The Czech Fiscal Council

REPORT ON THE LONG-TERM SUSTAINABILITY OF PUBLIC FINANCES

June 2021
The Czech Fiscal Council

Contents

Introduction

A key task of the Czech Fiscal Council (CFC) under Act No. 23/2017 Coll., on the Rules of Budgetary Responsibility, as amended (the "Act") 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.

The Act last year underwent two amendments that led to a substantial relaxation of the rules of budgetary responsibility. The first raised the cap on the structural deficit from 1% to 4% of GDP, with public finances to be consolidated at a rate of 0.5 pp a year in subsequent years.

The second amendment to the Act, passed in December 2020, set no limit on the structural deficit rule as a basis for determining budget expenditure and left the year-on-year rate of growth of consolidation unchanged. The second amendment therefore leads to a 1% structural deficit not being reached again until 2031. This is substantially worse than in the first amendment, as the latter envisaged a return to this key rule of the Act four years earlier.

The changes to the Act fundamentally worsened the starting position of the long-term public finance projection. Public debt rose by almost 8 pp to 38.1% of GDP in 2020 and thus topped 38% of GDP for the first time since 2014. The structural deficit increased to 2.7% of GDP in 2020 and will probably climb to 6.5% this year on the back of the new measures.

The coronavirus pandemic has put public finances objectively under huge pressure, yet fiscal policy during the crisis has also contained measures not linked to the pandemic. Public finances are thus being affected by a combination of temporary economic measures targeted against the impacts of the COVID-19 pandemic and measures worsening the sector's structural position, in particular a significant reduction in personal income taxation, the abolition of real estate acquisition tax and an increase in pensions in excess of the statutory indexation scheme.

The COVID-19 pandemic will recede, but the long-term challenges for public finances will remain relevant. Given that there is no recovery and consolidation strategy for the post-pandemic period, however, public finances will carry a legacy of rising debt for a long time to come.

The basis for assessing public finance sustainability is the long-run future path of general government debt, which has been worsening significantly from year to year ever since the CFC was established in 2018. If current fiscal policy is maintained, the debt brake will be breached as early as 2024, i.e. 19 years earlier than we expected in last year's Report, while the projected general government debt at the end of the 50-year projection horizon will rise above 300% of GDP. The overall impact on public finance sustainability over the COVID-19 pandemic period is thus much worse than we expected in the previous Report.

As in past Reports, however, population ageing is still the main common denominator of future public finance problems. Pension reform-related activities ground almost to a halt during the pandemic, so the Ministry of Labour and Social Affairs did not submitted a pension system reform bill to the government until May this year. However, as we describe in more detail in the text of the Report, the implementation of the proposed pension reform in this form would further exacerbate the problem of long-term public finance sustainability.

Alternative scenarios, moreover, indicate that neither the incorporation of extremely positive impacts of digitalisation and robotisation, nor more favourable demographic trends, will solve the problem of long-term Czech public finance unsustainability either. The linking of the retirement age to life expectancy under the current legislation would considerably improve the long-term sustainability of Czech public finances but would not solve the problem completely.

This Report shows clearly that just one year of relaxed fiscal policy could negatively affect public finance sustainability in the medium and long term. The sharp increase in projected debt in the period covered suggests that the Czech public finance system is in a state of long-term imbalance. A recovery plan and sustainable pension reform will be needed to correct this imbalance, but time is getting very short to prepare and implement them.

As the CFC has repeatedly pointed out, the later changes are made to the public finance system, the more painful and costly they will be. With regard to both current and future generations, it is therefore essential for measures of sufficient quality to be taken as soon as possible.

1 Summary

The current *Czech Fiscal Council Report on the Long-Term Sustainability of Public Finances* shows what impact a short period of expansionary fiscal policy and changes to the fiscal rules can have on the long-term sustainability of public finances. Although the projection in the Report covers a 50-year timescale, the initial conditions set today are fundamental to determining the size of the burden that future generations will have to bear.

The second section of the Report indicates that Czech public finances are currently facing enormous pressure and the COVID-19 pandemic has fundamentally affected the health of public finances. This is due not only to a decline in GDP and related economic measures, but mainly to changes in the long-term settings of fiscal policy – changes often not related to the COVID-19 pandemic itself.

We show in Box 2.1 that the increase in Czech debt during the pandemic completely deviates from the expected path of public debt in the international context. While the Czech government balance was better than the European Union average in 2019 and 2020, the International Monetary Fund's spring outlook identifies the Czech Republic as the country with the second-highest expected debt growth in the EU.

In the third section, we discuss two of the main assumptions on which we base our long-term projection of public finances. The first is real convergence of the Czech economy, characterised by growth in labour productivity and an increasing share of wages in the economy. The second key parameter is the Czech Statistical Office (CZSO) demographic projection, which we adjust for the actual development of the population. In Box 3.1, we discuss how the COVID-19 pandemic has affected demographic trends. In the adjusted demographic projection, the observed higher mortality and better migration balance slightly improve sustainability in the short term. However, as can be seen from the fourth section, which provides estimates of the expenditure and revenue sides of public finances, the problem of population ageing persists in the long run. It undermines the sustainability of the pension system. Without a significant change in the configuration of the pension system, the share of old-age pension expenditure in GDP will increase from the current 7.7% to 12.3% over the next 40 years.

The demographic changes are reflected in other areas of public finances besides pension system expenditure, most notably in health care, education and the system of cash benefits. Box 4.2 describes why the reform of the pension system in the form of the proposal submitted to the government in May 2021 will not ensure the long-term sustainability of public finances. Furthermore, as a result of the adjustment of the tax mix, which we discuss in more detail in Box 4.4, the assessment of the long-term sustainability of Czech public finances has deteriorated significantly.

This is confirmed by the projection developed in the fifth section. Assuming that the current fiscal policy stance and other components of economic policy that affect public debt do not change, the projected government debt will increase to 334% of GDP at the end of the 50-year projection horizon. This is significantly more than the 202% of GDP in the previous projection. Therefore, if there is no change in the current policy, the debt brake threshold (55% of GDP) will be breached as early as 2024, i.e. 19 years earlier than we expected in last year's Report. For the government debt to be no higher than the debt brake threshold in fifty years' time, the government balance would have to improve by 7% of GDP in each year of the projection.

Under the weight of uncertainty associated with the baseline scenario, we have prepared several alternative scenarios in section 6. These show how the projection would look given different demographic variants 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. According to most of the demographic alternatives, the path of public debt is similar to that in the baseline scenario. Both the alternative of linking the retirement age to life expectancy and that of faster productivity growth provide lower debt trajectories, but neither of them in itself leads to long-term public finance sustainability. In addition, an generational accounts analysis reveals that generations born mainly in this millennium will bear the greatest burden of the constant postponement of sustainable pension reform.

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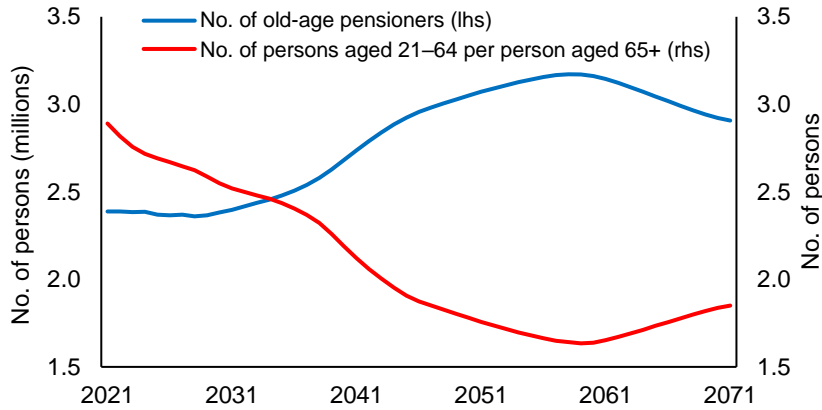
The number of old-age pension-
ers will peak around 2058 at about

3.2 million.

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

1.6

over the next 40 years.
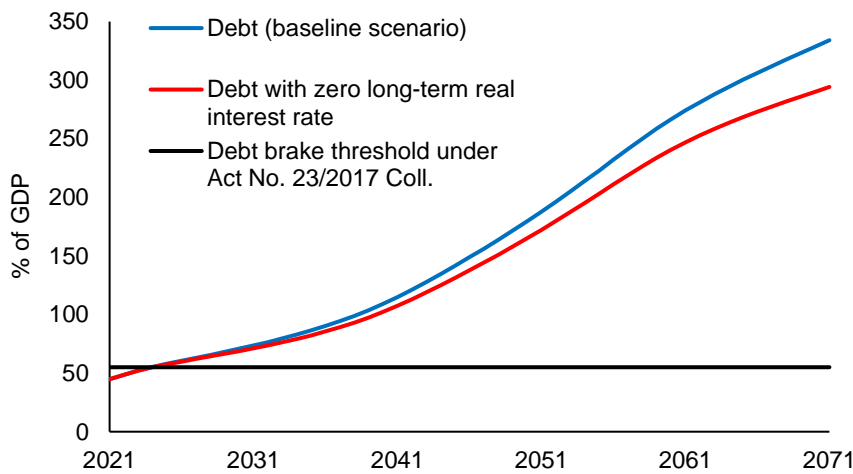
If the current tax and expenditure
policies were maintained, the
debt brake threshold would prob-
ably be breached in

2024.

At the end of the 50-year projec-
tion horizon, the general govern-
ment debt could reach

334% of GDP.
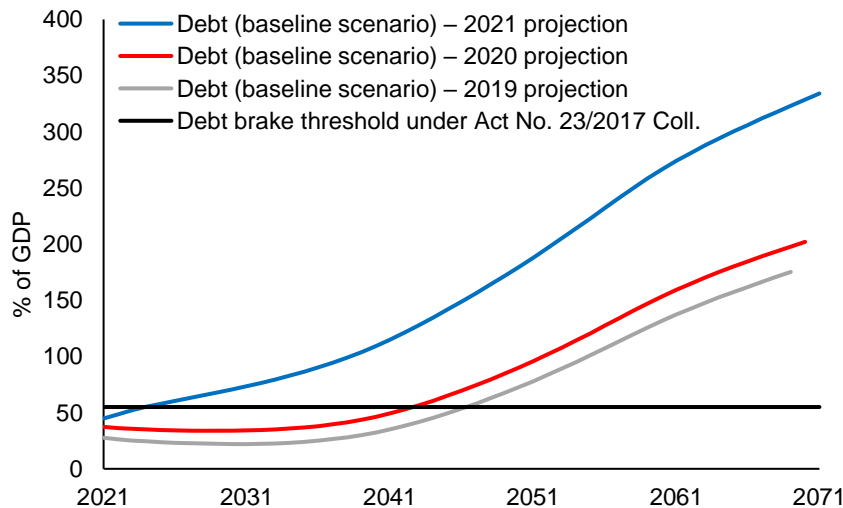
The general government debt in
the baseline scenario is

132 pp of GDP

higher than in the 2020 projec-
tion.

The debt brake threshold would
be breached

19 years earlier

than in the 2020 projection.

7% of GDP

is the amount by which the primary structural balance would have to be better from 2021 until 2071 for
the debt not to exceed the debt brake threshold in 2071.

2 Starting point and medium-term outlook

In the medium-term outlook, fiscal policy is assessed in the context of the current and expected course of the business cycle. The medium-term outlook is the outlook for the current year 2021 and for 2022–2024. This is the same timeframe 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 April 2021.

2.1 Starting point

The Czech Republic's gross domestic product (GDP) recorded a year-on-year decline of 5.6% in real terms in 2020, mainly because of the economic consequences of the COVID-19 pandemic. All the components of GDP except government consumption expenditure contributed to the decline. The sizeable contraction of the economy caused output to fall below its potential level, and the output gap thus reached –3.1%.[1]

The contraction also significantly affected general government finances, which moved from a surplus of 0.3% of GDP in 2019 to a deficit of 6.2% of GDP. Central government had the dominant effect on this result, recording a deficit of 6.4% of GDP, while local government posted a modest surplus and social security funds a zero balance. The structural balance reached –2.7% of GDP, which represents a year-on-year deterioration of 1.7 pp. A large part of the deficit arose as a result of one-off and temporary measures aimed at mitigating the impacts of anti-COVID-19 measures on economic agents and households (in particular the Antivirus programme and the compensation bonus). They totalled 2.3% of GDP.

According to the MF CR projection[2] for 2021–2024, this period should see renewed growth of the economy and gradual closure of the negative output gap. However, the improving situation will not be fully reflected in the general government balance, as numerous measures have been taken that will worsen the sector's structural position. These include in particular a substantial reduction in personal income taxation with an expected impact (excluding the second-round effects on consumption tax revenue) of approximately CZK 100 billion in 2021.[3] All this will lead to a significant deterioration of the structural balance in 2021 to –6.5% of GDP (see Chart 2.1.1, blue line). However, the sector's total deficit will be even bigger (–8.8% of GDP according to the MF CR projection), because the ongoing COVID-19 pandemic meant that many restrictive measures persisted into the first half of 2021 and the above support programmes therefore had to be continued.[4]

The substantial easing of fiscal policy was made possible by a double amendment of the Act. The original version of the Act limited the structural deficit to 1% of GDP (see Chart 2.1.1, dotted red line). In the first amendment, the cap on the structural deficit was raised significantly to 4% of GDP in 2021, to be improved at a rate of at least 0.5 pp per year in subsequent years (see Chart 2.1.1, dashed red line). The second amendment, passed at the end of 2020, completely abolished the structural deficit cap for 2021. The cap for 2022 is to be derived from the size of the structural balance for 2021, which will be set at the end of summer 2021. In subsequent years, the structural balance is again to be improved at a rate of at least 0.5 pp per year until the medium-term budgetary objective has been reached.[5] If, according to the April MF CR projection, the structural balance for 2021 is estimated at –6.5% of GDP, then it should be –6.0% of GDP in 2022, –5.5% of GDP in 2023 and so on (see Chart 2.1.1, solid red line).

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[1] MF CR (April 2021): Convergence Programme of the Czech Republic, MF CR (April 2021): Macroeconomic Forecast of the Czech Republic and MF CR (2020): Methodology of Deriving Expenditure Frameworks of the State Budget and State Funds.

[2] MF CR (April 2021): Convergence Programme of the Czech Republic.

[3] Act No. 609/2020 Coll. Estimated impact of the change in personal income tax according to MF CR (April 2021): Convergence Programme of the Czech Republic.

[4] The strongly expansionary nature of Czech fiscal policy stands out when compared with other EU Member States; see Box 2.1.

[5] Each EU Member State has its own medium-term budgetary objective (MTO) under the Stability and Growth Pact. The MTO is the minimum structural balance reflecting the normal volatility of government revenues and expenditure and the Member State's debt and future liabilities. The MTO is a limit, not a target. Adherence to the MTO should allow Member States to maintain a sufficient reserve in ordinary cyclical situations and to improve the sustainability of public finances. Owing to the negative impacts of the COVID-19 pandemic on the economy and public finances of the EU, the general escape clause under the Stability and Growth Pact was activated in 2020. Specifically in the case of the preventive arm, Articles 5(1) and 9(1) of Regulation (EC) No 1466/97 stipulate that "*in periods of severe economic downturn for the euro area or the Union as a whole, Member States may be allowed temporarily to depart from the adjustment path towards the medium-term budgetary objective, provided that this does not endanger fiscal sustainability in the medium term*". For details see https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0123&from=EN (europa.eu). Before the pandemic, the MTO for the Czech Republic was –0.75% of GDP.

The CFC disagreed with both amendments of the Act, neither of which were discussed with it in any way. It considered the first easing, in spring 2020, to be premature, since the real impacts of the impending crisis were not yet known. As for the second easing, the CFC felt that such a step was not macro-economically justified and that a 4% structural deficit for 2021 would have been more than sufficient.

Chart 2.1.1 General government structural balance
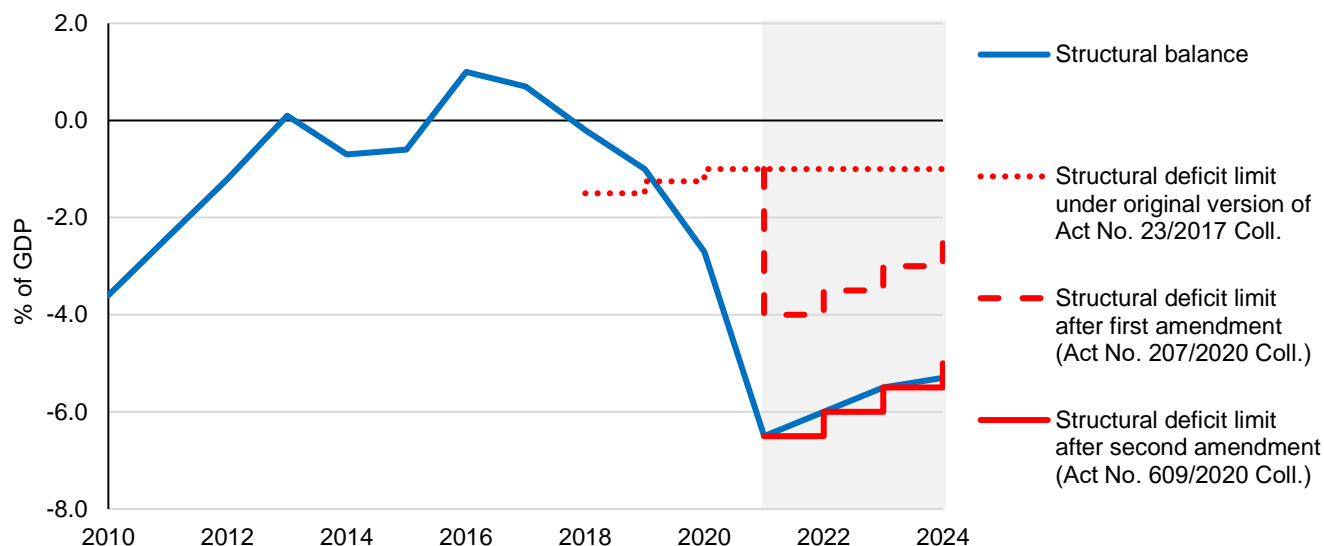
Source: MF CR (July 2019, September 2020 and April 2021): Macroeconomic Forecast of the Czech Republic; MF CR (April 2021): Convergence Programme of the Czech Republic; CFC calculations.
Note: Projection for 2021–2024 taken from MF CR (April 2021): Convergence Programme of the Czech Republic.

General government debt increased to 31.8% of GDP in 2020, a rise of 7.8 pp compared with 2019. The main factor driving the growth was the general government primary balance. This represents the largest annual increase in the debt quota since monitoring of this indicator began in the Czech Republic. The further easing of fiscal policy in 2021 and the subsequent under-ambitious reduction of the structural deficit at a rate of 0.5 pp per year will meanwhile cause the debt quota to increase further. According to CFC calculations, the debt brake – set by the Act at 55% of GDP – could thus be hit as early as 2024 (see Chart 2.1.2).[6] The Act requires the government to take action to ensure the long-term sustainability of public finances when this threshold is reached. The government's ability to use discretionary fiscal policy to stabilise the economy would therefore be reduced, and the activities of many general government organisations would be limited. Given that there is little likelihood of any major reduction in public expenditure under the biggest items (social security, health care and education) to make up the revenue shortfall caused by the "tax package" (Act No. 609/2020 Coll.), in practice this could imply an increase in the tax burden. Reaching the debt brake threshold also sends out negative signals to the financial markets.[7] This may be reflected in increased debt service costs and, ceteris paribus, further contribute to growth in indebtedness.

The Czech National Bank (CNB) in its latest Financial Stability Report[8] also points more emphatically to the risks associated with public finances. In a stress scenario assuming adverse macroeconomic developments over the following two years, the debt brake threshold would be exceeded as early as 2022 and the general government debt would reach 64.5% in 2023 and would therefore exceed the Maastricht criterion. Overall, the CNB identifies a potential reduction in investors' confidence in public finance sustainability as a result of growth in government debt without credible public finance consolidation as a medium-term risk.

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[6] According to the MF CR projection (April 2021), the debt-to-GDP ratio will reach 54.6% in 2024. It is therefore reasonable to assume that the debt brake would be exceeded in 2025.
[7] Especially when compared with developments in some other EU economies; see Box 2.1.
[8] CNB (2021): Financial Stability Report 2020/2021.

Chart 2.1.2 General government debt minus the state debt financing reserve
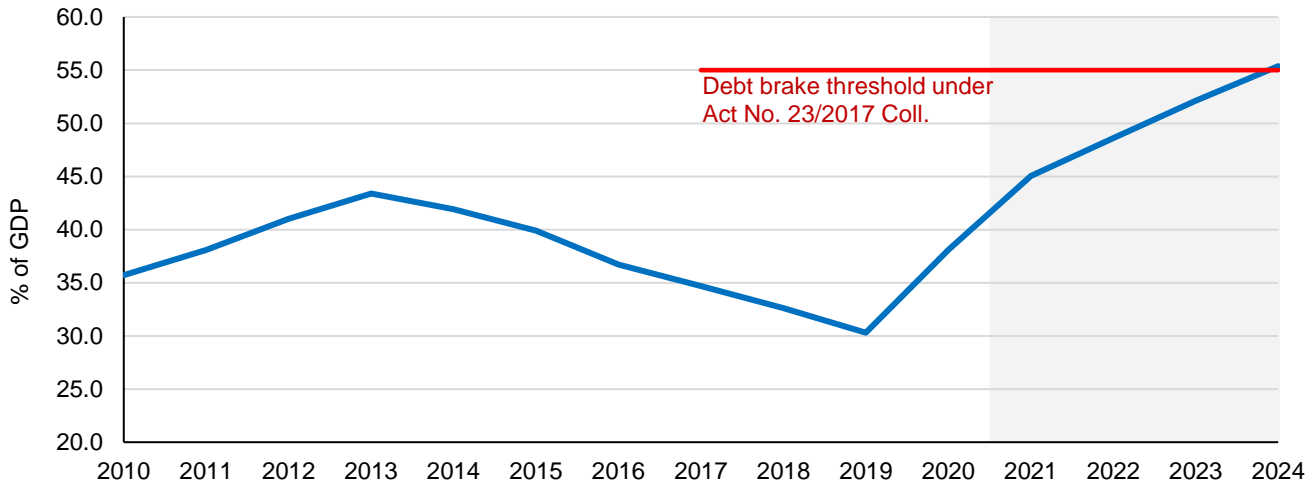
Source: MF CR: Draft State Final Accounts of the Czech Republic for 2014, section E. State Debt Management Report, MF CR (2017–2021): Convergence Programme of the Czech Republic, CNB (2021): Government Financial Statistics; CFC calculations.
Note: CFC projection for 2021–2024.

