

A Study on the Coordinated Development between New Urbanization and Service Industry in Hubei Province

Chun Liu^{1,2}, Weizheng Jiang¹

¹Wuhan Technology and Business University, Department of Management, Wuhan 430065, China

²Hubei Business Service Development Research Center, Wuhan 430065, China

Abstract. This paper selects two time series data on new urbanization and the contribution level of service industry to GDP in Hubei Province from 1998 to 2012. By unit root test, Johansen co-integration test and granger causality test analysis for the development of the urbanization and service industry time series, The test result shows that in the sample time interval, there is low negative correlation between urbanization level and the service industry in Hubei province, service industry to GDP in Hubei province is a one-way Granger cause of urbanization level, therefore, enhance the level of urbanization, at the same time, adhere to the development path of people-centered new urbanization, strengthen the service function of town in Hubei province.

Keywords: New urbanization; Service industry; Unit Root Test; Granger Causality Test; Hubei province.

1. Introduction

Urbanization is trend of civilization and symbol of modernization, which growth up with industrialization developing, settlement in non-agricultural and population concentration^[1]. It is a great mission to adjust economy structure and optimize industrial structure by the means of developing service industry, which also fits the situation of opening policy and play an important role on comprehensive national strength promoting^[2]. Focused on core cities especially megacities at modern service industry developing, strengthening core field of service industry of megacities, expanding center of regional service industry, rational distribution of commerce, trade and finances' functional area, forming industry structure by the leading of service industry as soon as possible^[3].

According to *Unswervingly follow the path of socialism with Chinese characteristics and strive to build a well - off society in an all - round way* in Nov. 2012, it reveals that stick to the way of new urbanization and agriculture modernization with Chinese characteristics. According to *Some opinions of the State Council on accelerating the development of service industry* in Mar. 2007, it reveals that service industry is an important part of national economy; service industry's developing is the significant of modernization. In the meeting of central urbanization in Dec. 2013, opinions like "urbanization is the necessity to modernization". Promoting urbanization is a powerful support to promote regional coordinated development, focusing on improving the proportion of service industry, enhancing urban innovation ability. In the *National new urbanization plan (2014-2020)* in Mar. 2014, it indicates that urbanization is closely related to service industry development, and service industry is the maximum capacity of employment. Population agglomeration in the process of Urbanization, the improvement of life style and the improvement of living standard, which will lead to expand the service needs of life.

This thesis is about the studying of coordinated development between urbanization and tourism in Hubei province by the means of Pertinence Analysis, *Unit Root Test* and *Granger Causal Relation Test*. providing the supporting and basis to Hubei government on development and implementation of the new urbanization and service industry development strategy in Hubei Province.

2. Literature References

"The spatial agglomeration of service industry and urban economic development is the mutual promotion relationship" was considered by Ma Peng (2010)^[4] and Qiu Ling (2012)^[5]. Chu Mingqin (2013)^[6] had viewpoint of "The intensive utilization of urban land in our country by the

agglomeration of productive service industry, and avoid the extensive use of urban land". Gu Yongfen (2013)^[7] pointed "The relationship between service industry agglomeration and economic growth in the Yangtze River delta urban agglomeration" by the means of Location Entropy; it reveals the government should pay attention to the transformation from "quantity" to "quality". Zhao Hongyun (2014)^[8] gave suggestion of boosting and coordinating between urbanization and service industry. It should promote the optimization and upgrading of the traditional service industry structure, at the same time; we should speed up the development of urban economy, and promote scientific and technological innovation.

According to Zheng qiongye(2011)^[9], Li Chenhua(2012)^[10]and Li Fengchun(2013)^[11], they sorted out the interactive relationship between the development of modern service industry and urban transformation, discussing about how to accelerate the transformation and upgrading of the city with the development of modern service industry and Building service economy system. Zhang Zhibing (2012)^[12] put forward to develop the productive service industry to promote the sustainable development of urban economy through studying on the mechanism of the development of the urban productive service industry on the economic transformation.

Li jing (2011)^[13] reveals there is a single-track correlation between urbanization and employment in the service sector in Shandong province. However, the effect of urbanization on the employment level of the service sector has hysteresis. Cai Boliang (2012)^[14] studied on the path of the development of the city and the service industry. Zhang Zhibing (2013)^[15] stood on the point of division of labor theory, value chain theory and industrial agglomeration theory to analysis the influence mechanism of producer service industry and city coordinated development. Cui Hongqiao (2014)^[16] studied on the promotion of service industry to urbanization is much obvious, the service industry has a limited role in promoting urbanization, which two factors have not realized the positive interaction and coordinated development in Ji Lin province by the means of Gray correlation analysis.

