The Czech Fiscal Council

REPORT ON THE LONG-TERM SUSTAINABILITY OF PUBLIC FINANCES

September 2022
The Czech Fiscal Council

Contents

Introduction

Under Act No. 23/2017 Coll., on the Rules of Budgetary Responsibility, as amended (the "Act"), a key task of the Czech Fiscal Council (CFC) every year is to prepare a *Report on the Long-Term Sustainability of Public Finances* (the "Report") and submit it to the Chamber of Deputies of the Parliament of the Czech Republic.

As in previous Reports, in this current one the CFC assesses the Czech public finance situation from both the medium and long-term perspectives. The key indicator in the first case is the current structural balance, while that in the second is the projected path of public debt over the next 50 years, which indicates the size of the long-term imbalance. We demonstrate the degree of urgency of the need to address the two imbalances by estimating the year in which the economy risks breaching the "debt brake" if revenue and expenditure policies remain unchanged.

Czech public finances are currently significantly imbalanced. This situation arose through a combination of a medium-term imbalance and a chronic failure to address the future impacts of population ageing.

However, the current problems are predominantly a result of an extreme relaxation of fiscal policy over the last two years. This easing was justified by the atypical nature of the COVID-19 crisis and the need for a firm fiscal response to it. While it is clear that the crisis required fiscal policy action, the extent of the response was excessive. Moreover, actions were taken with reference to the crisis which had nothing in common with it and which significantly worsened the structural public budget balance. Unfortunately, some of the measures proved problematic or even damaging from the fiscal and macroeconomic perspective. Perhaps the most prominent example is the sharp cut in personal income tax approved at the end of 2020, which, given the macroeconomic situation, not only failed to boost economic growth significantly, but also fuelled the inflationary pressures currently facing the Czech economy.

Public finances entered 2022 in a large structural imbalance. Government papers published to date unfortunately indicate no major reduction in the imbalance in the coming years. Fiscal consolidation efforts are of course being complicated by the new crisis driven by Russia's attack on Ukraine. New expenditure requirements are therefore being placed on public budgets. The revenue growth being generated by the high inflation is not sufficient to cover them.

The current public finance situation is also a result of problematic treatment of the fiscal rules. The successful functioning of these rules is fundamentally conditional on long-term legislative stability. Regrettably, the double amendment of the Act in 2020 greatly undermined the entire credibility of the system. In particular, poor-quality interventions in the construction of the structural balance rule made it much vaguer and harder to implement the rule.

As previously mentioned, in this Report the CFC presents the public budget situation from the medium and long-term perspectives. Unfortunately, we have to say that there has been only a minor improvement by comparison with the results presented in the previous Report, and the key conclusions are unchanged. If the imbalance is not eliminated in the near future, the debt ratio could reach the debt brake threshold (55% of GDP) by 2028. Our long-term analysis meanwhile indicates that the current tax and spending policies would lead to a sharp increase in the debt – especially from the 2030s onwards – that would not be financeable in the long term.

It is therefore clear that significant changes will have to be made on both the revenue and expenditure sides of public budgets. Even though these changes will not be popular, they need to be commenced as soon as possible, because our calculations show that the later they are made, the more costly they will be. However, delaying reforms also has redistributive impacts, as the financial burden shifts from the current economically active generations to future generations.

1   Summary

The 2022 *Report on the Long-Term Sustainability of Public Finances* (the "Report") was prepared at a time when the economy had recovered from the immediate consequences of the COVID-19 pandemic. However, the pandemic significantly affected public finances on both the revenue and expenditure side.

Scarcely had the situation started to calm down after the pandemic when Russian federation invaded Ukraine. This triggered a large migration wave and generated a negative supply shock stemming from growth in prices, especially of energy and food. The events of 2020–2022 show what impact an accumulation of one-off shocks and a short period of expansionary fiscal policy can have on the long-term sustainability of public finances.

Section 2 of the Report indicates that public finances faced great pressure in 2021 in spite of a partial renewal of economic growth. The general government sector recorded a deficit of 5.9% of GDP for 2021, the largest since 2003. The medium-term outlook is also negatively affected by the previous relaxation of the Act and by the fact that many of the measures adopted during the COVID-19 pandemic are of a more lasting nature than the pandemic itself, and some were often not even directly related to it.

In a box on the Potential implications of EU climate policy for Czech public finances in section 2, we outline the challenges arising from the European Green Deal, which sets the goal to reduce greenhouse gas emissions. As the Czech Republic is one of the largest greenhouse gas emitters per capita in the EU and also has one of the lowest environmental tax revenue-to-GDP ratios in the EU, these impacts could be substantial.

In section 3, as usual we describe the macroeconomic assumptions of the long-term public finance projection. First, we assume real convergence of the Czech economy, growth in labour productivity and a rising ratio of wages to gross value added. The second key parameter is the demographic projection of the Czech Statistical Office (CZSO), which we adjust for actual population growth. This adjustment reflects a higher gross birth rate, higher net migration and above all a substantially higher gross mortality rate linked with the indirect impacts of the COVID-19 pandemic. Almost 44 thousand more people died during 2020 and 2021 than the CZSO's 2018 demographic projection had predicted. We analyse the impacts of this change in detail in a box on changes in the demographic projection, where we also discuss the effect of a methodological change connected with the 2021 Census leading to a reduction in the total population by almost 207 thousand. This demographic change implies an improvement in the long-term public finance sustainability parameters (a decrease in the dependency ratio from 2.95 in 2020 to 2.82 in 2021). However, a strong population ageing trend persists in the long run.

Population ageing is reflected primarily in the sustainability of the pension system (section 4.1). If the parameters of the pension system are left unchanged, the share of old-age pension expenditure in GDP will increase from the current 7.5% to 11.5% over the next 40 years. The most recent changes to the parameters of the pension system have generally tended to increase its expenditures. In a box on the new replacement rate estimation method, we illustrate, for example, the increase in the initial replacement rate for 2022 (from 40.7% in 2021 to 43.1%) stemming primarily from how pensions have been valorised in response to the sharp growth in prices and the effect of the introduction of a "child-rearing bonus" in 2023. The demographic changes are reflected in other areas of public finances besides pension system expenditure, most notably health care (section 4.2), education (section 4.4) and the system of cash benefits (section 4.3).

The revenue and expenditure projections are reflected in the projected debt path, which is described in section 5. Assuming that the current fiscal policy stance does not change, the projected government debt will increase to 296% of GDP at the end of the 50-year projection horizon. Therefore, if there is no change in the current policy, the debt brake threshold (55% of GDP) will be breached as early as 2028. For the government debt to be no higher than the debt brake threshold in fifty years' time, the primary structural general government balance would have to improve by 6.04% of GDP in each year of the projection.

Given the uncertainty associated with the baseline scenario, we have prepared several alternative scenarios in section 6. These show how the projection would look assuming that the retirement age is linked to life expectancy based on the "quarter of life retired" principle or given faster labour productivity growth due to technological progress. Both the alternative of linking the retirement age to life expectancy and that of faster productivity growth provide lower debt paths, but neither of them in itself leads to long-term public finance sustainability. In our discussion of different demographic variants, we present an alternative examining the impacts of the reception and integration of refugees from Ukraine. Section 6 also contains an generational accounts analysis, which reveals that younger generations born mainly in this millennium will bear the brunt of the constant postponement of sustainable pension reform.

KEY FINDINGS in the baseline scenario
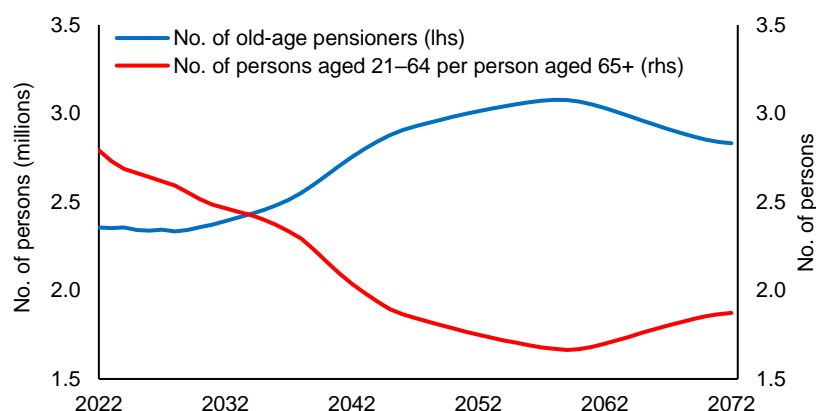
The number of old-age pensioners will peak around 2058 at about

3.1 million.

The number of 21–64 year olds per person aged 65+ will drop around 2059 to

1.66.
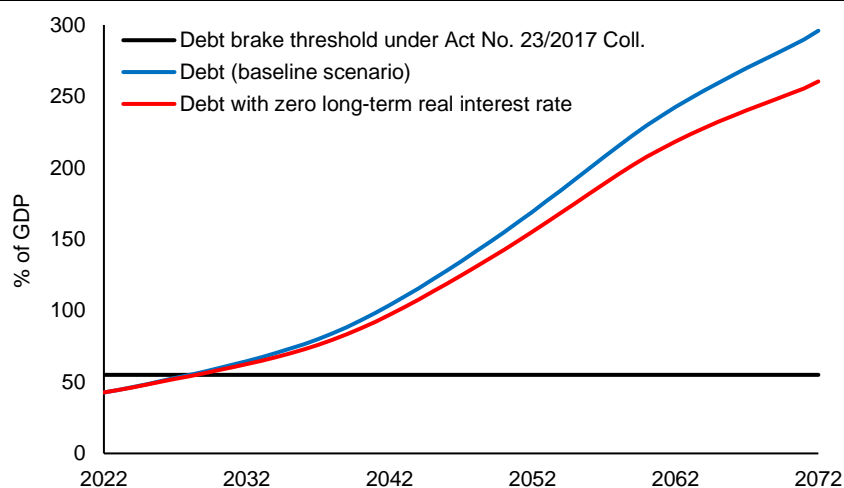
If the current tax and expenditure policies were maintained, the debt brake threshold would probably be breached in

2028.

At the end of the 50-year projection horizon, the general government debt could reach

296% of GDP.
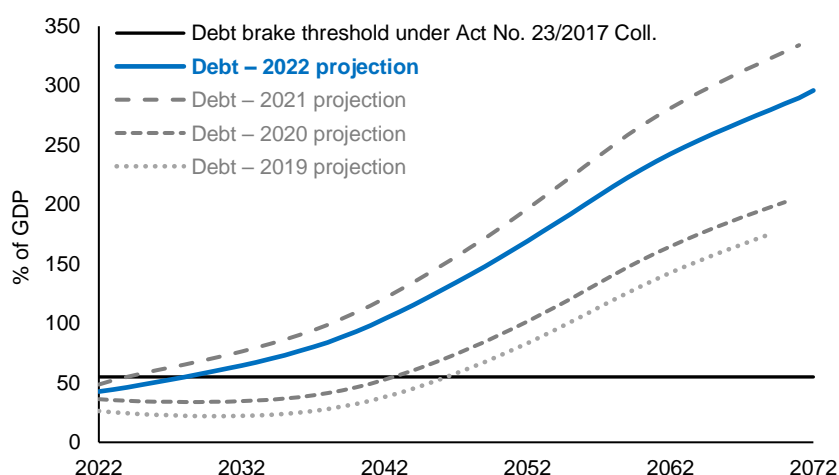
The general government debt in the baseline scenario is

38 pp of GDP

lower at the end of the 50-year projection horizon than in the 2021 projection. The debt brake threshold would be breached

4 years later

than in the 2021 projection.

Public finance sustainability gap

6% of GDP

is the amount by which the primary structural balance would have to be better from 2022 until 2072 for the debt not to exceed the debt brake threshold (55% of GDP) in 2072.

2 Starting point and medium-term outlook

In terms of timescale, the medium-term outlook is focused on the current year 2022 and the next three years 2023–2025. This is the same period as for the medium-term scenario presented in the Convergence Programme of the Czech Republic published by the Ministry of Finance of the Czech Republic (MF CR) in May 2022.

The Czech Republic recorded real growth in gross domestic product (GDP) of 3.5% in 2021. The main contributors to the growth were change in inventories (4.8 pp) and household expenditure (1.8 pp). The increased additions to inventories reflect firms' concerns about smooth supplies of production inputs amid international supply chain disruptions and "frontloading" due to concerns about the rising inflation rate. The growth in household expenditure was caused by a rise in real disposable income and spending of "Covid" savings created primarily during the first year of the pandemic. Exports recovered in 2021, rising by 6.9% year on year, but imports surged to 13.3%, so foreign trade had a negative impact on GDP growth (–3.6 pp).[1]

As regards the position in the business cycle, the economy was slightly above its potential output level in 2021. The output gap calculated according to the joint MF CR/CFC methodology stood at 0.1% of potential output.[2]

The general government sector recorded a deficit of 5.9% of GDP for 2021.[3] It was due mainly to a central government deficit (–6.3% of GDP). Social security accounts were almost balanced (–0.1% of GDP) and local government recorded a surplus of 0.6% of GDP. According to the Convergence Programme, the structural deficit reached 4.0% of GDP (see Chart 2.1).

Chart 2.1 General government structural balance
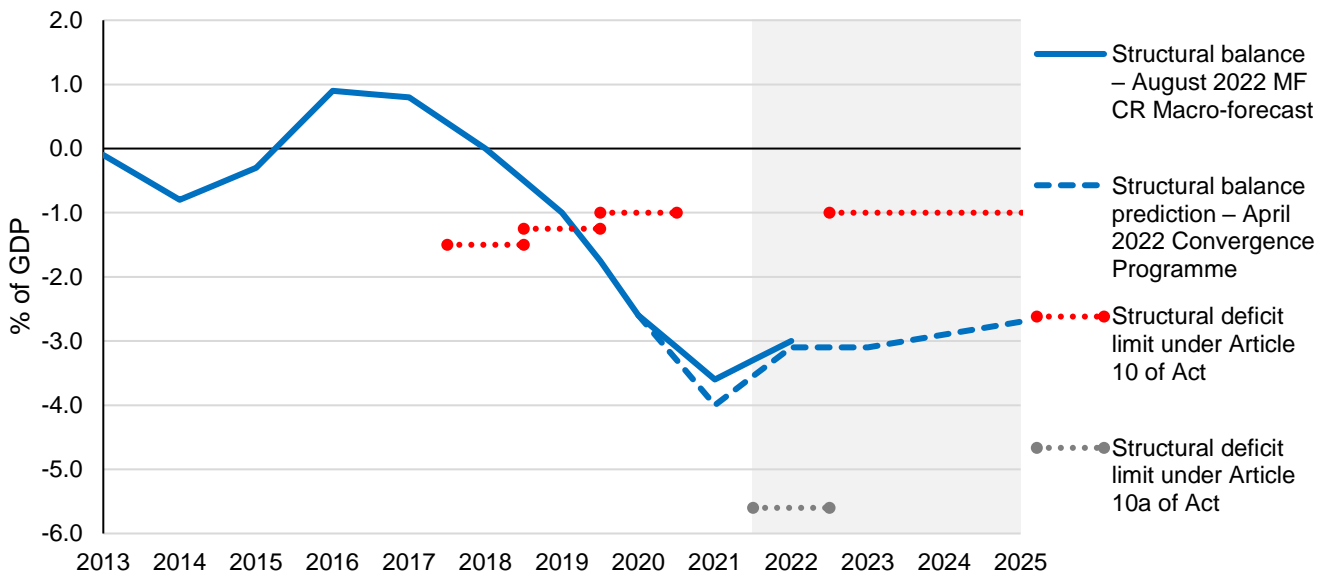
Source: MF CR (August 2022): Macroeconomic Forecast of the Czech Republic; MF CR (May 2022): Convergence Programme of the Czech Republic; CFC calculations.

The Czech Ministry of Finance[4] predicts real GDP growth of 2.2% in 2022, slowing to 1.1% the following year. In the next two years, the rate of growth is expected to increase again.

Government finances are expected to improve this year by comparison with 2021. The Ministry of Finance forecasted a deficit of 4.5% of GDP for this year in the Convergence Programme, whereas a figure of 3.8% of GDP is given in the August Macroeconomic Forecast.

The government deficit this year – and in the following years – will consist predominantly of the structural component. The structural deficit reached the aforementioned 4.0% of GDP in 2021. The Ministry of Finance expects a structural deficit of around 3% of GDP for 2022. The expected path of the structural deficit for 2023–2025 suggests only a gradual improvement (see Chart 2.1). This reflects

[1] MF CR (August 2022): Macroeconomic Forecast of the Czech Republic.
[2] MF CR (August 2022): Macroeconomic Forecast of the Czech Republic.
[3] Figures taken from the April notification of the government deficit and debt published by the Czech Statistical Office on 22 April 2022.
[4] MF CR (August 2022): Macroeconomic Forecast of the Czech Republic.

the fact that the measures adopted during the COVID-19 pandemic are of a more lasting nature than the pandemic itself, and many were not even directly related to it.[5] This substantial easing of fiscal policy was made possible by a double amendment of the Act, the problematic aspects of which are discussed in Box 2.1.

Box 2.1 Double amendment of the Act in 2020

The current unsatisfactory state of public finances in the Czech Republic is a consequence not only of external shocks (COVID-19, the war in Ukraine), but also of an inappropriate approach to the fiscal rules. As has been emphasised in several places, their successful functioning is conditional on legislative stability. Unfortunately, the Czech Republic has failed to maintain such stability – the Act No. 23/2017 Coll., on the Rules of Budgetary Responsibility, was amended twice in 2020.

The first amendment of the Act (implemented by the act No. 207/2020 Coll.) was passed in April 2020 along with an increase in the government deficit for 2020 to CZK 300 billion. This amendment was aimed at creating additional fiscal space for 2021 – the cap on the structural deficit (the basis for the expenditure fiscal rule, Section 10 of the Act) was raised from 1% to 4% of GDP. In subsequent years, public finances were to be consolidated at a rate of 0.5% of GDP per year by reducing the structural deficit. Under this first amendment, the economy was to return to a 1% structural deficit in 2027.

However, this legislation did not last very long. In autumn 2020 a section of the political representation came up with a proposal to amend personal income tax. This consisted in abandoning taxation of the super gross wage while keeping a 15% marginal tax rate. After debating this amendment, the Czech Parliament approved the change along with one other: an increase in the basic taxpayer discount in 2021 and 2022. The final public revenue shortfall was around CZK 100 billion in 2021 and CZK 120 billion a year later.

However, the approval of such a large public revenue cut (unless offset by expenditure-side savings) would have made it impossible to comply with the structural deficit cap for 2021 (4% of GDP, after the first amendment to the Act, as stated above), so an amendment to the Act on the Rules of Budgetary Responsibility was appended to this law. This amendment (in the form of the amendment to section 10a of the Act) set no structural deficit cap for 2021, and the estimated structural balance for 2021 improved by 0.5% of GDP was to be used to derive the expenditure frameworks for 2022.

As soon as the first version of the second amendment of the Act was tabled, the CFC drew attention not only to its macroeconomic and fiscal harmfulness, but also to deficiencies in its legislative implementation.[6] The CFC also emphasised that it was completely inappropriate for such a major change to be tabled as private member's motion to amend. Among other things, the motion had not passed through the government's Legislative Council. Unfortunately, despite these comments, the amendment was passed and entered into force.

The main current problem with the present legislation for deriving the government budget and government funds expenditure frameworks is the illogicality and inapplicability of the additionally inserted Section 10a, which, in the opinion of the Ministry of Finance, governs the method for deriving the expenditure frameworks for 2022 and subsequent years. The CFC disagrees, as the amendment only addresses the derivation of the frameworks for 2022 (Section 10a(2)).[7] For subsequent years, Section 10a contains no clear direction. This implies a return to the original structural balance of –1% of GDP given in Section 10(1) of the Act.

The aforementioned legal flaw (the absence of a specific method for deriving the frameworks for 2023 and subsequent years) was one of the reasons for the CFC adopting a negative opinion on the draft expenditure frameworks for 2023–2025 stipulated in the General Government Budget Strategy for 2023–2025.[8] In its opinion, the CFC also pointed out that according to the Act the Convergence Programme also forms part of this strategy and that the expenditure frameworks for the government budget and state funds budgets should therefore be consistent with the targets presented in the Convergence Programme submitted to the European Commission in spring 2022.

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[5] This phenomenon is also mentioned in the Supreme Audit Office's 2020 and 2021 Annual Reports and in its Opinion on the Draft State Closing Account of the Czech Republic for 2021.
[6] See https://unrr.cz/wp-content/uploads/2020/11/Statement-of-the-Czech-Fiscal-Council-super-gross-wage-taxation.pdf.
[7] "*In 2021, the Ministry shall use the 2021 balance, which it shall forecast in September 2021 at the latest, plus 0.5 of a percentage point, for the purposes of setting total general government expenditure for 2022. Section 9 shall not apply.*"
[8] See https://unrr.cz/wp-content/uploads/2022/04/Stanovisko-3_2022_ke-stanoveni-vydajovych-ramcu.pdf (available in Czech only).

General government debt reached 42.0% of GDP in 2021, up 4.4 pp on 2020 (see Chart 2.2). The dominant factor driving the growth in debt was the primary balance. According to the Convergence Programme (2022), the ratio is expected to rise gradually during 2022–2025 to 45.4% of GDP in 2025. Although the primary balance will be the main factor influencing the growth in the debt-to-GDP ratio, the effect of debt service will steadily increase. Interest costs stood at 0.7% of GDP in 2021 but will be at 1.2% of GDP at the end of the forecast period in 2025. Besides the substantial growth in debt recorded during the pandemic, this reflects rising interest rates. In 2021, the government financed its debt at an interest rate of no more than 1%. At the beginning of September, the price of a 10-year government bond is 4.7%. In early May 2022, Fitch Ratings affirmed its rating for the Czech Republic at AA- but downgraded the outlook from stable to negative because of the tense economic situation.[9] Moody's also took a similar step in August 2022 (maintaining the Aa3 rating, worsening the outlook from stable to negative).[10] This action may have a marked upward effect on the risk premium, potentially causing interest payments to increase further. In addition to factors that the Czech Republic has virtually no influence over itself, such as the course of the conflict between Russia and Ukraine, the number of refugees flowing into the Czech Republic, the high international prices of imported goods and services and, to a certain extent, the costs associated with the green transition (see Box 2.2), the debt trend will depend, among other things, on the evolution of public finances, the pace of fiscal consolidation and on monetary policy setting.

Chart 2.2 General government debt minus the state debt financing reserve
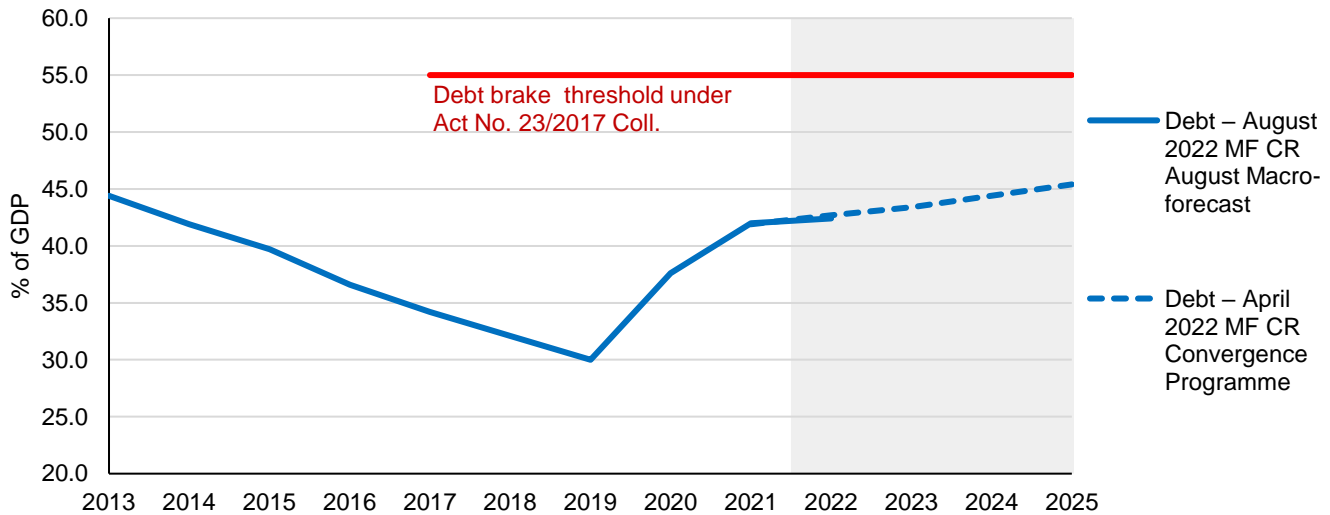
Source: MF CR (August 2022): Macroeconomic Forecast of the Czech Republic; MF CR (May 2022): Convergence Programme of the Czech Republic; CFC calculations.

