POLAND'S POPULATION 2001-2021

Poland's population by province divided into groups of age and sex

23 MARCA 2023

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Introduction

The aim of the study is to approximate the trends and changes in selected demographic data describing the population of Poland from 2002 to 2021. The collected data allows for analysis, taking into account the administrative division into voivodeships, age groups and gender. The study focuses on answering the following research questions:

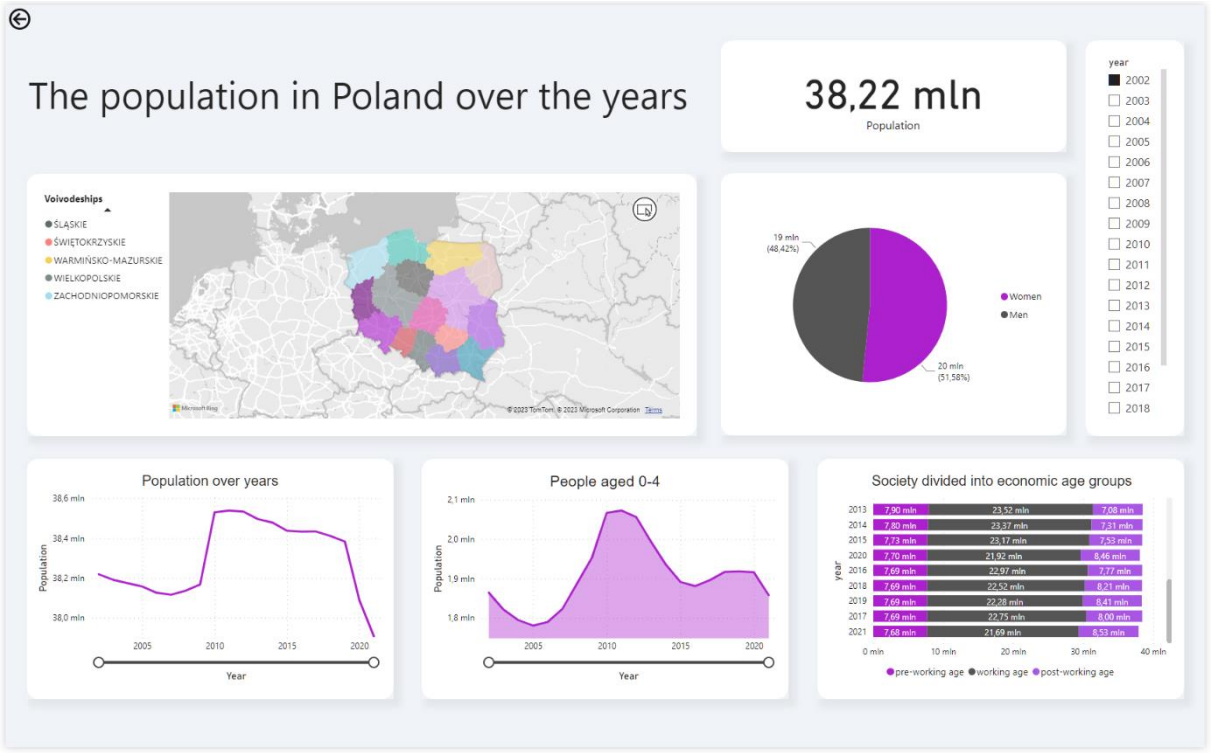
1. How has the population of Poland changed?
2. Does the introduction of the "500+" program in 2016 positively impact increasing the number of births?
3. How have economic age groups changed over the years?

Data acquisition

One of the key tools used during the acquisition of reliable data was the API of the Central Statistical Office, which allowed me to access a huge database containing, among other things, information about the population in Poland from 2002 to 2021. Through analysis of the open API documentation of the CSO and the use of provided methods, I selected the most interesting ranges of information about the population, divided by voivodeships, age groups, and gender. I downloaded the complete set of statistical data using self-developed Python code. Based on defined parameters, I automated the necessary API method calls, conversion, and saving of the received data in CSV format. Having the data in the selected format, I was able to easily and efficiently import, process, and analyze the collected information using chosen tools. Without access to the open API of the CSO and the ability to use it, collecting data on population changes over the years would have been much more difficult and time-consuming. Thanks to widely used API interfaces in today's times, we can effectively acquire, gather, and process valuable data that can be used for analysis, forecasting trends, creating long-term strategies, or making daily decisions in many aspects of our daily lives (economy, finance, economics, etc.).

