Does Urban and Rural Subsistence Security System Reduce Future Poverty? Empirical Analysis Based on Vulnerability to Poverty

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For a long time, related literature on researching the relationship between subsistence security system and poverty focuses on the current effects while ignoring its long-term effects. With the aid of CFPS2012 micro survey data, this paper empirically investigates the impact of the urban and rural subsistence security system on the household vulnerability to poverty. The Method of Propensity Score Matching (PSM) has been adopted in this paper to eliminate the sample selection bias as far as possible. Basic results show that subsistence security system has not significantly improved the vulnerability to poverty of the family, and may increase the possibility of falling into poverty in the future, which conclusion is valid for both urban and rural households.

Keywords: subsistence security system, vulnerability to poverty, private transfer payment, willingness to work

1. Introduction

The issue of poverty has long been the focal point in the world, especially in China. Since the reform and opening-up, Chinese government initiated the large-scale poverty-alleviation strategy for development and embarked on the journey of "poverty alleviation with Chinese characteristics" which was known to the rest of the world. An accumulated number of over 700 million people were lifted from poverty from 1978 to 2014. It could be regarded as the remarkable achievement, also a significant contributor to the undertaking of global poverty reduction coupled with the fulfillment of the MDG (Millennium Development Goal) set by the United Nations. What we cannot fail to uncover is the fact that a large portion of families are still living in poverty in China. As of 2014, as many as 70.17 million poverty-stricken people in rural areas,[1] posing a severe challenge to us. In the meantime, the time to achieve the

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[1] Based on the standard for rural poverty alleviation with annual per capita income of 2,300 yuan (constant price in 2010); data from the *Statistical Communique on National Economic and Social Development in 2014* published by National Bureau of Statistics of China.

completion of building a moderately prosperous society is around the corner, China's task of poverty alleviation is entering in the key phase.

In the end of 2015, the Poverty Alleviation and Development Conference of the central government proposed the "Five Proposals" (one through development, others, through movement, ecological development, education, social welfare respectively) to achieve targeted poverty alleviation, which further clarified the role of the social security system as the base of poverty alleviation. As the core component of the social security system, the subsistence security system (hereinafter referred to as "subsistence security") plays a pivotal role in the battle against poverty. In general, the subsistence security system refers to the fact that a country offers an amount of subsidy in cash to households whose income per person is below the minimum living standards in a bid to guarantee the social aid system needed by family members. In essence, subsistence security is a kind of public transfer payment provided by government to low-income people (Li and Yang, 2009; Han and Xu, 2014), which remains quite relevant to the improvement of the living standards of those in poverty. For one thing, subsistence security subsidy could raise the consumption level of people under subsidy on a daily basis and change families' poverty situation in a direct way. For another, people could spare enough time to participate in employment and skill training while accepting subsistence security subsidy, in a bid to hunt jobs proper for them and lift out of poverty fundamentally.

China's subsistence security system started in Shanghai in 1993. A rising number of the unemployed staff has been registered in urban areas due to the shift of management system of SOEs (State Owned Enterprises); meanwhile, a large proportion of staff's income was on the decline, thus exerting great impact on their livelihood, which could be ascribed to the depression and unsatisfactory production in some businesses. Against this backdrop, Shanghai Municipal People's Government announced in June 1993 to establish "the subsistence security system for urban residents" which heralded the reform of the social relief system in China. In 1996, the fourth session of the eighth National People's Congress required that "the Subsistence Security System should be gradually established during the ninth five-year plan. In 2007, the number of those enjoying the subsistence security subsidy totaled 22.72 million,[1] almost having covered each and every city in China. The building up of subsistence security system in rural areas started relatively late, but developed by leaps and bounds. In 2002, the sixteenth national congress of the Communist Party of China officially put forward that "we shall explore to set up the subsistence security system in rural areas in regions wherever possible". In 2007, *Notice of the State Council on Establishing a System of Minimum Living Guarantee China's Rural Areas* identified the instruction of "building

[1] Data of the population and standard of the minimum living security of urban and rural areas are from *Statistical Bulletin of Social Service Development* from the Ministry of Civil Affairs.

the subsistence security system in rural areas across China". By the end of 2007, the subsistence security system in rural areas initially took shape in different regions. As of 2015, the subsistence security system covered 74.874 million people, an increase of 31% against that of 2007. Among them, there existed 23.078 million urban residents and 51.796 million rural residents having received the subsistence security subsidy. As a matter of fact, the subsistence security system already became the "social safety network" which provided an umbrella for the poor people in order to maintain their basic life.

How does China's subsistence security system function at the present day over the past two decades? Have we met the expectation to reduce poverty? We are still in the stage of continuous research and exploration as regards the poverty alleviation effect of the subsistence security system. In 2002, the World Bank proposed the concept of the "vulnerability to poverty" in the *World Development Report* to describe the likelihood of individuals or families falling into poverty. This concept is the forecast of poverty and can be employed to identify those families who may get stuck into poverty in the coming days. It is helpful for governments to prevent families from falling into poverty in future by means of customized strategies. (Xu *et al.*, 2011). It is worth pointing out that vulnerability to poverty could not be observed right now or in the past due to the foresightedness but could only be estimated in some ways. A number of approaches to the measurement of vulnerability have been put forward by existing studies, typified by the Vulnerability as Expected Poverty, VEP proposed by Chaudhuri *et al*. (2002).[1] The advantage of this method lies in that we can evaluate the vulnerability to poverty by means of cross-sectional data or panel data in limited years. And it explains why this method is applied in many documents at home and abroad.