From the public finance sustainability perspective, what matters is not only the debt level, but also the debt holding structure, i.e. the entities that buy and hold government debt securities (residents and non-residents). This aspect is important, because non-residents are more likely to sell Czech government bonds in the event of increased risk aversion on financial markets.

The domestic public debt holding structure saw further changes during 2021. Domestic owners held 61.6% of public debt at the end of 2019, whereas the figure had risen to 67.7% by the end of 2020 and 71.6% by the end of 2021.

From the public debt structure risk assessment perspective, a sell-off of domestic debt by foreign investors would probably trigger not only a movement of the exchange rate, but also increased volatility in market prices of Czech government bonds. This risk of spillover of external shocks to the domestic financial system decreased further during 2021 owing to a decline in the share of government debt securities held by non-residents. Despite this, the CNB regards 25.9% as the critical threshold for the proportion of public debt held by foreign entities, in line with international practice.[11] However, this threshold has long been exceeded. The share of debt held by non-residents stood at 28.4% at the end of 2021 (see Chart 2.3).

[9] See https://www.fitchratings.com/research/sovereigns/fitch-revises-czech-republic-outlook-to-negative-affirms-at-aa-06-05-2022.
[10] See https://www.moodys.com/research/Moodys-changes-Czech-Republics-outlook-to-negative-from-stable-affirms--PR_467883.
[11] CNB (2022): Spring 2020 Financial Stability Report.

Chart 2.3 Public debt held by residents and non-residents
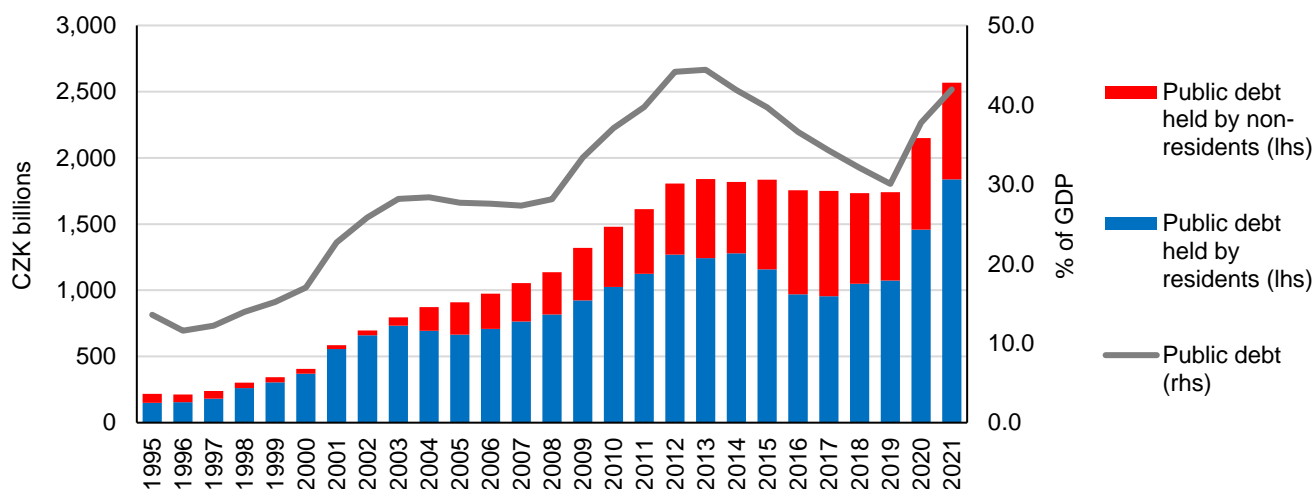
Source: CNB (2022), CZSO (2022); CFC calculations.

Financial institutions had a dominant share of the public debt holdings of domestic entities (residents) at the end of 2021 (see Chart 2.4). The Czech banking sector, which now holds more than CZK 1 trillion in debt, again recorded the biggest increase in public debt holdings (CZK 250 billion). Other Czech financial institutions (primarily insurance companies and pension funds) increased their Czech public debt holdings by CZK 109 billion. Government bonds thus probably represented a suitable alternative instrument for investing liquidity at a time of uncertainty.

At the end of 2021, domestic banks held 41.8% of public debt, up 3.6 pp on 2020 and 10.6 pp on 2019. The share of domestic government bonds in bank assets was more than 12.5% at the end of 2021. This figure is above average by international comparison.

Given the relatively high share of government bonds in banks' balance sheets, an escalation of sovereign risk would have significant impacts on the financial system.

The average time to maturity of government debt increased to 6.4 years at the end of 2021 (from 6.2 years at the end of 2020). A similar trend could be seen in OECD countries, where the average time to maturity stood at 7.4 years at the end of 2020 and recorded a year-on-year increase to 7.6 years.[12]

Given the planned deficits for the coming years and the high financing need, the structure of holdings of public debt can be expected to change not only in 2022, but also in subsequent years.

Chart 2.4 Public debt held by residents
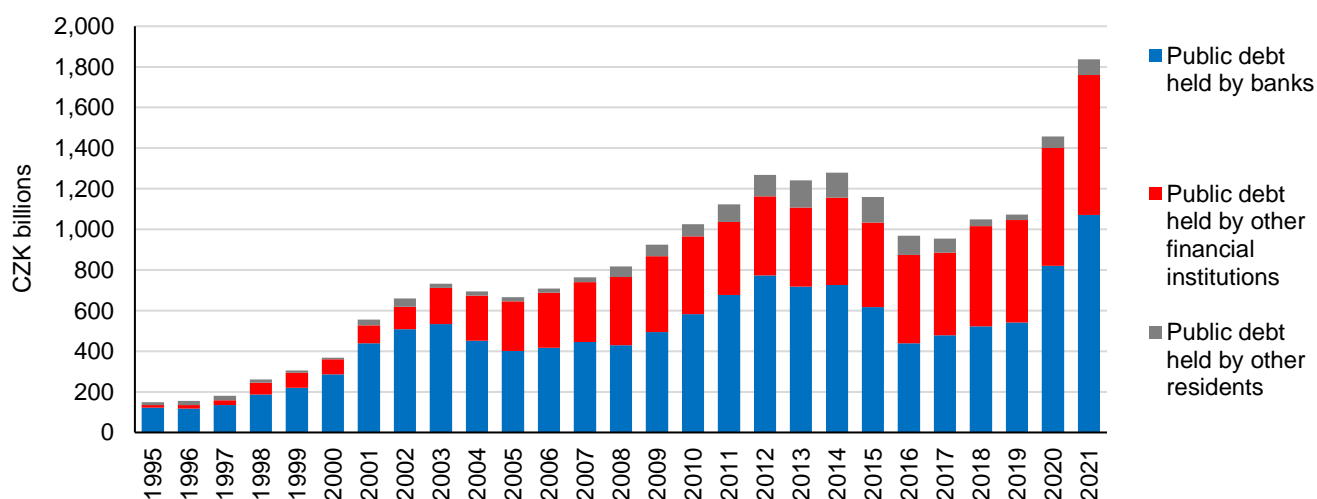
Source: CNB (2022); CFC calculations.

[12] OECD (2022): OECD Sovereign Borrowing Outlook 2022, OECD Publishing, Paris, https://doi.org/10.1787/b2d85ea7-en.

Box 2.2: Potential implications of EU climate policy for Czech public finances

In addition to the current problems and challenges associated with population ageing, Czech public finances will have to cope with climate change. The Czech Republic has so far been successful in meeting its international commitments in this area. Total greenhouse gas emissions in CO_2 equivalents fell by 38% between 1990 and 2019 (see Chart B2.2.1).[13] The biggest decreases were in the energy and agricultural sectors. Conversely, land use and forestry started contributing to growth in CO_2 emissions in 2018. Other areas, such as industry and waste, remained little changed in this respect.[14]

According to relevant studies, greenhouse gas emissions need to be reduced substantially to curb growth in the average temperature[15] on Earth.[16] The EU has responded to this by announcing a European Green Deal setting out the goals to reduce greenhouse gas emissions by 55% by 2030 and achieve zero net emissions by 2050. The Czech Republic is one of the largest greenhouse gas emitters per capita in the EU.[17] Energy and heat production accounts for around 35% of Czech greenhouse gas emissions, followed by industry with 28% and transport with 14%. A further 10% is produced by buildings, 7% by agriculture and 5% by the waste and other sectors.

Chart B2.2.1 Structure of greenhouse gas emissions by source – Czech Republic

Millions of tonnes (CO_2 equivalents)
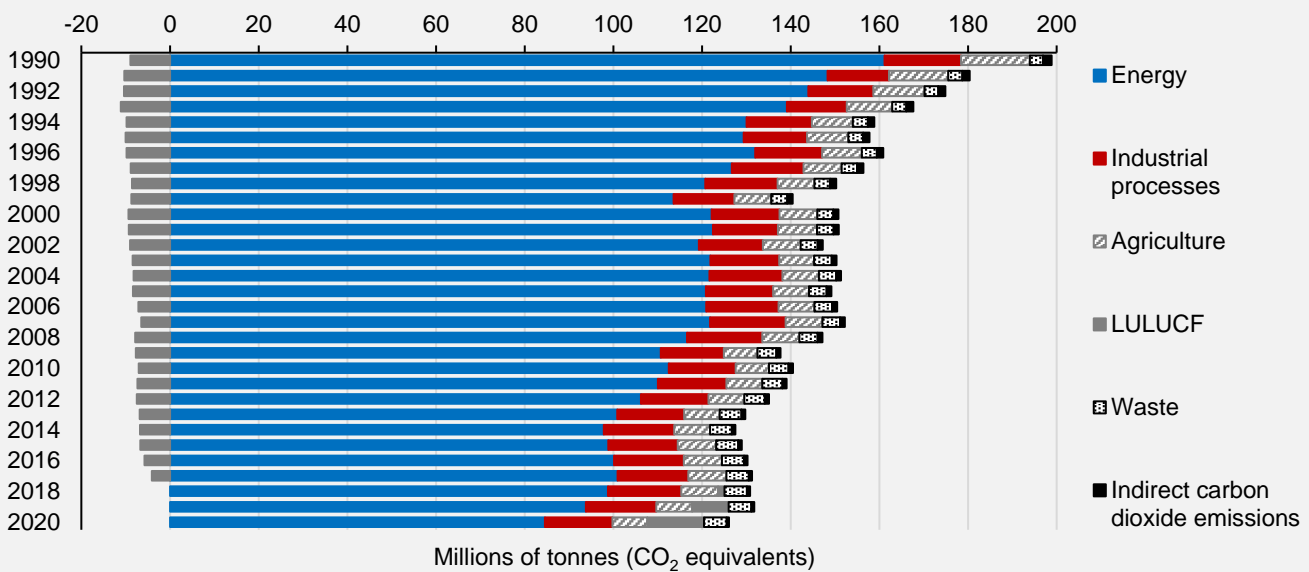
Source: Eurostat (2022); CFC calculations.
Note: LULUCF – land use, land-use change and forestry.

In its policy statement, the present government undertook to update the State Energy Policy by 2023 and adapt it to the EU's climate and energy objectives. It sees the future of Czech energy in a combination of nuclear energy and decentralised renewable sources, especially photovoltaics. Coal-fired power plants should be shut down on condition that sufficient back-up capacity is ensured. In this regard, natural gas seemed at the time to be of fundamental importance as a transition source.

A fundamental step towards achieving the target for 2030 is to reduce the country's reliance on coal. This should account for 75% of the reduction in emissions. However, the shutting down of coal-fired power plants will probably have to be delayed given the current geopolitical situation and developments on the natural gas market. A key condition for the form of the climate transition is the future form of the EU Emissions Trading System (EU ETS).

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[13] The commitment in the second period of the Kyoto Protocol, which ended in 2020, was 20%.
[14] The fall in emissions was due mainly to a decrease in the production of electricity and heat for production plants and services, households and other consumers. The decrease in combustion emissions in manufacturing companies in the early 1990s was a result of the decline and restructuring of some industries; at the end of the period, it was caused by savings and the introduction of new technologies. The reduction in emissions from services and households can be attributed to increasing energy efficiency, especially thermal insulation of buildings, and more economical energy management. On the contrary, the opposite trend – growth in emissions – is evident in transport.
[15] The temperature of the earth has risen by 1.1°C since the 1980s. Carbon neutrality needs to be achieved by 2050 to prevent a further increase of more than 1.5°C by 2100. For details, see Matthews, Caldeira (2008): Stabilizing climate requires near-zero emissions, *Geophysical Research Letters*, vol. 35(4).
[16] Structure of greenhouse gases in the Czech Republic in 2019: carbon dioxide (CO_2) 82%, methane (CH_4) 10%, nitrous oxide (N_2O) 5% and fluorocarbons 3% (CHMI).
[17] In 2017, only Luxembourg, Estonia and Ireland recorded higher greenhouse gas emissions per capita in the EU.

It covered around 61.5% of CO_2 production in the Czech Republic in 2019.[18] According to its policy statement, the government will promote the development of nuclear energy. The Czech Republic will use this to fulfil its climate commitments and ensure long-term compensation for emission sources. Expanding and supporting electricity generation from renewables should also be a significant element of the climate transition. Industry,[19] transport and buildings should contribute around 25% of the emissions reduction. Businesses will need to make major changes. These will give rise to additional costs and affect the tax revenue structure, especially in the initial period. How the bark beetle outbreak is managed will also have a significant effect.[20]

Achieving zero net greenhouse gas emissions will be an even bigger challenge. This cannot be done without making changes to land use and forestry. Part of the reduction in emissions will also have to be achieved using carbon capture and storage, technologies whose development and use are in their infancy. The additional investments for the period after 2030 are estimated at around CZK 4 trillion.[21]

In terms of the tax mix, the Czech Republic has one of the lowest[22] environmental tax revenue-to-GDP ratios in the EU (1.9% in 2020, as against 2.2% in the EU 27). Moreover, this ratio fell by 0.4 pp between 2010 and 2020. The Czech Republic is also below the EU average in terms of the share in total tax revenue (5.3%; 21st place; 5.6% in the EU 27). Pollution and resource taxes and transport taxes are substantially lower. In this area, there is therefore probably still some potential to raise additional funds to support the climate transition. Going forward, revenue from environmental taxes and emission allowances should be targeted primarily at achieving the objectives of reducing greenhouse gas emissions and increasing the country's energy independence.

The complex current geopolitical situation, which is affecting energy prices, has not led so far to any review of the efforts to expand the use of alternative energy sources (primarily solar and wind), increase the energy efficiency of buildings and industrial processes, electrify transport and economise on home and water heating.

Shifting away from coal as soon as possible seemed at the time to be cost-optimal, as it would generate savings on emission allowances, prices of which have been rising sharply in recent years. The EU is additionally discussing extending the EU ETS to transport and housing. Under certain assumptions, a rapid transition to a zero-emissions economy could spur economic growth and employment, especially in construction, manufacturing and services. On the other hand, prices of gas and oil have become a key parameter in this regard. Moreover, the process of phasing out coal mining and combustion will not have equal impacts on all regions. Greater support for coal-mining regions will need to be considered (see the just transition principles). Given the cost of the entire climate transition process, it is vital to make effective use of moneys earmarked for decarbonisation, such as the Modernisation Fund,[23] the Just Transition Fund[24] and the Recovery and Resilience Facility.[25]

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[18] Under the scheme, the total amount of emissions is capped in the ETS system and companies are allocated or sold emission permits, which are freely tradable and incentivise firms to reduce their emissions. The ETS does not currently apply to transport, buildings and agriculture.
[19] A large proportion of the greenhouse gases in industry are formed in the production of cement, lime, glass, metals and chemicals.
[20] CO_2 absorption predominated in forestry until 2017, but emissions have prevailed since 2018. This is due to the bark beetle outbreak, which requires trees that would otherwise capture CO_2 to be felled.
[21] For details, see, for example, McKinsey & Company (2020): Pathways to decarbonize the Czech Republic – Carbon-neutral Czech Republic 2050.
[22] In 2020, it had the 22nd lowest ratio relative to the size of the economy among the EU Member States.
[23] Over the next ten years, green projects in the Czech Republic are to be supported by investments totalling at least CZK 150 billion, representing 15.6% of the total resources of the Modernisation Fund. These investments are intended to reduce the country's reliance on coal combustion and accelerate the transition to clean energy sources. The Modernisation Fund was created by the European Commission by means of Directive 2003/87/EC for the period 2021–2030. It supports investments in developing low-carbon technologies, modernising energy systems and improving energy efficiency. It is funded mainly through the monetisation of 2% of the total quantity of emission allowances (EU ETS) over the period from 2021 to 2030. Revenues from allowances pursuant to Article 10c(4) of Directive 2003/87/EC (derogation allowances) and 50% of revenues from allowances pursuant to Article 10(2)(b) of Directive 2003/87/EC (solidarity allowances) are also used via the Modernisation Fund. The State Environmental Fund of the Czech Republic is stipulated as the recipient of resources from the Modernisation Fund under the Emission Allowance Trading Act. It acts as intermediary of this financial mechanism. The Modernisation Fund has nine core programmes. The specific forms and conditions of the support provided under these programmes will gradually be defined.
[24] The Just Transition Fund is one of the EU's key tools to support regions in the transition towards climate neutrality by 2050. In December 2019, the European Commission adopted a communication on the European Green Deal, which sets out a roadmap for a new growth policy for the EU. As part of the European Green Deal and with the aim of achieving the objective of EU climate neutrality in an effective and fair manner, the European Commission proposed the creation of a Just Transition Mechanism, which includes a Just Transition Fund. The Mechanism should focus on the regions and sectors that are most affected by the transition due to their dependence on fossil fuels and on greenhouse-gas-intensive industrial processes. The allocation criteria are based on industrial emissions in regions with high carbon intensities, employment in industry and mining, and the level of economic development. Member States that have not yet committed to implementing the objective of achieving climate neutrality by 2050 will be awarded 50% of their planned allocation. The level of EU co-financing of projects is set according to the category of region in which these projects are located. For less developed regions, it is set at maximum 85%, for transition regions 70% and for more developed regions 50%. The Just Transition Fund has an overall budget of EUR 17.5 billion for 2021–2027.
[25] The Czech National Recovery Plan contains reforms and investments contributing to the climate transition mainly in components 2.1–2.7. It envisages 41% of expenditure (around CZK 71 billion) going into this area.

3 Long-term macroeconomic projection

The long-term projection of the revenue, expenditure and balance of the general government sector over a 50-year timescale is based on projections for the relevant main macroeconomic variables. The most important of these are GDP growth, employment, labour productivity and the volume of wages. These in turn determine the distribution of gross value added between labour and capital.[26] We relate our fiscal projection systematically to GDP and other real variables. Unlike in the medium-term outlook, in the long-term projection we abstract from the business cycle. The estimated evolution of the economy is therefore a simulation of the paths of potential GDP and other corresponding macroeconomic variables.

The direct and indirect impacts of the COVID-19 pandemic and the anti-contagion measures were felt in full in the economy in 2020 and 2021. Scarcely had the impact of the pandemic started to fade when Russia invaded Ukraine. The related economic sanctions led to growth in energy prices and generated a negative supply shock. The latter was so large that it affected not only the cyclical position of the economy, but also the estimates of present and past potential output. We incorporated the drop in potential output into our projections. Nonetheless, the uncertainty surrounding the starting point of our projections remains fairly high, as the estimate of potential output may be retrospectively revised in the future.

3.1 Real convergence

As in previous years, our long-term macroeconomic projection this year is based on neoclassical growth theory. As regards the volume of inputs (such as capital, labour and technology), we assume that the Czech economy is and will remain a converging economy. We still consider the economy of Austria to represent the steady state of the Czech economy (i.e. some sort of convergence target). The Czech Republic and Austria are standard mixed EU Member State economies of similar size and structure.

We model the convergence process as convergence of GDP per worker, i.e. convergence of whole-

economy labour productivity. We assume that the difference between labour productivity in the Czech Republic and Austria will shrink by a constant percentage each year. The gap between the Austrian and Czech GDP per worker levels, which was estimated at 25.4% of the Austrian level in purchasing power parity in 2021[27] will thus narrow by roughly 2.3% a year on average. This matches the speed of convergence over the last 20 years and is in line with the usual empirical convergence results (see Chart 3.1.1).[28]

Chart 3.1.1 Convergence of output per worker to the Austrian level
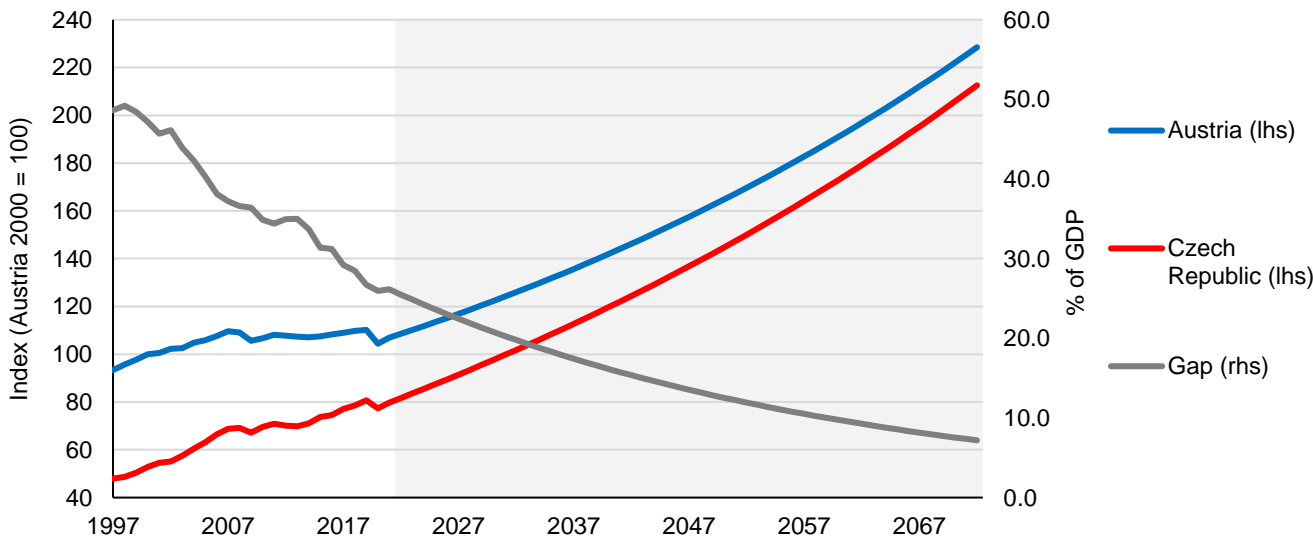
Source: OECD (2022); CFC calculations.

[26] A more detailed explanation of the procedure and parameters used for the long-term macroeconomic projection is given in OCFC (2019): Dlouhodobá makroekonomická projekce ČR. [Long-term Macroeconomic Projection of the Czech Republic, available in Czech only].
[27] According to OECD statistics (2022).
[28] For details, again see OCFC (2019): Dlouhodobá makroekonomická projekce ČR.

In addition to the convergence component of labour productivity growth, we assume continuing autonomous growth of technology at a pace of 1.5% a year (the rate of growth of aggregate factor productivity). This is equal to the long-run average for developed countries if we eliminate the effect of the financial crisis in 2008 and 2009. This technology growth rate is equal for the growth of the Austrian and Czech economies and must be added to the convergence component of growth when estimating the long-run rate of growth of the Czech economy.

In our simulation, the rate of growth of GDP per worker thus falls from 2.3% in 2022 to 1.7% at the end of the projection as a result of the convergence component of growth gradually being exhausted. With the given parameter settings, this implies that whole-economy labour productivity could be at 93% of the future Austrian level in 2072. We then use the convergence of labour productivity and the projected evolution of the number of workers, which depends primarily on demographic change, to generate the overall GDP projection.

