

# Social Physics and the Flow of Migrant Peasant Workers

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**Abstract.** Social physics is an old and new discipline. In the seventeenth century, when physics as we know it was gradually taking shape, natural philosophers were attempting to apply the concepts and methods of statistical physics to society as a whole. The social physics is the use of natural way of thinking, the basic principles of universal rules, systems and methods of calculation means the social, economic and other complex issues of qualitative and quantitative analysis of complex subjects. In the direction of natural and social sciences Cross-full, it could be easy to understand the flow of migrant peasant workers preference choice of this complex issue.

**Keywords:** Social Physics, Migrant peasant workers, Flow.

## 1 Introduction

According to the general rules of the world development process, While the per capita GDP is at the developing stage of US dollars 1000-3000, the society tends to be corresponding with the most serious bottleneck time of population, resources, environment, efficiency, equity and other social contradictions, there will always be the period of 'easy to economic imbalance, easy to social disorder, easy to act out of balance, and social ethics is also need to be adjusted and reconstructed' [1]. China's migrant peasant workers have reached a considerable scale, and become a major force of economic and social development. The social physics is the use of natural way of thinking, the basic principles of universal rules, systems and methods of calculation means the social, economic and other complex issues of qualitative and quantitative analysis of complex subjects. In the direction of natural and social sciences Cross-full, it could be easy to understand the flow of migrant peasant workers preference choice of this complex issue.

## 2 Social Physics and Analysis of Differences between Urban and Rural

From Chinese social physics community's point of view of the basic, there would be a understanding of the following framework to explore the mechanism in the process:

(1) to recognize both natural systems or human systems, without exception, anywhere (space) at any time (time) has emerged the ‘difference’ the absolute; (2) as long as there are a variety of ‘differences’ or ‘difference in the collection’ is bound to have a broad sense, ‘gradient’; (3) as long as there is a broad sense, ‘gradient’ is bound to have a broad ‘power’; (4) As long as there is a broad sense of ‘power’ is bound to have a broad sense ‘flow’ [2].

Therefore, it could conclude that in reality there is a gradient of the difference between urban and rural areas, by then cities’ gravitation and the gradient led the migrant peasant workers flow to cities. 30 years of reform and opening up, China is actually the cities’ rapid development in 30 years, the gap between rural and urban expansion, of which leading to migrant peasant workers significantly increasing. From 1978 to 2005 and according the national statistics, the gap between the disposable income of urban residents and farmers per capita net income constantly pulled in the large (as shown in Figure 1).Urban-rural income difference equal to the disposable income of urban residents divide farmers per capita net income.

As can be seen from Figure 1, the overall trend is gradually increasing differences between urban and rural areas, which also showed four stages: from 1978 to 1986, the income gap between urban and rural residents show a downward trend, the lowest point close to 1.8; from 1987 to 1994 , continued to show an upward trend, the highest level has exceeded 2.8; from 1995 to 1997, show a certain decline, but do not drop; 1998-2005, again on the rise, and in 2002 broke the 3, has been in recent years 3.2 in the near [3].

