

## ECONOMIC DIMENSION OF AGING OF THE POPULATION ON THE EXAMPLE OF THE CZECH REPUBLIC

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### Abstract

The paper, elaborated by an interdisciplinary approach of social sciences (especially economics, sociology, demography and economic policy theories), is focused on the current interconnection of demographic issues of the Czech Republic with social policy at the regional level. The application of methods of analysis, comparison and synthesis evaluates the impacts of population aging in the dimensions of the social system (pensions, social services) and health care. These dimensions are an expression of intergenerational solidarity and an integral part of the state's public finances. As a result of the aging population, Czech public finances are not sustainable despite the expected growth of the economy and tax revenues. Provided current fiscal policy is maintained, public debt would rise to 230% of gross domestic product in 2068. This forecast is also confirmed by the application of generational accounting methods through an intergenerational index, which, based on current economic and social policy trends, foresees a long-term imbalance in public finances within the social and health system of the Czech Republic.

**Key words:** demographic population aging, social policy of the public sphere, generational accounting

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### Introduction

The age structure of the population, as a reflection of the long-term population development and the related reproductive behavior and movement of the population, ranks among the basic characteristics of the monitored population. Nowadays, issues related to the demographic aging process are particularly discussed in connection with the age structure. It is one of the most important demographic processes that is characterized by changing population age groups. The argument about the negative impact of population aging on the economies of today's countries (including the Czech Republic) is derived from the fact that the productive employed generation (Duernecker & Vega-Redondo, 2018) bears the main burden of financing the programs of the welfare state. While the main beneficiaries of the most

important fiscal spending programs are the elderly. Population aging changes the age structure for the benefit of the old and to the detriment of the young. The negative impacts of population aging on the current economy of the Czech Republic imply the necessity of fundamental reforms, especially in the area of social and health system links to public finances. This also calls for the creation of social policy objectives, which are an integral part of public and regional economic policy.

## **1. Data and methodology**

During the 20th century, the issue of aging took on a completely new dimension as it began to transcend from individual to societal, ie demographic (Duernecker & Vega-Redondo, 2018). Demographic aging in the Czech Republic is monitored in the article processing by measuring the proportions of age groups from the total population, on the basis of indexes, ie comparative numbers (age index, productive load indexes) and average age or median age. The most common is the proportion of the three main age groups of the population, which are defined according to the expected economic activity of most people of the given age. It is therefore a pre-productive component of the population, which is mostly stereotypically defined by ages 0-14 (or 0-19 years). The productive component of the population consists of persons aged 15-64 (or 20-64 years) and the age group of post-productive persons aged 65 and over (65+ age group). Based on the age categories so divided, the aging process is interpreted by means of indicators of average age and age index (number of persons aged 65 + per 100 children aged 0-14) dependency index I. (number of children aged 0-14) per 100 persons aged 15-64), dependency index II. (number of persons aged 65 and over per 100 persons aged 15-64), and economic load index (number of children aged 0-19 and number of persons aged 65+ per 100 persons aged 20-59). The most common characteristic used in international comparisons is the proportion of people aged 65 and over in a given population. With regard to the specifics of monitoring the economic and social impacts of population aging in the Czech Republic, processing mainly requires the application of methods of analysis, comparison, synthesis, observation and generalization. Processing also requires an interdisciplinary approach to the social sciences and humanities involved.

