Scientific Research Publishing

Modern Economy, 2024, 15, 917-928
https://www.scirp.org/journal/me
ISSN Online: 2152-7261
ISSN Print: 2152-7245

The Realization of Lewis Turning Point Is Seen from the Labor Production Efficiency of Urban and Rural Sectors

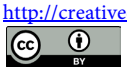
—A Statistical Study Based on Data

Jianfeng Jiao

College of Humanities and Law, Henan Agricultural University, Zhengzhou, China
Email: huoxibgzi343@gmail.com

How to cite this paper: Jiao, J. F. (2024). The Realization of Lewis Turning Point Is Seen from the Labor Production Efficiency of Urban and Rural Sectors—A Statistical Study Based on Data. *Modern Economy, 15,* 917-928.
https://doi.org/10.4236/me.2024.1510048

Received: July 12, 2024
Accepted: October 19, 2024
Published: October 22, 2024



Abstract

This paper aims to provide a new understanding of the current state of China's primary and secondary industries and the urban-rural dual structure. The study uses GDP data, employment data, and urbanization rates from 31 provinces between 1990 and 2022, and employs a threshold effect model for statistical analysis. The results indicate that urbanization, once reaching a certain threshold, positively affects labor productivity in the primary industry, shifting from negative influence. Meanwhile, although the secondary industry maintains a positive influence, a significant decline is observed at higher urbanization rates. The study concludes that China crossed the first Lewis turning point around 2017.

Keywords

Urban-Rural Dual Structure, Lewis Turning Point, Urbanization Rate, Labor Transfer

1. Introduction

According to data released by the National Bureau of Statistics, the urban population has more than tripled, growing from 144 million in 2000 to 493 million by 2020. The total floating population has also increased from 121 million people in 2000 at a rate of 100 million people per decade, and by 2020, the total number of floating population in China has reached 376 million. The urbanization rate has reached around 65% by 2022. The above data reflect a clear upward trend in population mobility and communication between regions. However, the author noticed that more than a decade ago, the academic community was generally concerned

about the problem of labor shortage. Since the labor supply situation is particularly important to developing countries, and the Lewis turning point is an important indicator to judge the labor attack situation, there has been a long discussion on whether the demographic dividend and the Lewis turning point will be realized in China. The first known to raise this question was clearly mentioned by Wang Cheng (2005) in his paper "The 'inflection point' of labor supply and demand and China's dual economic transformation" after the first "labor shortage" in China in 2004. Later, many scholars have discussed this issue from different perspectives.

After reading the literature before 2020, Yi Dinghong (2020) roughly classified the main research methods into three categories. The first is to judge the Lewis turning point based on the absolute surplus of the rural labor force. Cai Fang predicts that China's Lewis view should be in 2004, while the demographic dividend will disappear around 2015. However, some scholars such as Liu Wei and Hu Ying believe that China's Lewis turning point is far from coming. The second is to judge the wage standard, which is to observe the wage situation of the surplus agricultural labor force; that is, if the continuous rise of wages in the traditional sector is observed, it is considered to have reached the first inflection point in Lewis. If wages in the agricultural sector are observed gradually rising so that they coincide with the trend in the industrial sector, the Lewis second inflection point is considered imminent. Thirdly, it is mainly based on various macro indicators such as industrial and agricultural GDP proportion, income distribution gap, marginal production efficiency, urban and rural structural differences, etc. Among them, the most representative ones, Li Gang, Wang Bida and Zhang Zhongjie, are respectively. Through the comparison of the real income gap between the two departments and the change in labor productivity, Li Gang believes that the real income gap between the two departments is growing slowly, and the labor productivity is expanding. He also described China's alleged reality of reaching the Lewis turning point as an "illusion". However, Wang Bida and Zhang Zhongjie (2014), by constructing the Cobb-Douglas production function model using the panel data analysis method, finally concluded that although empirical observation that China overall in Lewes I stage, data shows that China in 1997-2004, both national and local areas over the first inflection point, and in 2005-2012 regional back to Lewes I stage. Yi Dinghong, mentioned above, believes that China has passed the first turning point of Lewis around 2005, changing the state of labor supply from infinite to limited; it is expected to reach equal marginal labor productivity in China's agricultural and industrial sectors by 2035, namely the second turning point in the Lewis-fee model. Other scholars, such as Wang Yanan and Zhong Funing, believe that although China has reached the first inflection point in Lewis before 2010, there is still a large number of surplus labor force in China's rural areas. Yang Fan and Huang Shaofan (2017) believe that although the unlimited supply of labor force was no longer the main driver of China's economic growth in 2017, China's Lewis turning point has not really arrived.