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 changed relatively significantly during 2020. At the end of 2019 domestic owners held 61.6% of public debt, whereas by the end of 2020 the figure had risen to 67.9%.

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. However, this risk of spillover of external shocks to the domestic financial system decreased significantly during 2020. In line with international practice, the CNB regards 26% as the critical threshold for the proportion of public debt held by foreign entities.[9] However, this threshold has long been exceeded. The current figure is 32.1% (see Chart 2.1.3).

Chart 2.1.3 Public debt held by residents and non-residents
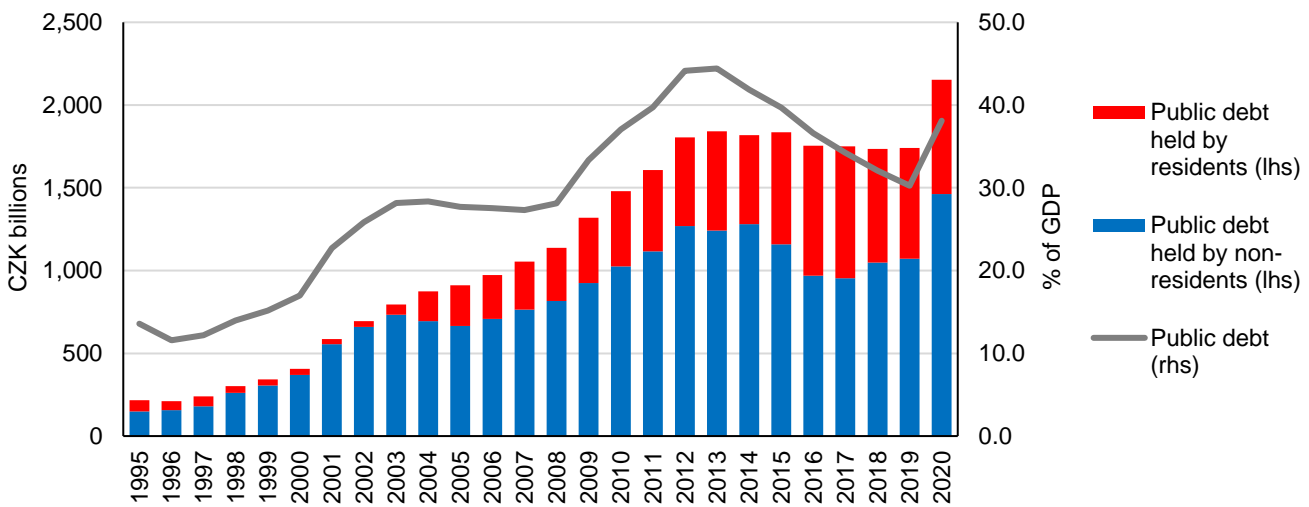
Source: CNB (2021), CZSO (2021); CFC calculations.

[9] CNB (2021): Financial Stability Report 2020/2021.

Financial institutions had a completely dominant share of the public debt holdings of domestic entities (residents) at the end of 2020 (see Chart 2.1.4). The banking sector recorded the biggest increase in public debt holdings – CZK 283 billion. Other financial institutions (primarily insurance companies and pension funds) increased their Czech public debt holdings by CZK 76 billion. Domestic financial institutions' high demand for Czech government bonds may be linked with the reduction in CNB interest rates. Government bonds thus probably represented a suitable alternative instrument for locating liquidity at a time of uncertainty.

At the end of 2020, domestic banks held 38.3% of public debt, up 7.2 pp on a year earlier. The share of domestic government bonds in bank assets was more than 10% at the end of 2020. 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[10] would have significant impacts on the financial system.

As in the previous year, the average time to maturity of government debt was 6.2 years at the end of 2020. During the first three months of 2021 it decreased to 5.9 years.[11] A similar trend can be seen in OECD countries, where the average time to maturity stood at 7.9 years at the end of 2019, down from 7.7 years a year earlier.

Given the planned deficits for the coming years and the high financing need, the public debt structure can be expected to change not only in 2021, but also in subsequent years.

Chart 2.1.4 Public debt held by residents
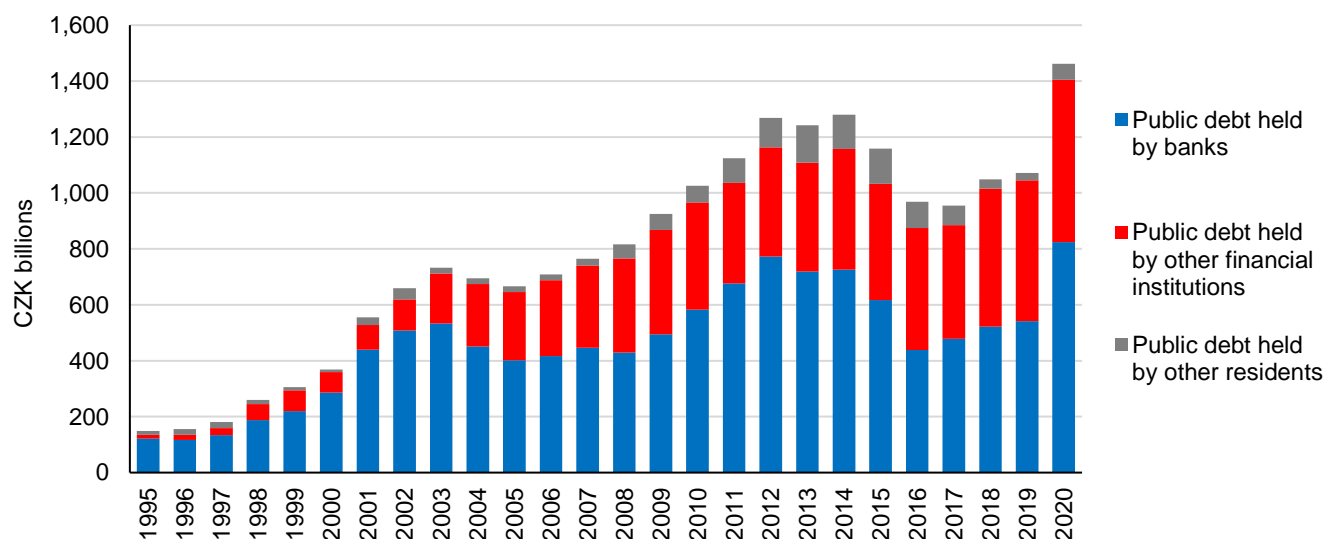
Source: CNB (2021); CFC calculations.

2.2 Fiscal policy stance relative to the position in the business cycle

The stabilisation role of fiscal policy, the aim of which is to reduce fluctuations in real output away from its potential (optimal) level, operated fully at the time of the COVID-19 pandemic. Fiscal policy uses two instruments to achieve this aim: automatic stabilisers and discretionary measures. As the name suggests, automatic stabilisers act automatically over the economic cycle. They include some social transfers and income taxes. By contrast, discretionary measures are deliberate government measures that change tax rates, social transfers and other government expenditure, including investment.

Fiscal policy needs to be countercyclical to fulfil its stabilisation function, i.e. the structural balance should be improving when the output gap is positive and can be worsening when it is negative. The situation where fiscal policy responds in the opposite way is termed procyclical fiscal policy. This type of fiscal policy fails not only to contribute to stabilising output growth over the economic cycle, but also to create sufficient space when the output gap is positive for fiscal expansion when it is negative. When a negative shock such as the COVID-19 pandemic hits the economy, the fiscal policy response and actions taken to support the economy usually widen the

[10] This situation can be described as excessive growth in the cost of funding government debt. This risk can be defined strictly as an inability of the government to meet its agreed financial obligations.
[11] MF CR (2021): Quarterly Report on the Management of the State Debt of the Czech Republic, 2021 Q1.

deficit. As a result, the debt rises, potentially jeopardising the medium- and long-term sustainability of public finances.

Chart 2.2.1 shows the relationship between the output gap and the change in the primary structural balance in 2017–2024. It is clear from the chart that 2017–2019 was a period of procyclical expansion – the economy was stimulated despite recording a significantly positive output gap. This resulted in a deterioration in the structural balance, which in turn exhausted the room for a fiscal response at a time of economic complications. These arose in 2020 due to the COVID-19 pandemic, and the fiscal policy response to them was expansionary, which can be described as appropriate. Unfortunately, however, the exhaustion of the fiscal space in previous years led to higher deficits than would have been necessary had fiscal policy been countercyclical in the past.

The expansionary fiscal policy in 2020 was implemented partly through temporary programmes and measures (Antivirus, the compensation bonus, health and social insurance relief, etc.), which do not encumber the structural balance in the longer term. The result is that the cyclically adjusted balance differs quite substantially from the structural balance. For the sake of clarity, the changes in both the primary structural balance and the primary cyclically

adjusted balance are shown in the chart for 2020–2022. As these one-off programmes contribute to the stabilisation of aggregate demand, it is more appropriate to use the cyclically adjusted balance to analyse the situation in 2020 and 2021 (see the dashed line in Chart 2.2.1).

According to the Ministry of Finance, fiscal policy will be expansionary in 2021 as well, although the structural balance will deteriorate to the detriment of one-off and temporary measures. This means that the one-off programmes will be replaced by a permanent change in the amount of tax and expenditure.

According to the Ministry of Finance, 2022–2024 will be a period of countercyclical restriction linked with an announced improvement in the structural balance of at least 0.5 pp a year. Although this estimated trend can be regarded as positive, looking back at Chart 2.1.1 it is clear that this gradual improvement is a rebound from the high structural deficit of 6.5% of GDP estimated for 2021. What is more, if the fiscal stimuli associated solely with the COVID-19 pandemic were truly one-off and temporary in nature, the structural balance could not also attain such huge negative figures in 2022–2024, i.e. after the expected fade-out of the most acute phase of the pandemic.

Chart 2.2.1 Relationship between the output gap and the change in the primary structural/cyclically adjusted balance
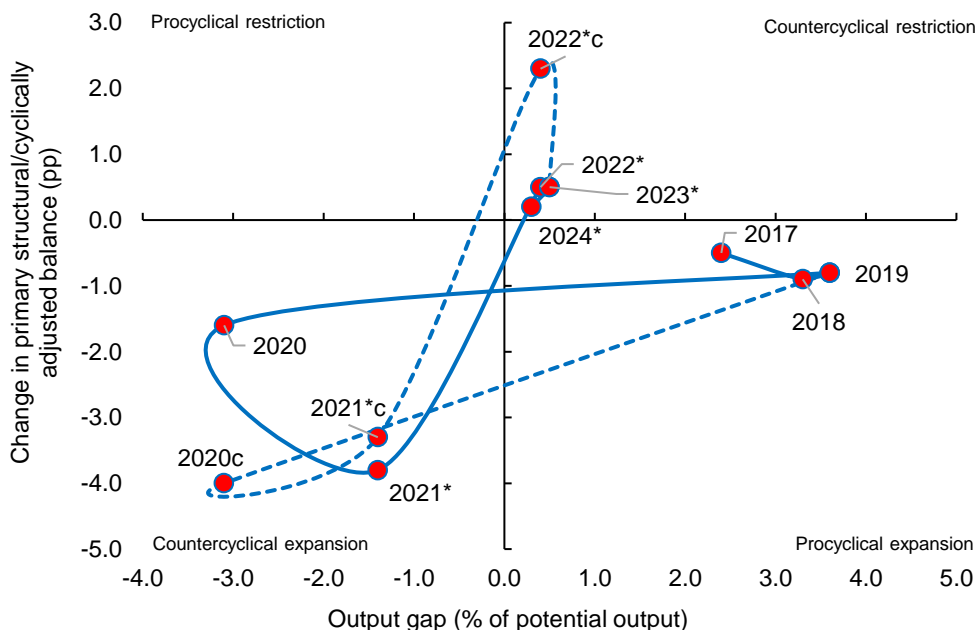
Source: MF CR (April 2021): Macroeconomic Forecast of the Czech Republic, MF CR (April 2021): Convergence Programme of the Czech Republic; CFC calculations.
Note: The primary cyclically adjusted balance for 2020–2022 is denoted by the letter *c* and the dashed line. For 2022–2024, the primary cyclically adjusted balance is the same as the primary structural balance due to the absence of planned one-off and temporary measures. This fact is reflected in an equal year-on-year change in the two balances in 2023 and 2024. Asterisks denote MF CR projections (April 2021): Convergence Programme of the Czech Republic.

2.3 Decomposition of the fiscal effort

The fiscal effort describes the year-on-year change in the structural balance and is expressed in percentage points. If the fiscal effort is positive, fiscal policy is restrictive. If it is negative, fiscal policy is loose. Table 2.3.1 shows the decomposition of the fiscal effort for 2017–2024. The decomposition is performed using the indirect method, i.e. as the year-on-year change in the structural balance with subsequent decomposition.

The fiscal effort in 2020 was negative, i.e. fiscal policy was expansionary thanks to the application of measures to reduce the adverse effect of the COVID-19 pandemic on the Czech Republic's economic situation.

Table 2.3.1 Decomposition of the fiscal effort (pp)

	2017	2018	2019	2020	2021	2022	2023	2024
Taxes and social contributions	*-0.6*	*0.3*	*0.0*	*2.1*	*-2.3*	*-1.4*	*-0.3*	*-0.4*
Other revenue	*-0.3*	*0.4*	*-0.1*	*0.1*	*0.2*	*0.7*	*0.2*	*-0.8*
*in which one-off revenue-side measures**	*0.0*	*-0.1*	*0.0*	*-0.7*	*0.6*	*0.1*	*0.0*	*0.0*
REVENUE	-1.0	0.8	-0.1	2.9	-2.8	-0.7	-0.1	-1.2
Compensation of employees and intermediate consumption	*0.0*	*-0.8*	*-0.3*	*-1.4*	*-0.2*	*0.6*	*0.3*	*0.3*
Social transfers and social transfers in kind	*0.5*	*0.1*	*-0.3*	*-2.6*	*-0.4*	*0.6*	*0.3*	*0.3*
Interest	*0.2*	*0.0*	*0.0*	*-0.1*	*0.0*	*0.0*	*0.0*	*-0.1*
Investment	*-0.1*	*-0.8*	*-0.2*	*-0.5*	*-0.4*	*-0.2*	*-0.2*	*0.8*
Other expenditures	*0.2*	*-0.1*	*0.0*	*-1.6*	*-0.2*	*2.0*	*0.2*	*0.1*
*in which one-off expenditure-side measures**	*0.1*	*0.0*	*0.1*	*-1.6*	*-0.1*	*1.7*	*0.0*	*0.0*
EXPENDITURE	0.7	-1.6	-0.8	-4.6	-1.0	1.2	0.6	1.4
FISCAL EFFORT	-0.3	-0.8	-0.8	-1.7	-3.8	0.5	0.5	0.2

Source: CZSO (2021), MF CR (April 2018, 2019, 2021): Convergence Programme of the Czech Republic, MF CR (April 2021): Macroeconomic Forecast of the Czech Republic; CFC calculations.
Note: Taxes and social contributions are cyclically adjusted but the other items are not. Data for 2021–2024 are projections from MF CR (April 2021): Convergence Programme of the Czech Republic. Positive figures indicate fiscal policy tightening. The totals in the table may be subject to inaccuracies due to rounding.
* One-off revenue and expenditure-side measures are already contained in the previous revenue and expenditure items and therefore enter the calculation with the opposite side.

The fiscal effort is influenced by, among other things, discretionary government measures. The most important discretionary measures for 2020 are summarised below.

In the area of direct taxation, several changes were made to corporate income tax (a change to the method of creation and deductibility of insurance technical reserves, the introduction of extraordinary write-downs, an increase in the limit on depreciation of tangible fixed assets, and a widening of the tax exemption of dividends paid to the state and regions) with a total negative impact on general government revenue of almost CZK 10 billion. As for property taxation, the abolition of real estate acquisition tax had a substantial effect, causing revenue to fall by CZK 13.8 billion. In the area of indirect taxation, revenue was boosted by CZK 10.3 billion by a change to the rates of excise duty on tobacco products and

spirits. In the case of VAT, a change in the rate on heat and cold supplies from 15% to 10%, the transfer of selected services and commodities to the second reduced rate (10%) and a lower rate of tax on accommodation services and sports events reduced revenue by CZK 4.2 billion.[12]

In addition to growth in compensation of employees, the rise in revenue in the area of social security contributions was caused by an increase in payments to the state for state insurees. However, this rise in revenue was offset by an equal increase in general government expenditure in the area of social benefits in cash. A six-month waiver of minimum social and health insurance pre-payments for the self-employed fostered a reduction in revenue. Revenue also fell because of a three-month waiver of social security and state employment policy contributions paid by employees with 50 employees or less (Antivirus –

[12] These tax changes are contained in the following laws: 364/2019 Coll., 609/2020 Coll., 386/2020 Coll., 80/2019 Coll., 256/2019 Coll. and 299/2020 Coll.

regime C). A reduction in the rate of sickness insurance, which made up for the abolition of the quarantine period for the first three days of sickness, brought about a further drop in revenue. Overall, revenue in the social security area fell by CZK 29.4 billion.[13]

Growth in other revenue of CZK 6.3 billion was recorded thanks to property income (dividend income).

The rise in expenditure in the area of compensation of employees was caused primarily by growth in the pay of education and health care workers. The increase was also due to bonuses in health care, social services and law enforcement.

The growth in expenditure in the area of social benefits in cash was caused by an increase in old-age pensions on top of statutory indexation. Pensions were further increased by a "face mask allowance" – an extraordinary benefit of CZK 5,000 per pensioner. There was also an increase in the parental allowance for households with children under four years of age which actively draw this benefit. The care allowance for persons in the level 3 and level 4 dependence categories was raised as well. The COVID-19 pandemic caused the closure of schools, day centres and other similar facilities and also gave rise to a need to self-isolate, which usually involved entire households, including children. This entailed increased attendance allowance expenditure. The total growth in social benefits in cash due to the aforementioned changes was CZK 49 billion.[14]

In the case of other expenditures, there were significant increases in the areas of subsidies and capital transfers. Subsidies recorded a sharp rise caused by support programmes for groups of entities that had incurred a drop in earnings for various reasons due to the COVID-19 pandemic. The main such programmes were Antivirus A/A Plus and Antivirus B, which totalled CZK 25.5 billion and were designed as wage compensation facilities. Others included COVID-Nájemné (rent), COVID-Ubytování (accommodation), COVID-Bus, compensation programmes for culture and sport, and support for firms facing increased demand for their products (personal protective equipment etc.). In all, CZK 12.2 billion was paid in subsidies. Under capital transfers, a "compensation bonus" was paid, causing expenditure to increase by CZK 26.3 billion. It was intended for the self-employed, small businesses, and employees working under an agreement to perform work or to complete a job.[15]

Box 2.1 Public finance sustainability in the medium term

The aim when evaluating public finance sustainability in the medium term is to assess how the general government debt would evolve in the event of adverse economic developments simulated by a stress test. The scenarios contained in previous Reports demonstrated the high sensitivity of public debt to economic developments. They were intended to illustrate how quickly public debt can rise in the event of a slowdown in GDP or even a contraction of the economy. At the time of writing, it can be said that the present situation and especially the medium-term outlook for Czech public finances are even worse than indicated by the last stress tests.

The predicted path of general government finances in the Czech Republic is also unusual in the international context. At the start of April 2021, the International Monetary Fund (IMF) published its twice-yearly World Economic Outlook (WEO). Along with various other indicators, it contains medium-term projections of general government fiscal balances for the period 2021–2026.

Table B2.1.1 shows that the Czech Republic's starting position in terms of the overall general government balance was roughly average in 2019. The Czech position remained relatively solid in 2020, when the COVID-19 pandemic led to a significant deterioration in public finances in all EU countries. In 2021, however, the relative position of the outlook for the Czech general government balance starts to deteriorate markedly – the IMF expects a deficit of 7.8% of GDP for the Czech Republic in 2021, the fourth-largest in the EU behind Spain, Greece and Italy. The IMF outlook is by no means pessimistic. It is even slightly better on average for 2021–2024 than that contained in the April 2021 Convergence Programme of the Czech Republic (the average balance for the Czech Republic will be –6.2% of GDP according to the IMF and –6.3% according to the Convergence Programme).

The IMF forecasts a year-on-year reduction in deficit for 21 countries of the EU-27 for 2021. Among the six countries for which it projects further government deficit growth, the Czech Republic's increase of 1.9 pp is the second-largest behind Estonia. For 2022, a lower government deficit compared with 2020 is expected for all the EU

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[13] The changes in the area of social security contributions are contained in the following laws: 136/2020 Coll., 134/2020 Coll., 300/2020 Coll. and 32/2019 Coll.

[14] The changes in the area of social benefits in cash arise from the following laws: 244/2019 Coll., 469/2020 Coll., 363/2019 Coll., 47/2019 Coll., 133/2020 Coll., 230/2020 Coll. and 438/2020 Coll.

