

## The Empirical Study on the Different Effects on Urban and Rural Consumption by Urbanization in China

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### Abstract

Consumption and urbanization mainly by transferring labor force are important variables in China. The article puts the two into analysis to consider the quality of the urbanization, selecting the data of urbanization rate, average consumption of urban and rural residents, using econometric tools of co-integration analysis, ECM and Granger causality test, and after that the paper finds the effects on urban and rural consumption by urbanization are extremely different: The urbanization rate has a long-term equilibrium relationship with urban residents' consumption, but does not have this relationship with rural one. The dynamic relationship between the urban consumption and urbanization is that the former makes the latter rise up, then the two promote each other, and finally the latter makes the former go up remarkably. Further more, although urbanization influences urban residents' consumption obviously, yet there is a delayed effect. So we should shift the production-factor-oriented urbanization model to people-oriented one, boost the supply of public goods, focus on the development of agricultural sector, increase the income of rural households to expand the consumption of rural residents and improve their qualities of lives.

**Key words:** Urbanization; Household consumption; Disparate impact; People-oriented urbanization

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### INTRODUCTION

With the slowdowns in the growth of recovering economies, the Chinese economy has stepped into "the second season". "Structure adjusting and reform accelerating" become the new means by which the fresh government runs the economy, and the enlargement of domestic demands is emphasized to be the biggest structure adjusting, so urbanization that carries the double responsibilities of achieving modernization and expanding domestic demand has attracted tremendous attentions. Nevertheless, what is the real effect on the demand and life quality of the residents by the Chinese urbanization over the 30 years after the opening up policy? Dose this effect make a significant difference in the urban and rural consumption? Can any defects of this kind of urbanization mode be found from the difference and thus any new approaches of urbanization be explored? This series of questions needs to be answered by theoretical and empirical analysis.

### 1. EXISTING RELATED STUDIES

The study on consumption has always been the core and key points in economics. W. Arthur Lewis pointed out that the rural population would transfer to the cities because of the difference in labor productivity and income between the urban and rural areas, and this trend could boost the consumption of the whole society. Fujita and Venables proved the geographic concentration of population and economic activities would produce versatile positive externalities, such as circulation and accumulated effect of consumption and cost, spillover effect of information technology and sharing effect of labor market and etc., and drew the conclusion that urbanization could enhance consumption and economic growth through agglomeration effect and scale effect.

From different perspectives and by different analysis method, Chinese scholars did research on the effects of

urbanization on consumption, but the conclusions were not the same. Liu (2004) considered the contribution of urbanization to household consumption rate was close to zero since reforming and opening. Wang (2003) found that the rate of urbanization and the rate of household consumption were negatively correlated. Wan Yong's study demonstrated the structure effect and security effect of China's urbanization were not obvious; urbanization enhanced the availability of transaction and convenience of traffic, but did not promote the availability of residents' information and the income distribution between urban and rural areas dampened consumer demand (Wan, 2012). Cai (1999) indicated urbanization and consumer demands were endogenous; to drive consumer demand by the transformation of dual economic structure was not only an effective strategy of development in the long term, but also would have more positive effect in the macroeconomic situation of lack of effective demand. Cai (1999), Li (2007), Tian (2004), Zhang (2010) held the opinions that urbanization had promoted and pushing effects on rural consumption demand.

The existing related studies discussed the relationship between urbanization and residents' consumption, but there still existed some flaws: Firstly, the researches about the disparate impacts on urban and rural consumption by urbanization was very limited. What dose urbanization on earth affect the consumer demand? Currently there is no unified conclusion because of the different data selection and research methods, and it is also closely related to the different effects on urban and rural consumption by urbanization itself. However, this problem has not attracted the scholars' attention. Secondly, these studies rarely focused on how to change the mode of urbanization from the perspective of increasing domestic demand. In fact, because only the factor of consumption that truly reflect the peoples' living conditions can distinguish the people-oriented urbanization and the urbanization of production elements, the people's consumption level becomes the most direct and key criteria to measure the quality of urbanization. This paper will make empirical research on the disparate impacts on urban and rural consumption by urbanization, seek intrinsic relations between urbanization pushing and consumer demand, and finally put forward practical proposals to establish people-oriented mode of urbanization and improve the quality of urbanization.