3.2 Demographic projection

The demographic projection is a key public finance sustainability parameter. It strongly affects both the expenditure side (such as pensions, health care, education and social benefits) and the revenue side of public budgets. The demographic projection is also one of the main inputs to the macroeconomic projection and the intergenerational accounts. It is used as the basis for simulating the number of workers, which

is affected by both the projected population count and the age structure of the population. The long-term demographic projection is based on the demographic projection published by the Czech Statistical Office (CZSO) in November 2018, which is drawn up in four variants: medium, high, low and no-migration medium (i.e. with zero net migration for each year of the projection).[29]

Table 3.2.1 Materialisation of the CZSO's demographic projection in 2018–2021 (‰)

	2018 and 2019 (average)			2020 and 2021 (average)		
	projection	reality	difference	projection	reality	difference
Net migration	3.011	3.892	0.881	2.439	3.638	1.199
Natural growth	0.020	0.046	0.027	-0.205	-2.230	-2.025
gross mortality rate	*10.496*	*10.579*	*0.083*	*10.514*	*12.702*	*2.188*
gross birth rate	*10.515*	*10.625*	*0.110*	*10.309*	*10.473*	*0.163*
GROSS OVERALL GROWTH RATE	3.031	3.939	0.908	2.234	1.408	-0.826

Source: CZSO (2022); CFC calculations.

We opted for the medium, i.e. most likely, variant of the demographic projection as the baseline scenario for our projections. Like last year, we updated the CZSO's official demographic projection this year by incorporating new data as follows.[30] First, we replaced the age structure of the population for 2019–2022 with the observed figures.[31] Then, for the assumed age-specific birth, mortality and migration rates for 2021–2100, which we took from the 2018 CZSO projection, we generated a new assumed population trend and age structure for each variant of the demographic projection.[32]

The CZSO's demographic projection is based on the situation in the Czech Republic at the start of 2018. During 2018–2021, however, the actual trend

differed from this projection, a fact we examine in more detail in Box 3.1 and Table 3.2.1. In short, population growth was slowed primarily by a higher-than-projected mortality rate. The latter was slightly higher in 2018 and 2019 and then rose significantly in 2020 and 2021 as a result of the COVID-19 pandemic. In those years, the gross mortality rate was the highest in the history of the Czech Republic; the last time such high mortality rates were seen in the Czech lands was 30 years ago. As regards the structure of the population, the higher-than-projected mortality rates were mainly in older age groups. A total of 269,180 people died during 2020 and 2021, almost 44 thousand more than the CZSO's 2018 demographic projection had predicted. A higher-than-projected number of new-borns and especially

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[29] CZSO (2018): Projekce obyvatelstva České republiky 2018–2100 [Population Projection of the Czech Republic 2018–2100, available in Czech only].

[30] For details, see the OCFC Information Study Hlaváček, Junicke (2021): Alternativní demografické projekce [Alternative Demographic Projections, available in Czech only].

[31] Data as of 1 January of the given year.

[32] We therefore assume that the current rise in the mortality rate associated with the COVID-19 pandemic will be only temporary and that the mortality rate will return to the downward trend assumed in the CZSO's demographic projection.

positive net migration, which together outweighed the effect of the higher mortality rate in 2018 and 2019, had an upward effect on the population. Net migration was 24.9 thousand higher in total for 2020–2021 than assumed in the original demographic projection, while total births were 6 thousand higher. The substantially higher mortality rate in 2020 and 2021 nonetheless meant that growth in the total population slowed appreciably relative to that predicted in the CZSO projection. Besides the "usual" movements, the population was affected in 2021 by the statistical effect of demographic data revisions linked with the 2021 Census. This methodological change reduced the population count by almost 207 thousand (see Box 3.1 for details).

Using the demographic projection, we estimated the growth in the number of workers as the number of people aged 21+ minus the projected number of old-age pensioners and level 3 disability pensioners. We estimate the numbers of beneficiaries of such pensions primarily according to the statutory retirement age.[33] In the projection of the number of workers, we assume a constant rate of economic activity for each age category and a constant natural rate of unemployment. By combining the rate of growth/decline in the labour force with the projection of GDP per worker, we obtain the growth path for total GDP, from which we derive the rate of growth of GDP per capita (see Table 3.3.1).

Box 3.1 Changes in the demographic projection

In this box, we present the two most important changes in the demographic projection which affected the overall population count.

The first is the 2021 Census, where a methodological change reduced the total population count by 206,941 from 10,701,777 at the end of 2020 to 10,494,836 at the start of 2021 (see the solid grey and red lines in Chart B3.1.1). This population decrease is larger than those in previous censuses (34.5 thousand in the 2001 Census and 46 thousand in the 2011 Census). The largest decrease – 160,758 – was in the population of working age (21–64 years). The numbers of persons aged over 64 and under 21 fell by 6,488 and 39,695 respectively. As a result, the dependency ratio decreased as well – from 2.95 in 2020 to 2.82.

Chart B3.1.1 Impact of the 2021 Census on the population count in 2000–2072
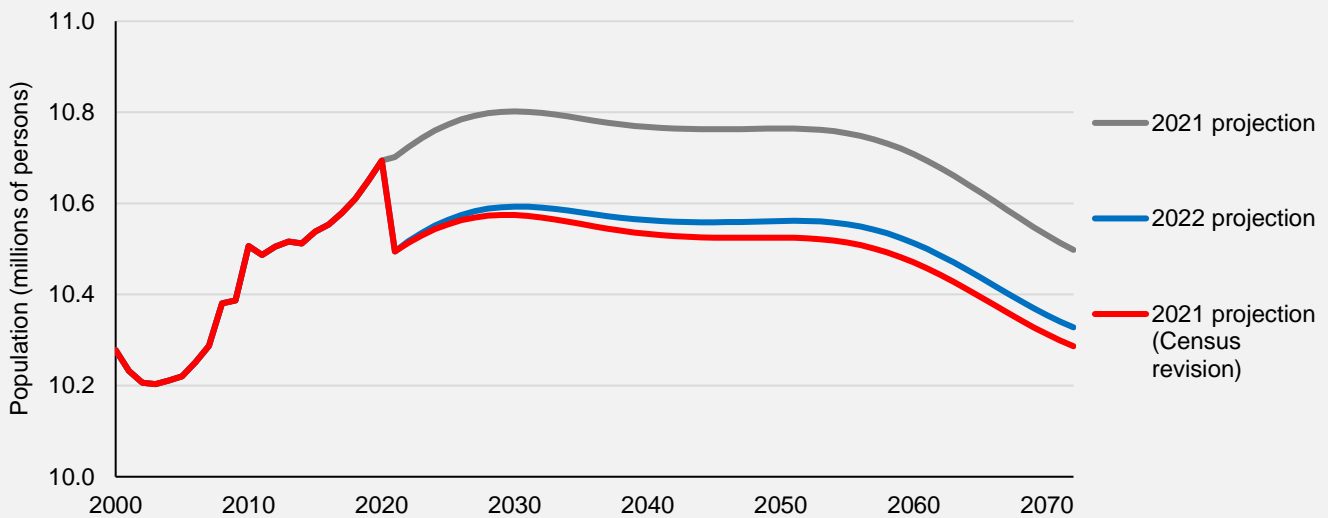
Source: CZSO (2018): Population Projection of the Czech Republic 2018–2100, CZSO (2022); CFC calculations.

The second change is the long-running COVID-19 pandemic. Its most frequently mentioned impact is undoubtedly an increase in deaths due directly or indirectly to the disease. The COVID-19 pandemic caused the total number of deaths to rise above its long-term average primarily in the second half of 2020 and the first quarter of 2021. The total number of deaths was almost 17 thousand higher in 2020 and nearly 27 thousand higher in 2021 than in the CZSO's 2018 demographic projection. The actual number of deaths in those two years was 43,862 higher than projected.

Chart B3.1.2 shows how the developments over the last four years have affected the long-term demographic projection. The original and revised demographic projections both assume that the population of the Czech Republic will peak around 2030. However, while the original medium CZSO variant projects a peak of 10.784 million,

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[33] The methodology and projection for the number of pension beneficiaries is described in more detail in section 4.1.

the increased mortality during the COVID-19 pandemic combined with the effect of the 2021 Census has reduced the projected peak by 212.5 thousand.

Chart B3.1.2 Impact of the COVID-19 pandemic on the population count in 2000–2072

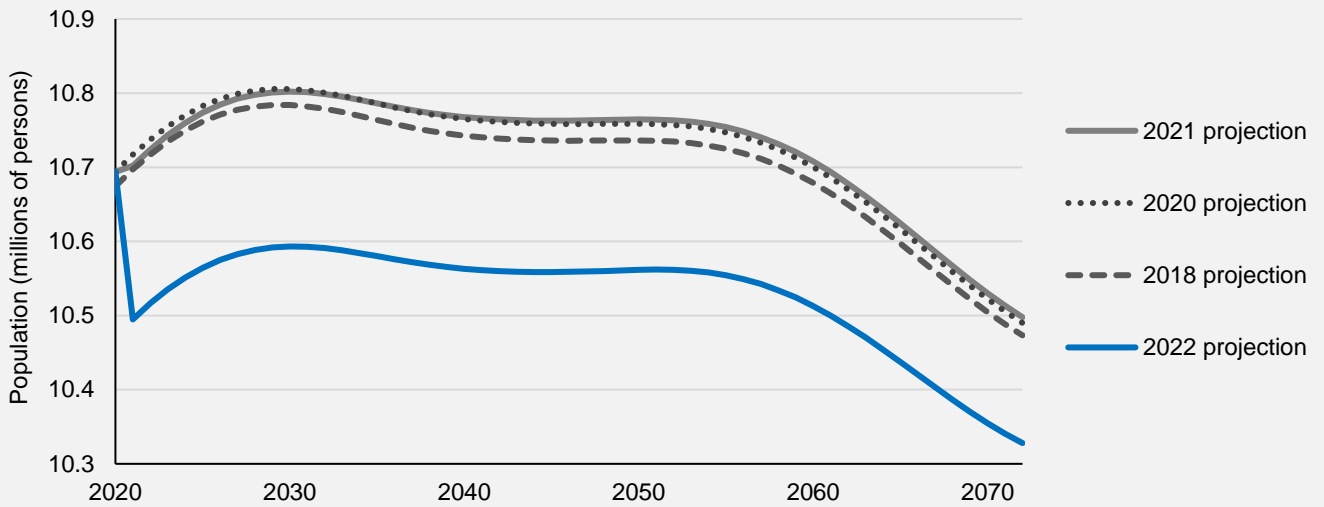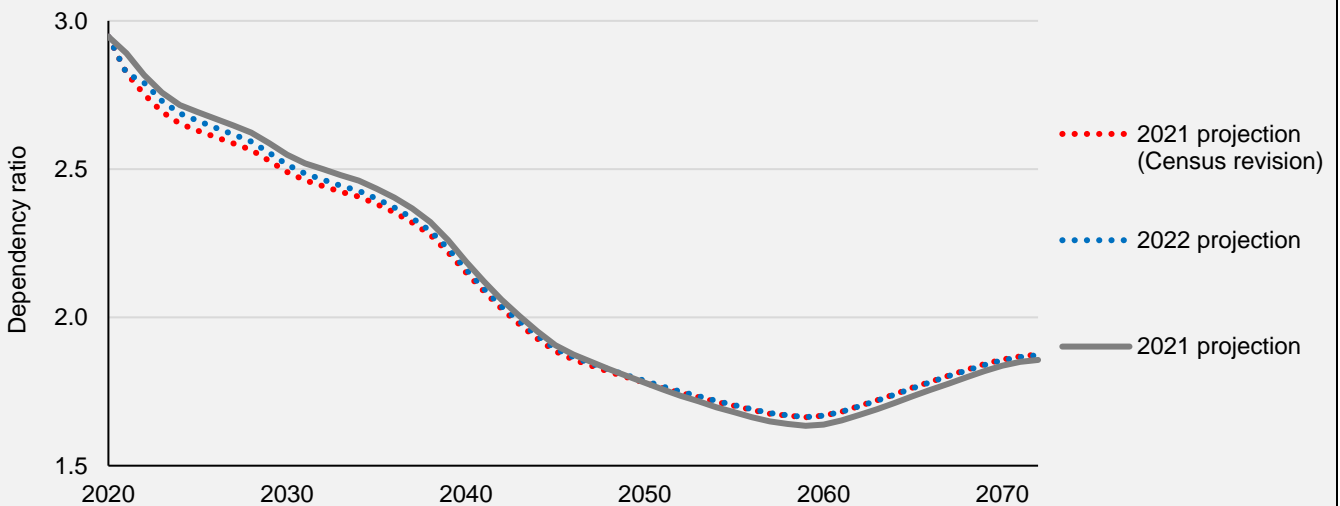Source: CZSO (2018): Population Projection of the Czech Republic 2018–2100, CZSO (2022); CFC calculations.

If we incorporate the changes seen in recent years into the original CZSO projection, we can illustrate the impact on the demographic structure in the long run using the ratio of persons aged 21–64 per person aged 65+. As Chart B3.1.3 shows, the Census revision leads initially to a deterioration in this indicator until roughly 2050 (a smaller number of working-age persons). Around 2060, the dependency ratio is then rather more favourable than in last year's scenario (according to 2022 projection, the minimum is 1.66, while according to 2021 projection, it reaches the minimum of 1.63). The developments in 2021 alone changed this ratio only slightly in favour of pension system sustainability, as a result of the population getting younger. From the long-term perspective, however, there is still a strong population ageing trend undermining the sustainability of the pension system.

Chart B3.1.3 Impact of demographic change on the dependency ratio in 2000–2072

Source: CZSO (2018): Population Projection of the Czech Republic 2018–2100, CZSO (2022); CFC calculations.

The third, and for now final, significant change in the demographics of the Czech Republic is the impact of the migration wave caused by Russia's invasion of Ukraine, which began in February 2022. However, given the shortage of official data, we do not incorporate this effect into our baseline scenario described in this box. We will examine it in more detail in one of the alternative scenarios discussed in section 6.3.

3.3 Real wages and the primary income distribution

Wage growth plays a major role in the projections for the pension system, education and health care and other areas. In our projection, we derive the evolution of real wages from the long-run growth projection for GDP per worker (or labour productivity; see section 3.1). We nonetheless complement this convergence effect of real wage growth with the effect of growth in the ratio of compensation of workers to gross value added (GVA),[34] as this ratio was and to a large extent still is low in the Czech economy compared with other countries, even though it has been increasing steadily over the years.

We still assume continued convergence of the ratio of compensation of workers to GVA at the same rate as in the case of GDP per worker. This means that the gap between the ratio of compensation of workers to GVA in the selected developed countries and the same ratio in the Czech Republic narrows by 2.3% a year in our projection.[35]

The increasing ratio of compensation of workers (and hence also employees) to GVA in our projection means that real wages are growing faster than labour productivity. The volume of wages and salaries is likewise growing faster than GDP in the long term, at the expense of the gross operating surplus of firms. The change in the distribution of GVA is meanwhile important for, among other things, the level and structure of future general government tax and insurance premium revenues. Real wage growth is also affected by the assumption made about the initial ratio of compensation of workers to GVA. If this ratio were higher, the ensuing wage growth would be slower. This ratio rose by 1.3 pp in 2020, partly due to the cyclical downturn of the economy, with corporate earnings falling faster than wages. This increase reversed partially in 2021, when the ratio fell by 0.3 pp. In our projection, we thus adjust the initial growth in the ratio of compensation of workers to GVA to one half of the actual growth. Overall, then, we assume that real wages will grow by 2.1% year on average (see Table 3.3.1). This is about 0.2 pp higher than per worker GDP growth.

The projection also includes an assumption about the rate of inflation. We assume that the rate of consumer price inflation is equal to the rate of growth of the GDP deflator, namely 2% a year. This inflation rate is in line with the CNB's current inflation target. Although this inflation target was significantly exceeded in 2021 and so far in 2022, we assume that the situation will normalise in the years ahead.

Table 3.3.1 Average annual growth rates based on the long-term projection (%)

	2022–2032	2033–2042	2043–2052	2053–2062	2063–2072	Entire period
GDP per capita	2.3	1.6	1.3	1.7	2.1	1.8
GDP per worker	2.2	2.0	1.9	1.8	1.7	1.9
GDP total	2.4	1.5	1.3	1.6	1.9	1.7
Average real wage	2.5	2.2	2.0	1.9	1.8	2.1

Source: CZSO (2022), OECD (2022); CFC calculations.

[34] For better international comparability, we work with the ratio of compensation of workers, which we define analogously to compensation of employees except that we include an estimate of compensation of entrepreneurs (the self-employed). The figure we use per self-employed person is equal to the average per employee.
[35] The selected developed countries are Austria, Germany, Sweden, Denmark, Belgium, the Netherlands and Finland. For details, see OCFC (2019): Dlouhodobá makroekonomická projekce ČR [Long-term Macroeconomic Projection of the Czech Republic, available in Czech only].

4 Revenue and expenditure in the long-term projection

The macroeconomic and demographic projections contained in the previous section form the basis for the projection of general government expenditure and revenue. We should add, though, that all the projections presented below are based on the assumption that current revenue and expenditure policies remain the same. They are therefore not forecasts of what we would consider to be the most likely future outcomes. The results should thus be interpreted accordingly: they are all conditional on the existing policy stance and are designed to answer the question of what would happen if the current revenue and expenditure policies were left unchanged.

Some expenditures are directly affected by demographic change. Others are influenced primarily by convergence effects, i.e. effects caused by the Czech economy expanding and converging in the long run towards the level of advanced countries. In reality, the demographic and convergence effects will be more or less intertwined, but demographic effects will prevail in the pension system, health care, social benefits and long-term care. Convergence effects will have more weight in the case of expenditure on public investment and public employees' pay and in the case of revenue from certain taxes and social security contributions. We will start by looking at the areas affected by demographic change.

4.1 Pension system

The pension system consists of old-age pensions, disability pensions and survivors' (widows', widowers' and orphans') pensions. The system is managed and administered by the Czech Social Security Administration (CSSA), with the exception of the armed forces, for which the system is managed by the relevant ministries (the Ministry of the Interior, the Ministry of Defence and the Ministry of Justice). However, the terms for members of the armed forces are the

same as those for the insured falling under the CSSA, so in the projection we treat the entire pension system as a single entity. We initially focus on the expenditure side of the system, modelling first the number of recipients of each type of pension and then the levels of those pensions. The revenue side of the system is modelled directly on the basis of our macroeconomic projection, as pension insurance contributions are de facto taxation of labour income.

4.1.1 Old-age pensions

Old-age pensions are quantitatively the most important component of the pension system. They are currently drawn by approximately 2.4 million people. The number of old-age pensioners fell by 50.4 thousand (around 2.1%) between the end of 2019 and the end of the first quarter of 2022, due partly to increased mortality among older people caused by the COVID-19 pandemic and partly to a continued rise in the statutory retirement age (of two months for men and six months for women on average in 2021).

The number of old-age pensioners will continue to be affected predominantly by demographic change and changes to the statutory retirement age.

The retirement age is rising at different rates for men and women in accordance with an addendum to Act No. 155/1995 Coll., on Pension Insurance. In 2030, the retirement age should be 65 years for both men and women. This statutory age then also enters the baseline scenario of our projection.[36]

In estimating pension system expenditure, we start by estimating the future number of old-age pension

beneficiaries. We base this estimate on the demographic projection and the statutory retirement age, but we also take account of the option of retiring early and, conversely, the option of working beyond retirement age and thus supplementing one's old-age pension.

For these reasons, we use the "rates of retirement" (i.e. the proportions of pensioners in each age cohort) to project the number of old-age pensioners. In projecting them, we also take into account the fact that the number of old-age pension beneficiaries interacts with disability pensions, and the payment of these two types of pensions is mutually exclusive. For these reasons, we work with rates of retirement that relate not to the entire population of a given age, but only to the section of the population that is not drawing a disability pension (see section 4.1.2 for the projection of the number of disability pensioners).

In constructing the rates of retirement, we also consider the raising of the statutory retirement age, which is the main determinant of senior citizens'

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[36] In one of the alternative scenarios in section 6, we also consider the linking of the retirement age to life expectancy as per Section 4a of the Act on Organisation and Implementation of Social Security (No. 582/1991 Coll., as amended). According to this Act, the statutory retirement age should be changed every time a new CZSO demographic projection is published so that, on average, each individual spends a quarter of their life retired. According to the latest CZSO calculations from 2019, the retirement age for persons born in 1969 or later should be raised above the current limit of 65 years. However, the Czech government decided not to increase the retirement age above this level in 2019. According to this provision, the retirement age could thus be changed again in 2024.

decisions on the timing of their old-age retirement in the Czech Republic. We construct the rates of retirement on the basis of time to the statutory retirement age. The rates of retirement thus tell us what per cent of people are old-age pension beneficiaries out of the total number of people who are, say, two years short of the statutory retirement age and are not disability pension beneficiaries.

We derived the rates of retirement used in the projection of the number of old-age pensioners separately for men and women as the average of the empirical retirement rates recorded in 2013–2019.[37]
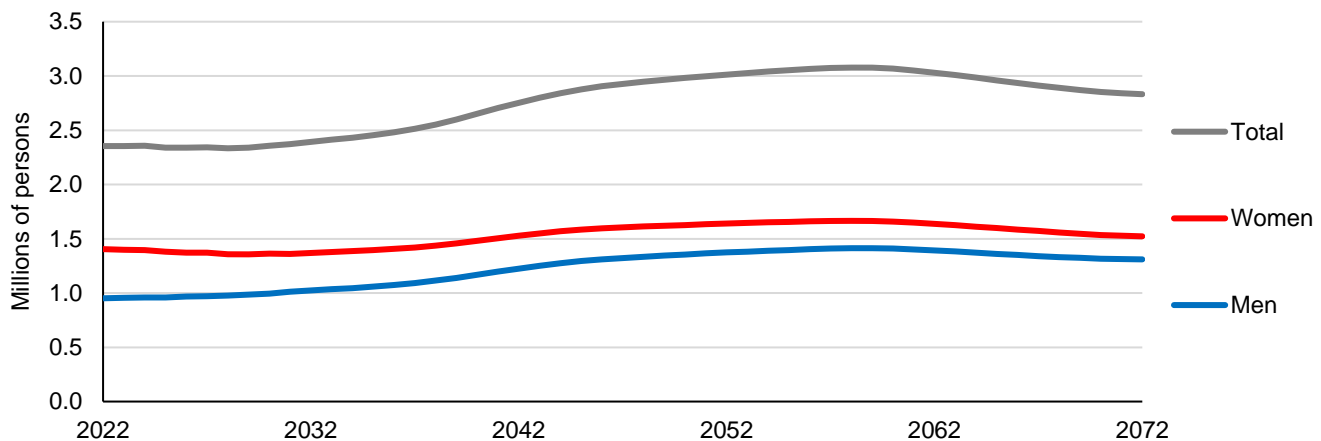
In the projection of the number of old-age pension beneficiaries, we start by deducting the estimated number of disability pension recipients of a given age (see section 4.1.2) from the size of the individual age cohorts according to the demographic projection. We then multiply this adjusted number of persons by the relevant rate of retirement and obtain the projected number of old-age pensioners.

In the baseline scenario of the projection, the number of old-age pensioners initially falls slightly due to a continued rise in the statutory retirement age

(a total drop of 0.9% by 2028; the number of female old-age pensioners will fall in particular; see Chart 4.1.1). After the raising of the retirement age is ended in 2030, and as the baby-boomers born in the 1970s start to retire, the number of old-age pensioners will grow steadily. It will peak around 2058 at about 3.1 million, i.e. roughly 30% higher than today. The projected number of old-age pensioners reflects, among other things, the changes in the demographic projection discussed above, most notably the decrease in the population count connected with the 2021 Census (see Box 3.1). The pensioner count thus peaks around 100 thousand lower compared with the estimate in the previous Report (2021).

Besides the change in the number of pensioners, there will be a change in gender structure, as the equalisation of the statutory retirement ages for men and women will lead to a rise in the proportion of men in the total number of old-age pensioners from the present level of 39.9% to 46.3% in 2072. After 2030, the persisting predominance of women among pensioners will thus be due solely to their higher life expectancy. The life expectancies of men and women meanwhile converge in the projection.

Chart 4.1.1 Projection of the number of old-age pensioners (medium variant of the demographic projection)

Source: CZSO (2022), CSSA (2022); CFC calculations.

In the projection of old-age pension expenditure, the average old-age pension was also estimated. It is affected both by the level and number of newly granted pensions and by the level of pensions already in existence and thus granted at various times in the past.

