

## POPULATION EXPANSION IN CHINA'S METROPOLISES AND ITS SCALE-CONTROL

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**ABSTRACT:** Metropolises are centers of politics, economy, culture and information, and also economic growth poles in comparatively large areas. After 1949, China's urban structure have changed greatly, from original "pyramid" shape into "upside-down pyramid" shape, that is, more megalopolises and metropolises, fewer medium-sized and small cities. The most distinguishing feature of urban population growth was the remarkable increase of population in megalopolises and metropolises. The key reason for urban population expansion is to want to obtain the benefits of scale-agglomeration economy of metropolises. The number of urban functions directly determines the quality and quantity of urban population. Metropolises appeal not only agricultural population but also the population of medium-sized and small cities, which put much more population pressure on metropolises. The ideal goals of scale-control of metropolitan population are discussed in terms of economy, society and ecology. In order to control the metropolitan population expansion, the following measures should be taken: developing medium-sized and small cities, and satellite cities establishing rationally regional urban system, reasonably distributing industrial enterprises, and greatly developing township enterprises.

**KEY WORDS:** urban population, scale-control, megalopolises, metropolises, medium-sized city, small city, town

Metropolises are centres of politics, economy, culture and information, and also economic growth poles in a comparatively large areas. Metropolises in this article refer to the cities with a population more than 500 thousand, including megalopolises and metropolises. The metropolises play a leading role in China's modernization. Since 1949, in order to increase national power rapidly and accelerate the development of national economy, Government has given priority to the development of metropolises and concentrated limited

material resources, labor power, financial resources on the metropolises. No doubt, it was true. But the development of metropolises has its own limit. It is subjected to the restriction of both the objective environmental capacity and the social-economic capacity. The ideal metropolises should be large cities whose combination of economic benefit, social benefit and environmental benefit is comparatively good. The metropolises with population expansion and poor benefits should be restricted.

## I. DEVELOPMENT OF CHINA'S METROPOLISES

By the end of 1990, there were 467 cities in China, with a total nonagricultural population of 193.3 millions, accounting for 17.6 per cent of the country's total. Among the 467 cities, there were 31 megalopolises, 28 metropolises, 117 medium-sized cities, 291 small cities. Table 1 explains how the number of cities in China have changed since 1949<sup>[1, 2]</sup>.

Table 1 Variation in composition of cities in China from 1949 to 1990

City-scale population ( $\times 10^3$ )	1949	1952	1957	1964	1976	1980	1984	1985	1990
>1000	6	9	10	13	13	15	19	22	31
500-1000	10	10	18	18	25	30	31	30	28
200-500	19	23	36	43	53	70	81	94	117
<200	34	115	114	95	95	109	169	178	291
Total	69	157	178	169	196	225	300	324	467

From Table 1, we can see that the development of the cities with a population more than 500 thousand was noticeable. The number of this kind of cities increased from 16 in 1949 to 59 in 1990, increased by 3.7 times. Especially, in the 14 years from 1976 to 1990, 21 metropolises were added, that is, 1.5 metropolises were added annually. The growth speed is amazingly fast.

From the population proportions in the different kinds of cities (Fig.1), we can see that, in 1953, the populations in megalopolises, metropolises, medium-sized cities and small cities accounted for 40.1%, 21.5%, 16.2% and 22.2% of total urban population respectively. By the end of 1988, the population proportion in megalopolises amounted to 42.6%, in metropolises amounted to 36%. The above two kinds of cities added up to 78.6%, increased by 17% compared with that of 1953. At the same time, the population proportion in medium-sized and small cities went down to 21.4%<sup>[2, 3]</sup>. From 10 largest cities in China, we can see clearly that the development of the metropolises is conspicuous (Table 2).

