

---

Jiang, T., Shangguan, Sh., Fang, Z., Fang, X. (2022), "Impact of Sichuan Rural Tourism Cooperatives on Local Economy and Employment", *Transformations in Business & Economics*, Vol. 21, No 1 (55), pp.39-52.

---

---

-----TRANSFORMATIONS IN -----  
**BUSINESS & ECONOMICS**

© Vilnius University, 2002-2022  
© Brno University of Technology, 2002-2022  
© University of Latvia, 2002-2022

---

## **IMPACT OF SICHUAN RURAL TOURISM COOPERATIVES ON LOCAL ECONOMY AND EMPLOYMENT**

### **<sup>1</sup>Tianyuan Jiang**

*College of Economics and  
Management  
China Agricultural University  
Qinghua East Road  
Beijing  
China  
Tel.: +861 3 1461 16799  
E-mail: jiangtianyuan@cau.edu.cn*

### **<sup>2</sup>Shuangyue Shangguan**

*College of Economics and  
Management  
China Agricultural University  
Qinghua East Road  
Beijing  
China  
Tel.: +861 8 8117 63751  
E-mail: 18811763751@163.com*

### **<sup>3</sup>Zuyi Fang**

*Department of Social Policy and  
Intervention  
University of Oxford  
32 Wellington Square  
United Kingdom  
Tel.: +861 5 9485 20706  
E-mail: zuyi.fang@spi.ox.ac.uk*

### **<sup>4</sup>Xiangming Fang**

*College of Economics and  
Management  
China Agricultural University  
School of Public Health  
Georgia State University  
Qinghua East Road  
Beijing  
China  
Tel.: +861 3 8102 29227  
E-mail: xmfang@cau.edu.cn*

**<sup>1</sup>Tianyuan Jiang** is a Research Assistant at the Academy of Global Food Economics and Policy in China Agricultural University. His research interests include rural public policy and rural tourism.

**<sup>2</sup>Shuangyue Shangguan**, MSc, is a PhD candidate at the College of Economics and Management in China Agricultural University. Her research interests include rural economy and rural medical insurance.

**<sup>3</sup>Zuyi Fang**, MSc, is a PhD candidate at the Department of Social Policy and Intervention at the University of Oxford. Her research interests include policy assessment and labour market.

**<sup>4</sup>Xiangming Fang**, PhD (*corresponding author*), is a Professor at the Academy of Global Food Economics and Policy at China Agricultural University, and an Associate Professor at the School of Public Health in Georgia State University. Prior to his current position, Dr. Fang served as Senior Health Economist with the U.S. Centers for Disease Control and Prevention. His research interests include food nutrition and health, human capital, and rural social security.

*Received: August, 2020  
1<sup>st</sup> Revision: November, 2020  
2<sup>nd</sup> Revision: February, 2021  
Accepted: May, 2021*

***ABSTRACT. Rural tourism plays a significant role in promoting rural industrial development and revitalisation during the integration of the primary, secondary, and tertiary industries. By analysing the 2015-2018 county-level panel data of Sichuan Province and using the Difference-in-Differences (DID) method with a propensity score matching (PSM) approach, this research***

*examined the impact of the policy about establishing rural tourism cooperatives in Sichuan Province on the county-level economic development and employment, as well as the possible mechanisms of impact. The findings showed that the development of rural tourism cooperatives: (1) increased the primary industry gross product, tertiary industry gross product, per capita gross product, and employment at county level without a siphon effect triggered by the tourism sector; (2) had a sustainable effect on promoting county-level primary industry gross product; (3) had a time-lag effect on increasing county-level tertiary output value, per capita GDP, and employment; (4) promoted county-level end-of-year loan balance, increased the loan level for rural residents, and increased the investments in production, thereby improving economic development and employment.*

**KEYWORDS:** rural tourism cooperatives, county-level economy, employment, policy assessment.

**JEL classification:** Q13, Q58, J23.

## Introduction

In recent years, there is a burgeoning interest in the integration of rural primary, secondary, and tertiary industries, which is the fundamental way to promote the revitalisation of rural industries. Multiple documents have been issued by the Central Committee of the Communist Party of China, the State Council, and local governments, stressing that an agricultural industrial chain must be built to form a competitive industrial cluster and promote the integration of rural primary, secondary, and tertiary industries. Rural tourism is regarded as one of the most important ways of industrial integration. It will not only extend the agricultural industrial chain and add value to agricultural products but also develop multiple functions in agriculture by exploring the value of agritourism and education. *The National Rural Industry Development Plan (2020-2025)* issued by the Ministry of Agriculture and Rural Affairs of China in July 2020 proposed the construction of key agritourism areas and the development of creative agritourism formats and products, so as to boost industrial prosperity. As such, rural tourism has become the key to activating rural factors of production, increasing rural income, and achieving rural revitalisation.

Guided by the national policies, local governments in China have undertaken various initiatives to develop agritourism, among which rural tourism cooperatives in Sichuan Province have drawn much attention from the State Council and researchers, due to their early start and rapid progress. As was mentioned in the *2016 Guiding Opinions on Vigorously Developing Rural Tourism Cooperatives*, the General Office of the Sichuan Provincial Government aimed for the leading position in rural tourism cooperatives development in China by 2020, as well as a new model of rural tourism development characterised by the economic form of rural tourism cooperatives. This represents an important step towards innovative rural tourism practices and calls for the scientific evaluation of the policy effects and the mechanism of impacts. The findings will not only provide evidence for relevant initiatives in other provinces but also inform future policies and plans.

