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The Role of Entrepreneurship in Raising the Level of Relative Income and Subjective Well-Being of Farmers in China

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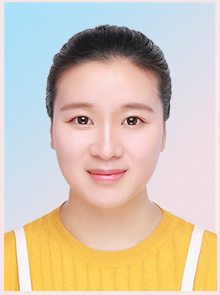

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Abstract. Entrepreneurship belongs to the category of initial distribution of income. The article raises questions whether entrepreneurship plays a positive role in the process of achieving the overall welfare of Chinese farmers, whether it contributes to increasing the level of their relative income and whether it can increase their subjective happiness. A theoretical hypothetical model "farmer entrepreneurship – relative income level – happiness" is constructed, and empirical analysis is carried out based on the data of the "Thousand Villages Survey" project, implemented by Shanghai University of Finance and Economics. First, we consider the impact of entrepreneurship on raising the level of relative income of Chinese farmers; then we analyze the impact of entrepreneurship on their sense of happiness. Finally, we use the mediator effect model to test the role of relative income level as a mediator in the process of influence of entrepreneurship on farmers' sense of happiness. The study has found that across China entrepreneurship does indeed contribute to the increase in the level of farmers' relative income, demonstrating the "enrichment effect"; it also contributes to the increase in their level of subjective sense of happiness, demonstrating the "happiness effect"; and the level of relative income plays a partial mediating role in this process. Thus, the sense of happiness of farmers engaged in entrepreneurship arises due to an increase in the level of their relative income and also due to the process of entrepreneurial activity itself. On this basis, it is recommended that state authorities and relevant structures actively promote the concept of "mass entrepreneurship and innovation" in rural areas, create a favorable environment for rural entrepreneurship, encourage farmers to become entrepreneurs, and promote the concept of "mass entrepreneurship and innovations" for rural entrepreneurship, encourage farmers to do business in order to increase their relative income and enhance their sense of happiness, thereby contributing to the overall financial and spiritual well-being of rural residents.

Key words: general well-being, farmer entrepreneurship, relative income level, sense of happiness.

Introduction

Entrepreneurship belongs to the category of initial distribution of income and is a distribution in which the income of an entrepreneur is directly related to such factors of production as labor, capital, land, knowledge, technology, management and costs invested in the business process. The article considers issues whether entrepreneurship is relevant in the process of achieving the general well-being of Chinese farmers[1], whether it contributes to an increase in their relative incomes[2] and whether it can increase their subjective happiness? The aim of the research is to determine the impact of entrepreneurship on increasing the relative incomes of Chinese farmers and enhancing their sense of happiness. The objectives of the work include the construction of a theoretical hypothetical model and conducting an empirical analysis based on data from the "Thousand Villages Survey"[3] project implemented by the Shanghai University of Finance and Economics. First, the impact of entrepreneurship on increasing the relative incomes of farmers (the so-called "enrichment effect of farmers due to entrepreneurship") is being investigated. Second, the influence of entrepreneurship on enhancing the sense of happiness of Chinese farmers (the so-called "happiness effect of farmers due to entrepreneurship") is being studied. Finally, using the mediator effect model, the role of the relative income level as a mediator in the process of influence of entrepreneurship on farmers' happiness is tested[4].

Currently, a significant amount of studies has been accumulated in the academic environment on the topic of farmer entrepreneurship, and some scientists have specifically considered the relationship between farmer entrepreneurship and happiness (Wang Qiong, Huang Weiqiao, 2020; Markussen et al., 2018), as well as between entrepreneurship of farmers and their incomes (Yuan Fang et al., 2019; Yu, Artz, 2019; Gu Jiarun, Xie Fenghua, 2012), however, the general relationship between farmer entrepreneurship, income level and happiness has been overlooked. In the presented article we aim to fill this gap. The novelty and contribution of the work are as follows: first, the role of the relative income level in the process of influence of entrepreneurship on farmers' happiness is tested, it is found that entrepreneurship affects the happiness of farmers not only directly, but also indirectly, through the impact on their income levels; second, the important role of farmer entrepreneurship in promoting the general well-being and happiness among the rural population of China has been identified, which provides a theoretical basis for the development and improvement of policies to support entrepreneurship among farmers by the relevant authorities.

[1] Common prosperity is a political term of the People's Republic of China, meaning that all members of society live happily, in prosperity and lead a wonderful cultural life in favorable financial circumstances. This is the main goal of the development of socialist market economy in China.

[2] Relative income is an income that is compared with incomes of other people; absolute income is an objective income that represents the actual income of an individual.

[3] The "Thousand Villages Survey" project is a major social practical and research project organized by the Shanghai University of Finance and Economics, which focuses on the "three rural" issues. The questionnaire is usually addressed to farmers in rural areas.

[4] The "enrichment effect" refers to the process of increasing individual wealth under the influence of certain factors. The "happiness effect" refers to the process of increasing an individual's happiness level under the influence of certain factors.

Theory and hypotheses

The hypothesis of the "enrichment effect" of farmers-entrepreneurs

Farmer entrepreneurship[5] is the process of adding value by the rural population of China by opening enterprises, creating farms or businesses of a certain scale or with certain characteristics, or engaging in individual commercial activities (Luo Mingzhong, Chen Ming, 2014). Research works on the relationship between entrepreneurship and farmers' incomes tend to be negatively affected by the limited data of field studies covering China's large rural population, which makes quantitative research difficult. Currently, conclusions on whether entrepreneurship contributes to increasing farmers' incomes remain controversial. For example, (Gu Jiarun, Xie Fenghua, 2012), analyzing the data from statistical yearbooks, found that in the eastern and central regions of China entrepreneurship has a positive impact on the growth of farmers' incomes, whereas in the western regions there is an inverse relationship. The research (Yuan Fang et al., 2019) demonstrated that farmer entrepreneurship contributes to poverty reduction only in the eastern and northeastern regions, and in the central and western regions this effect is insignificant. Therefore, the impact of farmer entrepreneurship on the income level requires further research, especially using the data of field studies covering rural areas of China.