## 2. MODEL DESCRIPTION, VARIABLE SELECTION AND DATA ACQUISITION

### 2.1 Model Description

We adopt the cointegration theory that was come up with by Engle and Granger, make stationary test on time series, judge whether there is a long-term stable equilibrium

relationship between variables through the co-integration test, then establish error correction model to determine short-term fluctuant equilibrium relationship between variables. The dynamic disequilibrium process of data needs to approximate the long-term equilibrium process of economic theory when setting up the model, and the most general one is Autoregressive Distributed Lag (ADL) Model. We consider the first-order autoregressive distributed lag model, which is denoted by ADL (1,1):

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 x_t + \beta_3 x_{t-1} + \mu_t \quad (1)$$

$$u_t \sim i.i.d(0, \sigma^2).$$

Let  $y^* = E(y_t), x^* = E(x_t)$ , and because  $E(u_t) = 0$ , we take expectations on both sides of the expression and then we get:

$$y^* = \beta_0 + \beta_1 y^* + \beta_2 x^* + \beta_3 x^*,$$

$$y^* = [\beta_0 + (\beta_2 + \beta_3)x^*] / (1 - \beta_1) = \beta_0 / (1 - \beta_1) + (\beta_2 + \beta_3)x^* / (1 - \beta_1).$$

Denote  $k_0 = \beta_0 / (1 - \beta_1), k_1 = (\beta_2 + \beta_3) / (1 - \beta_1)$ , and the upper expression can be written as:

$$y^* = k_0 + k_1 x^* \quad (2)$$

$k_1$  measures the long-term equilibrium relationship between  $y_t$  and  $x_t$ , and it is also the long-term multiplier of  $y_t$  about  $x_t$ .

From Equation (1) we get:

$$\Delta y_t = \beta_0 + (\beta_1 - 1)y_{t-1} + \beta_2 \Delta x_t + (\beta_2 + \beta_3)x_{t-1} + u_t$$

$$= (\beta_1 - 1)(y_{t-1} - k_0 - k_1 x_{t-1}) + \beta_2 \Delta x_t + u_t \quad (3)$$

Let  $\alpha = \beta_1 - 1$ , and then Equation (3) can be written as:

$$\Delta y_t = \alpha(y_{t-1} - k_0 - k_1 x_{t-1}) + \beta_2 \Delta x_t + u_t \quad (4)$$

In error correction model (4), when the long-term equilibrium relationship is expression (2), error correction term is the form like  $y_t - k_0 - k_1 x_t$ , and it reflects the short-term deviation of  $y_t$  about  $x_t$  in the phase  $t$ .

## 2.2 Variable Selection and Data Acquisition

### 2.2.1 Variable Selection

In this paper, the process of urbanization is expressed as urbanization rate (denoted as "u"), and urbanization rate is expressed by the proportion of urban population to the whole population:  $u = \text{urban population} / \text{whole population}$ ; the consumption demand of urban and rural residents are expressed as per capita consumption expenditure of urban and rural residents, and consumption demand of rural residents and urban residents are denoted as "ncc" and "czc" separately.

### 2.2.2 Data Acquisition

The data of urbanization rate "u", consumption demand of rural residents and urban residents "ncc" and "czc", all come from *China Statistical Yearbook* (1978-2011), which are shown in Table 1. To remove the dependence in the time series, transform the non-linear relationship to linear one, reduce the extreme values of variables, non-normal distribution and heteroscedasticity, we firstly take the logarithm of the three time series-u, ncc and czc, and the new generated series are denoted as lnu, lnnc and lnczc separately.