Visualization

Below I present a visualization that illustrates changes in the population of Poland over the years:



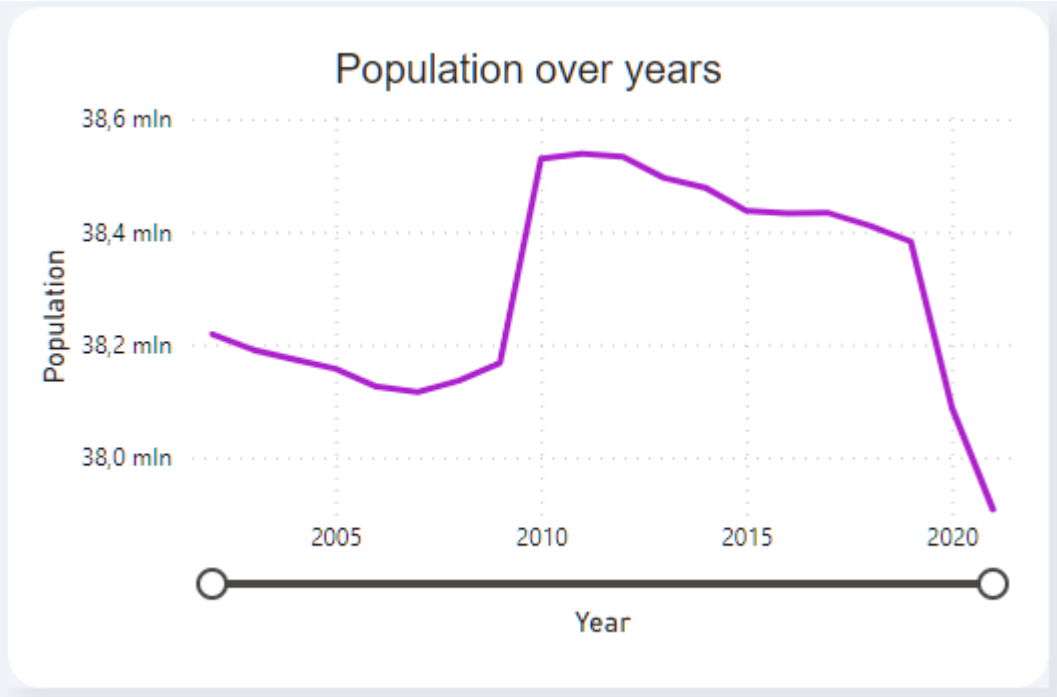
How has the population changed over the years?

The overall population of the country

Analyzing the data on the population of Poland from 2002 to 2021, we can see that it underwent interesting changes.

