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Impact of Off-Farm Employment on Farmland Transfer: Insight on the Mediating Role of Agricultural Production Service Outsourcing

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Abstract: Understanding the effects of the off-farm employment of rural laborers on agricultural land use is essential to promote farmland transfer and enhance rural development in China. This study aims to investigate the direct impact of off-farm employment on farmland transfer and the mediating role of agricultural production services outsourcing (APSO) by using the Probit and Tobit model approaches. This study uses field survey data of 960 rural households in 12 counties of the four main grain producing provinces of China. Findings of this study show that off-farm employment has a significant positive effect on the transfer of land out from households and a significant negative effect on the transfer of land into households. Furthermore, APSO has a significant mediating effect on the influence of off-farm employment on farmland transfer behavior. Specifically, APSO can reduce the positive impact of off-farm employment on agricultural land transfer and weaken the negative impact of off-farm employment on agricultural land transfer-in. The findings of our study also show that the mediating effect of different outsourcing of production links services on the impact of off-farm employment on agricultural land transfer is heterogeneous. Based on the findings of the study, it is contended that the APSO can reshape the supply and demand structure of rural land rental markets and policymakers should focus on the role of ASPO in shaping policies to promote land transfer.

Keywords: off-farm employment; farmland transfer; agricultural production service outsourcing (APSO); mediating effect

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1. Introduction

Since China's reform, opening, and urbanization, rural China has provided a large part of the labor force for China's economic development, and the young adult and middle-aged adult labor force are the main groups of off-farm workers [1,2]. Meanwhile, the rising wage level in cities, the widening gap between urban and rural education, and the weakening of traditional local culture and social capital have also attracted more and more farmers to leave agriculture and rural areas, and in this process, several "migrant workers" have formed. According to the annual reports on off-farm workers, released by the China Bureau of Statistics (data source: National Statistics Yearbook 2006–2016, China Population and Employment Statistics Yearbooks 2006–2016 and the annual reports on peasant workers 2006–2015), the number of rural off-farm workers consistently increased from 2005 to 2019, and 291 million farmers engaged in off-farm jobs in 2019. The structure of the allocation of the rural labor force between agricultural production and off-farm work has significantly changed, and moderate scale operation is the inevitable trend of China's agricultural development.

Generally, off-farm employment is considered a crucial prerequisite for the development of the land rental market [3]. The transfer and concentration of agricultural

land has become an important means to achieve agricultural scale operation and an important strategy to realize agricultural modernization and promote rural revitalization. However, the transfer of agricultural land has not completely reversed China's agricultural economic pattern based on small farmers [4]. Statistically, the proportion of off-farm laborers in the population increased sharply from 29.5% in 1978 to 72.3% in 2016 (data source: China Population and Employment Statistics Yearbooks 1979 and 2017), far exceeding the proportion of agricultural land transfer area by 35.1% (data source: http://www.moa.gov.cn/hdllm/zbft/tdqq/wzq/, accessed on 29 November 2017).

With the massive outflow of young and middle-aged rural labor in China, there is a high demand for labor saving machinery due to the scarcity of laborers in agricultural production [5]. In recent years, the Chinese government has issued a series of policies and measures to guide and support the development of socialized agricultural production services, known as agricultural production service outsourcing (APSO, refers to "outsourced machine services" in academia) by rural farmers. In the process of APSO, crop producers can not only enjoy the agricultural service in different links (e.g., plowing, sowing, harvest) with an amount of payment to providers, but also obtain the outputs. It shows that APSO not only effectively compensates for the shortage of agricultural labor due to off-farm labor outflow, but also introduces advanced production technologies into agricultural production, which effectively change the farmer transfer behavior and further help to accelerate the development of agricultural modernization [6]. Ignoring the mediating effect of APSO may lead to an overestimation of the effect of non-agricultural employment on agricultural land transfer. Therefore, this research aims to re-examine the driving effect of off-farm employment on agricultural land transfer by considering the role of agricultural production outsourcing, so that we can explain the reasons for the low rate of agricultural land transfer.

Previous studies have focused on the impact of off-farm employment on the cultivated land rental market; however, they have not yet reached a consistent conclusion. Some literature has indicated that the labor market is the main catalyst in the development of the land rental market [7–10], and off-farm employment is an important driver in the promotion of land transfers [6,11,12]. However, due to the imperfect rural land rental market caused by regulations and restrictions for participants [13,14], a large proportion of rural to urban migrants prefer to idle their farmland rather than rent it out. Thus, off-farm employment does not necessarily lead to land transfer [15].

Theoretically, APSO plays a vital role in the impact of off-farm employment on the agricultural land transfer market [16]. Specifically, on the one hand, off-farm employment is commonly believed to play a significant role in the promotion of APSO [17–21]. Ahmed and Goodwin (2016) conclude that the use of tractor tillers significantly increases off-farm employment in Bangladesh [22]. However, other studies have indicated that there is no inevitable relationship between off-farm employment and APSO, or even a negative relationship [23,24]. In terms of the heterogeneity of outsourcing in different production links, farmers' off-form employment plays a more significant role in promoting the outsourcing of labor-intensive links than technology-intensive links [25]. However, Chen et al. [11] noted that off-farm employment has a greater positive impact on outsourcing technology-intensive links, which is inconsistent with the findings of Deng et al. [25]. On the other hand, some scholars have shown that APSO has a significant positive impact on the transfer of agricultural land from large farmers in decision making and a significant negative impact on the decision making of small farmers about the transfer of agricultural land [26]. Some scholars also discussed the heterogeneity in the impact of outsourcing different production links on the transfer behavior of farmers at different operating scales. The results demonstrate that, compared to labor-intensive links, outsourcing technology-intensive links has a more substantial adverse effect on small farmers' land transfer behavior and a stronger positive effect on the land transfer behavior of large farmers [27]. In short, the APSO can replace some agricultural production links in mechanization, alleviate the labor constraints caused by off-farm employment, and reduce the probability of the transfer of agricultural land transfer from off-farm households [28]. APSO also reduces production

costs and transaction costs through the operation of services on a larger scale and promotes agricultural land management on a larger scale [29,30].

