

# Differentiation of Demographic Dynamics as a Result of Unevenness in Socio-Economic Development of China

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**Abstract**—The article is devoted to an actual problem, which is characteristic of modern actively developing China – the strengthening of differentiation in internal demographic development. Such differentiation is reflected in significant differences between regions in trends of natural reproduction of the population, internal migration and process of urbanization. Negative social and economic consequences caused by differences in demographic trends are the important scientific and practical problem for the Chinese Government that considers the demographic resources as the main factor for further development. The purpose of the research is to determine the factors and assess the level of demographic differentiation of Chinese regions. The main hypothesis of the research is the thesis that the intensification of unevenness of demographic development in different regions (provinces and cities) is caused by two interrelated factors: accelerated growth of China's national economy and consequences of the «One family – one child» policy, which took place until 2015. The author characterizes the conditions for demographic differentiation in China, estimates the level of demographic differentiation, and studies the differences in natural and migratory growth in Chinese provinces. Under the research, the place and role of some cities and provinces on the demographic and economic map of China are also considered.

**Keywords**—China's demographic development; China's economic development; differentiation of demographic dynamics; unevenness of economic development

## I. INTRODUCTION

### A. Statement of Problem and Its Relevance

China is the world's most populous country; up to the 1980s, it led in terms of population growth rates. Since the founding of the PRC and until 1980, the country's demographic development was intense, as the population grew by 414 million people or 70% from 1953 to 1982 [1]. Large population was seen as an enormous HR pool that would enable faster economic and territorial development. However, the onset of economic reforms in 1978 and the introduction of strict birth control in 1979 had a tremendous impact on the Chinese demographics and was precursor to the demographic gap in the country. The demographic gap is herein defined as a system of stable inter-regional (inter-locality) differences applicable to the population reproduction, the effects of

various factors on population numbers and structure, which manifest in a considerable difference in demographic dynamics and development.

At their core, demographic processes a priori feature considerable regional discrepancy, which is why the demographic gap problems have become acute for China rather recently in the post-reform period, as regional and industrial disparities manifested very apparently in the single economy, while socio-economic inequality of the Chinese society gained foothold.

On the one hand, modern science perceives socio-economic and demographic disparity as an inevitable and natural phenomenon pertaining to market relations, something that shapes the economic hierarchy of industrial centers and lagging outskirts, thus inducing centrifugal migration. On the other hand, the crisis in individual regions and the center-periphery gap is a result of unfair market exchange, disharmonic economic development, and state regulation failures [2]. Given that demographic resources lay the foundations for China's long-term economic growth while also being fundamental to the social stability and standard of living [3], comprehensive and in-depth research into the problem of exacerbating demographic gaps becomes imperative.

The scientific basis for such research consists in identifying the historical and economic reasons behind demographic gaps, a quantification of such gaps, and finding territorial differences in natural population growth and population gain from migration. The purpose hereof is to determine the factors and to quantify the demographic gaps in China by analyzing regional data. It is hypothesized that the enlargement of demographic gaps between regions (provinces and direct-administered municipalities) is caused by two interrelated factors: accelerated economic growth and the consequences of the birth control policy referred to as the One-Child Policy, which had been effective until 2015. Quantitative assessment and meaningful analysis on this matter is necessary for drafting appropriate recommendations on economic and demographic management; they will also be useful in sharing experience with other countries similar to China in terms of demographic gap problems caused by the branching of their national spatial and economic structure.

### B. State of the Art

Researchers showcase great interest in China's current economic and demographic problems due to the country's enormous influence on the world economy and global demographics. Nobel Prize winner in economics Joseph E. Stiglitz, a profound researcher of Chinese reforms, referred to China as a global economic leader at the core of the global order. At the same time, he noted that for modern economies, the key problem was the growing inequality, which impeded the global economic development [4]. Another Nobel prize winner, Michael Spence, believes that for China, the key problem is internal migration coupled with the need to create jobs and improve the general economic situation in such conditions [5].

Numerous Western and Chinese studies into the country's demographic gaps first cover the following contexts.