How the subsistence security system in both urban and rural regions affects the vulnerability to poverty has been researched in an empirical study with the help of CFPS2012 micro survey data. The approach of PSM has been adopted in this paper to erase the sample selection aberration as much as possible. And major contributions of the whole paper are mainly reflected in the following two aspects. At first, the forward-looking perspective is adopted in this paper to re-evaluate the poverty reduction effectiveness produced by the subsistence security system. The fact is that empirical studies can be found in some documents concerning the relation between relevant social security system and vulnerability to poverty in China (Fan and Xie, 2014; Li and Xi, 2015) though, the subsistence security system was not detailed. This paper concentrates on the subsistence security system, a form of social security system, supplementing to related papers. Next, the mechanism concerning how

[1] Vulnerability to poverty can be measured through ways include the Vulnerability as Expected Utility (VEU) (Ligon and Schechter., 2003) and Vulnerability as Exposed Risk (VER) (Dercon and Krishnan, 2000).

subsistence security system affects the vulnerability has been further studied. Relevant researches mainly focus on the cause and effect discussion of relevant policies and the vulnerability to poverty without further analysis on the internal mechanism. With the basic relation of cause and effect, the mechanism of how the subsistence security system affects the vulnerability to poverty has been uncovered from two aspects of private payment transfer and residents' willingness to work.

The rest parts of this paper go as follows: the second part introduces the measurement of the vulnerability to poverty; the third part discusses the data and variables; the fourth part reports and analyzes basic empirical results; the fifth part describes related mechanism; the final part delivers conclusions and policy suggestions.

2. Calculation Method for the Vulnerability to Poverty

According to the approach of VEP put forward by Chaudhuri *et al*. (2002), cross-section data could be used to take a gauge of the vulnerability to poverty, which was defined as the probability of families falling into poverty in future. It could be expressed in the form of equation as follows:

$$Vul_{h,t} = Pr(c_{h,t+1} \leq poor) \tag{1}$$

Among them, $Vul_{h,t}$ refers to the vulnerability to poverty of family h in the period of t; $c_{h,t+1}$ indicates the average consumption per person for the family during t+1; and *poor* remains the poverty line.

According to relevant papers from Chaudhuri *et al*.(2002), Zhang and Wan (2006) and others, assumed that future household consumption will follow a log-normal distribution and vulnerability can be calculated with the application of the three-stage feasible generalized least squares (FGLS) proposed by Ameriya (1977).

Firstly, the income equation is estimated, and the square of the residual obtained after the regression is used as the consumption fluctuation for OLS estimation. The estimation equation is:

$$\ln c_h = X_h \beta + e_h \tag{2}$$

$$e_h^2 = X_h \rho + \eta_h \tag{3}$$

$X_{h,t}$ are related variables that affect household consumption, as proposed by Fan and Xie (2014), which mainly include household characteristics variables of individual variables such as gender, age, education status, marital status and employment status, of household variables such as population and household per

capita income, and of virtual variables such as that of urban and rural areas and that of the east and the west.

Secondly, FGLS estimation is conducted with the fitting values obtained in the first step as the weights to obtain the sum β_{FGLS} and ρ_{FGLS}. Put them into equations (2) and (3) to get the expectation of the future logarithmic consumption $\hat{E}(\ln c_h \mid X_h)$ and its variance $\hat{V}(\ln c_h \mid X_h)$:

$$\hat{E}(\ln c_h \mid X_h) = X_h \hat{\beta}_{FGLS} \tag{4}$$

$$\hat{V}(\ln c_h \mid X_h) = \hat{\sigma}^2_{e,h} = X_h \hat{\rho}_{FGLS} \tag{5}$$

Thirdly, to select the poverty line and calculate the poverty vulnerability of the family *h*:

$$\hat{V}ul_h = \phi\left(\frac{\ln poor - X_h \hat{\beta}_{FGLS}}{\sqrt{X_h \hat{\rho}_{FGLS}}}\right) \tag{6}$$

Poverty lines of $1.25 per day and $2 per day are applied to calculate poverty vulnerability.[1] Generally, families above the vulnerable line are defined as vulnerable families. So to determine whether a family is vulnerable, specific vulnerability lines are to be identified. There are generally two ways for the definition of vulnerability lines, with the incidence of poverty as a low vulnerability line (Rajadel, 2002; Chaudhuri *et al*., 2002; Lin and Deng, 2014) and the 50% as the high vulnerability line (Zhang and Wan, 2006; Li and Xi, 2015).

Table 1 shows the proportion of urban and rural vulnerable households with the two vulnerability lines. The 1.25-dollar poverty line will be applied for further analysis.[2] Viewed on the whole, the proportion of vulnerable families in our country is relatively high. Under the 50% vulnerability line, the proportion of vulnerable households is 25.7%, with the incidence of poverty as a low vulnerability line, 77.9%. This indicates that a considerable proportion of residents are possible to fall in poverty in the future. From the comparison between urban and rural areas, the relative relationship between the proportion of urban and rural vulnerable households varies under different vulnerability lines. With the incidence of poverty as a low vulnerability line, urban vulnerable households have a relatively high proportion, while under the 50%

[1] In 2008, the World Bank set the international poverty line at 1.25 US dollars per person per day on average, the one for well-off society, 2 US dollars. Poverty line IS converted into a comparable 2011 poverty line based on purchasing power parity (PPP) and CPI since 2008.