The level of newly granted pensions consists first of a basic flat-rate part, which we assume will stay at 10% of the average wage. The second component of the pension is an earnings-related part derived from the insured person's past earnings indexed to

past average wage growth and the number of years of premium payments, including non-work validated periods and other adjustments. The calculation also contains two "reduction thresholds", a redistributive element reducing the differences in newly assessed pensions. These reduction thresholds change every year on the basis of average wage growth.[38]

We simulate the level of newly granted pensions as a percentage of the average wage. As the starting point for our projection of the level of newly granted

[37] For women, we considered a single aggregated retirement rate only. The model scenario involved a woman with two children. For a more detailed description and discussion of rates of retirement and modifications thereof as a result of different rates of increase in the retirement age, see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only] and also Box 4.2 of our 2021 Report.
[38] For a more detailed description, see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].

pensions we used the latest known figures, according to which the level of new pensions was 47.4% of the average gross wage for men and 41.1% for women.[39] The lower newly assessed pensions of women are due both to their lower wages on average and to their lower statutory retirement age and thus shorter coverage period. Following the equalisation of the statutory retirement ages for men and women (i.e. after 2030), the coverage period for women will increase and the difference between the newly granted pensions of men and women will therefore drop. For men we assume a constant ratio of newly granted pensions to the average wage, while for women we gradually raise the ratio in our projection so that it reaches 44.0% of the average wage in 2030. This ratio corresponds to a coverage period, including non-work validated periods, of 41 years (i.e. around four years more than is the case for women today). However, the gap between the newly granted pensions of men and women will persist beyond 2030 due to their different wage levels.

As periods of university education will no longer be recognised as non-work validated periods after 2050 under the current legislation, we slightly reduce the ratio of newly granted pensions to the average wage between 2050 and 2055.

To calculate the overall average pension, we also need to model pensions granted in the past. Their level depends both on the indexation system and on changes to the level of pensions going beyond that system. In past years (2018–2021), pensions rose 2 pp faster than the statutory indexation rate each year. The replacement rate was significantly affected by inflation in 2022. In accordance with the law, there were two extraordinary pension increases in 2022 – in June and September – on top of the usual January indexation. They will increase pensions by 10.5% altogether (see Box 4.1). As real wages simultaneously decreased, and given that pensions are not reduced when real wages fall, the initial overall replacement rate will rise from 40.7% at the end of 2021 to 43.1% in 2022.

In our projection, we assume that the indexation system will be maintained in the future. In accordance with Section 67 of the Act on Pension Insurance, we thus assume that existing pensions will be indexed at half the rate of real wage growth plus the full rate of inflation. The rate of inflation considered is the growth of either the overall consumer price index or the index of the costs of living of households of pensioners, whichever is the higher.

In our projection, we assume 0.3 pp higher growth in the index of the costs of living of households of pensioners than the rate of inflation based on the consumer price index. The latter will rise in line with the CNB's 2% inflation target in the long run. This is mainly because of the higher share of services and food in the consumption basket of households of pensioners. In a converging economy, prices of services rise faster than prices of other goods in the long run (the Balassa-Samuelson effect).

Besides the level of newly granted pensions and indexation, the average old-age pension is affected by the ratio of the number of newly granted pensions to the total pensioner count. Newly granted pensions tend to be higher than older pensions, as the indexation of the latter lags behind wage growth. On the other hand, a proportion of old-age pensions will cease to be paid due to the death of their beneficiaries. These terminated pensions, conversely, are lower than the average pension. The change in the average pension thus reflects the change in existing pensions, the number and level of newly granted pensions and, finally, the number and level of terminated pensions. The average old-age pension will also be affected by other changes to the pension system, such as the introduction of a "child-rearing bonus" (an increase in the old-age pension of CZK 500 a month per child raised as of 1 January 2023) and pension increases at 85 and 100 years of age (Section 67a(1) of Act No. 155/1995 Coll., on Pension Insurance). In this year's Report, we have refined the replacement rate calculation and now take into account the age structure of the old-age pensions of men and women. See Box 4.1 for more details.

Integrating all these assumptions into our demographic projection implies an average pension of between 42.0% and 43.5% of the average wage (see Chart 4.1.2). The replacement rate will initially rise in 2023 owing to the introduction of the child-rearing bonus and then fall over the next ten years due to its high initial level and the old-age pension indexation method. The growth in the replacement rate in the 2030s and 2040s is caused by a high number of newly granted pensions.

From the number of pensioners and the ratio of pensions to the average wage we can derive the path of old-age pension expenditure as a percentage of GDP. It peaks at 11.5% of GDP around 2059 (see Chart 4.1.3). The rise in expenditure compared with the present is driven primarily by growth in the number of pensioners and also by an increased initial old-age pension level.

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[39] MoLSA (2021): Statistická ročenka z oblasti práce a sociálních věcí 2020 [Statistical Yearbook in the Area of Labour and Social Affairs 2020, available in Czech only]. We use the average ratio of new pensions to the average monthly wage for the last two years.

Chart 4.1.2 Ratio of average old-age pension to average wage (%)

Ratio of old-age pension to average wage
Ratio of old-age pension to average wage (old methodology)
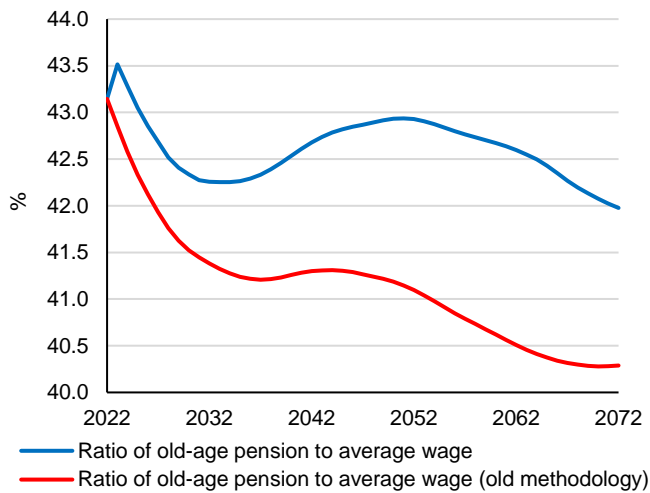
Source: CZSO (2022), CSSA (2022); CFC calculations.

Chart 4.1.3 Ratio of old-age pension expenditure to GDP (%)
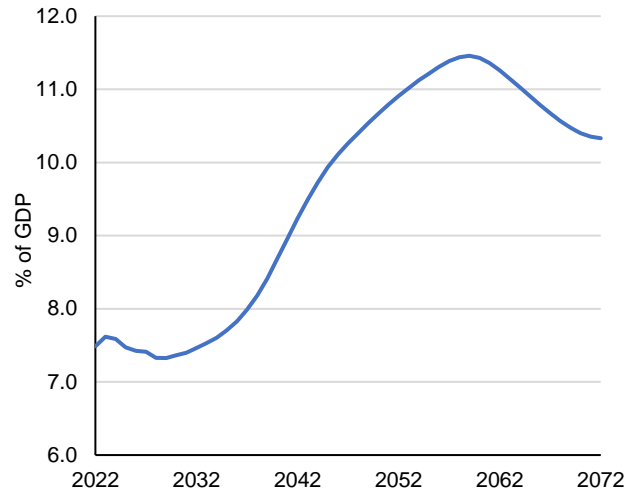
Source: CZSO (2022), CSSA (2022); CFC calculations.

Box 4.1 The new replacement rate estimation method

The key parameter for determining the future average pension and hence pension system expenditure is the replacement rate, namely the ratio of the average pension to the average gross wage. Several changes have been made to the calculation of the replacement rate in this year's Report. These changes are linked with the unpredictable growth of prices in 2022, legislative changes, and a refinement of the replacement rate projection methodology. We will describe them briefly in this box.

The first change is an increase in the initial replacement rate for 2022. This is linked with several waves of indexation during 2022. Under Section 67 of Act No. 155/1995 Coll., on Pension Insurance, pensions are always indexed on the "regular date", namely in January each year, based on the rate of inflation and wage growth the previous June. The most recent regular-date indexation of pensions was thus in January 2022, based on inflation and wage growth in June 2021. Pensions were valorised by CZK 805 on average, with statutory indexation based on inflation and wage growth accounting for CZK 505. Whenever growth in prices reaches a minimum of 5% since the last pension increase, the earnings-related part of pensions is valorised on an "extraordinary date" outside the regular date. This inflation threshold was exceeded in January 2022 (when prices were 8.2% higher than in June 2021), so the average pension was increased by CZK 1,017 (around 6.2%) in June 2022. There will be another extraordinary-date pension increase in September 2022, when the earnings-related component of pensions will go up by 5.2% (equal to the growth in the index of pensioners' living costs[40] between January and April 2022). Pensions will rise by CZK 700 (around 4%) on average. Overall, then, the average old-age pension will rise by CZK 2,522, or roughly 16.4%, during 2022. According to the Ministry of Finance forecast, the average nominal wage will increase by just 4.6% in the same period (i.e. the real wage will decrease), so the replacement rate will go up from around 40.7% in 2021 to 43.1%. Pension indexation on the following regular date (January 2023) will be based on relatively low growth in the index of pensioners' living costs between April and June 2022 (around 3.6%). The entire average old-age pension (not just the earnings-related part) will increase by this 3.6%.[41]

Other legislative changes need to be incorporated into the replacement rate outlook from 2023 on. A "child-rearing bonus" – an increase in the old-age pension of CZK 500 a month per child raised – is to be introduced on 1 January 2023.[42] This bonus will apply to both newly granted old-age pensions and pensions granted in the past. It will mainly increase the pensions of women. Our calculations are based on data on women's birth rates by age over the period 1950–2020 (source: CZSO), which we complement with the corresponding assumed age-specific

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[40] Pensions are indexed – be it on the regular date or on extraordinary dates – using either growth in the consumer price index or growth in the index of pensioners' living costs, whichever is the higher. The difference in inflation based on the two indexes is due to differences in the structure of their consumer baskets (for example, food and medication have larger weights in the case of households of pensioners and zero weights in the case of homeowners' imputed rents).

[41] Regular-date pension indexation should take into account the rate of real wage growth as well. However, as real wages have been falling recently, they are unlikely to affect the growth in pensions (only positive real wage growth is reflected in indexation; pensions never go down). The ratio between the basic flat-rate part and the earnings-related component of the average pension will change at the same time.

[42] See also OCFC (2022): Dopady zavedení „výchovného" do starobních důchodů [Impacts of the Introduction of the "Child-rearing Bonus" on Old-Age Pensions, available in Czech only].

birth rates from the CZSO's demographic projection. We then project the total number of children that the women of each generation will have over their lifetime. We also incorporate pension increases at certain ages into the projection (increases of CZK 1,000 and CZK 2,000 at 85 and 100 years of age respectively pursuant to Section 67a(1) of the Pension Insurance Act). Overall, by our estimation, the replacement rate will rise further to 43.9% in response to the introduction of the child-rearing bonus in 2023.

A methodological change to the replacement rate calculation of particular relevance to generational accounting (see section 6.4) is that age-specific pension amounts are now taken into account.[43] The starting information for determining replacement rates is the age structure of the old-age pension amount and the number of old-age pensions for 2020 (see Chart B4.1.1), when the retirement age was 63.57 years for men and 61.5 years for women with two children. It is apparent from the age structure that pre-retirement age pensions linked with early retirement are relatively low (around 17–20% lower).[44] Pensions reach a local peak close to retirement age; newly granted regular pensions tend to be higher because they are linked to the current wage level. Pensions then decrease with increasing age. This is linked with the indexation scheme for pensions granted in the past (under which pensions are indexed at the rate of inflation plus half the rate of real wage growth). Pensions then rise by CZK 1,000 at 85 years of age and CZK 2,000 at 100 years of age.[45] As our starting point, we use the pension amount adjusted for (reduced by) the effect of this provision.

Chart B4.1.1 Age structure of the number of pensioners and the average pension (2020, number of pensioners and average pension)
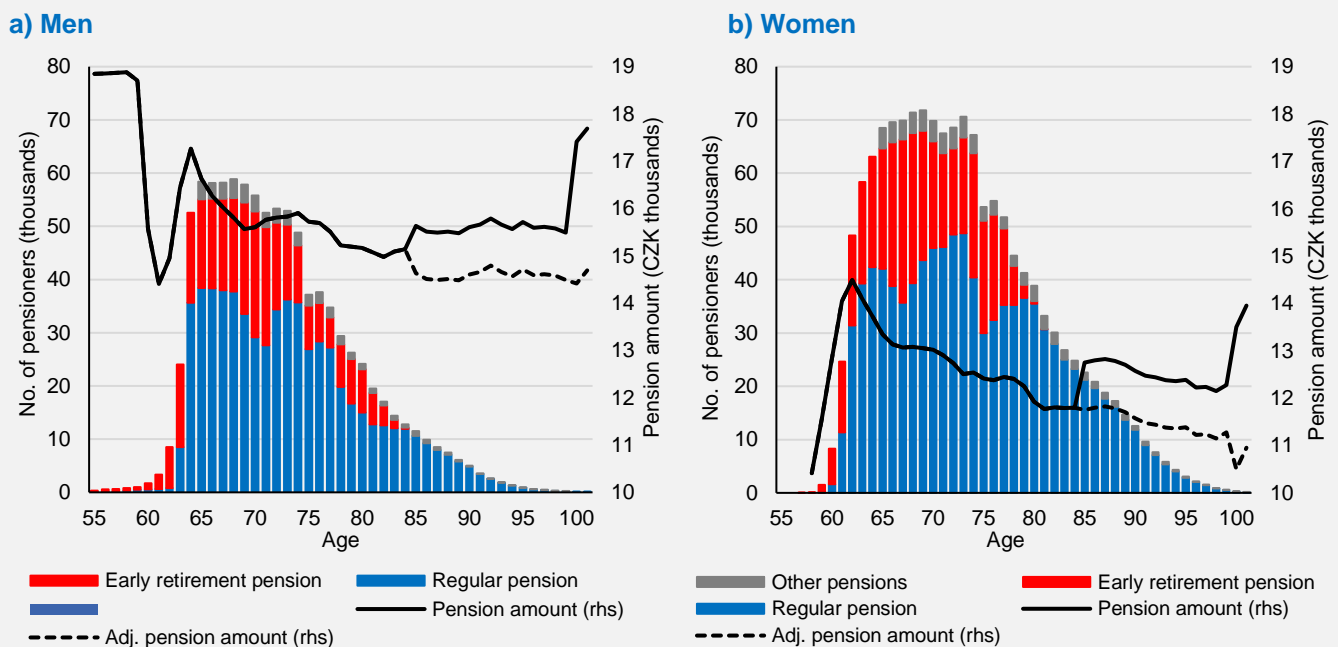
a) Men

Source: CSSA (2022), MoLSA (2022); CFC calculations.

b) Women

Source: CSSA (2022), MoLSA (2022); CFC calculations.

In the projection, we consider newly granted pensions and pensions granted in the past separately for men and women. We simulate the total number of old-age pensions and the number of newly granted old-age pensions for persons of a given age, which depends on the number of persons of that age in the demographic projection and on the statutory retirement age. In the second step, we use the adjusted age-specific pension amount curve (see Chart B4.1.1), to which we apply the standard indexation scheme (the rate of inflation plus half the rate of real wage growth). In the final step, we add our simulations of the child-rearing bonus and the pension increases at 85 and 100 years of age to the age structure of the pension amount. We assume that both these items have a constant ratio to the nominal wage, allowing them to be simply "added" at the end of the simulation.

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[43] Under the previous approach used in past Reports, it was implicitly assumed that all pensioners draw the same old-age pension. For details on the new approach, including a comparison with the previous approach, see OCFC (2022): Odhad náhradového poměru dávek důchodového pojištění [Estimating the Replacement Rate for Pension Insurance Benefits, available in Czech only].

[44] Relatively high pensions are reported for men aged 54–59 years. This is because some mineworkers have their retirement age reduced by seven years and receive higher old-age pensions. However, this special provision concerns only a small number of persons.

[45] Section 67a(1) of Act No. 155/1995 Coll., on Pension Insurance.

The replacement rates simulated under the new methodology and under the one used in the previous Report are compared in Chart B4.1.2. Before adjustment for the child-rearing bonus and the pension increases at 85 and 100 years of age (the blue line), the new methodology generates a replacement rate about 0.5 pp lower than the one applied in last year's Report (the red line) for the next 20 years. In the longer term, the simulated replacement rate is conversely around 0.5 pp higher. With adjustment for the child-rearing and age-based bonuses, the simulated replacement rate increases by around a further 1.5 pp (the grey line), but the effect of the child-rearing bonus on the replacement rate then gradually declines in line with past demographic trends (a falling number of children). At the end of the forecast horizon, the effect of the adjustment increases again because of a rising proportion of persons aged 85+.

Chart B4.1.2 Replacement rate simulation – comparison of the old and new methodologies
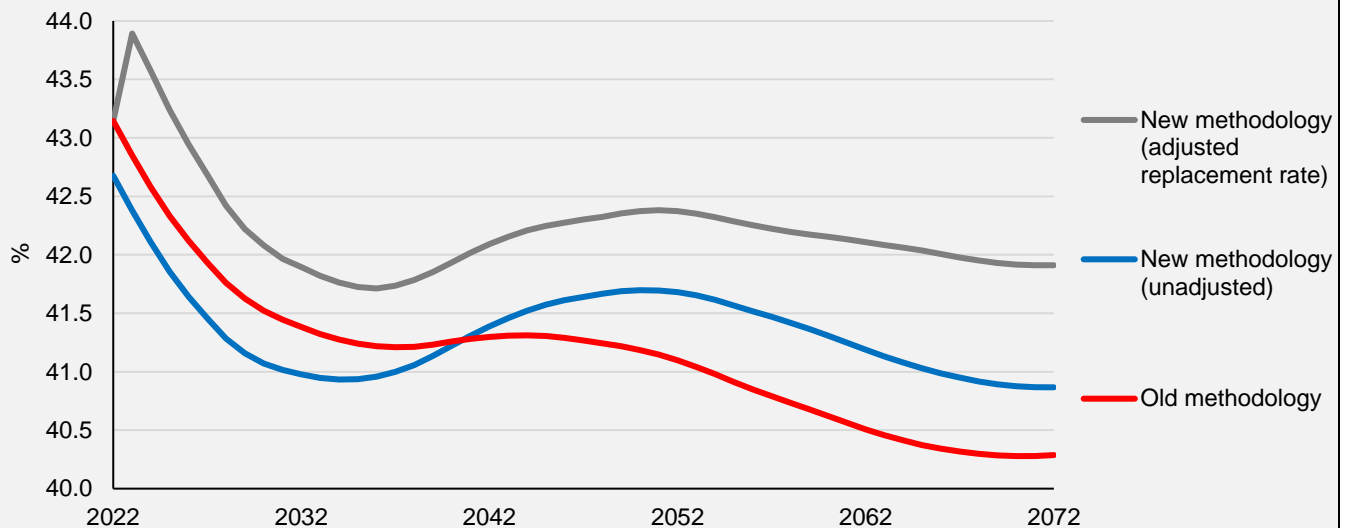
Source: CSSA (2022), MoLSA (2022), CZSO (2022); CFC calculations.

4.1.2 Disability pensions

As with old-age pensions, for disability pensions we project first the number of beneficiaries and then the average disability pension. The projection of the number of disability pensioners is based on assumptions about the proportion of persons receiving a disability pension in each age cohort (the rate of disability). As with the rate of retirement, we distinguish between the rates for men and women.[46] The rate of disability increases with age. In the past it peaked at the ages of 60–61 among men and 56–58 among women. The peaks of the age-specific disability rate curve are currently lower than they were in the past. This is primarily a manifestation of the healthy ageing hypothesis.[47]

Close to retirement age, disability rates are affected mainly by the conversion of some disability pensions into old-age pensions. The disability rates fall here, because a proportion of disability pensioners opt for the old-age pension and are thus taken off the disability pensioner register. Some disability pensioners with a higher disability pension draw that pension until the age of 65, when their disability pension is

automatically converted into an old-age pension. The disability rate in the population aged 65+ is thus zero.

In our projection of age-specific disability rates, we take the rising retirement age into account. For the under-55s, we assume the same disability rates as in the past. We also assume that the disability rate curve will peak two years before retirement age. The disability rate will thus rise steadily to this peak from the age of 55. We again assume an even decline in the disability rate from its peak until the age of 64. From 65 up, we assume a zero disability rate.

In our projection, the number of disability pensioners rises steadily and peaks in 2036, when it will be 16% higher than it is now. The growth in the number of disability pensioners is linked on the one hand with population ageing and on the other hand with the raising of the statutory retirement age, especially in the case of women. In 2037–2060, the number of disability pensioners will fall as they switch to old-age pensions. In 2060, the number of disability
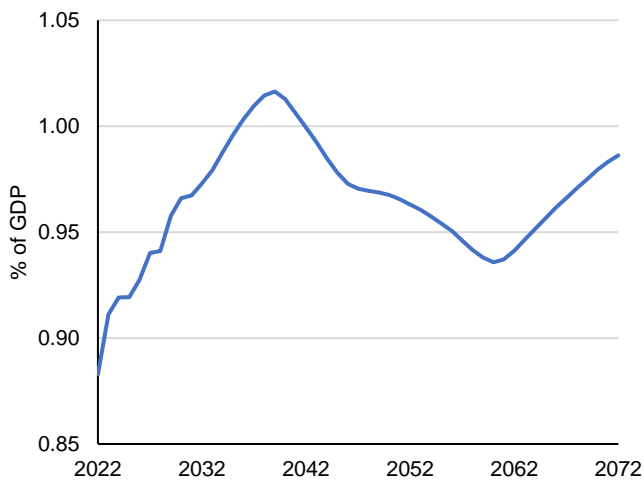
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[46] For a more detailed description of the method for projecting the number of disability pensioners, see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].
[47] For more on the healthy ageing hypothesis, see the 2018 Report.

pensioners will be 8.3% lower than it is at present. It will then rise modestly at the projection horizon.

We project the average disability pension by assuming a constant ratio between the average disability pension for a given degree of disability and the average old-age pension. The rate of growth of the average disability pension thus copies that of old-age pensions (see Chart 4.1.2). The initial level of disability pensions is affected by indexation in excess of the statutory scheme. In recent years, however,

disability pensions have been rising less significantly than old-age pensions.

Overall, according to the projection, expenditure on these pensions will rise from the current less than 0.9% of GDP to 1.02% of GDP in 2039, primarily due to the assumed growth in the number of disability pension beneficiaries (see Chart 4.1.4 and Table 4.1.1). The share of spending on disability pensions will subsequently fall to 0.94% in 2060.

Chart 4.1.4 Ratio of expenditure on disability pensions to GDP (%)

Source: CSSA (2022); CFC calculations.

Chart 4.1.5 Ratio of expenditure on survivors' pensions to GDP (%)
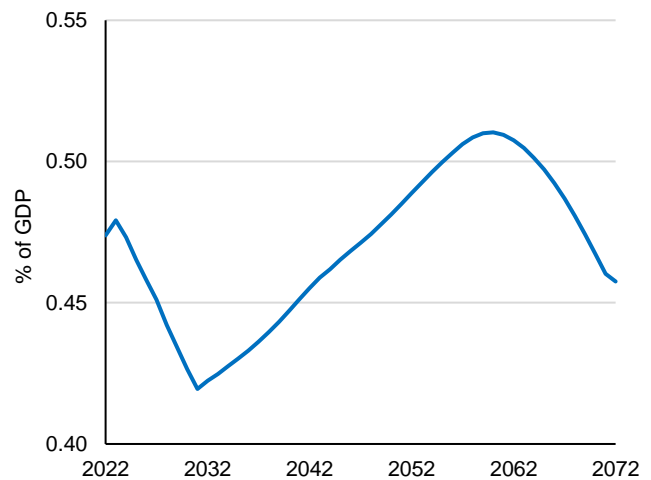
Source: CSSA (2022); CFC calculations.

4.1.3 Survivors' pensions

Survivors' pensions comprise widows', widowers' and orphans' pensions. Again, we first simulate the number of recipients of each type of pension. For orphans' pensions, we will assume a constant ratio of beneficiaries to the population of new-born to 21- year-old persons.[48]

In the case of widows' and widowers' pensions, we need to distinguish between pensions paid out individually (solo) and pensions paid out in combination with old-age (or disability) pensions. For solo widows' and widowers' pensions, we assume an approximately constant share in the part of the adult population (i.e. for our purposes the over-21s) not receiving an old-age or disability pension.

According to the projection, there will be a slight fall in the number of beneficiaries of orphans' pensions and solo widows'/widowers' pensions, as both demographic groups used as the basis for the projection shrink slightly despite the rising retirement age.

