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THE INFLUENCE OF DEMOGRAPHIC TRANSITION AS A CONSEQUENCE OF QUALITATIVE TRANSFORMATIONS IN WORLD ECONOMY ON ECONOMIC GROWTH

In this study the impact of factors affecting the GDP growth in developed and developing countries has been estimated. A model of influence of demographic transition on economic growth is developed. Specific features of demographic transition and the use of demographic dividend in the countries of Asia, Latin America, Middle East, Africa and Eastern Europe are analyzed. Predictions on the influence of demographic situation on economic growth in the regions under study and the forecasts of the overall development of the world economy subject to the demographic factor have been elaborated.

Keywords: demographic transition; demographic dividend; world economy; economic growth.

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ДЕМОГРАФІЧНИЙ ПЕРЕХІД ЯК НАСЛІДОК ВПЛИВУ ЯКІСНИХ ПЕРЕТВОРЕНЬ У СВІТОВІЙ ЕКОНОМІЦІ НА ЕКОНОМІЧНЕ ЗРОСТАННЯ

У статті оцінено вплив факторів впливу на зростання ВВП у розвинених країнах та тих, що розвиваються. Побудовано модель впливу демографічного переходу на економічне зростання та проаналізовано особливості демографічного переходу та використання демографічного дивіденду в країнах Азії, Латинської Америки, Близького Сходу, Африки та Східної Європи. Спрогнозовано вплив демографічної ситуації на економічне зростання у обраних регіонах та складено прогнози загального розвитку світової економіки в залежності від демографічного фактору.

Ключові слова: демографічний перехід; демографічний дивіденд; світова економіка; економічне зростання.

Форм. 1. Табл. 3. Літ. 10.

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ДЕМОГРАФИЧЕСКИЙ ПЕРЕХОД КАК СЛЕДСТВИЕ ВЛИЯНИЯ КАЧЕСТВЕННЫХ ПРЕОБРАЗОВАНИЙ В МИРОВОЙ ЭКОНОМИКЕ НА ЭКОНОМИЧЕСКИЙ РОСТ

В статье оценено влияние факторов, влияющих на рост ВВП в развитых и развивающихся странах, составлена модель влияния демографического перехода на экономический рост и проанализированы особенности демографического перехода и использования демографического дивиденда в странах Азии, Латинской Америки, Ближнего Востока, Африки и Восточной Европы. Сделан прогноз влияния демографической ситуации на экономический рост в выбранных регионах и составлены прогнозы общего развития мировой экономики в зависимости от демографического фактора.

Ключевые слова: демографический переход; демографический дивиденд; мировая экономика; экономический рост.

Introduction. Effect of demographic changes on economic growth has increased due to the phenomenon of developing world. Since the Second World War, developing countries, under different conditions, have been moving in their demographic

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transition from high to lower levels of mortality and fertility. This transition has led to the emergence of a new generation with higher demographic potential. East Asian nations have experienced this transition first; other regions, including Latin America, began the transition later, in the 1960−1970s. Other areas especially some of the Middle East and Africa − have not yet begun the transition or are in its early stage. In this study, it is important to assess the impact of factors affecting the GDP growth in developed and developing countries.

Latest research and publication analysis. The issues of demographic transition and qualitative transformations of the world economy on economic growth were investigated by E.G. Popkova and V.I. Tinyakova (2013a; 2013b; 2013c), D.E. Bloom and D. Canning (2013), D.E. Bloom et al (2013).

The object of the research is the demographic transition as a consequence of qualitative transformations of the world economy on economic growth.

The goal of the article is to show that demographic transition is a consequence of qualitative transformations of the world economic growth.

The methods for the research are comparative analysis and economic and mathematic modelling.

Key research findings. For the purposes of the study we will build a two-factor model, highlighting an *a* factor as (intensive) growth of GDP per capita and a *b* factor as (extensive) population growth. The total change in GDP in this case can be calculated by the following formula (Popkova and Tinyakova, 2013a):

$$I_{ab} = \frac{\sum a_1 b_1}{a_0 b_0}, \tag{1}$$

where a_1, b_1 − the value indicators in the study period; a_0, b_0 − in the previous (baseline) period. As a model for constructing indices we used chain model with sliding weights (i.e. each year will be compared with the previous year for which the data are available) (Popkova and Tinyakova, 2013b). This model provides the most complete picture of changes taking place in the studied parameters, but the data obtained for different time periods do not agree well with each other. Furthermore, the data in the row is also difficult to compare in dynamics and because of differences in time intervals (Popkova and Tinyakova, 2013c).

Chain model for all countries of the world has shown that the main factor influencing the GDP growth is not constant (in fact, it varies cyclically, every 25−30 years). In the years of intensive growth of the overall value of GDP growth is significantly higher (Table 1).

