

WORLD DEMOGRAPHIC SITUATION FROM THE PERSPECTIVE OF GLOBAL DEMOGRAPHIC BALANCE

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In 1971 in his Nobel lecture Simon Kuznets noted that the population growth had been ceasing to be the main force of the economic growth over the last one or two decades. Accordingly, the authors have examined the contemporary demographic situation in the world based on information given in United Nations (UN) population prospects. This paper describes the global demographic balance method that includes 5 age cohorts of the population of 20 countries and regions of the world for the last period of 1950-2010 and UN Population Prospect to 2050. This method has been applied to analyze quantitative parameters of the demographic situation in developed, least developed and in developing countries. Developed countries, which had passed the demographic transition, will face a depopulation pattern in XXI. The age structure of depopulation trends in these countries is given. In least developed countries the population growth has been persisting but not at so high pace as it was in the second half of the 20th century. BRICS countries stand out from developing countries. To assess qualitative characteristics of countries of the world the Human Development Index (HDI) has been used. This paper outlines characteristics of this indicator given by United Nations Development Programme (UNDP). HDI values for BRICS countries are specified, and a conclusion has been drawn that qualitative growth is needed for economies of these countries. Outputs of world population simulation and projections by G.P. Gorshkov, B.M. Dolgoplov and A.A. Akayev, adjusted for the biosphere ultimate capacity, are presented. A conclusion has been formulated that projections by S.P. Kapitsa and UN experts that disregard the biosphere ultimate capacity are more realistic.

Key words: UN demographic prospects, global demographic balance, age population structure, least developed and developing countries of the world, BRICS countries, Human Development Index, United Nations Development Programme, biosphere ultimate capacity.

1. Introduction

In 1971 Simon Kuznets said in his Nobel Prize lecture: «Six characteristics of modern economic growth have emerged in the analysis based on conventional measures of the national product and its components, population, labor force, and the like. First and most obvious are high growth rates of GDP per capita

and population in developed countries – both large multiples of the previous rates observable in these countries and of those in the rest of the world, at least until the recent decade or two» [1]. The trends that Simon Kuznets had identified for the two recent decades have become dominant in the contemporary world. The first one is a decline in population growth rates in devel-

oped countries down to depopulation. Such dynamics has been affecting the economic growth environment. To analyze the dynamics it was necessary to construct a global demographic balance.

In part 2 of this paper the global demographic balance methodology is presented. It's possible to estimate quantitative parameters of the global demographic situation with the help of the global demographic balance (the respective estimates are provided in the third part of this article). The quality characteristics of countries of the world have been assessed by applying the HDI, the findings are presented in the fourth part of this paper. Special attention has been given to the situation in BRICS countries, including Russia.

2. Global demographic balance methodology

To build the global demographic balance data from «World Populations Prospects. The 2008 Revision. Volume II: Sex and Age Distribution of the World Populations» [2] have been used.

Values for the following five-year age cohorts have been calculated:

- total population;
- children (0-14);
- persons of working age (15-59);
- retirement-age population (60 or over);
- the extreme elderly (80 or over).

For each population group its percentage of total population both of a region and the whole world has been calculated. In addition, the annual growth rate for each interval value indicator (r) has been determined:

$$r = \frac{\ln P_t - \ln P_0}{t} \quad (1)$$

Where:

P_t – the value of the index at the end of an interval;

P_0 – the value of the index at the beginning of an interval;

t – the length of an interval.

To analyze the global demographic balance the following regionalization structure has been chosen to classify countries and regions of the world:

1. World as a whole;
2. More developed countries;
3. Less developed countries;
4. Europe;
5. Western Europe;

6. Eastern Europe;
7. Russia;
8. North America;
9. USA;
10. Latin America;
11. Brazil;
12. Oceania;
13. Asia;
14. China;
15. India;
16. Japan;
17. Africa;
18. Sub-Saharan Africa;
19. South Africa;
20. BRICS.

The global demographic balance has enabled to analyze core demographic trends in the world, in civilizations and in retrospective according to the UN average and highest projections.

