



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

# Spatial Analysis of the Evolvement of Urban and Rural Economic Disparity in Yunnan Province, China

SUN Li-ping \*

College of Mathematic and Information Science, Qujing Normal University, Qujing 655011, China

**Abstract** The per capita disposable income of urban households and the per capita net income of rural households in Yunnan Province are selected as the variable indices. Data are from the *Yunnan Statistical Yearbook* and the *Yunnan Statistical Yearbook*. Their index and *RHL* value are used to carry out quantitative research on the occurrence, development and change of urban and rural economic disparity in Yunnan Province, China. Regression analysis on the evolvement trend of urban and rural economic disparity and spatial analysis on the convergence and divergence of urban and rural disparity caused by economic growth in Yunnan Province are carried out. Result shows that cities in Yunnan Province show a downward convergence; while rural areas show a downward divergence in the years 1978–2007, causing the economic disparity between urban and rural areas. Therefore, urban and rural disparity increases in Yunnan Province and the development of rural areas lags far behind the development of urban areas. Urban and rural economic disparity in Yunnan Province shows an inverted "U" shape of Kuznets Curve. In order to promote the coordinated development of urban and rural economy, suggestions are put forward, such as adopting the unbalanced development strategy, accelerating the overall economic development, promoting the development of small and medium-sized cities, enhancing the integration of urban and rural economics, appropriately supporting rural areas under poverty, and fully exerting the comparative advantage.

**Key words** Urban and rural economic disparity, Theil index, Yunnan Province, China

Since the reform and opening up, economic difference between urban and rural areas has become more and more obvious with the rapid development of Chinese economy. The increasing development gap between urban and rural areas will inevitably result in competition and opposition between urban and rural areas, which is not conducive to the coordination of the overall economy and poses a potential threat to social harmony and stability. Therefore, it is necessary to research on the occurrence, change and control of economic disparity between urban and rural areas, so as to find out a way to solve the problem of urban and rural disparity. At present, discussion on economic disparity in academic circle mainly focuses on regional economic disparity. For instance, Lin Yifu, Ku Dadao, Li Xiaojian, Ou Xiangjun, Lu Feng, Jiang Guofu and other well-known economical scholars and geographers have studied on the scale and spatial variation trend of regional economic disparity in China in different historical periods from different aspects, involving the economic disparity between southern and northern regions, among provinces, and among eastern, central and western regions<sup>[1–6]</sup>. Economic disparity between urban and rural areas is an important part of the regional economic disparity. Systematic research on the economic disparity between urban and rural areas, which is a main aspect of regional economic disparity, provides theoretical premise and realistic basis for the construction of socialist new countryside and the integration of city-country economy.

## 1 Data source and research method

**1.1 Data source** The per capita disposable income of urban households and the per capita net income of rural households in Yunnan Province are selected as the variable indices. The time period analyzed is the years 1978–2007. Data are from the *Yunnan Statistical Yearbook* and the *Yunnan Statistical Yearbook*<sup>[7–8]</sup>.

### 1.2 Research method

**1.2.1 Characteristic.** Analysis Method for the evolvement of urban and rural economic disparity in Yunnan Province. There are various indices to quantitatively describe the urban and rural disparity, such as the Geordie Coefficient, the standard deviation, the weighted variation coefficient, and the coefficients of deviation from mean. In this paper, Theil index and *RHL* value are selected, because Theil index can fully reflect the impact on population weight, and income weight and *RHL* value can directly reflect the relative differences between urban and rural development.

Calculation equation of Theil index is

$$T = \sum_i \frac{Y_i}{Y} \log \left( \frac{Y_i/Y}{N_i/N} \right), \quad (1)$$

where  $T$  is Theil index, weighted by the proportion of GDP,  $Y$  and  $N$  are the total income and total population of Yunnan Province, respectively,  $Y_i$  and  $N_i$  are the income and population of urban and rural population in Yunnan Province, respectively. Greater value of  $T$  indicates the greater differences between rural and urban areas.

Calculation equation of *RHL* value is

$$RHL = V_i/P_i, \quad (2)$$

where  $V_i$  and  $P_i$  are per capita disposable income of urban Yunnan at the  $i$ th year, *RHL* is the relative development disparity between urban and rural areas. The greater the *RHL* is, the

bigger the development disparity becomes.

