The empirical analysis on mode of developing the rural areas with the aid of the urban areas

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Abstract

Developing the rural areas with the aid of the urban areas, which was summarized through the long practice in China, is a new mode of promoting the coordinated development of urban-rural areas. The evaluation of the impact of this mode on promoting the coordinated development of urban-rural areas has great significance for reference for the urbanization development in other countries around the world. This paper takes Chenggong New District in Yunnan, China as an example, calculates the coordination degree of its urban and rural development in 1999, 2004 and 2009 with the use of urban and rural development coordination degree model, then makes clustering analysis of the urban and rural development coordination degree in various districts in Chenggong New District in 2009 with the use of Ward's method. Results indicate that a) the urban and rural development coordination degree of Chenggong New District is 0.359 in 1999, 0.545 in 2004, and 0.504 in 2009. The increase in the coordination degree year by year shows the mode of developing the rural areas with the aid of the urban areas has obvious effects on the coordinated development of urban-rural areas; b)the mode of developing the rural areas with the aid of the urban areas has obvious coordination impact on the aspects of infrastructure construction and basic livelihood guarantee, but has not enough coordination impact on the aspects of environmental governance, medical treatment and education; c) when the mode of developing the rural areas with the aid of the urban areas is applied, the coordinated development of industries and especially the agricultural industrialization development should be paid attention to.

Keywords: the mode of developing the rural areas with the aid of the urban areas, the coordinated development of urban-rural areas, Chenggong New District, China

1 Introduction

With the impetus of economic globalization and the rapid economic development, China has summarized the urban-rural integration mode of developing the rural areas with the aid of the urban areas under the guidance of scientific development concept [1]. The mode of developing the rural areas with the aid of the urban areas, which means the integration of urban and rural areas and aims at developing the rural economy with the help of the urban economic development and promoting the urban development by the potential development of rural areas at the same time, is a virtuous cycle development mode that urban and rural areas, as important resources and markets to each other, serve each other and commonly share modern civilization. China has made developing the rural areas with the aid of the urban areas as a national strategy for the integrated development of urban and rural areas since 2001, but there are now still huge differences in inf*rast*ructures and incomes between rural and urban areas [2]. Therefore, the mode of developing the rural areas with the aid of the urban areas requires scientific understanding and evaluation.

The researches on urban-rural integration have a long history, the much more famous of which are the Urban-rural Fusion Theory from Marx and Engels [3], Urban and Rural Development Theory from Theodore W. Schultz [4] and Central Place Theory proposed by W. Christaller and A. Lsch [5]. The 1957 Nobel Laureate Karl Gunnar Myrdal proposed Geographical Dual Economy Theory, making up for the flaw of the Growth Pole Theory [6]. Research on the coordination of urban and rural development evaluation focused on two aspects [7,8]. The first is the studies on the construction of the index evaluation of the urban and rural coordinated development. (Yang Zhenning (2008), Li Qin, Zhang Yuanhong, Zhang Jun et al (2009)) [9,10], the second is the empirical coordination evaluation research (Deng Ling, Wang Binbin (2008), Xue Hongxia, Liu Juxian, Luo Weiling (2010), Xiao Shien, Li Xianshi (2009), Zhang Deliang, Jiang Yue (2008)) [11-14]. It can be seen that scholars have conducted quite a few researches on the urban-rural integration, which provide related

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theoretic basis for this paper. In China, there are mature index system and corresponding model for the evaluation of the coordinated development of urban and rural areas, but quantitative evaluation of the mode of developing the rural areas with the aid of the urban areas is rarely involved in. Based on this situation, this paper takes Chenggong New District in Yunnan, China as an example, calculates the coordination degree of its urban and rural development in 1999, 2004 and 2009 with the use of urban and rural development coordination degree model, then makes clustering analysis with the use of Ward's method. The aim is to show the effectiveness and limited factors of promoting the urban-rural integration by the mode of developing the rural areas with the aid of the urban areas, and then come up with some policy suggestions when the mode is undertaken.