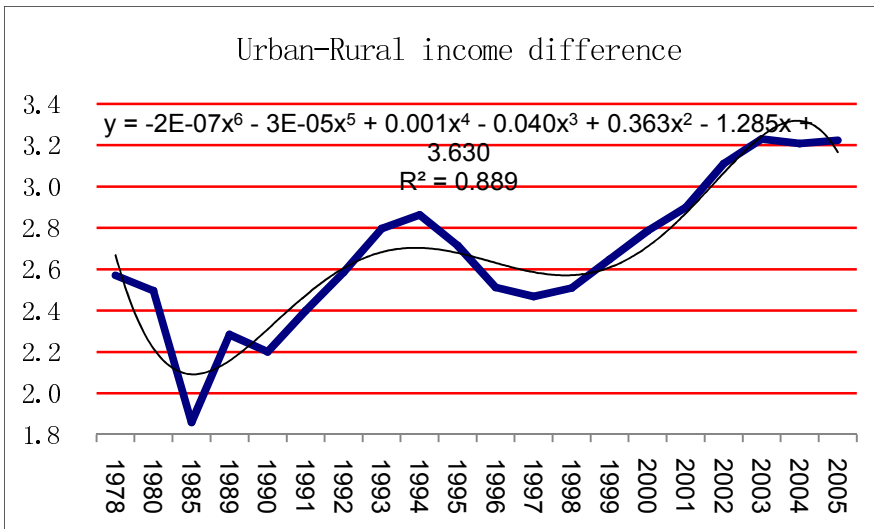


Fig. 1. Urban-Rural Income Differences during 1978~2005

### 3 The Differences of Cities' Gravity and the Flow of Migrant Peasant Workers

According to the relevant theories of social physics, differences lead to in gradient, the gradient rises to power, the powers cause flow and some other earlier analysis, which can be learned that there are a variety of income differences of China, and these income differences result gradient in different regions and different groups, then the gradients lead the existence of income gravitation income, which would be bound to lead to a variety of flow. Furthermore, the greater difference, the greater income gradient; the greater income gradient, the greater income gravitation; the greater income gravitation, the more migrant flow.

In order to research the migrant flow, it could be introduced Lorenz curve to study the differences between urban issues. In order to study the national income distribution between citizens, the American statisticians M.O. Lorenz put forward the famous Lorenz curve. First, population should be queued by income from low to high, and then should be considered income percentage by any lowest income percentage of the population, which would be the cumulative percentage of the population and the percentage of the accumulated income of correspondence described in graphic, which would be Lorenz curve (shown in Figure 2), through the A area is calculated to be well-known Gini coefficient.

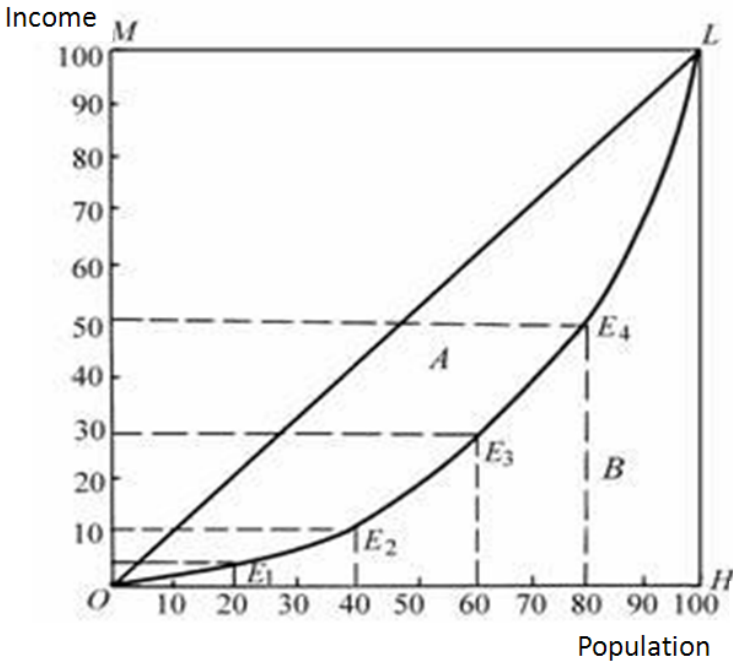


Fig. 2. The Schematic chart of Lorenz Curve

As the Lorenz curve and the Gini coefficient is in fact used to analyze the differences, we are here to use this method to analyze the differences between urban issues. The Results are between 0 and 1, the more close to 0 that the smaller gap between cities, the more close to 1 that the greater the gap between the cities. As the Gini coefficient in the calculation, select the more data points the smaller the error, the paper selected data GDP of top 100 cities from 1997 to 2007.

Lorenz curve as a function of the form:

$$G = 2 \left\{ \frac{1}{2} - \int_0^1 L(F) dF \right\} \tag{1}$$

In order to facilitate calculation, covariance method could be used in this article, the formula for:

$$G = \frac{2cov(y_i,i)}{n\mu_y} \tag{2}$$

The specific point of view:

Firstly,

$$\bar{i} = \frac{1}{n} \sum_{i=1}^n i = \frac{n+1}{2} \tag{3}$$

The formula of covariance is:

$$cov(y_i, i) = \frac{1}{n} \sum_{i=1}^n (y_i - \mu_y)(i - \bar{i}) = \frac{1}{n} \sum_{i=1}^n iy_i - \frac{n+1}{2} \mu_y \tag{4}$$

The coefficient of urban difference:

$$G = \frac{2cov(y_i,i)}{n\mu_y^2} = \frac{2}{n\mu_y^2} \sum_{i=1}^n iy_i - \frac{n+1}{n} \tag{5}$$

The results are shown in Figure 3.