3. Analysis of world demographic trends with the global demographic balance

On the planet rapid population growth is observed in a high period of industrial civilization. Previous population declines were results of wars, epidemics and natural disasters, but after such periods the population started to rise again. The crisis of industrialization and the approach of post-industrial civilization called into being a new demographic phenomenon.

1. First of all, one can observe a demographic change associated with the decline in birth rates and population ageing in developed countries (representing West European, East European, North American civilizations, a part of Eurasian one, as well as Australia and New Zealand from Oceania). Such demographic processes correlate closely with the Human Development Index and the level of a country development. The consumer society formed in the most developed countries (that comprised 1 billion 273 million or accounted for 18% of the world population in 2010) has stopped reproducing and requires more and more resources to support a prolonged lifetime. In 1950–2000 the increase in the number of children (0-14 years old) had stabilized in the above listed countries, whereas in 2050 the number of children is expected to fall to 10%, and only 11% of children will live from their birth in the consumer society, according to the UN average projections. At the

same time, the number of retirees (60+) had increased by 2.4 times in the mentioned countries in 1950–2000, and in 2000–2050 it is estimated to rise by 3.1 times. The number of the extreme elderly had grown by 4.4 times in 1950–2000, and in 2000–2050 it will augment by 3.2 times to reach 9% of the total population.

The number of persons of working age (15–59) had increased by 1.5 times in the most developed countries in 1950–2000, but it will decline by 11% in 2000–2050 to 52% of the total population, according to the UN average projections. It implies that only every eighth inhabitant of the planet will enjoy postindustrial production and consumption patterns.

In Western Europe, representing the western civilization, according to the average projections, the average population growth rate is estimated to drop from 0.7% in 1950–1975 to 0.15% in 2030–2050 that will constitute 2.7% of the total population. Such a demographic load on the population of working age implies extension of the working age among the population (60+) thanks to higher public healthcare level and lifelong education. Besides, postindustrial production tends to reduce the number of persons employed in the material production.

Perhaps, it will be followed by reductions of persons employed in human services along with virtualization of this area. Besides, possibly, immigrants from Asia and Africa will continue to move to Western Europe to be involved in unskilled work, and immigrants from Eastern Europe and Eurasia – in skilled work.

Eastern Europe (representing East European and Eurasian civilizations) has faced depopulation not because of demographic changes but due to social upheavals generated by the dissolution of the socialist camp and the USSR. A sudden fall in income and healthcare spending due to transition from socialistic principles to the market economy had resulted in the decline in population: (-0.4%) in 2000–2010, with a predictable fall to (-0.1%) – (-0.5%), accompanied by slowdown in children growth to (-0.8%) in 1975–2000 and to (-2.5%) in 2000–2010. That's why countries of Eastern Europe should pursue a purposeful policy to support birth rates and social stability.

In the USA (representing North American civilization) high population growth rates are observed with positive children growth rates over the entire interval, as well as shrinking share of the employed (15–59) – to 55% and higher percentage of the elderly (80+) – to 7–8%.

In Japan (representing Japanese civilization) the population growth rates are estimated at (-0.17%) –

(-0.39%) for 2010–2030 and (-0.36%) – (-0.72%) for 2030–2050. Percentage of children will drop to 11–15%, and the percentage of employed people – to 45%. At the same time, percentage of retirees (60+) will rise to 40–44%, and percentage of the extreme elderly – to 14–15%. Such demographic levels will force the Japanese society to identify new ways to handle this challenge.

Such demographic processes in developed countries will cause transformations in the economy and culture. The capitalist system had been operating, first of all, during a long historical period of demographic expansion. Nowadays it needs to adjust for a period, when population with high potential has been shrinking. It has to modify mechanisms to skim extra profit from world economic streams for the Golden Billion population that is aging. Besides, this process may impact the dominant system of sociocultural values. As different age groups have different values, educational and cultural interests, the sociocultural sphere of developed countries will more and more represent interests of the mature age population of those countries when the virtual component of this sphere will generally expand.