Theoretically, entrepreneurial activities reorganize factors of production and marshal them, as well as resources, for achieving new goals, which, in turn, develops into social wealth with higher value (Guo Cheng, He Anhua, 2017). Farmers-entrepreneurs, using factors such as their labor, creativity and natural resources, engage in entrepreneurial activities and gain income through the market exchange of products they produce or services they provide. As a rule, successful entrepreneurship can lead to an increase in the income level. For example, (Yu, Artz, 2019) investigated the choice of entrepreneurship among Americans with higher education and found that in the case of choosing rural entrepreneurship, their incomes were significantly higher than those of rural workers. However, it is worth noting that entrepreneurship is a high-risk economic activity. For example, rural entrepreneurship faces long manufacturing cycles, dependence on external factors such as weather, and often a lack of innovation. Entrepreneurship's entry barriers lead to a high concentration of farmers in the same industries, to the phenomenon of homogeneity of products and services, and the general competitiveness of entrepreneurs remains low. Moreover, the probability of failure in business is quite high. According to statistics, in 2015–2016 the failure rate of farming startups in Heilongjiang Province was about 30% (Li Gang, 2018), which, on the contrary, could reduce the level of farmers' incomes. However, due to entrepreneur-friendly policies (mass innovation, mass entrepreneurship), the business environment in rural areas of China is gradually improving. We assume that at the national level farmer entrepreneurship contributes to an increase in the relative income levels of farmers, which means that farmer entrepreneurship has an "enrichment effect". Based on this, the first research hypothesis is put forward.

H1: Entrepreneurship contributes to an increase in the relative incomes of Chinese farmers and has an "enrichment effect".

[5] A farmer is a person with a rural residence permit in China; farmer entrepreneurship is the entrepreneurial activity of this group; rural entrepreneurship is the entrepreneurial activity carried out in rural areas.

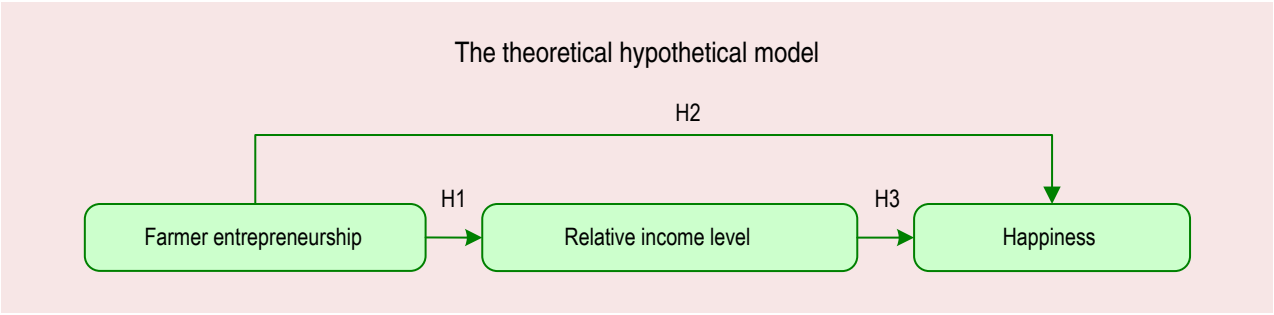
The hypothesis of the impact of entrepreneurship of farmers on their subjective well-being

Subjective well-being (SWB) is a general assessment of an individual's quality of life based on his or her own standards (Diener, 2000), which represents subjective feelings of joy and pleasure based on satisfaction and a sense of security. Although there are many works on the relationship between entrepreneurship and subjective well-being (Ravina-Ripoll et al., 2021; Xu Haiping et al., 2020; Teixeira et al., 2020; Liu Pengcheng et al., 2019; Blanchflower, Oswald, 1992), there are relatively few studies focused on the subjective well-being of farmers-entrepreneurs. Due to strict regulation and many factors affecting the business environment, farmers face huge obstacles in their activities (McElwee, 2006). (Wang Qiong, Huang Weiqiao, 2020) argue that not all farmers can achieve subjective well-being through entrepreneurship, as it depends on their motivation, type of business and other factors. The research (Martin, Verheul, 2012) demonstrated that entrepreneurship can harm farmers' health and, consequently, significantly reduce their subjective well-being. Despite some challenges, rural entrepreneurship continues to have a positive impact on the subjective well-being of farmers, which may be associated with an increased sense of independence, utility and interconnectedness (Markussen et al., 2018). For example, (Rui Zhenyun, 2017) notes that local entrepreneurship among migrants can not only bring satisfaction from achieving great results, but also enhance a sense of subjective well-being by realizing one's potential, raising social status, satisfying higher-level needs. We believe that entrepreneurship contributes to the improvement of the subjective well-being of farmers and propose the second research hypothesis.

H2: Entrepreneurship contributes to the improvement of the subjective well-being of Chinese farmers and has the effect of "increasing satisfaction".

