



# Analysis of the Inverted U-Shaped Relationship Between China's New Urbanization and Economic Growth: Based on Comparison With Traditional Urbanization

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## Abstract

According to the 2001-2016 Chinese provincial panel data, the paper analyzes the nonlinear relationship between China's new urbanization and traditional urbanization and economic growth. The results show that there is an "inverted U-shaped" relationship between the old and new urbanization and economic growth in China, but the turning point of the new urbanization economic growth effect will appear later, which will have a more lasting effect on economic growth. From the perspective of economic growth, it proves the necessity and urgency of the urbanization development tradition to the new type of transformation and upgrading, and proposes to promote the coordinated development of new urbanization and rural revitalization in China.

**Key words:** China's new urbanization; Economic growth; Inverted U-shaped relationship

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## INTRODUCTION

Urbanization has always been regarded as an important driving force for stimulating domestic demand and promoting economic growth. In the initial stage of economic development, the promotion of urbanization can not only achieve the effective allocation of rural

surplus labor, deepen the social division of labor, but also accelerating the modernization process and promoting the rapid development of the economy. However, when the urbanization rate is raised to a certain level, certain negative effects will gradually appear, such as serious environmental pollution, traffic congestion, increased unemployment, and rapid increase in urban management costs, which may have a negative impact on economic growth. It also provides a certain explanation for the "anti-urbanization" that has appeared in the western developed countries. In the past studies, some scholars have used the empirical analysis of urbanization and economic growth by panel data of 9 countries, pointing out that there is an "inverted U-shaped" development relationship between urbanization and economic growth (Xie, 2014). Some people pointed out that the urbanization rate is not as high as possible, and moderate urbanization is more conducive to economic development (Gao, 2018). Based on this, this paper speculates that there may be a nonlinear correspondence between urbanization and economic growth that promotes post-inhibition.

Since the reform and opening up, the urbanization rate of China's permanent population has increased from 17.25% in 1978 to 58.52% in 2017. In terms of economic growth, China's average annual economic growth rate is close to 10%, much higher than the overall level of the world economy at the same time. In 2010, it overtook Japan to become the world's second largest economy, creating a "Chinese miracle" for rapid economic growth. However, since 2012, China's economic growth has slowed markedly. Since 2015, the average annual economic growth rate has dropped below 7%, and economic growth is facing a structural slowdown. At this stage, there is no longer a rising trend between urbanization and economic growth. So is there an "inverted U-shaped" relationship between China's urbanization and economic growth? What is special about China compared to other countries? By studying the relationship between

urbanization and economic growth in China, especially the non-linear relationship. The paper compares the differences between traditional urbanization and new urbanization economic growth effects, in order to obtain the law of China's urbanization to promote economic growth. This paper has certain guiding significance for effectively overcoming the shortcomings of traditional urbanization, giving play to the advantages of new urbanization, and thus promoting sustained and stable economic development.

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## 1. LITERATURE REVIEW

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Scholars in China and other countries have conducted some research on the economic growth effects of urbanization. Most studies have shown that urbanization has a significant role in promoting economic growth. Based on the theory of economic endogenous growth and population exogenous growth, the scholar have found that urbanization will bring about spatial agglomeration and accumulation of human capital, thus promoting economic growth (Black, 1999). Taking empirical tests on developing countries in Asia as an example, the urbanization is an important source of power for developing countries to achieve rapid economic growth (Krey et al., 2012). Zhu Konglai et al. (2011) obtained a long-term stable equilibrium relationship between China's urbanization process and economic development through panel cointegration test, and analyzed from the perspective of elasticity that China's urbanization rate can maintain 7.1% of the economy by one percentage point increase. Zhang Yuanjun (2014) used the provincial panel data from 1987 to 2012 for regression, and found that urbanization mainly stimulates economic growth through fixed asset investment and infrastructure improvement. However, the previous research on the economic benefits of urbanization mainly focused on the urbanization in the traditional sense. Because the new urbanization time is relatively short, there is not much literature on the research of its economic benefits. Zhao Yongping, Xu Yingzhi (2014), Fan Zhaoyuan, and Zhou Shaoqi (2017) demonstrated that there is a significant relationship between new urbanization and economic growth through provincial panel data. Most of the literature focuses on the linear relationship between urbanization and economic growth, and there is not much literature on the nonlinear relationship between the two.

