

## Issues of determining the effects of migration on population growth in Ulaanbaatar

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**Abstract:** Since Mongolia's transition to a market economy in the 1990s, the “Great Migration” from rural to urban areas due to job shortages and natural disasters (droughts and dzud - disaster affecting livestock caused by severe natural conditions) in rural areas has continued. Many of these in-migrants have settled in large cities and their suburbs, especially in Ulaanbaatar, leading to many problems, including environmental pollution, traffic congestion, and overcrowding of social services. In addition, a number of studies have been conducted in Mongolia about the types of internal migration, factors influencing it, causes, characteristics of migrants, consequences and vulnerabilities. However, there is a lack of research about population location, density, settlement and their changes due to migration, especially the urban-rural population ratio, urban population growth and the impact of migration on it. Therefore, the main purpose of this study is to analyze the main indicators of population migration in Ulaanbaatar, to determine its impact on population growth, to evaluate and to determine future trend. Within the framework of the study, spatial and statistical analysis of data and materials of the last 30 years (1990-2019) of the main population indicators of Ulaanbaatar was conducted and future trend was determined based on the population projections. According to the research results, in-migrants were always dominant in Ulaanbaatar from 1990 to 2019, and the intensity of migration generally increased in the years following droughts and dzuds. In addition, a total of 663.1 thousand people migrated to Ulaanbaatar from aimags and rural areas over the last 30 years, which is equal to 45.2 percent of the total population of Ulaanbaatar in 2019. As a result, urban population of Mongolia counted 2,212.9 thousand in 2020, and the urbanization rate reached 68.0 percent, of which 67.7 percent is concentrated in Ulaanbaatar alone. Between 2000 and 2009, 47.4 percent of the total in-migrants (1990-2019) or 314.5 thousand people moved to Ulaanbaatar, which was the peak of migration to Ulaanbaatar. From a population perspective, Ulaanbaatar's population is expected to reach 2.5 million or the equivalent of 50.5 percent of the total population of the country in 2050. In order to reduce overcrowding in Ulaanbaatar, it is necessary, in the future, to reduce inland migration from rural areas to Ulaanbaatar, reduce the gap between urban and rural development levels, support and develop regional development cities, and diversify settlements system.

**Keywords:** *Population, population growth, migration, rural to urban migration, Ulaanbaatar;*

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## INTRODUCTION

Population migration is one of the most important issues of population geography, which has both positive and negative impacts on all aspects of the country's society, economy, population growth, jobs, comfortable living environment, culture, education and health service quality and access, citizens' standard of living, social welfare, protection, and urban planning [1]. The government of Mongolia develops and implements social and economic policies and programs in order to respect the right to move freely anywhere in the vast territory of the country, to create conditions for choosing a place to live and work, and to gradually eliminate the differences in the level of urban and rural development. Migration from rural to urban areas is not decreasing due to the lop-sided development of infrastructure, information, communication, comfortable working environment, as well as a quest for a better place to get quality education and health care [2]. According to the 1990-2019 statistics, a total of 663.1 thousand people migrated to Ulaanbaatar from rural areas, while 179.2 thousand people out migrated to rural areas. The net migration was 483.9 thousand people, which is equal to 45.2 percent of the total population of Ulaanbaatar in 2019 [3].

After Mongolia transitioned to market economy in the 1990s, there has been a continued "Great Migration" from rural to urban areas, particularly of livestock breeders who have lost their livestock due primarily to natural disasters (drought, and drud) [4] depriving of their livelihood mainstay, and also because they could not find appropriate jobs in the rural areas. These in-migrants settled in the central part of our country, in large cities and their suburban areas. This has had a real impact on many social and economic factors, such as the loss of population distribution and proper settlement system, increasing the burden of urban areas, creating excessive population

concentration, increasing environmental pollution, and differences in regional economic development [5]. As a result, as of 2020, Mongolia's urban population reached 2212.9 thousand, and the level of urbanization was 68.0 percent, which is an increase of 1037.5 thousand people or 88.2 percent, and the level of urbanization has increased by 13.5 points, respectively, compared to 1990 [6]. This trend was calculated based on the prospective estimation of Mongolia's population projection until 2045 released by the NSO in 2015. The total population of Mongolia will be 5,010.4 thousand, of which the population of Ulaanbaatar will be 2,868.7 thousand or 57.2 percent of the total population of the country in 2045, which is expected to increase rapidly [7].