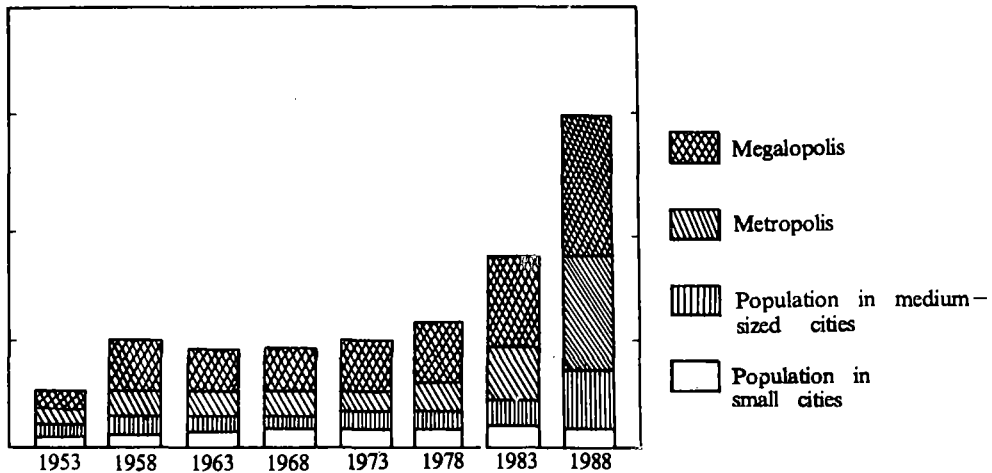


Fig.1 Variation in population composition of different city-scale

From Table 2, we can see that, from 1980 to 1985, the population of the 10 largest cities took a tendency of increase, of which Shanghai added 888 thousand people which was the largest, increased by 14.8 percent. Beijing added 553 thousand people, increased by 12.2 percent. Tianjin added 460 thousand people, increased by 12.3 percent. The highest rate of increase was 16.2 percent in Nanjing. The second was 15.1 per cent in Wuhan. The average population scale of the 10 megalopolises expanded from 2,908 thousand in 1980 to 3,294 thousand in 1985, increased by 13.3 percent. The tendency of increase can be seen from 1985 to 1990.

From the above analyses, we can see, one notable variation of the urban structure in China. From 1949 to 1990, the urban structure was being turned from a shape of "pyramid", that is, with few megalopolises and metropolises, more medium-sized and small cities into a shape of "upside down pyramid", that is, and more megalopolises and metropolises, fewer medium-sized and small cities. The most distinguishing feature of urban population growth was the remarkable increase of population in megalopolises and metropolises, the population proportion of these kinds of cities went up rapidly, but the proportion of population in small cities went down dramatically.

## II. REASONS FOR METROPOLITAN EXPANSION

It is well known that from the end of the 1950s, Chinese government has adopted an urban population policy that restrictively control migrants from rural areas into the metropolises. In 1979, the government formally put forward a policy of "strictly control metropolitan scale"<sup>[4]</sup>. But the metropolitan scale could not be controlled effectively, the

**Table 2 Population growth in China's 10 largest cities from 1980 to 1990<sup>[5]</sup>( $\times 10^3$ )**

City	Rank	1980	1985	Increased (%)		1985	1990	Increased (%)	
Shanghai	1	5,983	6,871	888	14.8	6,871	7,497	625	9.1
Beijing	2	4,588	5,103	553	12.2	5,103	5,770	667	11.6
Tianjin	3	3,743	4,202	460	12.3	4,203	4,575	372	8.2
Shenyang	4	2,844	3,253	409	14.4	3,253	3,604	351	9.7
Wuhan	5	2,575	2,964	389	15.1	2,964	3,284	321	9.7
Guangzhou	6	2,289	2,564	274	12.0	2,564	2,914	351	12.1
Harbin	7	2,050	2,252	202	9.7	2,252	2,443	192	7.8
Chongqing	8	1,862	2,080	218	11.7	2,080	2,267	187	8.2
Nanjing	9	1,651	1,919	267	16.2	1,919	2,090	172	8.3
Xi'an	10	1,532	1,732	120	13.0	1,732	1,960	227	11.6
Total		29,077	32,939	3,862	13.3	32,939	36,402	3,463	9.5
Average		2,908	3,294	386	13.3	3,294	3,640	346	9.5

metropolises are still expanding, urban population scale is constantly increasing, with a tendency of acceleration.