The hypothesis of the mediator effect of the relative income level

Since (Easterlin, 1974) put forward the paradox of "happiness and income", the uncertainty in the relationship between income and subjective well-being has drawn the attention of researchers who began to study various aspects such as family, job, emotional state, interpersonal relationships etc. (Xu Yingmei, Xia Lun, 2014; Wang Yanping, 2017). Research works demonstrate a complex relationship between absolute and relative incomes and their impact on happiness. Numerous studies have established a positive correlation between absolute and relative incomes and subjective well-being, and the influence of relative income is often more significant (Ball, Chernova, 2008; Verme, 2013). The Easterlin paradox demonstrates that an increase in absolute income does not necessarily lead to an increase in subjective well-being, whereas an increase in relative income can considerably increase the level of happiness. Currently, Chinese scientists adhere to three main points of view on the relationship between income and subjective well-being: a positive, negative or insignificant correlation. Most studies support the positive impact of income on the subjective well-being of farmers (Xiong Caiyun et al., 2014; You Liang et al., 2018), since farmers' incomes in China are generally lower than those of urban residents; therefore, an increase in both absolute and relative incomes can increase their subjective well-being. The main factors influencing the subjective well-being of farmers are the improvement of their quality of life and horizontal comparison with home folks (Liao Yongsong, 2014). An increase in relative incomes



is likely to cause an increase in the subjective well-being of farmers (You Liang et al., 2018; Xu Haiping et al., 2020). However, most of these research works are of theoretical nature and are not supported by empirical data. In our work, it is assumed that entrepreneurship can influence the subjective well-being of farmers through changes in the level of relative income. Based on this, the third hypothesis is put forward.

H3: The level of relative income acts as a mediator in the process of influence of entrepreneurship on the subjective well-being of Chinese farmers.

The theoretical hypothetical model constructed in this article is presented in the *Figure*.

Research design

Data description

Data of the "Thousand Villages Survey" project, implemented by the Shanghai University of Finance and Economics, were used in the work. The project examined the current entrepreneurship situation in rural areas of China. The survey was conducted by approximately 2,200 lecturers and students of the Shanghai University of Finance and Economics, who have been doing research and obtaining interviews in 31 provinces (autonomous regions and direct-administered municipalities) of China for a month. A total of 1,209 villages were surveyed in mainland China. A team of 30 lecturers from Shanghai University of Finance and Economics, leading a group of 302 students, conducted targeted studies in 30 counties of 22 provinces (autonomous regions and direct-administered municipalities) of China. The objects for targeted studies were selected using the method of multistage systematic disproportional probability sampling.

In particular, first, 30 counties were selected based on the probability of a sample proportional to the population, then two cities were chosen in each county, after that – 10 administrative villages. Finally, 5 households with entrepreneurs and 10 households without entrepreneurs were randomly taken from each selected village. In addition, as part of the research, a team of 1,886 students from Shanghai University of Finance and Economics, who used their summer holidays and returned to their homeland in order to conduct research, was organized. Each returning student did research in one or two villages. As a result of targeted studies and homecoming, more than 30,000 questionnaires were distributed, including those for mayors, chairpersons of village committees (secretaries), members of village committees[6],

[6] Criteria for selecting students to participate in the survey: (1) understanding the local dialect in order to successfully communicate with local residents; (2) participation in similar social research, having some practical experience; (3) the village from which students return should be representative and meet the basic principles of sampling; (4) preparatory strict training before conducting the study.

Table 1. The number of respondents and their territorial distribution

Territory	Rural residents	Farmers	Proportion (%)	Territory	Rural residents	Farmers	Proportion (%)
East China	512	3548	43.05	West China	333	2190	26.57
Beijing	8	49	0.59	Inner Mongolia	13	76	0.92
Tianjin	7	37	0.45	Guangxi	25	179	2.17
Hebei	64	429	5.21	Chongqing	34	246	2.98
Shanghai	135	893	10.83	Sichuan	60	405	4.91
Jiangsu	81	592	7.18	Guizhou	45	300	3.64
Zhejiang	77	562	6.82	Yunnan	43	303	3.68
Fujian	23	139	1.69	Tibet	5	26	0.32
Shandong	71	539	6.54	Shaanxi	33	177	2.15
Guangdong	39	272	3.30	Gansu	27	205	2.49
Hainan	7	36	0.44	Qinghai	13	77	0.93
Central China	298	2050	24.87	Ningxia	7	36	0.44
Shanxi	36	267	3.24	Xinjiang	28	160	1.94
Anhui	68	382	4.63	Northeast China	66	454	5.51
Jiangxi	49	345	4.19	Liaoning	22	145	1.76
Henan	73	562	6.82	Jilin	26	180	2.18
Hubei	28	186	2.26	Heilongjiang	18	129	1.57
Hunan	44	308	3.74	Total	1209	8242	100

Source: data of the "Thousand Villages Survey" project.

as well as for entrepreneurs and non-entrepreneurs among rural residents. According to the logic of the study, questionnaires of entrepreneurs and non-entrepreneurs were retrieved from the database, and after excluding some questionnaires with contradictory answers and missing data, a total of 8,242 valid questionnaires were received, of which 3,113 were questionnaires of entrepreneurs and 5,129 were those of non-entrepreneurs. The number of respondents and their territorial distribution are presented in *Table 1*.

Definition of variables

Dependent variables[7]: the level of relative income (*Income*) and happiness (*Happiness*). The analysis of the "enrichment effect" of Chinese farmer entrepreneurship compares the annual average total household income of farmers over the past three years with the average income level in the village to determine whether the farmer is highly profitable compared with other villagers. When analyzing whether entrepreneurship can increase the happiness of Chinese farmers, the subjective happiness is used.

