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Article

Village Organization and Sustainable Growth of Farmers' Income: An Empirical Study Based on Dynamic Survey Data of Labor Force in China

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Abstract: Common prosperity is the core goal of rural revitalization, and sustainable growth of farmers' income is an inevitable requirement. This study uses CLDS2016-2020 village and family level questionnaire data to reveal how the degree of village organization affects the sustainable growth of farmers' income, thus providing reference and decision-making for the local government to promote the increase of farmers' income and narrow the gap from the village level. The results show that the degree of village organization can significantly affect farmers' income, and the analysis results of the degree of formal organization are consistent with them. Specifically, for every 1% increase in the degree of village organization, the per capita household income will increase by 32.4%, among which the wage income will increase by 22.6%, the operational income will increase by 5%, the property income will increase by 0.8%, and the transfer income will increase by 4.2%. The estimation results through instrumental variables are consistent, and the results are robust. At the same time, improving the degree of village organization can also significantly increase the proportion of farmers' non-agricultural income and narrow the income gap among farmers. On the impact of heterogeneity, it is found that the geographical distance between villages and county and township governments, as well as the political identity and education level of farmers will affect the role of the degree of organization. The results of mechanism analysis show that improving the degree of village organization is mainly through promoting the circulation of agricultural land, socialized service of agricultural machinery and industrial and commercial capital to the countryside to increase farmers' income. The research revealed that the modernization of rural governance should be accelerated, and the degree of village organization should be improved, especially the degree of formal organization, so as to build a benign trust and cooperation relationship between the two village committees and the villagers, and implement policies and measures to improve the income of farmers according to local conditions. At the same time, strengthen the publicity and education in party member to improve the proportion of rural party member and the education level of farmers.

Keywords: Rural revitalization; Village organization; Degree of organization; Farmers' income; Common prosperity

1. Introduction

Since the 18th Congress of the Communist Party of China (CPC) was held, Socialism with Chinese characteristics has entered a new era. In the report of the 19th National Congress of the CPC, it was pointed out that the main social contradiction in China has changed from "the contradiction between the people's growing material and cultural needs and the backward social production" to "the contradiction between the people's growing need for a better life and the unbalanced and insufficient development". Under the strong leadership of the CPC Central Committee with Comrade Xi Jinping at its core, China's work on "agriculture, rural areas and farmers" has achieved remarkable results, and the fight against poverty has won an all-round victory. This is a miracle of poverty reduction in human history. However, at present, the foundation of agricultural and rural development in China is not solid. The biggest imbalance in the development of China is still the imbalance between urban and rural development, and the biggest inadequacy is still the inadequacy

of rural development. President Xi Jinping stressed: "Common prosperity is the essential requirement of socialism and an important feature of Chinese modernization." In 2022, the Party's Report to the 20th CPC National Congress pointed out that "China-style modernization is a modernization with a huge population and a modernization with common prosperity for all people". The sustainable income of rural residents in China has maintained a growth trend in the past, mainly due to the country's macroeconomic growth and the process of migrant workers, catching up with the rapid development of urbanization and industrialization. At present, China's economic development is facing a structural transformation, and the development of "agriculture, rural areas and farmers" is also facing a new era of development environment. The rural revitalization strategy should be smoothly promoted, and the goal of common prosperity should be achieved on schedule. The issue of sustainable income increase for farmers is still the top priority for the current and future period.

In the process of increasing farmers' income and narrowing the income gap between farmers, the organization of villages (the villages in this paper refer to administrative villages) is very important because it can promote the development of rural industries and improve the efficiency of rural governance in the form of organization coordination, organization drive and organization identification [1]. However, in the context of rural social transformation driven by rapid urbanization and industrialization, the "poor order pattern" and "acquaintance society" tend to gradually disintegrate, which brings challenges to rural governance. The village in the sociological sense is facing the risk of disintegration of the community, "the end of the village" has become an important footnote to this judgment [2,3]. On the one hand, the low organization of villages leads to the lack of organization for the national financial transfer resources in villages. At present, the national financial transfer resources mainly enter the rural society through the form of "project system" or direct "one-card" to households [4], resulting in higher transaction costs and an increase in the phenomenon of "elite capture" of project resources [5]; On the other hand, it makes it difficult for the "atomized" small farmers to effectively connect with the large market [6]. When facing the industrial and commercial capital going to the countryside, the small farmers lack the negotiation ability. As the passive receivers of the price when selling agricultural products, they bear the high risk of agricultural production, but can only get the low profit squeezed by the market space. The state of low organization makes it difficult for villages to form endogenous development power, and the development of villages is difficult, which makes a large number of young and middle-aged labor outflow, which in turn further hinders the formation of endogenous development power in villages. Facing the new situation, only by reorganizing the villages can we seize the new opportunities for the development of "agriculture, rural areas and farmers" in the new era and overcome the challenges of "low organization" of the villages. In other words, the organization of villages to promote revitalization and common prosperity is a practical solution.

2. The Necessity and Possibility of Village Organization

2.1. Village Organization Is Necessary

First, the aging and hollowing-out of rural areas are serious. The report of the 19th National Congress of the Communist Party of China pointed out that Socialism with Chinese characteristics has entered a new era and the main social contradiction has been transformed into the contradiction between the people's growing need for a better life and the unbalanced and insufficient development. Among them, the biggest imbalance is the imbalance between urban and rural development; The greatest inadequacy is the inadequacy of rural development. In the face of this structural dilemma, most farmers, driven by reason, have made the helpless choice of leaving the land and leaving their homes and going to the city to return to their hometown. According to some data, since 2019, the total number of migrant workers in China has reached 290 million, among which "post-80s" and "post-90s" migrant workers account for 48.6%¹. In recent years, the number of migrant workers returning to their hometown to start businesses has been increasing. By the end of 2022, the total number of

¹ National Bureau of Statistics: Survey Report on Migrant Workers in 2019, April 30, 2020, 1742724.htm 1, <http://www.stats.gov.cn/tjsj/zxfb/202004/t20200430>.

migrant workers returning to their hometown to start businesses had reached 12.2 million.². In addition, due to the consideration of children's education and settling down in cities, the number of peasant-worker families whose whole families move to cities at all levels is also increasing [7]. Compared with the left-behind rural areas, although the farmers in cities can obtain higher income, their willingness to return home and start businesses will also emerge in a situation. On the one hand, migrant workers are doing the most arduous and tiring work, but they are not paid the right wages. The income gap between migrant workers and urban residents is still very wide. When migrant workers compare their input/output with the input/output of the reference object, they will feel unfair [8]. On the other hand, when the strong logic that dominates the urban development suppresses the weak logic, so that the groups that have the ability and want to participate in social activities lose the chance of fair competition, a sense of exclusion will be generated among specific groups [9]. The social network of acquaintances leaving the countryside enters into a completely unfamiliar social network of cities. Farmers are not only difficult to integrate into the new environment, but also unable to enjoy equal social services with the citizens. This disparity in social relations and participation makes farmers feel strongly excluded. The villagers in the left-behind villages are short of development awareness and ability, and their economic income is not optimistic. At the same time, due to the mass outflow of the village population, the social ties formed among the villagers based on blood relationship, geography and human feelings are weakening. More importantly, the hollowness of the village and the atomisation of the villagers have led the village to be unable to seize the historic development opportunity of transforming the rural China into the urban and rural China, and the villagers are unable to improve their own situation.