### 1. Benefits of Scale-Economy and Agglomeration-Economy

Metropolises can produce and realize benefits of scale-economy and agglomeration-economy. It is reported that in Original West Germany the gross product value per capita in the cities with a population of more than 500 thousand was 1.4 times that of the cities with a population between 20 thousand and 50 thousand. In China, the tax rates produced by the metropolises were much more than that produced by the other cities (Table 3)<sup>[5]</sup>.

At the beginning of the founding the People's Republic of China, in order to obtain the benefits of scale-agglomeration economy of metropolises, the Chinese government paid more attention to investing capital, manpower and resources into the metropolises, and gave superiority to the development of metropolises. Nearly all the 156 great projects supported by the international society were arranged in the metropolises with a comparatively good basis, which accelerated the development of the metropolises. For example, before 1949, northeast China, there were only two megalopolises-Shenyang and Harbin. But because of the tremendous investment and development of heavy industry, now in the three provinces there are six megalopolises-Shenyang, Harbin, Changchun, Dalian, Ansan and Fushun. Because of the drawing of benefits of scale-agglomeration economy of metropolises, other provinces and autonomous regions also paid more attention to arranging industrial projections in the large cities to promote the development of regional economy.

**Table 3 Economic index of urban scale different urban scale ( $\times 10^4$ )**

Index	>200	100-200	50-100	20-50	<200
Profit tax produced by 100 yuan of fixed asset	18.9	15.2	13.8	11.1	12.6
Profit tax produced by 100 yuan fund	15.9	13.8	12.4	10.1	11.3
Social productivity	33,512	27,384	27,368	25,205	23,622

And now, the metropolises together with other medium-sized and small cities are trying their best to increase the total value of industrial and agricultural output so that in 2000 it will be 4 times that of 1980. In 1985, the gross value of industrial output in metropolises accounted for 45.8 percent of the country's total, 65.3 percent of the cities' total. If the metropolises could not achieve this goal, it was sure to affect the goal that the total value of industrial and agricultural output increased by 3 times that of 1980. Under the circumstance of the advanced science and technology not being applied widely and labor productivity not being improved rapidly, multiplying output value depends mainly on adding industrial enterprises and enlarging the scale of industrial enterprises. Also, revenue comes mainly from the industrial enterprises which is determined by the fiscal policy now in operation. All the above accelerate the expansion of the metropolises subjectively and objectively.

## 2. Centralized Multi-Functions

Urban functions are fundamental factors and important reasons for urban existence. The number of urban functions directly determines the quantity and quality of urban population. Generally speaking, the more functions the city has, the larger the urban population scale is. The large cities in China, especially the megalopolises, are often the capitals of provinces or autonomous regions, and have functions for political centres. In capitalistic states, there are independent political centers such as Washington, the capital of the United States, Ottawa, the capital of Canadian. Some capitals of states in these countries can be located on small cities. But it is impossible in the People's Republic of China. In China, all the political centers develop comparatively rapidly. In 1953, Beijing was the fourth largest city in China, but now it has leaped to the second place. Among all the 22 megalopolises, 17 are the capitals of provinces or the country.

In China, political centers are inevitable to be centers for economy management. since various management departments of national economy, nearly all the enterprises of information, finance, insurance, trust, postal service, and so on concentrate on political centers. The political centers are also transportation centers and In recent years, the megalopolises have opened to the outside world, and attracted a large amount of foreign capital. A lot of

Chinese-foreign joint ventures, enterprises jointly managed by China and foreign countries, ventures exclusively with foreign investment have been set up. The megalopolises also attract capital from other parts of the country to set up factories and other undertakings as well as some peasants to devote to the tertiary industry. All these lead to the increase of immigrants and the enlargement of metropolitan scale. Because of the opening policy, the floating population in the metropolises increase rapidly. In 1988, the number of floating population in Shanghai, Beijing, Guangzhou was 1,830 thousand, 1,150 thousand, 1,100 thousand respectively. This in fact enlarge the present scale of these cities' population.