**1.2.2 Spatial analytical method for the convergence and divergence of urban and rural disparity caused by economic growth in Yunnan Province.** The expansion of urban and rural difference is caused by the different growth speeds of economy. According to the per capita GDP in Yunnan Province, if the per capita disposable income of urban households and the per capita net income of rural households are close to the provincial average level, urban and rural disparity is considered as convergence, no matter the values are lower or higher than the provincial average level. And if the two values are far from the provincial average level, it is considered as divergence<sup>[9]</sup>.

Hence, the equation is

$$y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i}, \quad (3)$$

$$x_i = \frac{X_i - \bar{Y}_i}{\bar{Y}_i}, \quad (4)$$

where  $y_i$  and  $x_i$  are the relative development indices of rural and urban areas,  $Y_i$  and  $X_i$  are the per capita disposable income of urban households and the per capita net income of rural households of Yunnan Province in the  $i$ th year, and  $\bar{Y}$  is the per capita GDP of Yunnan Province in the  $i$ th year.

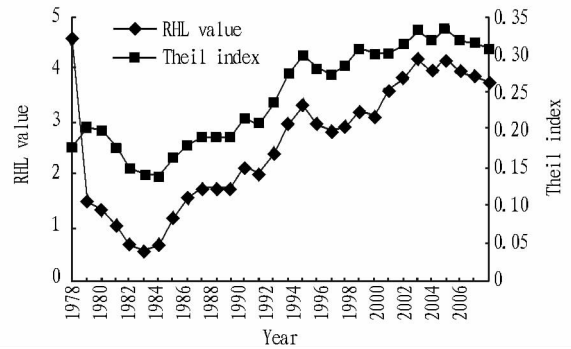
## 2 Result and analysis

**2.1 Evolvement characteristics of urban and rural economic disparity in Yunnan Province** According to equations (1) and (2), evolvement process of urban and rural economic disparity in Yunnan Province in the years 1978 and 2007 is obtained, denoted by Theil index and *RHL* value (Table 1). Based on Table 1, Fig. 1 illustrates the evolvement curve of urban and rural economic disparity in Yunnan Province in the years 1978–2007, showing the general features of the evolvement of urban and rural economic disparity.

**Table 1 Evolution of economic disparity between urban and rural areas in Yunnan Province in the years 1978–2007**

Year	Theil index	<i>RHL</i> value	Year	Theil index	<i>RHL</i> value
1978	0.318 7	2.51	1993	0.207 2	3.91
1979	0.104 6	2.89	1994	0.230 6	4.27
1980	0.094 6	2.85	1995	0.206 9	4.02
1981	0.071 3	2.51	1996	0.197 8	3.90
1982	0.045 6	2.12	1997	0.203 2	4.04
1983	0.039 2	1.99	1998	0.221 9	4.36
1984	0.046 6	1.96	1999	0.217 8	4.30
1985	0.082 1	2.31	2000	0.254 2	4.28
1986	0.109 1	2.56	2001	0.267 6	4.43
1987	0.120 4	2.71	2002	0.293 0	4.74
1988	0.120 2	2.70	2003	0.274 7	4.51
1989	0.121 1	2.73	2004	0.294 4	4.76
1990	0.151 5	3.09	2005	0.276 1	4.54
1991	0.141 3	2.97	2006	0.270 2	4.47
1992	0.168 5	3.34	2007	0.260 7	4.36

Fig. 1 illustrates that after eliminating the abnormal point, Theil index shows an overall upward trend with fluctuation in the years 1979–2007, evaluated by Theil index (the year 1978), indicating that the urban and rural economic disparity is increasing with the growth of economy. In the year 1978, Theil index is 0.318 7, which is extremely high, and then it declines and rea-



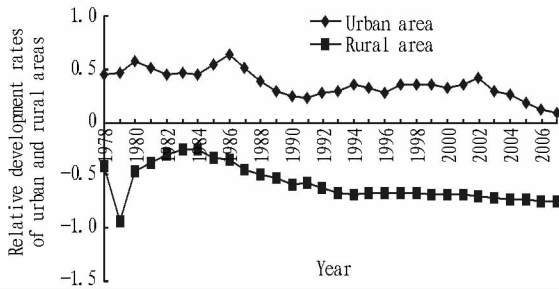
**Fig. 1 Evolution curve of economic disparity between urban and rural areas in Yunnan Province in the years 1978–2007**