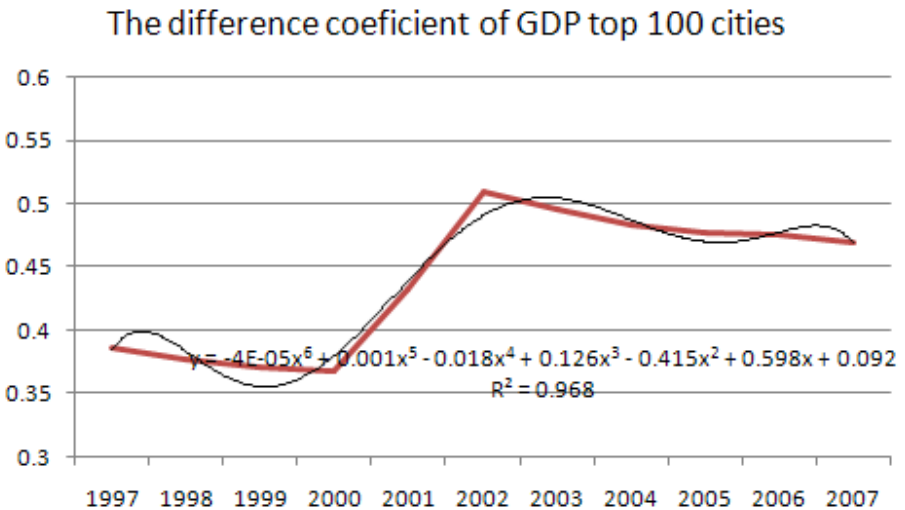


Fig. 3. The Difference Coefficient of GDP to 100 Cities

The results can be seen that there was a widening gap between the more obvious trend from the top 100 Chinese cities, which is that 10 years despite the rapid development of China's focus on the city, but to a large extent have only benefit a very small number of developed cities in the rapid economic development, and the result is the gap between urban reality has also been widening.

According to the National Bureau of Statistics and the Ministry of Labor and Social Security released a comprehensive analysis of the data, the total number of Chinese migrant peasant workers is about 1.2 billion, of which 60% is the inter-provincial flow. The main exports areas are central and western regions; the eastern part is the main input. The migrant peasant workers from central and western regions are the national ratio of 67%; migrant workers 70% are employed in the eastern region. The main inter-provincial movement of rural labor force to the provinces as Guangdong, Zhejiang, Shanghai, Beijing, Jiangsu, Fujian and Tianjin, the 7 provinces and cities in 2006 absorbed 82% of the total inter-provincial movement of rural labor employment, while the proportion in 1999 only about 65%, which means that migrant workers to urban mobility has become increasingly from low-income rural areas flow to the most economically developed cities or urban development group. One is the eastern coastal areas; in particular the Pearl River Delta region and Yangtze River Delta region are two of strongest attract centers, followed by regional central cities. Ignored in the culture, climate and other factors, it can be more or less to build a framework for the flow of migrant workers (Figure 4).