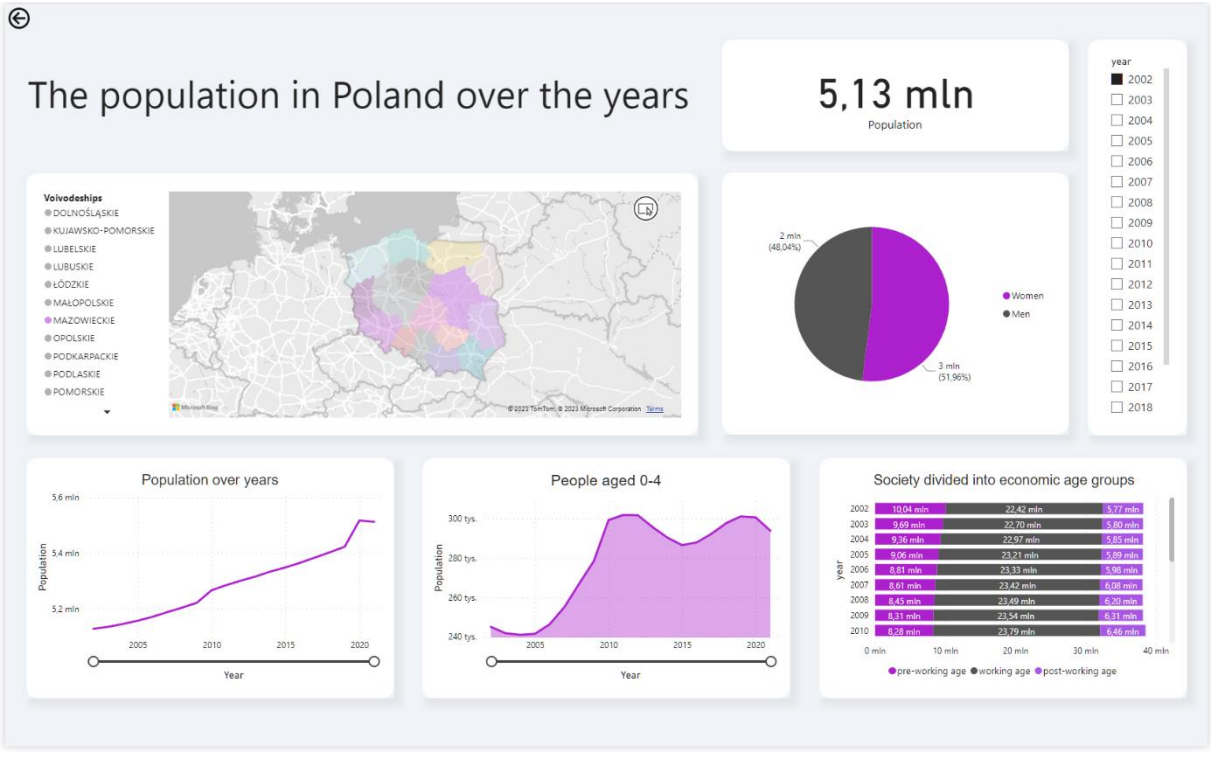
From 2002 to 2006, the population slightly decreased and amounted to: 38.21 million, 38.18 million, 38.17 million, 38.15 million, and 38.13 million, respectively. Then, from 2007 to 2011, the population strongly increased, reaching a peak of 38.53 million in 2011. In the following years, the population began to slightly decrease until 2019, to the level of 38.38 million.

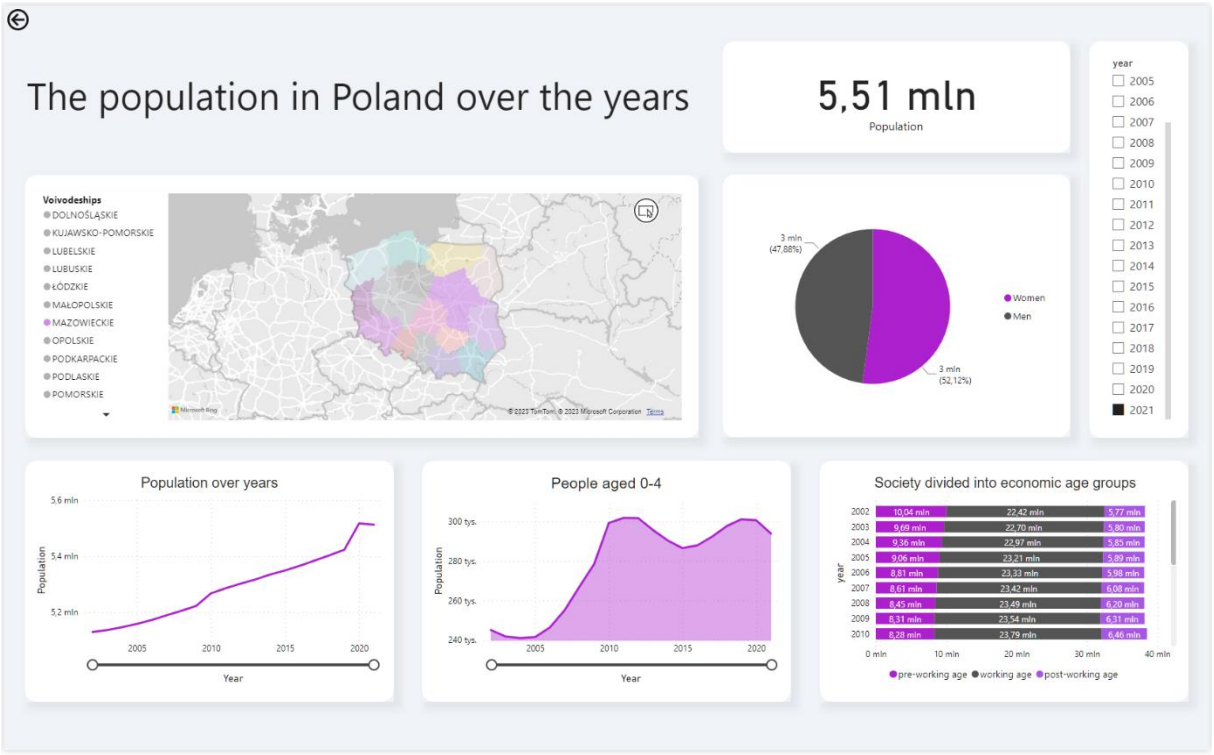
The largest decrease in population was recorded in 2020-2021, reaching a level of 37.9 million people, most likely due to the COVID-19 pandemic. Overall, over the entire period under investigation, the population in Poland decreased by about 1.3%.