Many literatures study mainly about the qualitative analysis of the relationship between the service industry and urbanization. At the same time, the quantitative research on the relationship between the development of service industry and the new urbanization in Hubei province is rare. In view of this, this thesis is based on the relevant data of urbanization level and service industry development in Hubei (1998-2012), and analyzes the relationship between the new urbanization level and service industry development by using the correlation analysis method, and analyzes the relationship between urbanization and tourism development in Hubei province by using the *unit root test* and *Granger Causal Relation Test*.

3. Analysis Model

3.1 ADF Unit Root Test

Unit root test and it always for *ADF unit root test* use for testing a time series data is stable or not. *ADF unit root test* as follow:

$$\Delta y_t = \delta y_{t-1} + \sum_{i=1}^m \beta_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

(1)In this model, y represents for time series, t represents for time variable, null hypothesis is $\delta=0$ and alternative hypothesis is $\delta<0$. If we accept the null hypothesis, we show that there is a unit root in x , which is a non stationary series, and the stationary sequence is stationary. For non-stationary sequences, if the order difference of d is completed, the sequence is d order or $I(d)$.

The test result of the null hypothesis of the model can be considered as a stationary sequence, and the model can be considered as a non stationary sequence.

3.2 Co-integration Test of Johansen

Co-integration means that a certain linear combination of multiple non-stationary economic variables is stationary, and if the number of non-stationary variables is in a co-integration, then these variables can be synthesized in a stationary sequence. The stationary sequence can be used to describe the equilibrium relationship among variables. The regression model established by these

variables only has meaning, *co-integration test of Johansen*, and the test method is applied to the co-integration test. The test model is:

$$y_t = \sum_{i=1}^p a_i y_{t-i} + \varepsilon_t \quad (2)$$

(2) In this model, y represents for endogenous variables vector of T dimension, a represents for matrix of coefficients, P represents for the order number of the inner variable.

3.3 Granger Causality Test

Grainger causality test is some kind of method to investigate whether the time series x is reason produced by time series y : the current y value is estimated to be the extent of its own lag can be explained by the introduction of the lag value of x sequence, it is verified by the introduction of the delay value of the x sequence to improve the degree of the y . If it is, Sequence x is the (*Cause Granger*) of y and the lag coefficient of x is statistically significant at this time. In general, it should also consider the other side of the problem: the sequence of y is the cause of the Grainger x . The following two regression models are estimated:

The Model of Unrestricted Conditional Regression:

$$y_t = \sum_{i=1}^m a_i y_{t-i} + \sum_{i=1}^m b_i x_{t-i} + \varepsilon_t \quad (3)$$

The Model of Restricted Conditional Regression:

$$y_t = \sum_{i=1}^m a_i y_{t-i} + \varepsilon_t \quad (4)$$

The model of (3) and (4), if the test coefficient $b_1 \dots b_m$ is significantly less than 0, the null hypothesis is rejected, which indicates that y 's change of *Granger* is caused by x ; when the null hypothesis is "y is not the *Granger cause* of x 's change", y and x in the two regression models are interchangeable.

Tab.1 the Date of Urbanization Development Level in Hubei from 1998 to 2012

Year	Total population (million)	Urban population (million)	Gross Regional Product(hundred million yuan)	Service industry added value (hundred million yuan)	UR(%)	SCR(%)
1998	5907.23	1884.41	3114.02	1136.71	31.90	36.50
1999	5938.03	1990.17	3229.29	1260.86	33.52	39.00
2000	5646.00	2285.11	3545.39	1445.71	40.47	40.80
2001	5658.00	2308.50	3880.53	1613.97	40.80	41.60
2002	5672.00	2348.20	4212.82	1795.93	41.40	42.60
2003	5685.00	2387.70	4757.45	2003.08	42.00	42.10
2004	5698.00	2427.30	5633.24	2292.55	42.60	40.70
2005	5710.00	2466.70	6590.19	2655.94	43.20	40.30
2006	5693.00	2493.50	7617.47	3111.98	43.80	40.90
2007	5699.00	2524.70	9333.40	3812.34	44.30	40.80
2008	5711.00	2581.40	11328.92	4466.85	45.20	39.40
2009	5720.00	2631.20	12961.10	5127.12	46.00	39.60
2010	5723.77	2846.13	15967.61	6053.37	49.72	37.90
2011	5758.00	2984.32	19594.19	7206.13	51.83	36.80
2012	5779.00	3091.77	22250.16	8210.94	53.50	36.90

4. Empirical Analyses

4.1 Data Sources and Processing

This paper relates to the new urbanization and service industry data of Hubei province from 1998 to 2012. In this paper, the proportion of urban population to the total population as a new type of urbanization level indicators with *UR* representatives; the proportion of service industry added value to *GDP* as the development of the service sector with *SCR* representatives. Raw data from *The Hubei Province Statistical Yearbook in 2013* and *The Report for The Service Industry Development of Hubei Province in 2013*.

In this paper, the date of the total population, urban population, *GDP* and service industry added value in Hubei province from 1998 to 2012 were used, the *SCR* and *UR* data are shown in Table 1.