TABLE 1 The process of the urban-rural integration in China

Period	Stage	Characteristic
1949-1957	Infancy stage of urbanization	Urban-rural morphological characteristics: Unequal agricultural trade, the restrictive flow of urban-rural labor force, unequal rights between urban residents and farmers, enforceability, promoting urban areas with rural areas
1958-1965	Ups and downs stage of urbanization	
1966-1978	Stagnation stage of urbanization	
1979-1984	Recovery of urbanization	Weakened enforceability, the relatively flow of production factors, capital and interest groups oriented marketization
1985-1992	Stable development of urbanization	
1993-2000	Rapid development of urbanization	
2001 to ---	Scientific Development	Developing the rural areas with the aid of the urban areas under the guidance of the scientific development concept, the strategy understanding of urban and rural areas has been changed from "divide and conquer", "vigorously promote urbanization" to " developing the rural areas with the aid of the urban areas", the urban-rural policy has extended from the economic aspect to political, economic, social, cultural and other aspects

Source:
Sheng Guangyao, Research on urbanization patterns and its changes, China Social Sciences Press, 2008 (6), Beijing, 37-39
Zhao Qunyi, Exploration of the strategic transformation of the relationship between urban and rural areas and the urban-rural integration planning in the new era, Urban Planning Journal, 2009 (6), 47-49

2 The study area

Chenggong New District locates at the southeast the main city of Kunming in Yunnan province. Formerly it was named Chenggong Town, which included Quan County, Longcheng Town, Luoyang Town, Dounan Town, Dayu Village, Majinpu Village, Wujiaying Village and Qidian Village and was famous for its location near Tian Lake. On May 30, 2003, Yunnan government made the strategy of constructing "modern new Kunming". The construction of "Modern New Kunming" firstly started in Chenggong New District. In 2007-2008, Chenggong New District was under administrative redivision, and it has been divided into seven districts (see Figure 1). From the perspective of its development process, Chenggong New District has experienced the development from township to the new district. Before 2003, it was a town; after 2003, it was planned to be a new district, forming the mode of developing the rural areas with the aid of the urban areas. In addition, Chenggong New District borders Tian Lake which coupled with the increasingly serious pollution problems, and its main characteristic industry is the flower industry. Combining these three aspects, it is obvious that Chenggong New District is a typical area to evaluate the effectiveness and the limiting factors for the mode of developing the rural areas with the aid of the urban areas.

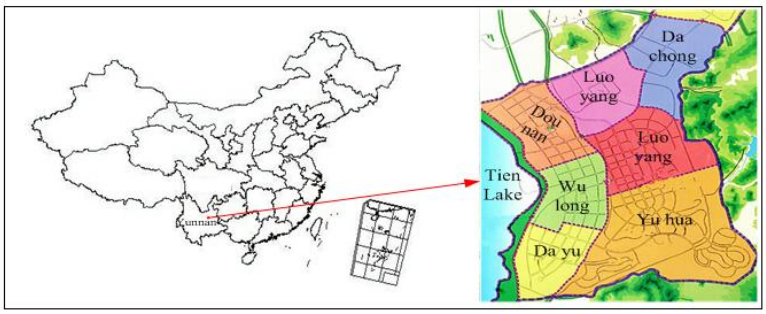

FIGURE 1 Chenggong New District location and zoning

3 Method and data

3.1 THE EVALUATION INDEX

Combining the indexes designed by previous scholars [15] and following the index selecting principles of comprehensiveness, representativeness, operability and comparability, this paper divides the coordinate development index system of urban-rural areas into four layers: A is the target layer, mainly reflecting the comprehensive coordinated development of urban and rural areas; B is the systematic layer, mainly reflecting the coordinated development of the three subsystems of economy, society, environment and space, which refines the target layer; C is the control layer, which further refines the system level indicators; D is the operating index layer, which can be used to measure the specific data to reflect the indicating level of the control layer. Those four index layers have formed a complete hierarchical structure of urban and rural coordinated development evaluation system (as shown in Table 2).