2.2. Village Organization Is Possible

Since the overall promotion of the rural revitalization strategy, agriculture and rural areas have been given priority to development, which means that rural areas will open up a new development situation. Rural revitalization is an all-round economic, political, cultural, social and ecological revitalization. From a macro perspective, national policies have begun to tilt towards the rural areas in recent years, and have begun to guide factors of production back to the rural areas, first and foremost, the return of talents. In early 2020, the National Development and Reform Commission and other 19 departments jointly issued the "Opinions on Promoting High-quality Development of Homecoming Entrepreneurs", which called for "further improving the political stance, fully understanding the importance and urgency of supporting migrant workers and other personnel to return to their hometown to start businesses, ... promoting high-quality development of homecoming entrepreneurs", and achieving the goal of "by 2025, building a batch of homecoming entrepreneurship industrial parks and demonstration areas (counties) with strong influence and the development of primary, secondary and tertiary industries, with more than 15 million homecoming entrepreneurs of all kinds nationwide, and driving about 60 million jobs." The introduction of a series of policy documents has guided the returning rural workers from the initial migrant workers to all kinds of personnel. The policy has gradually entered a new stage of paying equal attention to the quality and quantity of returning rural workers. As the key to the reconstruction of the rural subject and the organizational guarantee in the rural revitalization, village organization has become a key measure to increase farmers' income. Secondly, capital flows back. On the one hand, the state's financial input has been continuously increasing, with expenditures on agriculture, forestry, water and fishery increasing from 414.6 billion CNY in 2008 to 215.36 billion CNY in 2020.³; On the one hand, industrial and commercial capital should be encouraged to go to the countryside to promote the "integration of three industries" in rural industries. According to the statistics of the Ministry of Agriculture and Rural Affairs, as of October 2019, there were more than 150,000 subjects with capital going to the countryside and the accumulated investment exceeded 2 trillion CNY [10]. From the perspective of agriculture and rural areas themselves, agriculture is an industry that directly exchanges with nature

² Data source and official website, Ministry of Agriculture, People's Republic of China.

³ The data comes from China Rural Statistical Yearbook.

and has multiple functions such as economy, ecology, society and culture. In the past, for a long time, only the function of economic industry was paid by the price [11]. With people's understanding of the versatility of agriculture and the rise of "citizens returning home", the comprehensive value of agriculture will be recognized by more people, and there is still great potential for agriculture to be tapped. Finally, cultural identity. The countryside is a community that cannot be separated from modernization [12], and the village is the basic living unit in the countryside of China. First of all, the village community has a long historical tradition and a wide range of cultural identity, and the cultural identity and active support of the farmers form the basis of "re-organization" of the village; Secondly, the village is a life community where the villagers help each other. The long-term value pursuit of the rural society can ensure the smooth progress of the "re-organization" of the village and at the same time endow the rural modernization with cultural value. Finally, the village has always been the management community of the rural social public affairs, maintaining the basic order of the rural society, and its function is also conducive to promoting the "re-organization" of the village.

To sum up, it is necessary and possible to organize villages to promote revitalization. On the one hand, the village organization can awaken the villagers to the village's cultural value identity, and can also regain the "village community" consciousness; On the other hand, it can ease the contradiction between small and medium-sized farmers and the large market in the process of agricultural industrialization and marketization, effectively protect the interests of farmers, and promote the collective action of farmers in the development of rural industry, collective economy and public infrastructure construction; Finally, the village organization can also improve the human capital and social capital of farmers through organizing training and mutual aid in the village, and promote the improvement of farmers' welfare. To sum up, village organization plays a special social function in the history and reality of rural governance. The core of solving the current governance dilemma in rural areas and realizing the revitalization of rural areas and improvement of farmers' welfare lies in village organization and reconstruction of village community. Therefore, to comprehensively promote the revitalization of villages, we must comprehensively promote the organization of villages.

3. Literature Review and Theoretical Hypothesis

An organization is a collection of people based on division of labor and cooperation in order to achieve certain specific goals. There are three necessary conditions for an organization to exist: an organization is a collection of people, an organization meets the needs of its goals, and an organization achieves its goals through professional division of labor and coordination. The organization is embodied in the fact that each member that exists within the organization has its own specific responsibilities and fulfills the obligations of the organization based on the principle of voluntary participation to complete the collection of organizational goals. Organization refers to the process of coordinating the social and economic division of labor through a certain social and economic organization form and system, so that they form an interdependent and interrelated organic whole. On this basis, the organization includes two basic aspects: one is the organization of the team [13]; The other is the marketization of the organization, which is the unity of opposites [14]. Therefore, organization is a process in which people voluntarily unite to organize activities for the same goal. Village organization also belongs to the research field of "governance", which can be classified into the category of village governance. As the cornerstone of national governance, rural governance is of great significance to the realization of Chinese-style agricultural and rural modernization. Farmers' welfare, which takes farmers' income as an important component, belongs to the category of "economy". Attention to the relationship between "governance" and "economy" is also the focus of current and future research for a long time. As an indispensable part of rural social development, rural governance and farmers' welfare are closely related. The level of rural governance will obviously bring about changes in farmers' welfare level [15–18]. The ways of village organization affecting farmers' income and welfare can be divided into internal factors and external factors. The internal factors are to improve farmers' human capital level and social capital level by strengthening education, vocational and technical training and broadening information sources. The external

factors are to reduce the information asymmetry and transaction costs of agricultural land circulation, agricultural social services and industrial and commercial capital to the countryside.

3.1. Internal Influencing Factors

From the perspective of internal factors, many studies show that human capital, social capital and other micro-foundations have an important impact on income levels [19–24]. For example, a study by Mincer(1974) found that 33% of America's 1959 income level could be explained by education and work experience; Psacharopoulos(1994) also estimated the educational return rate of more than 60 countries, indicating that the educational return rate of developing countries is above 15% [25]. Scholars such as Morduch and Sicular (2000), Walder (2002), Knight and Yueh (2008) have recognized the important role of social capital such as political identity in farmers' income, and the research thinks that the economic income of farmers with political identity is significantly higher than that of ordinary farmers [26–28]. Studies by Gao and Yao (2006), Zou and Zhang (2006), Yang and Luo (2008), Wang et al. (2009) and Xu (2010) all think that human capital investment such as basic education and vocational training has a significant impact on the income level of farmers in China [29–33]. Wang (2012) recognizes the importance of nutrition and health to human capital, and believes that healthy human capital can prevent farmers from falling into a "poverty trap" [34]. Zhang et al. (2007) recognized the important role of social capital, such as political identity, in farmers' income, and the research concluded that rich social capital increased farmers' income [35]. Research conducted by Xu et al. (2007) and Zhang et al. (2009) from the perspective of farmers' family characteristics found that high population burden rate and high dependence on agriculture are not conducive to the improvement of farmers' income level. The social network and trust relationship formed by social capital play a positive role in dispersing risks, smoothing consumption and increasing income for actors [36,37]. The adjustment function of social capital in economic activities (market information, employment selection, use of resources, collective action, etc.) can broaden the information channels of farmers and serve as an information bridge between groups, making it easier for them to live relevant employment information, thus promoting employment and increasing income [38–42]. Social capital is even considered as the capital of the poor [43]. Narayan(1999) found through the research on the social capital of villages in Tanzania that social capital at the village level can provide services such as trust, cooperation and public services for farmers, and the existence of these social services has significantly promoted the increase of farmers' income [44]. Through the study of various variables of village-level social capital, it is also found that harmonious and good social relations among farmers and social stability in villages can effectively promote the growth of farmers' income [45,46].