[15] These tax changes are contained in the following laws and regulations: Government Resolution Nos. 353, 513, 550, 1035, 1037, 1081, 1107, 1329, 1376, 766, 1070, 1184, 1331/2020, 50/2021 and 334/2021; Act Nos. 159/2020 Coll. (amendments: 234/2020 Coll., 262/2020 Coll., 331/2020) and 461/2020 Coll. (amendments: 584/2020 Coll., 82/2021 Coll.).

countries except the Czech Republic and Estonia. The Czech government balance outlook for 2023 of –5.6% of GDP represents the second-highest deficit in the EU-27 (behind Romania with –6.2% of GDP). The Czech Republic maintains this position in the ranking in 2024–2026.

Table B2.1.1 General government balances 2019–2026 (% of GDP)

	2019	2020	2021	2022	2023	2024	2025	2026
Austria	0.7	-9.6	-6.5	-3.6	-2.2	-1.4	-1.0	-0.9
Belgium	-1.9	-10.2	-7.3	-5.0	-4.9	-5.0	-4.9	-4.9
Bulgaria	-1.0	-3.0	-3.9	-2.0	-1.8	-0.8	-0.3	0.0
Croatia	0.4	-8.0	-3.9	-2.6	-2.5	-2.4	-2.3	-2.3
Cyprus	1.5	-5.0	-3.2	-0.8	-0.4	0.0	0.6	0.8
CZ	0.3	-5.9	-7.8	-6.3	-5.6	-5.1	-4.5	-4.0
Denmark	3.8	-3.5	-1.8	-1.8	-1.2	-0.8	0.0	0.0
Estonia	0.0	-5.4	-7.1	-6.3	-5.2	-4.4	-3.6	-3.0
Finland	-1.0	-4.8	-4.3	-3.0	-2.2	-2.0	-1.8	-1.6
France	-3.0	-9.9	-7.2	-4.4	-3.8	-3.6	-3.5	-3.5
Germany	1.5	-4.2	-5.5	-0.4	0.4	0.5	0.6	0.6
Greece	0.6	-9.9	-8.9	-2.6	-2.0	-1.8	-1.7	-1.5
Hungary	-2.0	-8.5	-6.5	-4.8	-3.6	-2.3	-1.4	-0.6
Ireland	0.5	-5.3	-5.5	-2.8	-1.4	-1.0	-0.4	-0.3
Italy	-1.6	-9.5	-8.8	-5.5	-3.8	-2.2	-2.0	-1.8
Latvia	-0.4	-3.9	-6.7	-1.8	-0.9	-0.5	-0.6	-0.5
Lithuania	0.3	-8.0	-6.1	-1.8	-0.8	-0.4	0.0	0.4
Luxembourg	2.4	-3.8	-1.5	-0.5	-0.1	0.0	0.0	0.0
Malta	0.5	-9.0	-5.7	-3.1	-2.5	-2.0	-1.5	-0.9
Netherlands	2.5	-5.6	-4.3	-2.5	-1.6	-0.9	-0.3	-0.1
Poland	-0.7	-8.2	-4.7	-2.6	-2.9	-2.9	-2.8	-2.8
Portugal	0.1	-6.1	-5.0	-1.9	-1.4	0.5	0.3	0.3
Romania	-4.6	-9.7	-7.1	-6.3	-6.2	-6.1	-5.9	-5.9
Slovakia	-1.4	-7.3	-7.1	-4.9	-4.4	-3.9	-3.6	-3.3
Slovenia	0.5	-8.5	-6.2	-4.2	-3.4	-2.8	-2.2	-2.0
Spain	-2.9	-11.5	-9.0	-5.8	-4.9	-4.3	-4.3	-4.3
Sweden	0.5	-4.0	-3.9	-1.8	-0.2	0.1	0.3	0.3

Source: IMF – WEO (April 2021).

In accordance with this government balance outlook, it is clear that the path of Czech debt is completely out of line with the expected international trend in government debt. In most EU countries, government debt will start to decrease in 2023 at the latest (18 countries). In the remaining eight countries, either it will stay low, such as in Estonia (40.8% of GDP), or its rate of growth will not be as high as in the Czech Republic. Overall, this will mean that although the Czech Republic could boast the fourth-lowest debt in the EU-27 in 2020, its position will worsen in future years. In three to four years' time, it will probably no longer even rank in the top ten in terms of government debt level (see Charts B2.1.1 and B2.1.2).

Chart B2.1.1 General government debt in 2019
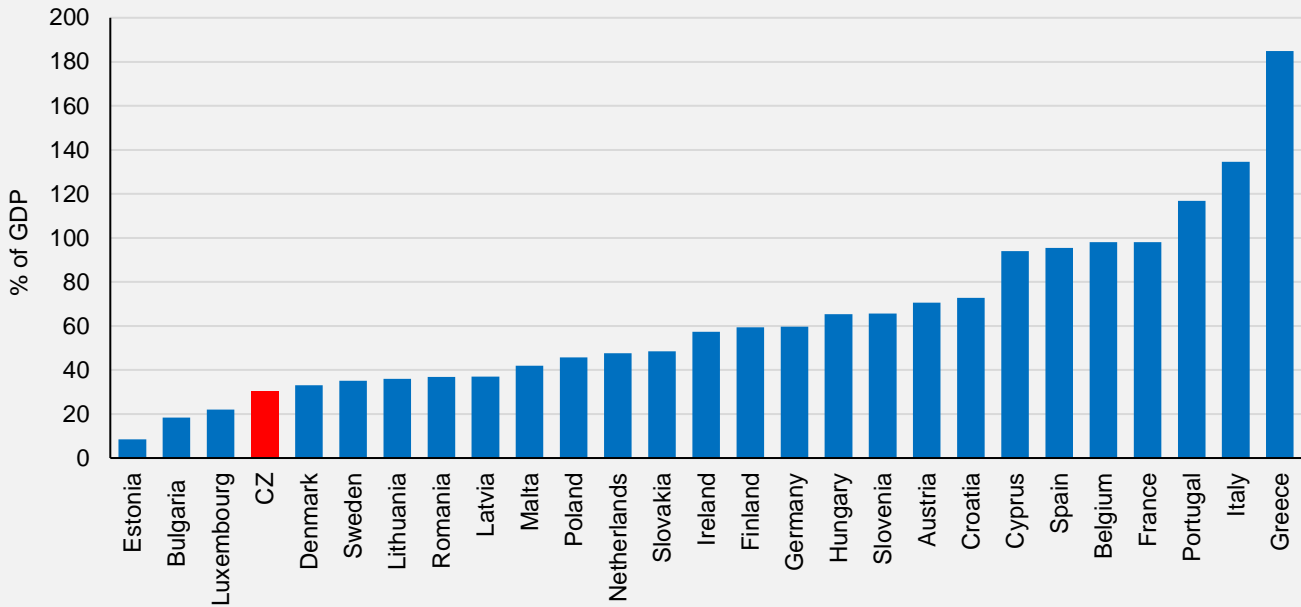
Source: IMF – WEO (April 2021).

Chart B2.1.2 General government debt in 2026
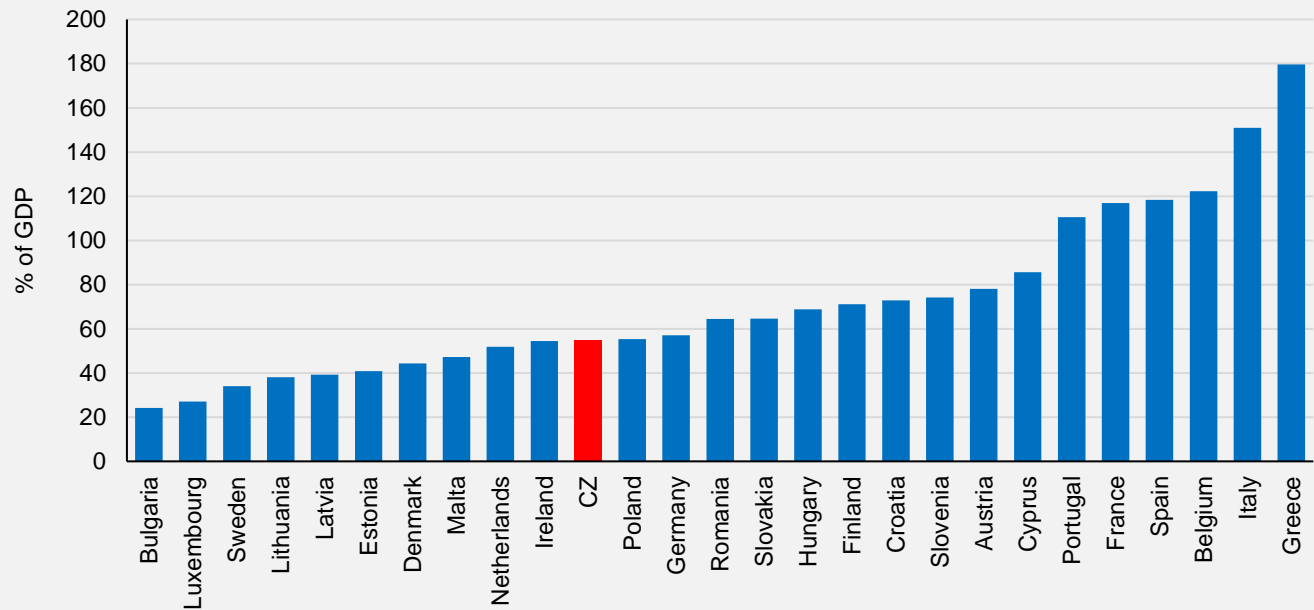
Source: IMF – WEO (April 2021).

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.[16] 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. The related negative economic shock 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. One fundamental change in 2020 was a sharp rise in the household saving rate, which reached 18.7%, 6.2 pp higher than in 2019.[17] According to neoclassical growth theory, such a substantial rise in the saving rate should lead to an increase in the steady state of the Czech economy.[18] However, because we believe that the growth in savings was forced by the shutdowns of retail and service outlets and will therefore be one-off in nature, we leave our assumption about the speed of convergence of the Czech economy unchanged.

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 27% of the Austrian level in purchasing power parity in 2020[19] 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).[20] The convergence in labour productivity between the Czech Republic and Austria was not affected very much by the drop in potential output in the Czech Republic in 2020, because Austria likewise recorded a decline in potential output.

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 2.4% in 2021 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 92.6% of the future Austrian level in 2071. 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.

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[16] 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].
[17] Households' annual gross savings amounted to CZK 597.8 billion in nominal terms, up 57% year on year. See CZSO (2021): Analýza čtvrtletních sektorových účtů – 4. čtvrtletí 2020 [Quarterly Sector Accounts Analysis – 2020 Q4, available in Czech only].
[18] The basic model of long-run growth (the Solow model) argues, among other things, that a higher saving rate will lead to higher GDP per worker through higher investment and a higher capital/labour ratio in the steady state. Countries with higher saving rates are thus wealthier, as confirmed by empirical analyses. For details, see, for example, Cahlík, Hlaváček and Seidler (2013): Makroekonomie, chapter 17.
[19] According to OECD statistics (2021).
[20] For details, again see OCFC (2019): Dlouhodobá makroekonomická projekce ČR.

Chart 3.1.1 Convergence of output per worker to the Austrian level
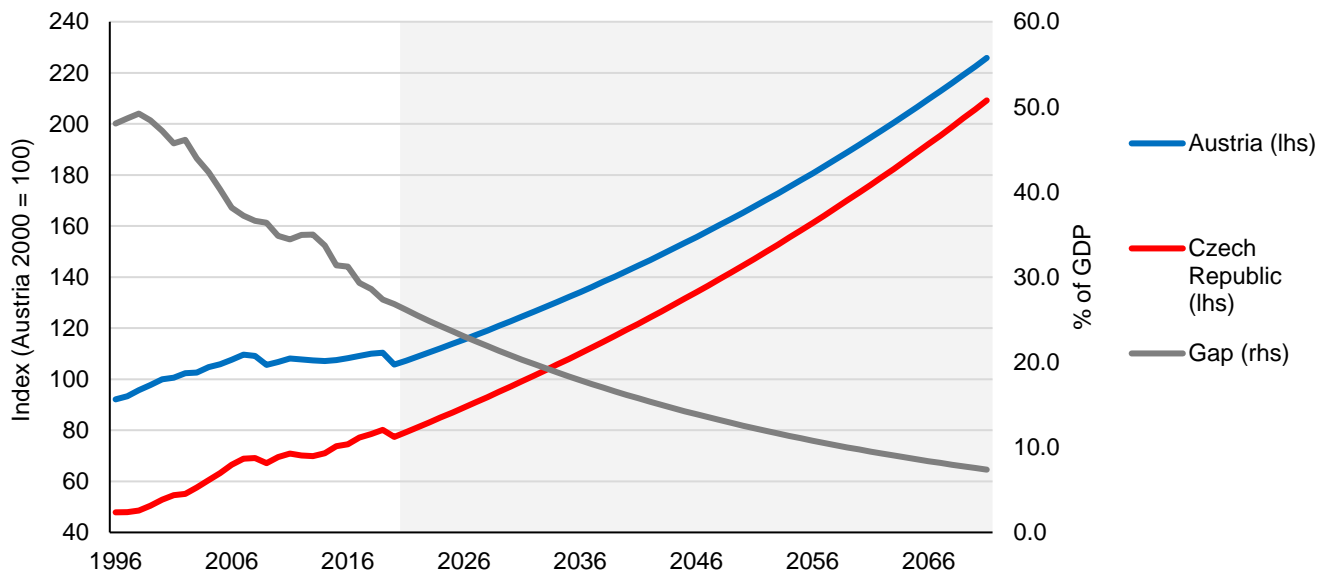
Source: OECD (2021); CFC calculations.

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).[21]

Table 3.2.1 Materialisation of the CZSO's demographic projection in 2018–2020 (‰)

	2018 and 2019 (average)			2020		
	projection	reality	difference	projection	reality	difference
Net migration	3.007	3.892	0.885	2.433	2.517	0.083
Natural growth	0.020	0.047	0.027	-0.319	-1.784	-1.465
Gross mortality rate	*10.480*	*10.579*	*0.099*	*10.516*	*12.083*	*1.567*
Gross birth rate	*10.500*	*10.625*	*0.125*	*10.197*	*10.299*	*0.102*
GROSS OVERALL GROWTH RATE	3.026	3.939	0.912	2.114	0.733	-1.381

Source: CZSO (2021); CFC calculations.

We opted for the medium, i.e. most likely, variant of the demographic projection as the baseline scenario for our projections. We then prepared alternative scenarios based on the other variants.

Like last year, we updated the CZSO's official demographic projection this year by incorporating new data as follows. First, we replaced the age structure

of the population for 2019–2021[22] with the observed figures. Then, for the assumed fertility, 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.

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[21] CZSO (2018): Projekce obyvatelstva České republiky 2018–2100 [Population Projection of the Czech Republic 2018–2100, available in Czech only].
[22] Data as of 1 January of the given year.

The CZSO's demographic projection is based on the situation in the Czech Republic at the start of 2018. During 2018–2020, 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 as a result of the COVID-19 pandemic. In that year, 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 higher-than-projected number of new-borns and positive net migration, which together outweighed the effect of the higher mortality rate in 2018 and 2019, had an upward effect on the population (see Table 3.2.1). In 2020, however, net migration fell, partly due to the COVID-19 pandemic and the introduction of border crossing restrictions, and the contribution of the birth rate was also lower. The substantially higher mortality rate meant that growth in the total population slowed appreciably relative to that assumed in the CZSO projection. Overall, the population of the Czech Republic was 15,173 persons lower at the end of 2020 compared with our simulation of the medium variant of the demographic projection presented in last year's Report (see Chart 3.2.1).

The combination of a higher birth rate, higher migration and a higher mortality rate also led to a higher ratio of the working-age population (21–64 years) to the population aged 65+ by comparison with the medium variant of the CZSO's demographic projection (2.89 versus 2.86).

Despite this, the most important feature of all the variants of the demographic projection is still a rising share of people aged 65+ in the total population from the current 20%. This share is set to reach roughly 30% around 2060 in the medium variant. Population ageing has been going on in Czech society for several decades now and is a common feature of all the projection variants. Nonetheless, those variants differ in other indicators, leading to a different total population. The difference between the high variant and the low variant is thus almost three million people at the end of our projection in 2071.

Chart 3.2.1 Population paths in the variants of the demographic projection
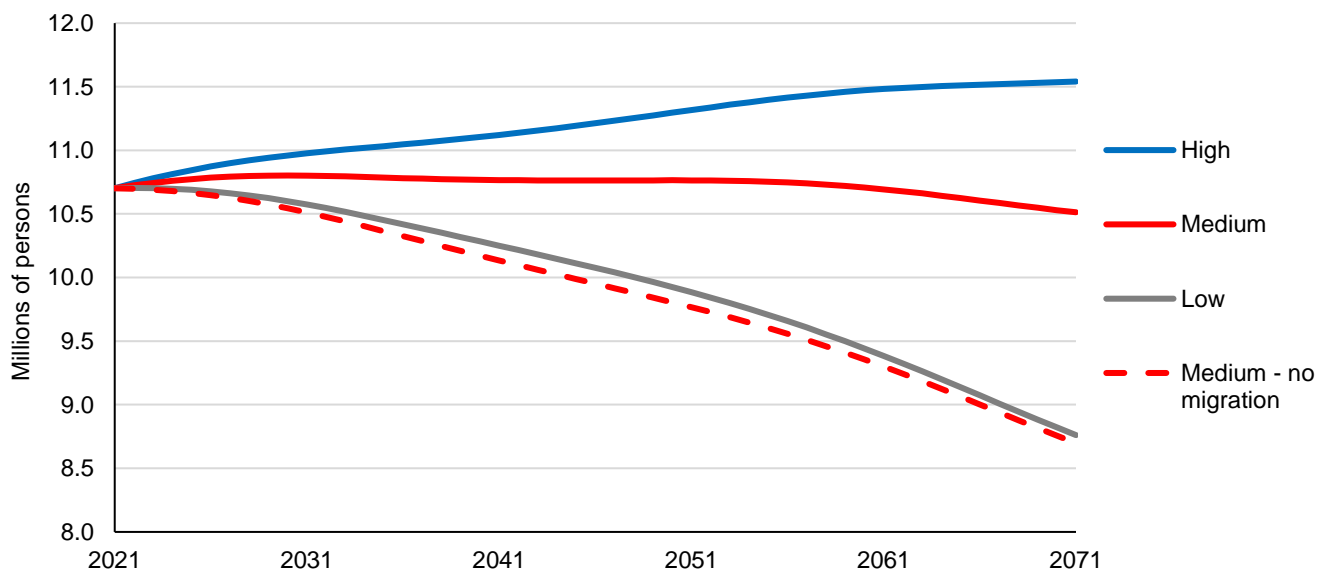
Source: CZSO (2018): Population Projection of the Czech Republic 2018–2100; CFC calculations.

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.[23] 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).

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

Box 3.1 The effect of the COVID-19 pandemic on the demographic projection

The most frequently mentioned impact of the COVID-19 pandemic 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 (see Chart B3.1.1). This excess mortality stood at 20,200 persons in 2020. It was thus around 50% higher than the officially recorded COVID-19 death count (12,400 persons). Of the excess mortality seen in 2020, persons aged 85+ accounted for roughly 40%, persons aged 75–84 for 35% and persons aged 65–74 for 25%. No excess mortality at all was observed among the under-65s. The trend of elevated excess mortality continued at the start of 2021. In the first quarter of 2021, excess mortality totalled 16,500 persons, while the percentage excess mortality in the 85+ age group decreased (probably due to vaccination).

Chart B3.1.1 Excess mortality in the weekly data
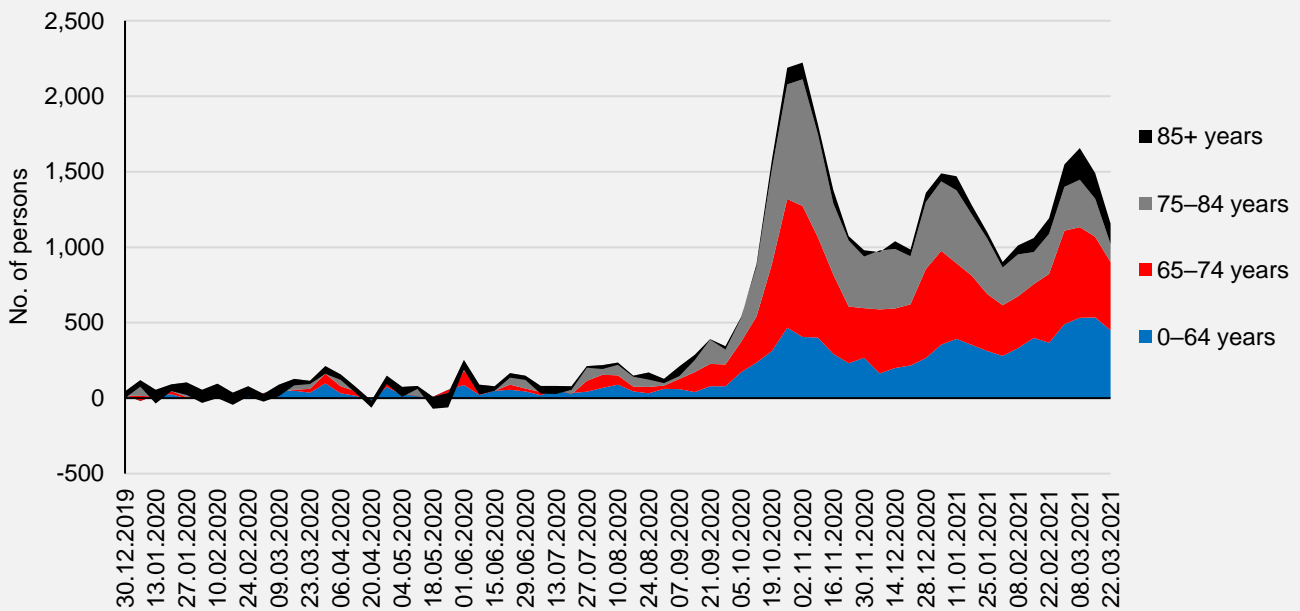
Source: CZSO (2021); CFC calculations.
Note: Difference in mortality compared with the average in the given week over 2011–2019. Data as of 11 May 2021.