Existing literature on rural tourism cooperatives has primarily used qualitative approaches to explore the design of agritourism development models, the selection of developmental pathways, and the governance of cooperatives, with few studies assessing the

economic impacts using a quantitative approach. Also, limited research has investigated the strengths and drawbacks of such cooperatives by integrating the professional cooperatives of farmers with rural tourism. Therefore, this article will fill the research gap by taking Sichuan Province – a pioneer in scaling up rural tourism cooperatives in China – as an example and exploring the role of rural tourism cooperatives in promoting county-level economy and employment using the PSM-DID method. Findings of this study will inform the development of rural industries and rural revitalisation. This article is structured as follows: section 2 is a literature review; section 3 explains the model construction, data source and variable setting; section 4 presents the results of the main analysis, robustness check, and the impact mechanism analysis; section 5 provides a conclusion and several policy recommendations.

## 1. Literature Review

In Western countries, evaluations of the effects of farmers' professional cooperatives and rural tourism cooperatives have shown different results. By conducting a survey on rice growers in China with a propensity score matching method, Hoken and Su (2018) found that there was no significant difference in terms of annual income between farmers who participated in professional farmer cooperatives and those who did not participate, thereby concluding that the role of farmers' professional cooperatives had been overestimated. However, through a qualitative analysis, Aref and Gill (2009) pointed out that poor organisational capabilities and economic weakness of individual rural households restricted the overall development of rural tourism in Iran. They confirmed the critical role of rural tourism cooperatives and recommended the use of cooperatives to promote rural tourism. Paresishvili *et al.* (2017) investigated the development of rural small-scale tourism in Georgia and concluded that rural tourism contributed to an increase in local income and employment rates, as well a reduction in population exodus in mountainous areas. Fleischer and Pizam (1997) evaluated a "Bed and Breakfast" project operated by farmers in rural areas of Israel, showing that rural tourism led to a significant increase in rural income, and the extra income was used to invest in other industries such as farm management so as to further promote the total annual income of farmers. In addition, another study by Fleischer and Tchetchik (2005) found that the combination of traditional agriculture and rural tourism increased labour efficiency, which could also promote the overall income of farmers.

Chinese scholars tend to agree that rural tourism can promote rural economic growth. For example, Xu (2018) pointed out that the development of rural tourism cooperatives could integrate tertiary industries, increase farmers' income, and transfer rural surplus labour. Ye (2014) showed that rural tourism-propelled economy had a significant positive impact on solving the "three rural" (rural villages, farmers, and agriculture) issues. In terms of the influence mechanism of rural tourism cooperatives, Qu (2017) conducted a research on the rural construction in Xinyang, Henan Province, showing that several factors (such as the relationships between cooperative members, and professionalism) had a positive, although not statistically significant, influence on the development of cooperatives, whereas scientific management had stronger and significant effects. Yin (2017) revealed several problems about the development of rural tourism cooperatives and suggested innovating organisational management, strengthen organisational leadership, and establish tourism demonstration agencies. Also, Wang (2010) conducted a survey on the employment situation of the Nanjing Jiangxinzhou Tourism Demonstration Site and found that participation in individual business posed a high risk for farmers and would potentially widen the local income gap. As with the

developmental path of rural tourism cooperatives, Wang (2015) conducted a qualitative study on more than 30 rural tourism cooperatives in 7 provinces and cities and found that the development of rural tourism cooperatives necessitated the improvement of the internal operating mechanism of the cooperatives and the management capability of the members. In addition, by investigating the Fang'gan Rural Tourism Cooperatives, Wang (2016) showed that the initiative of the main agent, government engagement, and tourism development were the three important influencing factors of the governance mechanism of rural tourism cooperative. Also, by investigating how tourism alleviated poverty in the Wumeng mountainous area of Sichuan Province, Li *et al.* (2018) concluded that the government should extend tourism infrastructure and public services to the countryside.

There are three limitations in the existing research on rural tourism cooperatives. First, they were predominantly qualitative studies. Existing studies mostly focused on constructs, development models, system construction, and path selection, while few studies used quantitative methods from an economic perspective to evaluate the system. Second, the combination of rural tourism and farmer professional cooperatives has been seldom investigated. Most studies considered the two separately without realising that their combination might also generate significant impacts. Third, existing quantitative studies tend to use OLS models, which did not sufficiently consider the impact of endogeneity.

By fully considering endogeneity from an economic perspective, this research used the PSM-DID method to explore the impact of the policy about establishing rural tourism cooperatives in Sichuan Province on local economy and employment. This research also examined whether the policy had a time lag effect and whether there was a siphon effect of the tourism industry using a robustness test and an impact mechanism analysis. Based on the results, we reached several conclusions and proposed a few suggestions.

