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THE IMPACT OF DEMOGRAPHIC AGING ON ECONOMIC GROWTH

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Abstract

This article discusses the impact of demographic aging on economic growth. The author considers the theoretical arguments against the theory of "macroeconomics of aging" about the negative impact of demographic aging on economic growth and labor productivity, as well as the controversial postulate of slowing economic growth while reducing the working-age population from the point of view of opponents of the aging economy. This article provides a correlation analysis of the relationship between GDP per capita and the share of labor in the total population in countries with different socio-economic status. This article concludes on the importance of quantitative and qualitative characteristics of the workforce, affecting the rate of economic growth. A two-factor analysis of the influence of labor and labor productivity on GDP by the author revealed that labor productivity has a greater effect on economic growth than the share of labor in the population structure. This article concludes that labor productivity does not account for most of the full range of economic growth factors. The author concluded that the influence of social macroeconomic indicators, such as unemployment and employment patterns in the modern labor market (full or shortened working hours), is great. The conclusion made in this article that there is no noticeable connection between the rate of demographic aging and the dynamics of GDP per capita is important for clarifying the basic conceptual provisions of the economy of aging states and creating the corresponding social infrastructure.

Keywords: Aging, economic growth, workforce, productivity, employment.

1. Introduction

The transition to the paradigm of post-industrial development has given rise to a variety of conceptual approaches to the economics of aging. This is due to the emergence of new threats for both advanced economies and emerging economies due to environmental and demographic changes.

The aging process has global implications for all aspects of public life. Aging is not just a demographic phenomenon. This is a complex phenomenon, due to a number of factors, continuously inherent in all objects of animate and inanimate nature. However, the economy of aging as a new social phenomenon began to be considered only at the end of the twentieth century, which in the scientific literature is associated with the impact on economic growth, savings, investments, consumption, especially the reproduction of labor, pensions, taxation and intergenerational transfers (Barysheva, Nedospasova, Berkalov, & Malanina, 2017; Barysheva, Nedospasova, & Frolova, 2018; Shirokin, Khazanov, & Barysheva, 2017). If for the past 60 years, the proportion of people aged 60 and older has increased from 8 to 10 %, in the next 40 years, this proportion will increase to 22 % from 800 million to 2 billion chelove to (Bloom et al., 2015).

2. Problem Statement

One of the key tenets of the aging economy is the thesis of a slowdown in economic growth and a deterioration in living standards due to an increase in the share of older people in the structure of society (Conesa & Kehoe, 2018). It is due to several factors: the deterioration of the average health of people with increasing age; decreased ability to work; a decrease in the proportion of people capable of working.

3. Research Questions

This article discusses the impact of demographic aging on economic growth. The article considers the influence of the share of labor in the total population on the dynamics of GDP growth per capita.

4. Purpose of the Study

The aim of this work is to determine the degree of influence of quantitative characteristics of the labor force on the rate of economic growth.

5. Research Methods

In this study, a correlation analysis is used, comparative and historical analysis, cross-country and within- matching.

6. Findings

Analysis of statistical data on the different countries of the OECD (2020a) and the data of sociological surveys conducted in the framework of the research projects of the International Scientific-Educational Laboratory technologies to improve the well-being of older people in the Tomsk Polytechnic

University (2014–2019 years, more than 3 million. Pers. Of respondents) show the ambiguity of the above factors on the effectiveness of labor in the modern economy of aging.

Firstly, an increase in age does not mean an automatic deterioration in health. Modern medical advances have allowed not only to increase the average life expectancy, but also to extend the period of active longevity.

Secondly, the onset of retirement age does not necessarily mean the termination of employment.

Studies give conflicting results on the competitiveness of older people in the labor market (Göbel & Zwick, 2013; Maestas & Zissimopoulos, 2010; Vandenberghe, Waltenberg, & Rigo, 2013; Zhang & Sue, 2010). With tatistika shows a steady increase in the economic activity of persons of retirement age in developed countries. Also, a decrease in the birth rate leads to an increase in the economic activity and employment of women.

**Table 01.** Labor force participation

Of the year	Total labor force participation (% of people of working age)	Male participation in the workforce (% of men of working age)	Women's participation in the workforce (% of women of working age)	Elderly participation in the workforce (% of people age 60-64)	Elderly participation in the workforce (% of people ages 65+)
1990	60.6	73.2	48.7	36.3	9.9
2019	60.3	68,2	52.6	53.6	14.1

Statistical analysis shows that the total participation of the population in economic life over the past 30 years in general and men in particular has been declining, while women have been growing. Participation in the labor force for housing people on the contrary increased in the age of 60-64 years, and at age 65+ (International Labour Organization, 2020).

Controversial is the postulate of slowing economic growth while reducing the working-age population. On the one hand, a decrease in the labor force leads to a decrease in the supply on the labor market and, accordingly, to an increase in wages and a weakening of business activity through a decrease in the return on production factors for employers. Also, a decrease in the share of the labor force, in addition to hindering the possibility of extensive economic growth, leads to an increase in current consumption expenditures and a reduction in free financial investment.