Existing research, while valuable, has the following deficiencies: (1) Empirical evidence on the impact of off-farm employment on farmland transfer is inconsistent; (2) Previous studies have poorly explained the driving effect of off-farm employment on agricultural land transfer in the case of APSO. Ignoring the impact of APSO will overestimate the impact of off-farm employment on agricultural land transfer; (3) The main areas of grain production are important in the realization of specialized grain crop production and the development of APSO, and are also important in the promotion of large-scale agricultural land management and the achievement of agricultural modernization. On the basis of the above analysis, our contributions are as follows. First, in terms of empirical research, this paper aims to introduce the conditions of APSO when considering the impact of off-farm employment on farmers' agricultural land transfer behavior, and focuses on the intermediary role of APSO and the mitigation effect it brings using the latest surveyed data in major grain-producing areas collected from 960 households in 2019 and 2020. Then, in terms of theoretical research, we also discuss the theoretical mechanism of the impact of off-farm employment on agricultural land transfer through APSO, to further expand the theoretical mechanism of off-farm employment affecting farmers' farmland transfer behavior and provide a reference for policies related to the promotion of appropriate scale management of agriculture in China.

The rest of this paper is structured as follows. Section 2 outlines the theoretical hypotheses. Section 3 presents the data and the estimate strategy. Section 4 discusses empirical results. Finally, Section 5 concludes and proposes policy implications.

2. Theoretical Hypotheses

2.1. Off-Farm Employment and Farmland Transfer

Based on the economic theory of family division of labor, the division of labor and the choice of specialization between family members are designed to maximize family profits by making full use of the advantages of each family member's abilities [31]. In the decision-making process within a household, off-farm employment and farmland management are two different 'products' of household production [32]. Therefore, with the hypothesis that the labor market is effective and that there is no restriction on the off-farm employment threshold for farmers, the family labor force could easily enter the labor market through the advantages of off-farm employment, which would reduce the number of family members in the agricultural labor force and encourage farmers to transfer out of agricultural land and inhibit them from transferring to agricultural land.

The migration of agricultural labor force to off-farm employment will also lead to a decline in the quality of labor involved in agricultural production. The migration of the rural labor force in China is dominated primarily by young and middle-aged people with a higher education level, which is characterized by "selective migration" [33], and the result is the loss of family labor and capital resources (including human capital) resources [34]. Therefore, with the gradual migration of rural labor, the phenomenon of aging and feminization of labor participating in agricultural production has become increasingly obvious. It can be expected that the decrease in the quantity and quality of the agricultural labor force will form the constraints of the agricultural labor force of farmers, allowing farmers to redistribute the endowments of land and labor factors by participating in the land rental market [35]. Under current land protection policies in China, rural smallholders cannot abandon their land for more than a certain period [36]. This massive migration of rural laborers would result in a decline in the importance of farmland, which in turn promoted farmland transferred out and inhibits farmland transferred-in. Non-agricultural employment will also bring an effect of remittance income to farmers [37], and it is possible for farmers to obtain remittance income through labor migration and engage in non-agricultural employment professionally, which prompts farmers to rent land and prevents them from renting land [38].

Based on this observation, this study puts forward the following hypotheses:

Hypothesis 1a. *Family off-farm employment has a significant positive impact on the transfer-out of agricultural land*.

Hypothesis 1b. *Family off-farm employment has a significant negative impact on the transfer-in of agricultural land*.

2.2. Off-Farm Employment, APSO and Farmland Transfer

The emergence of the APSO has caused important changes in farmers' input of production factors and agricultural management. It relaxes the constraints on farmers' resource endowment and improves the rational allocation of labor and land [39]. First, the comparative advantage of off-farm employment has attracted many young and middle-aged rural laborers to seek such work. In contrast, elderly and frail workers work at home, leading to insufficient and weak family agricultural labor, which poses a threat to agricultural production [40]. When the supply of socialized agricultural services is sufficient and the market is perfect, farmers with insufficient agricultural labor can choose to purchase agricultural services or agricultural machinery rental services to break through the original resource endowment restrictions. Therefore, farmers can use the "substitution effect" of APSO on agricultural labor to make up for labor loss caused by off-farm employment of family members [41], and thus reduce the opportunity cost of farmers' engaging in off-farm employment and the possibility of farmers' behavior of farmers. At the same time, it is beneficial to alleviate the restrictions on farmers who are transferring land and expanding the scale of their operations.

Second, off-farm employment can encourage farmers to increase their investment in capital, and farmers may reduce the probability of transferring-out the agricultural land by increasing the purchase of machinery [42]. The APSO can reduce farmers' demand for agricultural machinery purchases and alleviate the capital constraints farmers face in large-scale operations, which encourages farmers to transfer to the land. In general, these two effects reduce the probability and area that farmers will transfer out the land, while for farmers who are engaged in agricultural management, they increase the likelihood and area that they will acquire or transfer in farmland. These observations lead to the following hypotheses:

Hypothesis 2a. *The APSO has an intermediary effect in the relationship between off-farm employment and the transfer-out of agricultural land and will reduce the positive effect of off-farm employment on farmers' transfer-out behavior*.

Hypothesis 2b. *The APSO has an intermediary effect in the relationship between off-farm employment and the transfer-in of agricultural land, and it will reduce the negative effect of off-farm employment on farmers' transfer-in behavior*.

3. Data and the Empirical Framework

3.1. Study Area and Data Sources

The data used in this paper were collected from 12 counties across four provinces (as shown in Figure 1) through the questionnaire survey conducted by the research group. The 12 counties in the four provinces are Cao county, Yuncheng county, Shouguang county, and Laoling county in Shandong province; Xingyang county, Luoshan county, Zhengyang county and Xiping county in Henan province; Yingshang county and Linquan county in Anhui province; and Ningjin county and Gaoyi county in Hebei province. There are three main reasons for this: first, the Henan, Shandong, Anhui, and Hebei provinces are all major grain producing provinces in China and important regions to ensure national food security. National statistics show that in 2022, the cultivated area of the four provinces accounted for 55.82% of the total cultivated area of the country and wheat production