Due to the internal migration of the population, there are significant changes in the location, density, and settlement of the country's population [8], and researchers in this field in our country have been studying the types of migration, the factors affecting inland migration, their causes, characteristics, consequences, and the vulnerability encountered by the migrants [3]. However, there has been almost no research into the changes in the location, density, and settlement of the population due to internal migration, especially the ratio of the urban and rural population, the growth of the urban population, and the impact of migration on it. In addition, internal migration of population is one of the main factors affecting the formation of a proper system of population distribution and settlement. It is necessary to study the growth, trends, and the impact of migration on the population of Ulaanbaatar, based on scientific research, at a time when the Government of Mongolia is developing the Regional Development Policy and the General Plan for the Development of Population Distribution and Settlement. Therefore, the main goal of this research work is to

determine population migration of Ulaanbaatar and its impact on population growth, and the following objectives are proposed, including:

1. To determine the characteristics of population migration in Ulaanbaatar
2. To detect the effect of migration on population growth in Ulaanbaatar.

### Literature review

Scholars and researchers of the Department of Social and Economic Geography of the Institute of Geography (former name) of the Mongolian Academy of Sciences have played an important role in reviewing the studies conducted in the field of internal migration of the population of Mongolia. For example, Academician B. Gungaadash (1963, 1986) analyzed the changes in the number, age structure, and settlement of the country's population and concluded that the net growth of the population not only directly affects the distribution and changes of labor resources, but also the migration of the population is important. Professor M. Bayantor (1971, 1995) considered population migration in connection with the development of urban areas and concluded that the intensity of population migration and the settlement of migrants have a significant impact on the development of urban areas. He suggested that the result of migration is represented by settlement and location of the population. Geographer O. Sukhbaatar (1973) made the first attempt to systematically study the population migration of Mongolia and wrote a book called "Population migration of the Mongolian People's Republic". Dr. J. Oyungerel (2005) studied in detail the "geographic issues of population migration in Mongolia in the new social and economic conditions" and classified the factors affecting migration into social, economic and ecological, and determined the territorial differences in migration.

The Population Training and Research Center under the National University of Mongolia (NUM) (2001), (2005), (2009), (2018), (2021) conducted a series of studies on internal migration, its causes and consequences with the support of international organizations, such as the International Organization for Migration, United Nations Development Program and the Population Fund. Thanks to these studies, the state of population migration, factors affecting migration, characteristics, consequences and trends of migrants were studied, and conclusions and recommendations were developed. The National Statistics Office (2011), (2021) has produced basic population migration reports based on data from the 2000, 2010 and 2020 Population and Housing Censuses. Migration was measured in 4 regions and Ulaanbaatar city according to the criteria of in-migrants and out-migrants after birth over a period of the last 5 years and 1 year, and migration participants were disintegrated by age, gender and education. It also analyzed the reasons for migration, the problems faced by migrants, changes after migration, the policies and programs of the government regarding future migration.

If we look at the studies conducted in the field of internal migration of population in Mongolia, we find that there are many studies that analyze the types of migration, factors, characteristics, vulnerabilities, and problems of migrants, but there are almost no studies detailing the location and settlement of the population, especially the effects of migration on the growth of the population of Ulaanbaatar. However, this matter was analyzed by M. Altanbagana et al. (2022) within the framework of a project called "Redevelop the basis of the theory, integrated methodology, and method of regional development in Mongolia" and S. Davaanyam et al. (2023) in the report entitled "General Project of Population distribution and settlement development of Mongolia" In addition, a researcher B.

Narantulga (2018) had taken up this matter in her work on migration in the Mongolian society.

**MATERIALS AND METHODS**

Key statistical indicators of population migration in Mongolia and Ulaanbaatar and the changes in the last 30 years (from 1990 to 2019) were analyzed in this study. The main sources of the key indicators of population size, growth, and migration are the Population and Housing Census, which is conducted once every 10 years by the National Statistics Office, as well as the end-of-year data on resident population and migration population reports. Indicators were collected from the Statistical Yearbook of Mongolia and the statistical database from the site [www.1212.mn](http://www.1212.mn) at the province and capital levels for the years 1990-2019, and initial data processing was done on MS Excel to create a database.