We use a more complicated approach to project the number of widows' and widowers' pensions paid out

in combination with old-age or disability pensions. For the projection, we use age-specific widows'/widowers' pension rates, which indicate what proportion of women/men of a given age receive this type of pension. The curve of these age-specific rates rises with rising age. We adjust the age-specific combination survivor's pension rates in the projection to account for the rise in the statutory retirement age up to 2030 and the rise in life expectancy (for widows' pensions we take into account the rise in male life expectancy and for widowers' pensions we take into account female life expectancy).[49] The increasing statutory retirement age reduces the number of persons entitled to a combination survivor's pension, as, ceteris paribus, it reduces the number of pensioners. If life expectancy rises, or if the life expectancy of men and women converges, the event of being widowed moves to a higher age on average. So, despite the increasing number of senior citizens in the population, there is a slight decline in the number of combination survivors' pensions in our projection.

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[48] An orphan's pension can be drawn by a beneficiary up to the age of 26 years (if studying at university).
[49] For details, again see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].

We again model the level of survivors' pensions as a fixed ratio to the old-age pension according to the average for the past three years. The projection of survivors' pensions generally indicates a fairly insignificant figure of between 0.45% and 0.5% of GDP for all types of survivors' pensions combined, falling by around 0.05 pp in the period up to 2031 and then rising by 0.09 pp in the period up to 2060 (see Chart 4.1.5 and Table 4.1.1).

4.1.4 Total revenue, expenditure and balance of the pension system

We model pension system revenue on the basis of the expected evolution of compensation of workers. In our macroeconomic projection we expect the ratio of such compensation to GDP to increase as a result of convergence (see section 3.3). The ratio of pension system revenue to GDP will thus rise proportionately as well. Overall, the revenue of the system will thus go up from 8.5% of GDP (2021) to approximately 9.2% of GDP at the end of the projection period. However, it is apparent that such growth in the revenue of the system will be insufficient to cover the sharp rise in expenditure that will occur in the 2030s. The pension system balance will also be affected in the short and medium term by a rise in expenditure associated with pension indexation in 2022 and the introduction of the child-rearing bonus in 2023 (see section 4.1.1).

Over the next few years, the pension system as a whole will record modest deficits, which will improve until roughly 2030. After 2030, however, it will start to move into substantial deficits due to sizeable growth in the number of pensioners. The deficits will peak around 2059 at approximately 4% of GDP a year according to the projection (see Chart 4.1.6). The subsequent drop in expenditure and improvement in the balance of the pension system will be due to a reduction in the number of old-age pensioners.

In our projection, we assume that the pension system will operate under the current legislation. It is highly likely that the above deficit trend will necessitate a comprehensive pension reform in the future.

Chart 4.1.6 Annual balances of the pension system
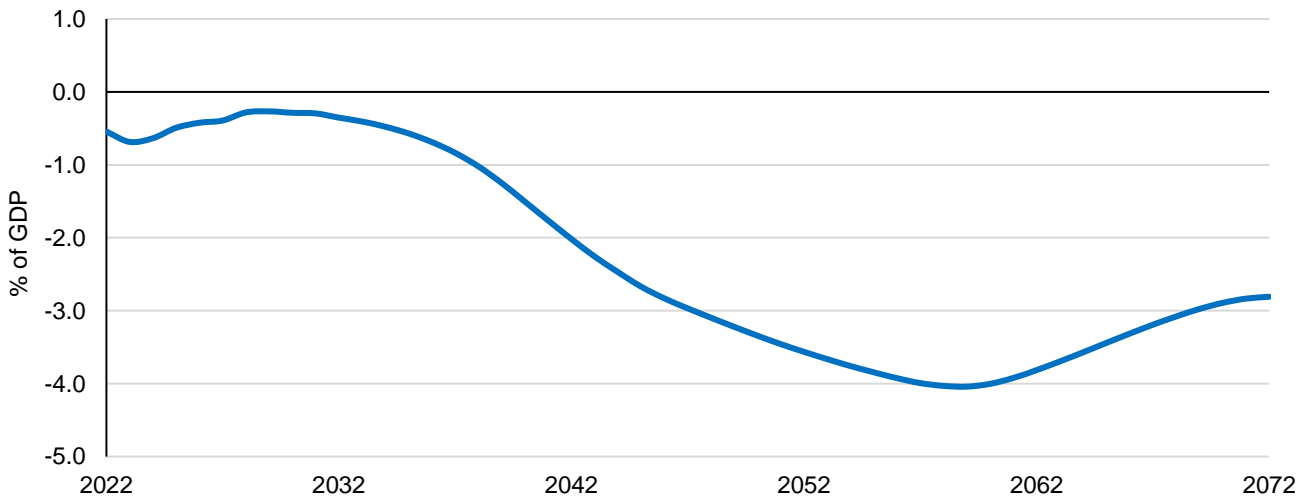
Source: CZSO (2022), CSSA (2022); CFC calculations.

Table 4.1.1 Summary of pension system projections for selected years (% of GDP)

	2022	2032	2042	2052	2062	2072
Old-age pensions	*7.7*	*7.7*	*9.4*	*11.1*	*11.5*	*10.5*
Disability pensions	*0.9*	*1.0*	*1.0*	*1.0*	*0.9*	*1.0*
Survivors' pensions	*0.5*	*0.4*	*0.5*	*0.5*	*0.5*	*0.5*
Total expenditure	9.0	9.1	10.9	12.6	12.9	12.0
Total revenue	8.5	8.7	8.9	9.0	9.1	9.2
BALANCE	-0.5	-0.4	-2.0	-3.6	-3.8	-2.8

Source: CZSO (2021), CSSA (2021); CFC calculations.
Note: Old-age pensions include pensions of armed forces personnel. The totals in the table may be subject to inaccuracies due to rounding.

4.2 Health care

In the Czech Republic, health care expenditure has long been covered largely by public sources, which account for around 80% of funding. The largest proportion of health spending – around 65% of the total – is covered directly by health insurance payments.[50] We will focus on this part in our projection. We concentrate solely on the public health system from the revenue-side perspective as well.

The basis for the expenditure side is the profile of the cost of health care per person of a given age. We distinguish between age-specific health care costs for men and women. We assume that these costs are sufficiently stable over time. Even so, the cost curve may change over the course of the projection, for example on the basis of the healthy ageing concept or the morbidity effect.[51]

In our macroeconomic projection, we assume that real wage growth will outpace productivity growth and GDP per capita (see section 3.3). If we assume that wages in health care will maintain their current level relative to the average wage, growth in the share of wages in GDP will lead, ceteris paribus, to an upward shift in the health care cost curve, because wage costs are a significant part of health care expenditure.

On the other hand, the relative price of some non-wage cost items (such as imported medicines and health care equipment) may fall due to real convergence, because real convergence causes convergence of the domestic price level to the price level abroad and hence real exchange rate appreciation. This may conversely slow the growth in health care spending. Given the aforementioned uncertainty about the direction in which the age-specific health care cost curve will change, in our simulation we use a stable curve derived empirically as the average of the relevant curves for the period 2010–2019, using separate curves for men and women.

The stable cost curve over time assumes that the cost of health care per person of a given age changes proportionately to GDP per capita. So, if there were no change in demographic structure, health care expenditure would increase proportionately to the growth of the economy. All changes in the share of health care expenditure are thus solely a result of the changing age structure of the population. Given the shape of the curve, which shows the costs covered by health insurance increasing with age, population ageing implies gradual growth in total health care expenditure (see Chart 4.2.1).

If we abstract from the increased costs caused by the pandemic situation, health insurance companies' costs are covered at a level of 5.6% of GDP at present. If the medium variant of the demographic projection were to materialise, the total costs covered by public health insurance would gradually rise by about 1.1 pp by the first half of the 2060s (see Chart 4.2.2).

The revenue side of the public health insurance system relies on contributions paid by employees, employers, the self-employed and individuals with no taxable income and on contributions paid by the state for "state insurees", i.e. children, students, old-age and disability pensioners, the unemployed etc. However, payments for state insurees are budget neutral from the perspective of the overall government deficit, because they constitute revenue to one public budget component – health insurance companies – on the one hand, and expenditure of another public budget component – central government – of an equal amount on the other.

We estimate the contributions collected from the first group as a constant ratio to compensation of workers. Here we project slight growth in contributions collected, due to the assumed rise in the ratio of wages and salaries to GDP.

The reference base for contributions on behalf of state insurees was increased from 22% to approximately 28% of the average wage in 2020 and 35% in 2021 in order to reduce the drop in revenue and offset the rise in public health insurance system expenditure connected with the COVID-19 pandemic. The reference base is currently configured so that payments for state insurees stay at the 2021 level in 2022, so the ratio of the average reference base to the average wage will fall to 34% in 2022.

No mechanisms further adjusting payments for state insurees have been set so far for the period after 2022. In the future, payments for state insurees may be indexed automatically.[52] However, we do not consider such indexation in the projection for now.

We therefore assume that the reference base will remain unchanged at CZK 13,088 for the next 20 years, when its ratio to the average wage will

[50] See CZSO (2021): Výsledky zdravotnických účtů ČR 2010–2019 [Health Accounts of the Czech Republic 2010–2019, available in Czech only].

[51] See Box 4.3 in the 2021 Report.

[52] An amendment to Act No. 592/1992 Coll., on Public Health Insurance Premiums, is currently in the legislative process and has now been passed by both chambers of parliament. Automatic indexation of payments for state insurees has been approved under this amendment. From 1 January 2024, these payments will be indexed at the rate of inflation (defined as the percentage increment in the consumer price index) plus one half the rate of real wage growth. However, this change will not affect the overall general government balance, as payments for state insurees are budget neutral in accrual accounting, constituting a government budget expenditure but simultaneously a revenue to health insurance companies.

gradually fall back to the original 23%. For the rest of the projection, we assume that the reference base for state insurees will rise at the same pace as the average wage. After rising considerably in the initial years of the projection, payments for state insurees will thus decrease to 1.4% of GDP over the next 20 years. In the final years of the projection, revenue from contributions covered by the state will increase to almost 1.6% of GDP around 2060 due to demographic change. In the second half of the projection, payments made by the state will be affected by population ageing and related growth in the number of old-age pensioners.

Our projection for the health care area continues to assume that insurance companies' costs will not increase significantly in the long term as a result of the pandemic. For this reason, we assume that the

pandemic will have no direct impact on insurance companies' future expenditure.

Assuming an unchanged reference base for payments for state insurees, the total revenue of the system, which will reach 6.5% of GDP this year, will gradually fall to 6.1% of GDP in the 2040s. Subsequently, however, it will increase again to around 6.4% of GDP 20 years later. If the medium variant of the demographic projection materialises, and if we abstract from the short-term expenditure associated with the COVID-19 pandemic, the public health insurance system will thus be in a modest surplus, primarily due to increased health insurance payments on behalf of state insurees. This surplus will fall steadily from 0.9% of GDP in 2022 to zero over the next 15 years. For the rest of the projection, the public health insurance system will record deficits of about 0.2% of GDP a year.

Chart 4.2.1 Costs covered by health insurance by age group
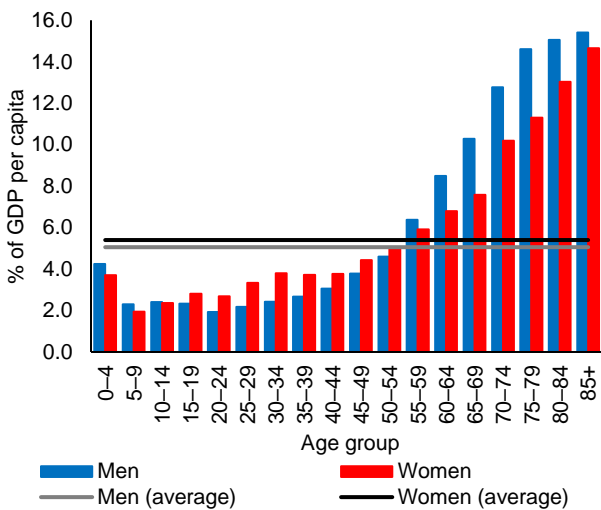
Source: CZSO (2022); CFC calculations.
Note: Averages for 2014–2019.

Chart 4.2.2 Ratio of public health care expenditure to GDP (%)
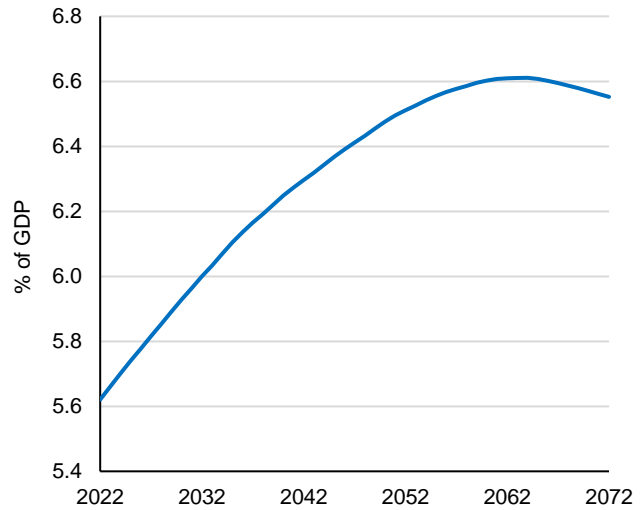
Source: CZSO (2022); CFC calculations.

4.3 Non-pension social benefits in cash and long-term care

Other expenditure items are spending on non-pension social benefits in cash and long-term care. In the model, we first simulate benefits that are sufficiently fiscally significant, amounting to more than 0.1% of GDP. These benefits must meanwhile be identifiably linked to demographic change. The following benefits meet these two criteria: maternity benefit, parental allowance, care allowance and housing allowance. Non-pension social benefits in cash also include a tax advantage for dependent children.[53] We then project other benefits, which we assume maintain a constant percentage of GDP at the current

level. Other benefits comprise unemployment benefit, child allowance, foster care benefit, birth grants, funeral grants, sickness benefit and social assistance/need benefit.

We simulate expenditure on fiscally significant social benefits separately, making use of their link to demographic change. In the case of housing allowance, we tested the link to demographic change on the basis of its past evolution. For some benefits, such as maternity benefit and parental allowance, the link to demographic change arises directly from how the

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[53] This change occurred as part of a revision of the national accounts methodology. From the perspective of the total general government deficit, however, this change is budget neutral, because discounts for children are now classed under social benefits (i.e. an increase in public budget expenditure) but personal income tax revenue is increased by the same amount. See section 4.6 of this Report.

benefit is constructed. To simulate them, we use an internally modified version of the CZSO demographic projection. We also assume that the current average benefit to average wage ratio and the current non-take-up rates of some benefits will be maintained.

We base our simulation of **maternity benefit** on the construction of that benefit. As the basis, we use a constant ratio of the average benefit to the average wage multiplied by the duration of the benefit. We relate the projection of this benefit to the projection of the number of new-borns.

The projection of spending on **parental allowance** is related to the number of children aged 0–3 years. In the simulation, we drew on data on the structure of parental allowance recipients by child age and on information on the number of parental allowance benefits paid and the number discontinued according to the child's age when the allowance was discontinued. We then calculated the share of recipients in each age cohort and their average monthly parental allowance. In the simulation, we assume that this share, together with the ratio of the average monthly benefit to the average wage, will be constant over time. Parental allowance was increased to CZK 300,000 in 2020 and remains at that level for 2022.[54]

Our estimate of the **care allowance** is based on the shares of individuals receiving an allowance in the given age categories and in the given dependence category in 2019 (Czech Labour Office data).[55] Under the assumption of a constant share of the number of individuals of a given age drawing an allowance, we then use the demographic projection to determine the total number of individuals drawing an allowance in the various dependence categories. The care allowance amount is set according to the laws in force.[56] Until 2021, the allowance in the highest two dependence categories was lower for persons using residential social services.[57] Since 2021, it has been the same as that for recipients being cared for at home. This increases the projected allowance amount. From 2022 onwards we then assume a constant allowance to average wage ratio.

The projection of **housing allowance** is also linked to demographic change. We simulate housing allowance on the basis of past developments using CZSO

information. It reveals that people aged 65+ account for around 25% of the number of housing allowance benefits paid.[58] The remaining three quarters of the recipients are thus aged 18–64. Since July 2020, persons actually living in the allowance applicant's household have been reported for eligibility for the benefit regardless of their permanent residence.

The **tax advantage for children** is linked to the number of children and the share of secondary school and higher education students. Entitlement to this benefit arises in the case of minors under the age of 18 years and in the case of children up to 26 years of age who have student status or who on health grounds are unable to prepare continuously for a future occupation or to pursue continuous gainful employment. In 2022, the annual tax advantage was CZK 15,204 for the first child, CZK 22,320 for the second child and CZK 27,840 for the third and each subsequent child. In the simulation, we use the average of the figures for the first and second child, i.e. CZK 18,762. We assume that the tax advantage for children will rise in line with the average wage.

Projections of expenditure on the various benefits as a percentage of GDP are shown in Chart 4.3.1. As a result of population ageing, care allowance expenditure will be the fastest growing among the social benefits. It will rise over the whole period of interest – from 0.6% of GDP at present to more than 1.4% of GDP in 2072. The rate of growth will not start to slow until the late 2060s.

Parental allowance expenditure will decline until approximately 2030, then rise until the first half of the 2050s and subsequently drop slightly again. This is due to the expected evolution of the number of children aged 0–3 years. The volume of the tax advantage for children will rise slightly until 2060 and then start to fall. The total amount of non-pension social benefits will rise slightly until the 2030s, from 3.1% to 3.2% of GDP, with rising care allowance expenditure being roughly offset by falling parental allowance expenditure. The amount of non-pension social benefits will subsequently increase, mainly as a result of rising care allowance expenditure, reaching 4.1% of GDP in 2072.

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[54] For parents of two or more children born at the same time, the total benefit is CZK 450,000. In the model, however, we simulate a parental allowance of a single level of CZK 300,000 for all children. According to CZSO data, multiple births accounted for just 1.3% of all births in 2019 (in 2009 the figure was 2.1%).

[55] The share of individuals receiving care allowance rises sharply after the age of 75. For a detailed description of the calculation method, see OCFC (2019): Odhady nákladů příspěvku na péči v návaznosti na stárnutí populace [Estimates of the Costs of Care Allowance in the Context of Population Ageing, available in Czech only].

[56] Section 11 of Act No. 108/2006 Coll., on Social Services. The monthly care allowance for persons aged 18+ ranges from CZK 880 in the lowest level 1 dependence category to CZK 19,200 in the highest level 4 category. The allowance is higher for the under-18s.

[57] The care allowance tends to be used by clients as part-payment for the social services they receive.

[58] We checked this figure using EU-SILC data for the Czech Republic for 2018, according to which people aged 65+ account for 20% of those drawing housing allowance and 22.5% of total housing allowance expenditure.

Chart 4.3.1 Projections of non-pension social benefits in cash
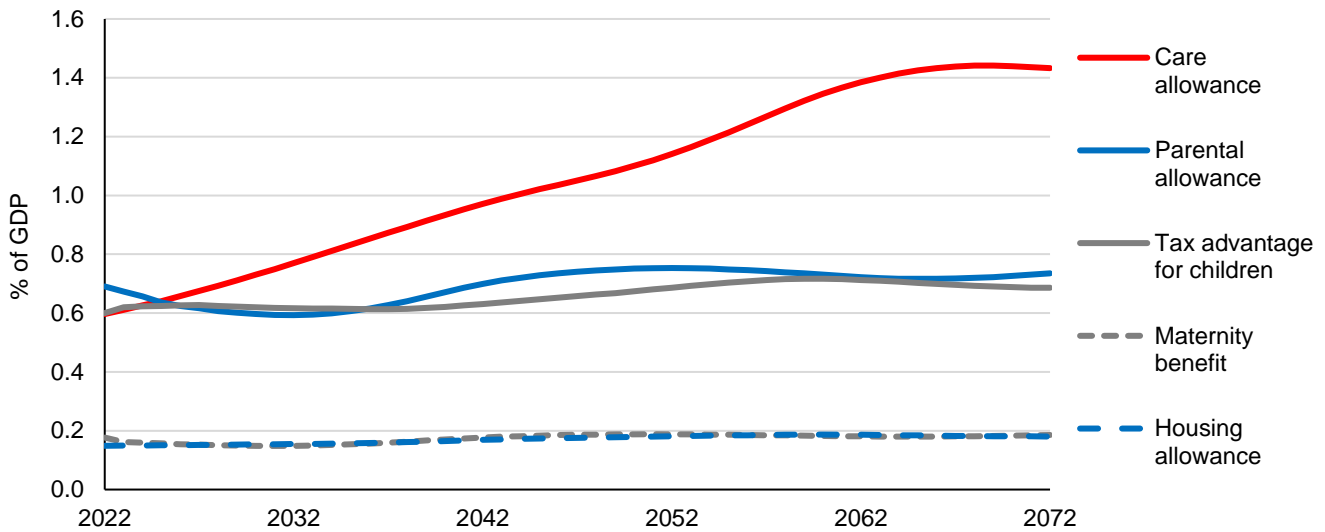
Source: CZSO (2022), MoLSA (2022); CFC calculations.

4.4 Education

Education expenditure fluctuated around 5.1% of GDP in 2021. The Ministry of Education, Youth, and Sports (MEYS) accounts for the largest share of public spending on education. It transfers almost 75% of the expenditure from its budget to local public budgets. Besides the MEYS, municipalities and regions contribute to education expenditure. They are responsible for establishing and administering educational establishments from pre-schools through to vocational colleges.

Wage costs in regional education account for the largest part of public education spending. They depend on wage growth and on the number of staff, which in turn depends directly on the number of schoolchildren. In the education expenditure projection shown in Chart 4.4.1, we assume that the number of teaching and non-teaching staff per 1,000 pupils in each type of school will stay unchanged over the entire projection horizon. The share of pupils in each age category in the projection is also left at the average of the actual shares over the period 2015–2019. Following an initial upswing, public education expenditure will slow in the 2030s and 2040s as a result of demographic change, as fewer teaching and non-teaching staff will be needed due to a smaller number of schoolchildren.

Total education expenditure growth is affected primarily by the rate of growth of the pay of teaching and non-teaching staff. In past years, average wage growth in the education sector outpaced that in the economy, as the previous government pledged in its policy statement to increase the pay of teaching and non-teaching staff to 150% of its 2017 level by 2021. We assume that it will grow at the same rate as the average wage in the economy from 2022 onwards.

Payments direct to universities for regular university activities and R&D make up a large part of MEYS expenditure. In the case of payments to universities, we are seeing an opposite trend to that in transfers to local government budgets. Their share in the budget heading's total costs is falling. In 2013, spending on universities made up almost one third of total MEYS expenditure, whereas in 2021 the figure was only 20%. Going forward, however, we project that spending on universities will stop declining, mainly because of rising wage costs. The share of university students aged 18–26 in the total population in the same age group is comparable with that in Austria. For this reason, we leave the ratio of students to the total population in the same age group at the current level for the purposes of the projection. In light of the demographic projection, the number of students can also be expected to rise, peaking in the 2030s.

In universities' operating costs, wage growth will be reflected in growth in compensation of academic workers, whose number also depends largely on student numbers. Owing to demographic change, the number of university students will rise for another decade. This is reflected in a need to expand university capacity and equipment. In our model, the bulk of public universities' operating costs thus depend on demographic change. We assume that the remaining one third of such costs grow at the same rate as GDP. We incorporate a further 1.5% of GDP of education spending into our projection to cover, for example, capital expenditure and other current expenditure, which we assume to grow in line with GDP.

We also expect universities' R&D spending to rise in the long run. We assume that two thirds of R&D expenditure is affected by growth in wages in education, while one third will grow in line with real GDP.[59]

Total education expenditure will rise in real terms over the entire projection horizon. In relation to GDP, it will rise fastest over the coming three years due to growth in wage costs. However, education spending in relation to GDP will slow over the following 12 years due to demographic change as the number of students in state schools (excluding universities) falls. Nonetheless, public education expenditure in relation to GDP will start to surge again around 2040, reaching 5.6% of GDP around 2060, although it will slow again in the final ten years of our projection due to demographic change.