On the other hand, according to opponents of the aging economy, labor shortages are an incentive to improve the quality of the workforce through education, the promotion of immigration, and the development of high technology (Population Aging and Macroeconomics, 2005).

Consider the dynamics of per capita GDP depending on the share of labor in 16 countries with different socio-economic status (Figure 01).
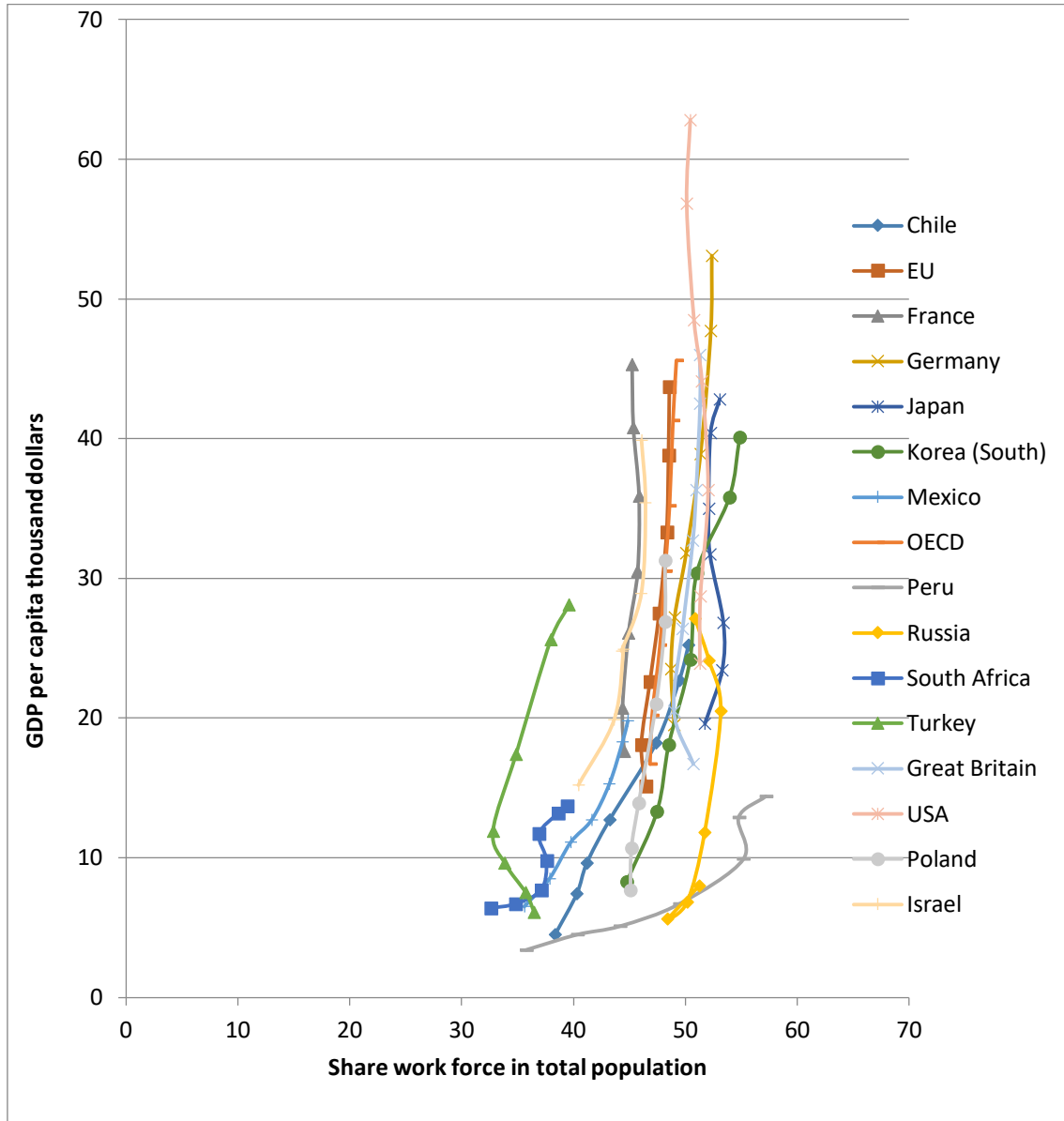
Figure 01. The dynamics of per capita GDP depending on the share of the labor force in different countries (The World Bank, 1990–2019)

In this figure, 3 types of graphs can be distinguished. In the first case, the charts of Turkey and South Africa have sections with a reverse slope, i.e. an increase in per capita GDP is accompanied by a decrease in the share of labor with a significant increase in per capita GDP. In the second, most common case, with a slight change in the share of labor, there is a sharp increase in GDP per capita. For example, in the USA the labor force decreased from 100 to 98 %, and GDP per capita grew from 23.9 to 62.8 thousand dollars. In a number of other countries, an increase in per capita GDP was accompanied by a significant change in the share of labor. For example, in Peru, from 1990 to 2018, the share of labor increased from 36 to 57 %, and GDP per capita increased from 3.4 to 14.4 thousand dollars.