Population migration is a socio-economic geographic process with spatial and temporal dimensions, which depends on many social, economic, and natural factors and resources. In order to detect the territorial disparities of migration, the

basic indicators of in- and out-migrants, and the intensity of migration are used [8]. The amount of population migration or the number of migrants is an indicator of the total sum of the number of in- and out-migrants in a given country or a region for a certain partial period (year, month). But the intensity of migration is the ratio of the total number of people who have left and arrived within a certain period of time per 1,000 or 10,000 people in that country or region. Migration gap or net migration refers to the difference between the number of people who have moved and migrated to a country or state in a certain period of time, and if the number of migrants exceeds the number of emigrants, it is net migration, and otherwise, it is net migration [18]. The main indicators of population migration are compared to 1,000 people to eliminate the population's effects. However, the ratio of the difference between the number of people who have migrated and those who have migrated to the average annual population is called the net migration coefficient. It is calculated using the following formulas [19].

$$a = \frac{b+c}{d} * 1000 \quad (1) \quad b(k) = \frac{b}{d} * 1000 \quad (2) \quad c(k) = \frac{c}{d} * 1000 \quad (3)$$

a – Intensity of migration  
 b – Number of in-migrants  
 c – Number of out-migrants  
 d – Population  
 b(k) – Ratio of in-migrants  
 b – Number of in-migrants  
 d – Population  
 c(k) – Ratio of out-migrants  
 c – Number of out-migrants  
 d – Population

On the one hand, the phenomenon of population change depends on the net growth of the population or the normal growth of the population, and on the other hand, on the mechanical growth of the population (migration). Normal growth is calculated by subtracting the number of deaths from the number of children born in a given year and depending on the number of births and deaths, this indicator can be either positive or negative.

But mechanical growth or net migration refers to the difference between in-migrants and out-migrants to a country or region in a certain period of time, and if the number of in-migrants exceeds the number of out-migrants, then it is called net migration [18]. The method of calculating population changes using these indicators is called the component method and is calculated using the demographic balance formula.

$$P_t - P_o = (B - D) + (In - Out) \quad (4)$$

*P<sub>t</sub>* – Population of the last year  
*P<sub>o</sub>* – Population of the first year  
*B* – Total births  
*D* – Total deaths

*In – Total in-migrants*  
*Out – Total out-migrants*

The population calculated by the population balance formula sometimes differs from the year-end population declared by official statistics. This is due to differences in one or more of the birth, death, or migration indicators used in the component calculation, or in the census

population. In other words, in practice, the information is incomplete or incorrectly recorded, and this type of error is common in countries with poorly developed civil registration and information systems. In such a case, the demographic balance formula is computed as follows.

$$P_t - P_o = (B - D) + (In - Out) + e \tag{5}$$

*e - is closure error, or the difference in estimates due to demographic phenomena or missing/incorrect registration of population numbers*

Population change data calculated using the component method can be used to determine the percentage, level, and component contribution of population growth. In doing so, the parameters of the

population balance formula will be compared to the average annual population and will be calculated using the following formula [19].

$$\frac{P_t - P_o}{P} * 100 = \frac{(B - D)}{P} * 100 + \frac{(In - Out)}{P} * 100 \tag{6}$$

The ratio of mechanical growth to net growth is one indicator of how migration

has affected population growth, which is calculated using the following formula.

$$\text{Ratio of MG to NG} = \frac{\text{Net migration}}{\text{Normal growth}} * 100 \tag{7}$$

*Ratio of MG to NG - is the ratio of mechanical growth to net growth*

If the ratio of MG to NG is >0, this means that migration has had a positive effect on population growth or the population has increased due to migration,

and if the ratio of MG to NG is >100, this means that net migration has had a greater impact on population growth than normal growth, respectively[20].

## RESULTS AND DISCUSSION

The new Constitution of Mongolia has given the citizens the right to freely choose their place of residence. It put an end to previous society's administrative regulation of migration of citizens, as a result of which population migration intensified in the 1990s. In 1991-1992, the privatization of collective and fund enterprises took place in rural areas, and people interested in taking part in the

privatization process migrated from cities to rural areas [8]. Considering the intensity of population migration in Ulaanbaatar from 1990 to 2019, it was stable from 1990 to 2002, from 13.5 to 29.1, to 46.6 in 2003, to a peak of 74.4 in 2004, from 33.9 to 40.2 in 2005 to 2009, and to 46.8 in 2010, from 27.9 to 31.7 in 2011-2016, which sharply decreased to 8.9-15.4 in 2017-2019.

