

An Empirical Analysis on the Relationship Among Urbanization, Farmers' Income and Rural Fixed Asset Investment in the Western Regions of China

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Abstract

The relationship among the growth of farmers' income, urbanization and rural fixed asset investment in the western region are empirically analyzed using the panel data of 11 provinces from 2000 to 2011. Results shows that the urbanization and rural fixed-asset investment in the western region can stimulate the growth of farmers' income on the whole and have a long-term stable relationship with it. Meanwhile, these results also suggest that there exist some discrepancies in the ability of promoting farmers' income between the urbanization and rural fixed-asset investment in western region from different provinces. In addition, the sown area of the crops has little effect on the farmers' income in the west of China. Under this basis, this paper also gives some relevant policy suggestions to promote the farmers' income by urbanization.

Key words: Western China; Urbanization; Fixed-assets investment in rural; Farmers' income

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INTRODUCTION

As some people say, the most promising potential of China in the future is the urbanization. According to the developmental law and tendency of the global economy, the development of the city and the advancement of urbanization are the core of the contemporary economic development. Meanwhile, the urbanization is the main power will contribute China's economic take-off (Black & Henderson, 1999). As the strategic breakthrough of reformation in our country, the urbanization is a main way to accelerate the urbanization construction and promote the coordinated development of urban and rural areas in China. Due to the limitation of their history, society, natural conditions, religious, ethnic and the political problems, there exists many difficulties in current economic construction and development, such as the function of economic growth impetus are still not strong enough and the rural poverty population distribution is relatively concentrated.

We found that the western industrialization was depending on the urbanization in the western region and it was also the important method to solve the problem of poverty as well as an important way for the sustainable development in the west China (Wang, 2011). As we all know, recently, The Third Plenary Session of 18th CPC Central Committee has pointed out that we should insist on a new path of urbanization with Chinese characteristics, promote the human-centered urbanization and the coordinated development among the big and medium cities and the small towns, accelerate the speed of amalgamation between industry and town and stimulate the coordinated advance of urbanization and the new rural construction.

In the aspects of the urbanization development level, the eastern region accounted for 45.3% of all the country in 2000, the central region was 29.7%, while the western region was 28.7%, we could easily found that there was 16.6 percentage points difference between the areas in

western China and the eastern China; The eastern region in 2009 was the highest at 56.7%, the central region was 42.3% and the western region was 39.4%, there was 17.3% difference between the western and eastern (Wang, 2011). The western region urbanization rate was 10.7% average increase from 2000 to 2009, At the same time, the per capita net income of farmers had a sharp increase from 2,253 yuan in 2000 to 7,917 yuan in 2012, which increased nearly by 3.5 times. But, in fact, the urban and rural residents income showed a trend of increasing that the gap of them was a rapid rise from 2.8:1 to 3.1:1. With the rapid growth of Chinese economy, the gap of income between urban and rural areas is not the reason why the urban residents income growing so fast, but the farmer real disposable income growing too slow, the rural was not fully enjoying the achievements brought by the economic growth, and which incurred more and more serious problems of "agriculture, rural areas and farmers". According to our research, there are many factors restricting the increase of farmers' income, one of the two most important reasons is that the differences between industrial and agricultural product price "price scissors", Besides, the other one is that the urbanization development is comparatively inferior (Ma & Gong, 2010). And urbanization can help the rural population quickly transfer into non-agricultural population. On the one hand, it can evaluate the conflict between the limitation of rural land and overpopulation, providing the family farms, peasants' cooperatives and other new type of the subjects of agricultural management with the achievement of production and marketing of large-scale, intensiv and commercialization as well as the integration of land such as the agricultural production resources, it also make the factors of production transfer freely and spread the advanced producing technology in development and application widely. On the other hand, the increasing of non-farm payroll can expand the scale of consumer market of agricultural products, and promote its peripheral area's industry structure. With increasing of the surrounding farmers entrepreneurial opportunities and other non-agricultural employment income, the harmony of urban sustainable development can come true, which, therefore, can speed up urbanization, increase farmers' income, and will be the important way to solve the poverty problem in western rural region.