[2] Relevant data from the 2012 China Family Panel Studies (CFPS2012). Results are consistent under the $2 poverty line and the $1.25 one.

standard, rural vulnerable have a relatively high proportion. This indicates that there are differences in the distribution structure of vulnerable families in urban and rural areas, the distribution of urban vulnerable families is more concentrated, while in rural areas, relatively more equally distributed.

Table 1. Proportion of Vulnerable Households in the Sample Group unit: %

Standard of vulnerable line		Incidence of poverty The incidence of poverty		50%	
Poverty line standard		1.25 dollars	2 dollars	1.25 dollars	2 dollars
Whole families	Vulnerable	77.9	66.2	25.7	28.0
	Not vulnerable	22.1	33.8	74.3	72.0
	In total	100.0	100.0	100.0	100.0
Urban families	Vulnerable	86.5	80.5	24.4	26.5
	Not vulnerable vulnerable	13.5	19.5	75.6	73.5
	In total	100.0	100.0	100.0	100.0
Rural families	Vulnerable	70.2	64.2	26.8	29.3
	Not vulnerable	29.8	35.8	73.2	70.7
	In total	100.0	100.0	100.0	100.0

3. Data Source and Variable Description

3.1. Data Source

Data used in this paper derive from the China Family Panel Studies, CFPS[1] in 2012. The study is committed to reflecting the changes taking place in fields of China's society, economy, population, education and health by tracking down and pooling together the data at the level of community, household as well as individual, in a bid to offer micro data support to academic research and public policy analysis.

Relevant variables included in the questionnaire of adults and households of

[1] As it is easy to be included and hard to exit, for most households, the situation of whether being included in the minimum living security remains unchangeable, so to conduct the fixed effect model analysis with the application of the two-year or three-year panel data will result in the decrease of the observations, decreasing the validity of the empirical results. However, with the application of multi-year mixed cross-sectional data will increase sample observations but results in auto-correlation problems that will result in erroneous results. That's why the 2012 cross-section data are applied for empirical analysis. Besides, the current data of China Family Panel Studies (CFPS2014) is not applied due to the lack of corresponding household information.

CFPS2012 were adopted in this paper. By weeding out the observed value of which the age of head is under 16 years old and the major variables were lacked, we've got the household sample with the size as 11223, involving 5216 urban families and 6097 rural families.

3.2. Description of Variables

In this paper, a family receiving the subsidy of the minimum living security is defined as the minimum living security family and *LLE* is set as 1, otherwise, 0.

The dependent variable is the vulnerability to poverty in urban and rural families, with the calculation process shown in the third part. Two poverty lines have been used in the calculation of the vulnerability, namely $1.25 and $2. The core explanatory variable is "whether you enjoy the subsistence security subsidy (*LLE*)". In the questionnaire of CFPS2012, interviewees were asked about their gaining of different kinds of government subsidies.

The definition of the subsistence security families is not random but is based on the family income and consumption situation. There exist obvious differences in terms of income, consumption, social network, property status, human resources between families having subsistence security allowance and those who do not have such benefit. By way of simple analysis of the mean value, the influence on the vulnerability to poverty would lead to endogeneity bias caused by sample selection. In order to overcome this problem, the PSM empirical approach is used in this paper. The first step of PSM is to take advantage of relevant variables to measure the match score of each family for serving as the standard of matching. Firstly, we utilized the key variables of family characteristics, involving the average income per person in a family, deposit per person, population and the dependency ratio. Among them, average income and sum of deposit for a family are the reflection of the economic situation. With these variables combined, it would affect the possibility to gain the subsistence security allowance and the poverty condition in future. The cause and effect could be deviated from the truth if those factors were missed. Population size and dependency ratio showcase the burden shouldered by a family. Generally, families with a larger population or higher dependency ratio are more likely to fall into poverty and easier to access the right to enjoy subsistence security allowance. Besides, to exclude the interference in the empirical results deriving from human resources, variables of individual characteristics are included in the process of matching, mainly ranging from gender, age, work, education to health. So, with an aim to eliminate the influence brought by the fixed effect, we also incorporate dummy variables of east and west regions as well as urban and rural dummy variables. Table 2 describes the key control variables with statistics.