According to the above combing, domestic and

foreign scholars have achieved many important results in the study of urbanization economic effects, but with the development and innovation of China's urbanization, there is still a certain extension space. First, most of the literature is measured by a single population urbanization rate indicator, which does not reflect the new urbanization connotation. Secondly, there is less literature comparing the economic effects of traditional urbanization and new urbanization. Finally, there are few studies on the relationship between urbanization and economic development from a nonlinear perspective. Is there an "inverted U-shaped" relationship between urbanization and economic growth, and whether the "inverted U-shaped" curve of traditional urbanization and new urbanization is different? The answers to these questions need to be further researched. And in the current economic slowdown, conducting these studies has important practical significance.

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## 2. EMPIRICAL RESEARCH

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### 2.1 Construction of New Urbanization Index System

The traditional measurement of regional urbanization level usually uses the proportion of urban residents to the total population. This will count some migrant workers working in urban areas as urban residents, but in reality they are difficult to stay in towns and enjoy towns. They are not real urban people in China. Therefore, the traditional urbanization rate measurement method is difficult to reflect the true level and quality of urbanization development. It is necessary to establish indicators that are more in line with social development and research needs to measure the level of new urbanization in terms of the level of urbanization development. Based on the report of the National New Urbanization Plan (2014-2020) and other scholars' selected new urbanization evaluation indicators, and choose the quality of life of residents, the construction of public service facilities and the coordinated development of urban and rural areas as the focus of attention, the paper finally selects 21 variables to build a new urbanization index system, comprehensively measure the new urbanization development level of people-oriented. The weighting method is the entropy weight method, and the specific indicators are shown in Table 1.

**Table 1**  
**New Urbanization Index System**

	Criteria layer	Variable
New Urbanization	Economic basis	Per capita GDP
		Per capita disposable income
	Residents' quality of life	Living Space
		Employment
	Environmental Quality	Urban population density
		Urban per capita housing area
	Medical	Urban registered unemployment rate,
		Proportion of employees in the tertiary industry
	Education	Per capita park green area
		Industrial wastewater discharge
	Public service	Number of beds per 1,000 medical institutions
		10,000 health technicians
	Infrastructure	Per capita education expenditure
		Museum visits
Social Security	Per capita urban road area	
	Urban gas penetration rate	
Environmental governance	Urban basic old-age insurance coverage	
	Urban basic medical insurance coverage	
Urban and rural coordinated development	Comprehensive utilization rate of industrial waste	
	Harmless treatment rate of domestic garbage	
Urbanization level	Urbanization rate of resident population	
	Engel coefficient ratio of urban and rural residents	
Urban-rural economic gap	Ratio of urban and rural consumption	

The specific construction process of the new urbanization evaluation indicators is as follows:

First, the variables selected in Table 1 are normalized. Since the dimensions and magnitude of each indicator and the positive and negative orientations of the indicators are different, the initial data needs to be standardized. This paper uses the commonly used range method for processing.

Positive indicator (the larger the indicator value, the better the system is):

$$V_{ij} = \frac{X_{ij} - \min\{X_{ij}\}}{\max\{X_{ij}\} - \min\{X_{ij}\}}, i=1,2,\dots,m; j=1,2,\dots,n$$

Reverse indicator (the smaller the indicator value, the better the system is):

$$V_{ij} = \frac{\max\{X_{ij}\} - X_{ij}}{\max\{X_{ij}\} - \min\{X_{ij}\}}, i=1,2,\dots,m; j=1,2,\dots,n$$

Where  $X_{ij}$  is the original index value,  $V_{ij}$  is the normalized index value,  $\min\{X_{ij}\}$  is the minimum value of the original index, and  $\max\{X_{ij}\}$  is the maximum value of the original index.

Then, calculate the proportion of the  $i$ -th province and the  $j$ -th indicator:

$$V_{ij} = \frac{V_{ij}}{\sum_{i=1}^m V_{ij}}$$

Further, the values of the entropy value  $E$  and the difference coefficient  $F$  are:

$$E_j = -\frac{1}{\ln m} \sum_{i=1}^m V_{ij} \ln(V_{ij}), F_j = 1 - E_j, F_j = 1 - E_j$$

Then calculate the ratio of the  $j$ th indicator in all indicators:

$$U_j = \frac{F_j}{\sum_{i=1}^n F_j}$$

Finally, we can get the value of the comprehensive evaluation index of new urbanization:

$$W_j = \sum_{j=1}^n U_j V_{ij}$$

The table below calculates the value of the new urbanization indicators for each province from 2001 to 2016. It can be seen that the size of the new urbanization indicators is closely related to the local economic development. Beijing, Shanghai, Tianjin, Zhejiang, Jiangsu, Guangdong and other eastern coastal developed areas are ranked higher, and the central and western regions such as Anhui, Gansu, Yunnan and Guizhou are relatively lower.

