Prognóza výdajů na zdravotnictví v Česku mezi lety 2019–2040

Metodologie a reference

Metodologie - vlastní zpracování dle postupu v Appendix

Data:

1 Health expenditure curves: Health accounts of the Czech Republic for year 2019. Czech Statistical Office, 2023.
https://www.czso.cz/csu/czso/vysledky-zdravotnickych-uctu-cr-m6hwrlzbbw

2 Projected real GDP growth: Real GDP forecast by the OECD, 2023.
https://data.oecd.org/gdp/real-gdp-forecast.htm

3 Annual wage growth: Data from the OECD, latest available.
https://data.oecd.org/earnwage/average-wages.htm

4 Population projections: World population prospects 2022.
https://population.un.org/wpp/

5 Life expectancy: World population prospects 2022.
https://population.un.org/wpp /

6 Population data of 2019: Database by the Czech Statistical Office, 2023.
https://www.czso.cz/csu/czso/population

7 Coefficients: Obtained from Lorenzoni et al., 2019.
https://read.oecd-ilibrary.org/social-issues-migration-health/health-spending-projections-to-2030_5667f23d-en#page26

Další reference:

1 How to Take into Account Death-Related Costs in Projecting Health Care Expenditure, 2006
http://www.jstor.org/stable/29789296

2 Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis, 1967
http://www.jstor.org/stable/1812111

3 Health Spending Projections to 2030: New results based on a revised OECD methodology
https://doi.org/10.1787/5667f23d-en

4 The impact of technological advancements on health spending: A literature review
https://doi.org/10.1787/fa3bab05-en

5 Death Related Costs Hypothesis in the Czech Health Care System - The Present and the Future
https://pep.vse.cz/artkey/pep-201001-0005_Death-Related-Costs-Hypothesis-in-the-Czech-Health-Care-System-The-Present-and-the-Future.php?l=cz

Dělnická 475/43
170 00 Praha 7

info@ministrzdravi.cz
www.ministrzdravi.cz

6 Health Technology Assessment of the Medical Devices: A Case Study from the Czech Republic

https://sciendo.com/article/10.2478/nispa-2021-0022

Appendix

This projection framework is based on the methodology of health expenditure projection by Lorenzoni et al. (2019), with minor modifications. The modifications include an updated expenditure curve, which was obtained from the Czech Statistical Office (CZSO, 2019), stratification by gender, different calculation of death-related costs, and the inclusion of time-effects without weights. At the same time, the projection is based on public health expenditure, leaving private expenditure out from the projections. The coefficients used to calculate the Baumol effect, income effect and time-effects were obtained from the OECD;s econometrics' output.

Health expenditure is divided into two categories: collective and individual expenditure. In the below equations, G represents individual expenditure, and C represents collective expenditure. Expenditure was separated into these two categories because demographic factors enter the calculation of individual expenditure but these do not enter the calculation of collective expenditure projections.

Individual expenditure was split into two groups: survivors and non-survivors. Survivors are the share of people who will be alive at year t, and non-survivors are the share of people who are expected to die at year t. The individual expenditure was calculated using expenditure curves by age-gender groups (CZSO, 2019). The data used to generate the age curves were only available for health insurance expenditure, and not for the public budget expenditure, which accounted for 18% of total health expenditure. Accordingly, the projected growth rate of health insurance companies' expenditure was applied to the public budget, allowing them to grow at the same rate. This mathematical operation is explained by the relatively similar increase in expenditure between health insurance and public budget in preceding years.

The income effect was obtained by multiplying the projected GDP growth (OECD, latest data available) by the income elasticity, across all age-gender groups (equation 1).

(1) $$\gamma = g_{as,pc,\ t-1} * \left(\left(y_t - \frac{y_{t-1}}{Y_{t-1}}\right) * \epsilon\right)$$

The Baumol effect was obtained by multiplying the Baumol coefficient (obtained from the econometric output by Lorenzoni et al.) to the average annual wage growth since 1993 (equation 2).

(2) $$\beta = g_{as,pc,\ t-1} * (\Gamma * (\Delta w_t))$$

The death-related costs were calculated by multiplying the highest health expenditure of all age groups by 4 for each age-gender group below 60 years old, and then the multiplication factor linearly decreases to 1 as age groups reach 95+ years old (equation 3). This computational approach was based on evidence of death-related costs (See Rocco and Palombi, 2006; Pavlokova, 2010).

(3) $$\varphi = \bar{g}_{as,pc,\ t-1} * \rho$$

The time effect entered the projection as a fixed parameter, multiplied for each year and age-gender group (equation 5).

(4) $$\tau = g_{as,pc,\ t-1} * \delta$$

The parameter effects are summed to the per capita expenditure of each age and gender group (equation 5)

(5) $$G_{as,pc,\ t} = g_{as,pc,\ t-1} + \gamma + \beta + \varphi + \tau$$

Then the expenditure of each one of these age-gender groups is multiplied by the new population of each one of these groups for the following years:

$$G_{as,t} = G_{as,t-1} * \emptyset_{as,t}$$

Then expenditures for all age-gender groups are summed to obtained total individual expenditure for year t:

(6) $$\sum_{as=1}^{n} G_{as,t}$$

Collective expenditure comprises spending targeted at the general population, including expenses in prevention, monitoring, among other non-individual targeted expenditures (equation 7). This type of expenditure grows with all parameters except for demographic factors.

(7) $$C = c_{pc,\ t-1} + \gamma + \beta + \tau$$

Total public health expenditure is obtained by summing the collective and individual expenditures. The total health expenditure obtained at time t, is then used as the baseline for the following year t+1, iteratively for all years until 2040.

(9) $$HCE_{public} = \sum G_t + C_t$$

Data sources:

Health expenditure curves: Health accounts of the Czech Republic for year 2019. Czech Statistical Office, 2023.

Projected real GDP growth: Real GDP forecast by the OECD, 2023.

Annual wage growth: Data from the OECD, latest available.

Population projections: World population prospects 2022.

Life expectancy: World population prospects 2022.

Population data of 2019: Database by the Czech Statistical Office, 2023.

Coefficients: Obtained from Lorenzoni et al., 2019.

Notations:

Subscript a: age

Subscript g: gender

G: Expenditure by age-gender group, including the effect of the parameters on expenditure.

g: Expenditure by age-gender group, without the effect of the parameters on expenditure.

γ: Income effect

ϵ: Income elasticity

y: GDP

w_t: Wage

β: Baumol effect

Γ: Baumol coefficient

φ: Death-related costs

ρ: Multiplying factor

τ: Time effects

δ: Time coefficient

$\emptyset$: Population change

HCE_{public}: Total public health expenditure