2. The least developed countries of the world (49 countries representing African, Muslim and Buddhist civilizations) accounted for 12% of the total population or 854 million in 2010. In the above mentioned countries the population had grown by 3.4 in 1950–2000 and is expected to increase by 2.5 in 2050, according to the UN average projections, and by 2.8 according to the highest estimates. These countries will face a slowdown in growth rates from 3.8 times in 1950–2000 to 1.5 times in 2000–2050, according to the UN average projections, and to 2 times according to the highest ones. At the same time, while the growth rate of retirees slightly lagged behind the population growth rate in the mentioned countries in 1950–2000, in 2000–2050 it will augment to 5.5 and 7.9 for the extreme elderly (80+). Consequently, in 2050 every fourth child, every 20th retiree and every fifth employed habitant of the planet will live in 49 least developed countries of the world.

The Human Development Index is extremely low in these countries. Correspondingly, every fourth child of the planet will live under conditions, where educational and healthcare services are almost unavailable for him/her. The same situation will be faced by every fifth employee in the world. As a result, the fifth part of human potential isn't good for functioning in the postindustrial civilization; the main field of using their work is old technological structures. According to the UN data, at present 1 billion people starve on the planet. Humaniza-

tion of life on the basis of partnership of civilizations assumes intensification of redistribution processes in favor of poor habitants in the world. It's feasible only due to robust growth in labor productivity, adoption of the sixth technological structure in developed and developing countries of the world with simultaneous intensification of redistribution streams from developed and developing countries to the poorest ones.

3. Demographic processes in developing countries maintain a middle position between the most and the least developed countries. Let's examine characteristics of these processes using BRICS countries (representing Latin American, Eurasian, Indian, Chinese and African civilizations), as an example.

The population of BRICS accounted for 44% of the world population in 1975 and is projected to shrink to 37% in 2050, while enjoying positive population growth that is estimated to decrease from 2% in 1950–1975 to 0.1% in 2050. In 2010 39% of children of the world, 45% of the employed, 40% of the retired and 33% of the extreme elderly (80+) lived in the region. In 2050 children will account for 17–21%, the employed – 57–58%, the retired – 22–25% and the extreme elderly – 4–5% of the total population of the mentioned countries.

Russia, as a part of BRICS, represents Eurasian civilization, and it is one of the most developed countries of BRICS. This country saw depopulation (-0.4%) in 2000–2010, and depopulation rates are expected to persist at (-0.2%) – (-0.4%) in 2010–2030 and at (-0.1%) – (-0.5%) in 2030–2050. In 1975–2000 the increase in the number of children averaged (-0.6%), in 2000–2010 – (-2.4%). At the same time, in 2000–2010 the country faced the decrease in the number of retirees (-0.6%). This information is an illustration of declined birth rates and higher mortality rates caused by the social catastrophe in the 1990s. As a result, Russia's percentage of the world population will shrink from 4% in 1950 to 1.2% in 2050. National demographic policies aimed to encourage births and to decrease mortality have started to produce positive results but the country is in the period of the demographic echo of the birth decline of the 1990s that aggravates the situation.

4. Use of the Human Development Index to estimate the world demographic situation

In the previous part of this paper the quantitative demographic indices of countries of the world were examined. The HDI use enables to assess quality indices associated with development of countries of the world.

Since the 1990s «the Washington Consensus» has been governing the world. But some politicians in developing countries have formulated their own purposes and development mechanisms. First of all, these include Pakistani Mahbub-ul-Haq and Indian Amartya Sen. In 1990 they suggested a new integral indicator to assess national progress. That was the Human Development Index (HDI). They assumed that «the real wealth is people» not profits earned by those people.

Since 1990 the United Nations Development Programme has published series of reports focusing on cross-country dimension of the HDI.

Experiences of 20-year operations in this field were summarized in Human Development Report 2010 [3].