Chart 4.4.1 Ratio of public education expenditure to GDP (%)
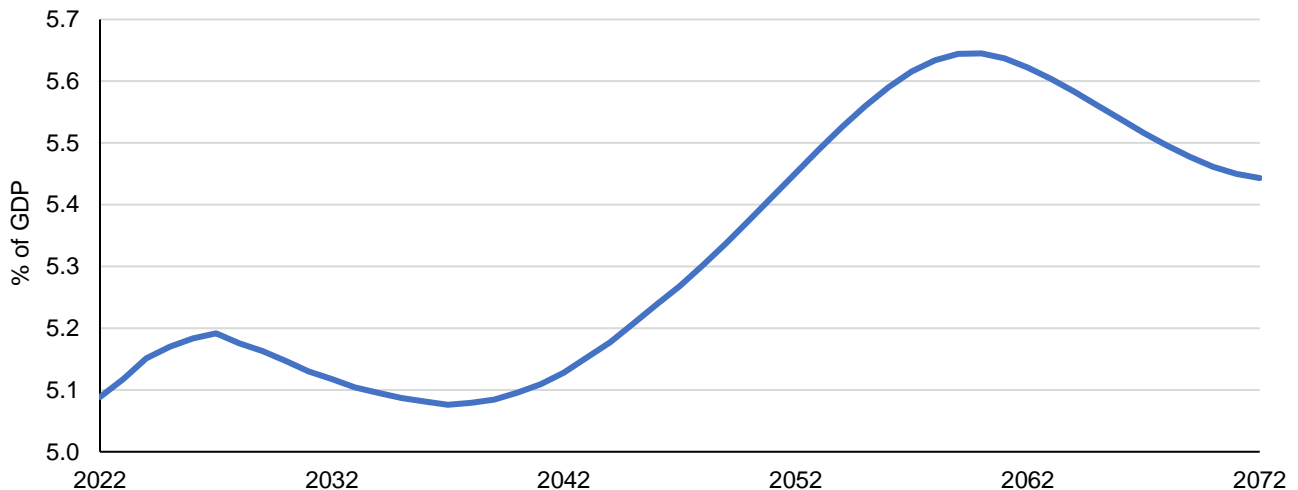
Source: MEYS (2022), CZSO (2022); CFC calculations.

4.5 Expenditure associated with convergence effects and other expenditure

So far, we have focused on expenditure that we assume will be associated more or less with demographic change. For the remaining general government expenditure, we could assume that its share in GDP will be approximately stable. Nevertheless, irrespective of demographic trends, the mere fact that the Czech economy is a converging one will, in the long run, systematically affect some other expenditures. It is not our goal, however, to simulate the shares and evolution of individual expenditure categories in detail. Rather, we are concerned with capturing the systematic and long-term changes that will result from convergence. Therefore, with regard to convergence effects we will focus on their contribution to the growth or decline in total expenditure (expressed in per cent of GDP).

The first group of expenditures where convergence effects may arise is **public investment**. The projection assumes a gradual reduction in the contribution of public investment to GDP. This relationship is based on analyses carried out on a sample of EU countries indicating an inversely proportional relationship between a country's level of economic development and the ratio of public investment to GDP. Less developed countries generally spend a higher percentage of their GDP on public investment. There are evidently a variety of reasons for this. First, in the case of less advanced but converging countries, a role may be played by efforts to upgrade infrastructure (such as motorways, railways and urban infrastructure) and the ensuing higher level of public investment. Another possible reason is the higher relative price level of investment goods in less developed countries, which leads directly to a higher investment rate. The higher relative price of investment may be due to the laws of economics (the different capital, labour and technology positions of less developed economies), but the cause may also be a lower standard of public administration, as indicated by quality of governance indexes, for example.[60] The CFC projection foresees both of these effects fading away as the Czech Republic's level of economic development rises. This will lead to a decline in the share of public investment of 0.3% of GDP at the projection horizon (see Table 4.5.1).

In the case of **defence expenditure**, there are no convergence effects in the sense of such expenditure increasing as a result of the convergence of the Czech economy, but our projection nevertheless assumes that the Czech Republic will, in accordance

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[59] This assumption is based on Eurostat (2019), according to which staff pay accounts for two thirds of total expenditure on tertiary education.
[60] See, for example, World Economic Forum (2019): The Global Competitiveness Report 2019.

with the Policy Statement of the Czech Government of 6 January 2022 and also given the international situation, honour its NATO commitments and thus be spending 2% of GDP on defence until 2025. The projection assumes that defence expenditure will rise gradually until 2025 to 2% of GDP and then flatten out.

The convergence of the Czech economy will also affect the **remuneration of employees in the general government sector**, which will be another source of expenditure pressure. This is due to an assumed gradual increase in the costs of activities performed by organisations in the general government sector. Growth in labour productivity and a rise in the share of compensation of employees in the private sector will give rise to wage pressures, which will inevitably spill over to the general government sector. However, the activities in this sector are mostly services, moreover services of such a kind that the wage growth cannot be entirely offset by growth in labour productivity (public administration, justice, internal security and so on). As a result, the costs will rise even if the services produced by general government sector employees are kept on the same scale, so their relative share in GDP will also increase. This is a manifestation of the Baumol-Bowen effect: goods which are produced with no increase in labour productivity in the long run (if they are to be provided in the same quality) necessarily become relatively more expensive due to wage growth in other sectors.

The impacts of the Baumol-Bowen effect on health, education and defence spending are not simulated in this section, since they are already contained in the partial projections presented in the previous sections of the Report. In the remaining areas, our projection assumes that this effect will gradually increase and will represent an additional 0.4% of GDP on the expenditure side at the end of the projection period.

Besides convergence effects, we account for growth in **payments to the EU**. The approval of the Multi-annual Financial Framework for 2021–2027 permanently increased the cap on payments to 1.4% of gross national income.[61] As in previous Reports, we thus assume an increase in payments to the EU of 0.1% of GDP compared with the present from 2028 onwards.

We assume that the remaining expenditure of 17% of GDP is sensitive neither to demographic change, nor to convergence or other effects and hence keep it constant until the end of the projection horizon. Its size is derived from the evolution of general government sector finances in 2015–2021 and from the Ministry of Finance's predictions for 2022–2024.[62]

Table 4.5.1 Ratio of expenditure associated with convergence effects and other expenditure to GDP (%)

	2022	2032	2042	2052	2062	2072
Other expenditure – baseline scenario	17.0	17.0	17.0	17.0	17.0	17.0
Convergence-related changes in other expenditure	0.0	0.7	0.7	0.7	0.7	0.8
public investment	*0.0*	*-0.1*	*-0.2*	*-0.3*	*-0.3*	*-0.3*
defence expenditure	*0.0*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
growth in general government costs	*0.0*	*0.1*	*0.2*	*0.3*	*0.3*	*0.4*
growth in payments to EU	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
OTHER EXPENDITURE INCLUDING CHANGES	17.0	17.7	17.7	17.7	17.7	17.8

Source: CFC calculations.
Note: The totals in the table may be subject to inaccuracies due to rounding.

4.6 Revenue in the long-term projection

General government revenues will be subject to interlinked demographic and convergence effects in the long-term projection. For the purposes of this Report, government revenues are split into the following categories: personal and corporate income tax revenue, statutory social security contributions, consumption tax revenue and other revenue (e.g. property income, income from the sale of goods and services, and income from the EU).

In the projection of **personal income tax** revenue, we assume that such revenue depends mainly on compensation of employees. According to our estimates, the ratio of compensation of employees to GDP will gradually increase due to the convergence effect (see section 3.3), and so, proportionately, will the share of this tax in GDP. This effect will outweigh the fact that the share of workers in the overall population will decline for demographic reasons. According to our macroeconomic projection, wages will

grow fast enough to more than offset the drop in the number of workers.[63] The expected growth in personal income tax revenue from the current 3.4% of GDP to 3.7% of GDP at the end of the projection is thus a result of convergence alone (see Table 4.6.1).

Corporate income tax revenue is very sensitive to the business cycle and therefore fluctuates over time. Also, the construction of the tax base makes this tax hard to predict. However, in the long-term projection we abstract from cyclical effects and, for reasons of logical consistency, we project such revenue on the basis of net operating surplus. It should explain this tax revenue better than GDP, because it is net operating surplus that is the macroeconomic counterpart of net operating profit before tax.[64] As with personal income tax, convergence effects will be apparent, but this time with the opposite consequence. Growth in the ratio of compensation of employees to GDP will necessarily lead to a decline in the share of gross operating surplus in GDP. The share of net operating surplus in GDP will in turn decline even more significantly, as we assume that the share of fixed capital consumption in GDP will remain constant. As a result, the ratio of corporate income tax revenue to GDP will fall from 3.2% at the beginning of the projection to 2.4% at the end.

We assume a fixed share in GDP for **other current taxes**. Their share in GDP has long been stable, and with the given tax policy setup we are not aware of any reasons for it to change.

Mandatory social security contributions comprise pension contributions (including the systems of the Ministry of Defence, the Ministry of Interior and the Ministry of Finance), public health insurance contributions excluding state insurees, payments for state insurees and other mandatory social security contributions (sickness insurance and state employment policy contributions). As in the case of personal income tax, all these payments are linked by construction to compensation of employees in our projection. Here again, the convergence effect is present – the ratio of these payments to GDP grows in proportion to the ratio of compensation of employees. In the case of revenue for state insurees, we mainly took into account demographic change in the categories that state insurees belong to (see section 4.2 for

details). Recall that in the general government sector, payments for state insurees are both a revenue (to health insurance companies) and an expenditure (for the state budget). As a result, they do not have any impact on the sector's balance. We nevertheless present them separately, since they affect the data on the structure and size of the general government sector.

Taxation of consumption (**taxes on production and imports**) consists primarily of revenue from VAT and selective excise duties. This tax revenue is simulated by the share of the final consumption expenditure of households in GDP, which represents an approximation of the largest part of the tax base for consumption taxes. According to our macroeconomic projection, this share is constant (a change in the structure of pensions in favour of compensation of employees does not necessarily translate into a change in the structure of use of pensions), so consumption taxation revenue will maintain a constant share in GDP.[65]

Property income is made up mainly of dividends and shares in the profits of state-owned enterprises. In this case again, we assume a constant share in GDP. We also do not expect the state to change its holdings in the major firms it (co-)owns. Overall, we therefore assume that property income will remain constant at 0.6% of GDP.

Other revenue consists mostly of income from the sale of goods and services and income from the EU. Given the way the Treasury operates, interest revenue on investment of surplus liquidity is not considered. The ratio of income from the sale of goods and services to GDP is essentially constant, so its ratio is fixed for the long-term projection. We assume that income from the EU will form a constant percentage of GDP in the long term as well. However, this income is subject to a high degree of uncertainty, making it difficult to quantify. Although it can be expected to increase in the short term owing to the EU's climate policy (see Box 2.2), we have no information of any structural change in the long term. We should also point out that our projection only includes general government income from the EU, not the total income from the EU for all entities in the Czech Republic, which, given convergence to the advanced economies, can be expected to decline.

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[63] Note that here we deviate partially from making our projection strictly in accordance with the current legislation. Tax regulations often include deductions and discounts or thresholds in nominal terms. Growth in nominal wages and other income can thus, ceteris paribus, lead to an increase in the average rate of taxation. This means that without any changes to the legislation, there is erosion of the real value of deductible items, migration into higher tax bands and related taxation at higher rates, and so on. In our projection, however, we abstract from this and similar effects and we assume that the real value of deductible items, for example, will be constant.

[64] We again abstract from the effects of inflation (these would manifest here in erosion of the real value of tax depreciation of the fixed capital of firms and in the valuation of inventories).

[65] Again, we diverge slightly here from strict conformity with the legislation, as some excise duties are constructed as a nominal figure for a given amount of goods. We therefore assume that the legislation will change over the long term in such a way that the revenue from this class of taxes evolves as if all the rates were constructed as ad valorem.

Table 4.6.1 General government revenues in selected years (% of GDP)

	2022	2032	2042	2052	2062	2072
Personal income taxes	3.4	3.5	3.5	3.6	3.6	3.7
Corporate income taxes	3.2	3.0	2.8	2.6	2.5	2.4
Other current taxes	0.2	0.2	0.2	0.2	0.2	0.2
Social security contributions	16.2	16.1	16.2	16.6	16.8	16.8
pension insurance	*8.5*	*8.7*	*8.9*	*9.0*	*9.1*	*9.2*
public health insurance (excluding SIs)	*4.5*	*4.6*	*4.7*	*4.8*	*4.8*	*4.9*
payments for state insurees (SIs)	*2.0*	*1.6*	*1.4*	*1.6*	*1.6*	*1.5*
other	*1.2*	*1.2*	*1.3*	*1.3*	*1.3*	*1.3*
Taxes on production and imports	11.7	11.7	11.7	11.7	11.7	11.7
Property income	0.6	0.6	0.6	0.6	0.6	0.6
Other revenue	4.8	4.8	4.8	4.8	4.8	4.8
TOTAL REVENUE	40.1	39.9	39.9	40.1	40.3	40.2

Source: CFC calculations.
Note: The totals in the table may be subject to inaccuracies due to rounding.
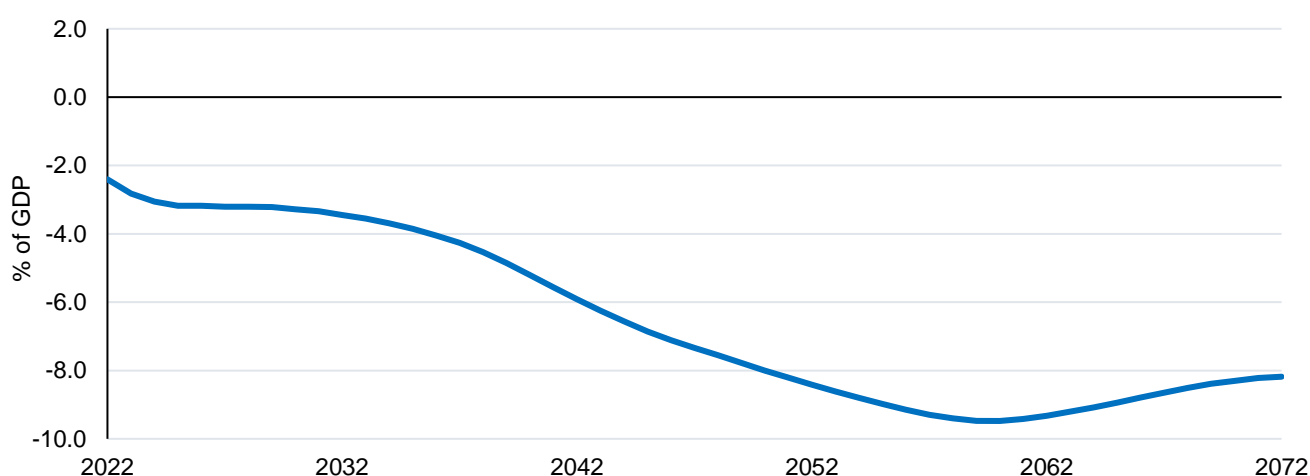
5 General government balance and debt

5.1 Primary balance

The projections of the individual revenue and expenditure items allow us to prepare a projection of the primary general government balance (see Chart 5.1.1).

Our projection indicates negative primary balances over the entire period of interest. A marked upward trend in the primary deficit emerges in the mid-2030s. This is caused by the expenditure side, which grows mainly for demographic reasons (spending on

pensions and health care and the care allowance), but increased education spending also plays a role. According to the projection, the primary deficits will fall after 2060, because by then the baby-bust cohorts will have started to enter old-age retirement. The annual deficits will nonetheless remain significant until the end of the projection period. The budget revenue side will basically be stable over the projection period and will not contribute to offsetting the rising expenditure.

Chart 5.1.1 Primary general government balance

Source: CFC calculations.

5.2 Interest costs

To obtain a comprehensive picture of the general government balance, we still need to complement the path of the primary balance with interest expenditure related to the general government debt. So far, we have expressed both expenditure and revenue items in relation to GDP, so the rate of inflation has been irrelevant to them. In the case of interest expenditure, however, this is no longer possible. Interest expenditure is generally determined by the nominal interest rate, which already contains the inflation rate. This is because the nominal interest rate is the sum of the real interest rate and the inflation rate, with the real interest rate itself being determined by real factors such as the marginal productivity of capital and the time preferences of economic agents. The long-run inflation rate thus has an effect, via the nominal interest rate, on the share of interest expenditure in GDP and hence also on the total share of general government expenditure in GDP. In our

projection of nominal interest rates, we assume a 2% inflation rate, in line with the centre of the central bank's target band.

The general government debt of the Czech Republic consists mainly of the state debt (which has long accounted for more than 90% of the total), and we will focus on it in our projection. We will assume that the interest costs on the remaining part of the general government debt (e.g. municipal debts) will behave similarly.

In reality, the state debt is financed by a whole spectrum of instruments, ranging from non-marketable borrowings to a wide palette of debt securities with various maturities, coupon yields and denominations.[66] In the projection, we are therefore forced to simplify and split the total general government debt into two parts – short-term debt (i.e. debt maturing within one year) and long-term debt. We assume that

[66] For more details, see MF CR (2022): Report on the Management of the State Debt of the Czech Republic in 2021 and Morda (2022): Vývoj státního dluhu České republiky (2. aktualizované vydání) [Evolution of the State Debt of the Czech Republic (2nd updated edition), available in Czech only].

the short-term debt is financed at the short-term rate and has to be refinanced each year at the current rate. By contrast, we assume that the long-term debt is financed using bonds with a ten-year original maturity and a coupon that equals the ten-year nominal interest rate (ten-year maturity was chosen because it is the longest maturity for which we have a sufficiently long, internationally comparable time series). We keep the shares of short-term and long-term debt in the total debt constant at 20% and 80% respectively. 20% is the upper limit for the share of short-term debt.[67]

We model total interest costs as the product of general government debt and the implicit nominal interest rate, which is a weighted average of the nominal interest rates paid on the short-term and long-term portions of the debt. The weight of the short-term interest rate in the implicit interest rate is identical to the share of the short-term debt, i.e. 20%. We will consider the short-term interest rate in our projection

to be constant at 1.8% p.a. This figure corresponds to a real short-term interest rate of –0.2% p.a. (the average real three-month interest rate over the period 2002–2021) plus inflation of 2%.[68] The interest rate on the long-term portion of the debt analogously has a weight of 80% in the implicit interest rate. In this case, however, we assume for the sake of simplicity that the interest rate on the long-term portion of the debt is equal to the ten-year moving average of the ten-year interest rates in individual years. We use this approach to account for the fact that the current interest rate is not relevant to the servicing costs of ten-year bonds already issued; all that matters is the interest rate at the time of issue. In the baseline scenario, we also assume that the ten-year nominal interest rate will converge to 2.8% p.a. (0.8 pp of which is the real interest rate – again, the average for the period 2002–2021) and the rest is the expected inflation rate. These assumptions together lead to a gradual increase in the modelled implicit interest rate to 2.6% p.a. by 2030.

5.3 Debt

Interest costs enter the calculation of the overall general government balance on the expenditure side and thus increase the annual deficits. Those deficits accumulate in the general government debt, and the growing debt generates further growth in interest costs (see Table 5.3.1 for data for selected years). Over the 50-year horizon, the cumulative general government debt is heading towards approximately 296% of GDP by 2072 (the baseline scenario). This is due mainly to the primary balances, not to our model of interest costs. Even if we were to assume (unrealistically) that long-term real interest rates were zero over the whole projection period, the debt would still head towards roughly 260% of GDP (see Chart 5.3.1).

Besides this version of the interest expenditure projection, we carry out an alternative projection with interest feedback in which we take into account the relationship between the size of the debt relative to GDP on the one hand and the interest rate level on the other. In the simulation, we assume that each percentage point of the debt-to-GDP ratio above the 55% threshold increases the current ten-year real interest rate by 0.039 pp.[69] Under these assumptions, starting in 2028, when, according to our projection, the debt will breach the debt brake threshold, the debt growth would be accelerated compared with the baseline scenario. In 2042, the debt would become unsustainable and the Czech Republic would fall into a debt trap, as the implicit interest rate would exceed the rate of growth of nominal GDP.

Table 5.3.1 Interest costs and budget balances (% of GDP) in selected years

|	2022	2032	2042	2052	2062	2072
Interest costs (baseline scenario)	0.8	1.6	2.6	4.2	6.1	7.4
Total balance (baseline scenario)	-3.2	-5.0	-8.5	-12.6	-15.4	-15.6

Source: CFC calculations.

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[67] See MF CR (2022): Strategy for the Financing and Management of the State Debt of the Czech Republic 2022.
[68] CNB nominal interest rate data. We used the GDP deflator from CZSO data to convert to the real interest rate.
[69] For an estimate of the risk premium, see Tománková (2020): The Effect of General Government Debt on Government Bond Interest Rates.

Chart 5.3.1 General government debt
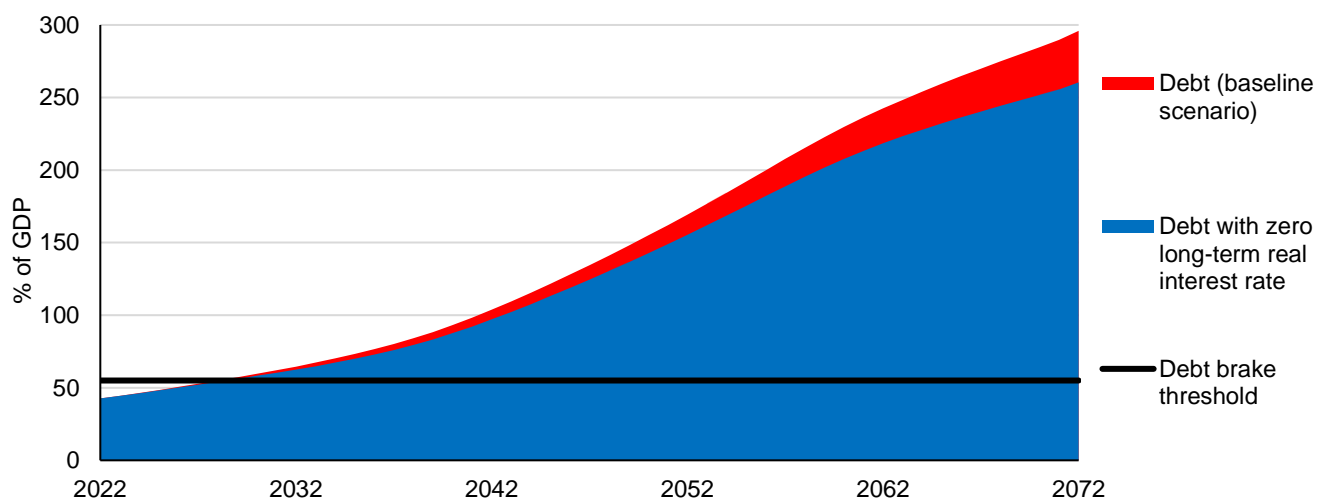
Source: CFC calculations.

5.4 Public finance sustainability indicator

The S1 indicator is used as an overall indicator of the sustainability/unsustainability of public finances. It is generally defined as the number of per cent of GDP by which the primary structural balance would have to change (by the same number of per cent of GDP every year) over an entire given period for the debt to reach a given level by the end of that period.[70]

In our case, we will therefore select a 50-year period and ask how many per cent of GDP the primary balance would have to be better every year relative to our projection for the general government debt to be at 55% of GDP, i.e. the debt brake level, at the end of the projection period. The S1 indicator constructed this way describes the **public finance sustainability gap**. However, let us emphasise that this indicator is intended primarily to allow for a quick comparison in the future of whether public finance sustainability is improving or worsening. It is **not** a recommendation that the balance should improve by the given figure each year in reality.

According to our simulation, the public finance sustainability gap currently stands at 6.04 (the figure last year was 6.98). This means that if the primary structural balance was 6.04% of GDP better

every year from 2022 onwards over the entire projection period, the debt would head towards 55% of GDP in 2072. Given that in such case the debt path would never exceed the debt brake, there would be no feedback between interest rates and the debt.

If measures to reduce the long-term public finance imbalance are put off, the changes to tax and expenditure policies needed to ensure that the debt will not exceed 55% of GDP in 2072 will have to be larger than that expressed by the sustainability gap indicator value presented above. If solutions are delayed until the debt brake threshold is reached (i.e. until 2028 according to the projection), the gap will widen to 6.74.[71]

Note that the similar indicator (S2) constructed by the European Commission, which, however, uses an infinite horizon instead of a 50-year projection period and expresses the fiscal effort needed for discounted revenue to equal discounted expenditure, is 7.7 for the Czech Republic in 2021[72] (4.8 in 2020[73]). Given the requirement for balanced revenue and expenditure, S2 is stricter than our measure of the sustainability gap when identical data are used.[74]

[70] For a more detailed description, see European Commission (2020): Debt Sustainability Monitor 2019.
[71] So, for the debt to head towards 55% of GDP in 2072, the primary deficit would have to be 6.74% of GDP lower from 2029 to 2072.
[72] European Commission (2022): Fiscal Sustainability Report 2021.
[73] European Commission (2021): Debt Sustainability Monitor 2020.
[74] The S2 calculation based on Debt Sustainability Monitor 2020 contained in last year's European Commission report used the data valid as of 5 November 2020. However, fundamental changes to the tax system, most notably the abolition of the supergross wage, were approved in December 2020. It is the inclusion of the impacts of these changes that makes S2 considerable stricter in this year's European Commission report.