From the analysis we see two situations where a decrease in the share of labor was accompanied by an increase in GDP per capita. In the United States, from 1990 to 2018, the share of labor in the total population decreased by 2 %, while GDP per capita grew by 163 %. In Russia, from 1990 to 2018, the

share of labor decreased by 1 %, while GDP per capita grew by 239 %. In other cases, an increase in per capita GDP was accompanied by an increase in the share of the labor force, but its character was heterogeneous.

In the range up to +10 % of the change in the share of the workforce, all countries in Europe, as well as Turkey, the USA and Japan, fall into the sample. In this group of countries, the share of labor ranged from –2 % in the USA to +9 % in Turkey, and per capita GDP ranged from +118 % in Japan to + 310 % in Poland. In the range from +10 to +20 %, only Israel fell into the sample, where an increase in the share of labor by 14 % was accompanied by an increase in GDP per capita by 163 %. In the range from +20 to +30 %, such heterogeneous countries as South Africa, Mexico, and South Korea were included in the sample. In this group of countries, the share of labor ranged from +21 % in South Africa to 26 % in Mexico, and GDP per capita ranged from +114 to +383 %. Countries such as Chile and Peru are in the range of more than +30 %. In this group of countries, the share of labor ranged from +31 % in Chile to +60 % in Peru, and GDP per capita from +324 to +460 %.

In general, the correlation coefficient is p = 0.5, which indicates a positive relationship between the share of labor in the general structure of the population and GDP per capita. The correlation coefficient for the selected 16 countries ranged from –.73 in the US to +0.99 in Chile, while a figure above + 0.95 was found in 7 cases, more than +0.9 in 8 out of 16 cases, only negative correlation was observed in 1 case, and the coefficient is below +0.5 only in 2 cases, the coefficient is between +0.5 and +0.9 in 8 cases out of 16. The arithmetic mean value of the correlation is +0.76.

The share of labor in the total population, indeed, affects GDP per capita, but this quantitative indicator is not able to explain most of the economic growth: in all the cases under consideration, GDP growth turned out to be much larger than the quantitative growth of labor. Criticism of this approach to the economics of aging involves the inclusion in the analysis of technological progress and growth in labor productivity. Let us conduct a two-factor analysis of the influence of labor and labor productivity on the value of GDP (Table 2).

Table 02. Labor force share and labor productivity (trend in % for the period 1990-2018)

Countries	Labor force share in the total population	Labor productivity (GDP per 1 hour worked)	GDP per capita (thousand dollars)
Japan	+1.2	+33	+53.5
Germany	+2.9	+31.4	+63.3
France	+0.7	+30	+61.1
Great Britain	+0.3	+35.4	+62.0
USA	–0.9	+35.6	+61.9

Of the 5 examples in the United States alone, growth in labor productivity and GDP per capita occurred with a decrease in the number of labor. As we see, in these countries the share of labor has changed from –0.9 % in the USA to +2.9 % in Germany. At the same time, per capita GDP grew by a large amount: from +53.5 % in Japan to 62.0 % in the UK. In turn, an increase in labor productivity (from +30 % in France to +35.6 % in the USA) may explain to a greater extent the change in GDP per capita

compared to the share of labor in the total population. An important role is played by other factors: the qualitative nature of the employment of the working-age population, the degree of participation of pensioners in the economic sphere, alternative employment regimes.

For the modern economy, not the quantitative parameters of the labor force are important, but the level of its employment. You can have a large amount of labor, but due to poor technological development this potential will remain unused (Zhironkin et al., 2017). For example, according to the report of The Boston Consulting Group in South Africa, the surplus of labor resources will be 36 % in 2020 and 39 % in 2030 (Strack, Baier, Marchingo, & Sharda, 2014) . In developed countries of the world, contrary to the opinion of a labor shortage, there is a noticeable unemployment rate (in 2018, from 2.4 % in Japan to 9.2 % in France) (The World Bank, 1990–2019).

An important factor in economic growth in aging countries is the nature of employment. For example, the percentage of full-time people in 2018, with the OECD average of 83.5 %, ranged from 76.1 % in Japan to 96.2 % in Russia (OECD Data, 2020b).

7. Conclusion

The qualitative factors presented in the analysis for increasing labor productivity compensate for a decrease in the share of labor in the economic structure of society and require the creation of an appropriate social, legislative and regulatory infrastructure. The dynamics of economic growth in Russia does not demonstrate a noticeable relationship with the quantitative characteristics of the labor force, which corresponds to the stage of economic development and technological changes (Babyshev & Barysheva, 2019).

Acknowledgments

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