**Table 2**  
**2001-2016 Average Index Value and Ranking of New Urbanization**

Ranking	province	Index value	Ranking	province	Index value	Ranking	province	Index value	Ranking	province	Index value
1	Beijing	0.746	9	Liaoning	0.383	17	Hubei	0.313	25	Henan	0.286
2	Shanghai	0.68	10	Neimenggu	0.355	18	Shanxi	0.311	26	Guangxi	0.264
3	Tianjin	0.546	11	Hainan	0.35	19	Jiangxi	0.304	27	Anhui	0.259
4	Zhejiang	0.537	12	Jilin	0.325	20	Qinghai	0.301	28	Gansu	0.237
5	Jiangsu	0.503	13	Chongqing	0.325	21	Hebei	0.3	29	Yunnan	0.237
6	Guangdong	0.5	14	Xinjiang	0.32	22	Ningxia	0.296	30	Guizhou	0.202
7	Shandong	0.422	15	Hunan	0.319	23	Shaixi	0.293			
8	Fujian	0.394	16	Sichuan	0.314	24	Heilongjiang	0.287			

## 2.2 Empirical Model

Many scholars have tried to study the relationship between urbanization and economic growth through empirical analysis, but because the theory of economic growth involving spatial structure is still not perfect, especially due to the lack of structural models that can be used for empirical research, it is difficult to empirically study the relationship between urbanization with economic growth (Zheng, 2014). From a theoretical point of view, under steady economic growth conditions, labor income growth is determined by a series of important economic variables such as physical capital, human capital, technological progress, natural resource endowments, institutions and policies (Wang, 2004). In order to study the relationship between urbanization and economic growth, this paper builds on the macroeconomic growth model of Barro & Sala-I-Martin (1997) and Islam N (1995), and builds the panel data model of per capita GDP growth rate, urbanization and other control variable. The main measurement model is designed as follows:

Model 1:

$$growth_{i,t} = \beta_0 + \beta_1nurb_{i,t} + \beta_2nurb_{i,t}^2 + \sum_j \lambda_j X_{i,t} + \alpha_i + \varepsilon_{i,t}$$

Model 2:

$$growth_{i,t} = \beta_0 + \beta_1nurb_{i,t} + \sum_j \lambda_j X_{i,t} + \alpha_i + \varepsilon_{i,t}$$

Model 3:

$$growth_{i,t} = \beta_0 + \beta_1nurb_{i,t} + \beta_2curb_{i,t}^2 + \sum_j \lambda_j X_{i,t} + \alpha_i + \varepsilon_{i,t}$$

Model 4:

$$growth_{i,t} = \beta_0 + \beta_1nurb_{i,t} + \sum_j \lambda_j X_{i,t} + \alpha_i + \varepsilon_{i,t}$$

In the above model,  $growth_{i,t}$  is the economic growth rate,  $nurb_{i,t}$  is the new urbanization rate,  $curb_{i,t}$  is the

traditional urbanization rate,  $X_{i,t}$  is the control variable and will be specified in the next section. The subscripts  $i$  and  $t$  represent the province and time, respectively,  $\alpha_i$  represents the unobservable regional effect, and  $\varepsilon_{i,t}$  represents the random error term. Model 1 and Model 2 are used to examine the relationship between new urbanization and economic growth. Model 3 and Model 4 are used to examine the relationship between traditional urbanization and economic growth. Model 1 and Model 3 examine nonlinear relationships.

## 2.3 Variable Selection

The explanatory variable of this paper is the regional economic growth rate  $growth_{i,t}$ , following the practice of many literatures, this paper uses the real GDP growth rate of each region. Real GDP was reduced by nominal GDP by using the 2001 GDP deflator. The main explanatory variables are urbanization level, namely new urbanization ( $nurb$ ) and traditional urbanization ( $curb$ ). The new urbanization adopts the new urbanization evaluation index obtained in the previous article. According to the general practice, the traditional urbanization level is measured by the ratio of the resident population to the total population that reflects the population's concentration to the town. Regional economic growth is inevitably affected by other factors besides urbanization. According to the general theory of economic growth, reference to relevant research and the author's concerns, this paper selects some control variables. The "government scale" ( $gov$ ) is used to control the degree of government intervention in the economy; Liu Ruiming pointed out that investment has a huge role in promoting economic growth, so the "fixed asset investment growth rate" ( $far$ ) is used to control the role of investment; On the other hand, according to the common practice of the literature, "openness" ( $open$ ) is chosen as the control variable. The definitions and descriptive statistics of each variable are shown in Table 3.