6 Alternative scenarios and additional analyses

The baseline scenario of our projection used in the previous sections was calculated on the assumptions that the modified medium variant of the CZSO's demographic projection will materialise and the current tax and expenditure policies will be maintained. To at least partly illustrate potential deviations from our baseline scenario, which can generally be significant in long-term projections, we prepared a set of alternative scenarios described in more detail below.

Two of the alternative scenarios are drawn up for the medium variant of the demographic projection. In them, we consider a change in the retirement age and a more optimistic assumption about the long-term growth of the economy. Another alternative scenario then tries to illustrate the impact of the increased immigration in 2022 associated with the war in Ukraine and related different assumptions regarding demographic change.

6.1 Linking of the retirement age to life expectancy

In the first alternative scenario, instead of using the current retirement age we assume that the retirement age is linked to life expectancy as per Section 4(a) of Act No. 582/1991 Coll. In such case, the retirement age (the same for men and women) would be set so that the remaining life expectancy of those who reach it (i.e. the time they will spend retired) equals a quarter of their overall life expectancy. To simulate this alternative scenario, we used the CZSO's retirement age projection,[75] which we prolonged to allow us to perform the projection up to the end of our projection period (i.e. up to 2072). We assume that until 2030, as in the baseline scenario, the retirement age would increase to 65 years, where it would stay for a short while. From 2034 onwards it would be gradually extended further to 67.9 years at the end of the projection.

The gradual increase in the statutory retirement age will foster lower deficits and lower debt in the projection through a number of channels. First, it will slightly raise the projected GDP level, because later retirement will gradually increase the number of workers in the economy (by about 5% by the end of the projection by comparison with the baseline scenario).[76] There will be a proportionate increase in general government revenue. However, the main change will be on the public budget expenditure side.

In the pension system, there will be a modest rise in expenditure on disability pensions and – thanks to an increase in the coverage period – in the average old-age pension as well. However, the increasing retirement age will be felt mainly in a drop in the number of old-age pensions paid, which will lead to lower spending on them. The number of old-age pensioners will thus be as much as 12.5% lower in 2072 than in the baseline scenario. Total spending on old-age pensions will be 10% lower. To a lesser extent, widows' and widowers' pensions will also decrease compared with the baseline scenario, with a decline in the number of these pensions outweighing a modest rise in solo widows' and widowers' pensions. The balance of the pension system will be around 1.0–1.8% of GDP better from 2050 until the end of the projection as a result of the gradual increase in the retirement age. The reduction in pension system deficits will lead to a commensurate decrease in primary structural deficits and, together with the slightly higher GDP level and lower interest payments, to a debt level that is 46 pp lower than in the baseline scenario in 2072 (see Chart 6.2.1). This scenario therefore has a large positive impact on the future debt level. It is nonetheless apparent that linking the retirement age to life expectancy does not in itself lead to long-term public finance sustainability.

6.2 Faster productivity growth due to technological progress

The next alternative scenario captures the effects of robotisation and digitalisation and their impact on labour productivity. To assess this factor we draw up a scenario in which labour productivity rises 1 pp faster than in the baseline scenario every year both in developed countries and in the Czech Republic.[77] We regard such an increase in the rate of growth as not entirely realistic in the long term, because the waves of technological innovation seen in recent decades have not been reflected too strongly in total

productivity growth. This alternative scenario is also less realistic in light of the current decline in GDP linked with COVID-19, the war in Ukraine and the related negative supply shock. The alternative scenario thus serves rather to illustrate the sensitivity of the projection to an acceleration in labour productivity growth.

In the technological acceleration scenario, we keep the other parameters, such as the rate of

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[75] See CZSO (2018): Zpráva o očekávaném vývoji úmrtnosti, plodnosti a migrace v České republice [Report on Expected Mortality, Fertility and Migration in the Czech Republic, available in Czech only].

[76] The number of workers will rise despite the fact that some of those forced to go into old-age retirement later due to the increase in the retirement age will transfer to disability retirement before reaching retirement age.

[77] See section 3.

convergence of the Czech economy to other countries, steady-state GDP growth abroad and the growth in the ratio of compensation of workers to gross value added, the same as in the baseline scenario.

Thanks to higher GDP growth per worker, real wage growth will therefore also increase relative to the baseline scenario. The number of workers this scenario is equal to that in the baseline scenario. As a result, we do not assume any structural unemployment which could arise temporarily as a result of the deployment of new technology.

The budget revenue side expressed as a percentage of GDP is not affected, because real incomes and GDP grow in parallel. The expenditure side will see an improvement in spending on pensions. Permanently higher real wage growth causes pensions granted in previous years to lag further behind real wages than in the baseline scenario, because the statutory indexation of pensions covers only half of the real growth in wages. Thanks to the higher GDP growth in this scenario, the debt carried over from previous years will also be lower in relation to GDP. Overall, the general government debt ratio is as much as 69 pp lower than in the baseline scenario, but even this very optimistic scenario does not in itself lead to a sustainable public finance path (see Chart 6.2.1).

Chart 6.2.1 General government debt – comparison of alternative scenarios with the medium variant
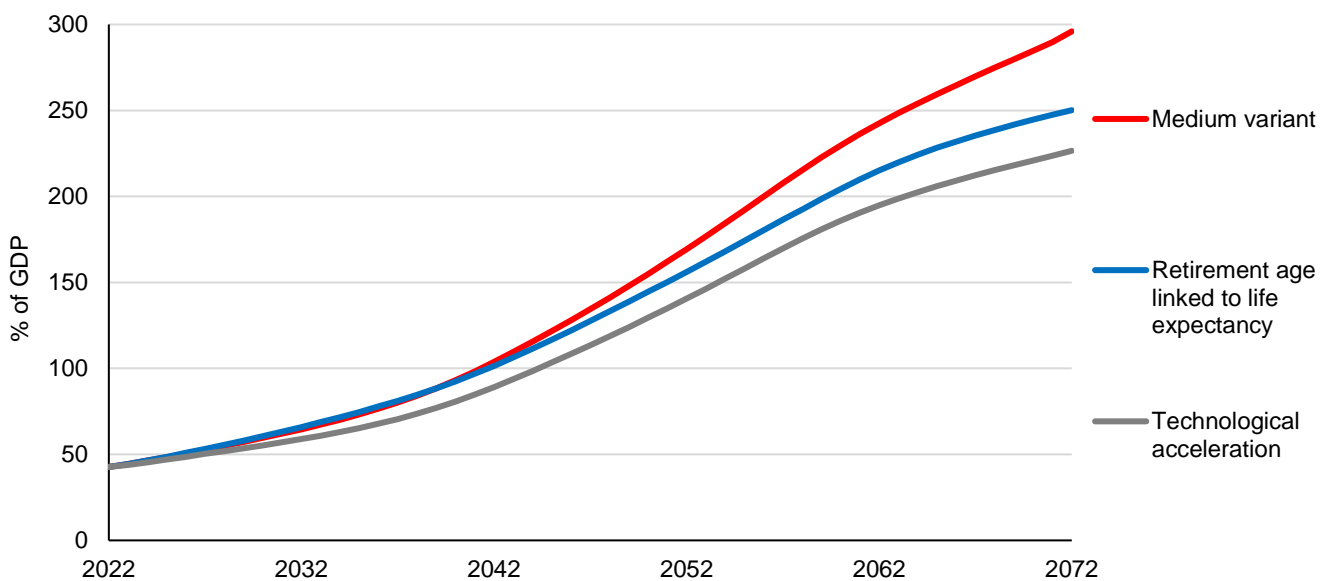
Source: CZSO (2022), CSSA (2022); CFC calculations.

6.3 Potential impacts of the reception and integration of refugees from Ukraine on long-term public finance sustainability

The large wave of migration in 2022 linked with Russia's invasion of Ukraine is without doubt a major change that has the potential to affect long-term public finance sustainability. By the end of May 2022, a total of 347,590 people had come to the Czech Republic from Ukraine, 64% of them women and 36% men. In the age group of 0–18 years, the numbers of males and females are almost equal (around 64.1 thousand men and 63.5 thousand women). Female immigration dominates in the case of working-age persons (150 thousand women and 57.8 thousand men), as the Ukrainian government has banned men of military age from leaving the country. The Czech Republic has also so far taken in 12,170 persons aged 65+, specifically around 3.2 thousand men and 9 thousand women (although the difference here is linked with the general demographic structure – there are fewer elderly men than women). However, the information about the age structure of the migration wave is only approximate, so we had to adjust the migrant age distribution according to the overall structure of the Ukrainian population before the Russian invasion. We additionally assume that 60% of the refugees will stay in the Czech Republic in the long term and the rest will either return or move to other countries.[78]

We therefore added these refugees to the Czech population and used the demographic projection

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[78] This assumption is based on Dustmann, Weiss (2007): Return Migration: Theory And Empirical Evidence For The UK. British Journal of Industrial Relations, vol. 45(2), pp. 236–256.

adjustment methodology[79] to simulate the expected future size and age structure of the population. We considered the same demographic projection parameters (age-specific mortality and birth rates) for refugees as for the existing population. Ukrainian migration is currently dominated by women of working/childbearing age. As a result, the current migration wave is affecting the population count not only directly, but also indirectly by increasing the number of children born in the future. The projected population is therefore 299 thousand persons higher at the projection horizon than in the medium variant of the adjusted demographic projection (see Chart 6.3.1, right-hand scale). Owing to the age structure of the migration wave, there will also be a modest improvement in the dependency ratio (the number of persons of working age per person aged 65+). While in the medium variant of the projection the dependency index reaches its minimum at the level of 1.66 in 2059, in the "Ukrainian variant" it is 1.68 in the same year.

Chart 6.3.1 Comparison of demographic characteristics of the medium and "Ukrainian variants": No. of persons aged 21–64 per person aged 65+ and total population
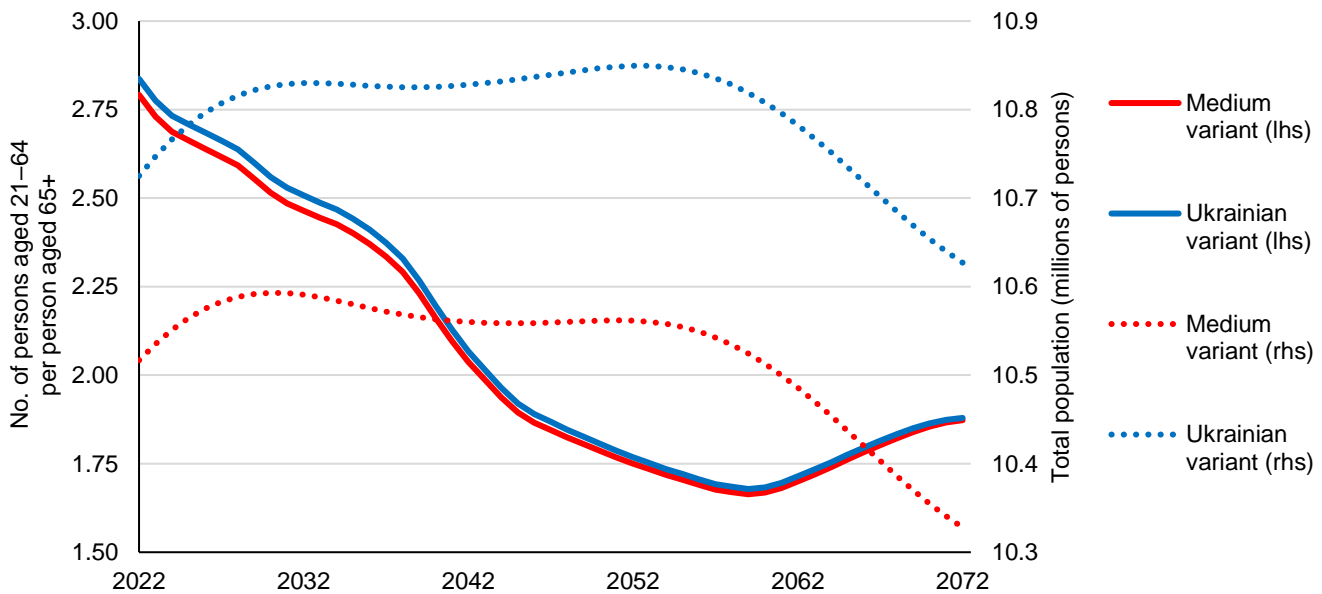
Source: CZSO (2022), Czech Interior Ministry (2022); CFC calculations.

We also assume in our simulation that the resettled refugees will show the same labour productivity, participation rate and unemployment rate as the rest of the population. Ukrainian employees will foster higher GDP and increased public budget revenues, especially from personal income tax and social and health insurance and also from other types of taxes. On the other hand, the refugees will give rise to higher expenditure, initially primarily on social benefits, health care and education. Later on, when the migrants who are currently of working age reach retirement age, pension system spending will go up.[80]

The net effect of these various opposing factors is that the debt will record slightly smaller increments in the near term. At the projection horizon, by contrast, it will be rather higher (see Chart 6.3.2) due to higher spending on pensions. However, the differences relative to the medium variant of the projection are marginal.

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[79] See the OCFC Information Study Hlaváček, Junicke (2021): Alternativní demografické projekce [Alternative Demographic Projections, available in Czech only].

[80] Under international agreements, refugees who have spent part of their lives working in Ukraine (or other signatory countries) have their coverage period in Ukraine taken into account. So, even where such employees work in the Czech Republic for less than the minimum coverage period (currently 35 years), if their combined period of coverage in the Czech Republic and Ukraine exceeds the minimum coverage period they will be eligible for an old-age pension in the Czech Republic on reaching retirement age. However, this pension will be reduced proportionately. A notional pension will first be calculated on the basis of their income in the Czech Republic. This notional pension will then be multiplied by the Czech coverage period divided by the total coverage period. In our projection, we first treated migrants in the same way as Czech employees (that is, we assumed the same retirement and replacement rates for them) and then factored in the reduction in pensions due to their shorter coverage period. The reduction in pensions was greater for older migrants, smaller for younger ones and zero for persons born after 1990.

**Chart 6.3.2 General government debt – comparison of different variants of the demographic projection**
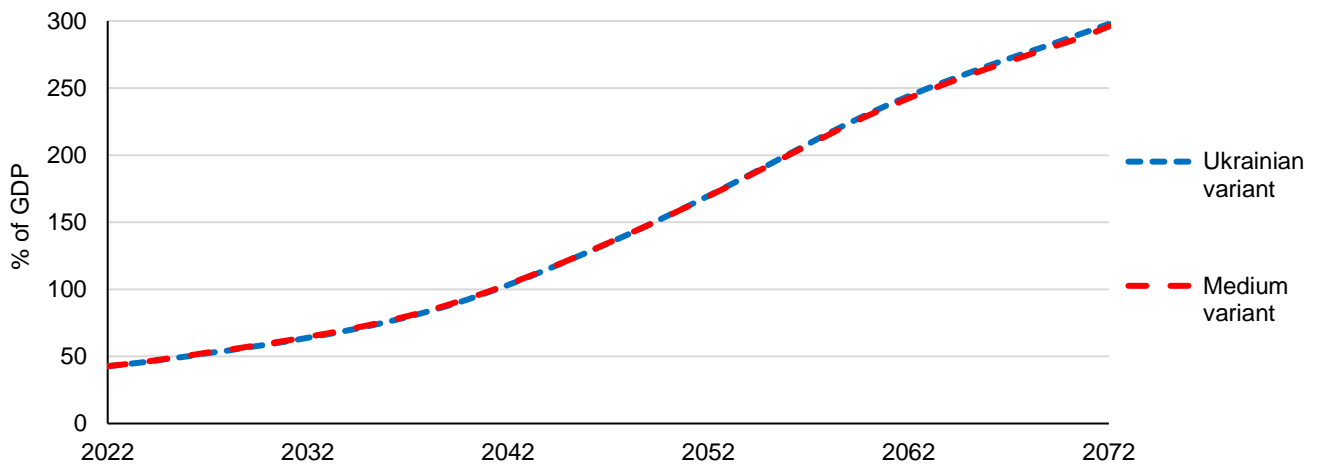
6.4 Generational accounts in the pension system

6.4.1 Generation-specific revenue and expenditure

In this section, we examine generation-specific revenue and expenditure in individual years. These show how the fiscal burden is distributed across the generations.[81] The largest generation-specific item is undoubtedly pension system revenue and expenditure, which we analyse in more detail in the following section. However, population ageing and the entry of baby-bust cohorts into the labour force affect not only the pension system, but also health care expenditure and generation-specific social benefits. We consider roughly 43% and 48% of total public budget revenue expenditure respectively in 2020 to be generation-specific.

Chart 6.4.1 depicts the age profile of revenue and expenditure per person of a given age. It is clear that children in the first three years of life are net recipients, primarily due to the payment of maternity and parental leave and also due to increased health care costs. Education benefits follow from the age of two years up, dominating until roughly the age of 18. Child/student-linked personal income tax discounts, which are also considered to be a social benefit and which we assign to children, are also significant.

**Chart 6.4.1 Payments and receipts per person of a given age in 2020**
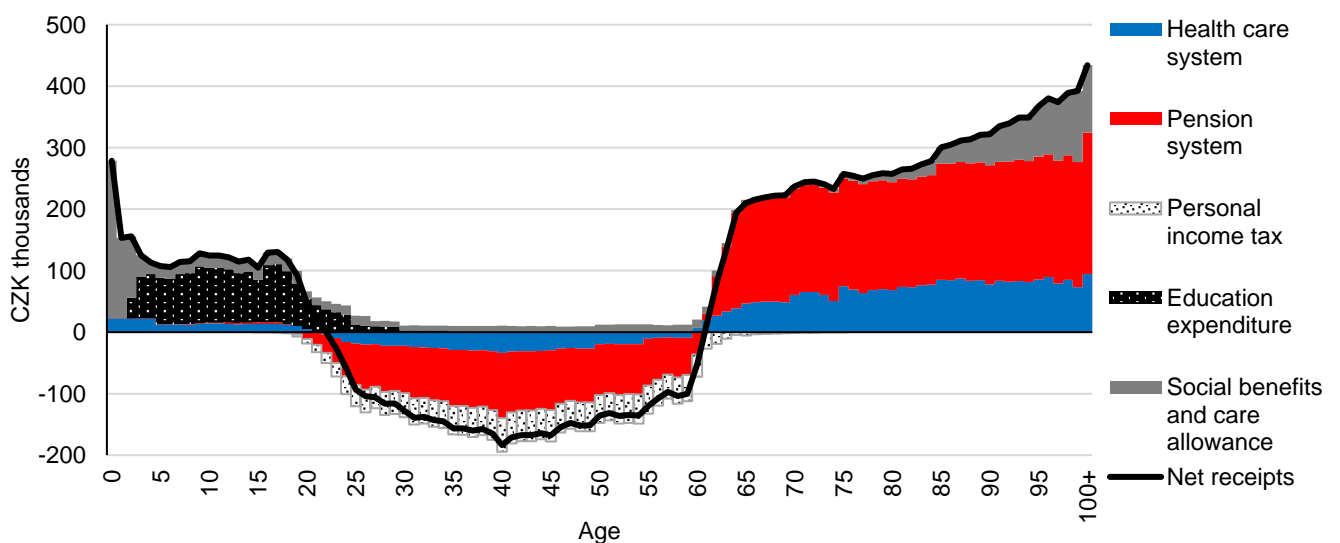
[81] For a description of the generational accounting methodology, see OCFC (2021): Metodika mezigeneračních účtů [Generational Accounting Methodology, available in Czech only]. See also Box 6.1 Generational accounting methodology in last year's Report (2021).

People of working age are conversely net contributors on average, as their contributions to the system in income tax and health insurance and social security contributions exceed the benefits that these generations draw from the system. Post-working age generations are again net beneficiaries, gaining most from the pension and health care systems. On average, a person aged between 22 and 60 years is thus a net contributor to public budgets at present.

The generational accounts also reveal that the average individual born in 2000–2004 (i.e. from the first generation whose entire life cycle we cover) will receive CZK 12.7 billion more from public budgets over their lifetime than they will contribute to them. However, each member of the generation born 50 years later will receive CZK 18.6 billion more than they contribute if policies are left unchanged.[82] As Chart 6.4.2 shows, generations born up to 2065 are net beneficiaries in the public finance system in our projection. Generations born later are still economically active in our defined period, but their entire retirement age period is not covered. Overall, they are therefore net contributors. In the long term stretching beyond 2150, however, these generations will also turn into net beneficiaries under unchanged policies.

Chart 6.4.2 Public budget payments and receipts of a given generation[83]
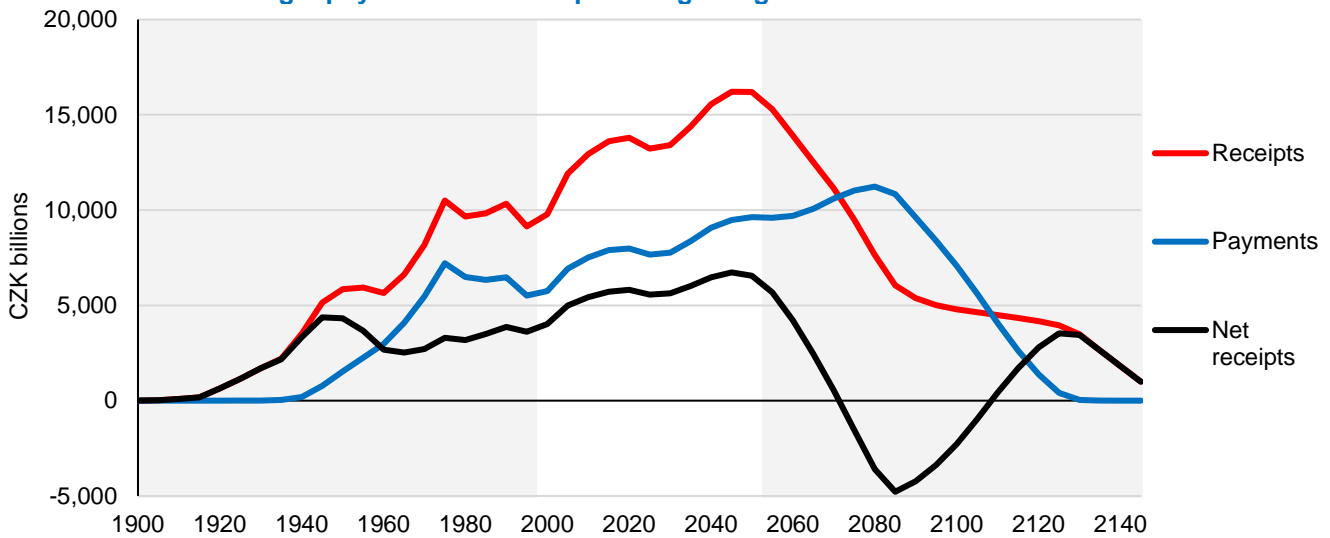
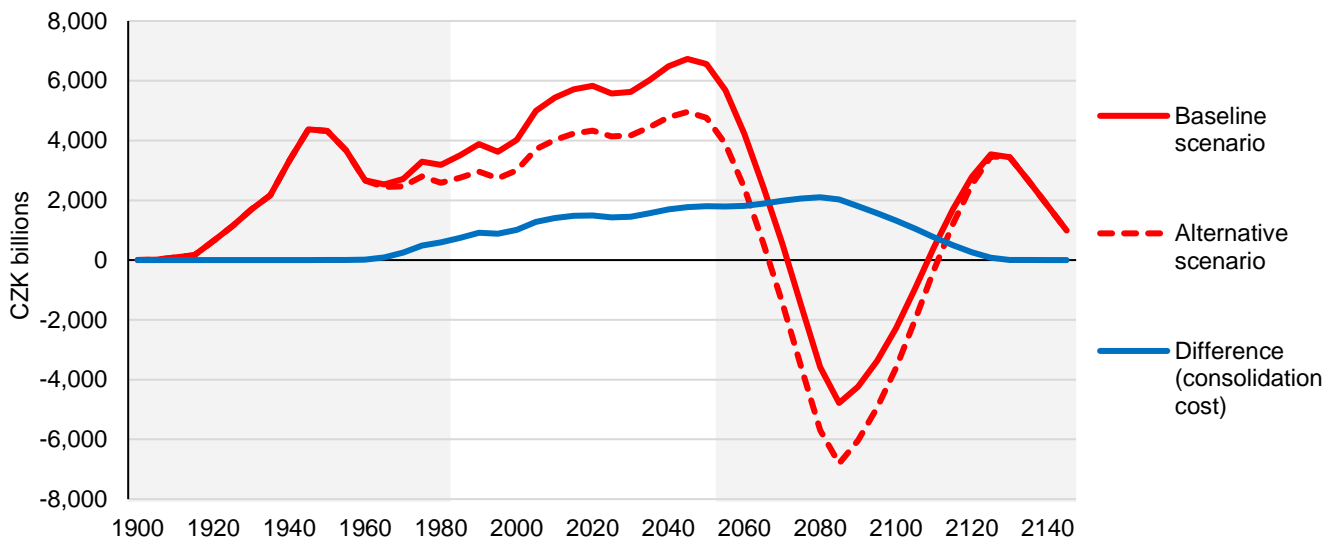Source: CZSO (2022), CSSA (2022); CFC calculations.