3.2. External Influencing Factors

From the perspective of external factors, village organization can affect farmers' income through the circulation of agricultural land, farmers' entrepreneurship, agricultural social services and industrial and commercial capital to the countryside. At present, the academic community has also done a lot of research on the impact of farmland transfer on farmers' income. From the perspective of increasing farmers' income and sources of income, some scholars believe that the circulation of agricultural land can effectively increase farmers' income. The circulation of agricultural land can allocate land resources more efficiently, promote intensive management of agricultural land [47], alleviate the poverty of farmers [48–50], a well-developed land lease market can reduce the circulation cost [51,52] and increase the land rent[53], promote the improvement of land production efficiency [54], increase the property income of farmers [55], and increase the welfare of farmers [56]. However, there are also some scholars who believe that the circulation of agricultural land cannot promote the increase of farmers' income. Shi et al. (2017) believe that the circulation of agricultural land can also increase farmers' income by expanding the operating area and also by increasing the unit land output value [57]. On this basis, Chen et al. (2020) found that only when land circulation promotes agricultural operation to realize economies of scale can it promote the improvement of agricultural productivity, thus promoting the growth of farmers' income [58]. Besley et al. (1995) and Khan et al.

(2019) believe that farmland transfer sometimes does not stimulate farmers to increase investment in agriculture, and the impact of increasing the scale of farmers' land management on farmers' income is not obvious [59,60]. A study by Zhang et al. (2018) found that the land leased was not conducive to the improvement of farmers' income. There are also relevant studies on the relationship between the rural land transfer and the income inequality of farmers, but there is no final conclusion yet [61]. Some people think that the land circulation reduces the inequality of farmers' income. Wan et al. (2005) believe that land can alleviate income inequality, but for a group of relatively poor farmers, land transfer does not have a significant impact [62]. Zhang(2008) based on the survey data of Zhejiang Province, shows that the land lease market has reduced the income inequality among farmers, and at the same time can alleviate the income gap between farmers caused by non-agricultural employment [63]. At the same time, there are also views that the land transfer may enlarge the income gap among farmers. Based on the analysis of Gini coefficient, Zhu et al. (2015), Xiao and Zhang (2017) believe that the rural land transfer has widened the income gap among farmers [64,65]. Xu and Yu (2020) use PSM model and Gini coefficient based on the survey data of major grain-producing areas to find that land transfer has exacerbated the income gap of farmers [66].

Academic literature on the relationship between entrepreneurship and farmers' income has been relatively rich, but no consensus has been reached [67]. Some scholars believe that entrepreneurship can not only increase the income of entrepreneurs [68], but also provide employment opportunities for low-income people, thus increasing their income [69]; However, there are also studies that show that the income-increasing effect of entrepreneurship is not obvious [70]. Of course, these are all discussions on the absolute amount of farmers' income from starting a business. Apart from raising the income level, many scholars have also paid attention to the impact of farmers' starting a business on the rural internal income gap. On the one hand, some researches think that whether the entrepreneur succeeds or fails, it will cause the entrepreneur to concentrate on the two ends of the whole income distribution [71], so the farmer's entrepreneurship will significantly expand the income gap between farmers [72,73]. On the other hand, some studies have shown that farmers' entrepreneurship can provide non-agricultural employment opportunities by promoting the development of secondary and tertiary industries in rural areas, so as to broaden the channels for farmers to increase their income [74] and thus play a positive role in narrowing the income gap between farmers [75].

The socialized service of agricultural machinery is considered to be beneficial to the increase of farmers' income. The floating of rural labor force and the aging trend of the population have brought about the structural shortage and weakness of rural labor force [76], which has brought great pressure on agricultural production [77]. As a key measure to ease the pressure, agricultural mechanization is an important foundation to change the mode of agricultural production and improve productivity, and also an important way to increase the income of farmers [78–81]. The socialized service of agricultural machinery is closely related to the income growth and income distribution of rural residents. The growth of farmers' income depends on the deepening of agricultural division of labor and effective employment of labor force [82], and the formation of socialized service of agricultural machinery is an important manifestation of the deepening of agricultural division of labor [83,84]. Relevant research shows that socialized service of agricultural machinery plays an important role in saving cost [85,86], improving agricultural production efficiency [87–89], promoting land circulation and scale operation [90,91], as well as labor transfer [92] and increasing non-agricultural income, which helps to promote the increase of farmers' income [93].

At present, the research on whether industrial and commercial capital going to the countryside can promote farmers' income is roughly divided into two categories: one is that industrial and commercial capital going to the countryside can promote farmers' income by flowing into farmers' land [94,95]. First of all, industrial and commercial capital flows to the countryside to release part of the agricultural labor force and provide a large number of jobs to promote non-agricultural employment of rural labor force and increase the wage income of farmers [96]. Secondly, industrial and commercial capital flows into rural areas to promote the development of rural land market, accelerate the transformation of land into property, and increase the income of farmers' family

property [97,98], which can also further revitalize the rural collective economy to promote the increase of farmers' income [99]. Some studies have also shown that after industrial and commercial capital flows to the countryside and into farmers' land, it has a driving effect on local farmers and has promoted some farmers to raise their agricultural operating income [100–102]. Another part of scholars hold a negative attitude, believing that industrial and commercial capital going to the countryside may not necessarily promote the increase of farmers' income, and may even damage the rights and interests of farmers. For example, Chen (2018) believes that capital going to the countryside means redistribution of limited agricultural profits, and some farmers will be marginalized or forced to reduce their income, resulting in conflicts of interest [103]; Yang (2019) research believes that in the process of industrial and commercial capital going to the countryside, the grass-roots government does not simply consider the maximization of profits, but follows the governance logic and political logic, which results in the state project funds excessively inclined to the capital main body and not benefiting ordinary farmers, thus damaging the interests of small farmers [104]; Liu and Wang (2015) study believes that industrial and commercial capital to the countryside can conspire with the elite in the countryside through non-market means to exploit the surplus value of farmers, thus causing the interests of farmers to be damaged and the income inequality in the countryside to further expand [105]; Zhao and Zhao (2016) from the perspective of organization, think that industrial and commercial capital as a form of external organization invades the village, repels the loosely structured farmers, and eliminates the endogenous power in the village, which leads to the loss of farmers' interests [106].

3.3. Village Organization and Farmers' Income

As the grass-roots organization of the rural society, the village contains two meanings: first, the village is an extremely important formal organization in the production and life of the farmers, which exercises the collective power of the villagers on their behalf, including land ownership, while supervising the farmers' land use behavior; Secondly, the village is a community built up by farmers based on their mutual recognition, and is an "acquaintance society" built up on the basis of clan, surname, blood relationship, religious belief and nationality. As the most important grass-roots organization, the village coordinates the actions between the villagers, the village committee and the villagers through formal and informal organizations, and carries the economic, political and social management functions of the rural society in China. The degree of organization measures the extent to which members of an organization follow certain organizational norms and articles of association around a common organizational intent, in order to promote the organization as a whole to achieve self-operation. For the village, the degree of organization reflects the intention of the village committee and the villagers and the villagers to organize around the village. Through trust construction and cooperation, the degree of self-operation of the organization and the maintenance of the basic order of the village can be ensured. The analysis of the existing literature on the organization focuses on the farmers. It is considered that improving the degree of the organization of farmers is an important way to optimize the agricultural production structure, promote advanced agricultural technology, resist the market risk of agricultural products and increase farmers' income. It is important to strengthen the trust and cooperation among farmers. However, to enhance the degree of organization of farmers, it is still impossible to avoid the important role played by village organizations. Chen Hangying believes that in order to change the de-organization characteristics of small farmers and realize the connection between farmers and modern agriculture, it is necessary to construct a new village collective organization and give full play to the function of collective economy, so as to realize the endogenous organization of farmers. Sun Xinhua believes that the organization of farmers needs to be led by village organizations, especially the leading role of village organizations in farmers' cooperation and production coordination. The organization of farmers has become a new trend of changes in rural micro-organizations, and villages play an important role in this process. Villages in China are not only production organizations, but also governance organizations that integrate supervision, stability maintenance and public security. They are formal organizations that exercise collective ownership of agricultural land and supervise farmers' behaviors

of using agricultural land, and informal organizations that restrict farmers' behaviors and coordinate farmers' collective actions through the rules of "acquaintance society". The two types of organizational forces jointly affect the human and social capital and behavior decision-making of farmers, and to a large extent, affect the income of farmers.