Explanatory variable: whether the farmer is engaged in entrepreneurship (*Entrepre*). Regardless of whether the "enrichment effect" of entrepreneurship or the "happiness effect" is analyzed, the fact of farmer entrepreneurship is used as an explanatory variable.

Control variables: when analyzing the "enrichment effect" of entrepreneurship among Chinese farmers, gender, age, health status, education level,

[7] The article studies several models. When testing the H1 hypothesis, the dependent variable is set as the level of relative income of farmers; when testing the H2 and H3 hypotheses, the dependent variable is set as the level of happiness of farmers.

skills and parents' occupation are selected; when studying the "happiness effect", gender, age, health status, education level, relative income level and region of residence are selected. The selection criteria are as follows.

Gender. The research (Kong Lingwen, 2018) demonstrated that the trend of bridging the gender income gap is more noticeable in low-income groups compared with high-income ones. Traditional gender stereotypes in China, according to which men are engaged in employment outside the home and women do household chores, significantly constrain women's incomes and widen the income gap with men through mediator factors such as education, marriage, working hours and profession status, especially in rural areas of China, where patriarchy and traditional gender roles prevail. Therefore, it is expected that gender differences may affect farmers' income level. In addition, studies demonstrate that gender also affects personal happiness, but the question of who is happier – men or women – remains a matter of debate in academic community. For example, the research (Graham, Chattopadhyay, 2012) demonstrates that all over the world, except the poorest countries, women's happiness level is often higher than that of men. The empirical research (Huang Jiawen, 2013) demonstrated that the happiness level of men in cities is lower than that of women. However (Shmotkin, 1990) argues that women's limitations and restrictions in work, leisure, and family status reduce their sense of happiness compared with men. Therefore, although it is impossible to determine exactly who is happier – male farmers or female farmers – it is expected that gender will affect the happiness of farmers.

Age. People at different stages of life usually have different income levels; as a rule, incomes gradually reach a maximum in adulthood and then decrease, so it is assumed that the influence of age on farmers' incomes has the form of an inverted U. In addition, age is also an important factor affecting the level of life satisfaction. Studies demonstrate that there is a U-shaped relationship between age and happiness: young people and elderly people tend to be happier than middle-aged people (Diener, 2000). This phenomenon may be caused by the fact that middle-aged people have more family obligations and are more likely to experience work-related stress than young and elderly people.

Health. Health status can also determine a person's income, especially for farmers engaged and not engaged in entrepreneurship. In most cases, they earn their living by physical labor, and the deterioration of their health can significantly affect income. Empirical studies confirm that health status is usually positively associated with income (Jiang Qiuchuan, 2015). Therefore, it is expected that the physical health of farmers will have a certain impact on their incomes. In addition, health status also usually affects the assessment of life satisfaction. Deteriorating health often causes people to suffer from more diseases, which affects their quality of life and happiness. In this regard, it is assumed that the worse the health of farmers, the lower their subjective happiness will be.

Education level (*Educ*). Education is always an important factor influencing the income levels of individuals. Studies demonstrate that farmers' education significantly increases agricultural incomes per acre of land cultivated, with the impact of women's education being particularly noticeable (Panda, 2015). Raise in the level of education of farmers can effectively increase their incomes (Le Junjie, 2008). In addition, some research works have demonstrated that the level of education can

affect the happiness of individuals, but the direction of influence varies from positive (Blanchflower, Oswald, 2004) to negative (Clark, 2003). Therefore, we also include the level of education as a control variable in the analysis of the impact of farmer entrepreneurship on income and happiness.

Skills. Farmers can sometimes get appropriate allowance for their work due to their skills. According to research works, the development of entrepreneurial and commercial skills is crucial for income and productivity growth. Farmers work in a complex and regulated environment, which can hinder entrepreneurial activities (McElwee, 2006). Nevertheless, well-directed efforts can improve farmers' skills and incomes. A social media-based program aimed at young small farmers demonstrated that within five years their commercial skills and incomes increased, which led to higher profits (Gever et al., 2023). In connection with the above, we consider skills as a control variable.

Parents' occupation (*Parents*). The income level is subject to intergenerational transmission (Qi Shouwei, 2016). Parents, partly reducing their own consumption, invest in the human capital of their children, allowing them to benefit from future income. Children from wealthy families have more opportunities to receive educational resources compared to children from low-income families, and differences in parents' incomes are mainly due to differences in their professions. Therefore, it is expected that the profession of parents has indirect impact on the income level of children, affecting their level of education. During the farmer survey, no direct influence of the profession of parents on the happiness of children was found, therefore, the profession of parents will not be included in the analysis as a control variable.

Relative income level (*Income*)[8]. Income level usually affects personal happiness. Both absolute and relative incomes are positively related to the level of happiness, but the influence of relative income is usually more significant (Ball, Chernova, 2008; Verme, 2013). However, (Easterlin, 1974) proposed the "paradox of income and happiness", arguing that after reaching a certain income level in a country, the relationship between income and happiness becomes unnoticeable. Therefore, within the framework of our research, the level of relative income will be included as a control variable for analyzing the happiness effect of farmers' entrepreneurial activities.

Region. Currently, there are differences in the income levels of farmers from urban and rural areas, as well as between different regions in China. Although regional differences may affect income levels, this article compares the average annual income of farmers over the past three years with the average level in their village to determine whether a farmer is highly profitable in his or her place of residence, so regional differences will not affect the selection of high-income farmers. Thus, the region will not be included in the analysis as a control variable while investigating the enrichment effect of entrepreneurial activities. However, differences in income levels by region can lead to divergence of subjective happiness of farmers, therefore, while studying the impact of farmer entrepreneurship on his or her sense of happiness, the region will be taken into account as a control variable.