represented 65.56% of the national wheat output. Second, agricultural production in Henan, Shandong, Anhui, and Hebei provinces is still dominated by small-scale farming, with an average contracted land area of only 0.6 hectares per household [43], and land fragmentation is obvious. However, with the priority promotion of several pilot land reform projects, the agricultural land transfer market has developed rapidly. At the Shandong Province end of 2020, the farmland transfer area was 2.75 million hectares, with a transfer rate of 44.7%, and the scale rate of land management had exceeded 60% (data source: http://sdxw.iqilu.com/share/YS0yMS02ODgzMTk1.html, accessed on 7 June 2020). In 2017, the proportion of the land area transferred in Henan and Anhui province in the contracted land area of the households also reached 32.5% (data source: https://www.tuliu.com/read-37732.html, accessed on 4 August 2016) and 46%(data source: http://mp.pdnes.cn/Pc/ArtlnfoApi/article?id=6466868, accessed on 14 August 2019) respectively, and the proportion of the transferred land area in Hebei province also reached 35.7% at the end of 2018. (data source: hebei.hebnews.cn/2019-01/08/content_7330785.htm, accessed on 8 January 2019). Finally, The socialized agricultural service system in the four provinces has been continuously improved. In 2019, the comprehensive mechanization rate for crop cultivation and harvesting in Shandong province has reached more than 86%. At the same time, the mechanization rate of Henan, Anhui and Hebei provinces is also around 80%. In China, areas with a high level of agricultural mechanization are also areas with a high level of non-agricultural employment [10]. Therefore, this study selects Henan, Shandong, Anhui and Hebei provinces to study farmers' non-agricultural employment, agricultural land transfer, and service outsourcing, which has important practical significance for promoting the connection between small farmers and agricultural modernization in major grain producing provinces.

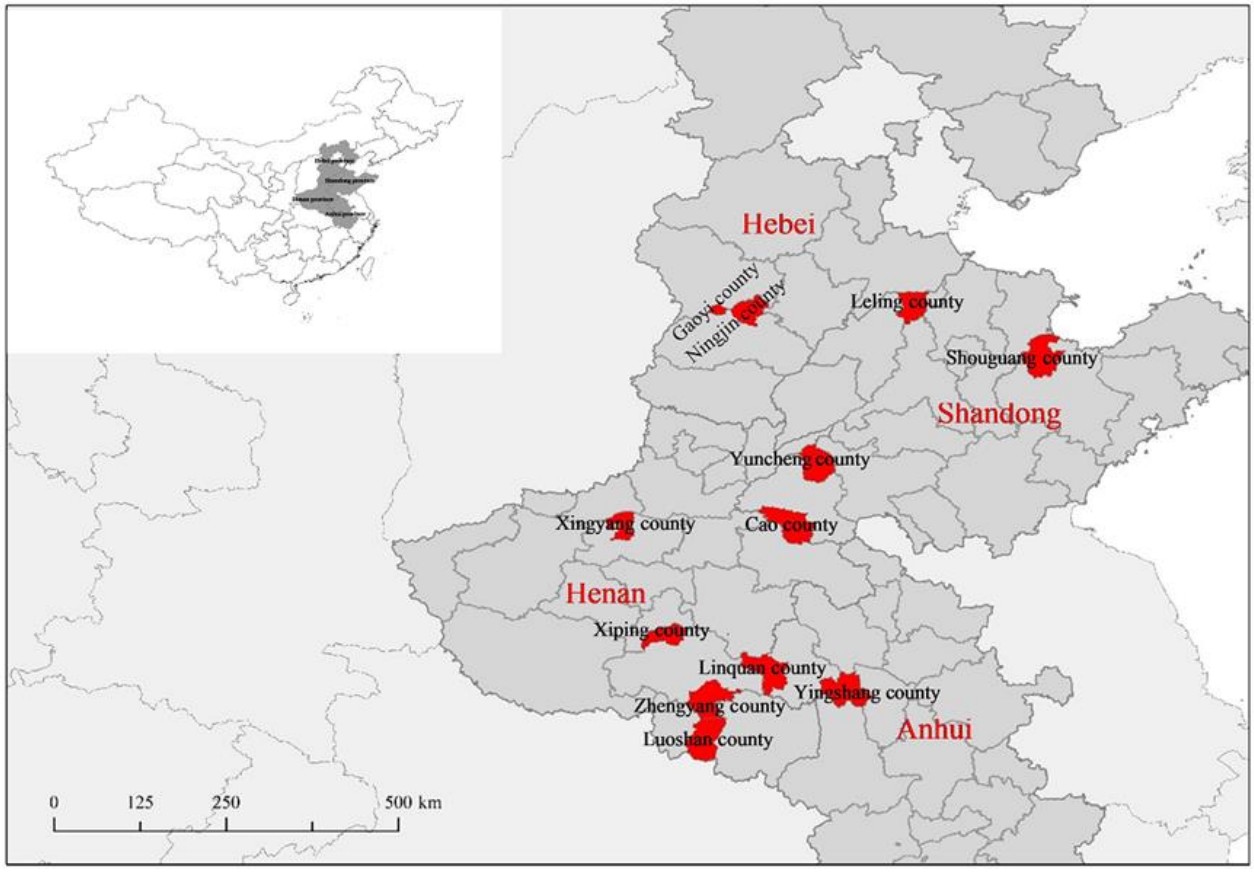

Figure 1. The sample distribution of 12 counties in four main grain production provinces (Total sample size = 960).

The survey was completed in two phases, in January 2019 (the sample areas including Hebei and Anhui province) and January 2020 (the sample areas including Shandong and Henan province), respectively. The sampling process is as follows: the research group first went to the sample areas to conduct the field survey using the stratified random sampling method based on the total population and total area of arable land in each province to select 3–4 counties in each province, 2–5 villages in each county, and then randomly selected approximately 30 households in each village for face-to-face interviews. With these concerns, in total, 960 wheat growers (compared to corn, the degree of wheat specialized agricultural services is higher, so this paper mainly analyzes the APSO of wheat growers.), consisting of 160 transferred-in households, 427 non-transferred households, and 373 transferred-out households (including 29 both transferred-in and transferred-out households) were selected. Among the transferred-out households, 33 households transferred all the farmland out; that is, these farmers have no agricultural production behavior, so it is not very meaningful to judge whether they have outsourcing behavior of agricultural production services. Therefore, these sample farmers will not be included in the mediating effect analysis model of farmland transfer out. The 29 both transferred-in and transferred-out households are treated as transferred-out households in this study. The transferred-in land of these farmers does not increase the planting area of wheat, but carries out cash crop planting, and its essence is the same as that of transferred-out households. From the field survey, adequate information was obtained to run the regression, land transfer information. For example, detailed household demographic information, labor employment, land transfer information, and agricultural production information.