The author found that before 2016, Chinese academic discussion mainly focused on the simple judgment of China's Lewis inflection point and stage, and later scholars paid more attention to the applicability of Lewis inflection point and the judgment of Lewis theory itself and reflection; they think the academic community in testing Lewis model or Totaro model lack the following discussion: First, the rural labor transfer to the city psychological effect such as follow suit psychology or speculative psychology. Second, the attraction of various urban resources and the difference between urban and rural social security. Third, the transfer and upgrading of the urban industry itself. Fourth, the specific national conditions, historical factors and policy evolution of the developing country. Because the above discussion has been going on for a long time, as the author mentioned above, the current situation in China has changed after the outbreak. Therefore, this study addresses a critical gap in the existing literature by analyzing recent data from 1990 to 2022, which provides a more updated view of China's primary and secondary industries. While previous studies largely focused on the early 2000s, this research uses a threshold effect model to investigate whether China has crossed the Lewis turning point, offering new insights into the labor productivity dynamics under the urban-rural dual structure.

The remaining study is structured as follows: Section 2 discusses the theoretical background and related literature; Section 3 describes the data and methodology; Section 4 presents the empirical results; and Section 5 concludes with policy recommendations.

2. Basic Concept Definition and Theoretical Overview

The Lewis inflection point is a theory proposed by Lewis (1954) in his book Binary Economy entitled "Economic Development under the Unlimited Supply of Labor". In his works, Lewis roughly divided the economy of the developing country into two sectors: the "subsistence sector" dominated by traditional agricultural production, and the "capitalist sector" of modern industry based on machine production in modern production methods. Lewis believes that in the traditional economic sector, due to the existence of a large population, resources and capital in this sector are relatively scarce, so the labor production efficiency of this sector is low. But it is precisely because of the existence of this sector that the modern sector, in the process of development, can obtain an unlimited labor force from the traditional sector with an almost constant wage level. Until the size of the modern economy took out the traditional "subsistence sector". At this time, the dual economic structure gradually disappeared, replaced by a single market structure. Since the labor supply situation is particularly important for developing countries, he determines the coming and disappearance of the "demographic dividend". Therefore, Lewis deliberately explained the two important main turning points in the process—the shortage of surplus labor force and the complete disappearance of surplus labor force. Later scholars called these two inflection points in the process "Lewis inflection point". According to Lewis's theory, later scholars divided

the development of a dual economy into three stages and two turning points. The first stage is the stage in which the modern sector of the city has an almost unlimited labor supply, which can be said to be a typical binary structure. Due to the severe excess of labor in the traditional sector, the wages paid by the urban industrial sector do not increase when absorbing the traditional sector of labor, and there may also be a small drop in wages due to excessive work. In the second stage, when the demand for labor in the urban industrial sector grew faster than the rate of labor supply, the wages in the modern sector began to rise gradually. However, at this time, the labor efficiency of the traditional sector in the rural areas is still lower than that of the urban industrial sector, and the labor remuneration is also lower than that of the city, so the labor transfer will continue. The third stage, that is, the surplus labor force is fully absorbed by the industrial sector, and the marginal productivity of the two sectors is equal. The characteristics of this binary economy disappear and the national economy becomes a whole. Actually, foreign scholars for Lewis' correction and question never stop; the American economist from developing countries the prevalence of urban unemployment, that the flow of rural labor force to the city should depend on and the laborer of urban high income and high unemployment rate, and accordingly put forward the "Todaro model". Compared with Lewis's path of integration of primary and secondary industries, Tobaro believes that the blind flow of rural labor will lead to a serious imbalance in urban and rural economic development and a high unemployment rate in cities. Therefore, he believes that we should not promote the flow of rural labor force to the cities, but should be appropriately restricted and guided to promote the countryside to the road of urbanization. Take this view mainly to Chu Yongsheng, Wang Yunyun and Gao Di, think about whether the Lewis model or Totaro model, the two defects of the common theory model explained in the rural labor transfer, did not consider the developing countries' special national conditions and institutional factors, especially the complexity of rural labor transfer and stage. This paper puts forward policy suggestions such as deepening the current situation of urban and rural household registration system, deepening the reform of the land system, increasing the investment in rural education, and promoting the integrated development of urban and rural areas.