ches the minimum value of 0.0466 in the year 1984, an annual decrease of 8.3%. This shows that urban and rural disparity is gradually reduced in the years 1978–1984, because after the implementation of contract responsibility system in the year 1978 in rural China, agricultural productivity has been greatly improved and the income growth of rural residents is faster than that of urban residents. In the years 1985–2004, Theil index shows an upward trend with an annual increasing rate of 10.93%, showing that urban and rural economic disparity in Yunnan Province is enlarging in this period and the development speed of rural areas is far lower than that of urban areas. After the year 2005, urban and rural disparity shows a decreasing trend with slow speed. According to the *RHL* value, change tendency of *RHL* value curve is almost the same as that of Theil index curve, which both decrease in the years 1978–1984, showing a two-fold to four-fold increase in the years 1984–1994. *RHL* value is basically above 4.0 after the year 1994, and falls a little after the year 2004.

**2.2 Spatial analysis on the convergence and divergence of urban and rural disparity caused by economic growth in Yunnan Province** According to the original data, Table 2 reports the urban and rural relative development indices in Yunnan Province in the years 1978–2007 based on equations (3) and (4). Fig. 2 illustrates the visual picture of Table 2, which can be used to analyze the convergence and divergence of urban and rural economic disparity in Yunnan Province.

**Table 2 Relative development indices of urban and rural areas in Yunnan Province in the years 1978–2007**

Year	Theil index	<i>RHL</i> value	Year	Theil index	<i>RHL</i> value
1978	0.45	-0.42	1993	0.30	-0.66
1979	0.46	-0.94	1994	0.36	-0.68
1980	0.57	-0.47	1995	0.32	-0.67
1981	0.52	-0.39	1996	0.27	-0.67
1982	0.45	-0.31	1997	0.35	-0.66
1983	0.46	-0.26	1998	0.36	-0.67
1984	0.45	-0.25	1999	0.35	-0.68
1985	0.54	-0.33	2000	0.32	-0.69
1986	0.64	-0.36	2001	0.35	-0.69
1987	0.51	-0.44	2002	0.42	-0.70
1988	0.39	-0.49	2003	0.30	-0.71
1989	0.30	-0.52	2004	0.26	-0.73
1990	0.24	-0.59	2005	0.18	-0.73
1991	0.23	-0.58	2006	0.12	-0.74
1992	0.27	-0.62	2007	0.09	-0.75



**Fig. 2** Convergence and divergence of urban and rural economic disparity in Yunnan Province in the years 1978 –2007

Fig. 2 shows that urban development of Yunnan Province shows a downward convergence; while rural development shows an upward convergence in the years 1979 –1984, leading to a gradually narrowing gap between urban and rural areas. In the years 1985 –1994, development speed of urban area is significantly faster than the average economic growth of the whole Yunnan Province, showing an upward divergence; but development speed of rural area is significantly slower than the average development speed of Yunnan Province, showing a downward divergence. Thus, the difference in urban and rural development leads to the rapid growth of urban and rural disparity. In the years 1995 –2003, development of urban areas shows a downward convergence trend with smooth fluctuation; but development of rural areas shows a downward divergence trend. Thus, the overall disparity increases. In the years 2004 –2007, urban area shows downward convergence and rural area shows a downward divergence. Thus, the overall disparity decreases.

In general, cities in Yunnan Province show a downward convergence; while rural areas show a downward divergence, causing the economic disparity between urban and rural areas in the years 1978 –2007. Therefore, urban and rural disparity increases in Yunnan Province and the development of rural areas lags far behind the development of urban areas.

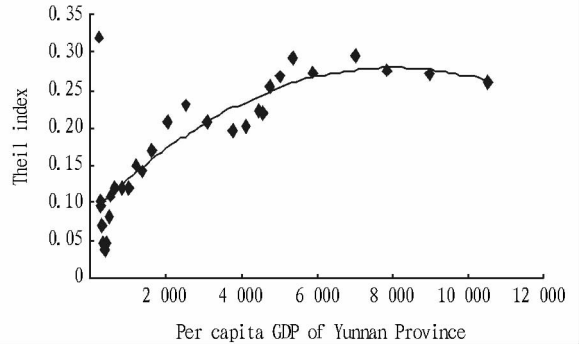
**2.3 Regression analysis on the evolvement trend of urban and rural economic disparity in Yunnan Province**