Furthermore, statistical results of household characteristics show that the average contracted land area is 0.52 hectares per household and the average number of land blocks is 2.78, which indicates that the endowment of family land resources is insufficient and the degree of fragmentation is high. The proportion of agricultural land transfer area is 55.52%, and the number of non-agricultural employees in the household labor force accounts for 64%. The proportion of non-agricultural employment is higher than that of agricultural land transfer. In the choice of outsourcing services, 80% of farmers will purchase the outsourcing service in farmers' production links.

3.2. Empirical Framework

Existing research focuses on analyzing farmers' farmland transfer-out behavior, but the transfer-in willingness and behavior of rural households play an important role in promoting the formation and development of farmland transfer market. Therefore, to form a comprehensive and robust empirical result, we analyze both transfer-in and transfer-out behaviors. Variables that indicate transfer decision and transfer area are treated as explained variables.

Farmers' land transfer decision is a binary variable, a Probit model is employed. The Probit model specification is specified as follows:

$$y_{it}{}^{*} = \alpha_0 + \alpha_1 Z_{i,t-1} + \alpha_2 X_{it} + \varepsilon_{it};\ \varepsilon_{it} \ \sim\ N\left(0, \sigma^2\right) \tag{1}$$

$$y_{it} = \begin{cases} 1,\ if\ y_{it}{}^{*} > 0 \\ 0,\ if\ y_{it}{}^{*} \le 0 \end{cases}$$

y_{it} is the dependent variable, which is a farmer's land transfer decision. For land transferring-in, it is equal to one if household i rented in land in period t, otherwise it equals zero. For land transferring-out, it equals one if household i rented in land in period t, otherwise equals to zero. $Z_{i,t-1}$ is the variable of off-farm employment. X_{it} is a vector of control variables, which contains the age and education level of the head of household, the average education level of the family, the area and number of land blocks contracted by the family, the family burden, the number of old-age and medical insurance, the distance to the business center, agricultural fixed assets and the per capita income level of the family. The descriptive statistics of specific variables are shown in Table 1. α_1 is the estimated effect of

off-farm employment on land transfer. α_2 is a vector of estimated coefficient for X_{it}. ε_{it} is the error term.

Table 1. Variables description and statistical analysis.

Variables		Description of the Variables	Mean	S.D [a]
Dependent variable				
Transfer behavior	$Land_{-out}$	Dummy: 1 = transfer out; 0 = otherwise	0.466	0.499
	$Area_{-out}$	Transferred out farmland area/mu [b]	2.332	3.469
	$Land_{-in}$	Dummy: 1 = transfer in; 0 = otherwise	0.271	0.445
	$Area_{-in}$	Transferred in farmland area/mu [b]	17.490	113.841
Key variable				
FNBL		Number of off-farm labor force/number of family labor force	0.427	0.351
Outsourcing		Dummy: 1 = Outsourcing of production links; 0 = otherwise	0.616	0.487
Plowing (Out_1)		Dummy: 1 = Outsourcing of plough; 0 = otherwise	0.513	0.500
Harvesting (Out_2)		Dummy: 1 = Outsourcing of harvesting; 0 = otherwise	0.603	0.490
Sowing (Out_3)		Dummy: 1 = Outsourcing of sowing; 0 = otherwise	0.560	0.497
Protecting (Out_4)		Dummy: 1 = Outsourcing of plant protection; 0 = otherwise	0.027	0.162
Control variable				
Age		Head's age (year)	58.464	11.418
Edu		Years of Head's education (year)	7.287	3.542
Average of family members		Average age of family members (year)	44.938	15.057
Generations in the same family		Number of generations in family members (generations)	2.193	0.827
Burden		Percentage of elderly or children [c] in the family	0.380	0.323
Pension		Number of people participating in pension insurance in the family (people)	2.380	1.316
Medical		Number of insured persons in the family (people)	3.872	1.818
Land		Area of the contracted land (mu)	6.532	5.648
Plots		Number of plots (parcel)	2.775	1.766
Distant		Distance to the nearest business center (km)	4.212	4.216
Assets		Net present value of household agricultural fixed assets (yuan [d], add 1 to take logarithm)	2.950	3.888
Income		Logarithm of income per capital (yuan, add 1 to take logarithm)	9.666	0.802

Notes: a S.D = Standard deviation, b 1 mu ≈ 0.067 ha, c the age range of the elderly is over 65 years old and that of children is under 16 years old, [d] 1 US dollar ≈ 6.18 Yuan in year 2021.

As for farmland transfer area estimation, a Tobit model specification is applied as follows according to Greene et al. [44]:

$$y_{it}{}^{*} = \beta_0 + \beta_1 Z_{i,t-1} + \beta_2 X_{it} + \theta_{it};\ \theta_{it} \sim N\left(0, \sigma^2\right) \quad (2)$$

$$y_{it} = \begin{cases} y_{it}{}^{*},\ if\ y_{it}{}^{*} > 0 \\ 0,\ if\ y_{it}{}^{*} \le 0 \end{cases}$$

In Equations (1) and (2), $y_{it}{}^{*}$ is a latent variable, and y_{it} is an observed variable, which is farmers' farmland transfer behavior. $Z_{i,t-1}$ and X_{it} have the same meaning in Equation (1). θ_{it} is the error term. The descriptive statistics of specific variables are shown in Table 1.