**Table 1**  
The Data of Urbanization Rate and Consumption Demand of Rural Residents and Urban Residents During 1978-2011

Year	<i>u</i>	<i>ncc</i>	<i>czc</i>	Year	<i>u</i>	<i>ncc</i>	<i>czc</i>
1978	17.92	100.0	100.0	1995	29.04	282.9	303.2
1979	18.96	106.5	102.8	1996	30.48	323.8	313.6
1980	19.39	115.4	110.2	1997	31.91	334.0	320.4
1981	20.16	126.8	114.6	1998	33.35	338.1	339.2
1982	21.13	138.3	115.4	1999	34.78	355.3	363.0
1983	21.62	153.1	117.9	2000	36.22	371.3	391.1
1984	23.01	172.8	127.2	2001	37.66	388.0	406.3
1985	23.71	195.7	141.3	2002	39.09	408.1	426.2
1986	24.52	200.3	150.8	2003	40.53	409.5	456.1
1987	25.32	210.0	159.3	2004	41.76	426.7	487.7
1988	25.81	221.0	174.7	2005	42.99	472.8	511.8
1989	26.21	217.2	176.0	2006	44.34	511.6	552.7
1990	26.41	215.4	190.9	2007	45.89	546.8	606.2
1991	26.94	227.1	211.4	2008	46.99	593.5	647.9
1992	27.46	246.5	245.3	2009	48.34	639.3	706.5
1993	27.99	257.1	270.8	2010	49.95	690.3	748.3
1994	28.51	265.0	282.8	2011	51.27	771.3	797.8

Note. The data of “*ncc*” and “*czc*” are eliminated inflation according to the index in 1978.

### 3. THE EMPIRICAL ANALYSIS: PROCESS AND RESULTS

#### 3.1 ADF Stationary Test and Co-Integration Test

Use the software “Eviews” to make ADF stationary test on the variables *lnu*, *lnncc* and *lnczc*, and the results are as follows:

**Table 2**  
ADF Stationary Test on the Variables

Variable	Test term <sup>①</sup>	ADF	1%	5%	10%	<i>P</i>	Result <sup>②</sup>
<i>ncc</i>	(C,T,2)	3.510	-4.285	-3.563	-3.215	1.0000	N.S
<i>lnncc</i>	(C,0,2)	-0.253	-3.654	-2.957	-2.617	0.9213	N.S
	(C,T,2)	-2.577	-4.273	-3.558	-3.212	0.2922	N.S
$\Delta$ <i>lnncc</i>	(C,0,8)	-4.280	-3.711	-2.981	-2.630	0.0026	S
<i>czc</i>	(C,T,2)	2.229	-4.263	-3.552	-3.210	1.0000	N.S
	(C,0,2)	0.150	-3.654	-2.957	-2.617	0.9647	N.S
<i>lnczc</i>	(C,T,2)	-2.746	-4.273	-3.558	-3.212	0.2263	N.S
	(C,0,2)	-4.188	-3.654	-2.957	-2.617	0.0026	S
<i>u</i>	(C,T,2)	-1.131	-4.285	-3.563	-3.215	0.9070	N.S
	(C,0,2)	-0.281	-3.662	-2.960	-2.619	0.9168	N.S
<i>lnu</i>	(C,T,2)	-2.696	-4.285	-3.563	-3.215	0.2449	N.S
	(C,0,6)	-4.342	-3.654	-2.957	-2.617	0.0017	S

Note. ① In the test form (C, T, K), C, T and K represent the constant term, time trends and lag intervals for endogenous, and lag intervals for endogenous are determined based on the principle AIC. ② “N.S” means “Not Stationary”; “S” means “Stationary”.

As it is shown in Table 2, *lnu*, *lnncc* and *lnczc* are all *I*(1), so we can make co-integration test. Here EG two-step method is adopted to conduct the co-integration test to determine whether linear combinations of the unsteady sequence have co-integration relationship. Regression models about *lnu* and *lnncc*, *lnu* and *lnczc* are set up respectively as follows:

$$\ln ncc=0.415+1.770\ln u+\mu_1 \quad (5)$$

(-2.947)(43.144)

$$R^2=0.983 \text{ D.W.}=0.270,$$

$$\ln czc=0.489+2.071\ln u+\mu_2 \quad (6)$$

(-7.660)(36.654)

$$R^2=0.977 \text{ D.W.}=0.211.$$

Then we make unit root test on the residual sequence of the regression models above. Specific results are as Table 3.