## **2. Methods**

### ***2.1 Difference-in-Differences with Propensity Score Matching***

The effects of the policy were estimated using a difference-in-differences (DID) design, which can effectively solve the endogenous problem of traditional OLS models and explore the impact of policy implementation itself by further adjusting for time effects. To create the DID model, the common trend hypothesis is an important prerequisite: if the policy was not issued, the economic development and employment trends of the counties that participated in rural tourism cooperatives and those that did not participate would have no systematic difference. In this study, counties that established rural tourism cooperatives after the policy release in 2016 were the treatment group, and those not implementing the policy were the control group. However, it was difficult to find homogeneous treatment and control group. Therefore, this research has drawn on the PSM-DID model proposed by Heckman *et al.* (1998), which integrates a propensity score matching (PSM) approach into the DID model to compensate the common trend assumption.

Since the policy was released in 2016, this research had the counties in Sichuan Province that started to operate rural tourism cooperatives as the treatment group, and those that have never established rural tourism cooperatives as the control group. Informed by Li *et al.* (2020), this research controlled for the following baseline variables: population (county population), school (number of primary schools), highway (highway mileage), average farming size (average farming size), and loan (year-end loan balance). Counties in the

treatment and control groups were matched using the propensity scores calculated from those control variables. The logit regression estimation model used to obtain the propensity scores is shown below as (1).

$$\text{logit}(Z) = \Phi(\text{population, school, highway, average farming size, loan}) \quad (1)$$

Kernel matching, nearest neighbour matching, and radius matching were tested in order to find the most appropriate matching method. The matching formula is shown as (2),  $p_m$  represents the propensity score value of the treatment group, and  $p_n$  represents the propensity scores of the control group. 0.05 was selected as the stricter radius value to obtain the matched sample for the next step of double difference estimation.

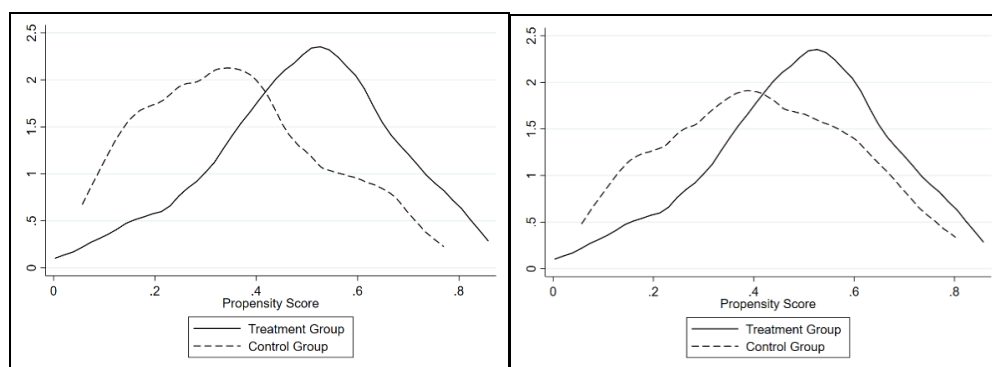
$$D_{(m,n)} = \min |p_m - p_n| \quad (2)$$

In order to test the matching effect of PSM, this research conducted a balance test. The results are shown in *Table 1*. The bias of most variables was controlled within 5%, and the t-tests showed that there was no significant difference in the baseline economic characteristics between the groups.

**Table 1. PSM balance test**

Variables	Samples	Mean		Bias (%)	t value	p> t
		Treatment Group	Control Group			
county population	Before Matching	0.057	0.035	2.1	0.19	0.849
	After Matching	0.190	0.202	-1.2	-0.10	0.921
number of primary schools	Before Matching	0.107	-0.077	17.5	1.65	0.100
	After Matching	0.040	0.121	-7.7	-0.70	0.485
highway mileage	Before Matching	0.343	-0.307	67.5	5.98	0.000
	After Matching	0.308	0.274	3.5	0.29	0.769
average farming size	Before Matching	0.080	-0.099	17.5	1.54	0.125
	After Matching	0.069	-0.007	7.5	0.61	0.543
year-end Loan balance	Before Matching	0.291	-0.248	53.7	4.75	0.000
	After Matching	0.102	0.105	-0.3	-0.03	0.977

Source: own calculations.



Notes: before matching(left); after matching(right).

Source: created by the authors.

**Figure 1. Kernel Density Estimation**

In addition, the kernel density function diagrams before and after matching (*Figure 1*) showed that the centres of gravity of the groups before matching were significantly different, and the interactive part of the density function after matching was larger, which satisfied the common support hypothesis. Both methods showed that the PSM improved group comparability, which provided the basis for the DID estimation.

## 2.2 Difference-in-Differences

When a traditional OLS model is used, or when only the within-group difference of the treatment group before and after the policy is estimated, the result would include not only the effect of the policy but also the confounding effects caused by other unobservable factors, such as the economic increase due to time and other heterogeneous deviations. Therefore, it is necessary to find a comparison that is similar to the treatment group in all other aspects except for the participation in the rural tourism cooperative initiative. The value is measured to calculate the policy impact. The DID regression model set in this research is as formula (3).

$$ECO^{psm} = \alpha_0 + \alpha_1 treat_i * time_{2017} + \alpha_2 treat_i * time_{2018} + \alpha_3 * time_{2017} + \alpha_4 * time_{2018} + \alpha_5 * treat_i + \sum_{i=1}^n \beta_i * X_{it} + \gamma + \varepsilon_{it} \quad (3)$$

In the formula,  $EOC^{psm}$  is the outcome variable. By taking treating county as the analysis unit, this research selected the gross value of the primary industry, the gross value of the tertiary industry, per capita GDP, and employment-population rate on the county level as the outcome variables.  $treat_i$  is the dummy variable of policy participation. If the county has established a rural tourism cooperative, it is in the treatment group and  $treat_i = 1$ ; otherwise 0.  $time_{2017}$  and  $time_{2018}$  are time dummy variables.  $time_{2017} = 1$  means the first year after the implementation of the policy; similarly,  $time_{2018} = 1$  represents the second year after the implementation of the policy. The cross term  $treat_i * time_t$  is the focus of this research. The coefficients  $\alpha_1$  and  $\alpha_2$  are the policy effects.