### **3. Difference between City and Countryside**

The metropolises are the national or regional centers for politics, economy, culture and information, with material condition high productivity, advantageous material condition and higher living standard. But in the vast countryside, because the agricultural population is multitudinous, the per capita arable land is limited, the level of mechanization of agriculture is low, the labor intensity is high, but the income is low. At the same time, the price scissors between industrial and agricultural product, conforming with "urban inclination", further reduce the economic income greatly. Therefore, the conspicuous difference between city and countryside is formed, which certainly gives rise to centripetal movement of the rural population. In fact, this centripetal movement of the agricultural population has never stopped ever since 1949. Especially since 1978, it has shown a tendency of strengthening.

The metropolises have strong appeal not only to the agricultural population, but also to the population of medium-sized cities and small cities. It is because there is a "gradient gap" in various aspects between the metropolises and the medium-sized cities and the small cities. The "gradient gap" causes the population in the medium-sized cities and the small cities to migrate into the metropolises to enjoy their civilization, which put much more population pressure upon the metropolises.

### **4. Deviations in Policy-Making**

In the 1950s, the work of family planning was not carried out in China. From 1949 to 1957, the natural population growth rate maintained over 3 percent in the cities, and even higher than that in the countryside. In the early years of the 1960s, affected by the indemnifying bearing peak, the natural growth rate of urban population was as high as 2 percent.

As to urban construction, the government proposed "turning consumer-cities into producer-cities", arranged many large productive projections in the metropolises, which lead to a large number of rural labors coming into cities. During the period of "Great Leap Forward" (1958-1960), it reached the limit. According to the statistical data, in that period, urban population increased from 99.49 million to 130.73 million dramatically, 90 percent of which was immigrants. The average annual growth rate was as high as 9.53 percent. So

many farmers migrated into cities, which was beyond the cities' carrying capacity. In fact, the phenomenon occurred at the end of the 1950s was just like the over-urbanization in many developing countries occurred in the 1960s and the 1970s. From 1961 to 1966, in order to reconstruct rationally new order of urban population and urban economic development, the cities began to reduce the staff, mobilize nearly 30 million reduced staff to go to the countryside. In 1966-1976, intellectual youths and some urban dwellers were mobilized to leave for the rural area, which further reduced the urban population. After 1977, the emigrants went back to their original cities. Therefore, the urban population expanded greatly, which further aggravated the various existing contradictions. The metropolitan expansion was also affected by artificial factors and deviations made in implementing the policies. For many years, the Government has taken metropolitan control as an important policy. But in practical work, there exist many problems, such as lacking overall urban population planning and authoritative organization etc.

### III. IDEAL GOALS OF METROPOLITAN SCALE-CONTROL

Metropolises are the pillars and bases of economic, social and cultural development in a country or a region. Without flourishing economy of the metropolises, there were not vigorously national and regional economy. But the development of metropolise has its own limit, and is subjected to the capacity of the objective environment and the social-economic environment. Each city has a threshold of urban population scale at a given time. Within the threshold, the city can obtain a comparatively good comprehensive benefit. or the urban comprehensive benefit. In recent years, many metropolises in China are threatened by "modern urban diseases" such as residence shortage, traffic jams, environment deterioration and so on. So, people pay close attention to the metropolitan expansion once more. "Strictly Controlling and so on metropolitan scale" has become the people's common knowledge. And now, it is urgent to explore the goals of metropolitan scale control.