**Table 3**  
Variable Definition Descriptions and Descriptive Statistics

variable name	Variable interpretation	Observation value	Mean	Standard deviation
growth	Actual gdp growth rate	480	0.112	0.030
nurb	New urbanization level: the establishment of an indicator system	480	0.364	0.142
nurb2	Square term of new urbanization level	480	0.153	0.128
curb	Traditional urbanization rate	480	0.499	0.147
curb	The square of the traditional urbanization rate	480	0.271	0.167
gov	Government size: government expenditure / regional GDP	480	0.198	0.090
far	Investment growth rate: the amount of economic fixed assets investment in the region in the current year	480	0.211	0.115
edu	Education level: number of students in higher education institutions / total number of people in the district	480	0.008	0.015

## 3. THE ANALYSIS OF EMPIRICAL RESULTS

### 3.1 Basic Regression Analysis

Through the Hausman and time dummy variable test, the

model contains both regional and temporal fixed effects. Therefore, the double fixed effect model is selected for regression. The results are shown in Table 4.

According to the regression results of Model 1 and Model 3, the primary terms of the two urbanization variables are both positive, and the secondary terms are

significantly negative. According to the regression results of Model 1 and Model 3, the primary terms of the two urbanization variables are significantly positive, and the secondary terms are significantly negative. This shows that both the traditional urbanization characterized by the proportion of urban permanent residents and the new urbanization of “people-oriented” have significant “inverted U” relationship with economic growth. This means that the promotion effect of urbanization on economic growth has a certain scope limit, and the increase in urbanization rate after a certain level of urbanization will not be conducive to economic growth. Therefore, in order to maintain stable economic growth, urbanization should maintain a moderate principle. We should not blindly pursue the improvement of urbanization rate, but should pay attention to the improvement of urbanization development quality, continuously promote urbanization innovation and explore new economic growth points.

From the regression results of Model 2 and Model

4, when considering the linear relationship between urbanization and economic growth, the impact of new urbanization on economic growth is positive at the level of 5%, while traditional urbanization is 1%. This shows that the inflow of labor resources brought about by the transfer of rural population to urban areas in the past decade or more has indeed effectively promoted the development of China’s economy. And from the perspective of the whole country, it can also play a certain role in promoting the future. At the same time, the new urbanization construction has a more obvious effect on economic growth.

From the perspective of control variables, the coefficient of investment in this variable is significantly positive at 1% in different models, indicating that expanding investment can effectively promote economic growth. Although the two variables of government expenditure and education level have different degrees of significance in different models, they all have significant effects on economic growth.

**Table 4**  
**Regression Results of Urbanization and Economic Growth**

variable	Interpreted variable: GDP growth rate			
	New urbanization		Traditional urbanization	
	Model 1	Model 2	Model 3	Model 4
nurb	0.213***	0.037**	--	--
nurb2	-0.224***	--	--	--
curb	--	--	0.310***	0.088***
curb2	--	--	-0.309***	--
far	0.085***	0.082***	0.076***	0.079***
gov	0.057**	0.091***	0.047*	0.097***
edu	0.370*	0.493**	0.334*	0.421**
C	0.032***	0.055***	0.007	0.030**
R <sup>2</sup>	0.7561	0.7428	0.7616	0.7430

a: \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

**3.2 Comparison of Economic Growth Effects of New Urbanization and Traditional Urbanization**

In order to better determine the critical point of urbanization’s effect on economic growth from promotion to inhibition, the regression results of Tier 1 and Model 3 are as follows:

$$growth_{i,t} = 0.7561 + 0.213nurb_{i,t} - 0.224nurb_{i,t}^2 + \sum X_{it} + u_i \quad (1)$$

$$growth_{i,t} = 0.761 + 0.31curb_{i,t} - 0.309curb_{i,t}^2 + \sum X_{it} + u_i \quad (2)$$

Secondly, using the differential method, calculate  $d(growth)/d(urb) = 0$  for equation (1)(2), according to which the inflection point of the urbanization economic growth effect can be accurately calculated. That is, when the urbanization rate is lower than the corresponding inflection point value, the increase in urbanization rate will promote regional economic growth. However, after the urbanization rate exceeds the critical point, the increase in urbanization rate may inhibit local economic growth. The calculated inflection point values are: new urbanization is 0.475, and traditional urbanization is

0.502. Comparing the traditional urbanization rate and the new urbanization rate of each region in 2016 with the corresponding inflection point values, if the 2016 value is greater than the inflection point value, the economic growth effect of urbanization in the region has already crossed the inflection point. The statistical results are shown in Table 5.