1. LITERATURE REVIEW

Against the existing dual economic structure in the developing countries, Lewis (1954) built a model of dual economic development to analyze the results of this situation. In his opinion, he thought it was the main reason for the relative poverty and backwardness and he also pointed out that the rural labor transfer into urban industry was the only way to improve agricultural productivity and farmers' income; Todaro (1969) modified the Lewis model,

and pointed out that the cause of the urban and rural population migration was not real income gap between urban and rural areas but the "expected income gap", as long as the expected income in cities and towns surpass the real income of farmers, the transferring process could make a sustained growth of farmers' salary income. Domestic scholars on reviews of the urbanization and the problem of "agriculture, rural areas and farmers" have been studied for a long time, some of domestic scholars like Wu (2002), Jiang and Chen (2013), Li and Fu (2014) believed that it is the main driving force for the growth of Chinese economy and it also the important measures to solve the problem of "agriculture, rural areas and farmers" to speed up the pace of urbanization and the basic way for shifting surplus rural labor to towns or industry. Wang (2010) also believed that the urbanization is the focus of the changing of economic development mode in Chinese economy and discussed the problems of urbanization construction and development mechanism. Lu (2006), who insisted that, from the macroscopic aspect, there was some positive effects between the urbanization in western region and the western farmers' income, and it will exist a lot of negative effects while under unscientific policy, so in order to accelerate advancing reasonable urbanization and increase the western farmers' income, we should spare no effort to deal with the relationship between the urbanization in western region and the western farmers' income.

Cheng (2005) also drew a similar conclusion, he pointed out that if the system measures were unscientific or unreasonable, there will be a negative correlation between the urbanization and farmers' income. Most scholars mainly use econometric regression model to depict the dynamic correlation between urbanization development and the growth of farmers' income by using the empirical method (Zuo & Cao, 2012; Wang & Peng, 2013). While Xie (2010), Liang Chunmei and Dong (2010) was using the co-integration test, Granger causality test and ECM model to analyze the farmers' income and the level of urbanization, Wu (2011) was using multiple regression of time series and panel data to test urbanization and urban-rural income gap.

A lot of the research about the farmers' income and urbanization having been done by domestic and foreign scholars, but these studies tended to focus on only one aspect. In fact, most of the researches were based on the qualitative analysis and it simply made a regression analysis on the urbanization and farmers' income where there was unable to control the influences of other important variables and lack of economic theory as well. According to many researches, urbanization and the increasing of farmers' income is not a simple correlation positive or negative correlation and it also not include only one variable that the urbanization rate, at different periods of economic growth and urbanization development level will lead to a different influence on the

degree of the farmers' income. Our research will use the econometric methods concluding 11 provinces and cities in the western China to discuss the relationship between the development of urbanization and farmers' income and analyze their impact by using time series data and panel data.

2. METHODOLOGY

2.1 Model Specification

In the econometric model, this paper studies the effect of urbanization on the growth of farmers' income by using the traditional analysis framework of the total production function where the urbanization rate is treated as an "input" used in the production process. This method has been adopted by most researchers, including Dr Leder (1982), Greenwood and Jovanvic (1990), Odedokun (1992, 1996), Pagano (1993), Murinde (1994), Tao, Ran, and Xiong (2005), etc.. And based on this condition, this paper gives the agricultural output production function to reflect urbanization rate as follows :

$$Y=(K, L, U, S) . \quad (1)$$

Among them, Y represents the agricultural output, K represents the total agricultural capital investment, L represents labor input, U represents the urbanization level, S represents the land area. In Equation (1), some common choices are made by the related existing researches (Chen & Chen, 2013; Yao, 2012; Li, 2012) etc. was using the proportion of urban population to represent the urbanization rate and per capita net income of rural farmers to represent the farmers income. Ma and Gong (2010) who not only set the indicators that the new urbanization rate, per capita net income of rural farmers and other indicators ,but also used total fixed assets investment in the rural areas to replace the total assets, primary industry employment to substitute the labor input, crop planting area to replace the cultivated Land Area, and add the fiscal expenditure for supporting agriculture to it. Considering all these factors that the researches related and the real situation of urbanization development, this paper choose the factors such as the proportion of urban population and the per capita net income of rural households and rural fixed asset investment and the total sown area of crops. To measure the urbanization level and the related factors of capital and land factor's effect on the growth of output, we input a capacity limit can be L , which is in accordance with the Parente and Prescott (1991):

$$Y=f(K, U, S) \min (L, L^\theta), \theta > 0 . \quad (2)$$

In Equation (2), the m represents the maximum capacity of the economy, once when it achieves a maximum labor capacity, the economy will face a constant return to scale, at the same time, the output will depend on the total capital investment, the urbanization level and the total land area. The Equation (1) will become:

$$Y=mf(K, U, S) . \quad (3)$$

Take the total differential of Equation (3), and get the result:

$$dY = m \frac{\partial f}{\partial K} dK + m \frac{\partial f}{\partial U} dU + M \frac{\partial f}{\partial S} dS . \quad (4)$$