## 2. Results

### 2.1 Economic, social, historical aspects of the aging of the Czech population

The aging population of the Czech Republic is accompanied by many economic and social changes. Older populations need special care, and so the cost of social security and health care is increasing. Increasing the quality of life, living standards and prolonging human life can be understood as the progress of our society, which appears in all developed countries. Aging in the Czech Republic has already intensified in the inter-war period, when the economic crisis of the 1930s stopped the great birth rate (Pavelka, 2017). During the Second World War, the birth rate grew due to the German population living in the borderland and propopulation policy in 1940. In the 1950s, there was a bottom-up aging that involved not only the number of people of reproductive age but other factors, especially reducing infant and child mortality. At the beginning of the 1960s, a small increase in birth rates came from promises to prolong maternity leave and to the years of the Second World War. Thanks to propopulation policy, an average of 190,000 children a year were born in the 1970s (peaking in 1974 when 194,215 live children were born). This was mainly due to the period when strong fifties from the 1950s found themselves in their fertile age, and in addition, they were accommodated by the propopulation measures (in the form of state aid) of the then political representation (see Tab. 1). Therefore, it is no wonder that the people who were born in 1973–1976 are the largest group in the current population of the Czech Republic. At the turn of the 70s and 80s of the last century financial resources began to run out of the then state, so the political representation reduced support to parents and the birth rate started to decline again.

After the events of 1989, accompanied by the transformation of the economy, the population could start a business and there were many other opportunities for self-realization. This brought a great change not only in the political and economic spheres but also in the birth rate. Fewer children started to be born and the second demographic transition, which was accompanied by individualism, emancipation of women, etc. occurred. The following table illustrates the facts of the demographic indicators of the population development of the Czechoslovak and Czech society (years of interest):

**Tab. 1: Comparison of significant demographic indicators of the 1970s - 1990s**

Demographic indicator	1974	1990	1999
The value of total child fertility per woman	2,43	1,89	1,13
Number of live births	194 215	130 564	89 471
Gross Birth Rate (%)	19,4	12,6	8,7

Source: Czech Statistical Office 2017 and own processing

## 2.2 Current situation and expected development of the Czech population aging

Nearly 6.9 million people aged 15 to 64 lived in the Czech Republic at the beginning of 2018, which was half a million less than in 2009. At that time, their number was highest since the end of World War II. According to the documents of the Czech Statistical Office, further reductions in the population of this age can be expected. According to the results of his demographic projection, the largest number reduction of the population of the Czech Republic between the ages of 15 and 64 should occur between 2035 and 2045, by 4.5% (Novotná & Volek, 2014). In 2055 53.7% of the population of the Czech Republic should belong to this age category. The center of gravity of the working-age population, represented by the strong births born in the 1970s, will gradually shift to a higher age as a result of the aging of individual generations, thereby naturally changing the age structure of the population. From 2022 onwards, the focus will be on the 45-49 age group, and from 2027 onwards on the 50-54 age group. position (Novotná & Volek, 2014).

From the above facts it is almost certain that a major problem would occur after 2035. In this period, the strong years of the 70s of the 20th century will be retiring. If we want to deal with the impacts of the expected demographic development on the economy of the Czech Republic, it is necessary to consider the long-term dynamics of the population age structure, including their relevant predictions (Abraham & Laczo, 2018). These facts are evident from the following Table 2, 3 with the demonstrated milestones from 2000 to 2065 in five-year (Tab. 2) and ten-year (Tab. 3) time intervals.

**Tab. 2: Population structure of the Czech Republic by age group in years 2000 - 2065 (selected years in %)**

Věk	2000	2010	2015	2020	2025	2035	2045	2055	2065
0 – 14	16,4	14,2	15,1	15,6	14,9	13,0	13,3	13,9	13,2
15 – 64	59,8	70,6	67,2	64,3	63,4	62,5	57,1	53,7	54,6
65 +	13,8	15,2	17,7	20,1	21,7	24,5	29,6	32,4	32,2

Source: Czech Statistical Office 2018 and own processing

**Tab. 3: Characteristics of age structure and load indices of the productive component of the Czech population between 2000-2065, selected years (in %)**

Demographic indicator	2000	2010	2015	2020	2025	2035	2045	2055	2065
Average age	38,8	40,6	41,6	42,7	43,9	46,3	47,5	48,3	49,0
Age Index	83,1	107,0	117,1	128,7	145,6	187,8	222,5	232,7	243,6
Dependency Index I.	23,9	20,2	22,5	24,2	23,5	20,8	23,4	25,9	24,2
Dependency Index II.	19,8	21,6	26,3	31,2	34,2	39,1	52,0	60,2	58,9
Economic load index	59,3	54,6	59,0	66,9	72,0	74,0	89,7	103,3	100,8