To explore the mediating effect of the APSO in the impact of off-farm employment on farmland transfer behavior, a mediating effecting model should be constructed. Referring to Baron and Kenny [45], and to Wen [46], the regression equation used to describe the relationship between variables is specified as follows:

$$y_{it}{}^{*} = c_0 + c_1 Z_{i,t-1} + c_2 X_{it} + \vartheta_{it} \quad (3)$$

$$M_{it} = a_0 + a_1 Z_{i,t-1} + a_2 X_{it} + \delta_{it} \quad (4)$$

$$M_{it} = a_0 + a_1 Z_{i,t-1} + a_2 X_{it} + \delta_{it} \quad (5)$$

In Equations (3)–(5), M_{it} is the variable of APSO. If household i choose APSO in period t, M_{it} is equal to one; otherwise, M_{it} is equal to zero. c_1 in Equation (3) is the total effect of off-farm employment on agricultural land transfer; a_1 in Equation (4) is the estimated

effect of off-farm employment on the intermediate transmission mechanism (APSO); b_1 in Equation (5) is the estimated effect of the intermediate transmission mechanism on farmland transfer after controlling all variables, and $c_1^{'}$ is the estimated direct effect of off-farm employment on agricultural land transfer after controlling the influence of the intermediate transmission mechanism. When c_1 is significant, if a_1 and b_1 pass the significant test, the mediating effect would be verified. If at least one of a_1 and b_1 is not significant, the Sobel or Bootstrap test should continue to determine whether there is a mediating effect.

3.3. Endogenous Test

In this study, there is no doubt as to the effect of off-farm employment on land transfer. However, land transfer can also motivate farmers to adjust their labor allocation [8]. When farmers' land transfer rights are limited and the development of land leasing market is slow, the transfer of labor to cities and non-agricultural industries may be restrained. However, a stable and organized land transfer market can effectively release the agricultural labor force of family members and increase the proportion of nonagricultural employment of family members [47]. Therefore, farmers' off-farm employment and land transfer status may be correlated in the same period, which can potentially cause the endogeneity problem. In this study, we choose to use the one-period lagged off-farm employment data to make the results more convincing. In particular, farmers' agricultural land transfer behavior in 2019 was used and farmers' off-farm employment situation in 2018 was observed.

With these data obtained in different periods, we run a regression to test the existence of an endogeneity problem. Instrumental variables are generally used to solve endogenous problems. The proportion of non-agricultural labor force of other sample farmers in the township, except for the surveyed villages it belongs to, can serve as an appropriate instrumental variable for the following two reasons. First, this variable is a totally exogenous variable that is not determined by other control variables. Second, this variable is a good indicator of the local labor market, which can significantly affect individual decisions in off-farm employment without changing farmers' land transfer decision. The result of the endogenous test based on the instrumental variable (see Table 2) showed that the *p*-values of the DWH and Wald test did not pass the significance test. It could be concluded that there was no serious endogeneity problem when estimating the effects of off-farm employment on farmland transfer in this study. With one-period lagged off-farm employment data used in the regression, there is no need to worry about the endogeneity problem.

Table 2. Endogeneity test results based on instrumental variables.

Variables	First-Stage Regression	Two-Step with Endogenous Regressors		Exogeneity Test
	fnbl	Transfer Behavior	Transfer Behavior	Transfer Behavior
	OLS	2SLS	IV-Probit	Probit
FNBL		0.539 **	1.575 **	1.006 ***
		(−0.249)	(−0.721)	(−0.211)
IV	0.592 ***			0.346
	(−0.078)			(−0.461)
Control variables	not shown	not shown	not shown	not shown
F value	57.651			
Shea's Partial R-sq	0.048			
p-value of DWH test		0.416		
p-value of Wald test			0.460	
R^2	0.458			

Notes: ** 5% significant level, *** 1% significant level.

4. Results and Discussion

We first performed a benchmark regression for the impact of off-farm employment on farmland transfer behavior and verified the mechanism of the impact of off-farm employment on agricultural land transfer through outsourcing of overall production services.

Then, based on different agricultural production links, we analyzed the heterogeneity of the mediating effect of outsourcing each production process in the impact of off-farm employment on agricultural land-transfer behavior.

4.1. The Impact of Off-Farm Employment on Farmland Transfer

Table 3 presents the results of the benchmark regression with Equations (1) and (2). In terms of farmland transfer behavior of farmers, off-farm employment has a significant positive impact on the farm transfer decision and area at a significant level. The marginal effects of off-farm employment on farmland transfer-out decisions and area are 0.224 and 1.294, respectively, which means that the probability and area of farmland transfer-out of farmers will increase by 2.24% and 12.94% for every 10% increase in off-farm employment, which verifies Hypothesis 1a. While, from the perspective of the transfer-in behavior of farmers, off-farm employment has a significant negative impact on the transfer-in decision of farmers and the area at the significant level of 1%, and the marginal effects of off-farm employment on the transfer-in decisions of farms and the area are −0.296 and −62.740, respectively, which verifies Hypothesis 1b. The findings showed that off-farm employment has a prominent impact on land transfer, which is consistent not only with the domestic literature [6,48] but also becomes a part of the international research discussion on farm succession and its ambiguous findings [49–51]. As posited in our theoretical analysis, farmers with advantages in off-farm employment usually consist of the young and middle-aged, leading to the aging, feminization, and weakening of rural surplus labor. The quantity and quality of labor engaged in agricultural production have begun to decline and this phenomenon caused a decline in the importance of farmland, which in turn promotes farmland transferred-out and inhibits farmland transferred-in. Policy initiatives to promote qualified employment and structural change in agriculture may help to retain young people in farming and realize agricultural scale operations [52].

Table 3. The impact of off-farm employment on farmland transfer.

Variables	Transfer-Out Behavior		Transfer-In Behavior	
	Land$_{-out}$	**Area$_{-out}$**	**Land$_{-out}$**	**Area$_{-out}$**
FNBL	0.224 ***	1.294 ***	−0.296 ***	−62.740 ***
	(4.930)	(5.340)	(−8.530)	(−6.730)
Age	0.000	0.003	−0.004 ***	−0.861 ***
	(−0.040)	(0.260)	(−2.920)	(−2.580)
Edu	0.004	0.015	0.000	0.162
	(0.850)	(0.640)	(0.010)	(0.210)
Average of family members	0.009 ***	0.046 ***	−0.001	−0.105
	(4.720)	(4.400)	(−0.420)	(−0.340)
Generations	0.061 **	0.280 *	0.021	1.249
	(2.030)	(1.780)	(1.020)	(0.260)
Burden	0.024 *	0.103	0.021 **	2.444
	(1.650)	(1.380)	(2.110)	(0.990)
Pension	−0.015	−0.032	0.025 **	5.117 **
	(−1.080)	(−0.430)	(2.530)	(2.010)
Medical	0.006	0.042	−0.018 *	−2.410
	(0.440)	(0.570)	(−1.930)	(−1.060)
Land	−0.007 **	0.014	−0.003 **	−0.355
	(−2.220)	(0.990)	(−2.090)	(−0.960)
Plots	−0.013	−0.050	0.004	1.166
	(−1.470)	(−1.100)	(0.690)	(0.890)
In	−0.228 ***	−1.114 ***	— —	— —
	(−4.750)	(−4.220)		

