the Hypotheses 1b, 1c, and 2. However, the effect of the young couple family on the family farm size is not significant, and the effects of the growing nuclear family, the mature nuclear family, and the extended family on the family farm scale are significantly negative. These results reflect that the 'moral economy' and 'substantive economics' can explain the China's family farm scale and the rural household behaviour.

The principle of 'safety first' is an important factor affecting the family farm scale and the rural household behaviour. Chinese society is in a period of transformation from the planned economy to a market economy; at the same time, there is a transition from the traditional to modern agriculture.

There are more rural households that operate small family farms in China than those that pursue profits because farmers are on the edge of survival and the pursuit of survival and safety comes first. To a great degree, the principle of 'safety first' explains the phe-

nomena of both part-time farming and small-scale family farming in China. The more than 30 years of development from 1978 have proved that the average scale of family farms is in decline, which is decided mainly by the family labour resource allocation and the demand for agricultural products. In fact, this is also true in other transition countries. For example, according to Harcsa's (1993) survey of the Hungarian rural areas, there is an increasing trend toward small-scale rural households and it is difficult to explain this economic behaviour by the means of traditional economics.

The principle of 'safety first' has different manifestations in different stages of the family life cycle. In the growing nuclear family stage, there are more minor children and the family burden is heavier, so labours have to care for children at home. Rural households will expand the family farm scale to meet the demand for more agricultural products. On the other hand, in the mature nuclear family and extended family stages, the adult children are more likely to choose to work in cities and let the elderly parents stay in the rural households to farm. Thus, in both stages, there is a weaker will to expand the family farm scale and to meet the demand for agricultural products as a priority. In addition, many male householders have chosen to engage in the non-agricultural work with relatively high incomes, while the female householders are left at home to take care of the families and are engaged in farming. Thus, the phenomenon of women farming has become more common, which is beneficial for the care of minor children and elderly parents as well as to meet the family demand for agricultural products. Obviously, the 'labour–consumer equilibrium' theory proposed by Chayanov has a partial explanatory power for the China's family farm scale and the rural household behaviour, and it should be combined with the principle of 'safety first' proposed by Scott to develop new features.

The rural household's choice of the family farm scale has a socially constructed nature, which differs with the changes of the family life cycle. Family forms the core of the China's rural society and the family organization is the most basic unit of rural society. Blood relations are the most important form of relationship in the rural social structure, which leads to the emphasis on family priorities and heeding the personal interests of the family. In addition to blood relations, the geopolitical relationships are important for farmers. Generally, in the Chinese rural society, the social relations network is a fundamental social

resource and forms extremely important social capital for farmers. The economic behaviour of small-scale rural households is embedded in complex social relations networks (Lin et al. 2011). The social security in Chinese rural areas is weaker, so many rural households maintain the part-time farming while going to work in urban areas, which can reduce the risk of non-agricultural employment and maintain the social relations networks in rural areas. According to the China's 'land management law', when farmers are not farming their land, it must be sold to other farmers. However, there is not always someone willing to buy this rural land. If the farmland is abandoned and cannot be sold, it is taken back by the rural collective organizations, which means the farmer loses his/her economic ties with the rural community. In addition, farming a certain scale of farmland is an important way of life for older farmers in rural areas who choose to integrate into the formation of long-term communities, to establish the communication networks among elderly communities, to build trust among the community members, and to obtain the help and care from neighbours and relatives. Therefore, older farmers are willing to maintain the small-scale family farm (Liu et al. 2010). Clearly, as the family life cycles change, the older farmers, especially the empty nest families, are more dependent on the social relationships of each rural community. Older farmers generally choose to maintain the small-scale family farm to meet the demand for agricultural products.

However, the attitude of young people to family farms is an important problem. In fact, they are mimicking their parents' choices. Many young people have worked in cities, grown up in cities, and even been educated in cities. However, they cannot enjoy the social security benefits of cities because the family's household registration cannot be moved to cities, unless he or she has achieved a university qualification. On the other hand, in rural areas, young people have some legal rights, including free farmland, are allowed to have two children, to obtain a farmland subsidy, and to enjoy lower costs for the medical and endowment insurance. Thus, most young couples inherit their parents' farmland to take part in the part-time farming when their older parents cannot continue to farm. In China, there are almost no family farm succession problems like those of developed countries.

At the same time, for small-scale farming operations, technology, information, and even mechanical work can be provided by specialized agricultural services to improve the performance of agricultural production.

In the North China Plain and the Northwest Loess Plateau, large harvesters have been used widely to replace manual harvesting of wheat and corn through the use of professional cooperatives and services.

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