Table 1. **Chain model for all countries**

Indicator	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP growth, %	140.5	137.2	112.6	134.3	162.9	156.6	140.7	133.0	129.2
Due to GDP/capita, %	123.5	119.0	104.0	115.3	133.3	130.0	119.2	111.2	113.0
Due to population growth, %	113.7	115.2	108.3	116.4	122.1	120.5	118.0	119.5	114.2

Source: The World Economy: Global trends over 100 years. Moscow: Economist, 2013.

Developed countries are characterized by the predominance of GDP growth due to the intensive factor that explains the growth of social welfare while population is reducing (Table 2).

Table 2. **Chain model for developed countries**

Indicator	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP growth, %	147.4	143.5	108.2	128.4	149.7	162.8	135.6	131.0	123.4
Due to GDP/capita, %	125.0	127.3	101.4	115.5	132.9	147.7	124.2	124.0	115.7
Due to population growth, %	117.9	112.7	106.7	111.2	112.6	110.2	109.2	105.7	106.6

Source: The World Economy: Global trends over 100 years. Moscow: Economist, 2013.

For developing countries, extensive factors are more important. This is largely due to recent demographic transition (Table 3).

Table 3. **Chain model for developing countries**

Indicator	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP growth, %	124.6	132.3	121.3	125.4	165.8	154.6	167.4	155.7	164.7
Due to GDP/capita, %	114.3	112.5	100.0	111.1	130.0	123.1	137.5	127.3	139.3
Due to population growth, %	109.0	117.6	121.3	112.8	127.5	125.6	121.7	122.4	118.3

Source: The World Economy: Global trends over 100 years. Moscow: Economist, 2013.

Countries with emerging demographic transition, are acquiring the so-called "demographic dividend", which is characterized by an increase in life expectancy. The reason of an increase in life expectancy of people has fundamental change in lifestyle: the relation to education, family pension, the role of women at work.

Asian economic miracle is a confirmation of the existence of this demographic dividend. In East Asia, for example, demographic transition has occurred quite rapidly (50−75 years), it is the fastest demographic transition of the second half of the XXth century. In Western Europe, for example, this process began in the middle of the XVIIIth century and lasted about 150 years. In Sweden, the transition lasted longer, taking nearly 300 years. Since the late 1940s there was a significant increase in the level of life, mainly due to the improvement of living conditions, water purification, and development of medicine. Starting from the 1950s, there was a significant decline in the mortality rate of newborns and children. The infant mortality rate in Asia as a whole declined from 182 deaths per 1,000 children in 1950 to 53 in 2000 (Population Council..., 2013).

The results of individual studies have shown that demographic dividend makes up from 1/4 to 2/5 of the economic miracle in East Asia (Bloom et al., 2013b). Not only the level of infant mortality and mortality rates of other groups decreases, and as a result life expectancy rose from 43 years in 1950 to 72 years today. Population growth has slowed considerably from 2.4% a year in the late 1960s, when it was the peak, to 0.66% per year today and is projected to be 0.2% in 2025 (United Nation..., 2013). But when the "children of boomers" retire, the population structure will change again bringing a lot of problems for the economy as a whole.

Demographic transition in the developed world began at the end of the XIXth century. Infant mortality in England and Wales fell from 154 deaths per 1,000 births in 1861 to 21 in 1961 (World economy..., 2013). Life expectancy has increased during the same period, for example, male life expectancy increased from 40 to 68 years. Fertility has declined in most countries up to 50%, between 1870 and 1949 (Bloom and Canning, 2013). In the late XIXth and early XXth century, the population of working age grew faster than the young, financially dependent population, latent affecting the acceleration of economic development, which took place in the West at that time.

After the Second World War, the birth rate increased from 2.2 children per woman in the 1930s to 3.8 in 1957 (Population Council..., 2013). The birth rate began to fall again only in 1960. Drastically reduced, it reached the replacement level in the mid-1970s. Eastern European countries also experienced an increase in the birth rate after the World War II, though on a smaller scale. Some researchers believe that the post-war demographic changes significantly affected economic growth.

Hospitable US policy toward immigrants was the key to maintain a high proportion of people of working age, which was in stark contrast to the political course Japan, where immigrants made up only 1.2% of the population. Reforms in these countries largely aimed at supporting health, social protection and public safety (United Nation..., 2013).

South and Southeast Asia have lagged behind East Asia in demographic transition. However, South-East Asia has recently started to benefit from demographic dividend, and South Central Asia is likely to follow suit. Prior to 1950, the population growth rate in Asia remained relatively stable and was less than 1% per year for at least 70 years. However, from 1950 to 1990 the growth rates in South-Central and South-East Asia increased rapidly and were significantly more than 2% per year (World economy..., 2013). These rates were lower than in Africa, but close to Latin America and significantly higher than in East Asia, North America and Europe.

This growth can be attributed to decreasing mortality rates, due to the advent of drugs to treat tuberculosis, scarlet fever, pneumonia, using antimalarial DDT, which led to a drop in infant mortality. As in East Asia, the birth rate has fallen behind decline in mortality. Improvements in healthcare have led to the fact that family could now have a small number of children to ensure its optimum size of the family. Family planning programs have also brought results. The decrease in birth rate in Southeast Asia was as impressive as in East Asia, while the average number of births per woman in South-Central Asia since 1960 has decreased by half. The birth rate in Southeast Asia, as expected in 2020, will approach the level of East Asia. Ultimately, this will lead to lowering the level of growth up to about 1% in 2020 (Population Council..., 2013).