[8] While researching the "enrichment effect" of farmer entrepreneurship, the relative income level is a dependent variable; while researching the "happiness effect" of farmer entrepreneurship, the relative income level will be considered as a control and mediator variable.

Table 2. The variables and descriptive statistics (N = 8242)

Variable type	Variable name	Value	Frequency	Percent (%)
Dependent variable	*Relative Income Level*	1 = A farmer with a high income (above the village average values)	2367	28.7
		0 = Other farmers (not higher than the village average values)	5875	71.3
	Happiness	0 = Very unhappy	12	0.15
		1 = Unhappy	408	5.0
		2 = So-so	793	9.6
		3 = A bit happy	1039	12.6
		4 = Happy	3511	42.6
		5 = Very happy	2479	30.1
Independent variable	*Entrepreneurship*	1 = Yes	3113	37.8
		0 = No	5129	62.2
Control variable	*Gender*	1 = Male	5788	70.2
		0 = Female	2454	29.8
	Age	From 20 to 80 years old	-	-
	Health Status	From 1 to 8, the greater the number, the worse the health	-	-
	Education Level	From 1 to 5, the greater the number, the higher the education level	-	-
	Skills	1 = Yes	2780	33.7
		0 = No	5462	66.3
	Parents' Occupation	1 = At least one of the parents was engaged in other activities besides farming	2169	26.3
		0 = Both parents have always farmed for a living	6073	73.7
	Region	1 = East	3548	43.0
		2 = West	2190	26.6
		3 = Central	2050	24.9
		4 = Northeast	454	5.5

The variables and descriptive statistics are presented in *Table 2*.

Econometric models and empirical analysis

Measurement model

1. The model of the "enrichment effect" of farmer entrepreneurship. Considering that the level of relative income as a response variable is a binary choice, a binomial logit model is used for empirical analysis when studying the effect of increasing the welfare of farmers and entrepreneurs. The econometric equation is given as follows:

$$ln(\frac{P(Income_i = 1|X_i)}{1 - P(Income_i = 1|X_i)}) = \partial_0 + \partial_1 Entrepre_i + \\ + \sum_j \partial_j \times Control_i + \varepsilon_i \quad (1)$$

Equation (1) is called model 1, its purpose is to test hypothesis H1. $P(Income_i = 1|X_i)$ represents the probability that the i-farmer is a high-income farmer, X_i represents all explanatory variables and control variables. As noted above, gender, age, health status, education, skills and occupation of the parents were selected as control variables.

2. The model of the "happiness effect" of farmer entrepreneurship. To study whether entrepreneurial activities can increase the happiness of farmers, namely to test the H2 hypothesis, the subjective happiness of farmers was used as a response variable, and the need to start a business was chosen as an explanatory variable. Gender, age, health status, education, relative income level and region were selected as control variables. Since the response variable has several categories, and the data in this research are set up in a wide format, the multinomial logit model (MNL)[9] is used for empirical analysis. The measurement model is given by equation (2), which is called model 2.

$$P(Happiness_i = j|\mathbf{X}_i) = \begin{cases} \frac{1}{1+\sum_{k=2}^{J} exp(\mathbf{X_i'\beta_k})} & (j=1) \\ \frac{exp(\mathbf{X_i'\beta_j})}{1+\sum_{k=2}^{J} exp(\mathbf{X_i'\beta_j})} & (j=2,\ldots,J) \end{cases} \quad (2)$$

3. The model of the mediator effect of the relative income level. As mentioned above, entrepreneurship can directly and indirectly affect the subjective well-being of farmers. In order to deeply analyze the process and mechanism of the impact of farmer entrepreneurship on their subjective well-being and test the H3 hypothesis, we have built a model of the mediator effect "farmer entrepreneurship – relative income level – subjective well-being". The mediator variable in this case is the level of relative income, the independent variable is whether farmers start their own business, and the dependent variable is subjective well–being. The test procedures are based on equations (3) – (5). ∂ in equation (3) reflects the influence of entrepreneurship on the subjective well-being of farmers, if mediators are not taken into account; β in formula (4) represents the impact of entrepreneurship on the level of relative income; δ in formula (5) reflects the influence of the level of relative income of farmers on their subjective well-being. ∂' indicates the direct impact of entrepreneurship on the subjective well-being of farmers after taking into account the mediator variable (relative income level).

$$Happiness_i = C_1 + \partial \times Entrepre_i + \\ + \gamma_1 \times Control_i + e_1 \quad (3)$$

$$ln(\frac{P(Income_i = 1|\boldsymbol{X_i})}{P(Income_i = 0|\boldsymbol{X_i})}) = C_2 + \beta \times Entrepre_i + \\ + \gamma_2 \times Control_i + e_2 \quad (4)$$

$$Happiness_i = C_3 + \partial' \times Entrepre_i + \\ + \delta \times Income + \gamma_2 \times Control_i + e_3 \quad (5)$$

Testing is carried out in three stages: first, the significance of the ∂ coefficient of equation (3) is checked; second, the significance of the β coefficient of equation (4) is checked; third, the significance of the δ and ∂' coefficients of equation (5) is checked. If all the coefficients (∂, ∂' and δ) are significant, then there is a mediator effect. At the same time, if the ∂' coefficient is not significant, then the mediator effect is full; if ∂' is significant, but $\partial' < \partial$, then this effect is partial.