**Table 3**  
Unit Root Test on the Residual Sequence

Variable	ADF	5%	10%	Result
$\mu_1$	-2.631	-3.46	-3.13	Not stationary
$\mu_2$	-3.452	-3.46	-3.13	Stationary under the significance level of 10%

What calls for special attention is that the ADF test here is for residual term which is calculated by co-integration but not for the real unbalanced error, and the chance to reject null hypothesis is larger than the actual circumstances. Hence the critical values are not the reference values that come with Eviews, but should be judged by what is put forward by Davidson, MacKinnon, Sandler and Enders. They come up with the critical values which are adopted in the Engle-Granger co-integration test whose sample size is less than 50 and unit root test on the residual sequence is about 2 variables. Moreover, considering the sample size in this study, it can be accepted under the significance level of 10%. Table 3 shows that the residual sequence of consumption demand of rural residents to urbanization rate is not stable, but consumption demand of urban residents to urbanization rate is stable. Therefore, there exists co-integration relationship between consumption demand of urban residents and urbanization rate, nevertheless there dose not exist this relationship between consumption demand of rural residents and urbanization rate. Furthermore, since there are some auto-correlations in regression model (6), next we consider adopting generalized difference method to remove its auto-correlations, and model as below:

$$\ln czc=563.368+0.639\ln u+1.229AR(1)-0.229AR(2) \quad (7)$$

(0.018) (-1.328) (6.549) (-1.214)

$$R^2=0.997 \text{ D.W.}=1.874.$$

#### 3.2 Error Correct Model

In order to further examine the dynamic condition in the short-term and the adjustment in the long-term of the

model, the error correct model is necessary to be built after passing the co-integration test. The most commonly used is the method that is come up with by Engle and Granger, which ask for obtaining the OLS estimated value of model (8).

$$y_t = k_0 + k_1 x_t + u_t \quad (8)$$

Then get  $\hat{k}_0, \hat{k}_1$  and residual sequence:

$$\hat{u}_t = y_t - \hat{k}_0 - \hat{k}_1 x_t \quad (9)$$

Replace  $y_t - \hat{k}_0 - \hat{k}_1 x_t$  in representation (4) with  $\hat{u}_{t-1}$ , that is, use OLS method to estimate parameters:

$$\Delta y_t = \beta_0 + \alpha \hat{u}_{t-1} + \beta_2 \Delta x_t \varepsilon_t \quad (10)$$

Based on the residual sequence  $\mu_2$  which is acquired in representation (6), let error correction term  $ecm_t$  equals  $\mu_2$ , and afterwards we establish error correction model:

$$\Delta \ln c_z c_t = \beta_0 + \beta_1 \Delta \ln u_t + \alpha ecm_{t-1} + \varepsilon_t \quad (11)$$

or

$$\Delta \ln c_z c_t = \beta_0 + \beta_1 \Delta \ln u_t + \alpha (\ln c_z c_{t-1} + 1.489 - 2.07 \ln u_{t-1}) + \varepsilon_t \quad (12)$$

After estimating we get:

$$\begin{aligned} \Delta \ln c_z c_t &= 0.088 - 0.785 \Delta \ln u_t - 0.06 (\ln c_z c_{t-1} + 1.489 - 2.07 \ln u_{t-1}) + \varepsilon_t \quad (13) \\ &= 0.088 - 0.785 \Delta \ln u_t - 0.06 ecm_{t-1} + \varepsilon_t \\ &\quad (6.196) \quad (-1.881) \quad (-1.113) \end{aligned}$$