The differential Equation (4) respectively using β_1 instead of the marginal product of capital and β_2 to replace the marginal output of urbanization level, β_3 instead of the marginal output. On both sides divided by m was per capita output growth model:

$$dY/m=\beta_1dK+\beta_2dU+\beta_3dS . \quad (5)$$

The Equation (5) can be used to analyze the relationship between the urbanization level income growth for farmers without considering the government's policy behavior, subsidies and other factors, and the basic econometric model of this study as shown below:

$$dFR_t=\beta_0+\beta_1dK_t+\beta_2dU_t+\beta_3dS_t+ut . \quad (6)$$

The FR represents farmers' income, β_0 represents the constant term, u represents the random error term. Based on Equation (6), for the purposes of demonstrating the relationship between the level of farmers' income and the level of urbanization, we set a vector autoregressive model as follows :

$$FR_t = \beta_0^* + \sum_{i=1}^n \beta_1^* K_{t-i} + \sum_{i=1}^n \beta_2^* U_{t-i} + \sum_{i=1}^n \beta_3^* S_{t-i} + u_t^* . \quad (7)$$

2.2 Data Type and Sources

The variables and data that in this study involves are the farmers' income, capital investment, urbanization level, land farming area, and the all data before 2004 are taken from the new China 60 years statistical data collection, and the data between 2005 and 2012 are from the China statistical yearbook, the data that total fixed assets investment in the countryside is from the rural China statistical yearbook, and some missing data are from the statistical yearbook of provinces and cities. Considering the changes of price level year by year, using the year 1980 as the basic period (1980 = 100) to eliminate the per capita net income of farmers (FR) influenced by the price factors, capital investment is equal to the rural fixed asset investment (K) divided by the first industrial jobs and land area is equal to the total sown area of crops (S) divided by the first industrial jobs. This study select 11 provinces and cities in the western region (excluding Tibet), including Chongqing (CQ), Sichuan (SC), Yunnan (YN), Guizhou (GZ), Inner Mongolia (NMG), Guangxi (GX), Xinjiang (XJ), Shaanxi (SX), Gansu (GS), Ningxia (NX), Qinghai (QH). In order to eliminate heteroscedasticity, it needs to take logarithm of each variable separately, labeled as $\ln FR$, $\ln U$, $\ln K$ and $\ln S$. Figure 1 and Figure 2 show per capita net income of rural residents and urbanization rate of the provinces autonomous regions and municipalities directly under the central government, respectively.

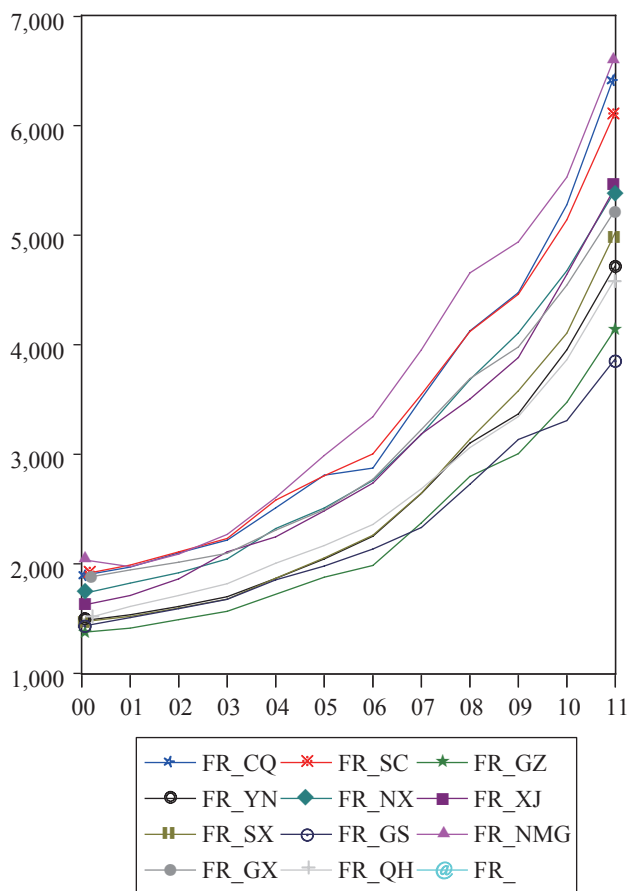


Figure 1
Per Capita Net Income of Rural Residents
 Note. The vertical axis to the real income of farmers of each province, unit: RMB yuan

According to the picture, the urbanization rate of each province, autonomous region and municipality in western and per capita income of farmers are rising year by year. urbanization rate in China was 51.27% in 2011, there only two cities that Chongqing and Inner Mongolia was more than the national average, which reached 55% and 57% respectively, the other provinces was under the level of national urbanization, and the city with the lowest rates of urbanization was Guizhou province, which was only 34.96% in 2011. The per capita net income of farmers in west China increased by an average of 3.2 times, but there still existed differences between different provinces, the highest per capita income of farmers was in Inner Mongolia, which reached 7,611 yuan, while the lowest is in Gansu province, which was only 4,495 yuan, and according to the statistics, the provinces was under the national average of 6,977 yuan excepted Inner Mongolia.