TABLE 2 The evaluation index system of the urban and rural coordinated development

Layer A	Layer B	Layer C	Layer D	Indicator variables
Integrated and Coordinated development of urban and rural areas	Urban and rural economy	Living standards	Per capita GDP (yuan)	X1
		Economic structure	The proportion of agricultural output accounted for the three industries output (%)	X2
		Revenue	Revenue (million)	X3
		Balanced economic benefits	Engel coefficient	X4
	Urban and rural society	Health	Number of beds (sheets) per thousand people	X5
			Number of doctors per thousand (people)	X6
			Financial health care expenditures (yuan)	X7
		Social Security	Minimum living security coverage (%)	X8
		Culture and Education	Educational services expense ratio (%)	X9
		Changes in population	Natural growth rate (‰)	X10
	Urban and rural environment and space	Ecological Construction and Environmental Governance	Urban forest coverage rate (%)	X11
			Sewage treatment rate (%)	X12
		Infrastructure	Car increasing ratio (%)	X13
			Villages traffic rate (%)	X14
			Fixed telephone penetration rate (%)	X15

3.2 MODEL

3.2.1 The evaluation model of the coordination degree of the urban and rural development

Existing studies have shown that the coordination degree models all make the coordinated evaluation on the basis of the comprehensive evaluation of the urban and rural areas. So the evaluation model of the integrated development of urban and rural areas should be determined firstly. To simplify the analysis of the problem and prevent the contained information overlap or cross, this paper uses the principal component analysis to reduce the dimension of the variables and classifies the highly linear original indicators related as a class, turning the original 15 indicators into a few mutual independent main ingredients, which reflect most of the information of the original variables. Principal component analysis takes advantage of the idea of using the least squares estimation to estimate the score of each principal component, which is to express the principal component as a linear combination of indicator variables, namely:

$$F_{ij} = b_{i1} \cdot X_1 + b_{i2} \cdot_{X2} + \cdots b_{in} \cdot X_n \quad (i = 1,2,3\cdots), \tag{1}$$

where F_{ij} is the principal component of the i-th, j-th region, b_{i1} is the sub-factor of the i-th principal component, X_n (n=1,2,...,15) is the nth indicator variables. And then summarize the weight αij of each principal component (the proportion of variance contribution rate of the principal component counting the total variance contribution rate) and come up with the comprehensive score of each urban and rural area in Chenggong New District. Normalize the score F_j and then we can get the score F of each urban and rural integrated development degree, which shows that the higher the score is, the higher the development level will be. The model of urban and rural comprehensive development degree is as follows:

$$F_j = \sum_{i=1}^{m} a_{ij} F_{ij}, \tag{2}$$

$$F = \frac{F_j - F_{j\,min}}{F_{j\,max} - F_{j\,min}} (i = 1,2,3\cdots). \tag{3}$$

After determining the integrated development model of urban and rural areas, we can come up with the coordination degree model of the urban and rural development. Through summarizing current research methods on coordination degree, we can classify them into two categories:

the distance coordination degree and the change coordination degree. Distance coordination degree aims at evaluating the degree primarily through measuring the static distance between each system and the concentration or dispersion degree of coordination between the systems; while change coordination degree aims at evaluating the degree primarily through measuring the consistency of relative changing degree between the systems [16]. According to the actual urban-rural integration development of Chenggong New District, the distance degree coordination is more suitable for its characteristics, so the paper selected this method to determine the urban-rural coordination development degree of Chenggong New District.

At present, the model of distance degree coordination contains two main types. One is to build the coordination degree model based on the dispersion degree between urban and rural development, namely:

$$B = 1 - \frac{S}{\overline{F}}, \tag{4}$$

where B ($0 \le B \le 1$) is the coordination degree of the urban and rural development; $\overline{F}$ is the average of the urban and rural integrated development degree; S is the standard deviation of development degree. The larger the value of B is, the better the degree the coordinated development between the various urban and rural areas will be, and vice versa.