Population growth in Latin America was modeled on East Asia. In 1956, life expectancy in Latin America as in East Asia was greater than 50 years (closer to 60). Due to improvements in healthcare, life expectancy in Latin America is now 70 years old, slightly behind East Asia, where it is 72 years (United Nation..., 2013). A decline in infant mortality in Latin America declined from 91 deaths per 1,000 births in 1965 to 32 deaths in 2000 (a figure very close to the infant mortality rate in East Asia). The birth rate also fell — from 5 children per woman in 1975 to 2.5 at present (United Nation..., 2013). In some countries, such as Brazil, Chile and Uruguay, the birth rate is slightly above the replacement level (2.1 children per woman) (United Nation..., 2013). Barbados, Cuba, Trinidad and Tobago are far below this level, while other countries, however, have even higher levels: in Bolivia, Guatemala, Haiti, Nicaragua and Paraguay women usually have about 4 children.

Most disputes about the impossibility of prosperity in Latin America are based on the political specificity of these countries; military juntas and dictators ruled in many Latin American countries for almost the entire XXth century, until the end of the 1970s. Between 1978 and 1990 75 Latin American countries refused such regimes and made tentative steps towards democracy.

Latin America was largely closed to the world economy. By 1980, only 12% of the entire region was considered to be open. Comparative analysis of these countries shows that a country with a population of working age, growing by 3% per year and by 1.5% faster than the general population will experience economic growth of 0.5%, if the economy is closed, and at the rate of 15%, if its economy is open (Bloom and Canning, 2013). In other words, the policy of openness can triple the size of "demographic dividend". The retrospective analysis suggests that if the region was completely open between 1965 and 1985, economic growth in Latin America could have averaged to 0.9% a year or more. This would double the average annual growth over that period.

The combination of poor management and lack of trade openness hindered the potential growth, which could have brought change in population growth in Latin America.

Most countries in the Middle East and North Africa are at relatively early stages of economic transition, reaching a relatively high life expectancy. Global average life expectancy in the region is 65 years.

The birth rate is on average 4 children per woman. For example, in 1997 in Jordan women had on average 5 children, in Egypt — 3 or 4, and in Yemen — 7 or 8 (Bloom and Canning, 2013). The observed economic growth over the past two decades is mainly based on the growth of the working age population in this region. In Egypt, 1/6 of growth in per capita income between 1965 and 1990 occurred due to this demographic transition (United Nation..., 2013).

The political course of the Middle East and North Africa will be the determining factor in getting these countries their demographic dividend. The openness to the world trade, as well as the public policy of employment, can help these countries in employment of their younger generations. Saudi Arabia, for example, is now facing the prospects of mass unemployment among school leavers, 60% of its population is under the age of 25 years. Some analysts see the main barriers to foreign investment in Saudi Arabia in its outdated education system, ill-conceived labor legislation (foreign private companies are reluctant to hire citizens of this country, as it is extremely difficult to dismiss the Saudis who are not doing their job).

Historically, the birth rate in Eastern Europe is different from the birth rate in the West. The birth rate fell during the XXth century, was a slight rise after the World War II, but it was followed by further decline after the legalization of abortion in the 1950th. 7 of 10 pregnancies end in abortion in Russia, despite the fact that the increased use of contraceptives has reduced the number of abortions (Population Council..., 2013).

The birth rate in Russia over the past 100 years has fallen from 7 children per woman to just 1. Latvia, Bulgaria, Slovenia, Russia and Czech Republic are currently in the top 10 countries with the lowest birth rates in the world, the birth rate in these countries is below the average. In this region, there are 10 countries with the lowest population growth. Growing mortality reduces its strength. High rates of alcohol addiction contribute disproportionately to an increase in the number of heart diseases. The healthcare system in the region is deteriorated, leading to the spread of such diseases as tuberculosis and AIDS.

Conclusions. The advantage of developing countries is the growing younger generation. Properly used human capital can lead to social progress. But the smart use of demographic dividend is not an easy task. Using the initiative of people baby boomers will no doubt contribute to economic growth.

The main problem of today's world economy is to properly employ the demographic dividend. In many ways, the effectiveness of its use depends on the implementation of various social programs. Society received a "demographic gift", now it needs to increase the educational level of population, concentrate its intellectual capital which will help prevent social inequality, inter alia.

Future policies in many countries are associated with the formation of a society based on knowledge, as only scientific and technical progress will allow developing countries ensure optimum employment and sufficient macroeconomic indicators.

It can be argued that demographic dividend as a factor of economic growth is the collection of socioeconomic benefits, which give additional benefits from reduced birth rate and life expectancy increase with retention of high consumer potential of population.

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