The differences between villages are mainly in their organizational structure and governance. Some villages are more closely organized and have a relatively stable governance structure. It is easier to build trust and cooperation among villagers and between villagers and village committees, while others are more dispersed. It is more difficult to build trust and cooperation among villagers and between villagers and village committees. We collectively refer to the strictness of village organization and the stability of governance structure as the degree of village organization, so as to measure the degree to which members of the organization promote the whole organization to realize self-operation around the organization's intention by following the organization's norms and articles of association. The higher the degree of organization is, the more closely the village is organized and the formal and informal organizations are connected with each other. The self-organization can maintain the basic production and living order of the village. Otherwise, it will be difficult for members to trust and cooperate with each other and the most basic production and living order in the village will not be sustainable. Tsai(2007) and Mattingly(2016) reveal that villages with higher degree of organization are significantly better than other villages in terms of public goods supply and foreign negotiation ability in the process of land requisition [107,108]. Although there is no systematic evidence to indicate to what extent the degree of village organization can increase farmers' income, we can infer from such research that the more organized the village is, the more advantageous it will be in the process of negotiating with capital, the more effective it will be in promoting the circulation of agricultural land, industrial and commercial capital going to the countryside and socialized service of agricultural machinery, and at the same time, it will be able to better balance the interest relationship between farmers and achieve the goal of sustainable increase of farmers' income and sustainable reduction of income gap within farmers. Based on the above analysis, we provide the following backup hypothesis.

Hypothesis 1: Improving the degree of village organization can promote farmers' continuous income increase.

Hypothesis 2: Improving the degree of village organization promotes the increase of farmers' income by promoting the circulation of agricultural land, embedding industrial and commercial capital and socialized service of agricultural machinery.

Hypothesis 3: Improving the degree of village organization can increase the proportion of farmers' non-agricultural income.

Hypothesis 4: Improving the degree of village organization can continuously narrow the income gap among farmers.

4. Research Design

4.1. The Degree of Village Organization Measurement

On the index measurement of the degree of village organization, the degree of village organization is measured from two dimensions of formal and informal organization [109]. Village daily activities mainly include business activities, agricultural production activities, political activities and daily social management activities. The degree of organization of formal organizations measures the organizational ability and self-operation ability of formal organizations such as village committees, economic organizations, production organizations and social management organizations to participate in the above-mentioned activities, focusing on the role played by village committees. The degree of organization of informal organizations measures the organizational ability and self-operation ability of social networks, religious activities, ethnic ties and informal power relations in the above-mentioned activities, focusing on the role played by social organizations and clan organizations. The criteria for judging and judging each indicator are shown in Table 1. The CLDS2016 questionnaire is taken as an example to explain the specific indicators.

In the questionnaire, "does Q25 village have non-agricultural economy", "does Q36 village have the following economic organizations", "does the village have more than half of its own office expenses (based on how much of Q53 village's office expenses and Q53.1 of which are paid by the superior finance)" can measure the degree of organization of the village's economic life. As a grassroots autonomous organization, about 60% of the country's village committees are integrated with the village collective economic organizations (Tong Zhihui, 2018). The village committees can become members of the collective economic organizations, and some of the profits of the collective economic organizations may also be allocated to the village committees for operation and control according to their articles of association. In addition, the economic organizations established by the villagers can also provide certain financial support for the operation of the village committees. Therefore, whether there is an economic organization in the village and whether the village committee's finance can be independent can reflect the degree of organization of the village's formal organization in economic activities. Considering the mutual influence between the village economic organization and the village Committee, only two of the three eigenvalues need to be "yes" to judge the degree of formal organization of the village's economic life is high, otherwise the degree is low.

In the questionnaire, "does Q84 village have water conservancy facilities (it refers to irrigation facilities such as public canals and mechanical wells built collectively, and the behavior of private people in building ditches does not belong to water conservancy facilities)", "whether the area under collective irrigation is more than half (according to q116.3.2, the proportion of irrigation area under collective owned irrigation facilities or equipment in the total irrigation area in 2015" can measure the degree of organization of formal organizations in production activities. In the rural governance structure, small-scale irrigation systems often rely more on formal organizations such as village committees, villagers' congresses, water conservancy associations and informal organizations such as clans and beliefs. After the abolition of agricultural tax, rural water conservancy construction has followed the principles of "acting according to one's ability, benefiting the masses, democratic decision-making, on-line control" and "one thing, one discussion". The irrigation system needed for production is greatly influenced by the formal organization of the village [110]. When the characteristic values of the two questions are both "yes", it is judged that the degree of organization of the village's production activities is high, otherwise the degree is low.

In the questionnaire, "How did the candidates for the Q39 village committee members come into being", "Q124.w16 How many percentage of voters participated in the recent election", "Whether the number of people in party member is more than 50 (according to Q45, the number of party member living in administrative units)" can reflect the degree of organization of political activities organized by the village. Village election is an important part of village political life and an important way of villagers' political expression. Its significance goes far beyond the village boundaries. Since the implementation of the village committee election system in accordance with the law in 1988, the effective implementation of the election has become one of the most important indicators to measure the degree of village autonomy. The Party branch, as the core of the leadership in the current rural governance system, and party member is the main body of action to play the leading role of the Party branch. Therefore, in addition to the election, the activities of the Party branch and party member are also an important part of the political life of the village. The higher the coverage rate in party member, the higher the degree of self-operation of the formal organization of the village. As the degree of institutionalization of village elections and party member partially overlaps, the degree of organization is judged only by "yes" of at least two of the three eigenvalues.

In the questionnaire, "Is there any social organization (Q55 village has the following types of social organizations (three at most, in order of major degree)", "Is there any place for social activities (Q65 forms a community square/park within the region)") can reflect the degree of organization of the village's formal organization in social activities. Although CLDS data surveys the social organization of villages, there is no relevant survey data on direct social activities of farmers. Considering that the probability and frequency of villagers participating in social activities in villages with activity sites are much higher than those in villages without activity sites, this paper uses whether villages have public activity sites to briefly reflect the degree of organization that formal

organizations in villages organize farmers to participate in social activities. As there are certain differences between social organizations and social life, there is no "strong correlation", so the degree of organization of social life in a village can be judged by combining the two characteristic values.

Informal village organizations include social networks represented by clans and surnames, religious organizations characterized by beliefs and rituals, ethnic components characterized by geography and ethnic groups, and informal social relationships embedded in power organizations. In this study, 13 topics were selected from the CLDS questionnaire to measure the degree of organization of informal organizations in the four activities.