Table 3. *Cont.*

Variables	Transfer-Out Behavior		Transfer-In Behavior	
	Land$_{-out}$	**Area$_{-out}$**	**Land$_{-out}$**	**Area$_{-out}$**
Out	— —	— —	−0.131 ***	−28.879 ***
			(−5.120)	(−4.470)
Distant	0.008 **	0.056 ***	0.005 **	0.079
	(2.190)	(2.920)	(2.230)	(0.140)
Assets	−0.023 ***	−0.125 ***	0.013 ***	3.053 ***
	(−6.440)	(−6.010)	(5.350)	(5.170)
Income	0.103 ***	0.486 ***	0.121 ***	23.770 ***
	(5.230)	(4.550)	(10.210)	(7.900)
LR chi2	190.860	179.510	375.820	318.950
R^2	0.149	0.056	0.395	0.099
N	960	960	960	960

Notes: 0.000 is the result of reserving three decimal places, not zero; the first row in each table represents the marginal coefficient and the next row represents the z-value (the same as in the following tables). N is the number of samples. * 10% significant level. ** 5% significant level. *** 1% significant level.

Among the control variables, the average age of the family labor force has a significant role in promoting the decision of farmland transfer-out. Household agricultural fixed assets have a significant positive effect on farmland transfer-in behavior and a negative effect on farmland transfer-out behavior. The agricultural fixed assets reflect the investments of farmers in agricultural business, and the higher the proportion of agricultural fixed operating assets, the higher the degree of attention to agriculture. The per capita income can significantly promote the farmers' farmland transfer-out and transfer-in behavior. The possible explanation is that farmers with comparative advantages in agricultural management may invest their family funds in agricultural production to increase agricultural profitability, and then they will transfer in the land; farmers with the comparative advantage of non-agricultural employment will transform family assets into non-agricultural industries with a higher return rate, which causes to reduce the survival security and income security function of agricultural land, and to transfer-out their land.

4.2. The Mediating Effect of APSO in the Impact of Off-Farm Employment on Farmland Transfer

The results are summarized in Table 4. For the farmer's farmland transfer-out behavior, the total effect of off-farm employment on the transfer-out decision and transfer-out area are significantly positive at the level of 1%; that is, c_1 in Equation (3) is significant. The marginal effect of off-farm employment on the transmission mechanism of the APSO is significantly negative at the level of 1%; that is, a_1 in Equation (4) is significant. The direct effects of the APSO and off-farm employment on agricultural land transfer are represented by b_1 and $c_1^{'}$ in Equation (5). The results show that the APSO has a significant negative impact on farmland transfer-out decision-making and farmland transfer area; that is, b_1 is significant. In summary, a_1, b_1 and c_1 are all significant, and it is thus confirmed that the APSO has a mediating effect in the impact of off-farm employment on famer's agricultural land transfer-out behavior. At the same time, comparing the marginal coefficients between the total effect and the direct effect of off-farm employment on farmland transfer, the APSO reduces the positive effect of off-farm employment on agricultural land transfer-out and verifies Hypothesis 2a.

From the perspective of farmer's land transfer-in behavior, the total effect of off-farm employment on the farmland transfer-in decision and the transfer-in area show that the off-farm employment has a significantly negative impact on the transfer-in decision and transfer area; that is, $c_1$is significant. The marginal effect of off-farm employment on the transmission mechanism of the APSO is significantly negative at the level of 5%; that is, a_1 in Equation (4) is significant. The results also indicate that the direct effect of the APSO has a significant positive impact on farmland transfer-in decision-making and transfer-in area; that is, $b_1$in Equation (5) is significant. In conclusion, the APSO has a mediating effect

on the impact of off-farm employment on farmer's farmland transfer-in behavior as a_1, b_1 and c_1 are all significant. At the same time, comparing the marginal coefficient between the total effect and the direct effect of off-farm employment on farmland transfer-in indicates that the APSO reduces the negative effect of off-farm employment on farmland transfer-in and verifies the Hypothesis 2b.

Table 4. The mediating effect of the agricultural production service outsourcing (APSO).

Variables	Transfer-Out Behavior					Transfer-in Behavior				
	$Land_{-out}$ (The Total Effect)	$Area_{-out}$ (The Total Effect)	Outsourcing	$Land_{-out}$ (The Direct Effect)	$Area_{-out}$ (The Direct Effect)	$Land_{-in}$ (The Total Effect)	$Area_{-in}$ (The Total Effect)	Outsourcing	$Land_{-in}$ (The Direct Effect)	$Area_{-in}$ (The Direct Effect)
FNBL	0.238 ***	1.353 ***	−0.148 ***	0.128 ***	0.876 ***	−0.296 ***	−62.740 ***	−0.247 ***	−0.279 ***	−57.964 ***
	(5.210)	(5.490)	(−3.080)	(3.430)	(4.080)	(−8.530)	(−6.730)	(5.980)	(−8.160)	(−6.310)
Outsourcing				−0.419 ***	−2.588 ***				0.080 ***	18.152 ***
				(−29.510)	(−16.260)				(3.040)	(3.020)
Control variables	not shown	not shown	not shown	not shown		not shown	not shown	not shown	not shown	
LR chi2	190.860	183.240	116,380	515.510	485.490	375.820	318.950	163.810	384.950	328.100
R^2	0.149	0.058	0.094	0.411	0..153	0.395	0.099	0.132	0.404	0.102
N	927	927	927	927	927	960	960	960	960	960

Notes: Due to limited space, the results of control variables are not listed in this table and can be provided if necessary (the same as below). *** 1% significant level.