The CZSO issues a demographic projection every five years. The last one was published in 2018. However, it is already clear that the actual population trend differs from this projection. The change in the population count and age structure compared with our 2020 projection is not due solely to the COVID-19 pandemic, though. In last year's Report, the CFC drew attention to the fact that the population of the Czech Republic at the start of 2020 was significantly – almost 20,000 – higher than assumed in the CZSO's 2018 projection. In addition to lower mortality in older age groups and almost 2,000 more births, this was due primarily to a larger inflow of migrants as a result of the economic boom.

At the start of 2021, however, the situation was different. The excess mortality caused by the COVID-19 pandemic moved the actual population count back close to the original projection. An upward effect of migration on the population is still apparent – compared with the original CZSO projection there were 4,721 more people (primarily working-age men) living in the Czech Republic in 2020 – but there were significantly fewer people aged 57+ than projected by the CZSO in 2018. We are therefore observing a demographic shift towards younger age groups.

Overall, more than 20,000 more people died in 2020 than in the demographic projection. By contrast, the population was pushed up by a slightly higher birth rate – there were around 800 more births than expected – and also by an inflow of working-age migrants, which remained rather higher than expected despite the adverse situation and closed national borders last year.

The excess mortality in 2021, when an additional roughly 16,500 mostly older people died in 2021 relative to the average for 2011–2019, will also have a downward effect on the demographic projection. However, we do not take this into account in this year's Report, as the data are currently incomplete.

Chart B3.1.2 shows how the developments over the last two 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 in 2030. However, while the original medium CZSO variant projects a population count of 10.783 million for this year, the very fact that the population grew significantly more in 2019 increased the projected maximum by almost 22,000. The higher-than-projected mortality last year then reduced this maximum by just 3,500 persons in 2030. The new population projection therefore still exceeds the original 2018 one.

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, this ratio has changed only slightly in favour of pension system sustainability, as a result of the population getting 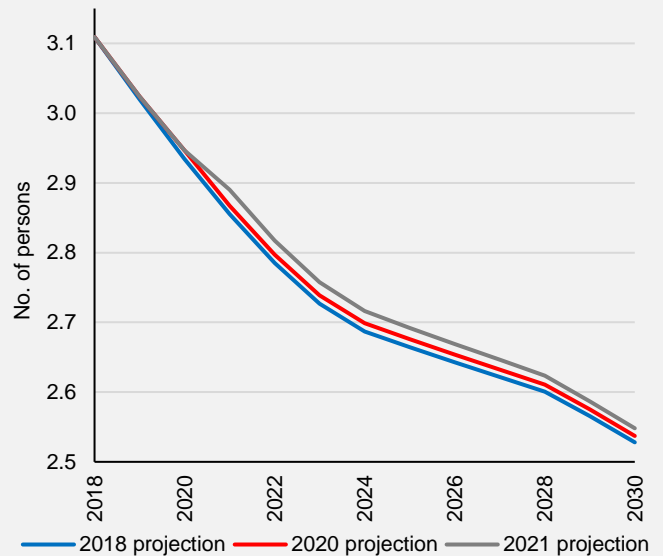younger. From the long-term perspective, however, there is still a strong population ageing trend undermining the sustainability of the pension system.

Chart B3.1.2 Long-term demographic projection – population count
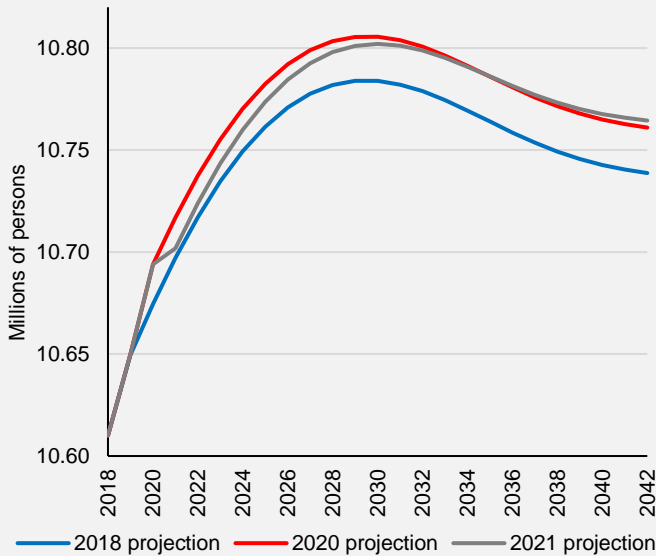
Chart B3.1.3 Number of persons aged 21–64 per person aged 65+

Source: CZSO (2021); CFC calculations.

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),[24] 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.[25]

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 and 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. In our

[24] 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.
[25] 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].

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.

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

	2021–2031	2032–2041	2042–2051	2052–2061	2062–2071	Entire period
GDP per capita	2.3	1.7	1.3	1.5	2.2	1.8
GDP per worker	2.3	2.1	1.9	1.8	1.7	2.0
GDP total	2.4	1.6	1.3	1.5	2.0	1.8
Average real wage	2.5	2.2	2.1	1.9	1.8	2.1

Source: CZSO (2021), OECD (2021); CFC calculations.

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 revenue and expenditure. 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 29,400 (around 1.2%) between the end of 2019 and the end of the first quarter of 2021, 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 1.6 months for men and 4 months for women on average in 2020).

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.[26]

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 "rates of retirement" (i.e. the proportions of pensioners in each age cohort) for the projection of 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' 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.

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[26] 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. According to this provision, the retirement age could thus be changed again in 2024.

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.[27] The calculation of the rates of retirement newly incorporates figures on the actual number of old-age and disability pensioners in 2018 and 2019. For persons below retirement age, the rates of retirement are slightly lower than those we used in previous Reports (see Box 4.1 for a comparison with the rates of retirement used in previous Reports).[28]

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 1.1% 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 3.2 million, i.e. roughly one third higher than today.

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 46.1% in 2071. 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)
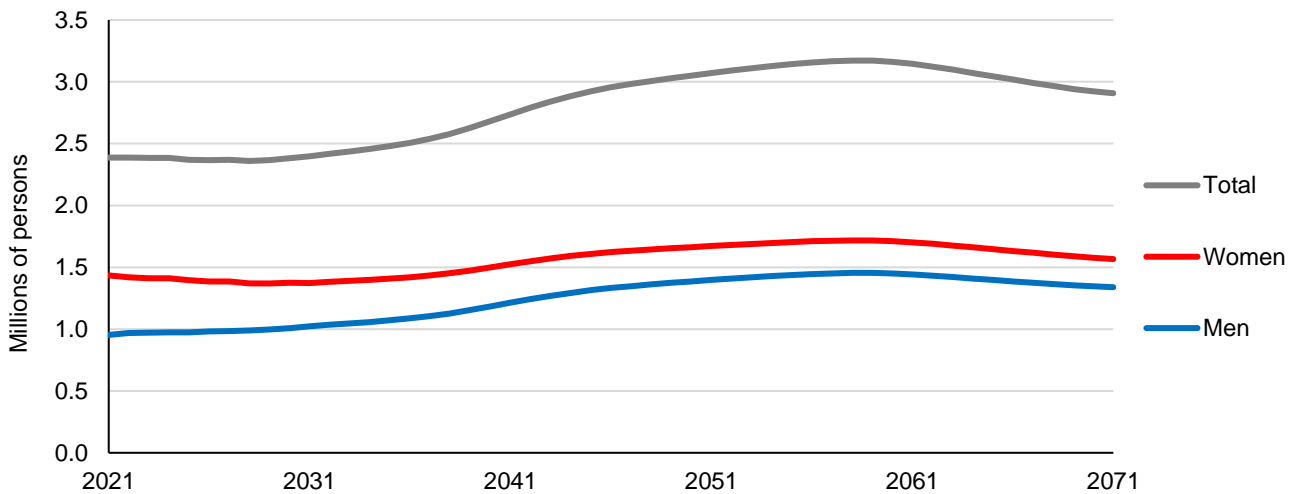
Source: CZSO (2021), CSSA (2021); CFC calculations.

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.[29]

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 pensions we used the latest known figures, according to which the level of new pensions was 46.2% of

[27] For women, we considered a single aggregated retirement rate only. The model scenario involved a woman with two children.
[28] 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]. See Box 4.1 of this Report for more on the retirement rate update.
[29] For a more detailed description, see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].

the average wage for men and 40.1% for women.[30] 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 (46.2%), 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. For 2021, the government among other things increased the basic flat-rate pension by CZK 60 to CZK 3,550 and the earnings-related component by 7.1%. The replacement rate for 2021 thus increased to 40.9%. Over the last three years, pensions have risen 2 pp faster than the statutory indexation rate each year, and the initial replacement rate has gone up by a total of 5.9%. The increase in pensions in excess of statutory indexation not only raises pension expenditure in the year of the increase, but will also affect spending for a long time to come.

In our projection, however, we assume that the current indexation system will be maintained and pensions will not be increased in excess of it. 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 and at 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 are 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. However, the average level of terminated pensions is not captured in any available statistics. For the purposes of the projection, we therefore simply assume that the ratio of the average terminated pension to the average old-age pension is constant.[31]

Integrating all these assumptions into our demographic projection implies an average pension that will range between 39.8% and the present 40.4% of the average wage (see Chart 4.1.2). The fall in the replacement rate over the coming decade is due to its high initial value and to the indexation method. Its growth in the 2030s and 2040s is caused by a high number of newly granted pensions. The projection of the average replacement rate is also increased by the higher rate of inflation for households of pensioners and the lower level of terminated pensions in relation to pensions currently being paid. In the absence of these effects, the replacement rate would probably be 3.7 pp lower at the end of the projection (see Chart 4.1.2).

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 12.3% 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. It also partially reflects the assumed rise in the ratio of compensation of employees to GDP, which feeds through to growth in pensions (both newly granted ones and indexed older ones), and growth in pensions newly granted to women stemming from a rising coverage period.

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[30] MoLSA (2020): Statistická ročenka z oblasti práce a sociálních věcí 2019 [Statistical Yearbook in the Area of Labour and Social Affairs 2019, available in Czech only]. We use the average ratio of new pensions to the average monthly wage for the last two years.
[31] Payment of pensions is more likely to be terminated for older pensioners, who have lower pensions on average. We therefore set the level of terminated old-age pensions at 95% of the average old-age pension.

Chart 4.1.2 Average old-age pension to average wage ratio

Ratio of old-age pension to average wage
Alternative ratio of old-age pension to average wage (see Note)
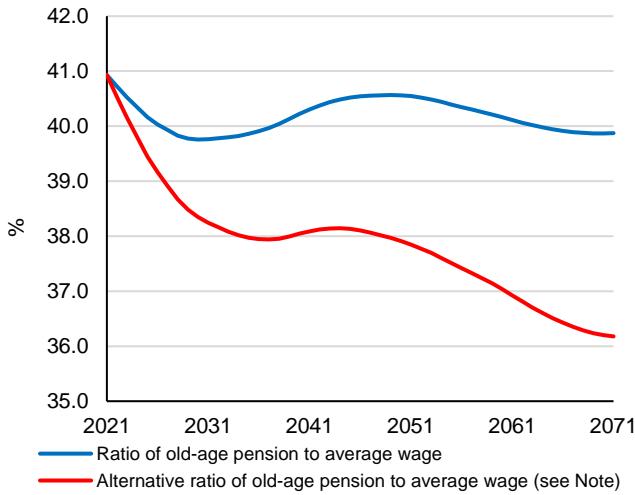
Chart 4.1.3 Ratio of old-age pension expenditure to GDP (%)
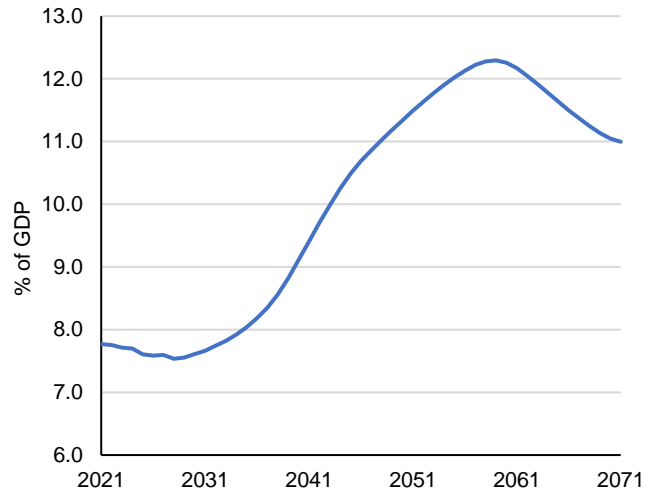
Source: CZSO (2021), CSSA (2021); CFC calculations.
Note: The alternative average pension to average wage ratio is that which applies when we abstract from the higher growth in the living costs of households of pensioners and the lower level of terminated pensions.

Box 4.1 Estimate of disability and retirement rates

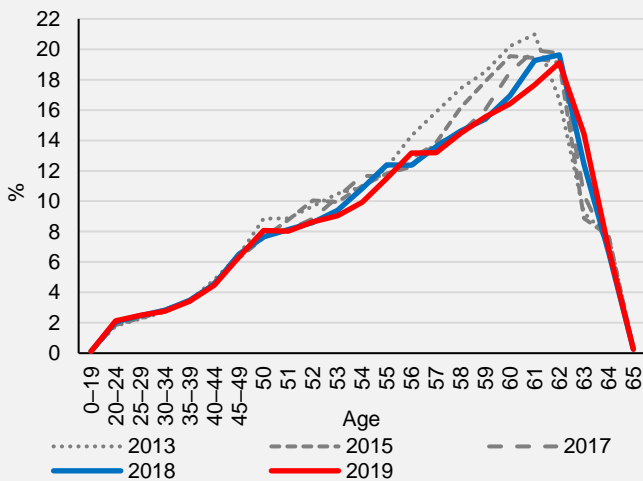To determine the future number of disability and old-age pensioners in our projection, we use projected disability and retirement rates in addition to the demographic projection. In previous Reports we used rates derived on the basis of historical data for 2013–2017, but in this year's Report we updated our projection to include newly available data for 2018 and 2019. This box sets out to describe the effect of this update on our projection and to quantify its impacts on the numbers of old-age and disability pensioners.

Disability rates were affected in 2018 and 2019 by the continued raising of the statutory retirement age, which moves the peak of the disability curve to a higher age (see Chart B4.1.1). This effect is particularly visible for women. The healthy ageing effect also manifests itself here – disability decreases among the over-50s, while the structure of the number of disability pensions paid also improves towards lower degrees of disability. The rate of disability among the under-50s is constant in the long run. The overall shifts in disability rates match the assumptions used in our projections. However, the actual disability rates are rather lower than in the past, so we have modified our projections. The reduction in projected disability rates reduced the projected number of disability pension beneficiaries by 1,600–3,100 over our projection horizon.

Chart B4.1.1 Disability rates by age

A) Men

B) Women

········· 2013   ── ── ── 2015   ─ ─ ─ 2017
────── 2018   ────── 2019
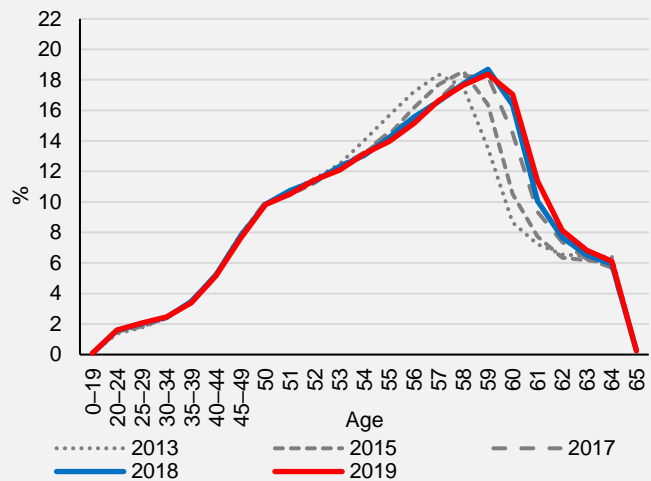
Source: CSSA (2021); CFC calculations.
Note: Rates of disability of all three degrees.

As with disability rates, we incorporated new data on retirement rates into our projection. In Chart B4.1.2, these rates are presented as a function of time to retirement age, so they are already adjusted for changes made to the latter. Retirement rates were also affected by the economic cycle – in 2018 and 2019 the economy was growing, the labour market was overheated, and the increased demand for labour reduced the incentive for older people to go into old-age retirement. The rate of retirement is thus lower, especially among men below retirement age. The change in the rate of retirement projection reduced the number of old-age pension beneficiaries in our projection by 3,000 to 8,000 over the entire projection horizon.[32]

Chart B4.1.2 Retirement rates by time to current retirement age

A) Men

B) Women
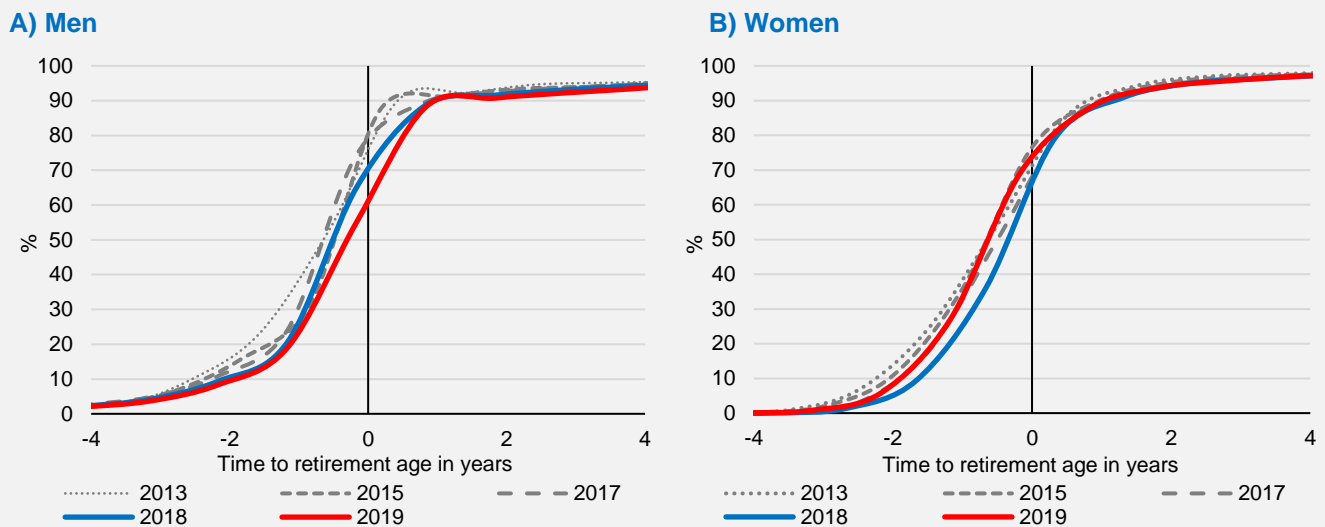
Source: CSSA (2021); CFC calculations.
Note: Adjusted for numbers of disability pensioners – the charts therefore show the ratio of the number of old-age pensioners of a given age to the total population excluding disability pensioners.

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.[33] 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 primarily a manifestation of the healthy ageing hypothesis.[34]

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 the age of 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 18% 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

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[32] As we derive the number of old-age pensioners from the population adjusted for the number of disability pensioners, the fall in the retirement rate and the fall in the disability rate act in opposite directions here. Ceteris paribus, a fall in the disability rate increases the number of persons that we multiply by the lower retirement rate.

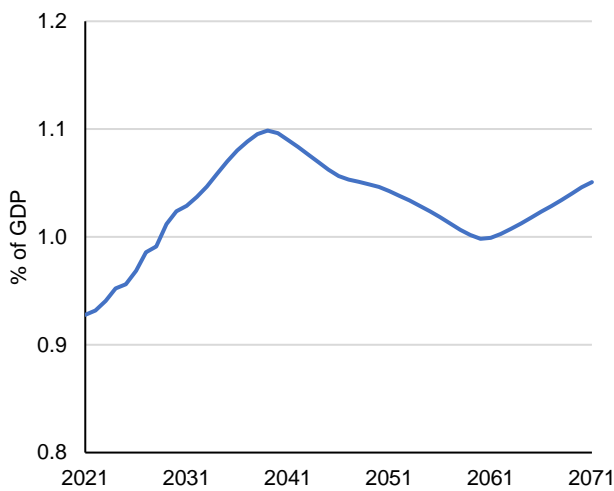[33] For a more detailed description of the method for projecting the number of disability pensioners, see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only]. See Box 4.1 of this Report for more on the disability rate update.

[34] For more on the healthy ageing hypothesis, see CFC (2018): Report on the Long-Term Sustainability of Public Finances. See also Box 4.3 of this Report.

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 pensioners will be 8% 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 roughly 0.93% of GDP to 1.1% 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 1% in 2060.

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

Source: CSSA (2021); CFC calculations.