Table 1. Index Setting of Village Organization Degree and Its Judgment Method.

category	Classification index of degree of organization	criterion	The basis of judgment and the questionnaire topics involved
	The degree of organization of village economic activities	If at least two of the three answers are "yes" at the same time, the degree of organization is judged to be high; otherwise, the degree of organization is low.	Collective economic organizations: is there a village-run non-agricultural collective economy in the village? Villagers' economic organizations: are there any of the following types of economic organizations in the village? Whether the office expenses borne by the village committee are more than half: the office expenses of the village are _____ million CNY; Of which, the superior finance shall pay the sum of _____ CNY.
The degree of organization of the formal organization	The degree of organization of village production activities	If the two answers are "yes" at the same time, it is judged that the degree of organization is high; otherwise, the degree of organization is low.	Collective water conservancy projects: are there any water conservancy facilities in the village? Is the area under collective irrigation more than half: the area under collective owned irrigation facilities or equipment in the village accounts for approximately the proportion of the total irrigated area throughout the year?
	The degree of organization of political activities in villages	If at least two of the three answers are "yes" at the same time, the degree of	Is the candidate for the village committee member produced in the village: how did the candidate for the village committee member be produced?

The degree of organization of village social activities	organization is judged to be high; otherwise, the degree of organization is low. If the two answers are "yes" at the same time, it is judged that the degree of organization is high; otherwise, the degree of organization is low.	Did more than half of the voters cast their ballots: how many voters cast their ballots in the recent election? Is the number of people in party member more than 50: At present, the number of people living in party member within the administrative scope is _____ Whether there are social organizations: are there any of the following types of social organizations in the village (three at most, sorted by major degree) Is there a place for social activities: is there a community square/park within the administrative area? Or is there a junior high school within the administrative division?
The degree to which informal organizations are organized	If the two answers are "yes" at the same time, it is judged that the degree of organization is high; otherwise, the degree of organization is low. If at least one of the four answers is yes, it is judged that the degree of organization is high; otherwise, the degree of organization is low.	Is there any place for clan activities: are there any ancestral halls and ancestral halls within the scope of administrative divisions? Whether the population proportion of the top three surnames is more than half: the name of the top three surnames: _____, accounting for: _____% of the total population; The second largest family name: _____, accounting for _____% of the total population; The third largest family name is: _____, accounting for: _____% of the total population Is there a church within the administrative area? Are there any temples within the administrative area? Is there a mosque within the administrative area? Is there a Taoist temple within the scope of administrative divisions?

The degree of inter-ethnic organization	If the answer is "yes", it is judged that the degree of organization is high; otherwise, the degree of organization is low.	Are there more than half of the most populous ethnic groups: are there any ethnic minorities in the village? If yes, the proportion of ethnic minorities in the total population is _____%; Which ethnic group has the largest population in the minority population? _____ ethnic group; The proportion of this minority in the population is _____%
The degree of informal organization of political power	If the answer is "yes", it is judged that the degree of organization is high; otherwise, the degree of organization is low.	Whether there is an informal power relationship: has the village ever been a cadre in the party and government departments at or above the county level? Or was there any donation to the village (including the use of administrative power to mobilize relevant resources to finance the construction of the hometown) by the people going out of the village in the current year?

When each classification indicator is determined as "high", the corresponding degree of organization is assigned as 1, otherwise it is assigned as 0. In this study, the entropy method is used to weight each secondary index, and then the overall evaluation of each village's degree of organization and the evaluation of formal organization's degree of organization and informal organization's degree of organization are obtained separately. In this way, the linear weighting method is replaced and the robustness test is performed. The advantages of this approach are as follows: firstly, the limitations of linear weighting in dealing with the correlation and dimensionality reduction of indicators can be effectively avoided; Secondly, determining the weight according to the information amount reflected by the variation degree of each index value can effectively avoid setting the weight for human intervention, and thus is more objective than linear processing. The specific steps of the entropy method are as follows:

First, each secondary index (RO_{ij}) of the degree of village I organization is normalized according to formula (1). As some indicators have a normalized result of 0, 0.001 is added to these results to avoid meaningless assignment.

$$RO'_{ij} = \frac{RO_{ij} - \min(RO_{ij})}{\max(RO_{ij}) - \min(RO_{ij})} \quad (1)$$

Secondly, the proportion S_{ij} of the index j of village I in the index value is calculated according to formula (2), and the entropy value H_j of the index j is further calculated according to formula (3).

$$S_{ij} = \frac{RO'_{ij}}{\sum_{j=1}^m RO'_{ij}} \quad (2)$$

$$H_j = -\frac{1}{\ln m} \sum_{j=1}^m S_{ij} \ln S_{ij} \quad (3)$$

Thirdly, substituting H_j into formula (4) to calculate the weight W_{ij} of each index; Finally, the weights W_j calculated according to the formula (4) are weighted with the corresponding index value RO_{ij} , and then the root army formula (5) sums up the weighted values of each secondary index, so as to obtain a comprehensive evaluation RO_i of the degree of village I organization.

$$W_j = \frac{1 - H_j}{\sum (1 - H_j)} \quad (4)$$

$$RO_i = \sum w_j \times RO_{ij} \quad (5)$$

For convenience of marking, the degree of village organization RO_i obtained in this study is represented by variable name $Cscore$, and the degree of village formal organization is represented by $Cscore1$ and the degree of village informal organization is represented by $Cscore2$ using the same method.

4.2. Data and Model Setting

This paper uses the panel data of the third period of "China Labor Force Dynamic Survey" of Sun Yat-sen University in 2014, 2016 and 2018 to conduct an empirical test, matching the village-level data and individual-level data to the level of farmers for use. The core explanatory variable used in this paper is the degree of village organization.

The core explained variable is per capita household income (unit: CNY). (Total household income/total household population), the explanatory variables used to measure income growth in measuring income structure are: operational income proportion, wage income proportion, property income proportion and transfer income proportion according to different sources of income; According to the different production and operation methods, it is divided into agricultural income proportion and non-agricultural income proportion. The explained variable in measuring the internal income gap is the village Gini coefficient.

In terms of mechanism variables, farmland transfer is defined as the total area leased out and invested in (unit: mu). The embedment of industrial and commercial capital reflects the productive embedment of industrial and commercial capital based on the number of times the land in the village has been expropriated/leased by the government or enterprises since 1990; According to the contribution of the enterprise with the largest staff size within the administrative area to the village public utilities, it reflects the living embeddedness of industrial and commercial capital, both of which are assigned a value of 1, otherwise they are assigned a value of 0. The agricultural machinery socialization service is defined according to the farm farming method used by the farmers in the production of food crops. The value assigned to the agricultural machinery service used is 1, and the value assigned to the unused one is 0.

In terms of control variables, the population density at the village level, whether roads are accessible, the proportion of floating population from outside, the proportion of non-agricultural registered population, the proportion of young and middle-aged population and the number of households at the household level, the proportion of juvenile population, the proportion of elderly population, whether there is a car, the average health status and the average length of education are selected. After excluding extreme values and invalid questionnaires, valid samples were obtained from 1,166 villages and 41,373 households, covering all provinces except Tibet and Qinghai. The village level data are matched to the household level, and the matched data can be used for empirical testing.

Tool variable: whether the village party branch secretary has management experience is used; if yes, the value is 1; otherwise, the value is 0.

Descriptive statistics of the interpreted variables, explanatory variables, mechanism variables, control variables and tool variables in the matched data are shown in Table 2.

Table 2. Variable Definition and Descriptive Statistics.