From model (7), there exists long term equilibrium relationship between consumption demand of urban residents and urbanization rate: urbanization rate increases by 1%, and then urban per capita consumption spending can increase by 0.639%. The integrated term in error correct models (11), (12) and (13) demonstrate the influence of fluctuations in short term. In the final ECM model (13), the coefficient of error correction term is negative, which is in accordance with reverse correction mechanism. The short-term fluctuation of urban resident consumption can be divided into two parts: one is the influence of urbanization in short term, the other is the influence caused by deviation from the long-term equilibrium. From the empirical results, urbanization rate and consumption demand of urban residents have fluctuation relation in short term, however, this fluctuation can be corrected to equilibrium level by error correct models.

### 3.3 Granger Causality Effect Examination

Since there lies a co-integration relationship between consumption demand of urban residents and urbanization rate, so the two variables can be conducted Granger causality effect examination.

**Table 4**  
**The Results of Granger Causality Effect Examination**

Lag length	$czc \rightarrow u$		$u \rightarrow czc$	
	Null hypothesis $H_0$ : $czc$ is not the Granger cause of $u$		Null hypothesis $H_0$ : $u$ is not the Granger cause of $czc$	
	F-statistic	P-value	F-statistic	P-value
1	1.1951	0.2830	2.5182	0.1230
2	1.0832	0.3528	1.4304	0.2568
3	4.1749**	0.0163	2.2484	0.1086
4	6.3057***	0.0017	1.9762	0.1352
5	2.7385*	0.0521	1.7072	0.1840
6	2.9777**	0.0404	7.1380***	0.0010
7	1.1219	0.4102	13.3740	8.E-05
8	0.9885	0.5011	11.5371***	0.0007
9	0.9168	0.5649	9.3075***	0.0067

Note. \*\*\*, \*\* and \* represent to reject the null hypothesis that there is not any Granger causality under the significance levels of 1%, 5% and 10%.

Table 4 signifies the results of Granger causality effect examination about urban residents' consumption expenditure and urbanization rate. Under the significance levels of 1% and 5%, and with the lag length of 3 and 4, the null hypothesis that consumption demand of urban residents is not the Granger cause of urbanization rate is rejected. With the lag length of 6, the null hypotheses that consumption demand for urban residents is not the Granger cause of urbanization rate, and urbanization rate is not the Granger cause of consumption demand for

urban residents is both rejected. When the lag length is 8 and 9, the null hypothesis that urbanization rate is not the Granger cause of consumption demand for urban residents is rejected.

### 3.4 The Analysis of Empirical Results

It can be founded from the empirical results:

Firstly, from the results of the unit root test on the residual sequence of the two regression models, urban residents' consumption expenditure and urbanization rate

have co-integration test while rural residents' consumption expenditure and urbanization rate do not have this kind of relation, which explains that there exists a long-term stable equilibrium relationship between urban resident consumption and urbanization, but there does not exist this long-term stable equilibrium relationship between rural resident consumption and urbanization. In the long run, 1% of the increase in urbanization rate can cause 0.639% of the increase in urban resident consumption.

Secondly, make further analysis on the dynamic relationship between urban residents' consumption and urbanization, and after conducting the Granger test on the two variables, we found that urban residents' consumption and urbanization present such a change: The promotion of urban residents' consumption gives rise to the urbanization rate, then urban residents' consumption and urbanization develop and promote each other, and finally transfer into the phase that urbanization boosts urban residents' consumption prominently. The reasons can be explored as follows: primarily, the consumption concepts and patterns of urban residents have demonstration effects on rural consumers, stimulate the rural residents to have the desire of enhancing the quality of life through urbanization. Later not only urban residents' consumption can push forward the process of urbanization, but also the urbanization can further improve the urban residents' consumption expenditure. After the demonstration effects release to a certain degree, the marginal demonstration effects decline progressively, the effects of consumption demand for urban residents to urbanization rate decrease, while the effects of urbanization on urban residents' consumption increase.