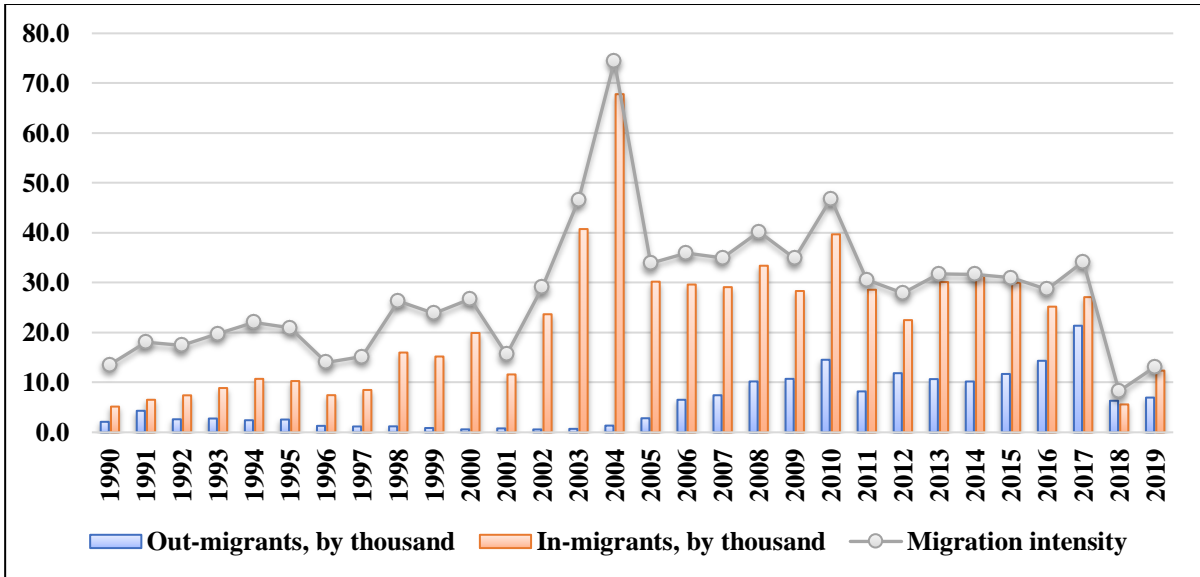


Figure 1. Main indicators of population migration in Ulaanbaatar city (1990-2019)  
Source: [www.ubstat.mn](http://www.ubstat.mn)

In order to detect the geographical disparities of population migration, it is necessary to calculate the number of in- and out-migrants, and their indicators per 1000 people. When considering the number of in-migrants in Ulaanbaatar from 1990-2019, it increased sharply from 5.2 to 23.7 thousand in 1990-2002 to reach 40.8 to 67.8 thousand in 2003-2004, which

was a peak record showing in the last 30 years. In 2005-2009, 28.3 - 33.4 thousand people immigrated, and in 2010, 39.7 thousand people migrated. Since then, it has steadily decreased, from 22.5 to 31.4 thousand in 2011-2016, and to 6.6 to 12.4 thousand in 2017-2019 due to the ban on migration to Ulaanbaatar. In this regard, the in-migration coefficient is similar.