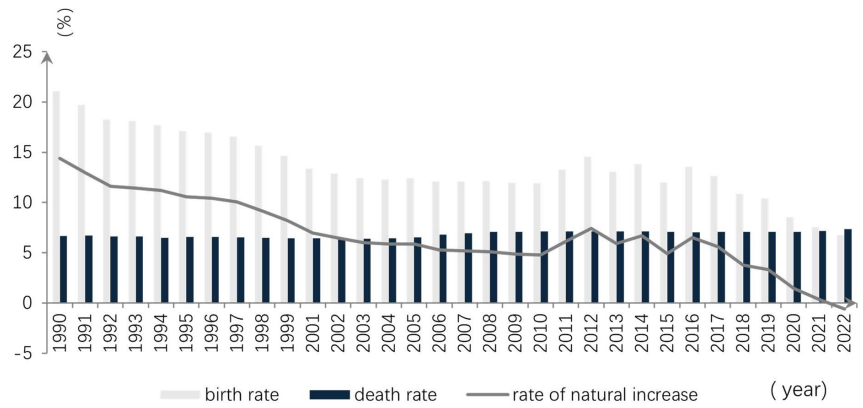
3. Changes in Labor Force Employment and Output under the Urban-Rural Dual Structure

China's population situation has long been a concerned about it. For example, Cai Fang pointed out as early as 2007 that China is about to face the problem of labor shortage with a declining fertility rate. Due to the population policy, the demographic dividend brought by China's dual economy will gradually disappear. It said it is expected to see zero growth in 2015, which will reverse the oversupply of the labor force in the past 30 years of reform and opening up. And the fact that China's Lewis turning point is still coming. He sees the "labor shortage" in China's coastal areas in 2004 as a good example. On the basis of the above, Cai Fang points

out the positive correlation between the "Lewis turning point" and "demographic dividend", and the emergence of the former is the precursor of the disappearance of unlimited labor supply.

3.1. Changes in the Total Population Size

Now, we observe that the population situation is indeed as Cai Fang predicted, and the natural growth rate entered a downward trend around 2015, as shown in Figure 1. However, according to general economic theory, when there is a labor shortage under other conditions, there should be wage rises and labor shortages rather than the career problems mentioned above. Most scholars believe that the urban-rural dual structure described in structuralist economics is universal in developing countries. The so-called "urban-rural dual structure" refers to the emergence of two sectors in an economy; one is the traditional sector, mainly concentrated in rural areas, which mainly relies on land and manpower for production; the other sector in the few cities, the industrial sector mainly produces machines caused by capital input, and gradually enters the industrialized modern society. As the largest developing country and a socialist country in the world, China has long had a dual structure between urban and rural areas due to its policy and economic development level. Since the reform and opening up, with the development of the economy and policy changes, the urbanization process has been gradually promoted. By 2022, the urban population has reached 920.71 million, accounting for 65.21% of the total population.

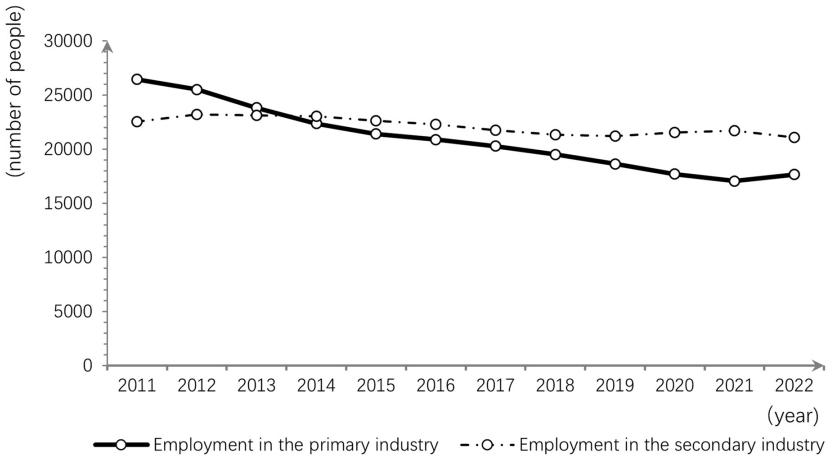


Source: National Bureau of Statistics of China.