Thirdly, although urbanization and urban residents' consumption have co-integration relationship and also have Granger causality relationship under certain lag length, the process of urbanization influences urban residents' consumption obviously, yet this kind of influence shows itself after lag length of 6, so there is a delayed effect. This is because the existing mode of urbanization transfers people as a factor of production, but ignores their demands and the improvement of the quality of their lives. In addition, the supply of public service (especially the service for peasant workers) that is closely related to consumption lags behind, so this type of urbanization which focuses on the transformation of the factors of production does not raise the urban households' consumption expenditure remarkably.

#### 4. RESEARCH CONCLUSION AND POLICY RECOMMENDATIONS

This paper uses urbanization rate and per capita consumption expenditure of urban and rural residents during 1978 to 2011, analyses their long-term equilibrium relationship and short-term dynamic relationship. The

results reveal that the effects on the consumption of rural and urban residents by urbanization are different, and there is hysteresis effect though urbanization prompts the consumption of the urban households. The existing urbanization transfers countryside inhabitant more as a factor of production than human being, and the income level and public service of the remained farmers and rural migrant workers can not equal that of the original urban inhabitants, which leads to distortion of the economic structure, and also causes the consumption and benefit levels of the urban and rural residents to take on the dual character. Consequently, it is urgent to set up the people-oriented urbanization mode, and this paper puts forward some ideas here:

a) Convert the production-factor-oriented urbanization to people-oriented one, paying more attention to improving the quality of people's lives. To be specific, boost the supply of public goods, continue to encourage the innovation of household registration system and speed up the reforms that related to it in conditional towns, peel away various interests attached on the household registration to provide favorable conditions for comprehensively promoting the reform of household registration system. Thus reduce or even eliminate the difference between "people in system" and "people out of system", and offer a fair environment of employment and favorable circumstances of residents' lives to relieve migrant workers' worries to consume.

b) Urbanization should not be the one only aiming at the migration of population, but also keeps watchful eyes on the development of rural areas and enhance the productivity of the agricultural sector. There are three levels of implication in urbanization: the first level is the process of shifting rural population to urban areas; the second is the process of increasing the number and expanding the scale of cities; the last is the process of the culture and life style of the cities constantly extending to the rural areas and ultimately helping realize urban life style in these rural areas (Zhang, 2005). The current urbanization in our country mostly stays in the first level, partly involves the contents of the second level, and have not touched the third level of urbanization, therefore the urbanization owns significant dual character. At present, in the case that rural surplus labors have almost been transferred out, the urbanization should be endowed with new content elements, turning from the population shifts to the development of rural economy, propelling the modern agriculture and advancing the large-scale operation and industrialization of agriculture.

c) Enlarge the rural residents' consumption demand. Generally, since the marginal propensity to consume of rural residents is higher than that of urban residents, the vast rural areas bear the weight of stimulating domestic demand. Under this circumstance, it is pressing to take special measures to boost domestic demand for

countryside inhabitants. The radical solution to strengthen the capacity of farmers' consuming is raising their income, and correspondingly, the government should take financial policy, fiscal taxation policy, industrial policy, income policy and altogether with other supporting measures to increase the income of rural households.

## CONCLUSION

Along with China's reform and opening up, urbanization has been the main feature in China's economy over the past three decades, and it has made great changes in people's lives. Yet the quality of urbanization has been ignored for a long time. This paper focuses on studying the quality of urbanization from the perspective of its effects on the lives of residents, specifically, its different impacts on urban and rural consumption. After making empirical research, this article finds that the urbanization rate has a long-term equilibrium relationship with urban residents' consumption, but does not have this relationship with rural consumption, therefore the effects on the consumption of rural and urban residents by urbanization are different. In addition, though urbanization prompts the consumption of urban households, there is a hysteresis effect. So the existing urbanization transfers countryside inhabitant more as a factor of production than human being itself, that is, this kind of urbanization is more production-factor-oriented than people-oriented. So it is momentous and urgent to change the existing mode of urbanization, more focus on its quality and the improvement of people's lives.

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