#### 1. Urban Economic Development

Generally speaking, population is an essential condition for urban development. As the creator of the social wealth, the population play an important positive role in the urban economic development. But, under certain circumstance, the requirement of the development of urban economy for human resources has its limit. When the growth of urban population fit with the demand of the development of urban economy, it can speed up the development of urban economy greatly. For example, from 1949 to 1957, the urban population increased from 57.65 million to 99.49 million, the average annual growth rate of urban population was as high as 7.05 percent, which metted the requirement of the rising economic development at the beginning of the founding of the People's Republic of China and

promoted the development of national economy powerfully. On the contrary, if the growth of urban population surpassed the requirement of the economic development, the surplus urban population can hinder the development of urban economy. In fact, if urban population was over excessive, the difficulty of employment was aggravated. The contradiction between the supply of human resource and the requirement of labor was formed. Heavy population pressure might obstruct the urban construction and development. It can be seen from the above fact that the growth of urban population must correspond to the requirement of the urban economic development for human resources.

## **2. Urban Infrastructure Carrying Capacity**

Urban population is the main body of a city. Considering the social benefits, the population carrying capacity of a city has its limits. Urban population, as producers, need not only cultural and scientific condition, but also living conditions and better working environment; as consumers, they should have not only requirements for clothes, food, housing, and traveling, but also better recreation for cultural entertainments. Public utilities, municipal engineering, hospitals, schools, culture and entertainment places and dwelling buildings suit to the development of urban population. are all needed. But if the urban population grow too rapidly, it is inevitable to give rise to various problems, affect the normal living of urban citizens, aggravate the burden of urban construction and urban management. If the population growth exceed urban carrying capacity, a series of problems, such as house shortage, environment pollution, traffic blocks will arise. Although constructing urban infrastructure can enlarge the carrying capacity of a city, the construction of urban infrastructure has to be conformed with the urban fiscal conditions. Each year, the investment in urban construction has a certain limit, the enlargement of municipal works can only be carried out gradually. Therefore, the increase of urban population can only be planned and gradual. It is clear that, from the point of social benefit, there is a problem of control and control scope in the growth of metropolitan. No matter to say, we have 800 million farmers, the urbanization of agricultural population is an inexorable trend. With the improvement of agricultural modernization level, millions of the population will migrate into cities. At present, there still exist differences between cities and countryside, industry and agriculture, metropolises and small cities. If we did not control the metropolitan scale, the great quantity of agricultural population would migrate into metropolises and so do the population in remote and frontier areas and in medium-sized and small cities, which is not only pernicious to the development of metropolises but also detrimental to the development of the rural areas.

## **3. Urban Eco-Environmental Carrying Capacity**

The conditions of a city and the surrounding areas such as land use, climate, resource,



energy, water resource and communication have a decisive impact on the urban population scale. Generally speaking, metropolises must have better environmental capacity and geographical conditions. The eco-environment of metropolises has a direct relation with the citizen health in body and mind, and is also the main content of urban spiritual civilization and material civilization. The excessive growth and is the high density of urban population inevitably bring about the complicated problems of eco-environment, such as reduction in arable land in the suburbs, afforestation area shrinkage, shortage of water and energy supply, ecological disturbance and environmental pollution. With the development of industries and growth of population, some cities have to collect water from different river drainage areas, so that environmental problems in larger area were created. The over excessive population and increase of traffic form noise pollution which make the urban dweller feel uneasy day and night, spoil the people's health in mental and mind. Therefore, considering ecological benefits, the urban population should not be over-excessive, over-dense, and should conform with the eco-environment.

We have argued the ideal aims of metropolitan scale-control from economic, social and ecological aspects respectively. In fact, it is very difficult or even impossible for the metropolises to obtain optimum benefits in the three aspects at the same time. What we pursue later can only be approximate to the optimum benefits, or optimum combination of the three aspects when the conditions permit.

#### **IV. STRATEGIC COUNTERMEASURES OF METROPOLITAN CONTROL**

Metropolitan scale-control include two aspects, one is to control the natural growth of urban population, the other is to control the immigrants from other areas or cities. The former, because family planning has been accepted by the urban citizen, is easy to control; the latter is the difficult point of the metropolitan scale control, and the focus to which experts pay attention<sup>[6]</sup>. In recent years, many experts and scholars have carried out a lot of research and exploration, put forward a series of theories and models such as restriction theory, dredging theory, holding back theory which play an important role in metropolitan scale-control in China. And now, according to the causes of metropolitan expansion and the ideal goals of metropolitan scale-control, the author put forward some strategic countermeasures.