Figure 1. Population changes in China.

In terms of industry, the number of employment in the secondary industry exceeded that of employment in the primary industry from 2013 to 2014, reaching 211.05 million in 2022, accounting for 28.8% of the total number of employment in the same year. The number of people employed in the primary industry decreased from 223.72 million in 2014 to 176.63 million in 2022, and the proportion decreased from 29.3% to 24.1%, as shown in Figure 2. In terms of the total stock, China's total population reached a peak of 1.4126 billion in 2021, and then

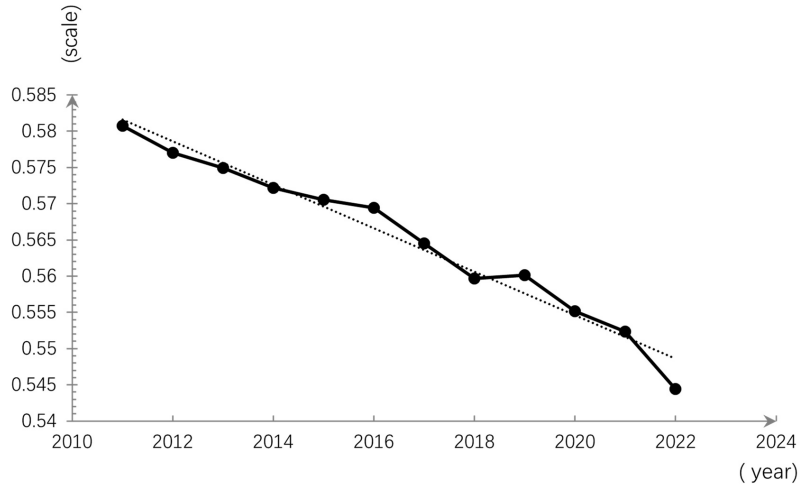
decreased slightly to 1.421175 billion in 2022. After the total labor force peaked at 792.82 million in 2016, there has been a small decline in the total labor force to 768.63 million by 2022.



Source: National Bureau of Statistics of China.

Figure 2. Labor and employment situation in the primary and secondary industries.

As shown in **Figure 3**, the ratio of population to labor force also decreased slightly from the trend. But in absolute terms alone, the decline is not significant. At the same time, China's urbanization rate has reached 65.22% in 2022. The urbanization rate in some economically developed regions, such as Beijing and Shanghai, is nearly 90%, while Shenzhen, Zhuhai and Foshan are nearly 100%. In terms of these data, China's modernization process is progressing steadily, but compared with some developed countries, in 2017, the US urbanization rate was 82.06%, UK urbanization rate was 83.14%, France was 80.18%, Germany was 77.26%, Japan was 91.54%, there is still a large gap with these countries.



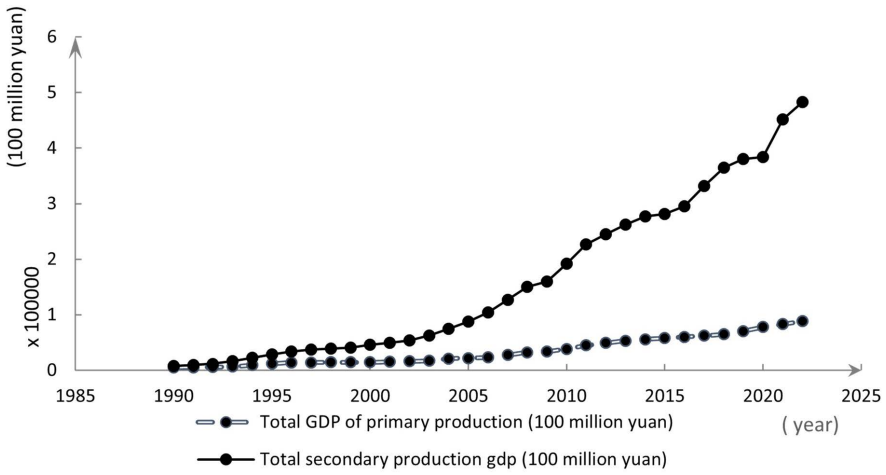
Source: National Bureau of Statistics of China.

Figure 3. The ratio of the population to the labor force.