3. EMPIRICAL RESULTS

3.1 F-Test

The panel data has advantage over both cross section data and time series data that based on qualitative research

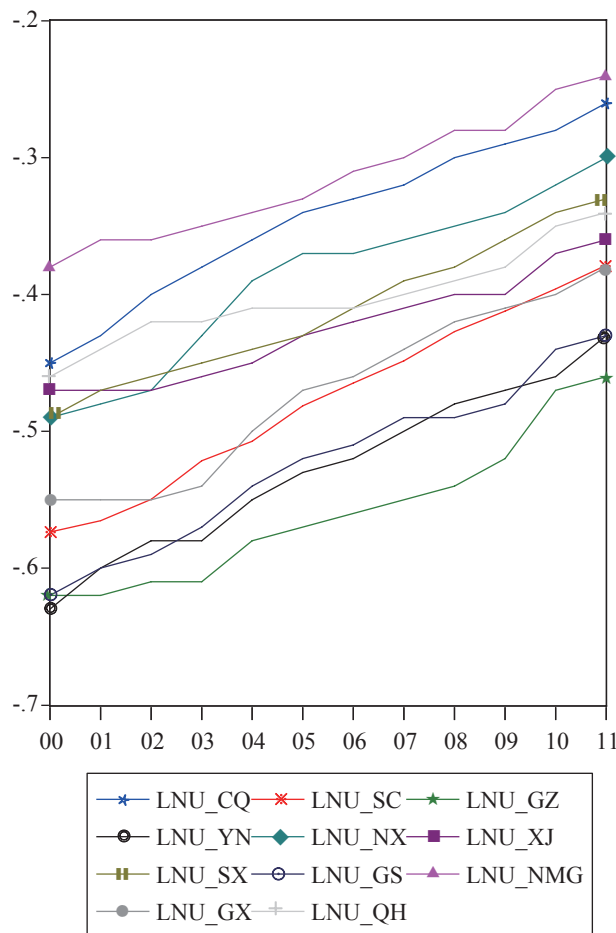


Figure 2
The Urbanization Rate
 Note. The vertical axis to the urbanization rate of each province.

of regional structure, because the panel data increases the degree of freedom significantly, which makes the statistical inference more effective; By increasing the number of samples at the same time can highly improve the ability of data analysis and the ability of interpretation of the model. In view of the advantage of the panel data, we can draw lessons from the method of panel data model setting. First of all, constructing F statistic to decide which is better between the mixed regression model and individual fixed effects regression model. There are two main assumptions as follows:

Hypothesis 1: all coefficient of every cross section are the same, while their intercepts are different.

$$H_1: Y_{it} = \alpha_i + X_{it}\beta + u_{it} \quad (8)$$

Hypothesis 2: all the intercept and coefficients in different cross sections are the same.

$$H_2: Y_{it} = \alpha + X_{it}\beta + u_{it} \quad (9)$$

Obviously, if accepted the hypothesis 2, there is no need for a significant test next. But if refused to the hypothesis 2, you should test the hypothesis 1 and judge whether the coefficients are the same, and if refused to hypothesis 1, you should select the model with variable coefficient. So the F statistics of H_2 are as follows:

$$F_2 = \frac{(S_3 - S_1)/(n-1)(K+1)}{S_1/[nT - n(K+1)]} \sim F[(n-1)(K+1), n(T-K-1)] \quad (10)$$

The F statistics of H_1 :

$$F_1 = \frac{(S_2 - S_1)/(n-1)K}{S_1/[nT - n(K+1)]} \sim F[(n-1)K, n(T-K-1)]. \quad (11)$$

Among them, S_1, S_2, S_3 represent unconstrained regression residual sum of squares, the sum of squared residuals of individual fixed effects regression model and the sum of squared residuals of mixed regression model respectively. And the test results of F value shows in the Table 1:

Table 1
The Test Results of F Value

$S3$	$S2$	$S3$	$(n-1)(k+1)$	$n(T-K-1)$	$(n-1)K$	$F1$	$F2$
0.7054	0.1050	0.0248	40	88	30	2.2405	60.3758

Find out F distribution and get the critical value under the significance level of 5%:

$$F_2(40,88)=1.5314, \quad F_2(30,88)=1.5888.$$

Because of F_2 is greater than the critical value, therefore, we decline to accept corresponding original hypothesis when under the significance level of 5%, and continue to test the H_0 hypothesis; but the F_1 Statistic is also greater than the critical value, we refuse to accept the corresponding original hypothesis H_0 .