##### **1. Construction of Rationally Regional Urban System**

In a certain range, the number of metropolises, medium-sized and small cities should have a rational urban structure. Metropolises are formed where the geographical sites are favorable, with an advantageous natural and transportation conditions, and the medium-sized and small cities are formed where the conditions are not so good. The me-

metropolises have close ties with the medium-sized and small cities, and the vast rural areas. The former need raw materials and markets of the latter, and the latter need the industrial, cultural and educational products supplied by the former. Therefore, in a certain region, the metropolises should integrate themselves with medium-sized and small cities. The development of metropolises should take the development of medium-sized and small cities as their bases. The development of medium-sized and small cities should depend on the development of the small towns and rural areas. The combination among megalopolises, metropolises, medium-sized cities, and the small cities should have a rational proportion (for instance, 1:3:9:27 or 1:7:49:343 or 1:4:16:64). Just like a pyramid, the bottom is wide, and the upwards should be narrowed. This kind of urban system is firm, which can insure metropolises develop steadily. And as the economic core, metropolises can act as the leader of the development of the medium-sized cities, small cities and vast rural areas. On the contrary, if the proportion of the metropolises is much large while the proportion of medium-sized and the small cities is much smaller, then the urban system lacks solid foundation, the metropolises can not give fully play to the role of growth pole and the economic development of both regions and cities both will be impaired. At the same time, the more irrational the urban system is, the shorter the medium-sized cities and the small cities, the more the metropolis population. Since the metropolises lack forcefully middle cushioning effect of medium-sized and small cities, the difference between city and countryside is too remarkable, the people will try their best to go to metropolises, and once they enter the metropolises, they will never want to leave.

## 2. Construction of Satellite Cities

The thought of constructing satellite cities originated in Ebenezer Howard's theory of garden city, the fundamental aims of which were to disperse the surplus industries and population in London. Ebenezer Howard built the first satellite city—Letchworth in the outskirts of London<sup>[7]</sup>. Since the 1950s with the metropolitan expansion in many countries, the experts pay much more attention to Ebenezer Howard's theory of garden city<sup>[8]</sup>. In the United States, England, France, and Japan, a lot of satellite cities have been built up. The satellite cities have produced positive effects.

In the 1970s, in order to solve the problems of the metropolitan expansion, Beijing, Shenyang, Shanghai began to build satellite cities. Now, Beijing has set up three satellite cities: Huangcun, Changping, Tongxian, which have played their roles in population control. Shanghai has set up a series of satellite cities with different characteristics: Jiading (science city), Jinshan (petrochemistry city), Baoshan (steel city). The construction of satellite cities of Shanghai is successful. For Liaoning Province, with many metropolises and high density of industries and population, it is more urgent to develop satellite cities.

### 3. Development of Small Cities and Towns

Small cities and towns are not only the bridges and ties connecting vast rural areas with metropolises, but also the centres of rural economy, culture and science. The construction and development of small cities and towns is the only way of agricultural urbanization in China. In the past, small cities and towns were not thought highly of, which led to slow development or even contraction of small cities and towns. Small cities and towns have been developed rapidly since 1978; and have been gaining their tremendous momentum (Table 4)<sup>[9, 10]</sup>

Table 4 Number of small cities and towns from 1953 to 1988

	1953	1963	1975	1978	1983	1984	1988
Towns	5402	4032	2386	2850	2781	6211	11261
Small cities	112	89	96	93	149	169	223
Total	5514	2863	2959	2943	2930	6380	11484

The flourish of small cities is not independent from the development of the township enterprises. If we say that urban industries are the nutrient substratum of the metropolises development, then we can say that the township enterprises are the accelerant of the prosperity of the small cities and towns. The township enterprises are not only the main funds resource for the town construction, but also can create employment opportunities, prevent agricultural population from migrating into the metropolises, which play an incalculable role in controlling the rapid growth of urban population.

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