The results have some similarities with the conclusions of other agricultural studies, such as those of Hong [53] and Kang [26]. Their studies suggest that service outsourcing can affect farmers' transfer behavior by increasing farmers' demand for land, manifested mainly as restricting transfer out of agricultural land and promoting transfer in agricultural land. It shows that APSO significantly mediates the effect of the influence of off-farm employment on farmers' farmland transfer behavior.

4.3. Robustness Test

The above results are based on the full sample (including transferred-in households, transferred-out households and non-transferred households). When evaluating the impact of off-farm employment on farmers' farmland transfer-out behavior, the transferred-in households were controlled in the regression model. Similarly, when evaluating farmers' farmland transfer-in behavior, transferred-out households were controlled in the regression model. However, this study focuses more on the net effect of off-farm employment on farmland transfer behavior. Therefore, this study uses a sub-sample of only transferred-out households (N = 340) and non-transferred households (N = 427) to test the impact of off-farm employment on the farmers' transfer-out behavior of agricultural land. Similarly, it uses a subsample that includes only the data of transferred-in households (N = 160) and non-transferred households (N = 427) to test the effect of off-farm employment on the farmers' transfer-in behavior of agricultural land. The results are shown in Table 5.

Table 5. Results of robustness test.

Variables	Transfer-out Behavior					Transfer-in Behavior				
	$Land_{-out}$ (The Total Effect)	$Area_{-out}$ (The Total Effect)	Outsourcing	$Land_{-out}$ (The Direct Effect)	$Area_{-out}$ (The Direct Effect)	$Land_{-in}$ (The Total Effect)	$Area_{-in}$ (The Total Effect)	Outsourcing	$Land_{-in}$ (The Direct Effect)	$Area_{-in}$ (The Direct Effect)
FNBL	0.321 ***	2.044 ***	−0.314 ***	0.119 ***	1.189 ***	−0.199 ***	−28.814 ***	−0.148 ***	−0.183 ***	−26.220 ***
	(6.390)	(7.910)	(−6.690)	(2.790)	(5.260)	(−3.770)	(−4.610)	(2.570)	(−3.470)	(−4.200)
Outsourcing				−0.456 ***	−2.809 ***				0.092 **	11.024 **
				(−30.340)	(−16.230)				(1.980)	(2.290)
Control variables	not shown	not shown	not shown	not shown		not shown	not shown	not shown	not shown	
LR chi2	139.640	172.30	171.640	418.520	461.940	185.390	230.480	136.670	189.200	235.640
R^2	0.126	0.057	0.160	0.379	0.154	0.270	0.094	0.197	0.276	0.096
N	767	767	767	767	767	587	587	587	587	587

Notes: ** 5% significant level, *** 1% significant level.

Compared to the above regression, there is no substantial change in the coefficient and significance level of the effect of off-farm employment on agricultural land transfer;

that is, the effect of off-farm employment on the transfer-out decision and transfer-out area are significantly positive at the level of 1%, and the effect of off-farm employment on the transfer-in decision and transfer-in area is significantly negative at the level of 1%. At the same time, it also verifies the intermediary effect of the APSO on the relationship between off-farm employment and agricultural land transfer. These findings support the benchmark regression results, and the conclusions of this study are robust.

4.4. Heterogeneity Analysis for APSO in Different Links

The initial analysis confirmed that off-farm employment could affect farmers' farmland transfer behavior through outsourcing of agricultural services. However, previous studies have shown that the degree to which farmers adopt APSO in different production links varies greatly [54]. This variation might lead to differences in the mediating effect of the outsourcing of different production links in the impact of off-farm employment on farmland transfer. The production of wheat is divided into eight links: plowing, sowing, plant protection, irrigation, fertilization, harvesting, drying, and saving. However, in actual practice, the degree of outsourcing of irrigation, fertilization, drying, and savings is very low, which has little effect on farmers' farmland transfer behavior. Therefore, this analysis focuses on the heterogeneity of the mediating effect of outsourcing the four links of plowing, harvesting, sowing, and plant protection in the influence of off-farm employment on farmland transfer behavior.

Table 6 presents the regression results of the mediating effect of the different outsourcing of production links outsourcing. For panel A, the estimation results show that outsourcing of the link of plowing, harvesting, and sowing all have significant mediating effects in the influence of off-farm employment on farmland transfer-out behavior. The marginal effect of off-farm employment on the transmission mechanism of the APSO is not significant in the model of the plant protection process; that is, a_1 in Equation (4) is not significant. The direct effect of the APSO on agricultural land transfer is not significant either, namely b_1 in Equation (5) is not significant. Therefore, outsourcing of the plant protection process does not have an intermediary effect in the impact of off-farm employment on farmland transfer-out behavior; that is, off-farm employment does not affect farmland transfer through outsourcing of the plant protection link. For the same reason, the results in panel B show that outsourcing of the plant protection process has no mediation effect on the impact of off-farm employment on farmland transfer-in behavior. However, outsourcing of plowing, harvesting, and sowing links has a significant mediating effect on the influence of off-farm employment on farmers' farmland transfer-in behavior. A possible reason is that plant protection work is repetitive and cumbersome, requiring a more flexible labor force, and it is difficult to achieve its substitution effect for a labor force through highly specialized service outsourcing. Therefore, it is difficult for off-farm employment to ease the constraints on the family labor force and promote the transfer-out of family farmland through the outsourcing of plant protection links.

The findings showed that outsourcing in labor-intensive links (e.g., plowing and harvesting) was more effective than that in technology-intensive links (e.g., plant protection),which differs from the conclusion of Chen et al. [55]. The interpretation of this result is that labor-intensive links, such as harvesting, cannot have an objective impact on agricultural output, while the plant protection link is a link with higher technical content, and the technological spillover caused by the outsourcing of this link is more obvious. However, we argue that the outsourcing of the plowing and harvesting links can save more agricultural labor and further promote the conversion of agricultural labor to nonagricultural employment. We believe that outsourcing of labor-intensive link services has a more significant impact on farmland transfer behavior.

Table 6. The mediating effect of the different production links service outsourcing.