Empirical analysis

1. Analysis of the "enrichment effect" of farmer entrepreneurship. In order to study whether entrepreneurship can increase the income levels of Chinese farmers, a regression analysis was performed using model 1 for all 8,242 farmers-entrepreneurs and non-entrepreneurs. The econometric model is represented by formula (1). The regression results are presented in the three left columns of *Table 3*. Among them: the coefficient of expediency of starting a business is 1.335, it is significant at the level of 1%, and the corresponding probability coefficient is 3.799. Consequently, when the control variables remain unchanged, the probability that the income of farmers who decide to start a business is above the village average is

[9] Although the dependent variable is an ordered sequence, the assumption of parallel slopes has not been met, so the ordered multiclass classification model is not used. Due to limitations on the volume of the article, the testing process is not presented.

Table 3. Regression results of the binary logit model of the impact of entrepreneurship on the well-being of farmers

Variable		Model 1		East	West	Central	Northeast
		Coefficient	Probability ratio	Coefficient	Coefficient	Coefficient	Coefficient
Independent variable	*Entrepreneurship*	1.335*** (0.054)	3.799	1.268*** (0.081)	1.510*** (0.105)	1.326*** (0.110)	1.040*** (0.236)
Control variables	*Gender*	0.198*** (0.062)	1.219	0.212** (0.092)	0.299** (0.121)	0.114 (0.130)	-0.031 (0.275)
	Age	0.081*** (0.015)	1.084	0.070*** (0.022)	0.082*** (0.030)	0.143*** (0.035)	0.103 (0.073)
	Age squared	-0.001*** (0.000)	0.999	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001 (0.001)
	Health Status	-0.149*** (0.034)	0.862	-0.159*** (0.058)	-0.179*** (0.065)	-0.112* (0.068)	-0.086 (0.126)
	Education Level	0.297*** (0.026)	1.346	0.250*** (0.038)	0.371*** (0.051)	0.341*** (0.060)	0.302** (0.118)
	Skills	0.159*** (0.055)	1.172	0.152* (0.083)	0.221** (0.108)	0.089 (0.112)	0.171 (0.258)
	Parents' Occupation	0.276*** (0.060)	1.318	0.406*** (0.085)	0.140 (0.130)	0.234* (0.128)	0.084 (0.293)
	Intercept	-4.061*** (0.367)	0.017	-3.801*** (0.554)	-4.162*** (0.691)	-5.603*** (0.852)	-4.175** (1.753)
Data points		8242		3548	2190	2050	454

Note: ***, **, * indicate that the evaluation results are significant at the levels of 0.01, 0.05 and 0.1, respectively; the numbers in parentheses represent robust standard errors.

3.799 times higher than that of farmers who are not engaged in entrepreneurship. In other words, across China, entrepreneurship does help farmers raise the relative income level, which supports the H1 hypothesis and demonstrates that farmer entrepreneurship leads to enrichment.

In addition, the regression results of model 1 indicate that when other variables remain unchanged, the probability that the income of male farmers will be above the village average is 21.9% higher than that of female farmers. This indicates a significant gender inequality in the income of farmers in rural areas of China; the probability that income will be above the village average is 8.4% higher per each year of life of the surveyed farmers, but it tends to decrease gradually with age, so the effect of age on income is an inverted U-shaped curve; the good health and higher education level of the surveyed farmers have a significant positive impact on their relative incomes; the probability that qualified farmers will have an income above the village average is 17.2% higher than that of unskilled ones; also, the probability that farmers' income will be above the village average is 31.8% higher if at least one of their parents not always farmed, rather than if both parents farm.

Moreover, as already mentioned, (Gu Jiarun, Xie Fenghua, 2012) and (Yuan Fang et al., 2019) came to different conclusions by studying the relationship between farmer entrepreneurship and the income levels of farmers in different regions. For further study on this issue, our research used the econometric model 1 in a regression analysis of subsamples of East, Central, West and Northeast China. The regression results are presented in the right half of Table 3. It can be found that farmer entrepreneurship in East, Central, West and Northeast China has significantly increased

the levels of relative income of entrepreneurs, indicating that farmer entrepreneurship in these regions is characterized by a significant enrichment effect.

2. Analysis of the "happiness effect" of farmer entrepreneurship. The key assumption in applying the MNL model is the independence of irrelevant alternatives (IIA), which means that the odds ratio of a person i choosing any two categories does not depend on other choice behavior. In other words, further increasing or decreasing the number of alternatives does not affect the odds ratio of choosing between two categories. Assumption IIA is a background for the application of the MNL model. Therefore, before using the model, it is necessary to evaluate the IIA assumption. In the presented article, the Hausman test is used to check whether the assumption IIA is met in order to proceed to the next stage of the analysis. *Table 4* presents the results of the test, which demonstrates that the IIA assumption cannot be violated after excluding any of the six categories that form subjective happiness of farmers.

To find out whether entrepreneurship can increase farmers' happiness, an MNL model is used for empirical research. To facilitate analysis and understanding, the article uses the farmers' happiness estimator "OK = 2"[10] as a reference scheme. The econometric model is represented by formula (2), and the regression results are presented in *Table 5*.

In this research, the coefficients of the variable "engagement in entrepreneurship" demonstrate that at the significance level of 1%, the relative risk ratios (RRR)[11] for the categories "a bit happy", "happy" and "very happy" are 1.484, 1.435 and 1.960, respectively. This means that, all other things being equal, the probability that farmers-entrepreneurs will answer "a bit happy", "happy" and "very happy" is higher than for non-entrepreneurs, increasing by 48.4, 43.5 and 96.0%, respectively. This confirms the H2 hypothesis: entrepreneurship does increase the happiness level of Chinese farmers, which indicates the presence of a "happiness effect".