The HDI constitutes a new pattern of progress that consists of three components: Gross National Income per capita, life expectancy and educational level. At the same time, the report stipulated that «human development is the expansion of people's freedoms to live long, healthy and creative lives; to advance other goals they have reason to value; and to engage actively in shaping development equitably and sustainably on a shared planet. People are both beneficiaries and the drivers of human development, as individuals and in groups» [3, p. 2].

The world's average HDI has increased 18% since 1990 and 41% since 1970. Three of 135 countries – the Democratic Republic of the Congo, Zambia and Zimbabwe have a lower HDI today than in 1970. The slowest progress has been experienced by countries in Sub-Saharan Africa struck by the HIV epidemic and countries in the former Soviet Union suffering increased adult mortality. The top HDI movers include China, Indonesia and South Korea (income «growth miracles»), as well as Nepal, Oman and Tunis in other categories. The slowdown in health advances is due largely to dramatic reversals in 19 countries. In 9 of them – 6 in Sub-Saharan Africa and 3 in the former Soviet Union – life expectancy has fallen below 1970 levels [3, pp. 3-4].

The Human Development Report specifies two central contentions: that human development is different from economic growth and that substantial achievements are possible even without fast growth [3, p. 5].

The report emphasizes the lack of a significant correlation between economic growth and improvements in health and education. Research by William Easterly and François Bourguignon had confirmed that. «Iran, Togo and Venezuela experienced income declines, yet their life expectancy has risen an average of 14 years and their gross school enrolment an average of 31%

since 1970 [3, p. 47]. This conclusion is very valuable for Russia, especially in the period of international sanctions against it.

The report stipulates that «much development policy-making assumes that economic growth is indispensable to achievements in health and education. Our results suggest that this is not the case. This does not mean that countries can forget about growth – we have underlined that growth generates important possibilities. Rather, the results imply that countries do not have to solve the difficult problem of generating growth in order to tackle many problems of the health and education fronts» [3, p. 50].

The stable development generates opportunities to maintain this positive process in the future. The HDI estimates this opportunity quite comprehensively. Not only the dynamics of economic growth but also both the educational level and life expectancy reached by this generation constitute the basis of high life quality for next generations. Especially progress in health confirms that. During half a year life expectancy has increased in developing countries as much as in the developed ones. The epidemiological transition has been passed. Some 85% of mortality reductions in a sample of 68 countries since 1950 could be explained by global progress. Eradicating smallpox, a disease that killed some 2 million people annually in the 1960s, cost only \$300 million.

Concerted government policies mattered. A package of six vaccines assembled by World Health Organization costs less than \$1, and deworming costs just 50 cents a year [3, pp. 50-51]. That has reaffirmed the conclusion made above about close correlation between economic growth and achievements in health and education in developing countries in the period of global progress.

The *table 1* lists HDI values for BRICS countries, according to Human Development Report 2010.

As the figures in the *table 1* show, BRICS countries don't have high indices in terms of the HDI standard [3, pp. 143-145]. Norway (HDI 0.938), Australia (0.937), New Zealand (0.907), USA (0.902) and Ireland (0.895) are top 5 HDI countries [3, p. 143].

As far as BRICS countries are concerned, Russia demonstrates the best index (0.719) that corresponds to rank 65, and India has the worst one (0.519) with rank 119. Such low HRI values of BRICS countries suggest that the quality of human potential in these countries has sound growth prospects.

5. Conclusions

According to the UN average estimate (disregarding the biosphere ultimate capacity), the world population is forecast to reach 9 billion 150 million, and according to the highest estimate, it may rise to 10,461 million. According to S.P. Kapitsa's [4] projection, the world population may approach 11,300 million people due to hyperbolic growth and demographic change. This projection is based on absolutely strong growth, ignoring any limitations associated with the biosphere capacity. At the same time, the ultimate earthen biosphere capacity is 5 billion people, as G.P. Gorshkov's [5] calculations suggest. According to B.M. Dolgopолоv's projection [6], the total population will stabilize at around 5.6 billion people with allowance for the biosphere capacity. A.A. Akayev's [7] forecasts an aperiodic or oscillatory reversal of the world population to about 5.2 billion people. U.V. Yakovets [8] supposes that the technological progress removes the limitations of the ultimate biosphere capacity. K.E. Tsiolkovsky [9] shares this opinion.