Table 2. Description and Statistics of Key Variables

Name of variable	Shortened form	Definition of variable	Mean value	Standard deviation
Gender of the head of a household	*Headgender*	Dummy variable; male=1, female=0	0.58	0.49
Age of the head of a household	*Headage*	(Age)	48.41	13.09
Marriage status of the head of a household	*Headmarry*	Virtual variable; married=1, others=0	0.88	0.33
Working condition of the head of a household	*Headjob*	Dummy variable; at work=1, not at work=0	0.61	0.49
Health condition of the head of a household	*Headhealth*	Very healthy=1, quite healthy=2, healthy=3, A little bit healthy=4, unhealthy=5	3.25	1.13
Junior high and below	*Headedu1*	Dummy variable; Junior high and below =1, others=0	0.50	0.50
Senior high degree	*Headedu2*	Dummy variable; Senior high and equal degree=1, others=0	0.13	0.34
Specialty degree or above	*Headedu3*	Dummy variable; Specialty degree or above=1, others=0	0.07	0.25
Family size	*Famsize*	Total number of families; (number of people)	3.91	1.65
Family deposit per person	*Famdeposit*	Family deposit divides family size, total household savings divided by total population, get the logarithm	6.75	2.48
Family income per person	*Famincome*	Total household income divided by the total population, get the logarithm	8.67	1.75
Family dependency ratio	*Famdepend*	The ratio of non-working population (less than 15 or over 64) divided by working population (age 15 to 64)	0.67	0.84
Other government subsidy	*Othersubsidy*	Dummy variable; other government subsidy=1, or =0;	0.45	0.50
Urban region or not	*Urban*	Dummy variable; urban survey site= 0, if not= 0	0.46	0.50
East region or not	*Region*	Dummy variable; east region=1, mid and west region=0	0.43	0.50

4. Subsistence Security Subsidy in Urban and Rural Areas and the Vulnerability to Poverty

4.1. Empirical Approach

In social sciences studies, the determination of cause and effect relationship is always judged by anti-truth. In other words, we compare and analyze the result and anti-fact result of an event at some time. In this paper, the result is the vulnerability to poverty for those families with subsistence security allowance; the anti-fact result is the vulnerability to poverty when some families did not acquire the subsistence

security allowance. The result of an event is observable while the result of anti-fact does not exist. Therefore, access to anti-fact result proves to be the key to the cause and effect. If the subsistence security subsidy randomly occurs, we can analyze the mean value of the vulnerability in families not enjoying subsistence security, which is the counter-fact of the vulnerability mean value in families enjoying subsistence security subsidy. Then we can obtain the correct deduction of causes and effects. However, because the determination of those having subsistence security allowance is not random, it is highly related to family conditions like income, consumption and human resources. Therefore, direct analysis of mean value could produce the biased inferences led by the selection of samples. To solve this issue, the approach of PSM is adopted in this paper to explore the impact of rural and urban subsistence security allowance on the vulnerability to poverty. The core idea of propensity matching is to match the minimum living security families and the non-minimum living security families by integrating multidimensional covariates into a single-dimension propensity score so the two differ only in their access to the minimum living security.

The first step to conduct the match analysis is to figure out the match score. The regression model of Probit is used in this paper to calculate the match score with the following form:

$$probit(LLE_h = 1) = \alpha + X_h\beta + e_h$$

Among them, X_h is the vector composed of multiple covariates, mainly involving variables of individual characteristics such as the age, gender, marriage condition, work, health and education and also variables of family characteristics like average incomeper person, average deposit per person, family size, family dependency ratio and the acquisition of other government subsidies. In order to eliminate the influence brought by the fixed regional effect, we also include the dummy variables in terms of urban, rural areas and eastern, western regions.

The result of Probit model of all samples is listed in the first two columns in Table 3. We can find that the coefficients of *headhealth*, *Headedu1*, *Headedu2* and *Headedu3* are significantly negative at the level of 1%, which signifies that the health of the head of families is in good condition with higher level of education and, lower possibility of acquiring the subsistence security allowance. It reflects the positive role of human resource in lifting up income and reducing poverty in families; in the meantime, the coefficient of the *Headjob* is significantly negative, mirroring that comparing with heads with one or more jobs, heads without any job are more likely to gain subsistence security allowance. This result matches with the reality. Coefficients of family size (*Famsize*) and family dependency (*Famdepend*) ratio are positive, showing that such family has higher possibility to deal with poverty with the increase of family size and the decline of labor proportion. But these two variables' coefficients are insignificant

at the level of 5%. In addition, according to the regression result, as family income per person (*Fampincome*) and family deposit per person (*Famdeposit*) rise, the probability for families accessing subsistence security allowance will be obviously lowered, indicating that the establishment of families enjoying the subsistence security subsidy has a highly negative relation with families' economic condition. Coefficients of dummy variables of urban (*Urban*) and region (*Region*) are negative at the level of 1%, showing that residents in urban areas and eastern provinces in China is less likely to have subsistence security allowance in comparison with those in rural areas and mid-west region. It is also meaning that residents under subsistence security subsidy are occupying a lower percentage in more developed regions.

Table 3. Probit Model Results of the Calculation Propensity and the Examination Result of the Balance Test

	Probit propensity score model	Matching condition	Mean difference test		
			Treatment group mean	Control group mean	Mean difference *p*
Headgender	0.207	Before matching	0.579	0.578	0.962
	0.036	After matching	0.579	0.567	0.570
Headage	–0.001	Before matching	49.934	48.244	0.000
	0.001	After matching	49.934	49.736	0.742
Headmarry	–0.415***	Before matching	0.796	0.889	0.000
	0.049	After matching	0.796	0.808	0.480
Headjob	–0.174***	Before matching	0.504	0.623	0.000
	0.036	After matching	0.504	0.498	0.791
Headhealth	0.089***	Before matching	3.518	3.223	0.000
	0.016	After matching	3.518	3.521	0.954
Headedu1	–0.143***	Before matching	0.460	0.504	0.006
	0.039	After matching	0.460	0.468	0.702
Headedu2	–0.219***	Before matching	0.096	0.138	0.000
	0.061	After matching	0.096	0.093	0.866
Headedu3	–0.527***	Before matching	0.019	0.072	0.000
	0.105	After matching	0.019	0.022	0.675
Famsize	0.020*	Before matching	4.019	3.900	0.024
	0.011	After matching	4.019	4.083	0.414