3.2 Hausman Test

Based on the above analyses, the variable coefficient model should be adopted, and under this basis, we need to take further step to determine whether adopting the fixed effects model or random effects model by using Hausman test. As the Table 2 shows, the P value is 0.0004, and it rejects the original hypothesis when under significance level of 1%, that is to say, we shall choose to build the fixed effects model.

Table 2
The Result of Hausman Test

Statistics	P value
18.4706	0.0004

The basic form of model:

$$\ln FR_{it} = \varphi_i + \ln \beta_1 K_{it} + \beta_j \ln U_{it} + \ln \beta_k S_{it} + \varepsilon_{it} \quad (12)$$

and $I, j, k=1, 2, \dots, 11; t=2000, 2000, \dots, 2011$.

3.3 Unit Root Test and Co-Integration Test

In order to avoid spurious regression phenomenon, we will make unit root test of panel data and Co-integration test in the following, with the aim of testing the stability of each variable and the stability of the econometric model. This paper uses the method such as levin method (LLC) and Madeira method (PP) to make the unit root test, if both tests pass the test under the significant level of 10%, we will conclude that there is no unit root.

Looking up the test results in the following chart, we can easily find the rural fixed asset investment, proportion of urban population, per capita net income of farmer households and crop planting area all have unit root. In view of the non-stationary variables, we choose to use finite difference method, and use Δ LNFR, Δ LNU, Δ LNK, Δ LNS to be the first order differential score for relevant variables respectively. In Table 3, we can find all the data tend to become stable after first-order difference transformation under the significant level of 1% and it is also the integrated of order one.

Table 3
The Results of Unit Root

Variables	Method of significance test		Test type	Result
	LLC	PP		
LNFR	1.9024	0.0063	Have linear trend term and constant	no
	0.9714	1.0000	Have linear trend term and constant	
Δ LNFR	-4.9772	54.1698	Have linear trend term and constant	yes
	0.0000	0.0007	Have linear trend term and constant	
LNU	-0.4172	15.8213	Have linear trend term and constant	no
	0.6617	0.8247	Have linear trend term and constant	
Δ LNU	-10.1396	89.9588	Have linear trend term and constant	yes
	0.0000	0.0000	Have linear trend term and constant	
LNK	7.8998	0.8169	Have linear trend term and constant	no
	1.0000	1.0000	Have linear trend term and constant	
Δ LNK	-3.9017	32.5347	have linear trend term and constant	yes
	0.0000	0.0687	Have linear trend term and constant	
LNS	0.03355	6.8109	Have linear trend term and constant	no
	0.5134	0.9992	Have linear trend term and constant	
Δ LNS	-8.3993	80.7591	Have linear trend term and constant	yes
	0.0000	0.0000	Have linear trend term and constant	

According to results of the panel unit root test in the above chart, we can make Co-integration test by using the panel data in the western region. This paper uses the method of Pedroni, Kao, and Fisher based on Johanson Co-integration test to make Co-integration and the test results are shown in Table 4, it can be seen from the Table 4 that the six indexes based on the test of Kao and Pedroni exist Co-integration relationship except ρ indicator when

under the significant level of 1%, and Fisher test exist one collaborators integral equation. When we omit the factor of investment, taking Co-integration test of farmers' income and the urbanization level alone, we also find that the urbanization development and farmers' income still exist a long-term equilibrium relationship that this relationship is stable, while we take FR, K and S to make Co-integration test separately, also find that there exist a co-integration relationship between them, and they also have a long-term equilibrium relationship. So we can conclude that there have a stable relationship among the farmers' income level, urbanization level, capital investment and land farming area.