Population by voivodeships

The changes in the population of residents in individual voivodeships are very interesting. The largest increase in population was recorded in the Mazowieckie voivodeship and amounted to 380 thousand.

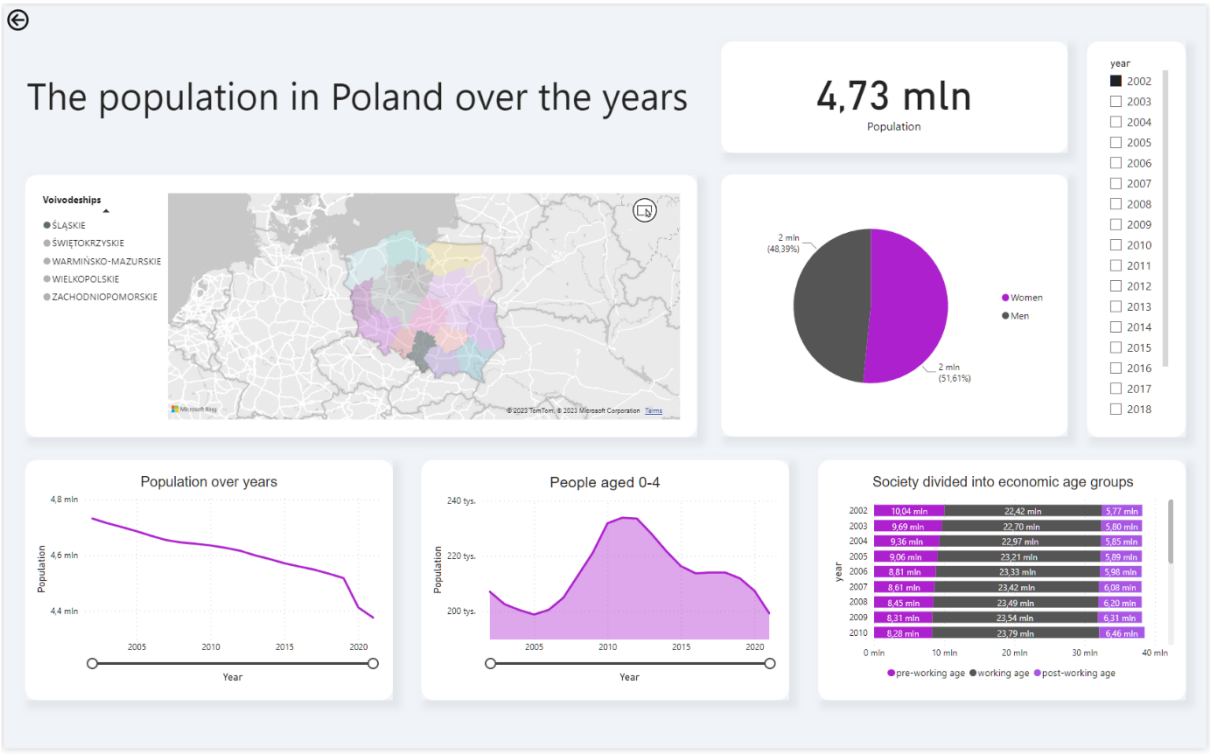


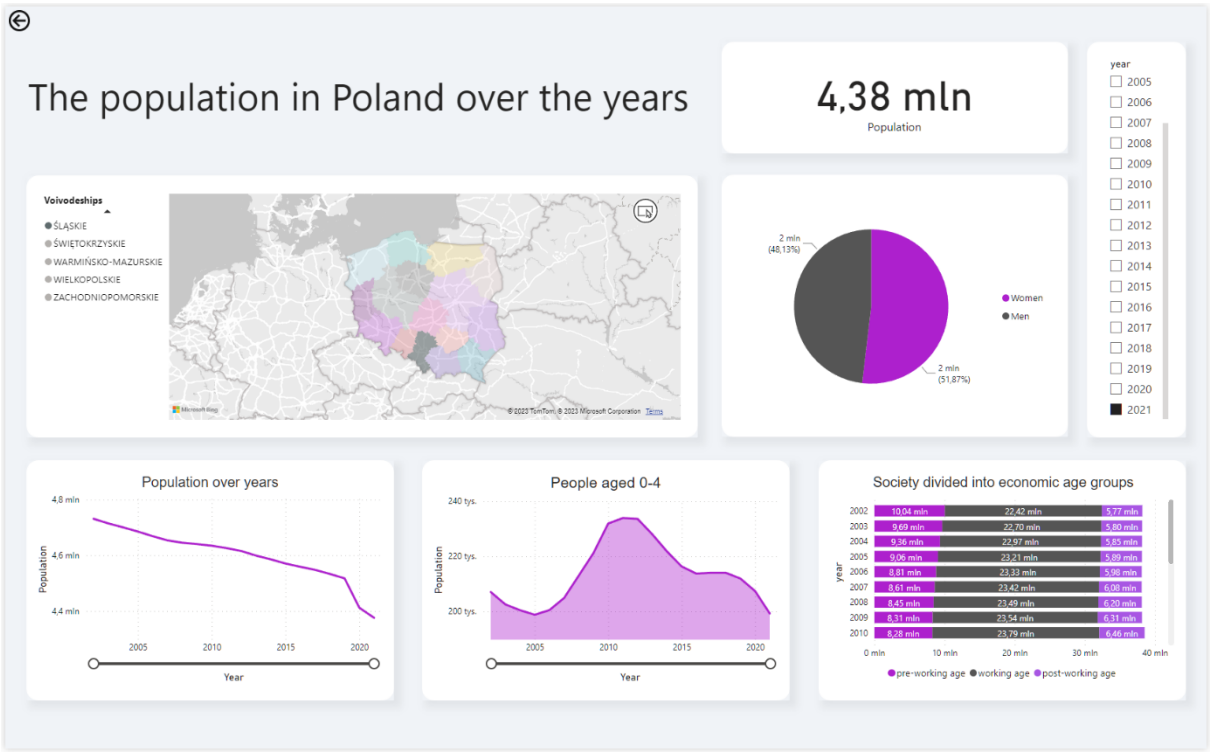


The largest population growth was recorded in the Mazowieckie, Małopolskie, Wielkopolskie and Pomorskie voivodeships. At the same time, the trend in the Śląskie and Lubelskie voivodeships was the opposite, with the population decreasing.

Furthermore, the data shows that in the remaining voivodeships of Poland, the number of inhabitants decreased. The largest decrease was recorded in the Śląskie voivodeship, which amounted to 350,000; the second-largest decrease was recorded in the Lubelskie voivodeship, which was 160,000.

These changes largely result from the transfer of the population to areas where new jobs were being created faster, allowing for higher salaries.