Chart 4.1.5 Ratio of expenditure on survivors' pensions to GDP (%)

Source: CSSA (2021); 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.[35]
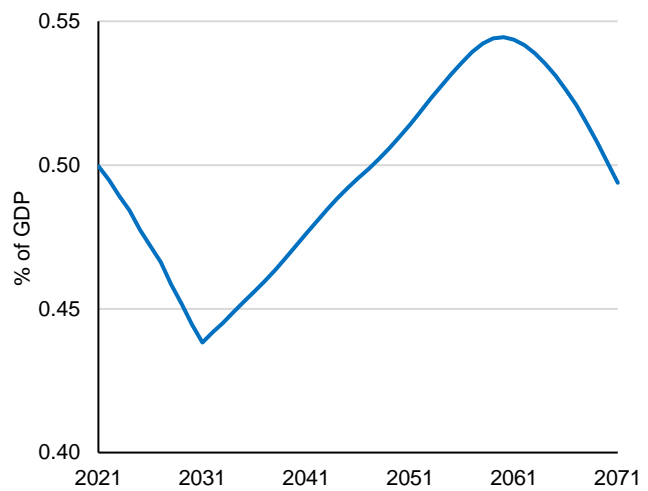
In the case of widows' and widowers' pensions, we need to distinguish between pensions paid out individually (solo) and pensions paid out in combination with old-age (or disability) pensions. For solo widows' and widowers' pensions, we assume an approximately constant share in the part of the adult population (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).[36] The increasing statutory retirement age reduces the number of persons who are 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

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

in the population, there is a slight decline in the number of combination survivors' pensions in our projection.

We again model the level of survivors' pensions as a fixed proportion of 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 around 0.5% of GDP for all types of survivors' pensions combined, falling by around 0.06 pp in the period up to 2032 and then rising by 0.11 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 another increase in pensions in excess of the indexation scheme in 2021 (see section 4.1.1).

Over the next few years, the pension system as a whole will record modest deficits, which will decrease 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 5% 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.

The above growth in pension system deficits is independent of the demographic scenario chosen (see section 6.3). 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. A plan for the reform of the pension system was prepared by the Commission for Fair Pensions in 2019–2021, and a structured version of that plan was submitted to the government in May 2021. In the opinion of the CFC, however, the proposed form of the pension system reform would lead to a substantial increase in expenditure in excess of our projections. The proposal also contains no specific idea about how this increased spending will be financed. As a result, its implementation would lead to a further widening of the deficits in the pension system (see Box 4.2 for details).

Chart 4.1.6 Annual balances of the pension system
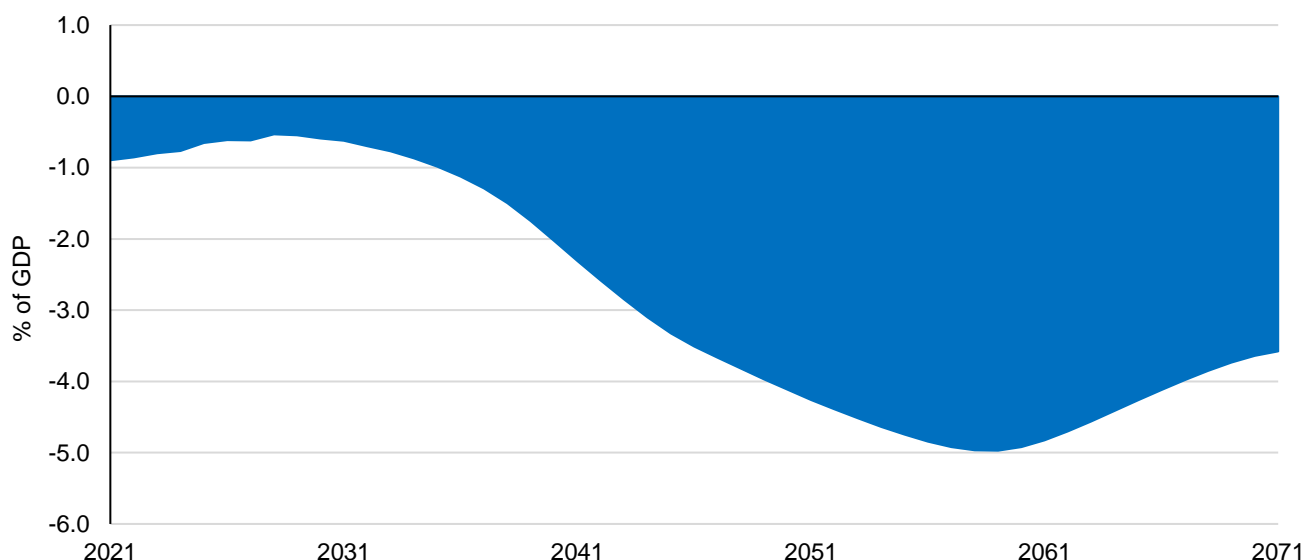
Source: CZSO (2021), CSSA (2021); CFC calculations.

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

	2021	2031	2041	2051	2061	2071
Old-age pensions	*8,0*	*7,9*	*9,6*	*11,7*	*12,4*	*11,2*
Disability pensions	*0,9*	*1,0*	*1,1*	*1,0*	*1,0*	*1,1*
Survivors' pensions	*0,5*	*0,4*	*0,5*	*0,5*	*0,5*	*0,5*
Total expenditure	9,4	9,3	11,2	13,2	13,9	12,7
Total revenue	8,5	8,7	8,9	9,0	9,1	9,2
BALANCE	-0,9	-0,6	-2,3	-4,3	-4,8	-3,6

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.

Box 4.2 Pension reform

In May 2021, the Ministry of Labour and Social Affairs (MoLSA) submitted a pension system reform bill to the government.[37] The bill is based in large part on the conclusions of the Commission for Fair Pensions drawn up in 2019. The proposed pension reform also reflects some of the recommendations made by the OECD, from which the Ministry of Finance and the MoLSA commissioned a review of the Czech pension system containing proposals for possible reforms.[38] According to the proposal, the pension reform will affect pensions to be granted in the future and those granted before it takes effect. It is designed to be more favourable in its individual impacts for all those covered than the current state of affairs.

The declared aim of the proposed reform is to make basic pension insurance fairer, easier to understand and financially and socially more sustainable. The proposal envisages the reform being implemented in two phases. In the first phase, a "basic pension" ("pillar zero") of 28% of the average wage would be introduced in January 2023 (for 2021 this would therefore have been CZK 9,930 a month). The structure of the old-age pension would thus change substantially – its "solidarity" component would be considerable larger than it is now. The basic pension would be financed from general tax revenues, not from social security contributions. The old-age pension eligibility conditions would also be relaxed – an old-age pension would be paid to every pensioner who has worked for at least 25 years instead of the current 35 years and who has reached retirement age.

The bill also contains a change to the pension indexation rules. The basic pension (i.e. the solidarity component of the old-age pension) would be indexed to nominal wage growth, while the earnings-related component would be indexed to inflation. The indexation of non-old-age pensions (disability and survivors' pensions) would be de-rived from that of old-age pensions. The first phase of the reform would also involve increasing the reference wage for determining social security contributions paid by the self-employed. The method for calculating the reference wage would be changed so as not to account for non-validated periods with no genuine income, which at present negatively affect the pensions of women in particular. From 2024 on, higher pensions for women would also be fostered by the introduction of a "parenting allowance" of CZK 500 on top of the primary caring parent's monthly pension for each child being reared (this amount would be indexed to inflation)

The second phase of the reform in 2025 would involve a tax reform intended to deliver additional pension account revenue. The same year would also see the introduction of a lower retirement age for arduous professions,[39] the completion of the system for valuing non-employment spells, a shortening of the penalty period for early retirement and a streamlining of the third pillar of the pension system.

The implementation of the proposed pension reform with the aforementioned parameters would make the pension system more level than it is at present. This would be fostered both by a substantial increase in the solidarity component of pensions from the current 10% of the average wage to 28% and by the method of indexation of the solidarity and the earnings-related components, with the solidarity component being indexed to nominal wage growth and the earnings-related component only to inflation. Whether the aim of making the tax system more equitable and easier to understand would be achieved is thus rather debatable. However, the main problem with the proposed reform is that it would lead to a substantial increase in pension system expenditure. Old-age pension expenditure would rise by up to 1.23% of GDP a year by comparison with the baseline scenario of our projection,

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[37] Bill amending Act No. 155/1995 Coll., on Pension Insurance, as amended, Act No. 582/1991 Coll., on Organisation and Implementation of Social Security, as amended, and Act No. 589/1992 Coll., on Premiums for Social Security and Contributions to the State Employment Policy, as amended.

[38] See also http://duchodovakomise.cz/wp-content/uploads/2020/11/OECD-Pension-Review-Czech-Republic.pdf. The proposed pension re-form does not in any way reflect the OECD's recommendation for a gradual, life expectancy-linked increase in the retirement age.

[39] Arduous professions include mining, welding, stone-grinding and general nursing with specialisation, among others. The retirement age for professions in this category would be reduced such that the person would retire one year earlier for every ten years worked. The extra expenditure on this earlier retirement would be financed at least partially by the employers of such workers through 5 pp higher contributions.

which assumes no pension reform (see Chart B4.2.1). The fact that the reform does not specify a concrete tax reform to deliver additional revenues to finance this increased expenditure could ultimately lead to a further escalation of public deficits. Instead of solving the problem of long-term public finance sustainability, the reform in its current proposed form could further exacerbate it.

Chart B4.2.1 Old-age pension expenditure (% of GDP)
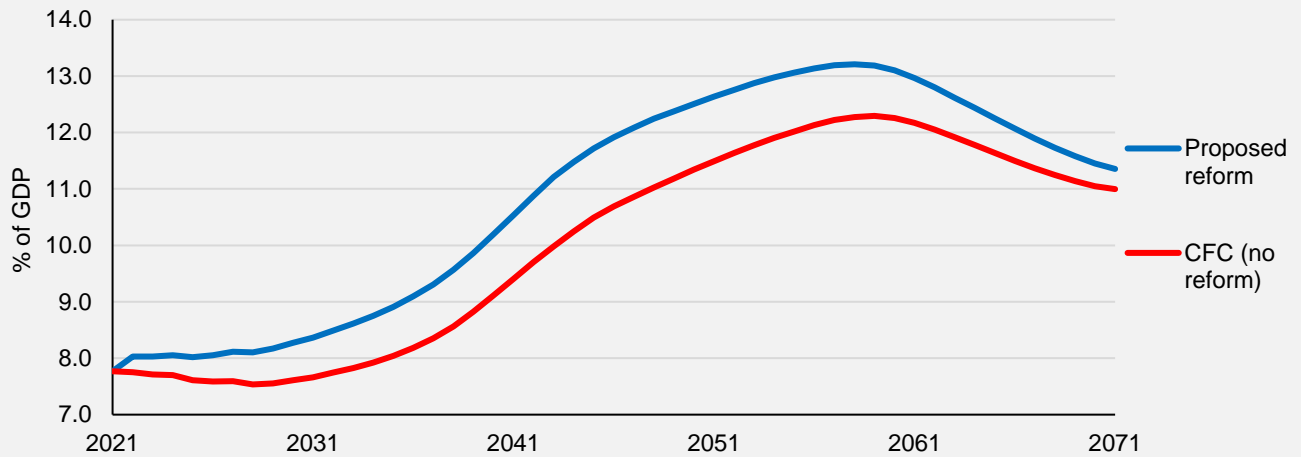
Source: CZSO (2021), CSSA (2021), Commission for Fair Pensions (2020); CFC calculations.

4.2 Health care

Health care expenditure in the Czech Republic is largely (more than 80%) covered by public sources, and 65% of total health spending is covered directly by health insurance payments.[40] We will focus on this part in our projection. Likewise, we will examine the revenue side solely in the public health system area.

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. We describe the factors that could lead to this happening in more detail in Box 4.3.

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 2009–2018, 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. If we abstract from the increased costs caused by the current 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 to a level 1.1 pp higher by the 2060s (see Chart 4.2.1).

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

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

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. According to our estimate, however, the state-funded contributions for state insurees will rise substantially this year due to a marked increase in the reference base for the payment of health insurance on behalf of state insurees.

The reference base for contributions on behalf of state insurees was increased from 23% to 36% of the average wage last year in order to reduce the drop in revenue and offset the rise in public health insurance system expenditure connected with the COVID-19 pandemic. No mechanisms further adjusting the payments for state insurees have been set so far for the period after 2021. 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 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 1.6% 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 1.9% 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 (see Chart 4.2.2).[41]

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' expenditure, while revenue for state insurees will rise from 1.4% of GDP last year to 2.3% GDP in 2021 as a result of the marked increase in the reference base.

Assuming an unchanged reference base for payments for state insurees, the total revenue of the system, which will reach 6.8% of GDP this year, will gradually fall to 6.2% of GDP in the 2040s. Subsequently, however, it will increase again to around 6.7% 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 1% of GDP in 2022 to zero over the next 20 years. For the rest of the projection, the public health insurance system will record deficits of about 0.1% of GDP a year.

Chart 4.2.1 Ratio of public health care expenditure to GDP (%)
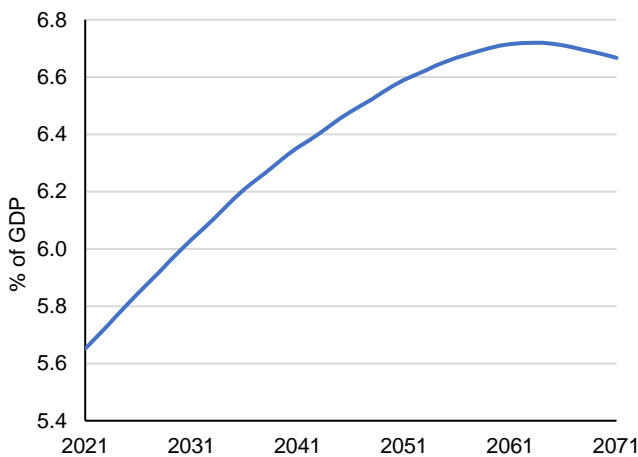
Source: CZSO (2021); CFC calculations.

Chart 4.2.2 Structural balance of the public health care system
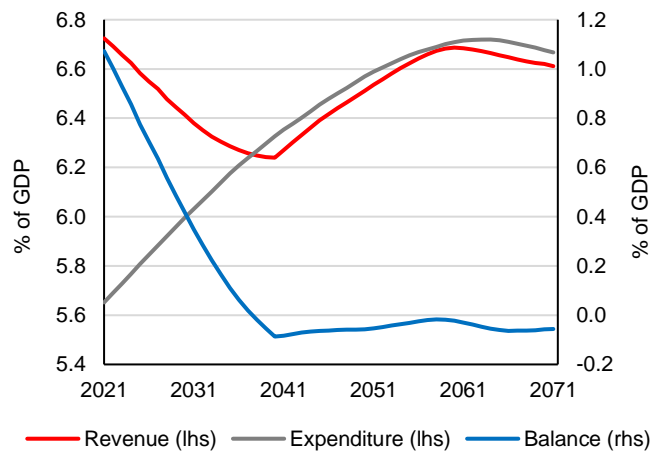
Source: CZSO (2021), MF CR (2021); CFC calculations.

[41] In contrast to the actual balance, the structural balance does not capture the effect of one-off expenditure connected with the COVID-19 pandemic and the reduction in revenue resulting from the position in the economic cycle.

Box 4.3 Health care – alternative approaches to modelling the expenditure profile[42]

In this Report, we assume that growth in income passes through to growth in the number of medical procedures evenly across all age groups. An alternative approach to modelling the expenditure profile conversely assumes that **income elasticities are age-specific**, hence medical procedures for members of individual age groups react differently to a given rise in per capita income. The empirical expenditure profiles in the Czech Republic indicate that procedures consumed by younger cohorts rise more slowly in percentage terms than procedures for older age groups, for which more effective absorption of additional medical procedures can be expected. Neglecting this fact could cause the impact of population ageing on the quantity of medical procedures to be underestimated in the long-term projection.

Another alternative approach that can affect the expenditure profile is that based on the **healthy ageing** concept, according to which healthy life expectancy increases with increasing life expectancy. The higher costs associated with ageing therefore gradually move to a later age over time. At the same time, some health issues become treatable, or at least move to a higher age, thanks to progress in the field of medicine.[43] According to this theory, the expenditure curve should gradually become more stretched out. However, the healthy ageing hypothesis does not say that individuals will consume fewer health procedures over the course of their lives, it merely asserts that medical procedures are, from a certain age upwards, more spread out over an increasing life expectancy.

Expansion of morbidity can have the opposite effect. In spite of the healthy ageing concept, the period of chronic health problems before death increases with increasing life expectancy. Mortality decreases, but morbidity at any given age does not. So, unlike the healthy ageing concept, the expansion of morbidity effect thus implies that health problems do not move into higher age groups with increasing life expectancy, and therefore leads to increasing expenditure on persons in all age groups from a certain age upwards.

The available data show that health care expenditure is several times higher for a person in the last year before death than for a survivor of the same age.[44] These **death-related costs** (DRCs) partly explain the increasing slope of the expenditure curve in older age groups, where the proportion of decedents steadily rises. In the explicit modelling of DRCs, the expenditure profile is split into a profile for those who will die during a pre-defined period (this period is usually set at one year, but this is an arbitrary decision not based on any empirical data) and a survivors' (non-DRC) profile. These profiles can be obtained using empirical data. However, this is associated with many problems, such as poor data availability and quality and high variability in last year of life costs, especially in younger age groups. The DRC expenditure profile is subject to greater variability than the overall expenditure profile, potentially reducing the reliability of long-term projections. Another option, therefore, is to merely simulate this expenditure profile (see Chart B4.3.1). As this approach produces similar results to that based on healthy ageing, it seems more appropriate to use the healthy ageing hypothesis directly.

Alternatively, the expenditure profile can be modelled using the **diagnosis approach**. Under this approach, health care spending is simulated using a model of the future occurrence of individual types of diseases, or diagnoses, in the population and the ensuing expenditure on treating them. So, the probability of these diagnoses is first modelled by age and sex, then the future expenditure on medical procedures arising from them is derived. A partial expenditure profile is obtained by multiplying the modelled probability of a diagnosis (by age) and the modelled costs of treating that diagnosis (also modelled by age). If we theoretically had expenditure profiles for all groups of diagnoses, the sum of those profiles would again be the total aggregate expenditure profile. However, considerably more input variables enter the partial expenditure profile models than the aggregate expenditure profile. Rather than making the projections more accurate, this could give rise to a systematically biased model under certain conditions. The diagnosis approach is only possible using groups of diagnoses, not individual ones, and the resulting model depends on the degree of detail we use for the diagnoses. Theoretically, it would be possible to estimate the expenditure profile only for diagnoses for which data are available and to combine that approach with the aggregate expenditure profile minus the costs of those diagnoses. In the Czech context, however, this approach is not appropriate due to the considerable inaccuracy of the input data.

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[42] Kubíček (2021): Projekce veřejných výdajů na zdravotnictví – srovnání metodik pro české podmínky [Projection of Public Health Care Expenditure – Comparison of Methods for the Czech Conditions, available in Czech only].

[43] This issue is linked with that of healthy life expectancy indicators, for which there is a high degree of uncertainty associated primarily with the subjectivity of perceptions of health and other methodological problems. See, for example, Hlaváček and Lakotová (2019): Délka života ve zdraví [Healthy Life Expectancy, available in Czech only].

[44] For example in Yang et al. (2003), Raitano et al. (2007) and Gastaldi-Ménager et al. (2013).

Chart B4.3.1 Comparison of alternative expenditure profiles (profiles for men)
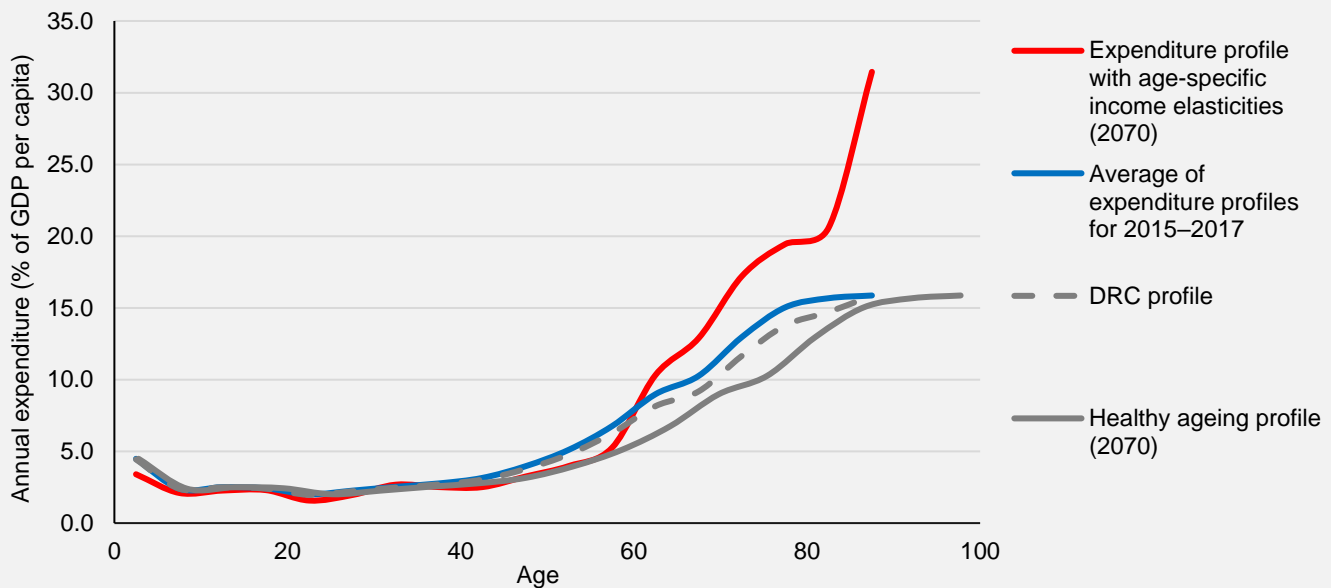
Source: CZSO (2021); CFC calculations.
Note: The profile for the DRC approach shown in the chart is a non-DRC expenditure profile that is a simulation of the survivors' expenditure profile assuming that DRC expenditure for people aged between 0 and 59 years is four times the expenditure on the oldest group and for people aged over 59 years declines linearly to the level of spending on the oldest group (an approach introduced in de la Maisonneuve et al., 2013). The expenditure profile for age-specific income elasticities assumes elasticities that are low for the majority of age groups. Up to the age of 59 years, the elasticities mostly range between 0 and 0.4, corresponding to the situation between 2000 and 2017, when real health spending on members of these groups increased slowly despite a rise in real income. From 60 years of age up, however, the elasticities increased rapidly towards unity (and higher) for the oldest age group.