Table 4
The Result of Co-Integration Test

Test method	Statistic	P value
Panel data ν	2.158779	0.0154
Panel data ρ	-1.018761	0.1542
Panel data (non-parametric estimation)	-2.172001	0.0149
Pedronia Panel data t (parametric estimation)	-2.856105	0.0021
group ρ	0.286079	0.6126
Group t (non-parametric estimation)	-2.277197	0.0114
group t (parametric estimation)	-2.991932	0.0014
Kao base on EG	-2.232493	0.0128
Fisher (base on Johanso n) none	112.1	0.0000
at least one	31.19	0.0923

4. ANALYSIS OF REGRESSION RESULTS

The parameter estimates of panel data regression can be seen from the Table 5, from the next chart, adjusted R Square is 0.9876, P value of the significance test of regression equation is 0.0000, which shows that the goodness of fit of the regression is very perfect, and most of estimated coefficients of the provinces are highly significant under the significance level of 10%, DW test for first-order serial correlation, assuming no random effects, is 1.7434, showing that there is no first order serial correlation, that is to say, the overall effect of the model is good.

You can see from the Table 6, the estimates of the constant term C are 2.9678, and the t value is significant, it shows that the 11 provinces of western regions are positive. The urbanization and rural fixed asset investment can promote increasing the farmers' income. While in the Table 6, the value of the fixed effects of Chongqing and Guizhou province in the southwest of China and

Table 5
The Provinces' Intercept Estimates

Province	Constant
Chongqing	-0.195108
Sichuan	0.920046
Guizhou	-0.028922
Guangxi	0.970682
Yunnan	0.023521
Ningxia	-0.273692
Xinjiang	-0.588314
Shanxi	-0.365562
Gansu	0.046580
Inner Mongolia	-1.042495
Qinghai	0.533263

other provinces like Shaanxi, Ningxia, Inner Mongolia and Xinjiang in the northwestern region are negative, because of their income comes mainly from salary income of migrant workers, these farmers spontaneous fixed income is negative. And the province like Sichuan, Yunnan, Guangxi in the southwest and Qinghai, Gansu in the northwestern region is positive, because of their income comes mainly from rural household business income, which greatly depends on the regional economic development level and agricultural population. Although the rapid economic development in southwest China, which provides plenty of rural migrant jobs, the agricultural population basis is so huge and most of the farmers' income is given priority to the income of household operation, so the per capita income is not high. And in recent years, with the deepening of the national western development strategy implementation, the northwest region's economic have got a big stride, the number of farmers going out for jobs is increasing, so the farmers' income is not only depending on the income of household operation, their living standard has been greatly improved.

The data in the Table 6 shows that the elasticity coefficient of urbanization of each province, elasticity coefficient of rural fixed asset investment and the elastic coefficient of land displaying a marked difference. The urbanization elasticity coefficient is up to 1.5661 in Qinghai, and the lowest is in Xinjiang at 0.1981; While the rural fixed asset investment elasticity coefficient is up to 0.4284 in Xinjiang, and the lowest is Qinghai at 0.0627; Inner Mongolia land marginal output is up to 1.2512, and the lowest is Gansu, which is only 0.5228.

On the whole, the elastic coefficient of urbanization is positive which showing that the urbanization has an obvious promoting effect on the growth of farmers' income, though Guizhou province and Xinjiang don't pass the test under the significance level of 10%. The elastic coefficient of urbanization in Qinghai is the highest at 1.5661, followed by are Sichuan and Inner Mongolia, they

reach 1.3608 and 1.3574, respectively, which means that the urbanization rate increased by 1%, and the growth of farmers' income in Xinjiang, Guangxi and Guizhou are 1.5661%, 1.3608% and 1.5661%, respectively. But the *t* value in Guizhou province and Xinjiang province don't pass the test, showing that urbanization is not the main factors to influence the farmers' income in the two provinces.

On the one hand, in the process of urbanization, many rural residents do not really become urban residents and directly benefit from the development of urbanization, and their salary, children's education are usually treated with discrimination, they also need to pay a lot for their jobs and living. On the other hand, because the industrialization development degree in their hometown is too low, and with a single function, incomplete system, low level of development in service, making it too difficult to absorb the rural labor force and increase farmers' income.

The elasticity coefficient of rural fixed asset investment of the provinces passes the *t* test under significance level of 10% and they are positive in addition to Yunnan, Shaanxi, Inner Mongolia and Qinghai, which shows a the long-term investment in fixed assets in rural having a promoting effect on the growth of farmers' income. Because of the size of investment in fixed assets having a close relationship with the strength of the local finance, the economic strength in southwest of China is better than the northwest regions, and the ability of farmers' income is naturally superior to the northwest. But in the western region, some problems

of the investment in fixed assets in rural such as repeated investment, inadequate investment will seriously reduce the efficiency of investment, at the same time, because of small scale of investment in fixed assets in rural and the huge rural population, making it is difficult to generate economies of scale to support the agriculture.