**Table 2. Explanation of DID parameters**

	Treatment Group	Control Group	Difference in Participation
Before Policy Implementation	$\alpha_0 + \alpha_4$	$\alpha_0$	$\alpha_4$
After Policy Implementation	$\alpha_0 + \alpha_1 + \alpha_3 + \alpha_4$	$\alpha_0 + \alpha_3$	$\alpha_1 + \alpha_4$
Difference in Time	$\alpha_1 + \alpha_3$	$\alpha_3$	$\alpha_1$

Source: created by the authors.

Taking the policy impact on 2017 as an example, the DID model is shown in *Table 2*: by taking  $X_{it}$  as the control variable, this research has added the same five covariates as in the above PSM process as the control variable;  $\gamma$  is the individual effect that does not change with time;  $\varepsilon_{it}$  is the constant.

### 2.3 Data

The counties in Sichuan Province were the target of this study. This research had the counties in Sichuan Province that started to operate rural tourism cooperatives since 2016 and continued to exist by 2018 as the treatment group, and those that have never established rural tourism cooperatives as the control group. We use the database of the Sichuan Administration for Industry and Commerce to determine these two groups. The detailed data were drawn from the county-level Statistical Yearbook of Sichuan Province (2015-2018). Using the PSM method, a sample of 300 observations was obtained.

### 2.4 Measurements

In order to explore the effects of the policy on the economy and employment, this research selected four county-level outcome variables, including the gross product of the primary industry, the gross product of the tertiary industry, per capita GDP, and employment. The logarithm of the first three variables was taken. The changes in gross product of the tertiary industry would show the direct impact of the tourism industry. Changes in the gross product of the primary industry on the county level were also tested to examine the siphon effect – whether the development of the tertiary industry inhibited the development of the primary industry. In terms of the impact on GDP, county-level per capita GDP was investigated. County-level labour population was explored to show the impact of rural tourism cooperative policy on employment because the development of rural tourism has been assumed to promote the employment of rural surplus labour Zhang (2019).

As explained in the statistical models,  $treat_i$ ,  $time_{2017}$  and  $time_{2018}$  were the core explanatory variables, while the cross-term coefficients  $\alpha_1$  and  $\alpha_2$  were the focus of the study.

In accordance with Li *et al.* (2020), when choosing control variables, this research has comprehensively considered three aspects of development, including industrial growth, economic growth, and development momentum. In terms of industrial growth, some research pointed out that average farming size had a positive impact on income growth (Qi, 2020). It influences the gross product of the primary industry and guarantees the development of the tertiary industry and employment. Therefore, the average farming size was added to the model as a control variable.

Additionally, the establishment and development of cooperatives rely on financial support. Hence, the year-end loan balance was also added as a control variable. Development momentum represents the comprehensive development opportunities in a county. It is influenced by several factors, such as population, level of education, road construction, county population, number of primary schools, and highway mileages. Thus, it was accounted for as well.

Table 3 shows the definitions of variables and descriptive statistics. In terms of the four outcome variables, it shows that, in 2015, there were small differences in counties' gross product of the primary industry, the gross product of the tertiary industry, per capita GDP, and employment between the treatment and control group, with the treatment group being slightly less economically developed than the control group. After the establishment of rural tourism cooperatives, the average value of the four outcome variables of the treatment group increased and exceeded those of the control group, with the gap widening for the following years.

**Table 3. Descriptive statistics of variables**

Variables	Variable Definition	2015		2017		2018	
		Control Group	Treatment Group	Control Group	Treatment Group	Control Group	Treatment Group
<i>primary industry</i>	Logarithm of the gross product of primary industry	11.73 (0.94)	11.72 (0.89)	11.79 (0.93)	12.22 (0.76)	11.76 (0.90)	12.37 (0.69)
<i>tertiary industry</i>	Logarithm of the gross product of tertiary industry	12.44 (1.08)	12.38 (1.17)	12.61 (1.03)	12.92 (0.72)	12.65 (1.03)	13.25 (0.76)
<i>per capita GDP</i>	Logarithm of per capita GDP	10.30 (0.48)	10.09 (0.37)	10.37 (0.46)	10.35 (0.35)	10.36 (0.45)	10.48 (0.32)
<i>employment</i>	Number of employed people	28.52 (18.05)	25.66 (17.03)	27.84 (18.31)	32.60 (16.92)	26.98 (18.32)	35.92 (19.08)
<i>population</i>	County population	45.17 (30.08)	47.51 (34.07)	44.46 (34.01)	52.98 (29.75)	43.74 (30.31)	52.81 (30.03)
<i>school</i>	Number of primary schools	42.45 (38.98)	52.38 (71.71)	37.56 (34.35)	40.37 (34.51)	38.11 (35.65)	39.59 (32.72)
<i>highway</i>	Logarithm of highway mileage	7.22 (0.58)	7.57 (0.48)	7.27 (0.57)	7.59 (0.52)	7.32 (0.61)	7.60 (0.53)
<i>average farming size</i>	Logarithm of average farming size	6.61 (0.82)	6.81 (0.51)	6.79 (0.84)	6.58 (0.83)	6.63 (0.84)	6.78 (0.56)
<i>loan</i>	Logarithm of year-end loan balance	13.28 (1.51)	13.14 (1.42)	13.38 (1.41)	13.90 (0.79)	13.43 (1.37)	14.00 (0.80)

Source: own calculations.