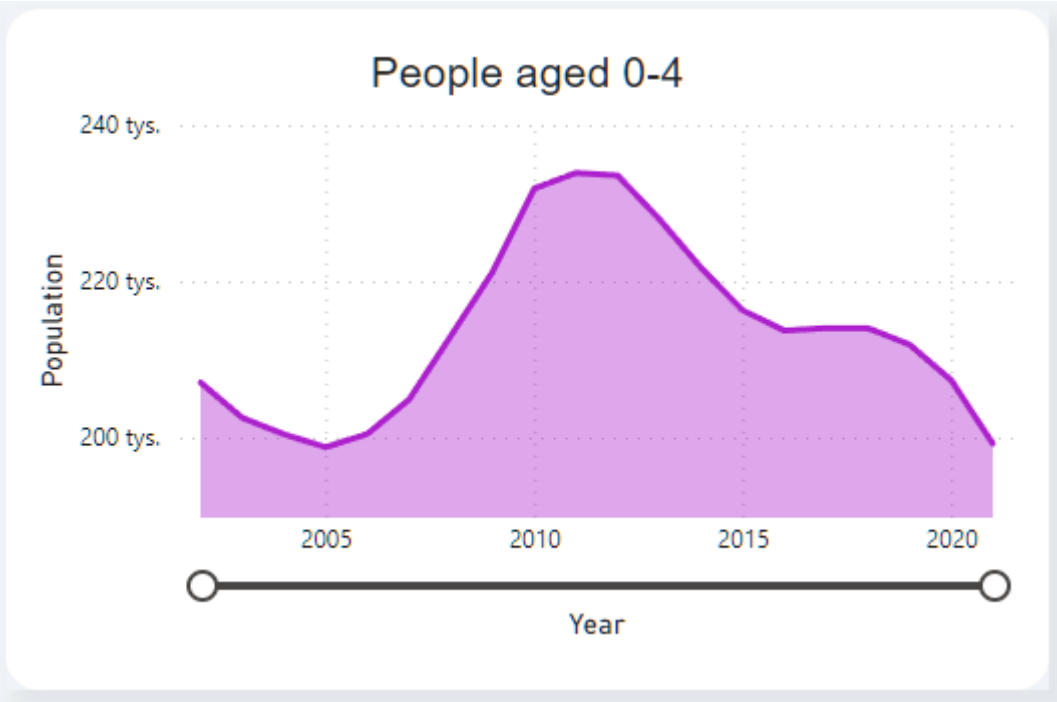




This phenomenon is related to factors such as migration of the population to larger cities, a decrease in fertility, or an aging society. However, it is worth noting that the increase in the population in selected voivodeships may result from factors such as the development of industry or science.

Does the '500+' program introduced in 2016 help with fertility?

It is true that since the introduction of the "500+" program in 2016 in Poland, there has been a temporary increase in the number of children in the 0-4 age group. In 2015, this number was 1.891 million, and in 2019 it reached 1.918 million. In the following years, there has been stabilization at this level. It is worth noting that in the years preceding the introduction of the program, the number of children in this age group was systematically decreasing, which may indicate the effectiveness of the program in encouraging families to have more children.



However, if we take into account that between 2005 and 2010 there were no programs aimed at promoting and supporting large families, and during that period there was an 11% increase in fertility, which was significantly higher than after the introduction of the 500+ program (1.6% growth from 2016 to 2021), it must be stated that the funds allocated to 500+ have a negligible effect on the increase in births. The increase in fertility in Poland between 2005 and 2010 was mainly due to the improvement of the country's economic situation and social changes. During this period, Poland joined the European Union, which had a positive impact on the economy, the speed of technological development, and increased investment in sustainable development of rural and non-industrial areas, while also improving the standard of living. The increase in fertility may also be the result of improved access to healthcare, education, and childcare.

At this point, attention should be paid to the high cost of the 500+ program, which amounted to 41 billion zlotys in 2020 alone. Although this program certainly contributed to the increase in the number of births, its long-term effectiveness and efficiency in the use of public funds raise significant doubts. Continuing research on the impact of this program on fertility in Poland will allow for a full assessment of its effectiveness in the future and provide a basis for making effective decisions regarding the creation of the country's demographic policy.

It should also be noted that there was a decrease in the population of children aged 0-4 from 2020 to 2021. There are several factors that contribute to the decline in the number of children despite the continuation of the 500+ program:

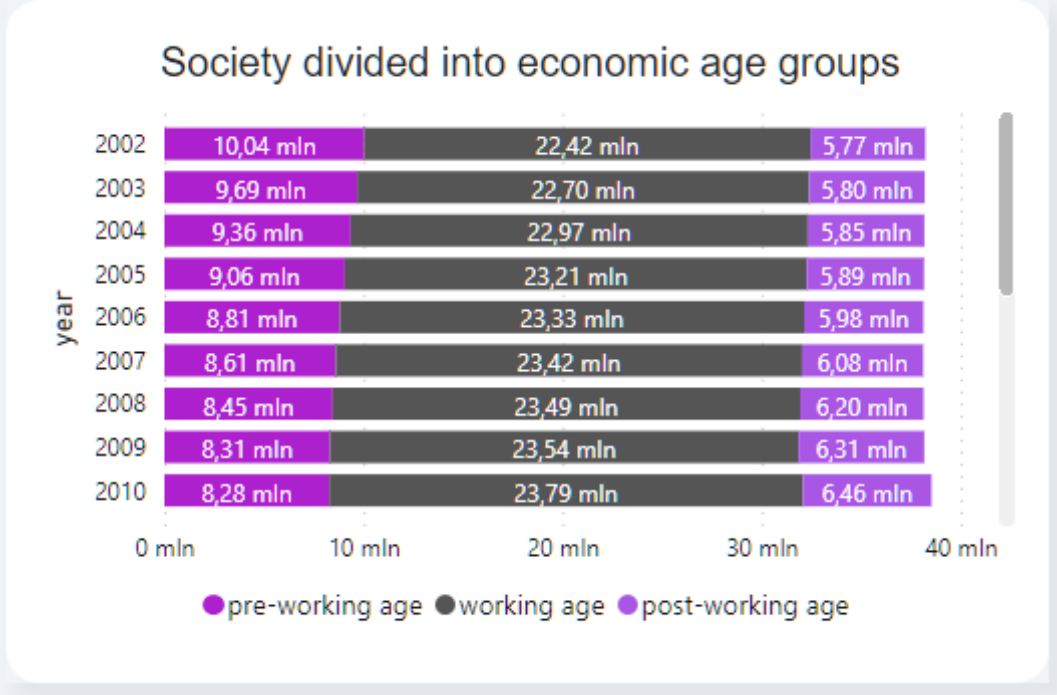
- Decrease in the number of women of reproductive age - in Poland, there has been a decrease in the number of women aged 15 to 49, which in the long run may affect the decline in fertility.
- Labor migration abroad - over the last few years, many people have decided to go abroad for work, which has an impact on the decline in the number of children because these individuals often postpone the decision to have children.
- Impact of the COVID-19 pandemic - the pandemic has led to changes in lifestyle and attitudes towards motherhood. Many couples have decided to delay their decision to have children due to uncertainty related to the pandemic, as well as difficult economic conditions and difficulties in accessing healthcare.
- Overall trend of declining fertility in Poland - the decline in fertility in Poland is not a new phenomenon and has been observed for many years in developing countries. Despite the introduction of the 500+ program, the increase in fertility was only temporary and was not able to eliminate the long-term downward trend.

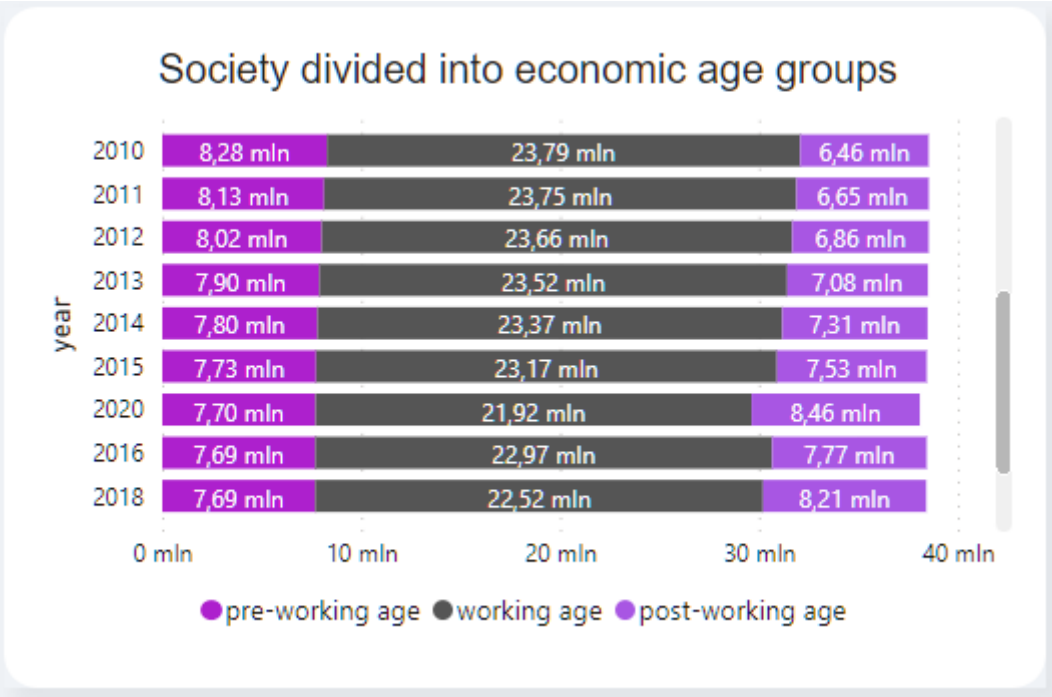
How have economic age groups changed over the years?