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

Another expenditure item is spending on non-pension social benefits in cash and long-term care. As in the previous Report, in the model we simulate benefits that are sufficiently fiscally significant, amounting to more than 0.1% of GDP. These benefits must also be identifiably linked to demographic change. The following benefits meet these two criteria: maternity benefit, parental allowance, care allowance and housing allowance. For the other benefits, i.e. unemployment benefit, child allowance, foster care benefit, birth grants, funeral grants, sickness benefit and social assistance/need benefit, we assume they maintain a constant share of GDP at the current level. Non-pension social benefits in cash now also include a tax advantage for dependent children.[45]

To simulate expenditure on fiscally significant social benefits, we make 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 benefit is constructed. We therefore simulate the projections for fiscally significant benefits using 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.

The simulation of **maternity benefit** can be based 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.

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

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[45] 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 the tax advantage for children is now counted under social benefits (i.e. as an increase in public budget expenditure), but personal income tax revenue is increased by the same amount. See section 4.6 of this Report.

average wage, will be constant over time. Parental allowance was increased to CZK 300,000 in 2020.[46]

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).[47] Under the assumption of a constant share of the number of individuals drawing an allowance at a given age, 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, while we estimate the share of allowance recipients in the level 3 and level 4 dependence categories who use residential social services at 45%.[48] From 2021 onwards we then assume a constant allowance to average wage ratio. The total volume of allowances paid will rise above 1.4% of GDP, mainly due to population ageing and an increasing share of people aged 75+ in the total Czech population.

The final fiscally significant benefit that can be linked to demographic change is **housing allowance**. We simulate it 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.[49] The remaining three quarters of the recipients are thus aged 18–64. Since July 2020, persons actually living in the applicant's household have been reported for eligibility for the benefit regardless of their permanent residence.

The **tax advantage for children** is simulated in relation to the number of children and the share of secondary school and higher education students. Entitlement to it 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 2021, the annual tax advantage was CZK 15,204 for the first child, CZK 19,404 for the second child and CZK 24,204 for the third and each subsequent child. In the simulation, we use the average of these figures, i.e. CZK 17,304.[50] We assume that the tax advantage for children will rise in line with the average wage.

It is clear from Chart 4.3.1 that as a result of population ageing, the care allowance will be the fastest growing social benefit. Care allowance expenditure will rise over the whole period of interest – from 0.6% of GDP at present to almost 1.5% of GDP in 2071. 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.[51] The total amount of non-pension social benefits will be at a constant level of around 3.1% of GDP until the first half of the 2030s, 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 4.2% of GDP in 2071.

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

[47] 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].

[48] The monthly care allowance for persons older than 18 ranges from CZK 880 in the lowest level 1 dependence category to CZK 19,200 in the highest level 4 category. With the exception of the level 4 category, the allowance is higher for the under-18s. By contrast, it is lower for persons in the level 3 and level 4 dependence categories who use residential social services.

[49] We checked this figure using EU-SILC data for the Czech Republic for 2018.

[50] This is the average tax advantage for the first and second child only.

[51] A bill amending Act No. 117/1995 Coll., on State Social Support, as amended, and Act No. 586/1992 Coll., on Income Tax, as amended (Senate Print No. 99) is in the legislative process. According to the bill in its current form, child benefit is to be raised by 26% in July 2021 and the income threshold for eligibility for this benefit is also to be raised from 2.7 to 3.4 times the family's living minimum. This means that the number of recipients of this benefit will increase. Other proposed changes include an increase in the difference between the basic amount and the increased amount from CZK 300 to CZK 500 and an increase in the tax advantage for the second and third child.

Chart 4.3.1 Projections of non-pension social benefits in cash
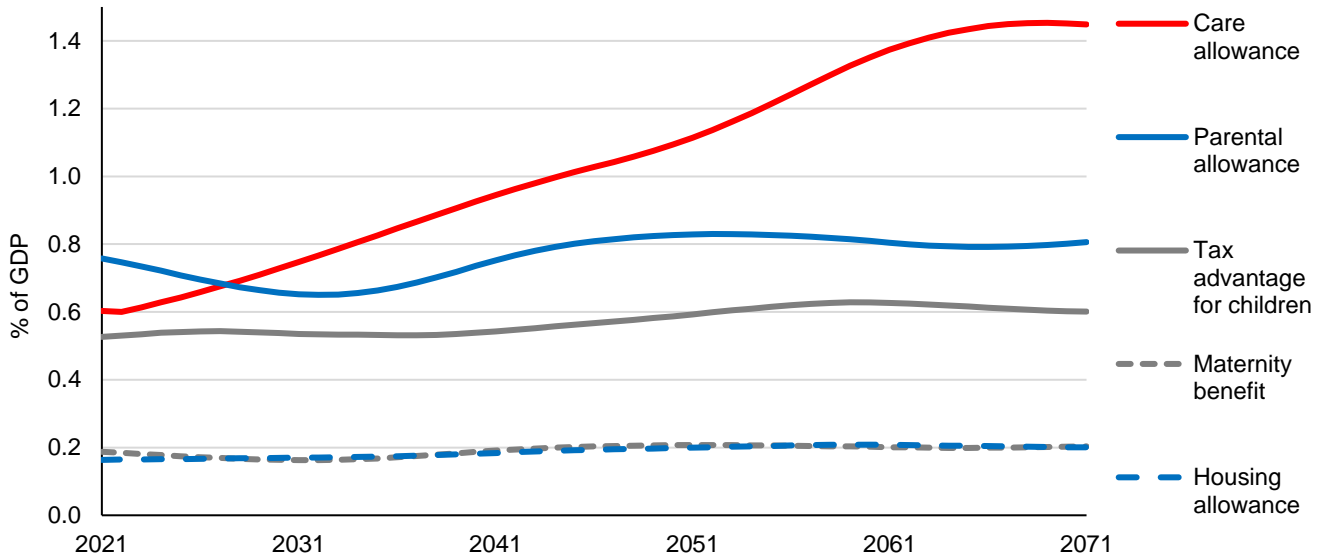
Source: CZSO (2021), MoLSA (2021); CFC calculations.

4.4 Education

Public education expenditure increased by 0.2 pp to 4.7% of GDP in 2020 compared with the previous year. The Ministry of Education, Youth and Sports (MoEYS) accounts for the largest share of this spending. It transfers around 70% of the expenditure from its budget to local public budgets. Besides the MoEYS, municipalities and regions contribute to public 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 4.4.2, 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. We also left the share of pupils in each age category in the projection 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 (see Chart 4.4.1).

However, total education expenditure growth will be affected primarily by the rate of growth of the pay of teaching and non-teaching staff. According to the government's programme statement, that pay is to increase to 150% of its 2017 level by this year. Our calculations thus show that the average gross wage of staff in the education system should approach

CZK 40,000 a month this year. As we do not know the next government's ambitions as regards wages and salaries in education in the coming years, we assume that they will grow at the same rate as the average wage in the economy from 2022 onwards. Spending on the pay of teachers and other staff in the education system will thus grow faster than GDP over the entire projection period.

Payments direct to universities for regular university activities and R&D make up a large part of MoEYS expenditure. In the case of payments to universities, however, we are seeing an opposite trend to that in transfers to public budgets. Their share in the budget heading's total costs has been falling in recent years. In 2013, spending on universities made up almost one third of total MoEYS expenditure, whereas in 2020 the figure was only 21%. Going forward, however, we project that spending on universities will no longer decline, mainly because of rising wage costs. The ratio of university students aged 18–26 to the total population in the same age group (26%) is comparable with that in Austria (27%). 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 will be 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% 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. Two thirds of R&D expenditure from the state budget is affected by growth in wages in education, while one third will grow in line with real GDP.[52] This causes R&D spending to grow faster than the economy as a whole in our projection.

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, when rapid wage growth in education will play the main role. However, education spending will slow over the following 15 years due to demographic change as the number of students in state schools (excluding universities) falls appreciably. By contrast, university operating costs will peak in this period, because – keeping the share in their age cohort at 26% – the number of students will be at its highest. Education expenditure will start to surge again around 2040, reaching 5.8% 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 Projection of staff numbers and the ratio of wage costs in education to GDP
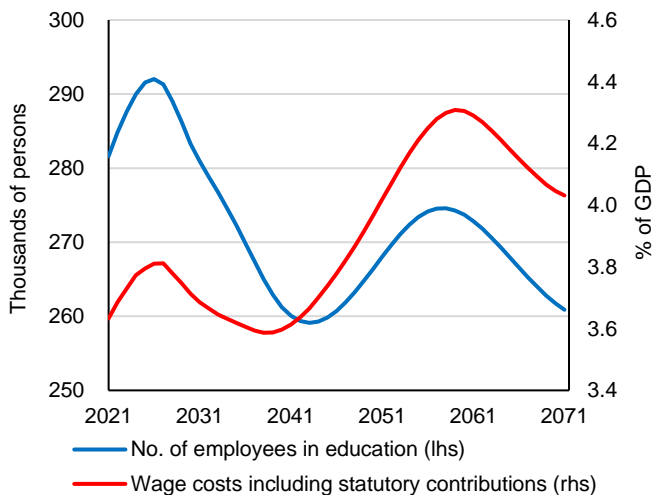
Source: MoEYS (2021), CZSO (2021); CFC calculations.

Chart 4.4.2 Ratio of public education expenditure to GDP (%)
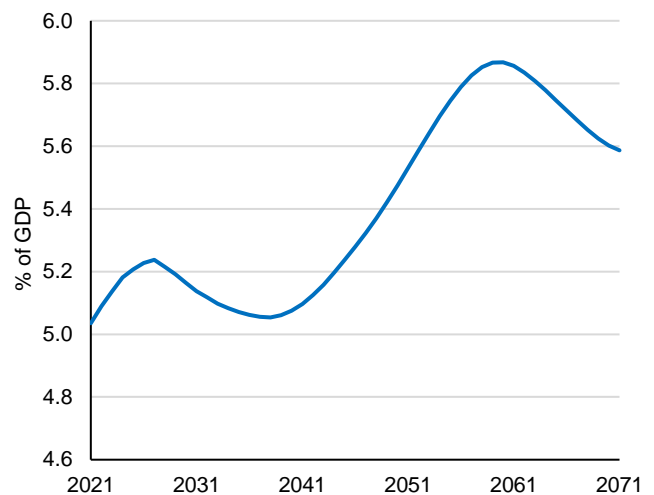
Source: MoEYS (2021), CZSO (2021); CFC calculations.

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

[52] This assumption is based on Eurostat (2019), according to which staff pay accounts for two thirds of total expenditure on tertiary education.

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.[53] 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 with the 2030 Concept for the Development of the Czech Armed Forces approved by the government on 30 October 2019, honour its NATO commitments and thus be spending 2% of GDP on defence over the next several years. The projection assumes that defence expenditure will be flat until 2024 and then rise gradually to 2% of GDP.[54]

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 Multiannual Financial Framework for 2021–2027 permanently increased the cap on payments to 1.4% of gross national income.[55] Nonetheless, with the exception of the coronavirus year 2020, in the previous programming period 2014–2020 payments to the EU were below the cap in effect at the time. As in previous Reports, we thus assume an increase in payments to the EU of 0.1% of GDP compared with the present as from 2028.

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 2014–2020 and from the Ministry of Finance's predictions for 2021–2023.[56]

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

	2021	2031	2041	2051	2061	2071
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.

[53] See, for example, World Economic Forum (2019): The Global Competitiveness Report 2019.
[54] MF CR (2021): Příprava státního rozpočtu České republiky na rok 2022 a střednědobého výhledu na léta 2023 a 2024 [Preparation of the State Budget of the Czech Republic for 2022 and the Medium-Term Outlook for 2023 and 2024, available in Czech only].
[55] Council Decision (EU, Euratom) 2020/2053 of 14 December 2020 on the system of own resources of the European Union and repealing Decision 2014/335/EU, Euratom.
[56] MF CR (April 2021): Convergence Programme of the Czech Republic.

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 workers. 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.[57] The expected growth in personal income tax revenue from the current 3.2% of GDP to 3.4% of GDP at the end of the projection is thus a result of convergence alone (see Table 4.6.1). Personal income tax revenue has dropped significantly compared with the previous Report as a result of the adoption of a "tax package" at the end of 2020 (see Box 4.4 for more information). The reporting methodology in the national accounts has also been changed. Personal income tax is no longer adjusted for the tax advantage for dependent children, which is simultaneously recorded as a social benefit. The change, amounting to around 0.5% of GDP, has therefore increased the amount of taxes and social benefits but has no effect on the overall fiscal balance.

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.[58] 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 (see section 4.2), in addition to the demographics of the categories that state insurees belong to (especially growth in the number of old-age pensioners) we took into account the major change made to the reference base at the start of 2021 (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

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[57] 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.

[58] 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).

taxation revenue will maintain a constant share in GDP.[59] Its decrease of 0.3 pp compared with last year's Report was mainly due to the abolition of real estate acquisition tax. There was also an increase in the rates of duty on tobacco and decrease in the rate of duty on diesel fuel (see Box 4.4). The predicted overall effect of these two changes is approximately budget neutral.

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 0.5% 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 as well. However, these incomes are subject to a high degree of uncertainty, making them difficult to quantify. The EU Multiannual Financial Framework for 2021–2027 and the Next Generation EU recovery plan had not been approved at the time of writing this Report. However, 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.

Table 4.6.1 Ratio of general government revenues in selected years to GDP (%)

	2021	2031	2041	2051	2061	2071
Personal income taxes	3.2	3.3	3.3	3.4	3.4	3.4
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	16.5	16.4	16.4	16.8	17.1	17.1
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*	*4.8*
Payments for state insurees (SIs)	*2.3*	*1.8*	*1.6*	*1.8*	*1.9*	*1.8*
Other	*1.2*	*1.2*	*1.3*	*1.3*	*1.3*	*1.3*
Taxes on production and imports	11.8	11.8	11.8	11.8	11.8	11.8
Property income	0.5	0.5	0.5	0.5	0.5	0.5
Other revenue	4.8	4.8	4.8	4.8	4.8	4.8
TOTAL REVENUE	40.2	39.9	39.8	40.2	40.4	40.3

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

Box 4.4 Major tax changes affecting the structural balance

General government revenue has been significantly affected since the start of 2021 by the adoption of a "tax package" by the Chamber of Deputies of the Parliament of the Czech Republic at the end of 2020.[60] The most fundamental changes related to personal income tax, where there was a reduction in the effective rate of tax through the abolition of the concept of taxation of the "supergross wage" and the simultaneous introduction of a progressive sliding rate with two marginal rates: 15% for a tax base of up to 48 times the average wage and 23% for a tax base exceeding this level. The basic personal income tax relief was simultaneously raised by CZK 3,000 to CZK 27,840 as from 2021 and by a further CZK 3,000 to CZK 30,840 as from 2022. By our calculations, the estimated negative effect of the changes to personal income tax in 2021 is CZK 102 billion.[61] According to the Ministry of Finance,[62] however, the reduction of the tax burden on individuals will significantly boost household consumption and hence also economic growth.

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[59] 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.
[60] Act No. 609/2020 Coll., Amending Some Laws in the Area of Taxes and Some Other Laws.
[61] Pavel and Lakotová (2021): Fiskální a distribuční dopady zrušení zdaňování superhrubé mzdy [Fiscal and Distributional Impacts of the Abolition of Taxation of the Supergross Wage, available in Czech only].
[62] MF CR (January 2021): Fiscal Outlook of the Czech Republic, MF CR (January 2021): Macroeconomic Forecast of the Czech Republic.

The predicted impact on consumption expenditure, however, may be significantly hampered by a rising household saving rate, which is evidently occurring as a result, among other things, of efforts by households to smooth their consumption spending over time. The household saving rate stood at 18.7% in 2020 and was 6.2 pp higher than in 2019. In nominal terms, the gross savings of households reached CZK 597.8 billion, up CZK 217.1 billion year on year.[63] The distribution of the overall tax saving among households is also contributing to growth in the saving rate. As stated in an OCFC study,[64] the monthly saving due to the reduction of the effective personal income tax rate is around CZK 230 for the lowest-income households but exceeds CZK 6,200 for those with the highest income. The tax saving is therefore concentrated predominantly in higher-income households, which demonstrably display a higher marginal propensity to save.

The tax package also contained minor changes to excise duties. According to a Ministry of Finance estimate, the increase in the rates of duty on tobacco products should have a positive effect on public budget revenue of around CZK 5 billion in total. Conversely, the reduction of the rate of duty on diesel fuel of CZK 1 per litre should have an overall negative effect of CZK 5.6 billion on excise duty revenue.[65]

The real estate acquisition tax of 4% of the acquisition value was also abolished in 2020 by Act No. 386/2020 Coll. The abolition of this tax was adopted with retroactive effect as from December 2019 and will have a negative effect on public budgets of more than CZK 13 billion a year.

The Czech Republic already had an unusual tax mix by comparison with European OECD countries, and the adoption of the aforementioned tax changes takes it even further from the usual practice in advanced countries. Using OECD data, it can be shown that the Czech Republic already had the second-lowest personal income tax revenue as a percentage of GDP among the European OECD countries (see Chart B4.4.1).[66] In the case of mandatory social security contributions, by contrast, the Czech Republic records the third-highest revenue (as a percentage of GDP) behind France and Slovenia (see Chart B4.4.2). The abolition of real estate acquisition tax caused a further decrease in the significance of property taxes, which are again very low in the Czech Republic compared with other European countries (see Chart B4.4.3).

Chart B4.4.1 Personal income tax revenue
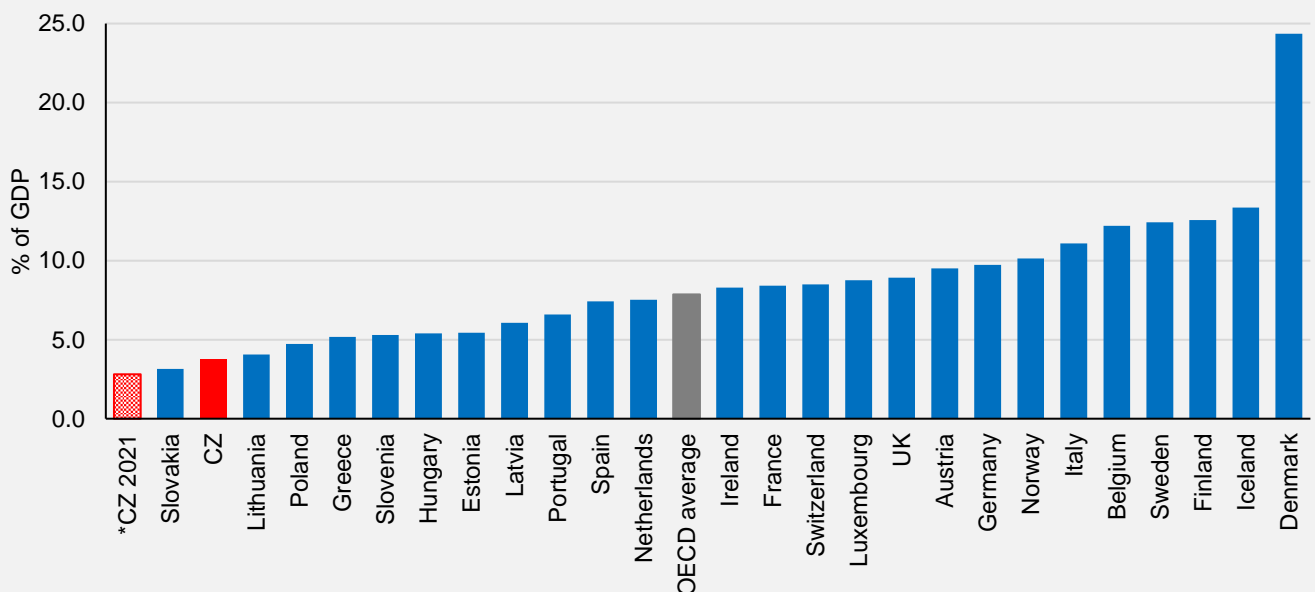
Source: OECD (2021); CFC calculations.
Note: Ten-year average for 2010–2019. * For illustration, the chart shows the predicted level of personal income tax revenue in the Czech Republic in 2021.

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[63] CZSO (2021): Analýza čtvrtletních sektorových účtů – 4. čtvrtletí 2020 [Quarterly Sector Accounts Analysis – 2020 Q4, available in Czech only].

[64] Pavel and Lakotová (2021): Fiskální a distribuční dopady zrušení zdaňování superhrubé mzdy [Fiscal and Distributional Impacts of the Abolition of Taxation of the Supergross Wage, available in Czech only].

[65] MF CR (April 2021): Convergence Programme of the Czech Republic (p. 13).

[66] However, the comparison is complicated by taxation of pensions in the majority of European countries, which increases personal income tax revenue. For details, see Hlaváček and Lakotová (2019): International Comparison of Public Expenditure on the Pension System.