The elastic coefficient of land in addition to the southwest region of Chongqing, Sichuan, Guizhou and the northwest region of Ningxia, Xinjiang and Gansu, other provinces in western China are positive, and *t* value only in Guizhou, Xinjiang, Shaanxi and Inner Mongolia can pass the test of significance, which shows that the land is not the main factors to influence farmers' income in the western region because of the land in the western region is vast, there exists many difficulties such as the weak ecological regions, difficult exploitation and soil erosion, desertification, salinization due to the Qinghai-Tibet plateau, Loess plateau and Yunnan-Guizhou plateau, meanwhile, the nature, history, economic and social factors may be the important reasons to effect it. And the mode of production that lack of economic scale and intensive production may lead to the low utilization ratio and productivity (Liu, 2006). But this is not to say that the land is useless, the land is still the most stable safeguard for farmers' living. Considering the ecological protection, food security and rural stability, and many other factors, strictly protect the arable land still has a vital significance.

Table 6
The Results of Regression Model

Variable	Coefficient	Std. error	<i>t</i> -statistic	Prob.	
<i>C</i>	2.967812	0.154119	19.25666	0.0000	
_CQ—LNK_CQ	0.345408	0.041089	8.406396	0.0000	
_SC—LNK_SC	0.076920	0.034763	2.212688	0.0295	
_GZ—LNK_GZ	0.267914	0.051621	5.190032	0.0000	
_YN—LNK_YN	0.065299	0.064667	1.009773	0.3154	
_NX—LNK_NX	0.286277	0.075445	3.794490	0.0003	
Rural fixed asset investment	_XJ—LNK_XJ	0.428426	0.081056	5.285551	0.0000
	_SX—LNK_SX	0.170399	0.106774	1.595884	0.1141
	_GS—LNK_GS	0.129662	0.031187	4.157621	0.0001
	_NMG—LNK_NMG	0.125486	0.076549	1.639305	0.1047
	_GX—LNK_GX	0.106958	0.030833	3.468927	0.0008
	_QH—LNK_QH	0.062742	0.074263	0.844868	0.4005
	_CQ—LNU_CQ	0.756947	0.267988	2.824556	0.0059
	_SC—LNU_SC	1.360779	0.328138	4.146970	0.0001
	_GZ—LNU_GZ	0.478835	0.304693	1.571532	0.1196
	_YN—LNU_YN	1.327947	0.495255	2.681338	0.0088
Urbanization rate	_NX—LNU_NX	0.602432	0.322984	1.865207	0.0655
	_XJ—LNU_XJ	0.198057	0.597899	0.331256	0.7412
	_SX—LNU_SX	1.131695	0.519105	2.180089	0.0319
	_GS—LNU_GS	0.531586	0.146109	3.638287	0.0005
	_NMG—LNU_NMG	1.357393	0.438505	3.095504	0.0026
	_GX—LNU_GX	1.031718	0.144176	7.155949	0.0000
	_QH—LNU_QH	1.566127	0.711326	2.201701	0.0303

To be continued

Continued

Variable	Coefficient	Std. error	t-statistic	Prob.
_CQ—LNS_CQ	-0.327284	0.298164	-1.097662	0.2753
_SC—LNS_SC	-0.088508	0.474016	-0.186719	0.8523
_GZ—LNS_GZ	-0.312104	0.113682	-2.745421	0.0073
_YN—LNS_YN	1.169374	0.804564	1.453427	0.1497
_NX—LNS_NX	-0.124846	0.181081	-0.689447	0.4924
Sown area of the crops				
_XJ—LNS_XJ	-0.376629	0.206209	-1.826444	0.0712
_SX—LNS_SX	0.714246	0.226871	3.148242	0.0022
_GS—LNS_GS	0.133249	0.511847	0.260331	0.7952
_NMG—LNS_NMG	1.251225	0.353317	3.541372	0.0006
_GX—LNS_GX	-0.522756	0.319796	-1.634654	0.1057
_QH—LNS_QH	0.315059	0.262776	1.198966	0.2338
$R^2=0.987554$ $P=0.000000$ $D.W=1.743356$				

CONCLUSION AND POLICY RECOMMENDATIONS

The western region are always the important battlefield for poverty alleviation in China, but the policy bias and the fragility of agriculture cause the injury of interests of farmers, and seriously hamper the growth of rural areas. In this paper, we analyze the relationship between the urbanization and the investment in fixed assets in rural areas by using the panel data of 11 provinces from 2000 to 2011, and then draw the following conclusions. First, the urbanization has a positive effect on the investment in fixed assets in rural areas and they have a long-term stable relationship. Second, for different provinces, urbanization and the investment in fixed assets in rural areas have different influences on the ability of the growth of farmers' income. Third, the investment in fixed assets in rural areas and arable land also plays a role on farmers' income, but the effect is small. In view of the above analysis, we put forward some policy suggestions as follows.