These preliminary results indicated that the establishment of rural tourism cooperatives might promote economic development and employment in a sustainable way. A comparison between the changes of the control variables in both groups showed that the average populations in the treatment group were generally larger than those of the control group in all three years. Also, the average populations in the control group decreased by time, whereas those in the treatment group tended to increase. In terms of the number of primary schools, the average number in the treatment group was larger than that in the control group at baseline but both the treatment group and the control group experienced a significant reduction from 2015 to 2017. This may be attributed to the policy of removing and merging schools. In addition, the treatment and control groups had few differences in highway mileage, average farming size, and year-end loan balance. The changes over time were also small.

### 3. Results

#### 3.1 Rural Tourism Cooperatives and Local Economy and Employment

Table 4 shows the PSM-DID estimation results of model (3), which examined the effects of the Sichuan Rural Tourism Cooperative Policy on economy and employment at county level. 2016 is the year when the policy was first implemented. The coefficients of  $treat_i * time_{2017}$  and  $treat_i * time_{2018}$  represent the impact of rural tourism cooperatives on county economy one year and two years after the implementation respectively.



**Table 4. Analysis of empirical results**

Variables	Gross Product of	Gross Product of	Per Capita GDP	Employment
	Primary industry	tertiary Industry		
	(1)	(2)	(3)	(4)
$treat_i$	-0.125 (-0.99)	-0.068 (-0.69)	-0.310** (-2.16)	-0.257*** (-2.91)
$time_{2017}$	-0.039 (-0.33)	0.081 (0.88)	0.076 (0.57)	-0.064 (-0.79)
$time_{2018}$	-0.044 (-0.37)	0.121 (1.30)	0.028 (0.21)	-0.110 (-1.33)
$treat_i * time_{2017}$	0.329* (1.80)	0.039 (0.27)	0.096 (0.46)	0.181 (1.41)
$treat_i * time_{2018}$	0.404** (2.20)	0.245* (1.70)	0.361* (1.73)	0.383*** (2.98)
Population	0.305*** (3.39)	0.218*** (3.11)	-0.268*** (-2.63)	0.653*** (10.42)
Number of Primary Schools	-0.08 (-1.64)	0.001 (0.02)	-0.114* (-1.85)	-0.065* (-1.74)
Highway Mileage	0.152** (2.32)	0.057 (1.12)	-0.104 (-1.40)	0.140*** (3.08)
Average Farming Size	0.225*** (5.19)	0.111*** (3.29)	0.036 (0.73)	0.028 (0.92)
Year-end Loan Balance	0.457*** (5.89)	0.790*** (13.05)	0.941*** (10.68)	0.267*** (4.93)
Constant	0.046 (0.54)	-0.062 (-0.94)	0.021 (0.22)	0.047 (0.80)
N	300	300	300	300
$R^2$	0.572	0.764	0.493	0.804

Notes: t statistics in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: own calculations.

First, the cross-term results for the outcome variables were all positive, which means that the establishment of rural tourism cooperatives promoted the economic development and employment level in each county. Second, one year after the policy, the county's gross product of primary industry had a statistically significant increase but the changes in the other three outcome variables were not significant with the *p-value* larger than 0.1. This shows that the establishment of rural tourism cooperatives has a timely impact on the primary industry, the reasons of which can be twofold: rural tourism attracted more tourists to the countryside, who may have promoted the sales of agricultural products through instant catering consumption, enjoyment of picking, and purchase of fresh agricultural products; meanwhile, the development of rural tourism may have increased the unit price of agricultural products through environmental and entertainment premiums, and also reduced the intermediate price through direct trading between farmers and consumers, thereby increases the unit price for farmers. Regarding the results after two-year's implementation, it shows that the county's gross product of the primary and tertiary industries, per capita GDP and employment increased significantly. Compared with the previous year, the increase in the gross product of the primary industry was even larger, indicating that the effect of the policy was sustainable and had a time lag. One potential reason is that the development of the rural tourism industry benefited from the increase of experience, audiences, and facilities. During the first year,

despite the continuous improvement, the profit was thin and the scale was small. The impact on the gross product of the tertiary industry, per capita GDP, and employment was trivial. However, in the second year, as the tourism cooperatives became mature, the scale was expanded, the supporting facilities were improved, and the profits increased. The aggregated effects gradually increased the gross product of the tertiary industry and further influenced the per capita GDP. At the same time, with the scale-up of services and the improvement of service capacity, rural tourism cooperatives required more staff, thus creating more job opportunities and significantly increasing the county-level employment rates. Based on the above results, a conclusion can be drawn that the development of the tertiary industry in the county did not lead to the siphon effect triggered by the development of the tourism industry. This is in contradiction with the findings by Yang (2017), which indicated that the development of the tertiary industry would inhibit the development of other industries. This can be explained by the different statistical designs – this study used the DID model and fully considered the impact of endogeneity when selecting relevant variables.