Source: Czech Statistical Office 2018 and own processing

### 2.3 Current analysis of age structure of seniors

Also, the number and share of senior citizens does not change only as a whole, and the age structure within this component is evolving. The youngest group, aged 65-69, remains the largest age group in the senior population, representing a third of all seniors in the long term. Between 2007 and 2017, the group of 90-94 years of age grew relatively the most, more than twice (by 28,000), its percentage in the senior population increased from 1.4% to 2.4%. Of the younger age groups, the number of persons in the 70-74 age group increased relatively the most (by 57%, almost by 207,000 in absolute terms), followed by the 65-69 age group (by 44%, by almost 211,000). The growth of these two groups demonstrates the shift of strong post-war years in the senior age in recent years. In comparison in the longer term (selected years 1987 and 1997) to 2017, the youngest age groups (65–69 years and 70–74 years) grew the most again, while the oldest ones increased in relative terms the most dynamically. Compared to 1997, people aged 90–94 and over 95 are currently more than double. Compared to 1987, the number of people aged 90–94 almost quadrupled and the 95+ age group is even 4.6 times more than in 1987. However, the percentage of the oldest two groups in the senior group is very low in the long-term (in the last thirty years between 1.0-2.5% in the 90-94 age group, 0.2-0.4% in the 95+ group).

### 2.4 Fiscal impacts of population aging

The expected decline in the working-age population (roughly 40% by the end of 2100) will be clearly reflected in the tax revenues of the state budget (Abraham & Laczo, 2018). income will be subject to taxation. It is not possible to exclude even lower taxes on corporate income, where labor shortages (Dugast & Foucault, 2018) are also likely to be reflected in lower prosperity and corporate profits, and consequently in indirect taxes (value added tax, excise tax.. ). This can be expected to result in higher demands on non-insurance social benefits for

the post-productive group of the elderly (state social support and assistance benefits - mobility allowance, housing allowance, care allowance...), as the representation of the post-productive population will increase significantly (Šetek, 2015). It is also possible to expect a significant decrease in the social insurance system. The entire insurance benefit system based on selected social insurance depends on the amount of the economically active population. This should be affected similarly to the state budget by the expected demographic development. Given that old-age pensions are financed from the vast majority of the system, the growth in expenditure with the increasing number of seniors will be quite significant. In terms of the old age dependency ratio, the rate of dependence of the 65+ category on the productive age category will increase roughly double by 2100. While maintaining the current state of the pension system, this would mean that the economically active population would have to roughly double in order to maintain the current income standard of the elderly.

Similar impacts as with the state budget and social security system will be a significant decrease in the health insurance system, which would also be deficit even with the current parameters set. The reason is the expected lower number of payers, ie economically active inhabitants, on the one hand, and a significantly higher number of people in the post-productive age with premiums paid from the state budget on the other. On the other hand, with a smaller volume of funds in the health insurance system, growing demand for health care can be expected, due in particular to a change in the demographic structure of the population, ie 65+, to which the system has been spending significantly higher amounts of money than to persons of working age (Šetek & Petrách 2016).

It is also certain that the Czech Republic will have to constantly strengthen the integrated system of social services in the field of gerontology with the aging of society and the growing number of seniors in the coming years. It is also necessary to establish a sustainable model for their funding. In the context of a fiscal social policy concept, it will be decided whether these services will continue to be funded from the state budget or local government budgets, or whether insuring will be introduced (modeled on Germany).