Taking the per capita GDP of Yunnan Province in a certain year as independent variable, and the Theil index in the corresponding year as dependent variable, regression analysis is carried out in a timed sequence. Hence, the regression equation is

$$y = -3E - 0.9x^2 + 5E - 0.5x + 0.087 8 \tag{3}$$

According to the regression equation, coefficient of determination in regression equation is  $R^2 = 0.962 9$ , indicating that fitting degree of regression equation is relatively good. Fig. 3 illustrates that urban and rural economic disparity shows an inverted "U" shape with the growth of economy in Yunnan Province in the years 1979 –2007. In the year 1979 –2003, urban and rural economic disparity shows a trend of expansion. After the year 2004, expansion of economic disparity slows down. According to the research on income disparity and economic growth by Kuznets, income disparity increases with economic growth during the process of economic development. After entering into a certain stage, income disparity is reduced with the economic growth and shows an inverted "U" shape<sup>[10]</sup>. Based

on the regression analysis on urban and rural economic disparity in Yunnan Province, it can be obtained that urban and rural economic disparity in Yunnan Province shows an inverted "U" shape of Kuznets Curve with the growth of economy.



**Fig. 3** Trend analysis on the evolvement of urban and rural economic disparity in Yunnan Province in the years 1978 –2007

**3 Conclusion and suggestion**

**3.1 Conclusion** Theil index is taken as the basic analysis curve to carry out quantitative description of urban and rural economic disparity and its development trend in Yunnan Province. Result shows that in the years 1978 –2007, urban and rural economic disparity in Yunnan Province is gradually expanding due to the unbalanced development. In other words, development speed of urban area is far faster than that of rural areas, leading to the disparity between rural and urban areas. According to the regression model, urban and rural disparity in Yunnan Province shows an inverted "U" shape of Kuznets Curve. However, it should be noted that both Theil index and regression curve are relatively smooth after the year 2004. Thus, the future change trend of urban and rural disparity still needs further practical examination.

**3.2 Suggestion** In order to promote the coordinated development of urban and rural economy, the following suggestions are put forward:

**3.2.1** Adopting the unbalanced development strategy; accelerating the overall economic development. We should avoid imposing uniformity in all cases, and slowing down the development speed of urban area blindly in order to narrow the urban and rural gap. Yunnan Province is a backward western province with its economic development level far behind the eastern coastal areas. Yunnan Province still belongs to the development stage of early industrialization. Therefore, radiation and leading role of core city should be strengthened. And unbalanced development strategy should be adopted in order to integrate the limited resources into departments and areas with high efficiency and good basic conditions, and to improve the economic benefits and to accelerate the overall economic development.

**3.2.2** Promoting the development of small and medium – sized cities; enhancing the integration of urban and rural economics. To minimize the urban and rural disparity, small and medium – sized cities should be developed to be a new economic

(4) The government should supply fiscal subsidies for farmers' cooperative organizations who are well run and have obviously pushed forward the development of "three agricultural problems" concerning agriculture, countryside and farmers. About the items concerning agriculture, the government should give certain priority to farmers' cooperative organizations. For instance, the government can provide raw materials in production terms for farmers' cooperative organizations by directly subsidy the prices, meanwhile, the government should launch a set of laws and regulations for farmers' cooperative organizations, thus to provide basis for the tax deduction and credit preference.

## 4 Conclusions

Generally speaking, the farmers' cooperative organizations of Yunnan Province still lays in the developmental stage, so there are still many problems and shortages. I just probe into the qualitative analysis of these problems and provide countermeasures, but as for the quantitative analysis of these problems still needs further analyzing. Supported by the governments from various levels and financial institutions, the farmers' cooperative organizations in Yunnan Province will develop better and better.

## References

- [1] JIANG ML. The development model of farmers' cooperative organizations—an investigation from Yunnan Province[J]. Jiangsu Rural Economy, 2006(12):67–68. (in Chinese).
- [2] Chongqing Wanzhou Branch of Agricultural Bank of China. Predicament and outlet of financial support for "Three Agriculture" [J]. Guizhou Rural Finance, 2009(4):17–20. (in Chinese).
- [3] CAO LP. Investigation and consideration of financial support for

(From page 3)

growth point, so as to accelerate the development of adjacent villages, to reinforce the linkage effects with overall economy, to share complementary advantages, to connect the growth poles with different grades, and to promote the integration of urban and rural economic development.