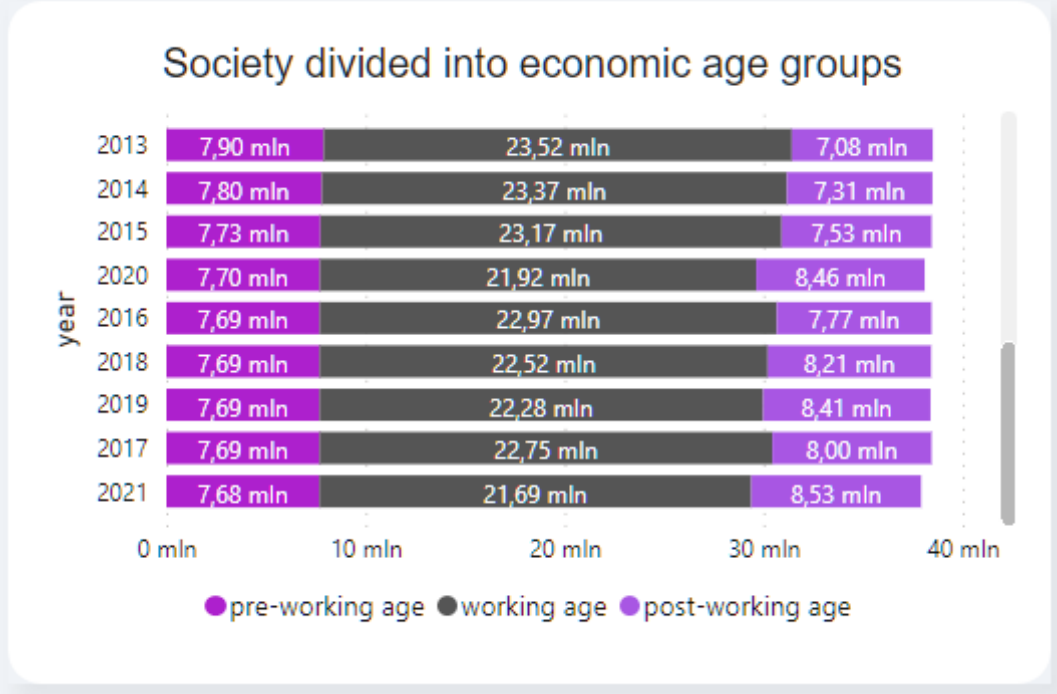
Age groups for the purpose of this analysis:

• pre-production age: 0-19 years old for both males and females,
• production age: age of ability to work, i.e. for men the age group of 20-64 years old, for women - 20-59 years old,
• post-production age: men older than 64 years old, women older than 59 years old.

Data on the population divided into three age groups - pre-production, production and post-production - allow conclusions to be drawn about changes in society over the years. In the period from 2002 to 2021, significant changes can be observed in these age groups. In 2002, the largest number of people belonged to the production age group - over 22 million, while the pre-production group was - 10.04 million and the post-production group - 5.77 million. In the following years, the number of people in the pre-production age group systematically decreased, while the number of people in the post-production age group increased. From 2002 to 2010, the production age group steadily increased and in 2010 reached its highest value of 26.79 million. Its number began to decrease after 2010 and in 2021 it was 21.69 million, which is a lower result than observed in 2002.







Since the introduction of the "500+" program in 2016, a slowdown in the decline of the number of people in the pre-productive age group can be observed. On the other hand, the number of people in the post-productive age group continued to increase. Generally speaking, changes in the population of individual age groups are influenced by many factors, such as changing demographic trends, living and working conditions, or government programs, and cannot be attributed to one specific source.

Conclusion

In conclusion, the analysis of population data in Poland indicates many changes in different age groups and regions over the years. We can see that the 500+ program introduced in 2016 had a slight impact on fertility rates and did not help much in rejuvenating society. From 2005 to 2010, there was an increase in fertility rates despite the absence of such supportive programs. Demographic changes in individual age groups are the result of many factors, including economic and social changes and technological development.

Analysis of demographic data is important for planning public policy and investment in sectors with the greatest potential for development. The increase in the number of people in younger age groups will impact future needs in the care and education sectors, while the growing number of older people requires increased investment in social and health care. That is why it is so important for public policy to take into account demographic changes and to be constantly adjusted to the changing needs of the population in different age groups.