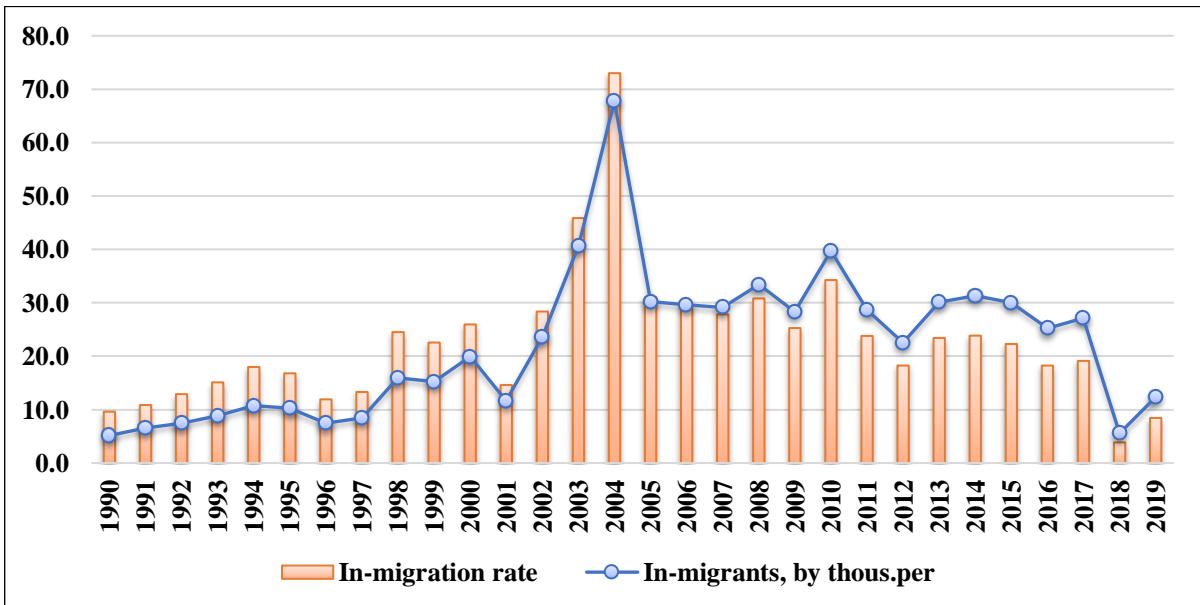


Figure 2. In-migrants and their coefficient in Ulaanbaatar (1990-2019)  
Source: [www.ubstat.mn](http://www.ubstat.mn)

In addition, considering the number of in-migrants to Ulaanbaatar in the last 30 years by provinces, the Central aimag (province) leads with 73.8 thousand people (11.1 percent), Darkhan-Uul aimag with 50.1 thousand people (7.5 percent), Zavkhan aimag with 45.6 thousand people

(6.8 percent), and Umnugovi aimag 13.8 thousand people (2.1 percent), Govisumber aimag with 9.3 thousand people (1.4 percent), and Bayan-Olgii aimag with 5.1 thousand people (0.7 percent) are the lowest.

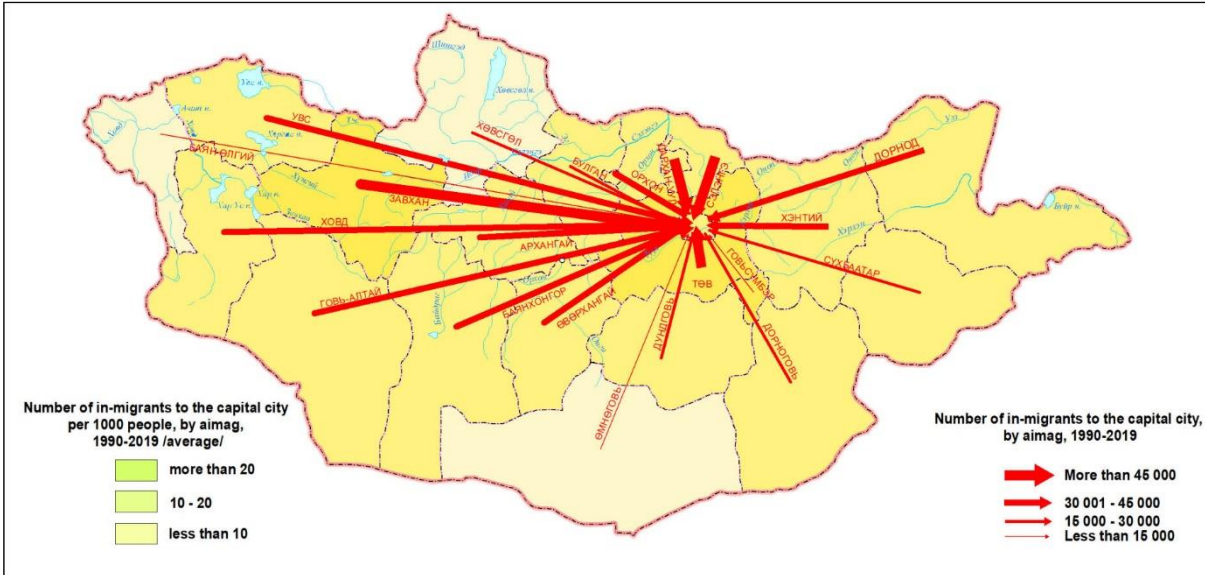


Figure 3. In-migrants to Ulaanbaatar, by aimag (1990-2019)

Source: [www.1212.mn](http://www.1212.mn)

However, the number of out-migrants from the capital city of Ulaanbaatar increased over the past 30 years from 0.8 to 4.3 thousand in 1990-2005 and from 6.4 to 14.5 thousand in 2006-2010. But in 2011-2016, it fluctuated between 8.2-14.3

thousand, it increased to 21.4 in 2017, and decreased to 6.3-7.0 in 2018-2019. The out-migration coefficient changed according to the number of migrants and reached its highest value of 15.1 in 2017.