From Figure 1 it can be seen that *UR* has a trend of increasing, and *SCR* has a trend of fluctuation.

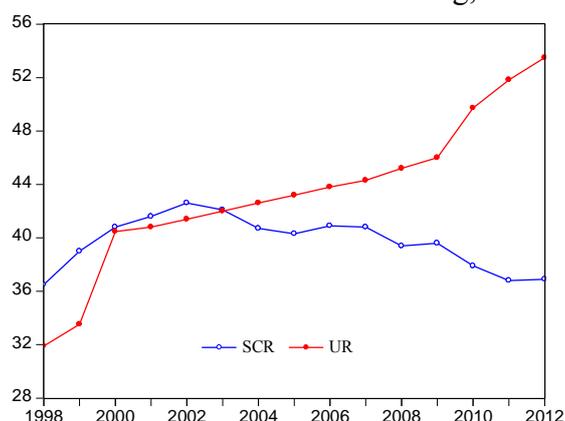


Fig.1 the Trend Change between UR and SCR

4.2 ADF Unit Root Test

In this paper, the *ADF test* method is used to test the unit root of *UR* variable and *SCR* variable, and taking the logarithm from *UR* and *SCR* are expressed by *LnSCR* and *LnUR*. The results of test are shown in Table 2.

Table 1 the Results of ADF Unit Root Test

Variables	<i>ADF Test value</i>	Critical Value of 5%	<i>DW</i>	Results
<i>LnUR</i>	2.804112	-1.96843	1.902211	Unstable
<i>LnUR</i> ₋₁	-2.348003	-1.970978	1.840075	Stable
<i>LnSCR</i>	0.075076	-1.96843	0.818264	Unstable
<i>LnSCR</i> ₋₁	-2.873532	-1.970978	2.169361	Stable

Note: the subscript "-1" said one order difference.

The *ADF test* is carried out by the time series of *LnSCR* and *LnUR*, the time series of the variables *LnSCR* and *LnUR* are more than 5% critical values. However, after the difference, the difference between *LnSCR* and *LnUR* is less than 5% significance, So it can be seen that the first order difference of the logarithm of *UR* and *SCR* is stable, that is, *I* (1).

4.3 Co-integration Test of Johansen

Table 3 shows that the rate of urbanization and service industry's contribution rate of Johansen test, the table is the test results of trace statistics.

Table 3 Co-integration Test of Johansen

Hypothesis	Characteristic	Trace Statistics	Critical Value of 5%	Probability(<i>P</i>)
None *	0.978214	50.41238	15.49471	0.0000
At most 1	0.050104	0.66824	3.84147	0.4137

Note: None: no co-integration relationship; At most 1: a co-integration relationship.

The contribution rate of urbanization and service industry in Hubei province show no co-integration relationship, the test results of trace statistics is 50.41238, critical value of more than 5% is 15.49471, probability is 0, which show the result reject the original hypothesis, that at least there is a co-integration relationship; The next original hypothesis is At most 1 there is a co-integration relationship at most, critical value of more than 5% is 3.84147, the result accept the original hypothesis; So there is a co-integration relationship between the rate of urbanization and service industry in Hubei province.

4.4 Granger Causality Test

LnUR and *LnSCR* are *I* (1) by the results of the *unit root test*, which show that the two variables is stationary sequence. *Johansen co-integration test* shows that there is a long-term co integration relationship between the rate of urbanization and service industry in Hubei province. But cannot

explain the causal relationship between the two variables. In this paper, the logical relationship between the two is explained by the *Granger causality test*. Shown in Table 4.

Table 4 Granger Causality Test

Causality Hypothesis	<i>F</i>	<i>P</i>	result
<i>LnUR</i> is not the reason of <i>LnSCR</i>	1.29876	0.3247	accept
<i>LnSCR</i> is not the reason of <i>LnUR</i>	15.5626	0.0017	reject

Note: lag period 2

The results of *Granger causality test* show that, at the condition of significance is less than 5% and lag period for 2 years, *LnUR* is not the reason of *LnSCR*, *LnSCR* is the reason of *LnUR*, there is a one-way causal relationship between *LnSCR* and *LnUR*. It reveals that the development of service industry has a negative effect on the level of urbanization, but the development of the service industry is not directly caused by the development of urbanization. It indicates that the development of urban service functions of urban development has not played a role in the development of urbanization in Hubei Province, which restricts health and stable development of urbanization.

5. Conclusions

The results of this paper show that the development of urbanization has a strong negative correlation with service industry, and stationary time series for a first order differential variable. The development level of service industry is the *Granger reason* of urbanization development, and the development of urbanization is not the *Granger cause* of the development of urban service industry. Hubei province improves the level of urbanization simultaneously meanwhile need to adhere to the new path of people-oriented urbanization development, strengthen the service function of the city, and improve the quality of life of residents.

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Corresponding author: LIU Chun, Wuhan Technology and Business University, Department of Management, Wuhan 430065, CHINA

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