In addition, the coefficients of the "health status" variable are significant, which indicates a strong relationship between health status and the subjective happiness. Farmers with poorer health estimate their happiness lower, while farmers with good health – higher. This empirical conclusion is in harmony with the research results of other scientists (Jiang Qiuchuan, 2015). Relating to the variable "education level", the coefficient for the

Table 4. Hausman test results for the IIA assumption in the MNL model

Missed variable	chi2	df	P > chi2	Null Hypothesis
0	-353.285	23	1.000	Fail to reject Ho
1	-532.172	24	1.000	Fail to reject Ho
2	-500.055	32	1.000	Fail to reject Ho
3	-509.738	24	1.000	Fail to reject Ho
4	-1100.000	24	1.000	Fail to reject Ho
5	-563.077	24	1.000	Fail to reject Ho
Note: although the value of the chi2 less than zero indicates that the model does not meet the asymptotic assumptions of the test, such result is normal and does not contradict the IIA assumption (Zhang Longyao, Jiang Chun, 2011).				

[10] A farmer's assessment of his or her level of happiness as "so-so" acts as a benchmark, because "so-so" is the boundary between the unhappiness and happiness of farmers. Using "so-so" responses as a benchmark facilitates understanding of the relative risk ratio.

[11] Relative risk is the ratio of the probability of choosing a certain category to the probability of choosing a base category.

Table 5. Regression results of the MNL model of the impact of entrepreneurship on farmers' well-being

Variable		Model 2									
		Very unhappy		Unhappy		A bit happy		Happy		Very happy	
		Coeffici	RRR	Coeffici	RRR	Coeffici	RRR	Coeffici	RRR	Coeffici	RRR
Inde-pendent variable	*Entre-preneurship*	0.057	1.059	-0.166	0.847	0.395***	1.484	0.361***	1.435	0.673***	1.960
Control variables	*Gender*	1.399	4.051	0.039	1.039	-0.120	0.887	-0.244***	0.783	-0.315***	0.730
	Age	0.140	1.150	-0.009	0.991	-0.061**	0.941	-0.028	0.972	-0.021	0.980
	Age squared	-0.001	0.999	0.001	1.000	0.001***	1.000	0.000**	1.000	0.000*	1.000
	Health Status	0.454**	1.574	0.169***	1.183	-0.107**	0.898	-0.228***	0.796	-0.538***	0.584
	Education Level	-0.023	0.977	-0.198***	0.821	0.026	1.026	0.173***	1.188	0.188***	1.207
	Relative Income Level	-0.604	0.547	0.144	1.154	0.302**	1.352	0.606***	1.834	0.751***	2.118
	Region	0.353	1.423	-0.013	0.986	-0.065	0.937	-0.111***	0.895	-0.116***	0.891
	Intercept	-11.191*	0.000	-0.292	0.747	1.702***	5.486	1.926***	6.865	1.648***	5.194
Data points = 8242 Pseudo Log-Likelihood = -10980.718 Wald $\chi^2(40)$ =517.61 Prob > χ^2 = 0.000 Pseudo R^2 = 0.0272											
Note: ***, **, * indicate that the evaluation results are significant at the levels of 0.01, 0.05 and 0.1, respectively. Coeffici – coefficient, RRR – relative risk ratio.											

category "unhappy" is negative and is significant at the level of 1%, the respective relative risk is 0.821. Consequently, the lower the education level of the surveyed farmers, the lower their subjective happiness. At the same time, the coefficients for the categories "happy" and "very happy" are positive and also significant at the level of 1%, the respective relative risks are 1.188 and 1.207, which indicates that the higher the education level, the higher the subjective happiness of the surveyed farmers. This also confirms the conclusions of other researchers (Blanchflower, Oswald, 2004). Finally, in the row of the variable "relative income level", the coefficients for the categories "a bit happy", "happy" and "very happy" are positive and significant at the level of 1%, and the relative risks exceed 1. It follows that the happiness level of the surveyed farmers is strongly related to the level of their relative income. Farmers with incomes above the village average are more likely to choose "happy". This conclusion is in agreement with studies of many scientists (You Liang et al., 2018; Xu Haiping et al., 2020) and does not contradict the Easterlin paradox (Easterlin, 1974).

3. Analysis of the mediator effect of the relative income level. Empirical analysis performed in the previous section demonstrated that the level of relative income of the surveyed farmers affects their sense of happiness, while entrepreneurship affects the level of their relative income. In order to study extensively the mechanism of the influence of entrepreneurship on the subjective happiness of farmers, the level of relative income will be considered as a mediator.

The happiness variable includes six categories. The modeling carried out (Liu Hunyun et al., 2013) demonstrated that when a dependent variable has five or more categories, the usual linear regression analysis can be considered to analyze the mediator effect, since the level variable will be closer to continuous data as the number of cate-gories increases. Therefore, in order to analyze the mediator effect, in this section the dependent

variable is considered as a continuous variable. In addition, since the mediator variable "relative income level" represents data from two categories, we use a logistic regression model when studying the impact of entrepreneurship on relative income.

Table 6 presents the regression results of equations (3), (4) and (5), from which we see that the calculated values ∂, β, δ, and ∂' are: $\hat{\partial} = 0.287$, $\hat{\beta} = 1.345$, $\hat{\delta} = 0.221$, and $\hat{\partial}' = 0.227$ respectively, and all of them are significant at the level of 1%. Since all the coefficients ∂, β, δ, and ∂' are significant and $\hat{\partial}' < \hat{\partial}$, the level of relative income is of importance in the process of influence of entrepreneurship on the happiness of farmers, acting as a partial mediator. Thus, the H3 hypothesis was verified.