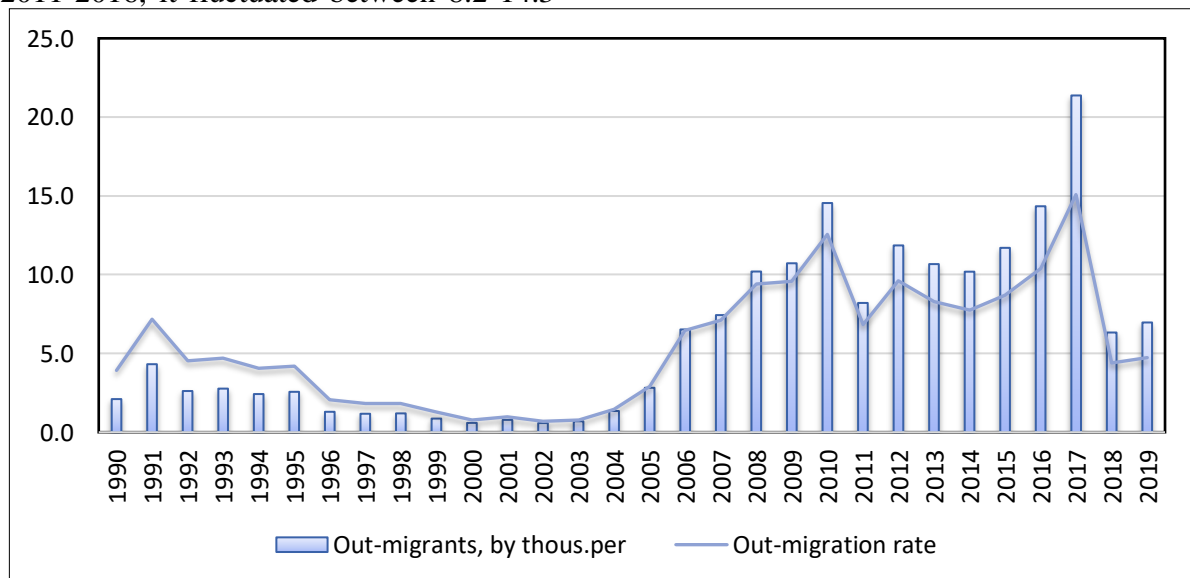


Figure 4. Out-migrants and their coefficient in Ulaanbaatar (1990-2019)

Source: [www.ubstat.mn](http://www.ubstat.mn)

In 1990-2019, considering the number of out-migrants from Ulaanbaatar by aimags Central or Tuv aimag leads with 20.3 thousand people (11.3 percent), Darkhan-Uul aimag with 18.9 thousand people (10.5 percent), Orkhon aimag with

16.9 thousand people (9.5 percent), while Govisumber aimag has 4.3 thousand people (2.4 percent), Sukhbaatar aimag 4.2 thousand people (2.4 percent), and Bayan-Olgii aimag 2.2 thousand people (1.2 percent), which are the lowest.