The other is to build the model based on the overall and composite efficiency between urban and rural areas, the theoretical basis of which is the balance theory and utility theory. The balance theory means to maintain a balanced relationship between urban and rural areas, that is to increase A's efficiency without decreasing B's. The utility theory refers to the simultaneous development of urban and rural areas, making the maximum overall benefit [11]. The model is as follows:

$$B = \left\{ \frac{F_1 \cdot F_2}{\left(\frac{F_1 + F_2}{2} \right)^2} \right\}^k, \tag{5}$$

where B is the coordination degree, $0 \le B \le 1$; F_1 and F_2 represent the integrated development degree of the urban and rural areas; K is the adjustment coefficient, $K \ge 2$. Theoretically speaking, the smaller the deviation between F_1 and F_2 becomes, the higher the coordination degree between urban and rural areas will be, and vice versa.

Model (4) is applicable to evaluating multiple (two or more) urban and rural development coordination degrees. Based on this model, we can evaluate the coordination degree between the comprehensive development of each urban area and that of the rural area. Besides, we can also further determine the coordination degree of various subsystems including economic development level, the social status, the environment and space in urban and rural areas. In the end, we can find out the factors limiting the coordinated development of urban and rural areas and provide an important reference for the strategic decisions for the urban and rural coordinated development. Model (5) is applicable to the coordination evaluation between two subsystems, namely, the urban subsystem and the rural subsystem, which uses a whole to represent the development of different rural areas. This may lead to the question whether the development index of the rural area selected is typical and comprehensive. Therefore, the paper selects model (4) as the coordination degree model.

In summary, Equations (1), (2), (3), (4) constitute the evaluation model of the coordination degree of the urban and rural development.

According to previous studies on the coordination degree [12,13], and combining practice, the criteria of the coordination degree of the urban and rural development in this paper is shown in Table 3.

TABLE 3 The criteria of the coordination degree of the urban and rural development

Coordination degree	Very coordinated	Coordinated	Primary coordinated	Less coordinated	Not coordinated
B' value	B≥0.8	0.6≤B≤0.8	0.4≤B≤0.6	0.2≤B≤0.4	B≤0.2

3.2.2 Ward's method

This method was proposed by Ward. Divide n samples into k categories: $G_1, G_2 \ldots G_k$, $X_i^{(t)}$ represents the i-th sample in G_t, n_t represents the sample number of in G_t, $\overline{X}_i^{(t)}$ is the gravity of G_t, and then the sum of squared deviations of the samples in G_t is as follows:

$$S_t = \sum_{i=1}^{n_t} (X_i^{(t)} - \overline{X}_i^{(t)})'(X_i^{(t)} - \overline{X}_i^{(t)}), \tag{6}$$

The sum of squared deviations of the samples in k categories is as follows:

$$S = \sum_{t=1}^{k} S_t = \sum_{t=1}^{k} \sum_{i=1}^{n_t} (X_i^{(t)} - \overline{X}_i^{(t)})'(X_i^{(t)} - \overline{X}_i^{(t)}). \tag{7}$$

3.3 DATA SOURCES

The units of measurement are changeable and the levels of the variable values are very different from each other. In order to eliminate its effects on the analysis of development and coordination degrees of urban and rural areas, the paper uses the statistical analysis software SPSS16.0, and applies dimensionless method to the raw data in 1999, 2004, 2009 from Chenggong New Town Statistical Year-

book and Yunnan Provincial Statistical Yearbook with the use of *Z*-score method, namely

$$Z = \frac{x_i - \bar{x}}{S}. \quad (8)$$

4 Results

4.1 EXTRACTION OF PRINCIPAL COMPONENTS AND WEIGHTS

From the output results of the principal component analysis of the index data of Chenggong New District in 2009 by the software SPSS16.0, it is obvious that there is a high correlation between the 15 indicator variables, indicating that it is very necessary to reduce the dimension of the data and take the principal components out. (as shown in Table 4) in accordance with the principle that the eigenvalue is greater than 1. The paper extracted four principal components respectively represented by F_{1j}, F_{2j}, F_{3j} and F_{4j}. After calculating, the accumulated variance contribution rate of the four principal components reached 91.236%, which can reflect most of the information of the 15 indicators used in this paper. According to the above calculations, we can get the weights of the four principal components as follows: 28.5%, 26.47%, 25.58% and 19.45% respectively.