### 3.2 Robustness Checks

This study conducted two robustness checks. First, the comparisons were re-matched by removing the insignificant control variables while other procedures remained unchanged. The results are shown in *Table 5*.

**Table 5. Robustness test 1 (insignificant control variables removed)**

Variables	Gross Product of Primary industry (5)	Gross Product of tertiary Industry (6)	Per Capita GDP (7)	Employment (8)
$treat_i$	-0.134 (-1.04)	-0.068 (-0.70)	-0.322** (-2.23)	-0.266*** (-2.98)
$time_{2017}$	-0.023 (-0.19)	0.082 (0.91)	0.090 (0.67)	-0.063 (-0.76)
$time_{2018}$	-0.030 (-0.25)	0.123 (1.34)	0.037 (0.27)	-0.115 (-1.37)
$treat_i * time_{2017}$	0.361* (1.95)	0.050 (0.35)	0.111 (0.53)	0.191 (1.48)
$treat_i * time_{2018}$	0.385** (2.07)	0.241* (1.70)	0.350* (1.68)	0.421*** (3.26)
<i>Population</i>	0.311*** (3.84)	0.232*** (3.75)	-0.306*** (-3.36)	0.583*** (10.35)
<i>Highway Mileage</i>	0.141** (2.13)	0.055 (1.08)	-0.108 (-1.45)	0.155*** (3.37)
<i>Average Farming Size</i>	0.208*** (4.77)	0.109*** (3.29)	0.020 (0.40)	0.021 (0.69)
<i>Year-end Loan Balance</i>	0.421*** (5.69)	0.776*** (13.77)	0.939*** (11.31)	0.318*** (6.19)
Constant	0.036 (0.42)	-0.065 (-0.99)	0.019 (0.20)	0.059 (0.98)
N	303	303	303	303
$R^2$	0.562	0.766	0.481	0.801

Notes: t statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: own calculations.

Second, informed by Shi *et al.* (2018), the counties that started rural tourism cooperatives in 2017 were added to the matched treatment group with other procedures staying the same. The results are shown in *Table 6*. The results were consistent across *Table 4-6*, indicating a high level of robustness. The improvement in economy and employment in the model was the result of policy implementation, rather than other unobserved factors.

**Table 6. Robustness test 2 (new counties added to treatment group)**

Variables	Gross Product of Primary industry (9)	Gross Product of tertiary Industry (10)	Per Capita GDP (11)	Employment (12)
$treat_i$	-0.141 (-1.23)	-0.084 (-0.92)	-0.197 (-1.48)	-0.245*** (-2.81)
$time_{2017}$	-0.036 (-0.31)	0.086 (0.94)	0.096 (0.71)	-0.058 (-0.65)
$time_{2018}$	-0.026 (-0.22)	0.127 (1.37)	0.051 (0.38)	-0.097 (-1.09)
$treat_i * time_{2017}$	0.273* (1.66)	0.048 (0.37)	0.093 (0.49)	0.167 (1.34)
$treat_i * time_{2018}$	0.362** (2.20)	0.336** (2.57)	0.329* (1.72)	0.455*** (3.63)
Population	0.427*** (5.36)	0.240*** (3.79)	-0.248*** (-2.68)	0.672*** (11.06)
Number of Primary Schools	-0.119** (-2.30)	0.002 (0.05)	-0.075 (-1.24)	-0.044 (-1.11)
Highway Mileage	0.088 (1.51)	0.035 (0.75)	-0.200*** (-2.94)	0.101** (2.26)
Average Farming Size	0.251*** (5.98)	0.103*** (3.11)	0.011 (0.24)	0.033 (1.04)
Year-end Loan Balance	0.399*** (5.50)	0.770*** (13.40)	0.903*** (10.73)	0.232*** (4.21)
Constant	0.020 (0.24)	-0.073 (-1.10)	-0.015 (-0.15)	0.031 (0.49)
N	355	355	355	355
$R^2$	0.571	0.747	0.464	0.763

Notes: t statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: own calculations.

### 3.3 Possible Channels

With the evidence that rural tourism cooperatives promoted economic employment, this research further explored the impact mechanism by treating the control variables in the original regression as the intermediary variables. The results are shown in *Table 7*. After the implementation of the policy, the county's year-end loan balance increased more and more rapidly over time. In other words, the establishment of rural tourism cooperatives promoted county economic development by increasing rural residents' loans and employment. Before the development of rural tourism cooperatives, rural elements such as land, labour, and landscape resources were not fully utilised due to financial constraints. With the development of cooperatives, relevant supporting policies facilitated farmers' loan applications, and rural residents were also motivated by the policies to make more loans. These loans were in turn

invested in agricultural production materials and rural tourism facilities, which fundamentally released various rural factors of production, thereby promoting the development of the county's primary industry, tertiary industry, per capita GDP, and employment.