	Probit propensity score model	Matching condition	Mean difference test		
			Treatment group mean	Control group mean	Mean difference *p*
Fampincome	–0.036***	Before matching	8.227	8.713	0.000
	0.009	After matching	8.227	8.243	0.842
Famdeposit	–0.026***	Before matching	6.135	6.820	0.000
	0.007	After matching	6.135	6.141	0.953
Famdepend	0.026	Before matching	0.724	0.670	0.040
	0.020	After matching	0.724	0.720	0.913
Othersubsidy	0.047	Before matching	0.543	0.438	0.000
	0.038	After matching	0.543	0.553	0.658
Urban	–0.160***	Before matching	0.346	0.469	0.000
	0.038	After matching	0.346	0.341	0.808
Region	–0.355***	Before matching	0.267	0.452	0.000
	0.038	After matching	0.267	0.267	0.980
_cons	–0.454***	Joint inspection	Pseudo R^2	LR number	P value
	0.140				
Observed value	11223	Before matching	0.066	474.110	0.000
		After matching	0.001	2.190	0.999

Note: ***, ** and * are significant at the level of 1%, 5% and 10% of significance respectively.

4.2. The Test of Stability and Common Support

Stationarity conditions require there being no significant difference between the treatment group and the control one in each covariate after the matching, and no significant joint difference in all covariates so that the sample selection bias can be effectively corrected. In this paper, mean difference is conducted of each covariate of the minimum living security families and the non-minimum living security families before and after matching with the results shown in Table 3.[1] It can be seen that the *p* of mean difference between different family groups in each covariate are greater than 10% after matching, indicating that the two groups are stable on all covariates.

[1] The matching method applied in Table 3 is the *k*-Nearest Neighbor with the caliper, the matching parameter is $k = 1$ and the caliper is 0.25 × the standard deviation of the propensity. The results of other matching methods are similar, they'll not be mentioned due to the limitation of the length of the paper.

The Probit regression model is conducted with the matched samples, and the LR statistic of 2.19 is gained. At 10%, can't be rejected is the original assumption of that all covariates have no synergistic effect, indicating that all variables are co-stationary. Stationarity test under various matching methods are further conducted with results remaining the same.

For some matching methods (such as greedy matching), a larger co-supportive domain is required for more valid results (Heckman *et al*., 1997). A large co-support domain is to ensure that most individuals in the treatment group can be matched in the control group, and the sample information can be applied ad analyzed as much as possible to enhance the external validity. If the co-support domain is small, the empirical conclusions may only apply to a particular type of subsets (Lechner, 2001), lacking in generality and generalizability. Corresponding co-support domains are listed after each matching, and the co-support domains and sample observations are almost consistent under various matching modes, indicating that the common support domain conditions are valid.

4.3. Greedy Matching Results

After getting the propensity of each family through the Probit model, we can get the match between the minimum living security families and the non-minimum living security families. Three common greedy matching methods are applied in this paper with the first being the *k*-Nearest Neighbor, that is, looking for *k* different individuals whose propensity are the closest, and when *k* is equal to 1, it is the nearest matching. As the nearest match does not limit the absolute distance between two propensities, so two with large propensity may also match, causing the reduce of the comparability. The second is calipers, with the limitation of the absolute distance within a certain one, Rosembaum and Rubin (1985) suggested a quarter of the standard deviation of the propensity of the sample as caliper size. The third is the *k*-Nearest Neighbor within caliper, as a combination of the first two, is to conduct the *k*-Nearest Neighbor within a given caliper. It combines the merits of the first two so it's the popular one.

Table 4 proves to be the Average Treatment Effect on the Treated (ATT) in terms of all samples. To make the result more stable, various parameters are adopted in the process of matching. In the *k* neighboring matching, 1, 5 and 10 are selected for *k* value; in the caliber matching, the calibers selected are 0.01, 0.05 and 0.1 respectively as well as alignment standard deviation of 1/4 times. In order to save space, Table 4 only describes the *k* neighboring matching result of which the alignment standard deviation has 1/4 of its caliber. We can see from Table 4 that the ATT based on different matching approaches is insignificant[1] under the level of 5%, so we cannot

[1] In this paper, empirical results under the standard of $1.25 poverty line will be applied for analysis. The conclusion under $2 is the same here and below.

reject the original hypothesis that the subsistence security subsidy has no influence on the vulnerability to poverty. It means that the subsistence security subsidy in rural and urban areas has not decreased the likelihood of falling into poverty in the upcoming days for those families. When the significance level expands to 10%, the significance of most empirical result remains unchanged. And only the caliper match result of 0.1 caliper level is significantly positive. Such coefficient manifests that the likelihood of family vulnerability to poverty would be up by 1.366 percentage point if the subsistence security subsidy is gained when other conditions remain unchanged. In general, as is indicated by the greedy matching result of all samples, subsistence security subsidy has not played a positive role in reducing poverty for families in future. However, it could drive up the vulnerability to poverty for families in urban and rural families.