3.2. Changes in the Output Value of the Primary and Secondary Industries and the Output Value of Unit Employment

3.2.1. Changes in the Output Value of the Primary and Secondary Industries

In order to better explain and understand the current situation in China, the author will briefly summarize the GDP of China's primary and secondary industries from 1990 to 2022 as follows. According to the data given by the China Statistical Yearbook, the gap between China's primary and secondary GDP has been widening since 1990. As can be seen in Figure 4, the GDP growth of the secondary industry is relatively significant, especially since 2005, but the gap with the secondary industry is gradually widening, and there is no sign of reducing the gap until 2022.

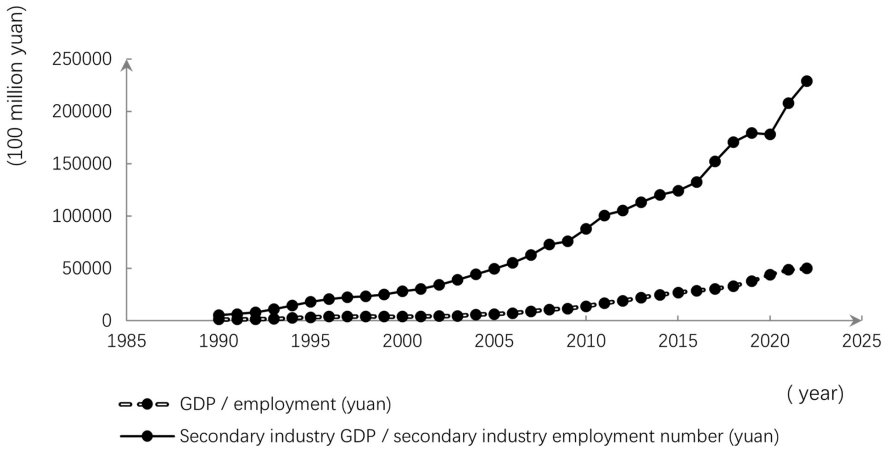


Source: National Bureau of Statistics of China.

Figure 4. The GDP of the primary and secondary industries.

3.2.2. Changes in Labor Efficiency in the Primary and Secondary Industries

From the perspective of labor output efficiency level, that is, the change in labor efficiency is reflected by the output level of unit labor employment, and measured by the GDP of the primary and secondary industries divided by the labor employment of the primary and secondary industries, as can be seen in Figure 5. From the trend, the labor output efficiency of the secondary industry has grown rapidly since 1990, and the growth rate has increased faster since about 2005, and the labor output efficiency of the primary industry has maintained a small and stable growth rate like GDP. Therefore, the labor output efficiency of China's primary industry is lower than the industrial sector, and the growth is slow. If the factors of currency depreciation and real GDP are taken into account, it can be roughly seen that the low output level of unit employment in the primary industry, indicates that there is likely to be a labor surplus in the primary industry sector. It also shows that the secondary industry sector still can absorb the rural surplus labor force.



Source: National Bureau of Statistics of China.

Figure 5. Labor force production efficiency in the primary and secondary industries.

4. The Threshold Effect Test of Urban and Rural Labor Output Efficiency Change

This paper will use the threshold effect model to empirically test whether there is a threshold point for the output change of the labor force, that is, whether there will be an inflection point. The author uses the threshold model of Hansen (1999), The data from 1990 to 2022 to test the realization of the Lewis turning point in China.

4.1. Variable Selection and Model Setting

Combined with the research needs, the measurement model is established as follows:

$$\ln pigdp_{it} = \alpha_0 + \alpha_1 \ln eipi_{it} \times I\left(\ln ur_{it} \le \theta_1\right) + \alpha_2 \ln eipi_{it} \times I\left(\theta_1 < \ln ur_{it} \le \theta_2\right) + \alpha_3 \ln eipi_{it} \times I\left(\ln ur_{it} > \theta_2\right) + \cdots + \alpha_n \ln eipi_{it} \times I\left(\ln ur_{it} > \theta_n\right) + \varepsilon_{it} \quad (1)$$

$$\ln sigdp_{it} = \beta_0 + \beta_1 \ln eisi_{it} \times I\left(\ln ur_{it} \le \theta_1\right) + \beta_2 \ln eisi_{it} \times I\left(\theta_1 < \ln ur_{it} \le \theta_2\right) + \beta_3 \ln eisi_{it} \times I\left(\ln ur_{it} > \theta_2\right) + \cdots + \beta_n \ln eisi_{it} \times I\left(\ln ur_{it} > \theta_n\right) + \varepsilon_{it} \quad (2)$$