Variable category	variables	Variable meaning	sample number	mean value	standard deviation	Min	Max
Explanatory variable	Cscore	the organized degree of village	41373	0.4241	0.1731	0.0001	0.8750
	Cscore1	the degree of formal organization	41373	0.3896	0.1986	0.0001	1
	Cscore2	the degree of informal organization	41373	0.4587	0.2320	0.0001	1
	income_avg	Per capita gross income	28767	29140.8200	27308.3300	one	120400
	prop_wage	Proportion of wage income	40084	0.4977	0.4652	0.0001	1
	prop_oprt	Operational income proportion	40151	0.1211	0.3068	0.0001	1
	prop_wealth	Proportion of property income	40224	0.0147	0.0796	0.0001	0.625

Explained variable	prop_trans	Proportion of transfer income	40229	0.0399	0.1650	0.0001	0.9
	prop_farm	Proportion of agricultural income	40238	0.2131	0.3746	0	1
	prop_nofarm	Non-agricultural income proportion	40238	0.7869	0.3746	0	1
	gini1	Village Gini coefficient	41941	0.4502	0.1042	0.1224	0.8158
Mechanism variable	landtransf	Farmland circulation	41373	17.5159	33.6298	0	100
	fund	commercial capital embedding	24246	0.4837	0.4997	0	1
	machine	Socialization service of agricultural machinery	41941	0.2878	0.4527	0	1
Control variable	density	population density	41192	6291.1880	10722.3800	15.45	40000
	land_avrg	Per capita land area	24243	2.8858	4.3788	0	29.3048
	dist1	Distance to the county seat	24315	26.7677	23.1873	1	100
	dist2	Distance to township government	24279	6.0588	7.0578	0	50
	road	Whether it's a passage or not	25005	70.8632	28.4954	0	100
	rice	Is it a rice planting area ?	19739	0.4367	0.4960	0	1
	convs_land	Is there any returning forest to farming in this village?	18703	0.4376	0.4961	0	1
	seal	Whether to close the mountain to facilitate afforestation	18703	0.3544	0.4784	0	1
	prop_frqn	Proportion of floating population	37773	0.0693	0.1523	0	1
	prop_nagr	Proportion of non-agricultural registered population	38868	0.2685	0.3948	0	1.5169
	prop_young	Percentage of young and middle-aged population	36203	0.6059	0.2020	0.0933	1
	Fmnum	Number of family population	41940	4.0925	2.0179	1	11
	prop_mino	Proportion of juvenile population	41940	0.0439	0.0988	0	0.6667
	mrg	Proportion of married people	33277	0.8856	0.2694	0	1
	work_out	Proportion of migrant workers	33277	0.0995	0.2576	0	1
	party	Proportion of people in party member	33277	0.0785	0.2316	0	1
	prop_old	Proportion of elderly population	41940	0.2287	0.3098	0	1
	car	Does the family have a car?	41941	0.7994	0.4005	0	1
	heath	Average health status	33273	2.3809	0.7831	1	5
	educ	Average educational years	33257	3.5654	3.5654	0	11
instrumental variable	exper	Does the village party secretary have management experience?	756	0.2249	0.4178	0	1

The variables related to Cscore (degree of village organization) and income_avg (gross income per capita) are all treated as numbers. On the one hand, they are for the sake of stability, because the difference in numerical levels between the core explanatory variable (degree of village organization) and the core interpreted variable (gross income per capita) is too large. Taking the logarithm can reduce the fluctuation of the coefficient and the heteroscedasticity in the data. On the other hand, the coefficient is also an elastic coefficient, and the percentage change can be seen.

$$\ln(1 + income_avg_{it}) = \beta_0 + \beta_1 \ln(1 + Cscore_{it}) + \beta_2 X_{it} + \mu_i + \varphi_t + \varepsilon_{it}$$

Among them, the interpreted variable income_avg represents the total household income per capita. In the empirical test, the interpreted variables also include prop_wage (proportion of wage income), prop_oprt (proportion of operational income), prop_wealth (proportion of property income), prop_trans (proportion of transfer income), prop_farm (proportion of agricultural income), prop_nofarm (proportion of non-agricultural income), gini1 (village Gini coefficient), etc. X_{it} represents a series of control variables that affect farmers' income, and μ_i represents individual effect and φ_t represents period effect, ε_{it} representing random error perturbation term.

5. Results of Empirical Analysis

5.1. The Basic Regression Analysis

The two-way fixed effect model is used to perform benchmark regression on the questionnaire data, and the regression results are shown in the table.

The empirical results show that the degree of village organization has a significant positive impact on the total per capita income of households and the clustering is stable at both the village level and the household level (see Table 3). Specifically, for every 1% increase in the degree of village organization, the total per capita income of farmers can be increased by 32.4%, which has a greater role in promoting, which is consistent with the assumption 1 in this paper.

Table 3. Basic regression.

variables	(1) income_avg	(2) income_avg	(3) income_avg	(4) income_avg
Cscore	0.003*** (0.094)	0.324*** (0.091)	0.324* (0.188)	0.324*** (0.104)
cluster	—	—	CID	FID
Observations	24,900	24,881	24,881	24,881
R ²	0.077	0.166	0.166	0.166
Control variables	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Similarly, through analysis, it can be concluded that the degree of village organization has a significant positive impact on the wage income of farmers' families and operational income, and the clustering is stable at both the village level and the household level (see Table 4). Specifically, for every 1% increase in the degree of village organization, the proportion of wage income and the proportion of operational income can be increased by 22.6% and 5%, respectively. In contrast, the proportion of wage income of farmers is much higher than that of operational income. The possible reason is that the degree of village organization is high, which can significantly promote the transfer of labor force and non-agricultural employment of farmers, and also increase the information and channels for farmers to obtain employment, thus increasing the income of farmers.

Table 4. Degree of village organization and wage income, operational income.

variables	(1) prop_wage	(2) prop_wage	(3) prop_wage	(4) prop_wage	(5) prop_oprt	(6) prop_oprt	(7) prop_oprt	(8) prop_oprt
Cscore	0.216*** (0.023)	0.226*** (0.025)	0.226*** (0.064)	0.226*** (0.026)	0.094*** (0.015)	0.050*** (0.017)	0.050 (0.039)	0.050*** (0.018)
cluster	—	—	CID	FID	—	—	CID	FID
Observations	34,111	27,350	27,350	27,350	34,164	27,393	27,393	27,393
R ²	0.030	0.116	0.116	0.116	0.004	0.019	0.019	0.019
Control variables	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The degree of village organization also has a significant positive impact on farmers' property income and transfer income, and the clustering is stable at both the village level and the household level (see Table 5). Specifically, for every 1% increase in the degree of village organization, the proportion of property income and the proportion of transfer income can be increased by 0.8% and 4.2%, respectively. The high degree of village organization and the increase in the proportion of property income may be due to the fact that, on the one hand, farmers will have a higher negotiating position in the land transfer market, so the transfer and lease prices will be higher; on the other hand, they may be able to promote the transaction of idle houses and other properties by standardizing and accelerating the construction of the rural property rights transaction market. However, the increase was small because the proportion of property income in the total income of farmers was very low, which was in line with the actual situation. The increase in the proportion of transfer payments is due to the high degree of organization of the villages. On the one hand, the villages may be able to better distribute the transfer payments to the farmers when receiving the transfer payments from the state and the superior government; On the other hand, it is also possible that in villages with a high degree of organization, relatives and friends are more closely connected, and it is easier to "get rich first and then get rich" within the circle of acquaintances, with more emotional income support. This is consistent with the assumption 2 in this paper.

Table 5. Degree of village organization and property income, transfer income.