Chart B4.4.2 Social security contribution revenue
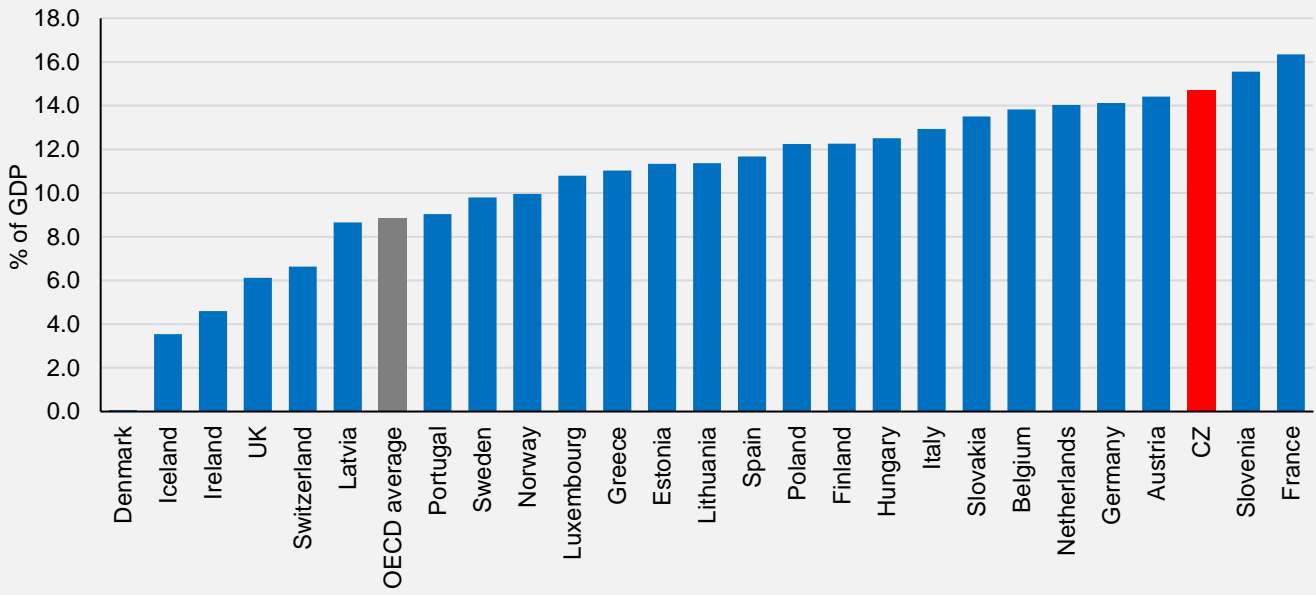
Source: OECD (2021); CFC calculations.
Note: Ten-year average for 2010–2019.

Chart B4.4.3 Property tax revenue
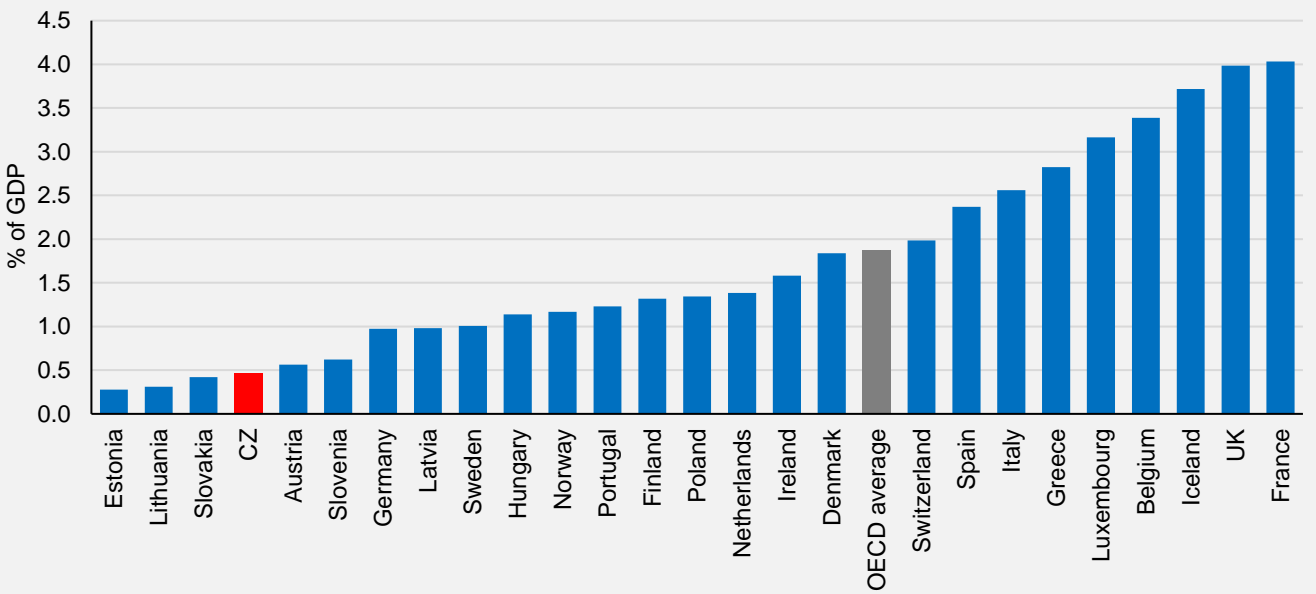
Source: OECD (2021); CFC calculations.
Note: Ten-year average for 2010–2019.

5 Overall general government balance and debt

5.1 The specific situation in 2021–2025

In our public finance sustainability projection, we work for each year with revenue and expenditure figures that are commensurate with the economy being at its potential output level. We use those figures to derive the structural balances of the general government sector, which in turn affect the debt projection. This approach does not entail any major distortions when the economic cycle is following its usual course, as the cyclical falls in revenue that occur at times of low economic activity are offset by cyclical surpluses recorded when the economy is thriving.

However, the coronavirus crisis is highly unusual in terms of the depth of the economic contraction, the scale of state fiscal support and the increase in expected income from the EU in the related years. The balances in 2021–2025 will thus be very negative, implying a major shift in the general government debt level. Our projection results would be over-optimistic

if we did not take this fact on board. We therefore decided to use a specific approach to take the balances for 2021–2025 into account.

For each year, we calculated the ratios of revenue and expenditure to GDP in the usual way (i.e. in relation to potential output). Subsequently, however, we adjusted the hypothetical structural balance for effects related to the expected economic contraction and fiscal policy response, in particular the cyclical component of the balance, one-off and temporary measures (in 2021), and the deviations of some expenditure and revenue items from their long-term averages (in particular investment expenditure and revenue from the EU). The resulting balance was used as an input to the projection of the debt quota in those years. In subsequent years, we use the structural balance only.
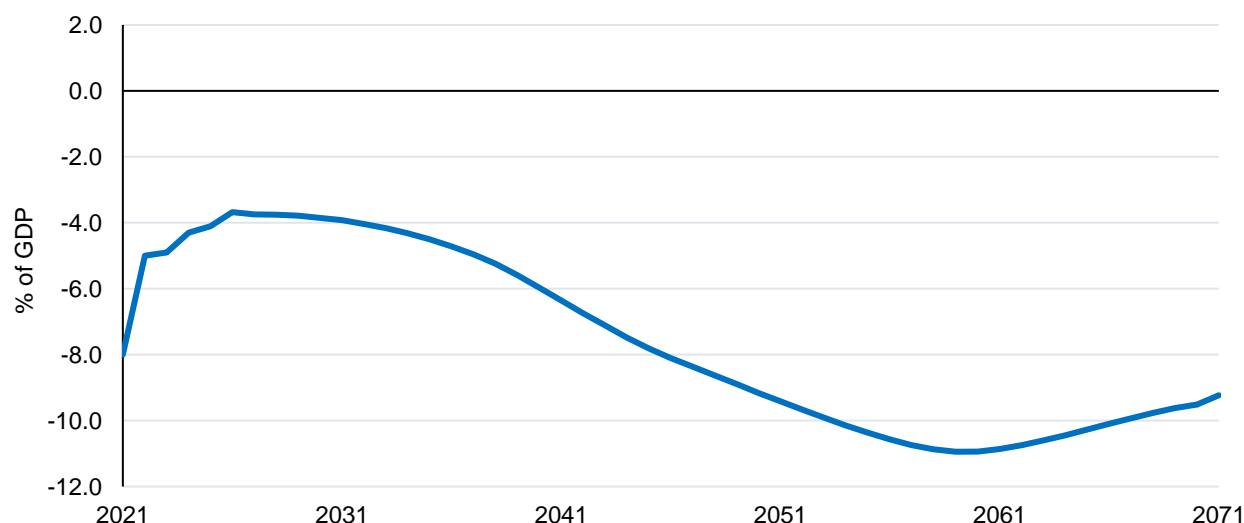
5.2 Primary balance

The projections of the individual revenue and expenditure items allow us to prepare a projection of the primary general government balance (see Chart 5.2.1).

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 5.2.1: Primary general government balance

Source: CFC calculations.
Note: For 2021, the primary general government balance is taken from MF CR (April 2021): Convergence Programme of the Czech Republic.

5.3 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 as a share of 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.[67] 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 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.[68]

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 2005–2020) plus inflation of 2%.[69] 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 2005–2020) 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.

5.4 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 5.4.1 for data for selected years). Over the 50-year horizon, the cumulative general government debt is heading towards approximately 334% of GDP by 2071 (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 294% of GDP (see Chart 5.4.1).

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

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[67] For more details, see MF CR (2021): Report on the Management of the State Debt of the Czech Republic in 2020 and Morda (2019): Vývoj státního dluhu České republiky [Evolution of the State Debt of the Czech Republic, available in Czech only].

[68] See MF CR (2020): Strategy for the Financing and Management of the State Debt of the Czech Republic 2021.

[69] CNB nominal interest rate data. We used the GDP deflator from CZSO data to convert to the real interest rate.

percentage point of the debt-to-GDP ratio above the 55% threshold increases the current ten-year real interest rate by 0.039 pp.[70] Under these assumptions, starting in 2024, when, according to our projection, the debt will breach the debt brake threshold, the debt growth would be accelerated compared with the baseline scenario. Around 2040, 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.

Chart 5.4.1 General government debt
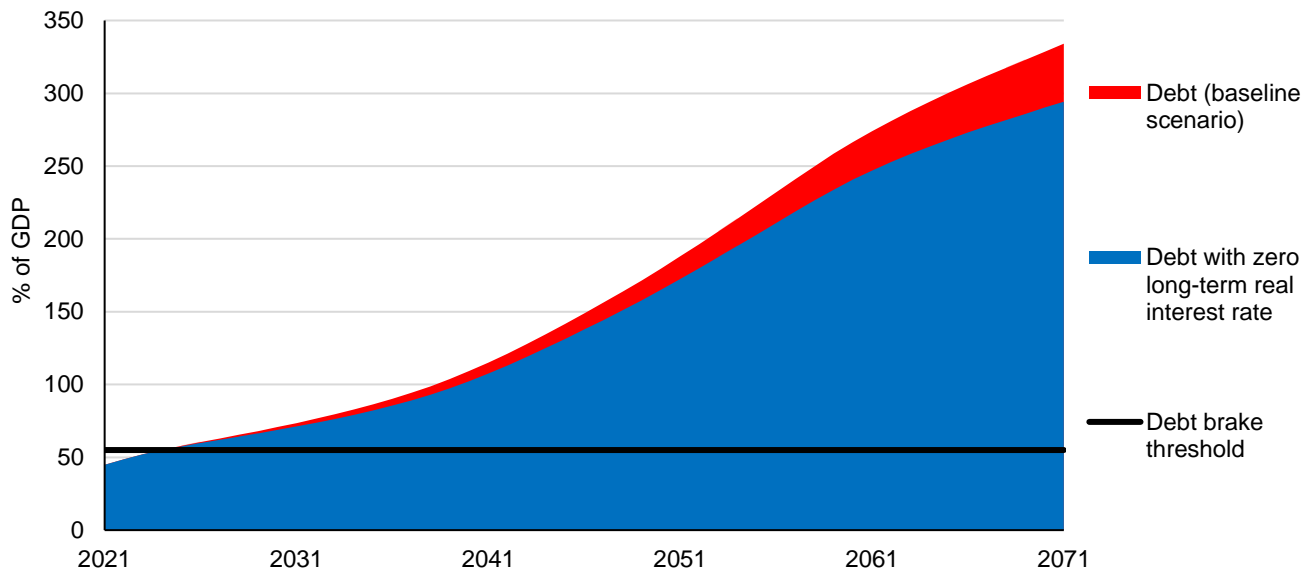
Source: CFC calculations.

Table 5.4.1 Interest costs and budget balances (% of GDP) in selected years

	2021	2031	2041	2051	2061	2071
Interest costs (baseline scenario)	0.8	1.8	2.8	4.7	6.8	8.4
Total balance (baseline scenario)	-3.7	-5.7	-9.2	-14.1	-17.7	-17.6

Source: CFC calculations.

5.5 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.[71]

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 6.98 (the figure last year was 3.28). This means that if the primary deficit was 6.98% of GDP lower every year from 2021 onwards over the entire projection period, the debt would head towards 55% of GDP in 2071. 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 2071 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

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[70] For an estimate of the risk premium, see Tománková (2020): The Effect of General Government Debt on Government Bond Interest Rates.
[71] For a more detailed description, see European Commission (2020): Debt Sustainability Monitor 2019.

2024 according to the projection), the gap will widen to 7.29.[72]

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 4.8 for the Czech Republic in 2020 (and 4.8 in 2019 as well).[73] This indicator value is more favourable than the S1 value that we calculate. This is because, in contrast to our calculations, the S2 value for 2020 does not take into account the changes in effect since the start of 2021 (the abolition of taxation of the supergross wage and the increase in personal tax relief), which significantly widen the expected general government deficits.[74]

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[72] So, for the debt to head towards 55% of GDP in 2071, the primary deficit would have to be 7.29% of GDP lower from 2024 to 2071.

[73] European Commission (2021): Debt Sustainability Monitor 2020 and European Commission (2020): Debt Sustainability Monitor 2019.

[74] The requirement for balanced revenue and expenditure makes S2 stricter than our measure of the sustainability gap when identical data are used. This was the case in previous Reports. The S2 calculation in Debt Sustainability Monitor 2020 uses the data valid as of 5 November 2020. However, fundamental changes to the tax system were approved in December 2020. The inclusion of the impacts of these changes in S1 (and their exclusion from S2) makes S1 considerable stricter than S2 in this year's 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. The other alternative scenarios assume that different variants of the demographic projection materialise.

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 2071). We assume that until 2030 the retirement age would increase to 65 years as in the baseline scenario. From 2034 onwards it would be gradually extended further to 67.9 years at the end of the projection.[76]

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).[77] 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 old-age pensions. The number of old-age pensioners will thus be as much as 11.2% lower in 2071 than in the baseline scenario. Total spending on old-age pensions will be 7.9% lower. To a lesser extent, widows' and widowers' pensions will also decrease compared with the baseline scenario, with a decline in the number of combination widows' and widowers' pensions outweighing a modest rise in solo widows' and widowers' pensions. The balance of the pension system will be around 1.1–1.4% 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 deficits and, together with the slightly higher GDP level and lower interest payments, to a debt level that is 45 pp lower than in the baseline scenario in 2071 (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.[78] 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 COVID-19-linked decline in GDP, which has also led to a drop in potential output. The alternative scenario thus serves rather to illustrate the sensitivity of the projection to an acceleration in labour productivity growth.

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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] There are professions which, due to their physically arduous nature, people will not be able to carry on at the age of 67.9 years. It will therefore clearly be necessary to modify the retirement age for such professions in the future. Pursuant to Section 4b of Act No. 582/1991 Coll., the government may propose a revision to the extended retirement age for these arduous professions.

[77] 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.

[78] See section 3.

In the technological acceleration scenario, we keep the other parameters, such as the rate of convergence of the Czech economy to other countries 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 81 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
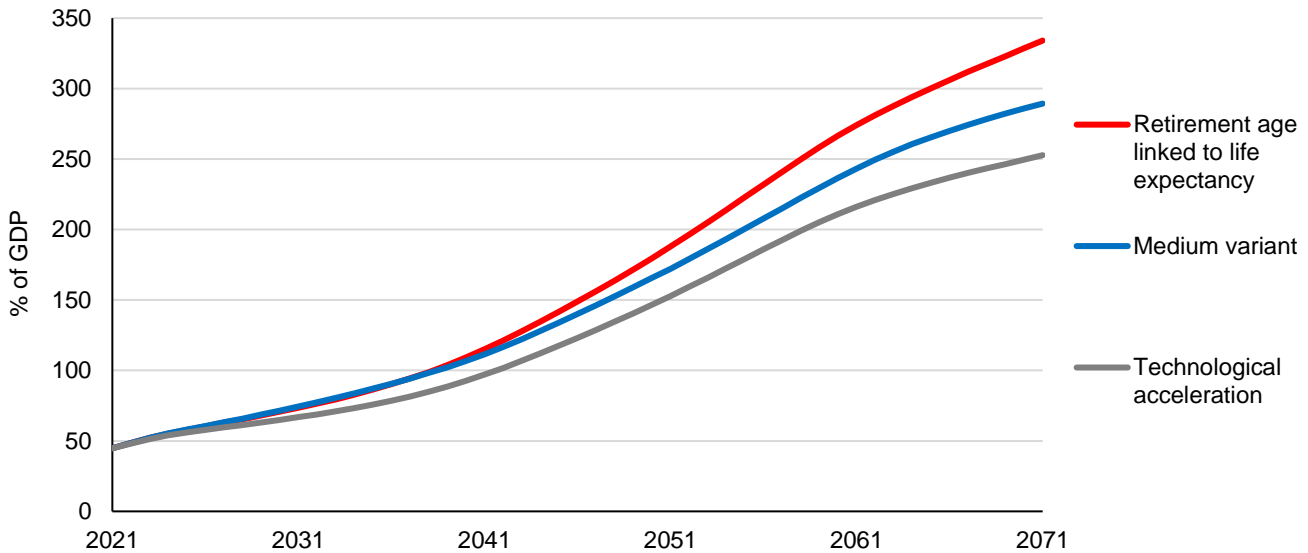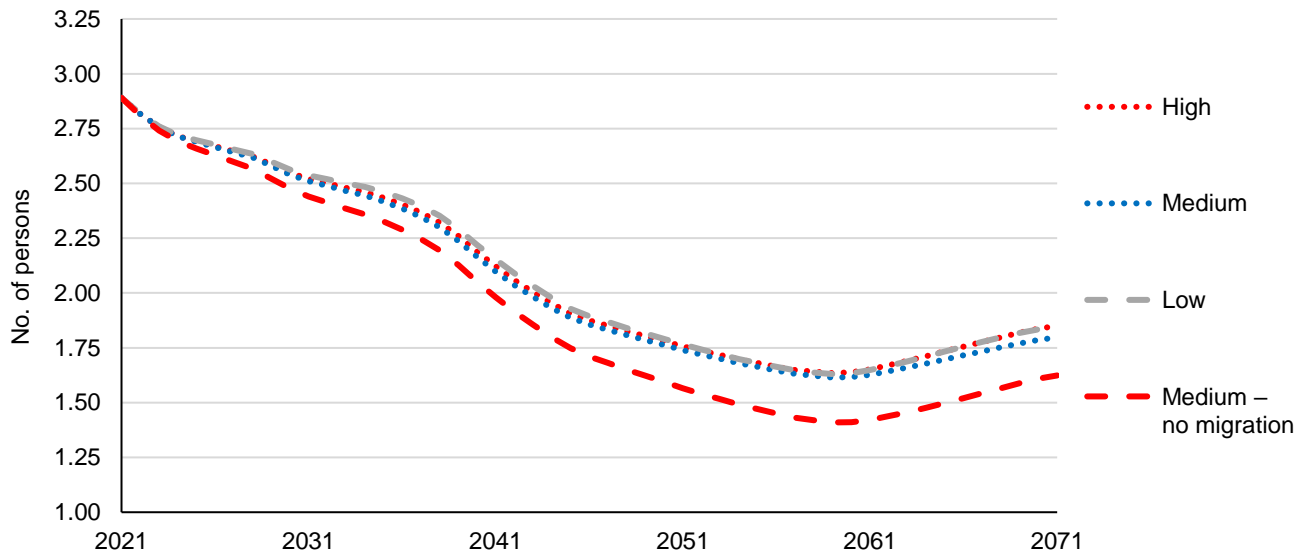

Source: CZSO (2021), CSSA (2021); CFC calculations.

6.3 Different variants of the demographic projection

The next scenarios illustrate the sensitivity of our projections to different demographic assumptions. If, instead of the medium variant of the demographic projection, we use the high or low variant, we obtain modifications of the baseline scenario caused by different population growth. To illustrate the uncertainty about migration flows we also use the no-migration medium variant of the demographic projection. The demographic scenarios differ from each other in terms of population age structure and population size. The differences associated with different age structure manifest themselves mainly on the expenditure side of the pension system (different numbers of pensioners). On the other hand, population size co-determines the size of the economy itself and therefore has an impact on the debt-to-GDP ratio via the absolute size of GDP. Although the variants of the demographic projection differ in many respects, the medium, high and low ones are quite similar as regards the population age structure they project. This is apparent, for example, from the ratio of the working-age population (for our purposes those aged 21–64 inclusive) to the population aged 65+ (see Chart 6.3.1).

Chart 6.3.1 Number of persons aged 21–64 (inclusive) per person aged 65+

Source: CZSO (2021); CFC calculations.

The similarity in population structure in the demographic variants is caused by contrary mechanisms within those variants. For example, the lower birth rate and lower rate of migration in the low demographic variant than in the medium one foster a decline in the ratio of the number of working age persons to the number of persons aged 65+. However, the higher mortality rate and lower life expectancy in this demographic variant conversely increase this ratio. The medium, high and low demographic variants thus ultimately generate similar debt-to-GDP ratio projections (see Chart 6.3.2).