TABLE 4 Total variance explained

Serial number	The initial eigenvalue			Square load rotation sum		
	Total	Variance %	Cumulative%	Total	Variance %	Cumulative %
1	7.203	48.019	48.019	3.902	26.014	26.014
2	2.962	19.750	67.768	3.623	24.151	50.165
3	2.096	13.972	81.740	3.500	23.335	73.500
4	1.424	9.496	91.236	2.660	17.736	91.236
5	.931	6.207	97.443			
6	.308	2.052	99.495			
7	.076	.505	100.000			
8	5.287E-16	3.525E-15	100.000			
9	3.337E-16	2.225E-15	100.000			
10	2.291E-16	1.527E-15	100.000			
11	1.751E-16	1.167E-15	100.000			
12	8.875E-17	5.917E-16	100.000			
13	6.764E-18	4.509E-17	100.000			
14	-2.216E-16	-1.477E-15	100.000			
15	-3.985E-16	-2.657E-15	100.000			

4.2 DETERMINING PRINCIPAL COMPONENT FACTORS

From Table 5 it can be seen that the load value of the first principal component is relatively large in sewage treatment (X12), Engel's coefficient (X4), the number of one thousand people owning beds (X5) and the number of one thousand people having doctors (X6), as a result F1 mainly reflects the environmental and healthy level; The second principal component is relatively large in the forest coverage in urban and rural areas (X11), villages traffic rate (X14), car increasing ratio (X13) and per capita GDP (X1), so F2 mainly reflects the infrastructure and environmental indicators; The load value of the third principal component is larger in the natural growth rate (X10), fiscal health care expenditure (X7), fixed telephone penetration rate (X15), and minimum living security coverage (X8), and they are all positive correlations, so F3 mainly reflects the social development indicators of the urban and rural areas; The load value of the fourth principal component is larger in the educational services expense ratio (X9) and revenue (X3), so F4 mainly reflects the urban and rural economic and educational development.

TABLE 5 Rotated component matrix

	Factor			
	1	2·	3	4
X12	.957	.054	.247	.051
X4	-.860	-.419	.036	.119
X5	.769	.095	-.006	.628
X6	.743	.396	.117	.486
X11	-.230	-.875	.360	.152
X14	.257	.868	.333	.213
X13	-.009	.844	.295	.405
X1	-.565	-.700	-.294	-.019
X2	-.161	-.647	-.491	.530
X10	-.165	.218	.879	.241
X7	.310	.113	.867	.129
X15	.508	.053	.651	.046
X8	.420	.219	.599	.472
X9	.241	.147	.278	.833
X3	-.152	-.076	.619	.711

4.3 EVALUATION OF URBAN AND RURAL INTEGRATED DEVELOPMENT

According to Equations (1), (2), (3) and the data in Table 4 and 5, the integrated development degree can be calculated for each urban and rural area in Chenggong New District in 2009 (as shown in Table 6).

TABLE 6 Urban and rural development degree of Chenggong New District in 2009

	F1	F2	F3	F4	F
Quan District	0.165	0.624	1.000	1.000	1.000
Longcheng Street	1.000	0.791	0.495	0.224	1.000
DounanStreet	0.361	0.714	0.000	0.776	0.547
Wujiaying Street	0.660	0.476	0.905	0.074	0.823
Luolong Street	0.102	0.842	0.618	0.270	0.639
Wulong Street	0.000	1.000	0.612	0.023	0.589
Yuhua Street	0.119	0.955	0.520	0.000	0.570
QidianStreet	0.063	0.000	0.403	0.062	0.000

Based on the above methods, this paper makes the principal component analysis to the indicator data in 2004 and 1999 respectively, and ultimately gets the comprehensive development degree of Chenggong New District in 2004 and 1999 (see Table 7), which is used as the calculation basis of urban and rural coordination degree.