Firstly, reform urban-rural dual structure, continue to deepen the reform of household registration system and establish migrant workers' protection mechanisms. Because urban-rural dual structure is an important systematic bottleneck that restricts the development of our country economic development, and the dual structure of towns and countryside fundamentally hinder the rural labor force transferring to towns, it not only retards the progress of urbanization but also affects the scale operation of agricultural production. So, a) we should accelerate the reformation of urban-rural dual structure and in support of the farmers in western region working in the developed areas, set up the mechanism of urban-rural integration and allow the migrant workers who have a fixed residence in the city or a fixed income to settle down, at the same time, gradually cancel some unreasonable fees such as the fee of urban infrastructure construction in order to reduce the costs of peasants who settle down in cities. b) solve the social security problems properly after farmers working in

the city and provide an equal opportunity with the citizens in some aspects such as pension, unemployment, medical insurance and housing and children education, which can help them quickly integrate into the city life. c) We should refine the reformation of the urban labor employment system, build a unified labor market between urban and rural areas. Improve relevant legal system, improve the transparency of the labor market, reduce the costs of farmers' transaction caused by the information asymmetry and protect the legitimate interests of farmers.

Secondly, we should regulate the investment in fixed assets in rural and increase the investment in agriculture. As we all know, the rural investment in fixed assets is the important material basis in boosting the rural economy and increasing farmers' income. First of all, we should standardize the investment in fixed assets in rural both in the western region and the countryside, mobilise funds to the second and third industry, so as to improve the rate of farmers' employment and achieve the "local urbanization". When compared with eastern and western, the scale and speed of development of the investment in fixed assets lags behind, which lead to the weakness of rural infrastructure and restrict the further development in western rural regions. so, we need to increase investment in national agriculture to strengthen the construction of rural infrastructure, including farmland water conservancy construction, power engineering and rural hardware and software construction. Finally, with scientific planning and layout and reasonable use of investment funds, we can avoid duplication of investment, improve the level of agricultural modernization and the service ability, after which we can make the western rural work "development production, wealthy life, polite rural phenomenon, clean and tidy appearance and democratic management".

Thirdly, urbanization construction and development in different provinces should adopt different patterns. Firstly, because of the different provinces in western have different economic basis, industrialization level, resources endowment and urban scale, it is unfavorable to make the urbanization development pattern of "one size fits

all”, and the pace should be reasonable and adjust the measures to local conditions, and to allow them to adopt diversity, transitional system and policy; Secondly, we should strengthen the linkage between urban and rural areas and entitle farmers more property rights protection, promote the equal exchange of urban and rural elements and balance configuration of public resources, which allow farmers to gain an equal opportunity to take part in the process of modernization construction and share the benefits of modernization. Finally, exploit the advantages in different scale of cities and towns in gathering population, industry, talent, capital, information, etc. so as to accelerate the development of towns in the second and third industry and speed up the cultivation of leading enterprises and township enterprises and the construction of the market, and that can create more employment opportunities, enhance the absorption capacity of towns and economic vitality and promote the effective transfer of rural surplus labor. At the same time, we also need to utilize the driving effects of central cities, exert its agglomeration effect and radiation function, making it absorb the surplus labor adequately in the pastoral area and promote the development of national economy as well.

Finally, the urban land system must protect the rights and interests of farmers as the rural property owner. On the one hand, we should give farmers the property rights of the land contract. The central file no. 1 in 2014 puts forward “to develop various forms of scale operation and establish agricultural land security system”, that is to say, if the industrial and commercial enterprises want to lease farmland, it must be engaged in agriculture, and have to use the form of security to guard against operational risks that may damage the interests of farmers. What’s more, it needs to respect the farmers will, gradually develop a moderate scale management and reach the aim of the land scale and intensive development. On the other hand, we should get further to improve the system of land expropriation and requisition procedures. Because urbanization means changing the land types, however, the rights and interests of land for farmers cannot be fully guaranteed. Therefore, we must standardize the land requisition system. The appreciation income of land from rural land transfer should mainly return to the agriculture and farmers. In addition, in order to well protect the land resources in the western region, we should promote a sustainable utilization of the cultivated land.

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