The above Formulas (1) and (2) respectively represent the threshold effect model of labor output efficiency change under the urbanization process of agricultural and industrial sectors. Both sides of the model are logarithmic to reduce the influence of heteroscedasticity. In the model, $I(*)$ is the schematic function, and the internal expression is true when the value is 1, and the other value is 0, θ which is the threshold value to be estimated. The variable $\ln pigdp$ $\ln sigdp$ is the explained variable, representing the GDP of the primary and secondary industries; the variable $\ln eipi$ $\ln eisi$ is the explanatory variable, representing the employment of the primary and secondary industries; $ln\,ur$ is the threshold variable, representing the urbanization rate;ε is the random disturbance item. The subsign i is the region, indicating 31 provinces, autonomous regions, or municipalities directly under the government; the subsign t is the year, the time span is 1990-2022; the subsign n indicates the number of thresholds.

4.2. Instructions for the Use of the Data

The author explains all the data sources here. In this paper, the data of 31 provinces, autonomous regions, or municipalities directly under the Central Government (excluding Hong Kong, Macao, and Taiwan) from 1990 to 2022 were selected, and the panel data were used for the study. The GDP data of primary and secondary industries used in the study are mainly derived from the China Statistical Yearbook and Statistical Yearbook of various provinces; the employment data of primary and secondary industries are mainly from the China Statistical Yearbook, China Population Yearbook and Statistical Yearbook of each province; the urbanization rate index used in this paper is mainly derived from the Statistical Yearbook of each province, and the national urbanization rate data comes from China Statistical Yearbook. The following results are the test results.

4.3. Empirical Metrological Inspection Process

The author first tested whether there is a threshold effect in the setting of Formula (1) and Formula (2) under the setting of the single threshold, double threshold, and triple threshold to determine the number of thresholds. The results are shown in Table 1 below.

Table 1. Test and estimate value results of labor output efficiency in industrial and agricultural sectors under the process of urbanization.

explained variable	threshold variable	Core solution Release variables	Single threshold model		Two-fold threshold value model		Triple threshold value model	
			threshold estimated value	F intercon-nected system calculate	threshold estimated value	F intercon-nected system calculate	threshold estimated value	F intercon-nected system calculate
ln pigdp	ln ur	*ln eipi*	3.7589	374.82***	3.7589	374.82***	3.7589	374.82***
			-	-	3.8286	119.09	3.8286	119.15
			-	-	-	-	2.7838	37.84
ln sigdp		*ln eisi*	3.7604	371.98***	3.7604	371.98***	3.7604	371.98***
			-	-	3.8277	133.10	3.8286	127.03
			-	-	-	-	4.3147	122.15

Note: * * *, * * and * are significant at the statistical levels of 1%, 5% and 10%, respectively.

Table 1 shows that at the significant level of 1%, it can be seen that in the process of urbanization, there is a single threshold effect between the GDP of primary and secondary industries and the number of employment in primary and secondary industries. The presence of a double and triple threshold was not observed at the 5% and 10% significant levels. Accordingly, it can be determined that only one threshold point exists for the explanatory variables and the explained variables under the threshold variable.

Table 2. Estimation results of labor output efficiency threshold model of industrial and agricultural sectors under the urbanization process.

	(1)	(2)
Core explanatory variable (threshold variable)	explained variable	
	ln pigdp	*ln sigdp*
ln eipi *I (ln ur ≤ 3.7589)	−1.1874***	-
	(−14.56)	-
ln eipi *I (ln ur > 3.7589)	0.1442***	-
	(−12.19)	-
ln eisi *I (ln ur ≤ 4.5149)	-	1.5963
	-	(14.03)
ln eisi *I (ln ur > 4.5149)	-	0.2223
	-	(17.01)
sample capacity	957.0000	957.0000
coefficient of determination	0.5610	0.6186

Note: The t statistic is in brackets, * * *, * * and * are significant at 1%, 5% and 10%, respectively.