From the perspective of traditional urbanization, there are only six provinces that have not yet crossed the inflection point in the economic growth effect of traditional urbanization. This indicates that for most provinces, the improvement of traditional urbanization rate at this stage has made it difficult to promote further economic development, and traditional urbanization has already faced bottlenecks. For the new urbanization, the economic growth effect of the new urbanization has only seven in the provinces that have turned the inflection point, which further confirms the development potential of the new urbanization. At this stage, the new urbanization construction is further promoted to promote economic growth. Have an important role.

**Table 5**  
**The Situation of Urbanization Economic Effects Across Provinces**

	Whether to cross the inflection point	Number of provinces	Province list
Traditional urbanization	Yes	24	Beijing, Tianjin, Shanghai, Zhejiang, Jilin, Heilongjiang, Anhui, Jiangxi, Hubei, Inner Mongolia, Chongqing, Shaanxi, etc.
	No	6	Henan, Guangxi, Sichuan, Guizhou, Yunnan, Gansu
New urbanization	Yes	7	Beijing, Tianjin, Shanghai, Zhejiang, Guangdong, Jiangsu, Shandong
	No	23	Hebei, Liaoning, Fujian, Hainan, Jiangxi, Hubei, Inner Mongolia, Chongqing, Shaanxi, Guizhou, Gansu, etc.

## CONCLUSION AND ENLIGHTENMENT

According to the general characteristics of China's economic growth and urbanization development, based on the data of 30 provinces and cities from 2001 to 2016, this paper first uses the entropy weight method to construct a new urbanization comprehensive evaluation index system to evaluate the new urbanization level of each province in each year. Secondly, the two-way fixed effect model is used to test the inverted U-shaped relationship between urbanization and economic growth, and the regional differences of urbanization economic effects are discussed. Empirical studies show that:

(a) Whether it is the traditional urbanization characterized by the urban resident population or the new urbanization calculated through a series of indicators of the quality of urbanization development, there is an "inverted U-shaped" nonlinear relationship between them and economic growth. That is to say, urbanization expansion can not always promote economic growth, and there may be reverse inhibition in the later stage. Therefore, urbanization development should maintain a moderate principle.

(b) Compared with the reality of the inflection point of traditional urbanization, for most provinces, the average development level of new urbanization is still some distance away from the inflection point of its economic growth effect. Therefore, by transforming and upgrading urbanization from traditional urbanization with large-scale expansion to new urbanization, the speed of economic slowdown can be postponed and the economy can be further developed.

(c) Observing the situation of each province crossing the inflection point, we can see that most of the economically developed eastern regions such as Beijing, Shanghai, Zhejiang, etc. face the situation where both traditional and new urbanization cross the inflection point. The central regions such as Hubei and Chongqing are mainly traditional urbanization crossing the inflection point and the new type has not crossed. In the western regions, such as Guizhou and Gansu, the traditional and new urbanization have not crossed the inflection point. There are certain regional differences in the crossing points of various regions. In summary, the expansion of urbanization scale has a more obvious effect on underdeveloped regions, and the improvement of

urbanization quality in developed regions can effectively promote economic growth.

In view of this, the above conclusions have certain significance for China to better maintain stable economic growth and bring into play the advantages of urbanization at this stage:

(d) The urbanization construction method should change from time to time. On the one hand, at this stage, it is necessary to strengthen the transformation and upgrading of traditional urbanization to new urbanization. In the past one or two decades, traditional urbanization has effectively promoted economic growth, but at this stage its negative effects are greater than positive promotion. As a new impetus for economic growth, new urbanization has a significant role in promoting economic growth at this stage and can maintain further economic development. On the other hand, it should also be noted that any policy is phased and time-sensitive. The economic effects of new urbanization may also face the "powerless" dilemma in the future. Therefore, the flexibility of urbanization development policies should be maintained, and adjustments should be made in time according to actual conditions.