Chart 6.4.3 shows how the net receipts of each generation would change if we assume higher taxation at the rate at which general government debt would stay at the debt brake level (55% of GDP) until 2072. We assume that the tax burden is increased in 2029, a year after the debt brake is reached. If we take only generation-specific revenue and expenditure into account, the tax burden would have to be increased by 36%, either directly through personal income taxation or in combination with social security or health insurance contributions. In this case, net receipts would rise for all generations from 1950 on, while the burden would increase for generations born after 1990. If there were an equal increase not just in taxes deducted from income, but also, for example, in excise duties, the increase in the tax burden would be smaller (around 18%).

It is clear when we compare the baseline no-change scenario with the alternative sustainable finance scenario that future generations, especially those born after the 2040s, will bear the largest burden (see Chart 6.4.3).

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[82] Revenue and expenditure are expressed in real terms in 2021 prices and are discounted by a real interest rate of 1%.
[83] The figures in the charts in sections 6.4.1 and 6.4.2 covering the period 1900–2150 (or 1950–2100) are in 2021 prices and are discounted by a real interest rate of 1%. The x-axis shows the individual generations by the five-year periods of their birth. Generations whose entire career or entire pension period is not covered are indicated in grey.

Chart 6.4.3 Net receipts of each generation – baseline and alternative scenario[83]

Source: CZSO (2022), CSSA (2022); CFC calculations.

6.4.2 Generational accounts and the pension system

In the previous section, we compiled generational accounts for the widest possible set of generation-specific household revenues and expenditures. To discuss the impacts of pension system reform on various different generations, it is appropriate to examine specific pension system revenues and expenditures in the framework of these generational accounts.

The Czech pension system is based largely on intergenerational solidarity, with social security contributions paid by the economically active generation being used directly to pay existing pensions ("pay-as-you-go"). In the generational accounts model, we therefore include the pension insurance payments of the working population (i.e. pension system revenue), which we then compare with expenditure on pensions paid to the economically inactive population. In the projection of expenditure on the pensions of individual generations, we use the expenditure calculation method presented in section 4.1 of this Report.[84] We consider spending on old-age, disability, widows', widowers' and orphans' pensions. For the projection of pension system revenue decomposed into generations, we began with the method used to calculate such revenue for the pension system as a whole (see section 4.6 of this Report). We

then divided these contributions to the pension system by generation on the basis of the volume of wages paid. We left the ratio of the wage of a generation of a particular age to the average wage in the economic as a whole, as well as the participation rates and cyclically adjusted unemployment rates of each cohort, constant over time. In the baseline scenario, we assume the same pension system parameters as in our projections described in section 4.1. Here, we calculate how much each generation will pay into the pension system in total and how much it will receive in old-age, disability and other pensions in the period 2000–2150 (see Chart 6.4.4).[85] The net amount received from the pension system (pensions paid out minus social insurance contributions paid in) for each generation is thus determined by the pension per pensioner, but also reflects the generation's relative population size, life expectancy and retirement age. In the period 2000–2150, the current older generations no longer contribute to the system and merely draw pensions (the left-hand part of Chart 6.4.4). Conversely, the youngest generations, which have yet to be born and do not reach retirement age in our projection period, merely contribute to the system (disability and orphans' pensions excepted; see the right-hand part of Chart 6.4.4).

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[84] See also OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].
[85] Revenue and expenditure are expressed in real terms (2021 prices) and are discounted by a real interest rate of 1%.

Chart 6.4.4 Pension system payments and receipts of individual generations[83]
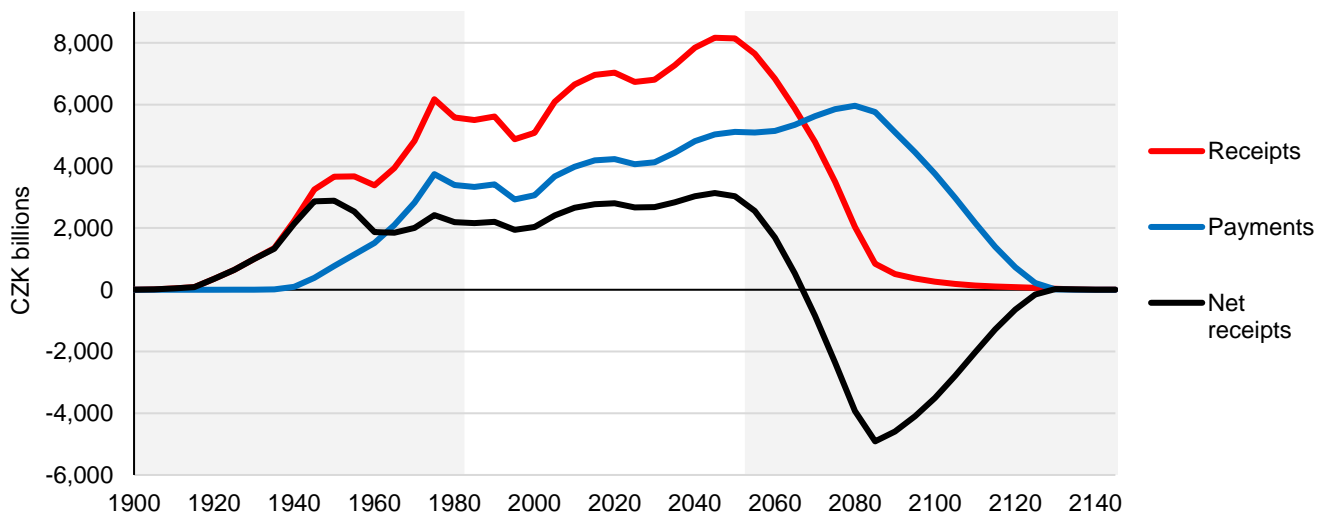
Source: CZSO (2022), CSSA (2022); CFC calculations.

The generations whose entire work and pension cycle we cover begin with the one born in 1980 and end with the one born in 2050. All these generations get more out of the pension system than they pay into it. Younger generations receive more, owing mainly to a combination of higher life expectancy and the capping of the retirement age at 65 years. The higher net receipts of these generations are also due to their real income levels. However, the calculation presented in Chart 6.4.4 does not take account of the fact that the present configuration of the pension system is unsustainable in the long term and leads to an escalation of government debt, as described in section 5. The considerations of any pension reform therefore raise the question of which generations will bear the brunt of that reform and whether it will burden some generations more than others. It is also not certain whether delaying pension reform will hit younger generations considerably harder than older ones.

We therefore prepared a set of simple possible alternatives, which we construct in such a way that the accumulated pension system balance is zero in 2072. There are several ways of achieving this. One can change the revenue side of the pension system (raise the social security contribution rate) or change the expenditure side (reduce the replacement rate and hence reduce pensions), or do a combination of the two. Another option is to move the retirement age (see section 6.1), which has a similar effect as reducing pensions. Below, we consider two options separately: the situation where only the social security contribution rate rises and pensions stay the same as in the baseline scenario in relation to the average wage (see Chart 6.4.5) and the situation where the contribution rate stays unchanged and pensions fall relative to the wage, i.e. the replacement rate decreases (see Chart 6.4.6).

In both variants we consider various alternative changes. In alternative 1, we assume that the pension system is balanced every year. For each year, we therefore calculate the contribution rate/replacement rate that equalises pension system revenue and expenditure. In this alternative, the central authorities put the reform of the system on hold until the current relatively favourable pension system situation starts to worsen due to population ageing. This alternative leads to pension insurance rates being essentially flat at roughly 29–30% of revenue until 2035, i.e. only slightly above the current rate of 28%. However, the rising number of pensioners then causes them to rise above 40% in 2060. This means that in 2060, economically active generations would face a pension insurance burden 12 pp higher than the current working generation, which by then will be drawing pensions. Conversely, keeping the current pension insurance rate would mean that pensions would have to be lowered from the current level of about 43% of the average wage to 29.2% around 2060. In this case, the current economically active generation would bear the debt sustainability burden, as it would receive lower pensions than current pensioners.

In the other alternatives, we raise the pension insurance rate or lower the replacement rate so that the pension system is cumulatively in equilibrium by 2072.[86] Alternatives 2 and 3 differ from each other in

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[86] These alternatives are therefore configured so that the net present value of pension system revenue over 2022–2072 equals the net present value of pension system expenditure over the same period. Unlike in alternative 1, in which the pension system is stable over the entire period 2022–2150, in alternatives 2 and 3 the pension system is not necessarily stable after 2072.

terms of when the pension insurance rate starts to rise or the replacement rate starts to fall. In alternative 2, we consider an increase in the rate starting in 2029, i.e. a year after the debt brake threshold is reached. In alternative 3, the rate increase occurs in 2042, when, according to our projection, the interest rate will exceed nominal GDP growth and the debt will become unsustainable. Needless to say, the greater the delay in raising the rate, the bigger the response required. The insurance rate rises from the current 28% of revenue to 35.9% in alternative 2 and 39.9% in alternative 3. The question is, however, whether such a large rise in the insurance rate would cause labour costs to rise above the viable level, with impacts on overall macroeconomic performance.

It is apparent from Chart 6.4.5 that increasing pension insurance rates would put the biggest burden on younger generations. These impacts are greatest in alternatives 1 and 3, with recently born and future generations being hit much harder than those born before 2000. Raising the rates earlier is rather fairer across the generations than the other alternatives, as it spreads the costs of stabilising the pension system over more generations.
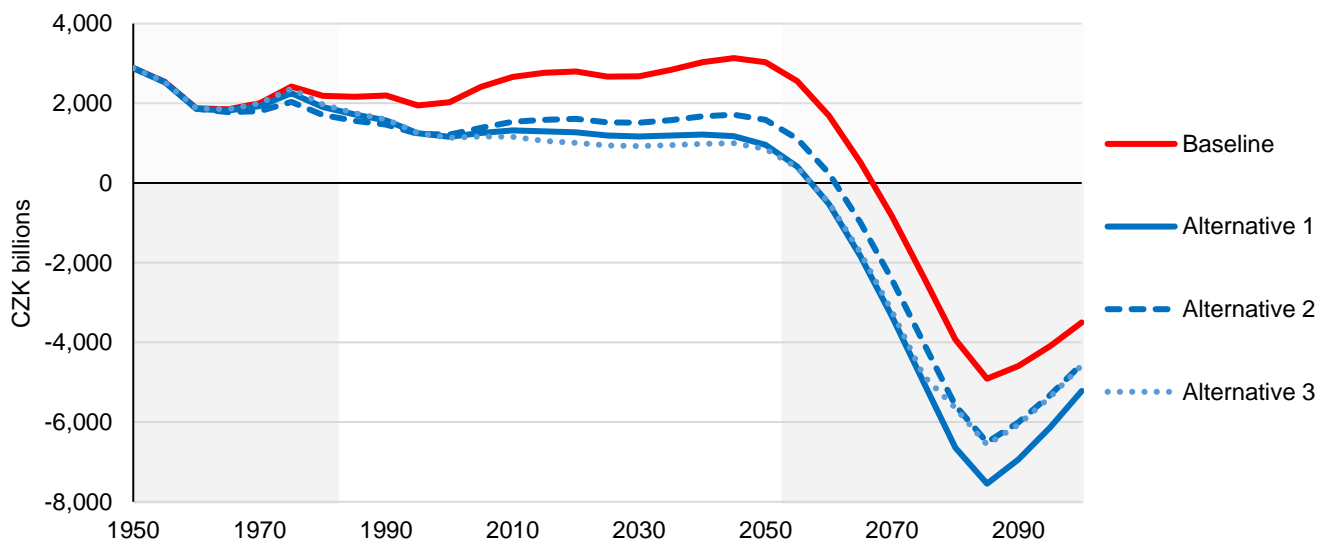
If we assume that the pension insurance rate stays at the current level of 28% in the future and the retirement age does not change either, it will be necessary to lower the replacement rates to achieve a balanced pension system. Chart 6.4.6 shows that

both older generations (starting with the one born in the 1960s) and younger ones will be worse off in the event of a reduction in pensions, so the impacts of the consolidation of the pension system will be distributed more evenly across generations by comparison with an increase in the pension insurance rate at the same moment in time. Again it holds true that if the reduction occurs earlier, the burden will be split more evenly across the generations. If, conversely, pensions start to be reduced later, the impact on older cohorts will be smaller at the expense of younger generations.

Our projection of changes in the configuration of the pension system is simplified in many respects, because taking full account of all aspects of the pension system and the ways of making it balanced in the future would make our analysis less clear. For instance, the projection does not take into account the option of increasing the retirement age or the option of funding the pension system from tax revenues other than social security contributions. We also do not consider pillars of the pension system other than the currently dominant pay-as-you-go one.

It is clear from our projection, however, that putting off changes to the pension system will be asymmetrically burdensome on younger generations born after the turn of the millennium.

Chart 6.4.5 Rising insurance rate scenario (net balance)[83]

Source: CZSO (2022), CSSA (2022); CFC calculations.
Note: In each alternative, the pension insurance rate is raised in such a way that the pension system is balanced in 2072. In alternative 1 this is achieved by means of a balanced pension system every year, while in alternatives 2 and 3 we consider an increase in the rate starting in 2029 (i.e. a year after the debt brake threshold is reached) and in 2042 respectively.

Chart 6.4.6 Falling replacement rate scenario (net balance)[83]
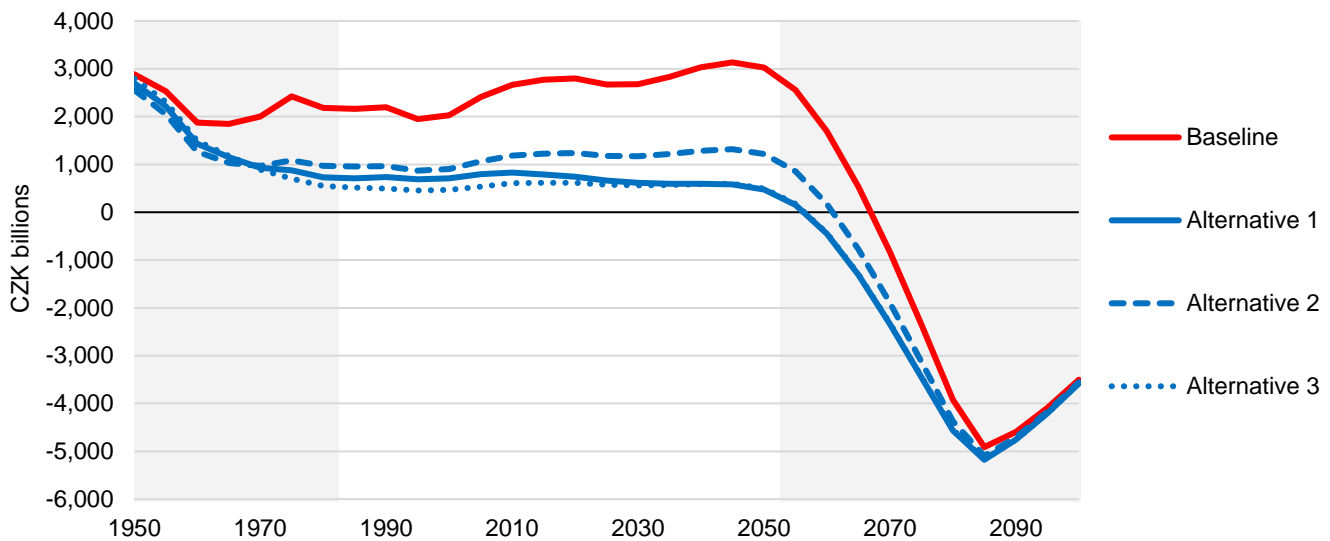
Source: CZSO (2022), CSSA (2022); CFC calculations.
Note: In each alternative, the replacement rate is raised in such a way that the pension system is balanced in 2072. In alternative 1 this is achieved by means of a balanced pension system every year, while in alternatives 2 and 3 we consider an increase in the replacement rate starting in 2029 (i.e. a year after the debt brake threshold is reached) and in 2042 respectively.

6.5 Comparison with the previous Report

This year's Report is rather more optimistic than the 2021 one as far the assessment of public finance sustainability is concerned. The debt at the end of the projection period has gone down from 334% of GDP last year to 296% of GDP in this year's Report. Even so, the projected debt is substantially higher than it was in previous Reports (in 2020, for example, it was only 202% of GDP at the end of the projection).

The decrease in the debt at the projection horizon is due mainly to a minor improvement in the starting position; nominal GDP in 2021 was approximately 3% higher than forecasted by the Ministry of Finance last year.[87] The higher-than-forecasted nominal GDP resulted primarily from faster growth in prices and was reflected in, among other things, higher state budget revenue. The output gap was +0.1% of potential output instead of previously estimated −1.4%. The deficit of the public institutions sector in 2021 reached 5.9% of GDP. In spite of hight deficit, the increase in the debt-to-GDP ratio was less significantly than expected. The deficit did not reach the expected level (8.8% of GDP) and the nominal GDP reached a higher value than was estimated. This led to an increase in the debt-to-GDP ratio of 4.4 pp instead of the originally expected 6.7 pp.

The slower growth in debt than in last year's Report was due mainly to lower total general government expenditure. In particular, projected spending on pensions, health care and education were lower. These are all items which depend predominantly on

demographic change. The projections of these expenditures were affected mainly by changes in the demographic projection linked with a revision of the initial age structure of the population. The latter was revised quite considerably by the CZSO owing to the census results. In particular, the estimate of the number of people of working age was reduced. The lower initial population count will in turn be reflected, for example, in a lower projected pensioner count (almost 3% lower around 2060). The number of pensioners is also lower at the start of the projected period, owing to the increased rate of mortality among elderly people connected with the COVID-19 pandemic. The smaller total population will also be reflected in lower projected health care expenditure.

Relaxed expenditure policies are continuing to foster higher primary deficits and growing debt. In particular, the projected old-age pension replacement rate has risen, mainly because of an increase in the initial replacement rate for 2022 and 2023. The rise in this rate in 2022 was driven by high inflation and two related extraordinary pension increases (in June and September), such that pensions rose faster than wages. In 2023, the introduction of the child-rearing bonus will be reflected in the replacement rate. This rise in pensions and the replacement rate will affect pension system expenditure for many years to come.

The changes in the primary structural deficit projection will mean that the debt will hit the debt brake threshold in 2028, four years later than we expected

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[87] This paragraph compares data published in MF CR (April 2021): Macroeconomic forecast of the Czech Republic and MF CR (August 2022): Macroeconomic forecast of the Czech Republic.

in last year's Report. The factors behind this improvement are: the general government outcome in 2021 turned out better than originally expected; the medium-term outlook for the budget deficits so far presented by the new government is more favourable; the increase in the debt-to-GDP ratio is also hampered by the high rate of inflation manifested by a huge increase in nominal GDP. The lower debt projection also implies lower interest costs. This effect amounts to 0.2% of GDP at the start of the projection but gradually rises to 1.1% of GDP at the end as the debt accumulates.

As a result of the decline in the projected primary structural deficits and debt, the public finance sustainability gap has also narrowed – from 6.98% of GDP last year to 6.04% of GDP this year. The sustainability gap indicates how much the primary structural balance would have to improve every year over the period 2022–2072 for the debt not to exceed the debt brake threshold in 2072.

Conclusion

Compared to last Report, the current Report indicates a very slight improvement in the medium-term sustainability of Czech public finances, as the modelled (projected) point of impact with the debt brake has shifted several years later. However, we should add that this slight improvement is particularly more a result of updates of economic data and better-than-expected fiscal outcomes for 2021 than a change in the structural position of Czech public finances. Unfortunately, though, the long-term imbalance is not improving. This is due to an absence of major changes to the most costly and also most demographically sensitive expenditure blocks – the pension and health care systems.

As mentioned several times, the COVID-19 pandemic put public finances under considerable pressure. However, a large proportion of the expansionary fiscal policy pursued over the last two years is not directly linked to the pandemic and thus represents an additional burden on public budgets. In this regard, it is crucial to prevent a repeat of such a scenario in the current energy crisis. The emphasis should be on ensuring that the measures adopted are only one-off and temporary and do not burden the structural balance. The publication of a credible consolidation strategy setting out specific changes affecting structural parameters should be an integral part of the consolidation of public finances.

There is also a need to make changes to the pension system that will at least partly reduce the future long-term imbalance. Phased implementation of minor changes should be avoided, because the risk is that only popular, expenditure-increasing revisions will be made and that they will not be offset by increases in revenue or adjustments to other relevant parameters (such as the retirement age).

The current capital market situation suggests that we can no longer rely on low interest rates, which in the past reduced the debt cost burden and undoubtedly reduced the incentive for fiscal restriction. If the Czech Republic is to maintain its advantage of relatively low debt and debt service costs, public finances need to be put on a sound footing as soon as possible.

Appendices

D.1 Summary of general government revenue and expenditure in selected years (% of GDP) – medium variant of demographic projection

	2022	2032	2042	2052	2062	2072
REVENUE						
Personal income taxes	3.4	3.5	3.5	3.6	3.6	3.7
Corporate income taxes	3.2	3.0	2.8	2.6	2.5	2.4
Other current taxes	0.2	0.2	0.2	0.2	0.2	0.2
Social security contributions	16.2	16.1	16.2	16.6	16.8	16.8
pension insurance	*8.5*	*8.7*	*8.9*	*9.0*	*9.1*	*9.2*
public health insurance (excluding state insurees)	*4.5*	*4.6*	*4.7*	*4.8*	*4.8*	*4.9*
payments for state insurees	*2.0*	*1.6*	*1.4*	*1.6*	*1.6*	*1.5*
other	*1.2*	*1.2*	*1.3*	*1.3*	*1.3*	*1.3*
Taxes on production and imports	11.7	11.7	11.7	11.7	11.7	11.7
Property income	0.6	0.6	0.6	0.6	0.6	0.6
Other revenue	4.8	4.8	4.8	4.8	4.8	4.8
TOTAL REVENUE	40.1	39.9	39.9	40.1	40.3	40.2
EXPENDITURE						
Pensions	9.0	9.1	10.9	12.6	12.9	12.0
Health care (public health insurance system only)	5.6	6.0	6.3	6.5	6.6	6.6
Other social benefits in cash	3.1	3.2	3.6	3.9	4.1	4.1
Payments for state insurees	2.0	1.6	1.4	1.6	1.6	1.5
Long-term care outside the public health insurance system	0.6	0.7	0.8	0.9	1.0	1.0
Education	5.1	5.1	5.1	5.5	5.6	5.4
Other expenditure – baseline scenario	17.0	17.0	17.0	17.0	17.0	17.0
Changes related to convergence	0.0	0.7	0.7	0.7	0.7	0.8
public investment	*0.0*	*-0.1*	*-0.2*	*-0.3*	*-0.3*	*-0.3*
defence expenditure	*0.0*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
growth in general government costs (wages)	*0.0*	*0.1*	*0.2*	*0.3*	*0.3*	*0.4*
growth in payments to EU	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Total expenditure excluding interest	42.5	43.3	45.8	48.6	49.6	48.4
Primary balance	-2.4	-3.4	-5.9	-8.4	-9.3	-8.2
Interest (no interest rate feedback)	0.8	1.6	2.6	4.2	6.1	7.4
TOTAL EXPENDITURE (no interest rate feedback)	43.3	44.9	48.4	52.8	55.7	55.8
TOTAL BALANCE (no interest rate feedback)	-3.2	-5.0	-8.5	-12.6	-15.4	-15.6
DEBT (no interest rate feedback)	42.7	64.6	103.8	169.3	242.5	296.0

Source: CFC calculations.
Note: The totals in the table may be subject to inaccuracies due to rounding.