TABLE 7 Urban and rural development degree of Chenggong New District in 1999 and 2004

	The whole county	**Longcheng town**	**Luoyang Town**	**Dounan Town**	**Dayu Village**	**Majinpu Village**	**Wujiaying Village**	**Qidian Village**
F1999	1.000	0.878	0.550	0.608	0.228	0.503	0.339	0.000
F2004	1.000	0.892	0.838	0.832	0.581	0.587	0.777	0.000

4.4 ANALYSIS OF URBAN AND RURAL INTEGRATED DEVELOPMENT

According to Equation (5), a comprehensive calculation of the coordinated development of urban and rural areas in 1999, 2004 and 2009 is conducted, and the results are shown in Table 8.

TABLE 8 The coordination degree of Chenggong New District in 1999,2004,2009

Year	**1999**	**2004**	**2009**
Coordination degree	0.359	0.545	0.504
Coordination phase	Less coordinated	Primarily coordinated	Primarily coordinated

Meanwhile, the author calculated the coordination degrees of the four principal components of Chenggong New District based on the scores of each principal component of urban and rural areas in 2009. And then we got the coordination degree of the principal components in sequence (see Table 9). That the development of urban areas and the development of rural areas are uncoordinated in the first and the fourth principal components is the major factor for limiting the coordinated development of urban and rural areas in Chenggong New District.

TABLE 9 Coordination degree of four principal components

Principal component category	F1	F2	F3	F4
Coordination degree	-0.13	0.52	0.46	-0.24
Coordination phase	Uncoordination phase	Primary coordination phase	Primary coordination phase	Uncoordination phase

To analyze the integrated development of each urban and rural area in 2009 more directly, the paper chooses four principal components as the indicator variables of the cluster analysis and classifies various urban and rural levels. The cluster analysis tree is as follows.

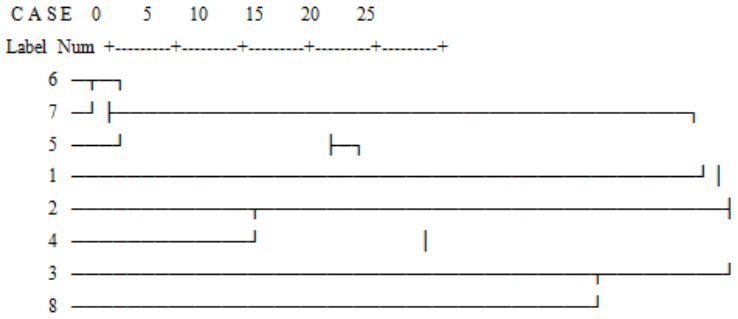

FIGURE 2 Cluster analysis tree

Note: 1:Quan District; 2:Longcheng Street; 3:Dounan Street; 4:Wujiaying Street; 5:Luolong Street; 6:Wulong Street; 7:Yuhua Sreet; 8 Qidian Street

5 Discussion and results

The mode of developing the rural areas with the aid of the urban areas is valid. The coordination degrees of urban and rural development of chenggong new district in 1999, 2004 and 2009 are respectively 0.359, 0.545, and 0.504. So it shows that the urban and rural areas developed rapidly and coordinately from 1999 to 2004, and the urban areas drove the development of rural areas in this short time. The result matches the year 2003 when the Provincial Party Committee and Yunnan government determined the overall strategy of "Modern New Kunming", with Chenggong as a key development area, and the development strategy of "developing the rural areas with the aid of the urban areas" through re-planning. The implementation time consistency of the mode of developing the rural areas with the aid of the urban areas indicates the development strategy mode is valid.