Reliability test

Since starting a business requires a certain amount of start-up capital, farmers who decide to start an entrepreneurial activity may have higher incomes than those who prefer not to start a business in the village. In this regard, the sample may be biased. To eliminate the problem of endogeneity caused by possible selection bias in model 1 and further prove the reliability of the conclusion, we use the propensity score matching (PSM) method. The results of the regression analysis are presented at the top of *Table 7*. The explanatory variable of the robustness test of model 1 is whether to start a business, and the response variable is the level of relative income. The following can be found: although three different comparison methods are used, all the results demonstrate that the ATT value remains positive and significant after the endogeneity problem caused by selection bias is eliminated. This proves that the empirical results of model 1 are relatively robust.

Table 6. Analysis of the mediator effect of the relative income level on the impact of entrepreneurship on the well-being of farmers

Dependent variable	(3)	(4)	(5)
	Happiness Level	Relative Income Level	Happiness Level
Entrepreneurship	0.287*** (0.025)	1.345*** (0.054)	0.227*** (0.026)
Relative Income Level			0.221*** (0.027)
Gender	-0.110*** (0.027)	0.202*** (0.061)	-0.117*** (0.027)
Age	0.001 (0.006)	0.079*** (0.015)	-0.002 (0.006)
Age squared	0.000 (0.000)	-0.001*** (0.000)	0.000 (0.000)
Health Status	-0.227*** (0.018)	-0.146*** (0.034)	-0.222*** (0.018)
Education Level	0.104*** (0.011)	0.314*** (0.025)	0.092*** (0.011)
Region	-0.042*** (0.013)	-0.055*** (0.028)	-0.039*** (0.013)
Intercept	3.827*** (0.151)	-3.802*** (0.373)	3.865*** (0.151)
Data points	8242	8242	8242
R^2 or Pseudo R^2	0.0592	0.1141	0.0661

Note: ***, **, * indicate that the evaluation results are significant at the levels of 0.01, 0.05 and 0.1, respectively; the numbers in parentheses represent robust standard errors.

Table 7. Robustness test results

Model 1		K-nearest neighbors matching	Radius matching	Kernel matching
	Treatment group	0.475	0.474	0.475
	Control group	0.189	0.193	0.190
	ATT	0.286***	0.281***	0.284***
	T-value	23.97	25.76	26.16
Model 2	Variable	Regression coefficient	Probability ratio	
	Entrepreneurship	0.647***	1.910	
	Gender	-0.311***	0.732	
	Age	-0.027	0.974	
	Age squared	0.000*	1.000	
	Health Status	-0.459***	0.632	
	Education Level	0.344***	1.411	
	Relative Income Level	0.482***	1.619	
	Region	-0.100	0.904	
	Intercept	3.225***	25.164	

Note: ***, **, * indicate that the evaluation results are significant at the levels of 0.01, 0.05 and 0.1, respectively.

In addition, to test the robustness of the empirical findings obtained using model 2, those of 8,242 surveyed farmers who gave responses "very unhappy" and "unhappy" were classified as "unhappy" in the research. Those who answered "a bit happy", "happy" and "very happy" were grouped into the "happy" category. Thus, a subsample of 7,449 farmers was formed, and these two categories of farmers were used as a dependent variable, with happiness assigned a value of 1 and unhappiness assigned a value of 0. The independent and control variables remained unchanged and corresponded to model 2. A binary logistic model was used for regression analysis. The results are presented at the bottom of Table 7. It was revealed that, all other things being equal, the happiness level of farmers-entrepreneurs is significantly higher than that of farmers who are not engaged in entrepreneurial activities, which indicates the robustness of the empirical results of model 2.

Conclusion and recommendations

In the present research, a theoretical hypothetical model "farmer entrepreneurship – relative income level – happiness" was constructed, and an empirical analysis of the impact of entrepreneurship on increasing the levels of relative income and happiness of Chinese farmers was carried out. In addition, the mediator effect of the relative income level in the process of influence of entrepreneurship on the happiness of Chinese farmers has been verified. As a result of the work, the following conclusions were obtained.

In the country as a whole, entrepreneurship contributes to an increase in the relative incomes of farmers and has a significant "enrichment effect". Empirical research has demonstrated that, all other things being equal, farmers-entrepreneurs are 3.799 times more likely to receive incomes above the village average than farmers who are not engaged in entrepreneurship. Moreover, entrepreneurship contributes to an increase in the farmers' relative incomes, even considering regional differences of East, Central, West and Northeast China.

Entrepreneurship also leads to an increase in the subjective happiness of Chinese farmers, i.e. it has a significant "happiness effect". It has both direct and indirect effects on the sense of happiness, and the relative income level acts as a partial mediator in this

process. The "happiness effect" of entrepreneurship among farmers is associated with both an increase in relative income and an improvement in purchasing power, as well as with the spiritual gratification they receive in the process of entrepreneurial activity.

Based on all this, it can be concluded that in the process of achieving the goal of cooperative enrichment of rural farmers in China, entrepreneurship, as a category of initial distribution of income, plays an important role in increasing the farmers' relative incomes, as well as contributes to strengthening the sense of happiness. In this regard, state authorities and relevant structures need to actively support mass entrepreneurship and innovation in rural areas by creating a favorable business environment, encourage farmers to engage in entrepreneurial activities to increase their income and subjective happiness levels, as well as promote the cooperative enrichment of the material and spiritual conditions of a farmer's life in rural areas.

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