Column (1) in Table 2 shows the regression results with the number of people employed in the primary industry as the core explanatory variable and the urbanization rate as the threshold variable. The data show that the effect of primary industry employment when the threshold value is less than 3.7589 on the GDP of primary industry is negative at the significant level of 1%, while the effect of primary industry employment on the GDP of primary industry is greater than 3.7589 changes from negative to positive at the significant level of 1%. This shows that the labor output efficiency of the primary industry was significantly improved after the urbanization rate was greater than 3.7589. Column (2) shows the regression results with the number of people employed in the secondary industry as the core explanatory variable and the urbanization rate as the threshold variable. Although it is not very significant from the significant level, from the numerical value, the labor output efficiency of the secondary industry decreases significantly when the urbanization rate is greater than 4.5149.

5. Research Conclusions and Policy Suggestions to Improve Urban and Rural Labor Efficiency

5.1. Study Conclusions

After converting the above value into the natural number, the threshold of the primary industry appears when the urbanization rate is about 57%, namely around 2017, while the threshold of the secondary industry is when the urbanization rate is about 65%, which is around 2022. According to the description of the Lewis turning point theory and combined with the statistical results, the author believes that China crossed the first turning point of Lewis around 2017. Compared with the conclusion of this paper, such as Cai Fang and Yi Dinghong (2020), the Lewis inflection point came late before 2010. But I think the Lewis turning point before 2010 was a little more radical. Although China experienced a temporary

labor shortage in its coastal areas in 2004, the author thinks that, after the year of economic development and population flow reality, 2004 was not the real urban labor absolute shortage, but due to the incomplete policy and the economic itself cyclical problems want to go to the city to find higher returns of rural workers into the city in the face of expected earnings to reduce the cost of living increase by temporary leave the choice of the city. Compared with other scholars' points of view, such as Yangfan and Huang Shaoan, etc., the conclusion of this paper, despite the infinite supply of labor, is no longer the main driving force of China's economic growth, but China's Lewis inflection point is not really coming view is more similar, but the difference is that in 2017 China does across the lewis the first inflection point. From the perspective of the data, the trend of touching the second turning point of Lewis is also more obvious, but it also needs the structural reform of the secondary industry and related supporting policies.

5.2. Policy Suggestions on Guiding the Rational Flow of Urban and Rural Labor Force and Improving Labor Efficiency

The study is based on the perspective of Lewis inflection point and statistics in order to narrow the gap between urban and rural areas and balance the employment of urban and rural labor force. The author puts forward the following several policy suggestions here. First, we should improve the policy of urban departments to accept migrants further and implement a clear household registration system so that migrant workers can stay down. Second, as mentioned above, once the Lewis turning point is crossed, it proves that the supply of labor will not be like Lewis Phase 1. However, many enterprises did not take advantage of the demographic dividend period to improve the demographic dividend to improve production technology and improve the organizational structure, but relied on the demographic dividend. Extensive management ignores the environmental and social impact. In the new era, these enterprises and cities that are "addicted" to the demographic dividend are bound to be completely eliminated in the competition. Therefore, the author suggests that cities and enterprises should now lay out the policy of talent attraction so as to have sufficient labor force in the future competition. Third, China has been a big agricultural country since ancient times. For China, rural areas should not only undertake agricultural production, but also assume the functions of social stability and ecological stability. Therefore, the government should deliberately balance the speed and frequency of rural labor force flow, and timely dissuade the mass departure or return home caused by following the trend. While guiding the transfer of surplus labor from rural areas to cities in an orderly manner, we should also actively carry out the construction of agriculture, rural areas and farmers, so as to realize green, efficient and humanized high-quality development.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference. *Journal of Econometrics, 93,* 345-368. https://doi.org/10.1016/S0304-4076(99)00025-1

Lewis, W. A. (1954). Economic Development with Unlimited Supplies of Labor. *The Manchester School, 22,* 139-191. https://doi.org/10.1111/j.1467-9957.1954.tb00021.x

Wang, B. D., & Zhang, Z. J. (2014). The China Lewis Turning Point and Phase Study—Based on 31 Inter-Provincial Panel Data. *Economist, 11,* 16-26.

Wang, C. (2005). The "Inflection Point" of Labor Supply and Demand and China's Dual Economic Transformation. *Chinese Journal of Population Science, No. 6,* 2-10.

Yang, F., Huang, S. A., & Picault, J. (2017). Is China's Demographic Dividend Over? *Shandong Social Sciences, No. 4,* 82-89.

Yi, D. H. (2020). The Lewis Turning Point in China: Problems, Impact and Countermeasures. *China Labor, No. 2,* 5-19.