- *Urbanization.* By assessment of China's urbanization scale, scientists draw conclusions on the considerable and ever-growing inequality of the country's regions in terms of production, public investments, infrastructural development, standard of living, and thus the natural population growth and population gain from migration [6–10]. The seriousness of urbanization-induced demographic and socio-economic transforms occurring in China is reflected in the following quotes: "The China Dream is an Urban Dream" [11], "High-tech development in the USA and China's urbanization would be two key factors affecting the process of human society development in the 21st century" [6].
- *Internal migration.* The main subject matter of research here is the breakdown of migration fluxes by age, sex, and education; motivation; directions and consequences of migration for human health and the environment; as well as evaluation of migrants' income and standard-of-living inequality in China's major cities [12–15].
- *Correlation of China's economic and demographic development.* A popular problem to research is the so-called "demographic dividends", i.e. the economic growth rate increase attributable to limiting the population growth [16–20]. According to Chinese researchers' estimates, the decline in fertility, nuptiality, and working-age population growth rates in 1983-2008 did contribute to China's 19.5% economic growth. At the same time, the effects of demographic changes is most apparent in provinces and cities boasting the most intensive economic growth [17].

Comprehensive research into this problem, as well as comparison of different opinions and statistics contributes to further research. However, Western studies still pay insufficient attention to the quantification of China's demographic gaps and to analyzing the discrepancies in demographic reproduction as a total of natural population growth and migration gains. In this regard, Russian scientists have made a valuable contribution by establishing clear criteria of Chinese demographic gaps and regionalizing the country by a number of demographic traits [21–23]. In

previous research, we covered in detail the factors of socio-economic inequality and general demographic dynamics of China [3, 23].

## II. FACTORS AND EXTENT OF DEMOGRAPHIC GAPS IN CHINESE REGIONS

### A. Factors and Context of Demographic Gaps in China

China's demographic gaps were initially caused by the natural and geographical factors as well as by the historical settlement trends. However, during the late 20th century's reforms, the demographic development was mainly driven by economic factors. On the one hand, the One-Child Policy was the result of economic reforms, made imperative by the need to reduce the demographic burden on the existing resources while reducing the country's poverty. On the other hand, the altered population structure, now dominated by working-age population (72.5% in 2016) as well as one of Asia's lowest demographic burdens (37.9% in 2016) [1] are in line with the needs of a growing economy.

At the same time, China's demographics is associated with spatial unevenness. Let us analyze how natural population growth and internal migration affect the demographics of different regions. Based on the statistics available from the National Bureau of Statistics, China, we clustered the country's 31 regions by annual average population growth in 2000-2016. The region list included provinces, autonomous districts, and direct-administered municipalities ("the DAMs"), while excluding Hong Kong, Macau, and Taiwan as areas of a special economic status. For each cluster, we calculated the weighted average annual natural population growth rates and population gains from migration for 2000-2016, see Table 1.

TABLE I. CLUSTERING THE CHINESE REGIONS BY POPULATION GROWTH RATE

Cluster (Annual Average Population Growth Rate)	Provinces and DAMs in the Cluster	Total Population Growth, Million People	Weighted Average Population Growth Rate, %	Weighted Average Natural Population Growth Rate, %	Weighted Average Gain From Migration, %
Cluster One > 1.0%	Beijing, Tianjin, Shanghai, Guangdong, Tibet, Xinjiang, Ningxia, Zhejiang	54.8	1.8	0.60	1.30
Cluster Two (0.5% to 1.0%)	Hainan, Qinghai, Shanxi, Yunnan, Shaanxi, Fujian, Hebei, Shandong	30.5	0.63	0.65	0.02

TABLE 1 CONTINUATION

Cluster (Annual Average Population Growth Rate)	Provinces and DAMs in the Cluster	Total Population Growth, Million People	Weighted Average Population Growth Rate, %	Weighted Average Natural Population Growth Rate, %	Weighted Average Gain From Migration, %
Cluster Three (0.1% to 0.5%)	Jiangsu, Guangxi, Inner Mongolia, Jiangxi, Hunan, Heilongjiang, Liaoning, Henan, Anhui	19.6	0.28	0.46	0.19
Cluster Four (< 0.1%)	Gansu, Jilin, Guizhou, Sichuan, Chongqing, Hubei	4.6	0.11	0.42	0.54