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
variables	prop_wealth	prop_wealth	prop_wealth	prop_wealth	prop_trans	prop_trans	prop_trans	prop_trans
Cscore	0.011*** (0.004)	0.008* (0.004)	0.008 (0.008)	0.008* (0.005)	0.083*** (0.008)	0.042*** (0.008)	0.042*** (0.016)	0.042*** (0.009)
cluster	—	—	CID	FID	—	—	CID	FID
Observations	34,228	27,441	27,441	27,441	34,230	27,441	27,441	27,441
R ²	0.003	0.004	0.004	0.004	0.015	0.028	0.028	0.028
control variables	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The empirical results show that the degree of village organization has a significant negative impact on farmers' agricultural income, while it has a significant positive impact on non-agricultural income, and the clustering is stable at both village level and household level (see Table 6). For every 1% increase in the degree of village organization, the proportion of agricultural income decreased by 19.7%, whereas the proportion of non-agricultural income increased by 19.7%. The impact on the income structure is basically consistent with the previous conclusion about the increase in the proportion of wage income, which is consistent with the assumption 3 of this study. In villages with high degree of village organization, fewer farmers will engage in agricultural operations and more will choose to start businesses or work, so non-agricultural income will increase significantly.

Table 6. Degree of village organization and agricultural and non-agricultural income.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
variables	prop_farm	prop_farm	prop_farm	prop_farm	prop_nofar m	prop_nofar m	prop_nofar m	prop_nofar m
Cscore	-0.122*** (0.018)	-0.197*** (0.020)	-0.197*** (0.071)	-0.197*** (0.022)	0.122*** (0.018)	0.197*** (0.020)	0.197*** (0.071)	0.197*** (0.022)
cluster	—	—	CID	FID	—	—	CID	FID

Observations	34,186	27,649	27,649	27,649	34,186	27,649	27,649	27,649
R ²	0.154	0.187	0.187	0.187	0.154	0.187	0.187	0.187
control variables	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The empirical results show that the degree of village organization has a significant negative impact on the village Gini coefficient, indicating that the improvement of the degree of village organization can narrow the income gap among farmers, and the clustering is stable at both the village level and the household level (see Table 7). Specifically, for every 1% increase in the degree of village organization, the village Gini coefficient will decrease by 6.5%. This is also consistent with common sense and practice, and is also consistent with hypothesis 4 of this study. Because villages with high degree of organization will usually pay more attention to the distribution of the interests of the farmers in the villages, and will also develop in a more "group" way, and the income gap among the farmers will be smaller, thus obtaining a sense of fairness and happiness, and having a better sense of identity and belonging to the villages.

Table 7. Degree of Village Organization and Income Gap among Farmers.

variables	(1) gini1	(2) gini1	(3) gini1	(4) gini1
Cscore	-0.065*** (0.006)	-0.071*** (0.007)	-0.071* (0.037)	-0.071*** (0.007)
cluster	—	—	CID	FID
Observations	19,398	16,105	16,105	16,105
R ²	0.162	0.183	0.183	0.183
control variables	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.2. Estimation of Instrumental Variables

Although we adopt a two-way fixed-effect model to control the effects of time-invariant regional heterogeneity and time trends affecting all regions simultaneously, potential endogenous problems may still exist. On the one hand, the degree of village organization and farmers' income may be affected by some other unobservable factors, such as local history and culture and resource endowments; On the other hand, the places with high income of farmers may pay more attention to unity, thus resulting in reverse causality. In order to alleviate the endogenous problems mentioned above, we use the instrumental variable method to estimate the causal impact of the degree of organization on the income of farmers. The tool variable used in this paper is "whether the secretary of the village branch has management experience". Whether the secretary of the village branch has management experience is directly related to his ability to govern the village, which can have an important impact on the degree of village organization. With this variable, endogenous problems can be solved to a certain extent. In the process of data processing, both the degree of village organization and the per capita income of households are logarithmic, so as to eliminate the impact of numerical orders on the results as much as possible. The sign and significance of the coefficients estimated by the tool variables are consistent with the benchmark regression, which supports the causality of the results of the benchmark regression.

Table 8. Estimation of Tool variables.

	(1)	(2)	(3)
variables	lnincome_avg iv=exper	lnincome_avg iv=exper	lnincome_avg iv=exper
lnCscore	3.023*** (0.691)		
lnCscore1		2.584*** (0.592)	
lnCscore2			3.525*** (0.825)
Observations	15,441	15,441	15,441
R ²	0.128	0.125	0.070
Control variables	YES	YES	YES
year FE	YES	YES	YES
Cluster	FID	FID	FID
KP-LM-F test	432	367.2	205.5
KP-LM-pvalue	0	0	0

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.3. The Robustness Test

In the process of robustness test, this paper adopts the calculation method of changing independent variables and the random sampling method to verify. On the one hand, the entropy method is used to calculate the degree of village organization, while the robustness test is used to calculate the degree of village organization by adding up the values of variables. On the other hand, we randomly selected 80% and 90% of the sample size for verification, and the results are consistent with the benchmark results (see Tables 9–11). Therefore, we have reason to believe that the conclusion of the benchmark regression is sound.

Table 9. Robustness test of replacement measurement method.

	(1)	(2)	(3)
variables	lnincome_avg	lnincome_avg	lnincome_avg
lnCscore_sum	0.109*** (0.039)		
lnCscore1_sum		0.216*** (0.035)	
lnCscore2_sum			-0.057 (0.039)
Observations	24,946	24,946	24,946
R ²	0.167	0.169	0.167
Control variables	YES	YES	YES
year FE	YES	YES	YES
Cluster	FID	FID	FID

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10. Robustness analysis of 80% random samples.

variables	(1) lnincome_avg	(2) lnincome_avg	(3) lnincome_avg
lnCscore	0.320*** (0.112)		
lnCscore1		0.517*** (0.087)	
lnCscore2			-0.087 (0.089)
Observations	19,940	19,940	19,940
R ²	0.169	0.170	0.169
Control variables	YES	YES	YES
year FE	YES	YES	YES
Cluster	FID	FID	FID

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11. Robustness analysis of 90% random samples.

variables	(1) lnincome_avg	(2) lnincome_avg	(3) lnincome_avg
lnCscore	0.319*** (0.109)		
lnCscore1		0.529*** (0.082)	
lnCscore2			-0.107 (0.086)
Observations	22,438	22,438	22,438
R ²	0.164	0.166	0.164
Control variables	YES	YES	YES
year FE	YES	YES	YES
Cluster	FID	FID	FID

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.4. Mechanism Analysis

In order to further explore how the degree of village organization affects the sustainable growth of farmers' income, this paper conducted a mechanism analysis and set the model as follows:

$$M_{it} = \beta_0 + \beta_2 \ln(1 + Cscore_{it}) + \beta_3 X_{it} + \mu_i + \varphi_t + \varepsilon_{it}$$

$$M = \{landtransf, fund, machine\}$$

M_{it} represents the mechanism variables, including agricultural land transfer, industrial and commercial capital embedment and agricultural social services, $Cscore$ represents the degree of village organization, and X_{it} represents the control variables. μ_i represents individual effect and φ_t represents eriod effect, ε_{it} represents random error perturbation term.

The empirical results show that the degree of village organization can improve farmers' income by promoting the circulation of agricultural land, embedding of industrial and commercial capital and socialized service of agricultural machinery, and the clustering is stable at both the village level and the household level (see Table 12). Specifically, villages with high degree of organization are more likely to promote collective action of farmers internally and reduce information asymmetry and transaction costs externally. Therefore, the income of farmers can be increased by promoting the circulation of agricultural land, undertaking industrial and commercial capital and socialized service of agricultural machinery.