Panel A: Transfer-Out Behavior														
Variables	**Land$_{-out}$ (The Total Effect)**	**Area$_{-out}$**	**Outsourcing-Links**				**Land$_{-out}$ (The Direct Effect)**				**Area$_{-out}$ (The Direct Effect)**			
			Out$_1$	**Out$_2$**	**Out$_3$**	**Out$_4$**	**Out$_1$**	**Out$_2$**	**Out$_3$**	**Out$_4$**	**Out$_1$**	**Out$_2$**	**Out$_3$**	**Out$_4$**
FNBL	0.321 *** (6.390)	2.044 *** (7.910)	−0.187 *** (3.540)	−0.298 *** (6.130)	−0.308 *** (6.150)	0.003 (0.140)	0.222 *** (4.900)	0.133 *** (3.140)	0.149 *** (3.390)	0.320 *** (6.390)	1.643 *** (7.000)	1.283 *** (5.650)	1.321 *** (5.720)	2.039 *** (7.900)
Outsourcing							−0.385 *** (−19.960)	−0.439 *** (−30.900)	−0.430 *** (−29.690)	0.076 (−0.740)	2.399*** (−13.550)	2.765*** (−15.970)	2.585*** (−14.950)	0.633 (−1.170)
Control variables	not shown	not shown	not shown				not shown				not shown			
LR chi2	139.640	172.30	109.980	155.790	128.300	16.82	319.470	411.540	373.040	140.180	376.420	456.970	421.940	173.710
R^2	0.126	0.057	0.100	0.143	0.117	0.090	0.289	0.372	0.338	0.127	0.125	0.152	0.140	0.058
N	767	767	767	767	767	767	767	767	767	767	767	767	767	767
Panel B: Transfer-In Behavior														
Variables	**Land$_{-in}$**	**Area$_{-in}$**		**Outsourcing-Links**			**Land$_{-in}$ (The Direct Effect)**				**Area$_{-in}$ (The Direct Effect)**			
FNBL	0.199 *** (−3.770)	−28.814 *** (−4.610)	−0.236 *** (3.870)	0.112 ** (2.260)	−0.159 *** (2.750)	0.022 (0.910)	−0.166 *** (−3.140)	−0.179 *** (−3.430)	−0.170 *** (−3.290)	−0.199 *** (−3.770)	−25.370 *** (−4.040)	−25.871 *** (−4.190)	−24.923 *** (−4.060)	−28.808 *** (−4.620)
Outsourcing							0.113 *** (3.420)	0.117 ** (2.970)	0.141 *** (4.230)	0.008 (0.090)	10.861 *** (2.870)	13.568 *** (3.170)	15.260 *** (3.970)	3.379 (0.350)
Control variables	not shown	not shown	not shown				not shown				not shown			
LR chi2	185.390	230.480	43.410	47.660	42.600	18.440	196.460	193.780	201.880	185.390	238.690	240.770	246.600	230.98
R^2	0.270	0.094	0.061	0.090	0.065	0.053	0.287	0.283	0.294	0.270	0.097	0.098	0.100	0.094
N	587	587	587	587	587	587	587	587	587	587	587	587	587	587

Notes: ** 5% significant level, *** 1% significant level.

5. Conclusions and Policy Implications

Based on field survey data of 960 rural households in the main grain producing areas of China, this study first empirically examines the impact of off-farm employment on farmland transfer from the general level, and then analyzes the intermediary effect of the APSO on the impact of off-farm employment on farmland transfer. Finally, it further tests the heterogeneity of the mediating effect of different production links that service outsourcing in the impact of off-farm employment on agricultural land transfer. The main findings are as follows: (1) In general, off-farm employment has a significant positive effect on the transfer-out behavior of farmers on agricultural land, while it has a significant negative impact on the transfer-in behavior of farmers on agricultural land; (2) The APSO has a significant mediating effect in the influence of off-farm employment on farmland transfer behavior, and the results are robust. After considering the impact of the APSO, the positive effect of off-farm employment on the transfer-out of agricultural land will be reduced, while the negative effect on the transfer-in of agricultural land will also be weakened; (3) The mediating effect of different outsourcing of production links service outsourcing in the impact of off-farm employment on agricultural land transfer is heterogeneous. Specifically, outsourcing of plowing, harvesting, and sowing links has a significant mediating effect, but the plant protection process does not have a mediation effect. These results demonstrate that existing research has overestimated the driving effect of off-farm employment on the development of the agricultural land transfer market by not considering the impact of the APSO.

Based on the findings generated from the present study, some important policy implications and actions could be considered. (1) With the gradual popularization of APSO in China, the driving effect of off-farm employment on the development of the agricultural land transfer market is decreasing. To further exploit the driving force of labor flow, the government should pay attention to the quality of off-farm employment and strengthen the stability and predictability of off-farm employment and further enhance the role of off-farm employment in promoting farmland transfer. (2) There must be a realization that moderately large-scale agricultural land operations cannot rely solely on the leading role of the labor market, but must also play an integral role in the advantages of the agricul-

tural outsourcing market. Outsourcing can achieve economies of scale and allow farmers involved in the agricultural division of labor to be successful in the labor economy. The government should devote itself to improving the agricultural social services system to achieve an optimal division of labor and finally realize the organic connection between small farmers and modern agricultural development [56–62]. (3) The plant protection link has the lowest degree of outsourcing and the link with the highest technical content. Therefore, the Chinese government should establish and improve professional organizations in agricultural production, strengthen the construction of cooperatives that provide technical services, achieve a balance of outsourcing in all aspects of agricultural production, further ease labor constraints, and encourage rural households to transfer farmland.

As is the case with any research study, there are associated limitations. First, although we have discussed many factors affecting the behavior of agricultural land transfer in the empirical study, there are still some factors that affect the decision of land transfer farmers that were not introduced as control variables, such as land quality, parcel distance, or crop planting structure, which will be solved in the follow-up research with new data. Moreover, we have figured out the endogeneity between off-farm employment and land transfer, we have also explained the endogeneity between off-farm employment and APSO. Furthermore, we have added other suitable instrumental variables to verify whether the endogeneity between off-farm employment and APSO exists at the empirical level. This paper focuses on the decision-making behavior of farmers in the transfer of agricultural land. In the future, we can consider the degree of market participation of farmers, further explore the quality of agricultural land transfer, mainly including the term, contract form, and transfer rent of agricultural land transfer, and analyze the impact of off-farm employment on the quality of farmers' market participation in agricultural land transfer under the new background.

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