Table 4. Greedy Matching: ATT of all Samples

Standard		Poverty line of $1.25			Poverty line of $2		
Matching method	Matching parameter	ATT	Standard deviation	Co-support samples	ATT	Standard deviation	Co-support samples
k-Nearest Neighbor	*k*=1	0.640	1.120	11218	0.633	1.131	11218
	k=5	0.527	0.879	11218	0.507	0.889	11218
	k=10	0.355	0.844	11218	0.341	0.854	11218
Caliper match	caliper=0.01	0.504	0.806	11211	0.483	0.816	11211
	caliper=0.05	0.859	0.799	11217	0.839	0.809	11217
	caliper=0.1	1.366*	0.792	11220	1.348*	0.801	11220
	caliper=0.25×σ	0.531	0.805	11215	0.512	0.815	11215
k-Nearest Neighbor within caliper	*k*=1; caliper=0.25×σ	0.640	1.120	11215	0.633	1.131	11215
	k=5; caliper=0.25×σ	0.528	0.879	11215	0.509	0.889	11215
	k=10; caliper=0.25×σ	0.365	0.844	11215	0.350	0.854	11215
Sample size	11223						

Notes: ***, ** and * indicate significance at 1%, 5% and 10%, respectively. 0.25×σ, a quarter of the standard deviation of the propensity.

Due to the urban-rural dual structure and the differences of the purpose during the economic transformation period, the subsistence security system was artificially divided into urban and rural systems at the beginning. The urban and rural subsistence security systems are distinct concerning legal system construction, subsidy standards, audit process, capital input, fundraising approach as well as management system. Apart from this, because of the distinct ways as regards industry, traditional guaranteeing idea and the poverty alleviation chosen by urban and rural residents, it is likely that urban and rural families would vary in terms of the private transfer payment and labor supply behavior after they received the subsistence security allowance, thus having

various effect on the vulnerability to poverty. To explore the heterogeneous effect brought by the subsistence security system, the sample families were divided in this paper based on their household registration. Also, the urban and rural subsistence security allowance's influence on the vulnerability to poverty was studied.

Table 5 shows the ATT in urban and rural areas respectively. At first, under various parameters, the subsistence security allowance in cities has a negative ATT regarding the vulnerability to poverty. But it is not significant at the level of 10% of significance, thus unable to turn down the original hypothesis that the urban subsistence security allowance has no influence on the vulnerability to poverty. Unlike urban families, the ATT is positive in terms of rural subsistence security allowance while insignificant at the level of 5%. It is worth pointing out that, the ATT is significant when the matching parameter k = 5 at the level of 10% of significance, showing that receiving the subsistence security allowance raises the likelihood of rural families' falling into poverty in future by 1.847 percentage point. Despite that the matching results between rural and urban households vary, the subsistence security allowance, in general, does not play a role in reducing poverty for both of them.

Table 5. Greedy Matching: ATT in Urban and Rural Areas

Matching parameter	Poverty line of $1.25			Poverty line of $2		
	ATT	Standard deviation	Co-support samples	ATT	Standard deviation	Co-support samples
			Urban families			
k=1	–0.614	1.833	5120	–0.791	1.849	5120
k=5	–1.312	1.455	5120	–1.459	1.467	5120
k=10	–0.879	1.394	5120	–0.997	1.406	5120
Sample size			5126			
			Rural families			
k=1	1.074	1.440	6093	1.223	1.457	6093
k=5	1.847*	1.113	6093	1.908*	1.128	6093
k=10	1.649	1.069	6093	1.686	1.084	6093
Dample size			6097			

Notes: ***, ** and * indicate significance at 1%, 5% and 10%, respectively; in order to save space, Table 5 only reports the neighboring matching result of k when the caliper is 0.25×σ while the conclusions reached under other matching methods are basically same.

4.4. Kernel Matching Results

Greedy matching is nearest neighbor matching or limited matching, because each individual in treatment groups has only 1 or k matches, among which k is usually far lower than the number of samples in control groups. This determines that greedy matching may not produce optimal ATT.

In this paper, some families who rely on the subsistence security system may not find proper matches. As a result, they are excluded from calculating ATT. If too

many observed outcomes were excluded, ATT after matching would only apply to one sample unit and would have lost external validity (Lechner, 2001). In addition, within a certain range of caliper width, no less than one family who do not depend on the subsistence security system has close propensity scores with some low-income family. Greedy matching fails to take into account the relative closeness between this low-income family and other families who do not receive subsistence assistance. A more reasonable way is to give a bigger weighting to families without receiving subsistence allowances that have a higher degree of closeness with poor families.

Kernel matching and neighbor linear[1] regressive matching can better fix the above-mentioned gaps resulting from greedy matching. In kernel matching, each match in families relying on subsistence allowances refers to all families without receiving subsistence allowances. Moreover, each non-low-income family while acting as matches has been given corresponding weighting[2] according to relative closeness.

Table 6 shows the ATT of kernel matching. On the one hand, the ATT that arise from various matching methods and indexes are not obvious at the level of 10%, which proves that the subsistence security system has no obvious effect on the vulnerability to poverty. On the other hand, the ATT are obvious, which suggests that the subsistence security system has increased the vulnerability to poverty. This result has kept in line with the conclusion resulting from greedy matching. That is to say the subsistence security system for urban and rural residents has not effectively helped prevent low-income families from falling into poverty in the future. Instead, it may raise the possibility of poverty in the future.