Basically, the UN demographic projections disregard the ultimate biosphere capacity. According to these projections, the total population had grown by 2.4 times in 1950 – 2000 and is estimated to rise

Table 1.

The Human Development Index (HDI) in BRICS countries

Country	HDI rank	HDI value	Life expectancy at birth (years)	Mean years of schooling	Gross National Income (GNI) per capita (PPP 2008 \$)
Russia	65	0.719	67.2	8.8	15,258
Brazil	73	0.699	72.9	7.2	10,607
China	89	0.663	73.5	7.5	7,258
South Africa	110	0.597	52.0	8.2	9,812
India	119	0.519	64.4	4.4	3,337

by 1.5–1.7 times further in 2000–2050. The authors have relied on these projections to compute their own global demographic balance. The following results have been obtained: in 2000–2050 the total number of children is expected to grow by 1–1.3 times, the employed – by 1.5–1.6 times, the retired – by 3 times and the extreme elderly (80+) – by 5.6 times. According to these calculations, children will account for 20–24% of the world population, the employed – 57–58%, the retired – 19–22% and the extreme elderly (80+) – 4% by 2050.

Overall, population aging is observed because of the decline in births and the increase of the number of re-

tirees, especially the extreme elderly (80+). That confirms Kapitsa's conclusion that more and more countries of the world are facing demographic changes. The HDI analysis made by the authors to compare BRICS with the most developed countries has enabled them to draw a conclusion about sound growth potential for BRICS countries, including Russia.

Holding the demographic imperative affects production and consumption patterns. Correspondingly, in the middle of the 21st century serious changes are anticipated in the global socio-economic landscape and in economic growth environment that necessitates new research in this area. ■

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МИРОВАЯ ДЕМОГРАФИЧЕСКАЯ СИТУАЦИЯ В РАКУРСЕ ГЛОБАЛЬНОГО ДЕМОГРАФИЧЕСКОГО БАЛАНСА

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В 1971 в Нобелевской лекции С. Кузнец отметил, что за последние 1–2 десятилетия рост населения перестает быть основными двигателем экономического роста. В связи с этим авторами исследуется современная демографическая ситуация в мире на базе информации, приведенной в прогнозах ООН. Описывается методология глобального демографического баланса, включающего пять возрастных когорт населения для 20 стран и регионов мира для прошлого периода, для 1950–2010 гг. и прогноза ООН до 2050 года. С его помощью количественно анализируется демографическая ситуация в развитых, наименее развитых и развивающихся странах мира. Для развитых стран мира, прошедших демографический переход, в XXI веке будет характерен режим депопуляции населения. Приводится возрастная структура депопуляционных тенденций в этих странах. В наименее развитых странах рост населения продолжается, но уже не такими высокими темпами, как во второй половине XX века. Для развивающихся стран особо выделяются страны БРИКС. Для оценки качественных характеристик стран мира используется Индекс развития человеческого потенциала (ИРЧП). Даются характеристики данного индикатора, приводимые Программой развития ООН. Приводятся значения ИРЧП для стран БРИКС и делается вывод о необходимости качественного роста экономик этих стран. Приводятся результаты моделирования и прогнозирования Г.П. Горшковым, Б.М. Долгополовым и А.А. Акаевым численности населения мира с учетом предельной емкости биосферы. Делается вывод о том, что прогнозы С.П. Капицы и экспертов ООН, сделанные без учета предельной емкости биосферы, более реалистичны.

Ключевые слова: демографический прогноз ООН, глобальный демографический баланс, возрастная структура населения, развитые, наименее развитые и развивающиеся страны мира, страны БРИКС, индекс развития человеческого потенциала, Программа развития ООН, предельная емкость биосферы.

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