## **2.5 Application of Generation Accounting and Public Finance System in the Context of Demographic Forecasting**

In 1991, the *Generational Accounts: A New Approach to Fiscal Policy Evaluation* publication is the date to date the origins of generation accounting. The authors of A. Auerbach, J. Gokhale and L. J. Kotlikoff presented the main idea behind the concept of generation

accounting (Gokhale & Raffelhüschen, 1994). His initial philosophy is based on the reality that every individual is a tax payer and a recipient of transfers throughout his life. According to the life cycle hypothesis from the Italian economist Franco Modigliani, the authors chose that the amount of taxes and transfers depends on age (Egorov & Harstad, 2017). If the company is divided into three basic groups by age, pre-productive population, economically active - productive population and seniors - post-productive population, it can be stated that only the middle group pays more money to public budgets than it draws (Wawrosz & Valenčík, 2014). On the other hand, young and old people only contribute to public budgets in a limited amount (Newbert, 2018). It follows, therefore, that every individual in society is either a net payer or a net beneficiary at a certain age. Young and old are mainly net beneficiaries (they receive more from public sources than they do). Conversely, the middle group as productive are net taxpayers, ie it transfers more to public budgets than they themselves receive (Prušvic & Pavloková 2010).

This can be interpreted on the basis of income tax and health insurance. These essentials are paid only if the individual works. In fact, he pays a percentage of his wages, so he is a tax payer and health insurance. Conversely, children and elderly people who are not involved in the labor market do not pay this tax or the insurance, but receive various transfers from the state. Therefore, this group of people (children and old) tend to be net beneficiaries. Current policy actions have mostly long-term impacts. For example, pension reform will affect both the current generation and the future generation. For example, the current generation may be affected by an increase in income tax. If the current system generates a debt, someone will have to pay for it in the future, which will affect future generations (Džbáňková & Sirůček, 2013). Thus, the generation accounts show the amount of net taxes an individual can expect within a current or future generation. - ie what amount of money is likely to be taken by an individual to the system and how much he / she is likely to gain from transfers from the state during his / her life (Gokhale & Raffelhüschen, 1994). Generation accounts should deliver results in a way that provides a basic comparison between generations. Only a quantification of net taxes would not provide such a comparison. Based on the results from the generational accounts of both generations, a possible intergenerational balance or imbalance can be identified and, in the long term, fiscal sustainability or the unsustainability of public finances. From the point of view of public choice theory, generation accounts show how policy should redistribute resources between generations, as long as current policy remains unchanged for currently living individuals.

## **2.6 Implementation of the principle of subsidiarity in the provision of social services in the field of gerontology**

Since the beginning of the transformation of the Czech economy from the 1990s, local and regional levels of public policy have grown in importance, particularly in the context of decentralization, liberalization and the application of the subsidiarity principle as stratified and transferred solidarity to the immediate neighborhood of the needy individual. In this context, due to the aging of the population and new trends in the way of care for the elderly, it was necessary to fundamentally change the way in which care was provided. Current requirements are quality of life, individual approach and the aforementioned subsidiarity. For the above reasons, the main objective of the mix of regional and social policy is to implement local public interest. It can be characterized as a long-term increase in the living standards of citizens of a given territory by increasing the quality and quantity of public services and ensuring decent living conditions for all citizens, the process of local development - or local public policy - should be based on reflecting on the different needs of the social group of seniors. This reflection is currently supported, especially with the advent of the Industry 4.0 era, through the application of the basic principles of strategic management - smart administration.

## **Conclusion**

Between 2035 and 2045, an enormous increase in the group of seniors is expected. From this period, the growth rate of the group will accelerate steadily. On the basis of the forecast of the expected increase in the social group of senior citizens, public finance debt would reach 230% of gross domestic product in 2068, while fiscal policy is set. In this context, intergenerational imbalances and the consequent fiscal unsustainability of public finances can be discussed in the context of generational accounting. It is absolutely certain that the existing social and health system is not ready for aging and will not be sustainable in its present form. In order to achieve an overall intergenerational balance, a combination of measures that lead to a balance for the present generation and especially for future generations is the most appropriate instrument. These instruments include, in particular, the implementation of health and system reform as well as an integral part of public finances.

In support of the above-mentioned reform, it is necessary to apply the principle of subsidiarity, especially in the framework of the provision of social services in the field of gerontology. The essence of this principle lies in transferring responsibility to the nearest



social environment (institution) of the elderly, which is the family, the municipality, the city region or the components of civil society. Smart (community, city and region) applications are fully helpful in providing social services.

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