The mode of developing the rural areas with the aid of the urban areas has obvious coordination impact on the aspects of infrastructure construction and basic livelihood guarantee, but has not enough coordination impact on the aspects of environmental governance, medical treatment and education. According to Table 5, the first principal component reflects the level of environmental management and health care, the second represents the infrastructure, the third represents the basic livelihood guarantee, and the fourth reflects the development index of economy and education of urban and rural areas. According to Table 7, the second and the third principal components are coordinated while the first and fourth principal components are uncoordinated. The mode of developing the rural areas with the aid of the urban areas has obvious coordination impact on the aspects of infrastructure construction and basic livelihood guarantee, but has not enough coordination impact on the aspects of environmental governance, medical treatment and education.

Based on the results from Cluster analysis in Figure 3, it can be seen that Dounan Street and Qidian Street are in the last category. Dounan District locates in the northwest of the New District, which mainly relies on Dounan international flower auction trading center and is a flower industry dominated district. Qidian Street is dominated by agriculture and doesn't combine well with the industrialization and urbanization. Besides, each development index is still relatively backward. As a result, developing the rural areas with the aid of the urban areas means that urban areas should service the rural areas well. In addition, the coordinated development of industries and especially the agricultural industrialization development should be paid attention to. Only in this way can it play a better role.

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References

[1] Zhao Q 2009 Exploration on the strategic transformation of the relationship between urban and rural areas and urban and rural planning in the new era *Urban Planning Forum* (6) 47-9 (*in Chinese*)
[2] Liu Q 2009 Studies on the pathway of integration of urban and rural areas in the new rural construction process *Hebei Agricultural Sciences* (12) 86-7 (*in Chinese*)
[3] Fei L2010 Integration of urban and rural industries: Contemporary horizons of the urban-rural fusion of Marxist ideology *heory Research* (1) 62-65 (*in Chinese*)
[4] Nerlove M 2001Transforming Economics: Theodore W. Schultz, 1902–1998 in Memoriam *Economic journal* (12) 726-48
[5] Hottes R, Christaller W 1983 Annals of the Association of American *Geographers* (3) 51-4
[6] Yu H 2005 Innovative thinking about the system of overall planning urban and rural Development in Shanghai *Shanghai Academy of Social Sciences Press* 330-1 (*in Chinese*)
[7] Xia A, Xu X, Xue D 2003 Research review of Chinese Urban and Rural Coordinated Development Research *Geography* (5) 56-60 (*in Chinese*)
[8] Song H, Jiang C, Du Y 2004 Research review of overall planning urban and rural development *Research in the world* (10) 34-7
[9] Yang Z 2008 Research on index of urban and rural development - Based on the timing ordinal number *Economic Management* (11) 35-6
[10] Li Q,Zhang Y, Zhang J, etc 2009 Evaluation system of urban and rural development: Research overview and vision *China Rural Survey* (5) 2-10 (*in Chinese*)
[11] Deng L, Wang B 2008 Research on evaluation index System of Urban and Rural Development - Based on application of Wenjiang District in Chengdu *Southwest University of Nationalities (Humanities and Social Sciences Edition* (4) 80-4 (*in Chinese*)
[12] Xue H, Liu J, Luo W 2010 Research on coordinated development degree of urban and rural areas in Guangzhou *China Land Science* **24**(8) 39-45 (*in Chinese*)
[13] Xiao S, Li X 2009 Analysis of the coordinated development of urban and rural economy in Hebei *Technology & Management Research* (5) 113-5 (*in Chinese*)
[14] Zhang D, Jiang Y 2008 Empirical analysis of urban and rural overall development in Yunnan Province *East China Economic Management* (11) 42-6 (*in Chinese*)
[15] Jing PQ 2003 Progress and dynamic of urban-rural integration *Urban Planning* (6) 30-5 (*in Chinese*)
[16] Lai L W-C 2004 Spontaneous Catallaxis in Urban & Rural Development Under Planning by Contract in a Small Open Economy: The Ideas of Hayek and Mises at Work in Town & Country Planning in Hong Kong *The Review of Austrian Economics* **17**(2-3) 155-86

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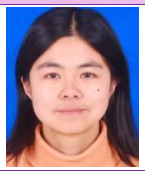

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