Table 12. Mechanism test.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
variables	landtransf	landtransf	landtransf	fund	fund	fund	machine	machine	machine
Cscore	40.044*** (1.818)	40.044*** (10.882)	40.044*** (2.001)	0.899*** (0.034)	0.899*** (0.211)	0.899*** (0.038)	0.184*** (0.023)	0.184* (0.101)	0.184*** (0.026)
cluster	—	CID	FID	—	CID	FID	—	CID	FID
Observations	28,323	28,323	28,323	17,429	17,429	17,429	28,323	28,323	28,323
R ²	0.109	0.109	0.109	0.110	0.110	0.110	0.266	0.266	0.266
control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.5. Heterogeneity Analysis

The population density of the village, the height of per capita land area and the distance from the county government and the township government are important village characteristics. The former directly reflects the aggregation pattern of villages and the frequency of farmers' information exchange, which will affect the level of social capital, land circulation and the level of agricultural mechanization, and thus affect the income of farmers. Villages with high population density are usually more organized. The latter relates to the connection between rural and urban areas, is directly related to employment, and will also have an impact on income. Similarly, the political identity and education level of farmers are important characteristics of individuals, which are directly related to the level of human capital and will also affect farmers' income. The questionnaire contains questionnaires about village level and individual level. After matching with the family data, it provides a good data support for the heterogeneity analysis of this paper. In the analysis of heterogeneity, the conversion of values is divided by the mean value of variables. If the value is higher than the mean value, it is regarded as high, and if it is lower than the mean value, it is regarded as low. The estimated results are shown in Tables 13–15.

Table 13. Heterogeneous Effects 1.

	(1)	(2)	(3)	(4)
variables	density_low	density_hig h	land_avrg_lo w	land_avrg_hig h

InCscore	0.279** (0.140)	0.291* (0.149)	0.493*** (0.166)	0.557*** (0.179)
Observations	13,699	11,224	8,175	8,723
R ²	0.136	0.134	0.162	0.107
Control variables	YES	YES	YES	YES
year FE	YES	YES	YES	YES
Cluster	FID	FID	FID	FID

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14. Heterogeneous Effects 2.

variables	(5)	(6)	(7)	(8)
	dist1_low	dist1_hig h	dist2_low	dist2_high
InCscore	0.248 (0.158)	0.552*** (0.192)	0.641*** (0.166)	0.113 (0.186)
Observations	7,302	9,401	7,037	9,666
R ²	0.131	0.134	0.160	0.117
Control variables	YES	YES	YES	YES
year FE	YES	YES	YES	YES
Cluster	FID	FID	FID	FID

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 15. Heterogeneous Effects 3.

variables	(9)	(10)	(11)	(12)
	party_no	party_yes	educ_low	educ_high
InCscore	0.318*** (0.114)	0.212 (0.393)	0.255 (0.163)	0.244* (0.128)
Observations	21,683	1,030	10,412	14,511
R ²	0.147	0.192	0.103	0.117
Control variables	YES	YES	YES	YES
year FE	YES	YES	YES	YES
Cluster	FID	FID	FID	FID

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The empirical analysis results show that, from the village level, no matter whether the village population density and per capita land area are large or small, the degree of village organization can significantly improve the income of farmers, which indicates that the characteristics of the village itself, such as population size and area, will not affect the promotion effect of the degree of organization. However, for villages far away from the county seat, the promotion effect of the degree of organization is more significant, because the villages near the county seat are more convenient to go to the county seat, easier to go out for work, and have more obvious characteristics of personal development; The villagers in the villages far away from the city are more likely to develop in groups, but the benefits from organization are greater. From a personal perspective, the effect of the degree of organization is not significant for groups with political identity in party member, but more significant for groups without political identity in party member. This may be due to the fact that non-party member groups are more vulnerable than party member groups and rely more on the development and benefits brought by the organization. The degree of organization can obviously promote the families with higher average education level, but not the families with lower average education level. This may be because the families with higher education level are usually in the leading position in the organization and can all obtain more organizational benefits.

5.6. Further Discussion

The degree of organization can promote the growth of farmers' income. In the table, the degree of formal organization of villages is referred to as the degree of formal organization, and the degree of informal organization is referred to as the degree of informal organization. We further analyze the impact of the two levels of organization on farmers' income and income gap for empirical analysis. The empirical results show that the degree of village formal organization has a significant positive impact on farmers' income, which is consistent with the effect of the degree of village organization, and the clustering to the village level and household level is stable (see Tables 16 and 17). However, the degree of organization of informal organizations in villages has a significant negative impact on the income of farmers, and when the household level control variables are added, the degree of organization of informal organizations has no significant impact on the income level of farmers. This shows that the increase in the degree of organization of informal village organizations, such as clan and religious forces, will weaken the role of formal organizations, which may have a negative impact on the income of farmers and the development of villages. On the other hand, this also shows that the village is formally organized and the basic leader is the trend of village organization.

Table 16. Degree of formal organization and total income per capita.

	(1)	(2)	(3)	(4)
	incomme_av	incomme_av	incomme_av	incomme_av
variables	g	g	g	g
Cscore1	0.544*** (0.075)	0.529*** (0.071)	0.529*** (0.144)	0.529*** (0.079)
cluster	—	—	CID	FID
Observations	24,900	24,881	24,881	24,881
R ²	0.079	0.168	0.168	0.168
Control variables	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 17. Degree of informal organization and total income per capita.

	(5)	(6)	(7)	(8)
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variables	inconme_avg	inconme_avg	inconme_avg	inconme_avg
Degree of informal organization	-0.467*** (0.072)	-0.099 (0.070)	-0.099 (0.151)	-0.099 (0.082)
cluster	—	—	CID	FID
Observations	24,900	24,881	24,881	24,881
R ²	0.079	0.166	0.166	0.166
Control variables	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The empirical results show that the degree of village formal organization has a significant negative impact on the village Gini coefficient, indicating that both the degree of village formal organization and the degree of informal organization can improve and narrow the income gap among farmers, which is consistent with the results of the degree of village organization, and the clustering is stable at both the village level and the household level (see Tables 18 and 19).

Table 18. Degree of formal organization and income gap.

variables	(1) gini1	(2) gini1	(3) gini1	(4) gini1
Cscore1	-0.058*** (0.005)	-0.051*** (0.005)	-0.051* (0.031)	-0.051*** (0.006)
cluster	—	—	CID	FID
Observations	19,398	16,105	16,105	16,105
R ²	0.163	0.182	0.182	0.182
Control variables	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 19. Degree of informal organization of villages and income gap.

variables	(1) gini1	(2) gini1	(3) gini1	(4) gini1
Degree of informal organization	-0.020*** (0.005)	-0.033*** (0.005)	-0.033 (0.027)	-0.033*** (0.005)
cluster	—	—	CID	FID
Observations	19,398	16,105	16,105	16,105
R ²	0.158	0.179	0.179	0.179
Control variables	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6. Conclusions and Enlightenment

As the basic component unit of China's grass-roots society, the degree of organization of villages has an important impact on the sustainable growth of farmers' income and the sustainable narrowing of the gap. The premise is to be able to build a trust and cooperation mechanism between the village committee and the villagers as well as between the villagers within the village. In this study, the organization form of village is included in the analysis of farmers' income, which makes up for the deficiency of discussing the influencing factors of farmers' income from the village level. In the process of policy practice, this paper provides the following enlightenment for local governments on how to improve the income of farmers: first, to enhance the degree of organization of villages, to construct a good trust and cooperation mechanism between village committees and villagers, especially to attach importance to the role of formal organizations such as party branches and village committees, and to improve the self-building ability and endogenous development momentum of villages; Secondly, centering on the goal of rural revitalization and common prosperity, it is necessary to enhance the role of village official organizations in policy implementation and policy guidance, because the village system should implement the policy intention of improving farmers' income and narrowing the income gap between farmers; Third, increasing the proportion of party member within the villages and the education level per capita can help to promote the village organization and share the benefits of organization.

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