**Table 7. Analysis of impact mechanism**

Variables	Population (13)	Number of Primary Schools (14)	Highway Mileage (15)	Average Farming Size (16)	Year-end Loan Balance (17)
$treat_i$	0.075 (0.39)	0.190 (1.19)	0.582*** (3.22)	0.270 (1.34)	-0.091 (-0.54)
$time_{2017}$	-0.023 (-0.13)	-0.094 (-0.62)	0.079 (0.46)	0.241 (1.27)	0.068 (0.43)
$time_{2018}$	-0.046 (-0.25)	-0.083 (-0.55)	0.155 (0.90)	0.026 (0.13)	0.105 (0.66)
$treat_i * time_{2017}$	0.199 (0.71)	-0.136 (-0.58)	-0.048 (-0.18)	-0.556* (-1.88)	0.441* (1.79)
$treat_i * time_{2018}$	0.217 (0.76)	-0.162 (-0.68)	-0.112 (-0.42)	-0.062 (-0.21)	0.467* (1.88)
Constant	0.009 (0.07)	-0.003 (-0.03)	-0.296** (-2.50)	-0.091 (-0.69)	-0.139 (-1.26)
N	300	300	300	300	300
$R^2$	0.013	0.013	0.075	0.015	0.049

Notes: t statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: own calculations.

## Conclusions and Discussion

By analysing the 2015-2018 county-level panel data of Sichuan Province and using the PSM-DID method, this study investigated the effects of the Sichuan Rural Tourism Cooperative Policy on economic development and employment at the county level, and explored possible impact mechanisms. Several conclusions were drawn. First, the development of rural tourism cooperatives had a significant positive effect on the gross product of the primary and tertiary industries, per capita GDP, and employment on the county level. Also, there was no siphon effect triggered by the tourism development, which means that the development of the tertiary industry after the implementation of the policy did not affect the primary industry but increased the gross product. Second, the development of rural tourism cooperatives sustainably promoted the gross product of the county. In the first year of implementation, the gross product increased significantly, and during the following years, the magnitude of the positive effect had been further enlarged. Third, the development of rural tourism cooperatives contributed to an increase in the gross product of the tertiary industry, per capita GDP, and employment on the county level, despite a time lag. During the first year, the changes in these three indicators were trivial but in the following year, they improved substantially. Fourth, developing rural tourism promoted year-end loan balance, improved the loan level of rural residents, and increased their productive investment, thereby improving the county-level economic development and employment.

Based on the findings, we would like to propose two policy recommendations. First, promote rural tourism cooperatives and set up support systems. By analysing the impact of the

policy issued by Sichuan Province to promote rural tourism cooperatives on the local economy and employment, this study has found that the policy was able to produce positive effects within one year of implementation, and further boost the benefits for the following years. Therefore, it would be helpful to replicate this policy in other provinces and cities in China by establishing prerequisite facilities. Moreover, unlike the traditional tourism industry, rural tourism is less restricted by natural resources and its covered range of tourists is relatively small. Therefore, it can promote farmers' income in a relatively short period of time and increase employment in rural areas. This is of great importance for poverty alleviation and the improvement of people's wellbeing. Second, promote the development momentum and infrastructure construction in rural areas. Rural infrastructure, such as rural energy and agricultural technology service facilities, rural transportation and communication facilities, and rural financial credit insurance, will add to rural tourism. In addition to government financial support, cooperatives themselves should also consider the construction of local infrastructure and improve the external service quality of rural tourism and the experience of tourists. The benefits of improving local infrastructure are twofold. It will not only optimise the development of rural tourism and increase the income of farmers but also improve the living conditions of villagers, introduce modern civilization into the countryside, transform traditional agriculture, and achieve industrial upgrading. This development momentum will further attract new projects and promote economic growth in the district.

## References

- Aref, F., Gill, S.S. (2017), "Rural tourism development through rural cooperatives", *Nature and Science*, Vol. 7, No 10, pp.68-73.
- Fleischer, A., Pizam, A. (1997), "Rural tourism in Israel", *Tourism management*, Vol. 18, No 6, pp.367-372, doi: 10.1016/S0261-5177(97)00034-4.
- Fleischer, A., Tchetchik, A. (2005), "Does rural tourism benefit from agriculture?", *Tourism management*, Vol. 26, No 4, pp.493-501, doi: 10.1016/j.tourman.2003.10.003.
- Heckman, J., Ichimura, H., Smith, J., Todd, P. (1998), *Outreach: Characterizing selection bias using experimental data*, National bureau of economic research.
- Hoken, H., Su, Q. (2018), "Measuring the effect of agricultural cooperatives on household income: Case study of a rice-producing cooperative in China", *Agribusiness*, Vol. 34, No 4, pp.831-846, doi: 0.1002/agr.21554.
- Li, B.B., Mi, Z.Y., Zhang, Z.H. (2020), "The contribution of leisure agriculture to the development of rural economy and its influence mechanism: Taking the national leisure agriculture and rural tourism demonstration counties as an example", *Economic Geography*, Vol. 40, No 02, pp.154-162, doi:10.15957/j.cnki.jjdl.2020.02.017, [in Chinese].
- Li, S.X., Zhang, H.Q. (2018), "Research on the path of poverty alleviation by tourism in Wumeng Mountainous Area of Sichuan Province", *Rural Economy and Technology*, Vol. 29, No 14, pp.170-171, [in Chinese].
- Paresishvili, O., Kvaratskhelia, L., Mirzaeva, V. (2017), "Rural tourism as a promising trend of small business in Georgia: Topicality, capabilities, peculiarities", *Annals of Agrarian Science*, Vol. 15, No 3, pp.344-348.
- Qi, C.A. (2020), "Research on the poverty reduction effect of the transfer of rural labor force in China", *Technological Economy and Management Research*, No 09, pp.102-105, [in Chinese].
- Qu, X.S. (2017), "Research on the impact of tourism cooperatives on rural tourism - based on the perspective of community self-organization capacity building", *World Agriculture*, No 09, pp.163-170, doi:10.13856/j.cn11-1097/s.2017.09.026, [in Chinese].
- Shi, D.Q., Ding, H., Wei, P., Liu, J.J. (2018), "Can smart city construction reduce environmental pollution?", *China Industrial Economics*, No 06, pp.117-135, doi:10.19581/j.cnki.ciejournal.2018.06.008, [in Chinese].
- Wang, C.C. (2016), "Research on the influencing actors of the governance mechanism of rural tourism professional cooperatives, electronic", scholarly journal, *M.Sc. Thesis*, Shandong University, available at, <https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CMFD&dbname=CMFD201701&filename=1016204137.nh&v=MPNh1QtvQQEqK6raq3c99mK%25mmd2FagOjYjGSWrSkcuTvOA0hLuvaXQUz%25mmd2FuASAOXI%25mmd2BI0u>, [in Chinese], referred on 02/01/2019.