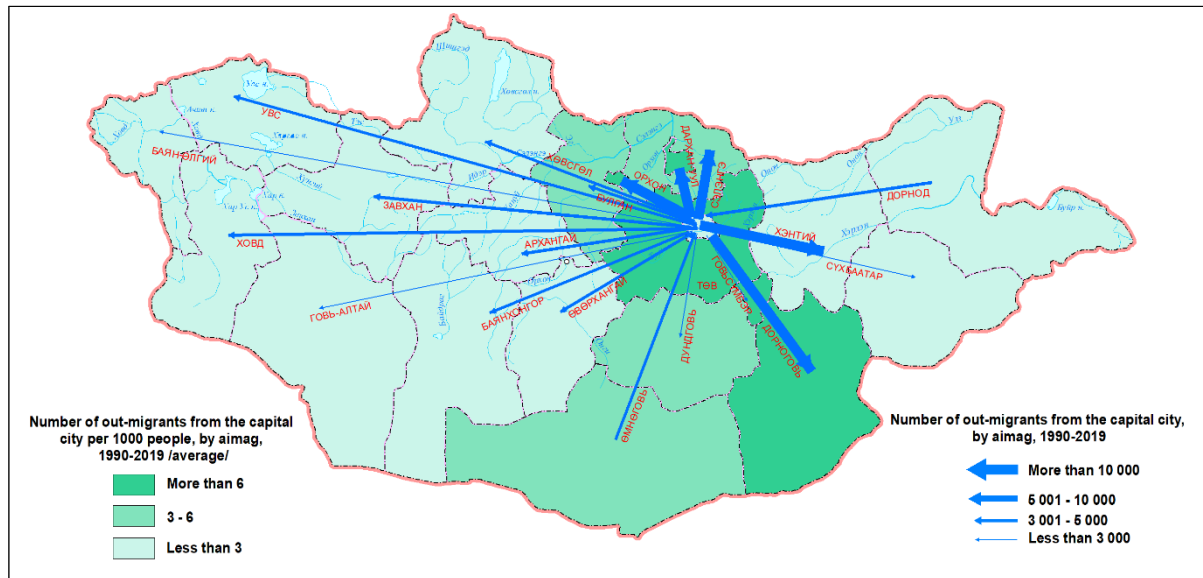


Figure 5. Out-migrants from Ulaanbaatar, by province (1990-2019)

Source: [www.1212.mn](http://www.1212.mn)

For the city of Ulaanbaatar, if we consider the main indicators of population migration from 1990 to 2019, in-migration will always prevail, and the number of participants in migration increased in the years after drought and *dzud*, i.e. in 2003-2004 and 2010, but has decreased in recent years. This decrease is due to the ban on migration to the city by the mayor's order issued in 2017, but this may have increased the number of unregistered migrants. A change in population size between two distinct time periods is called population change, and if the change is positive, then it is population growth, and if it is negative, then it is population decline. Population change consists of two main components: normal growth, defined by birth and death differences, and

mechanical growth, defined by in-migration and out-migration differences [20]. Considering the changes in the population of Ulaanbaatar over the last 30 years, according to the results of 2019, the population of Ulaanbaatar is 1,466.1 thousand, which is 929.5 thousand people or 173.2 percent compared to 1990, 698.6 thousand people or 91.0 percent compared to 2000, and 307.4 thousand people or 26.5 percent compared to 2010 percentage increased respectively. However, considering the average annual population growth rate, it is 2.6 percent in 1990-1999, 4.6 percent in 2000-2009, and 2.7 percent in 2010-2019. It can be seen that population growth and percentages are different due to normal and mechanical growth.



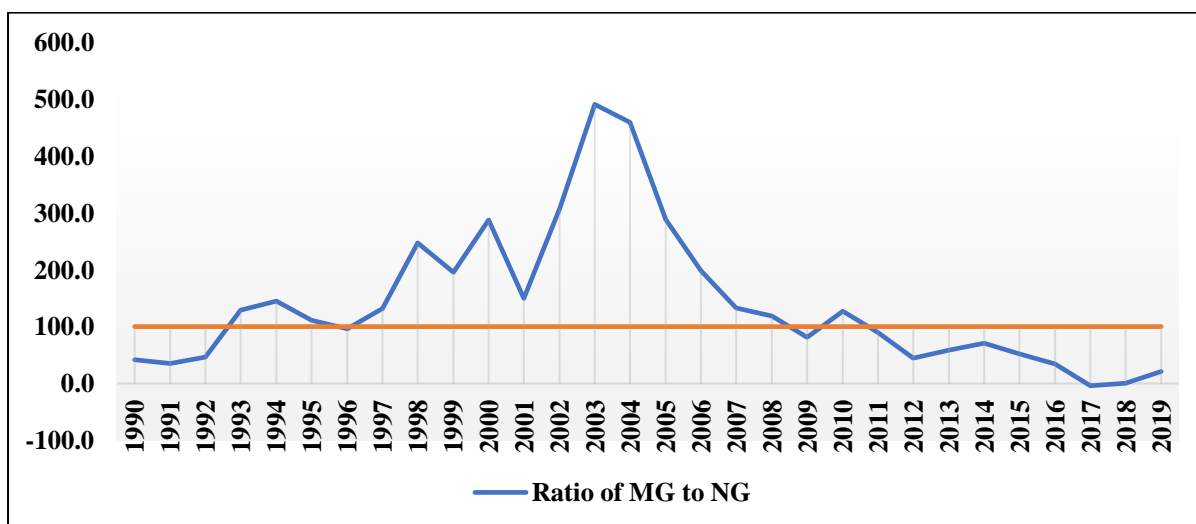
**Table-1. Basic indicators of the population of Ulaanbaatar (1990-1999, 2000-2009, 2010-2019)**