**3.2.3** Appropriately supporting rural areas under poverty; fully exerting the comparative advantage. Rural areas under poverty have relatively weak self-development and self-accumulation abilities. Without the guidance from the outside, these rural areas are bound to fall into the vicious circle of poverty. Therefore, we should exert the macro-control function of governments, increase financial support for poor areas, give full play to their comparative advantages, and promote the sustained, coordinated and rapid development of urban and rural economy.

## References

- [1] LIN YF, CAI F, LI Z. Analysis of regional disparities in the period of China's economic transformation[J]. Economic Research Journal, 1998(6): 12–15. (in Chinese).

- farmers' cooperative organizations[J]. Times Finance, 2009(2):85–56. (in Chinese).
- [4] DING H. Predicament and countermeasures of financial support for farmers' cooperative organizations[J]. China Collective Economy, 2008(5):165–166. (in Chinese).
- [5] The Heilongjiang Branch of Bank of China. Exploration of a new approach to financial support for the development of modern agriculture[J]. Heilongjiang Finance, 2009. (in Chinese).
- [6] WANG AQ, HAN Y. On Xinjiang finance and development of the farmers' professional economic cooperative organization[J]. Finance & Economics of Xinjiang, 2009(2):66–71. (in Chinese).
- [7] ZHANG C. Investigation of the development of farmers' cooperative organizations and their financial support[J]. Reform & Opening, 2006(8):21. (in Chinese).
- [8] KAN XX, HAN XL. Empirical analysis on rural financial support situations and farm's income increase[J]. Journal of Anhui Agricultural Sciences, 2010, 38(10):405–406, 440. (in Chinese).
- [9] LIANG JX, GUO P. Empirical analysis on the efficiency of rural financial service in Heilongjiang Province[J]. Science-Technology and Management, 2010, 12(1):11–15. (in Chinese).
- [10] DENG L, WANG YP. Supervision of foreign banks with the opening of rural financial market[J]. Journal of Anhui Agricultural Sciences, 2009, 37(15):408–410. (in Chinese).
- [11] MIN ZT, YAN ZX. An empirical study on China's rural financial organization's market performance[J]. Statistics & Information Forum, 2008, 23(12):20–26. (in Chinese).
- [12] SUN CX, ZHONG JQ. Study on the reform direction of China's rural credit cooperatives[J]. Journal of Anhui Agricultural Sciences, 2009, 37(25):414–417. (in Chinese).
- [13] GU HB, ZHOU ZQ. The analysis of the supplies of the rural finance system and its efficiency[J]. China Economist, 2007(8):54–56. (in Chinese).
- [14] ZHANG XT, LUO JC. Empirical research on rural finance supporting agricultural development[J]. Journal of Anhui Agricultural Sciences, 2009, 37(28):446–448. (in Chinese).

- [2] LU DD, XUE FX. China's regional development report—1997[M]. Beijing: The Commercial Press, 1998. (in Chinese).
- [3] LI XJ, QIAO JJ. County level economic disparities of China in the 1990s[J]. Acta Geographica Sinica, 2001, 56(2):136–145. (in Chinese).
- [4] OU XJ, SHEN ZP, ZHU CG. Spatial analysis of evolvement of regional economic inequality in Jiangsu Province[J]. Economic Geography, 2007, 27(1):78–83. (in Chinese).
- [5] LU F, XU JH. Study on the decomposition of the regional economic inequalities in China based on different regional division systems[J]. An Geography, 2006, 88(2):77–81. (in Chinese).
- [6] JIANG GF, LIU CY. Study on the spatial difference of county economic in Henan Province[J]. Economic Geography, 2008, 28(4):636–639. (in Chinese).
- [7] National Bureau of Statistics of China. Yunnan yearbook[M]. Beijing: China Statistics Press, 1978–2007. (in Chinese).
- [8] Statistical Bureau of Yunnan Province. Yunnan statistical yearbook[M]. Beijing: China Statistics Press, 1978–2007. (in Chinese).
- [9] LONG GY, NG MK. The political economy of intra-provincial disparities in post-reform China: a case study of Jiangsu Province[J]. Geoforum, 2001, 32:215–234.
- [10] DING SB, WANG RC, LI XM, et al. Regional economics[M]. Beijing: Higher Education Press, 2003: 136–137. (in Chinese).