As can be seen from Table 1, population growth is dominated by Cluster One, including the three most important direct-administered municipalities (Beijing, Tianjin, and Shanghai) as well as by Guangdong's capital Guangzhou. Over the period of 2000-2016, these cities' population growth totaled 41.2 million people, or 40.4% of China's total population growth. Being initially low on human resources (105 million people or 8.6% of China's population as of 1995) and occupying only 2.2% of China's total area, these four cities are the country's today fastest-growing metropolitan areas accounting for 12.3% of the country's population. In the 21st century alone, Beijing's population has risen by 55.7%, Tianjin's by 51.5%, Shanghai's by 44.9%, and Guangdong's by 24.1% [1].

In contrast to these megacities, there are regions whose population is on decline; these are the provinces of Guizhou, Sichuan, Hubei, as well as the municipality of Chongqing. In 2000-2016, the total population of these regions in Central China dropped by 5.2 million people, or by 2.5%, reducing their share in the total population from 16.6% in 2000 to 15.0% in 2015.

The interregional redistribution of population is mainly driven by internal migration; as can be seen from Table 1, the lower clusters are losing their population to the upper clusters. Major donors are the central provinces of Sichuan, Henan, Hubei, Anhui, and Guizhou, whose migration balance totaled 27 million people over 2000-2016; the main centers of attraction were the eastern provinces of Guangdong, Zhejiang, and Jiangsu, whose migration balance totaled 20 million people over the same period. The cities of Beijing, Shanghai, and Tianjin received more than 20 million people, with internal migration making up for almost 95% of their population growth. As for the natural population growth, it is the key factor for donor regions, as it compensates the migration outflow to some extent.

### B. Demographic Gaps in China

Internal migration is the main driver of urbanization in China. The establishment of free economic zones in the east coast, the creation of points of national economic growth in

the east resulted in both financial and human resources being concentrated there. In line with the intent and nature of our analysis, we picked up a number of coefficients to analyze the demographic gaps as well as to correlate them to economic development, see Table 2.

TABLE II. CHINA'S DEMOGRAPHIC GAPS

Indicator	Indicator Applicability Rationale	Calculated Value	Conclusion
The Lorentz factor	Describes the inequality in distribution of the absolute population growth in 2000-2016	0.45	Actual distribution is 45% behind an absolutely uniform distribution
Concentration ratio	Describes the population non-uniformity as of 2016	19.1	The three most populous provinces have 19 times the population of the three least populous provinces
Spearman Rank Correlation Coefficient 1	Describes the correlation between the province-specific population gain from migration and the GRP per capita changes in 2000-2016.	0.60	60% of the population gain from migration in these provinces is attributable to the increase in the GRP per capita
Spearman Rank Correlation Coefficient 2	Describes the correlation between the province-specific population gain from migration and absolute population growth in 2000-2016.	0.69	69% of the population gain from migration is attributable to the redistribution of population caused by internal migration

Therefore, the intensification of internal migration in China is largely attributable to the different socio-economic development of the country's regions. According to other studies, 65% of Chinese migrants leaving their settlements in search for job have preferred to settle in the east of the country [22]. At the same time, population outflow is most significant for the inner regions immediately adjacent to the coastal ones.

### III. CONCLUSION

This research has produced the following findings.

1. The problem of China's demographic gaps was exacerbated during the economic reforms, as they intensified the socio-economic inequality of the country's regions. China's demographic gaps as a scientific and practical problem have been studied by many Western, Chinese, and Russian scientists; they manifest themselves in many aspects of the country's demographic and socio-economic development.

2. Demographic gaps are mainly caused by internal migration. Clustering the Chinese regions by population growth rates has clearly identified the donor regions and the receiving regions.

3. The intensification of internal migration in China is largely attributable to the different socio-economic development of the country's regions. According to our calculations, 60% of province-specific population gain from migration is attributable to the increase in the GRP per capita, while 69% of the total population growth is attributable to internal migration.

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