Table 6. The ATT of Kernel Matching

Standard		$1.25 Poverty Line			$2 Poverty Line		
Matching methods	Matching index	ATT	Standard deviation	Sample numbers with both support	ATT	Standard deviation	Sample numbers with both support
		All samples					
Kernel matching	Epan kernel function	0.814	0.800	11223	0.795	0.809	11223
	Normal kernel function	1.405*	0.792	11223	1.386*	0.801	11223

[1] Kernel matching and neighbor linear regressive matching are known as kernel matching.

[2] To identify weighting, it's necessary to use kernel function (Heckman *et al*., 1997). In kernel matching, Epanechnikov kernel and Normal kernel are used. In neighbor linear regressive matching, Normal kernel and Tricube kernel are used. In Epan and Normal kernel function, the bandwidth is 0.06 while in Tricube, the bandwidth is 0.8. This paper has tried different kernel functions and bandwidths. The results are still steady.

Standard		$1.25 Poverty Line			$2 Poverty Line		
Matching methods	Matching index	ATT	Standard deviation	Sample numbers with both support	ATT	Standard deviation	Sample numbers with both support
Neighbor linear matching	Normal kernel function	0.355	0.806	11223	0.347	0.815	11223
	Tricube kernel function	0.456	0.745	11223	0.443	0.754	11223
	Number of samples	11223					
		Urban families					
Kernel matching	Epan kernel function	–0.639	1.320	5126	–0.766	1.331	5126
	Normal kernel function	0.256	1.308	5126	0.100	1.319	5126
Neighbor linear matching	Normal kernel function	–0.944	1.330	5126	–1.054	1.341	5126
	Tricube kernel function	–1.067	1.179	5126	–1.174	1.191	5126
	Number of samples	5126					
		Rural families					
Kernel matching	Epan kernel function	1.589	1.015	6097	1.610	1.028	6097
	Normal kernel function	2.119**	1.003	6097	2.145**	1.017	6097
Neighbor linear matching	Normal kernel function	0.981	1.022	6097	1.014	1.035	6097
	Tricube kernel function	1.314	0.971	6097	1.336	0.983	6097
	Number of samples	6097					

Note: ***, ** and * refer to the statistical significance at the significance level of 1%, 5% and 10%, respectively.

5. Mechanism Analysis

5.1. The Subsistence Security System for Urban and Rural Residents and Targeted Approaches to Poverty Elimination

Table 7 describes the percentage of families receiving subsistence allowances in different family groups,[1] a move that examines whether the subsistence security system for urban and rural residents has provided targeted approaches to poverty alleviation. According to the chart, below the $1.25 poverty line, most families

[1] Related data originates from the CFPS2012 survey data which has been verified. The conclusion is basically the same.

receiving subsistence allowances are not poor families, taking up two thirds of the total recipient families. This shows the system has not provided targeted approaches to poverty alleviation due to the failure to recognize low-income families. In comparison, the situation is worse in urban areas. When the poverty line is raised to the $2 standard, still nearly half families receiving subsistence allowances are not poor families. Therefore, there is still a big gap in achieving the policy goal of "support those who are in poverty". Based on the previous analysis and the results from Table 7, the paper argues that bias errors originating from the implementation of the system is a major reason that the system has failed to reduce the vulnerability to poverty.

Table 7. Families Receiving Subsistence Allowances in Different Family Groups Unit: %

	$1.25 Poverty line			$2 Poverty line		
	Poor families	Non-poor families	Total	Poor families	Non-poor families	Total
Total families	33.7	66.3	100	50.3	49.7	100
Urban families	30.9	69.1	100	42.2	57.8	100
Rural families	35.3	64.7	100	54.2	45.8	100

5.2. Urban and Rural Subsistence Security System and Private Transfer Payments

This paper explores the impact of subsistence allowances on private transfer payments. In CFPS2012, we asked two questions: "In the past year, how much financial support or how many donations (¥) you have received from your relatives who you do not live together with (including your children/parents/parents-in-law/ others who you do not live together with)" and "In the past year, how much financial support or how many donations (¥) you have received from people outside your family (such as friends and colleagues). This paper adds up two kinds of "financial support or donations" and divides them by household size to get the family per capita payment as the measurement index of the private transfer payments.

The left part of the Table 8 shows the Average Treatment Effects on the Treated (ATT) of the subsistence security system on private transfer payments. It can be seen that according to all matching indexes, the ATT of all the samples are negative above 5% in terms of significance level. This means receiving subsistence allowances will dramatically reduce the private transfer payments a family will receive. The negative effect has deviated a bit according to different matching methods and indexes between 144.668 and 257.428. This proves that the subsistence security system has led to a reduction of private transfer payments by 144.668~257.428 yuan every year. The urban and rural subsistence security system has negative effects on private transfer payments and has a higher level of statistical significance. This suggests that the urban and rural subsistence security system crowds out private transfer payments from time to time in both urban and rural areas. In particular, the urban and rural subsistence security system

has a smaller impact on crowding out private transfer payments compared with national subsistence allowances standard[1] in urban and rural areas. It means the reduction of private transfer payments in part reflects the effect of poverty reduction the system has brought about. The empirical results from Table 8 have supported prior conclusions.