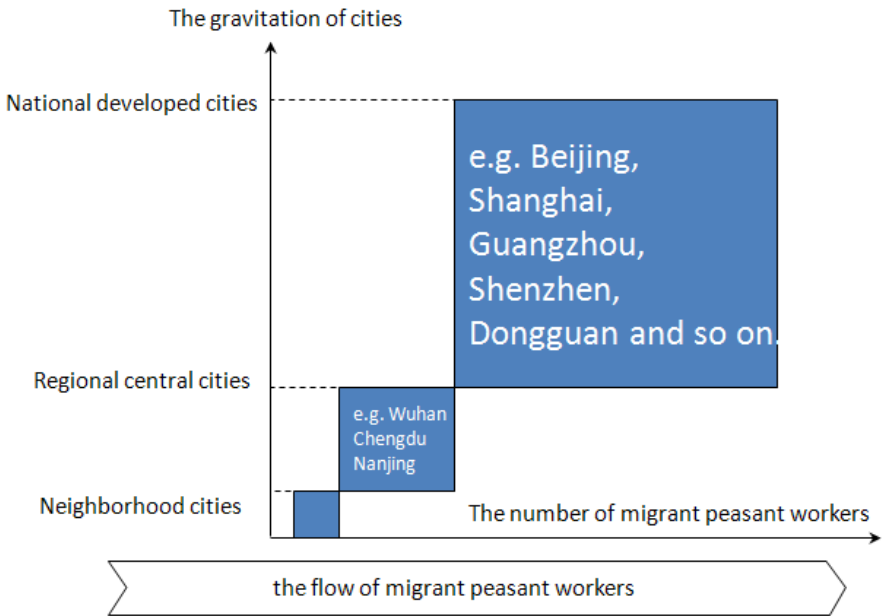


Fig. 4. The Flow of Chinese Migrant Peasant Workers

As can be learned from Figure 4, if the box area is larger, the flow would be greater. Due to the great existent income gradient, developed cities are the first choice for migrant peasant workers, such as Beijing, Shanghai, Guangzhou, Shenzhen, Dongguan and other cities. As previously mentioned differences between the Chinese cities continually have been enlarging factor, which will lead to a very small number of cities over the influx of migrant peasant workers. The results of this analysis obtain the views of consistency with a number of scholars. There is no doubt that a large number of migrant peasant workers in the inflow to the economy's vitality at the same time, will also inevitably bring a variety of social instability.

## **4 Policy Proposals Based on Social Physics**

It is thought by social physics that the impact of the steady flow due to the differences arising, in the existence of income differences under the multi-dimensional construction of a harmonious society, the government must consider reducing the difference between profit or take advantage of differences in lead. Reasonable use of the principle of superposition of the stream flow can be reduced or even to reach the steady-state, that is, the difference caused by different kinds of material with the reverse flow stream will weaken. As a result, we offer the following suggestions:

### **4.1 Coordinating Economic Development and Narrow the Differences**

In order to maintain steady and rapid development of China's economy, our country must face up to the existing differences between the rapid urban expansion, we should deepen reform and expand opening up, step by step in different regions of coordination between the various urban gap in attention to the secondary distribution of maintaining social equity To prevent polarization. Employment is the flow of migrant workers in urban and rural areas of comparative advantage as a result, the flow of migrant workers in the next few years will be mainly from rural to urban areas in particular, to the more developed economies of large and medium-sized cities, from the economy to the less developed regions in economically developed areas to focus, beads Pearl River Delta, the Yangtze River Delta and Beijing-Tianjin-Tangshan district are still the major flow of migrant workers. However, the eastern part of the cost of living increase over the years, and the slow growth of wages of migrant workers, there are less attractive to migrant workers. In the future to fight for the formation of a new batch of economic growth so as to the flow of migrant workers employed to provide a new choice. In addition, efforts to attract some of the rural labor force to choose local or provincial or other adjacent areas of urban employment, the flow will become more diversified.

### **4.2 Concern in Rural Areas and Achieving the Goal of Increasing Farmers**

The main income of rural residents by the natural environment, the market prices of agricultural and sideline products, as well as the development of township enterprises, and the income of urban residents by wage and incentive system, as well as different industries and different skills of the wage difference between. It is therefore necessary to strengthen the market prices of agricultural interventions to encourage the broad

masses of rural areas, according to its own conditions for the development of township enterprises and optimize its industrial structure so as to increase the income level to absorb labor force and employment; at the same time the Government should increase the public in rural areas and facilities for scientific research into agriculture, increase agricultural subsidies and credit support to foster the development of township enterprises, promote urbanization, public property through the transfer payment system and other measures to increase the income of the farmers[4]. At the same time, in order to reduce the key elements brought about by the rapid accumulation of wealth effect, the state must step up to the secondary distribution of income ability to adjust the personal income tax, inheritance tax and property tax, and other standards to achieve a real difference to lower earnings.

#### **4.3 Introduction of Policies to Reduce the Ratio of Migrant Peasant Workers Return**

At present, due to the economic differences caused by population movement has brought a lot of problems. The influx of a large number of population in some cities so that the city's public facilities, employment and law and order, and other serious pressure, and into the city for those who have caused such as security, school children and many other issues. For example, the annual Spring Festival travel season, due to the large number of returning to the flow of transport has brought great pressure. Data show that in 2007 National Spring Festival passenger transport reached a total of 2.17 billion. Such a large number of rural areas were mainly due to the large number of the labor force. According to the study of urbanization in China is 1 percentage point every year to raise the speed of development, and an increase of 1 percentage point in rural areas to cities in the release of 10,000,000 persons of the labor force. As a result, how to get these out of the labor movement into the workplace, and to reduce unnecessary back, is to narrow the differences in an important way to ease the conflict. Governments at all levels should put the corresponding supporting policies, so that cities can play an active labor force into urban mainstream society.

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