- Wang, C.H. (2015), "Efficiency, fairness, trust and satisfaction: the path choice for the development of rural tourism cooperatives", *China Rural Economy*, No 04, pp.59-71, [in Chinese].
- Wang, J.X. (2010), "Research on the impact of rural tourism development on local farmers' employment - taking Nanjing Jiangxinzhou as an example", *Guangdong Agricultural Sciences*, Vol. 37, No 12, pp.166-169, doi:10.16768/j.issn.1004-874x.2010.12.077. Chinese.
- Xu, X.C. (2018), "Re-discussion on the practical exploration of rural tourism cooperatives", *China Farmers' Cooperative*, Vol. 03, p.52, [in Chinese].
- Yang, Y.L. (2017), "Research on the siphon effect of tourism industry: Taking Lijiang city as an example, electronic", scholarly journal, *M.Sc. Thesis*, Yun'nan University, available at <https://kns.cnki.net/kcms/detail/detail.aspx?dbcode=CMFD&dbname=CMFD201902&filename=1017218567.nh&v=6z1mn2IQ7n5JegmtuN9Bjxz10D6IitasR%25mmd2FBfiyv9uiSdhO8rLTHs4D9xmE7DXEWt>, [in Chinese], referred on 18/08/2019.
- Ye, Y. (2014), "Research on the influence of rural tourism economy on the "Three Agricultures"", *Hubei Agricultural Sciences*, Vol. 53, No 19, pp.4769-4773, doi:10.14088/j.cnki.issn0439-8114.2014.19.068, [in Chinese].
- Yin, Y. (2017), "Research on the development status and countermeasures of rural tourism cooperatives in Sichuan Province", *Journal of Sichuan Administration Institute*, No 04, pp.81-85, [in Chinese].
- Zhang, Z. (2019), "The influence of rural tourism on the employment of rural labor force and its path", *Shandong Social Sciences*, No 07, pp.143-147, doi:10.14112/j.cnki.37-1053/c.2019.07.023, [in Chinese].

## SIČUANO KAIMO TURIZMO KOOPERATYVŲ POVEIKIS VIETOS EKONOMIKAI IR UŽIMTUMUI

Tianyuan Jiang, Shuangyue Shangguan, Zuyi Fang, Xiangming Fang

### SANTRAUKA

Kaimo turizmas yra reikšmingas skatinant kaimo pramonės plėtrą ir atgaivinimą, integruojant pirminę, antrinę ir tretinę pramonę. Išanalizavus 2015–2018 m. Sičuanų provincijos apskričių lygmens panelinius duomenis ir pritaikius skirtumų skirtumo (DID) metodą su polinkio balų atitikimo (angl. *PSM*) metodu, šiame darbe nagrinėjamas kaimo turizmo kooperatyvų steigimo Sičuanų provincijoje politikos poveikis apskričių lygmens ekonominiams vystymuisi ir užimtumui, taip pat galimi poveikio mechanizmai. Išvados atskleidė, kad kaimo turizmo kooperatyvų plėtra: (1) padidino pirminės pramonės bendrąjį produktą, tretinės pramonės bendrąjį produktą, taip pat bendrąjį produktą, tenkantį vienam gyventojui, ir užimtumą apskričių lygmeniu be turizmo sektoriaus sukulto sifono efekto; (2) tvariai paveikė pirminės pramonės bendrojo produkto skatinimą apskričių lygmeniu; (3) laikinai paveikė tretinės pramonės produkcijos vertę, BVP, tenkantį vienam gyventojui, ir užimtumo didinimą apskričių lygmeniu; (4) apskričių lygmeniu skatino paskolų likutį metų pabaigoje, didino paskolų kaimo gyventojams lygį ir investicijas į gamybą; taip gerinta ekonominė plėtra ir užimtumas.

*REIKŠMINIAI ŽODŽIAI:* kaimo turizmo kooperatyvai; apskrities lygmens ekonomika; užimtumas; politikos vertinimas.