№	Indicators	1990-1999	2000-2009	2010-2019	1990-2019
1	Population of the first year. by thousand people	536.6	767.5	1158.7	536.6
2	Population of the last year. by thousand people	673.7	1121.2	1466.1	1466.1
3	Population growth. by thousand people	137.1	353.7	307.4	929.5
4	Population growth. by percent	25.5	46.1	26.5	173.2
5	Average annual population growth rate	2.6	4.6	2.7	5.8
6	Total births. by thousand people	121.3	174.8	357.8	653.9
7	Total deaths. by thousand people	49	57.6	77.5	184.1
8	Natural growth. by thousand people	72.3	117.1	280.3	469.8
9	In-migrants. by thousand people	96.1	314.5	252.5	663.1
10	Out-migrants. by thousand people	21.3	41.7	116.2	179.2
11	Net migration. by thousand people	74.8	272.8	136.4	483.9
12	Percentage of natural growth in population growth	49.2	30	67.3	49.3
13	Percentage of mechanical growth in population growth	50.8	70	32.7	50.7

Net migration is one of the main factors influencing population change [20], and according to the results of 1990-2019, the population of Ulaanbaatar city increased by 929.5 thousand people, 50.7 percent or 483.9 thousand of which was due to population migration. Comparing it by periods, 50.8 percent or 74.8 thousand or an increase of 137.1 thousand in 1990-1999, 70 percent or 272.8 thousand, or an increase of 353.7 thousand in 2000-2009, and 32.7 percent or 136.4 thousand, or an increase of 307.4 thousand in 2010-2019 respectively as a result of population migration. In other words, 2000-2009 was

the peak period of in-migration from rural areas to Ulaanbaatar.

Considering the ratio of normal growth and net growth of Ulaanbaatar city in the last 30 years, migration had a positive effect on population growth in all years except 2017, and the peak value reached 490.3 in 2003. However, the years in which the value of the ratio is more than 100, or net migration has affected population growth more than normal growth, are 1990-1992, 1996, 2009 and 2011-2019 respectively. During the last three decades, the average of this indicator is 140 in Ulaanbaatar.



**Figure-6. ratio of MG to NG of Ulaanbaatar city (1990-2019)**

Our estimated results, effects of migration on population growth in Ulaanbaatar on the last three decades are 40-50%, which is different by nearly 70% of recent population growth owing to migration, estimated by Yecheng Xu et al (2021) [21]. It is believed that the reason lies in the fact that our calculations are based only on statistical data.

If this trend continues, by 2045, the total population of Mongolia will reach 5010.4 thousand, of which the population of Ulaanbaatar will be 2868.7 thousand or 57.2 percent of the total population of the country, and it will increase rapidly. In order to reduce overcrowding in Ulaanbaatar in the future, it is important to curtail migration to Ulaanbaatar from rural areas, reduce the gap between urban and rural development level, support and develop regional development cities, and establish diversified settlements system.

## CONCLUSIONS

By carrying out this research work, we have achieved a set of goals and objectives, basing on which we can draw the following conclusions:

-Considering the main indicators of population migration in Ulaanbaatar in the last 30 years, the number of participants in total migration and the intensity of migration were relatively stable in the first ten years, which then increased sharply in the mid decade and reached their peak values, but in the last ten years there has been a steady decline. In total, 663.1 thousand people migrated to Ulaanbaatar

### Acknowledgement

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city from rural aimags and villages from 1990-2019, 179.2 thousand people left, and net migration was 483.9 thousand people.

-The highest number of migrants was in the years immediately after droughts and *dzud*, i.e. in 2003-2004 and 2010, and considering the number of migrants by aimag, more than 40,000 people migrated from Central, Darkhan-Uul, Zavkhan and Selenge aimags respectively. Although the number of migrants has been increasing since 2005, migration has always dominated over the past 30 years. Considering the number of migrants by aimag, more than 10,000 people migrated to such rural provinces as Central, Darkhan-Uul, Orkhon, Selenge, Dornogovi, and Khentii.

-From 1990 to 2019, the population of Ulaanbaatar increased by 929.5 thousand, but according to the component method, normal growth is 483.9 thousand and mechanical growth is 469.8 thousand. 24.2 thousand people are related to errors in the civil registration system. The share of mechanical growth in population growth is 50.7. When comparing the share of mechanical growth in population growth by three decades, it is 50.8 percent in 1990-1999, 70.0 percent in 2000-2009, and 32.7 percent in 2010-2019. In addition, 47.4 percent of those who migrated in the last 30 years or 314.5 thousand people migrated to Ulaanbaatar in 2000-2009. Therefore, it was concluded that the years 2000-2009 were the peak period of immigrants in Ulaanbaatar.

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