(e) Pay attention to regional differences and implement urbanization according to local conditions. Due to the differences in geographical location and policy environment in various regions of China, the gaps in urbanization and economic levels in various regions cannot be ignored. Different stages of urbanization development have different effects on the promotion of economic growth. The level of urbanization in the eastern economically developed regions is generally high, and the urbanization rate has changed from a promoting effect to a restraining. Therefore, the eastern region should stabilize the growth rate of urbanization and focus on the improvement of urbanization quality. The level of urbanization in the central and western regions is relatively low, and the promotion of economic growth has not been effectively implemented. We should further increase policy support, accelerate the development of urbanization, and effectively play its role in promoting economic growth and improve the living standards of local residents.

(f) It is essential to realize the coordinated development of new urbanization and rural revitalization. Rural revitalization is an important strategy put forward

by the 19th National Congress of the Communist Party of China. Its main purpose is to revitalize the rural economy, promote rural modernization, break the urban-rural dual structure, and realize the integration of urban and rural development. The “inverted U-shaped” relationship between urbanization and economic growth reflects the law of diminishing returns to scale after the development of urbanization exceeds the critical value. The one-way flow of population to the towns will lead to an oversized town. After exceeding the urban carrying capacity, it will lead to a series of problems such as “big city disease”, “semi-urbanization” and the difficulty in ensuring the quality of life of residents, which is not conducive to further economic development. Therefore, we should strive to achieve two-way flow of urban and rural factors, combine new urbanization with rural revitalization, and achieve coordinated development of both, in order to maintain sustained and healthy economic growth in the long run.

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## REFERENCES

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- Barro, R. J., & Sala-I-Martin, X. (1997). Technology diffusion, convergence and growth. *Journal of Economic Growth*, 2(1).
- Black, D., & Henderson, V. (1999). A theory of urban growth. *Journal of Political Economy*, 107(2).
- Fan, Z., & Zhou, S. (2018). The effect of new urbanization on economic growth—Research based on the dynamic panel data models with spatial errors (In Chinese with English abstract). *Journal of Applied Statistics and Management*, 37(1), 146-15..
- Gao, T., Gui, G., & Liu, S. (2018). Moderate urbanization, industrial adjustment and economic growth (in Chinese with English abstract). *Jilin University Journal Social Science Edition*, 58(3), 32-43.
- Islam, N. (1995). Growth empirics: A panel data approach. *Quarterly Journal of Economics*, 110(4).
- Krey, V., O’Neill, B. C., Ruijven, B. V., Chaturvedi, V., Daioglou, V., Eom, J. Y., ... Ren, X. L. (2012). Urban and rural energy use and carbon dioxide emissions in Asia. *Energy Economics*, 34(2).
- Lan, Q., Liu Z., & Peng, Y. (2017). The construction of evaluation index system for quality of new-pattern urbanization and its evaluation method: Based on study of spatial differences among China’s 31 provinces (cities) during the year of 2003 to 2014 (in Chinese with English abstract). *Southern Economy*, 1, 111-126.
- Wang, D., Cai, F., & Zhang, X. (2004). Saving and growth effect of demographic transition: The population factor in the sustainability of China’s economic growth (in Chinese with English abstract). *Population Research*, 28(5), 2-11.
- Xie, Z. (2014). Life quality improvement, acceleration of urbanization and economic growth (in Chinese with English abstract). *Shanghai Journal of Economics*, 7, 14-21.
- Xiong, X., & Xu, Z. (2018). Research on level and mechanical machine under the guidance of new urbanization (in Chinese with English abstract). *The Journal of Quantitative & Technical Economics*, 2, 44-63.
- Zhang, Y. (2014). Urbanization and provincial economic growth (1987-2012): From the view of trade openness (in Chinese with English abstract). *Journal of Financial Research*, 7, 49-62.
- Zhao, Y., & Xu, Y. (2014). Effect of new urbanization on economic growth: Spatiotemporal differentiation and conduct path (in Chinese with English abstract). *Journal of Business Economics*, 274(8), 48-56.
- Zhen ,X. (2014). The contribution of urbanization to China’s economic growth and its ways of realization (in Chinese). *Chi*
- Zhu, K., Li, J., & Yue, F. (n.d.). Empirical analysis on the relationship between China urbanization and economic growth (in Chinese). *Statistical Research*. 28(9), 80-87.