Table 8. The ATT of the Subsistence Security System on Private Transfer Payment and People's Willingness to Work

	Private transfer payment			People's willingness to work		
Mating index	ATT	Standard deviation	Sample numbers with both support	ATT	Standard deviation	Sample numbers with both support
	All samples			All samples		
k=1	–144.668**	66.371	11215	–0.032*	0.017	4449
k=5	–257.428***	68.814	11215	–0.041***	0.012	4449
k=10	–212.103***	58.247	11215	–0.042***	0.011	4449
Sample number		11223			4460	
	Urban family			Urban family		
k=1	–514.071**	241.055	5120	–0.058*	0.032	2601
k=5	–257.434**	127.754	5120	–0.039**	0.020	2601
k=10	–239.588*	129.020	5120	–0.033*	0.018	2601
Sample number		5126			2608	
	Rural family			Rural family		
k=1	–271.228**	107.522	6093	–0.047**	0.023	1846
k=5	–120.185**	55.567	6093	–0.049***	0.015	1846
k=10	–141.449***	50.254	6093	–0.054***	0.014	1846
Sample number		6097			1852	

Notes: ***, **, * refer to the statistical significance at the significance level of 1%, 5% and 10%. To keep the paper short, Table 8 only shows the matching results of numbers close to *k* within the caliper width of 0.25×σ. The conclusion from other matching methods is basically the same.

5.3. Urban and Rural Subsistence Security System and People's Willingness to Work

This paper further explores what impact the subsistence security system has on people's willingness to work. An indicator is determined based on the question "Did you try to find a job in the past month" in our CFPS2012 survey. If the answer is "yes",

[1] National urban average subsistence allowances standard in 2011 was 287.6 yuan per month, 3451.2 yuan a year. National rural average subsistence allowances standard in 2011 was 143.2 yuan per month, 1718.4 yuan a year. Empirical results have shown that the subsistence allowances system has crowded out 217 yuan (for rural families) of private transfer payments a year and 514 yuan (for urban families), just a small part of subsistence allowances.

the variable "willingness to work" will be assigned "1". If the answer is "no", then it will be assigned "0". The samples are currently unemployed urban and rural residents. What's worth noting is that since the elderly and those in poor health are more likely to receive subsistence allowances while at the same time they are usually less willing to work. Empirical cases that include these observational data might cause deviation in light of neglecting variables. Therefore, observational data[1] of respondents who do not work because of their age and health status has been excluded.

The right part of Table 8 shows the Average Treatment Effects on the Treated (ATT) of the subsistence security system on people's willingness to work. The result drawn from the full samples shows that people's willingness to work will be lower by 3.2 to 4.2 percentage points because of the system. This means that being covered by the system will make people less willing to seek and do a job, which to some extent prevents people from getting out of the poverty through their own hard work and partly offsets the system's effect on poverty reduction in the future. This conclusion applies to both urban and rural residents.

6. Conclusions and Policy Suggestions

With data from micro surveys of CFPS2012, this paper explores the influence of this system on the vulnerability of families falling into poverty in a case study. In order to reduce the sample deviation, we employed the Propensity Score Matching, and models of greedy matching, kernel matching and neighbor linear regressive matching to prove the conclusion is solid. The results show our minimum subsistence security system fails to protect rural families from falling into poverty. Instead, it is likely to make them more vulnerable to poverty. The aforementioned results are true for both rural and urban families. On this basis, the paper makes a further channel research to explore why the system hasn't worked. The research results suggest that the minimum subsistence security system in part crowds out private transfer payments available for families while at the same time makes insured people who are capable of working less willing to work. In addition, the paper uses data from CFPS to work out the percentage of poor families covered by the system. It turns out that the current minimum subsistence guarantee system fails to cover families that should have been insured and thus drastically curtails the effects this system has on poverty reduction.

Based on the research results, it can be concluded that the following work should be done in order to push for targeted and long-term efforts to poverty alleviation under the minimum subsistence security system. First, family income and consumption in different periods should be considered when determining who are eligible to be

[1] For the question "what is the major reason that you do not have a job?", observed data with answers like "old age" , " disability or diseases", "less than 16 years old" and "studying at school" is excluded.

covered by the subsistence security system so that the system has a positive role in poverty reduction for the long run. To do that, not only should current poverty be included in the criteria for granting subsistence allowances, but also the vulnerability of falling into poverty. The focus should be families struck by serious accidents or with member(s) suffering severe disability or chronic diseases. Second, various ways for providing aids should be developed so that the system will not squeeze out private transfer payments and people's willingness to work. Therefore, on top of the traditional way of granting subsidy in the form of cash or goods, it's also necessary to offer job training and recommendation as well as salary subsidy for the effective combination of the minimum subsistence security system and reemployment so as to reduce the vulnerability of poverty for the insured families. On this basis, a flexible system should be established to reassess those subsistence allowance recipients who have work ability. The duration and the amount of the allowances should be adjusted accordingly to diminish the long-term reliance of the labor force on subsistence allowances. Third, more efforts should be made to ensure government authorities are efficient in reviewing the eligibility to receive subsistence allowances and providing targeted approaches to poverty reduction. What's important is to improve government employees' professional skills and their work ethic through training in order to adapt to the complex review work that requires the use of information technologies. Fourth, it's essential to introduce a support system for supervising review and assessment procedures in a move to prevent subsistence allowance cheating. For families whose incomeis above the subsistence security line, their eligibility should be canceled for better use of government funds.

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