Chart 6.3.2 General government debt – comparison of different variants of the demographic projection
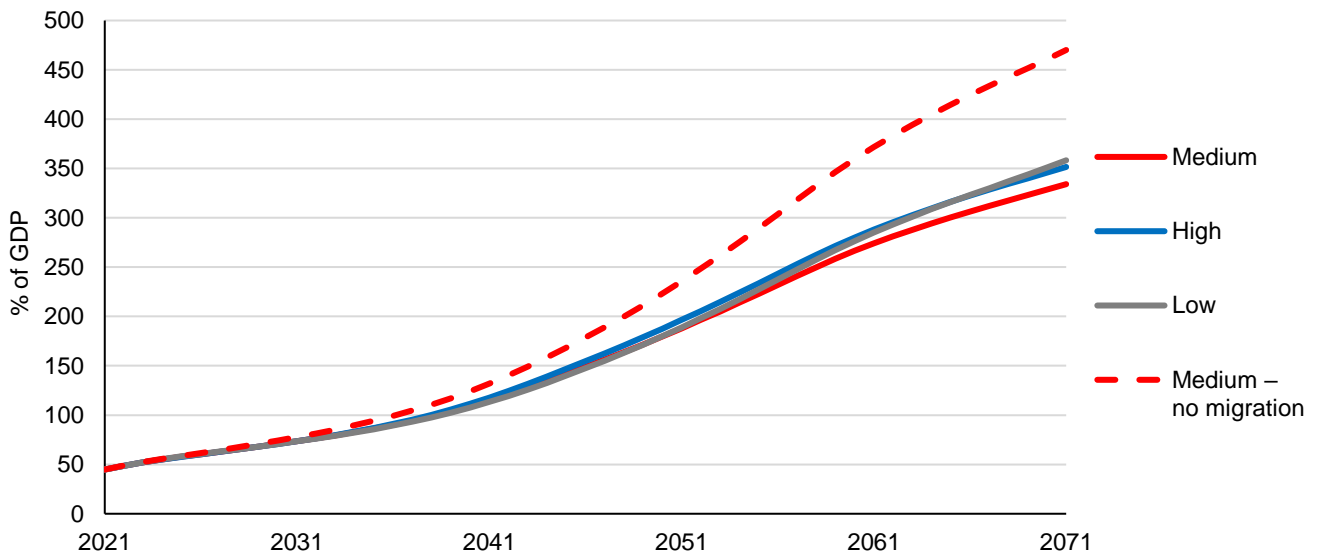
Source: CZSO (2021), CSSA (2021), MF CR (2021); CFC calculations.

The no-migration medium variant stands out from the others in terms of structure. The effect of change in the age structure of the population is stronger in this scenario than in the others.[79] The pension system falls into deficits of more than 8% of GDP a year, mainly because of revenue shortfalls. Another factor here is the effect of the lower population and hence lower GDP. Partly as a result, the debt projection heads towards more than 450% of GDP at the end of the projection period (see Chart 6.3.2). This is therefore the worst debt path of all the variants projected.

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[79] The medium variant of the demographic projection assumes constant positive net migration of 26,000 persons a year. The cumulative net migration shortfall therefore has a substantial impact on the projected population structure.
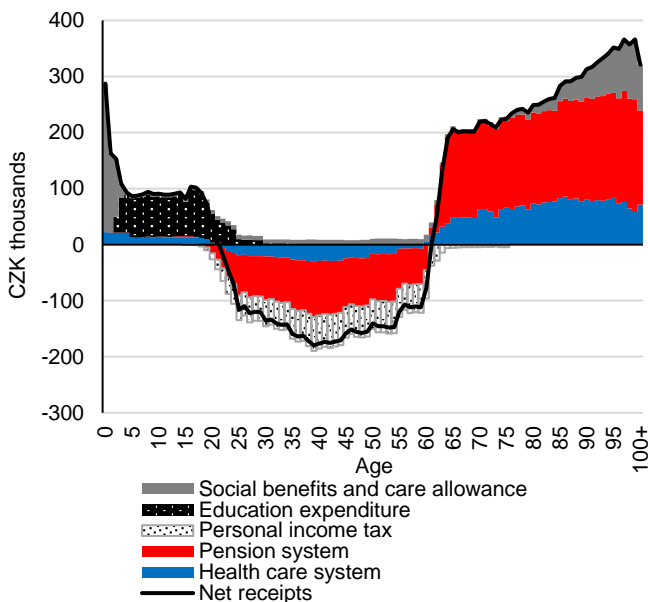
6.4 Generational accounts in the pension system

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. 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. As described in more detail in Box 6.1, we consider roughly 45% of total public budget revenue and expenditure in 2019 to be generation-specific. By 2071, however, generation-specific expenditure will have risen to 57% of total expenditure according to our projection, while generation-specific revenue will have fallen to 43%. This is further evidence of the long-term unsustainability of Czech public finances.

Chart 6.4.1 depicts the age profile of revenue and expenditure per person of a given age. It is clear that the largest benefit recipients are children in the first year of life, 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. 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 will receive CZK 7.6 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 11.8 billion more than they contribute if policies are left unchanged.[80] 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 and are therefore net contributors. In the long term stretching beyond 2150, however, these generations will also turn into net beneficiaries under unchanged policies.

Chart 6.4.1 Payments and receipts per person of a given age in 2019

Source: CZSO (2021), CSSA (2021); CFC calculations.

Chart 6.4.2 Public budget payments and receipts of a given generation[81]
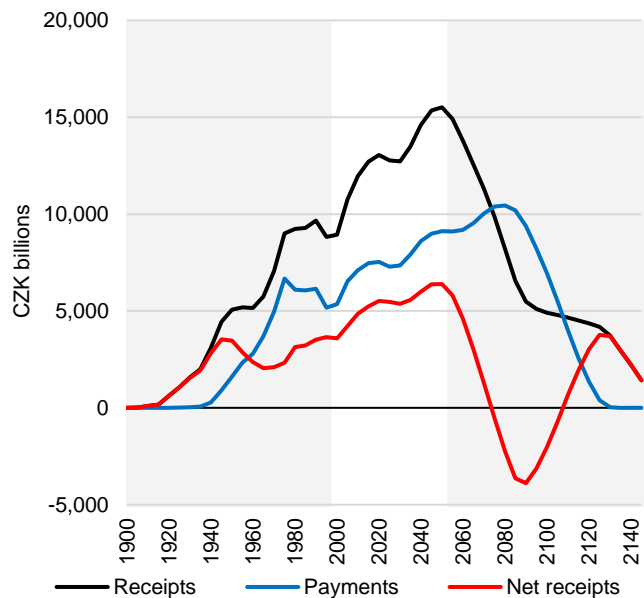
Source: CZSO (2021), CSSA (2021); CFC calculations.

[80] Revenue and expenditure are expressed in real terms in 2020 prices and are discounted by a real interest rate of 1%.
[81] The figures in the charts in sections 6.4.1 and 6.4.2 covering the period 1900–2150 (or 1950–2100) are in 2020 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 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 2071. We assume that the tax burden is increased in 2025, straight 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 40%, 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.

In the second case, we take into account all revenue and expenditure, including non-generation-specific items, which we recalculate for each generation. In this case, the increase in the tax burden would be smaller (around 20%) but would involve all taxes – not just those deducted from income, but also, for example, excise duties. The increase in the tax burden would thus also affect earlier generations that are not economically active in 2025.

In both cases, however, 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 6.4.4). Significant population ageing will occur when these generations are economically active. This will lead to an increase in total pension expenditure (see section 6.4.2) and to higher spending on health care and social benefits.

Chart 6.4.3 Net receipts of each generation – baseline and alternative scenario[81]
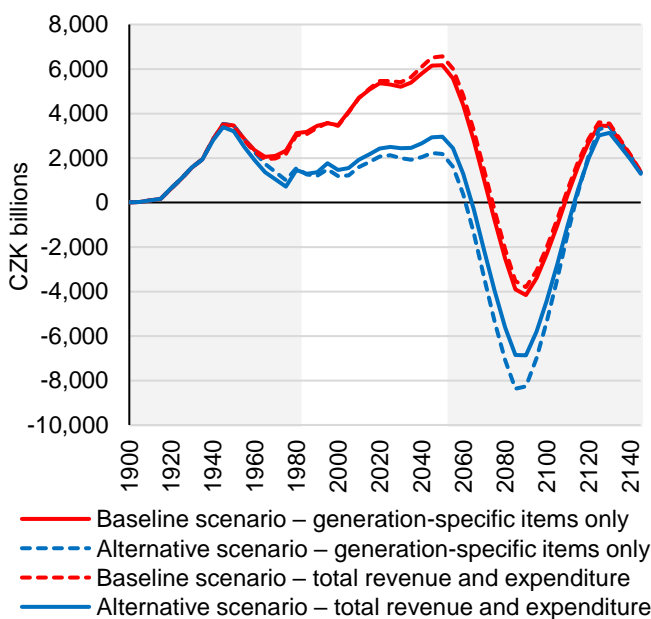
Source: CZSO (2021), CSSA (2021); CFC calculations.

Chart 6.4.4 Increased receipts – difference between baseline and alternative scenario[81]
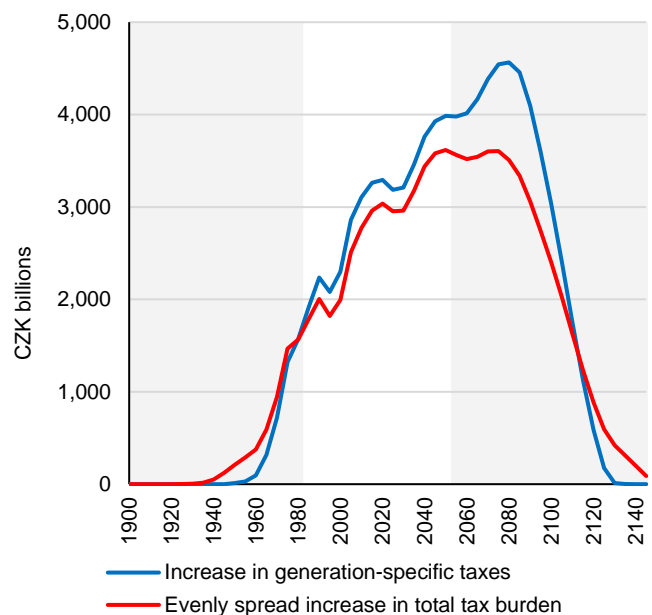
Source: CZSO (2021), CSSA (2021); CFC calculations.

Box 6.1 Generational accounting methodology

We compiled generational accounts for the first time in last year's Report. These aggregate accounts show how much a member of a given generation will pay into public budgets over their entire lifetime in taxes and statutory contributions and also how much they will receive from them in various benefits and allowances. In this year's Report, we have significantly expanded the generational accounts compilation methodology. We describe the method we use to calculate the generational accounts in more detail in this box.

We prepare generational accounts for the period 2000–2150. The figures for 2000–2019 reflect actual revenue and expenditure broken down by age. Those for 2020–2150 are our projections, which are linked consistently with the projections contained in this Report. We do not take into account pre-2000 revenue and expenditure. We assign the initial year-2000 debt to the generations born before 2000, while we assume that this burden falls on future generations born after 2000. The payments or net receipts of the present generation (school education, for example) are also only counted from 2000 onwards.

The demographic projection plays a significant role in the creation of the generational accounts. It is based on a modified medium variant of the CZSO's demographic projection between 2022 and 2100 (see section 3.2 of this Report). We extend this timescale by another 50 years, assuming that the mortality rate, birth rate and migration rate stay constant at their levels at the end of the CZSO's demographic projection.

In the generational accounts, we track the age and sex structure of revenue and expenditure in five-year age cohorts. The timescale and the shorter age cohorts (in last year's Report we used 10-year cohorts) allow us to identify multiple generations. The first generation, which we capture late in life, is the one born between 1900 and 1905, whose members were more than 100 years old in 2000. The last generation in our projection consists of children who will be born between 2145 and 2150. It is clear that for the oldest generations we do not cover all of their lifetime contributions to public budgets and we only include the pensions they draw. By contrast, the last generation of working age is primarily a contributor to public budgets and a limited beneficiary of the various expenditures. We capture several generations over the entire period from birth to death. These are the generations born between 2000 and 2050.

We base our calculation of the generational accounts on the long-term macroeconomic projection, which assumes convergence of GDP per worker to the Austrian level (see section 3.1). We perform the modelling in real prices (real GDP and real wages) relative to potential GDP, although for 2000–2019 we give the actual figures. The revenue projection is based on calculated revenues broken down by generation. We left the average wage ratio of each cohort constant over time at the average for the last decade. We approximated the participation rates and the cyclically adjusted unemployment rates by taking into account the changing retirement age.

In the model, we compare the revenue and expenditure of each generation. Compared with the previous Report, where we compiled generational accounts for the pension system only, we have added other generation-specific expenditures such as spending on health care, education and non-pension social benefits in cash. We credited maternity benefit and parental allowance to the generation of children to which these benefits are linked directly. Non-generation-specific revenues and expenditures, and revenues and expenditures for which generational specificity is hard to estimate (such as excise duty revenue and military spending), were spread evenly across all generations in each year. Overall, we were able to identify around 45% of general government revenue and expenditure as being generation-specific.

Table B6.1.1 Generation-specific public budget revenues (expenditures of individual generations)

Generation-specific revenues	Variables entering model	Share in general government revenue in 2019 (%)
Social security insurance payments	Volume of wages, pension insurance rate	22.2
Health insurance payments (excluding state insurees)	Volume of wages, health insurance rate	10.7
Personal income tax	Volume of wages, effective tax rate	13.1

Source: CZSO (2021), MoLSA (2021), IHIS CR (2000–2021); CFC calculations.

Table B6.1.2 Generation-specific public budget expenditures (revenues of individual generations)

Generation-specific expenditures	Variables entering model	Share in general government expenditure in 2019 (%)
Pensions (old-age, disability, widows'/widowers', orphans')	Number of pensions, pension amounts	19.3
Health care (health insurance companies' costs)	Age-specific health care cost profile	13.4
Education (excluding R&D spending)	Number of pupils, teachers' salaries	6.9
Non-pension social benefits in cash	Average wage, volume of wages, number of women on parental leave by age of child, number of employees, number of sick days, number of pupils	6.0
Care allowance	Number of persons drawing allowance, allowance amount by level of dependence, average wage	1.3

Source: CZSO (2021), MoLSA (2021), IHIS CR (2000–2021); 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 inter-generational 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.[82] 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 6.4.5).[83] 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 the chart). 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; the right-hand part of the chart).

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[82] See also OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].
[83] Revenue and expenditure are expressed in real terms (2020 prices) and are discounted by a real interest rate of 1%.

Chart 6.4.5 Pension system payments and receipts of individual generations[81]
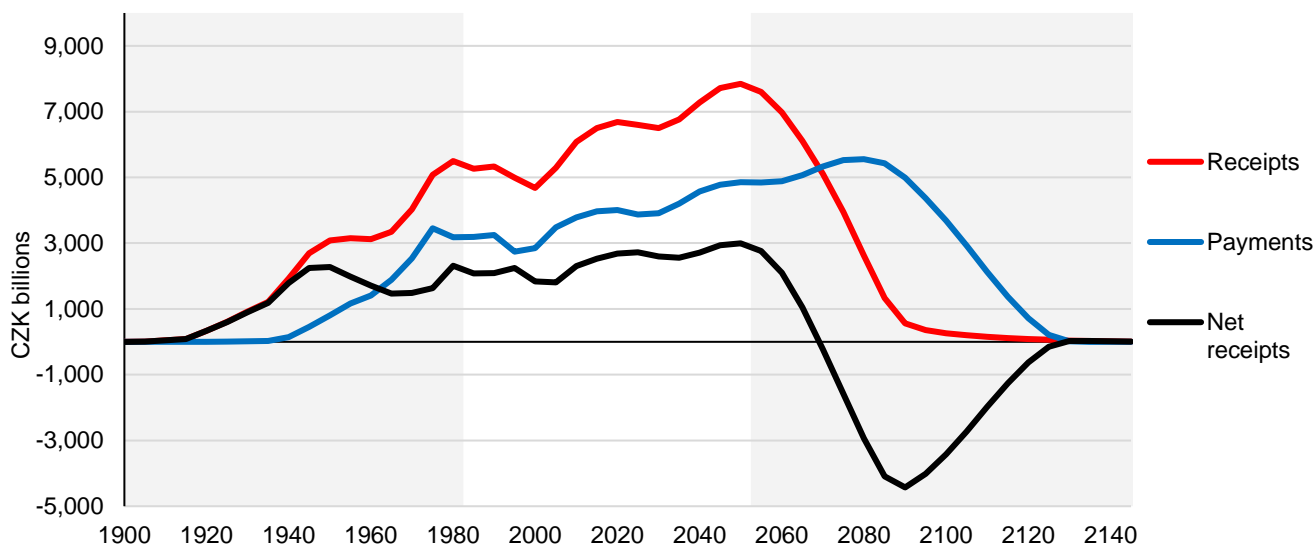
Source: CZSO (2021), CSSA (2021); CFC calculations.

The generations in respect of which we cover their entire work and pension cycle 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 6.4.5 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 generation 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 deficit is balanced in 2071. There are several ways of achieving this. One is to move the retirement age (see section 6.1). Alternatively, 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. 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 6.4.6) and the situation where the contribution rate stays unchanged and pensions fall relative to the wage, i.e. the replacement rate decreases (see Chart 6.4.7).

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. This alternative leads to pension insurance rates being essentially flat at roughly 30% of revenue until 2030, i.e. only slightly above the current rate of 28%. However, the rising number of pensioners then causes them to rise above 43% in 2060. This means that in 2060, economically active generations would face a pension insurance burden 15 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 41% of the average wage to 26% 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 2070.[84] Alternatives 2 and 3 differ from each other in terms of when the pension insurance rate starts to rise or the replacement rate starts to fall. In

[84] These alternatives are therefore configured so that the net present value of pension system revenue over 2021–2071 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 2021–2150, in alternatives 2 and 3 the pension system is not necessarily stable after 2071.

alternative 2, we consider an increase in the rate starting in 2025, i.e. a year after the debt brake threshold is reached. In alternative 3, the rate increase occurs in 2040, when, according to our projection, the interest rate will exceed nominal GDP growth and the debt will become unsustainable (i.e. in a situation where the interest rate will rise in response to the growing debt and even balanced primary deficits will not be sufficient to maintain public finance stability; see section 5.4). 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 37.1% in alternative 2 and 38.6% 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 (see the international comparison of social security contribution revenue in Chart B4.4.2 in Box 4.4).

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 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 6.4.5 shows that both older and younger generations will be worse off in the event of reduction in pensions. If the reduction occurs earlier, the burden will be split 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 most burdensome on younger generations.

Chart 6.4.6 Rising insurance rate scenario (net balance)[81]
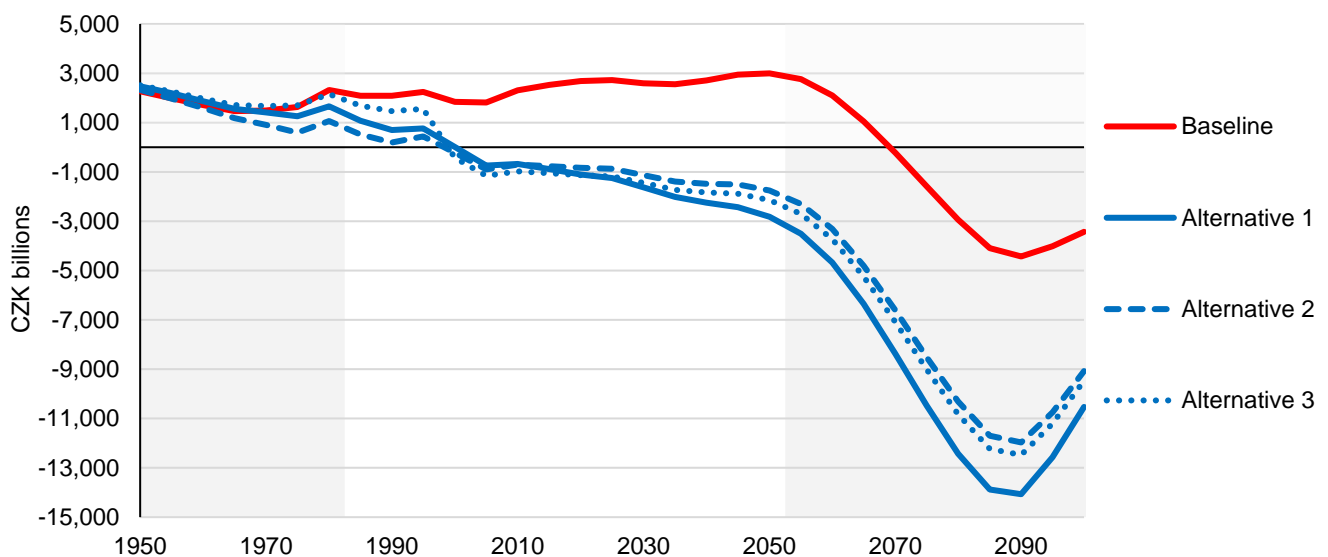
Source: CZSO (2021), CSSA (2021); CFC calculations.
Note: In each alternative, the pension insurance rate is raised in such a way that the pension system is balanced in 2071. In alternative 1 this is achieved by means of a balanced pension system every year, while in alternatives 2 and 3 we consider an increase in rates starting in 2025 (when the debt brake threshold is reached) and in 2040 respectively.

Chart 6.4.7 Falling replacement rate scenario (net balance)[81]
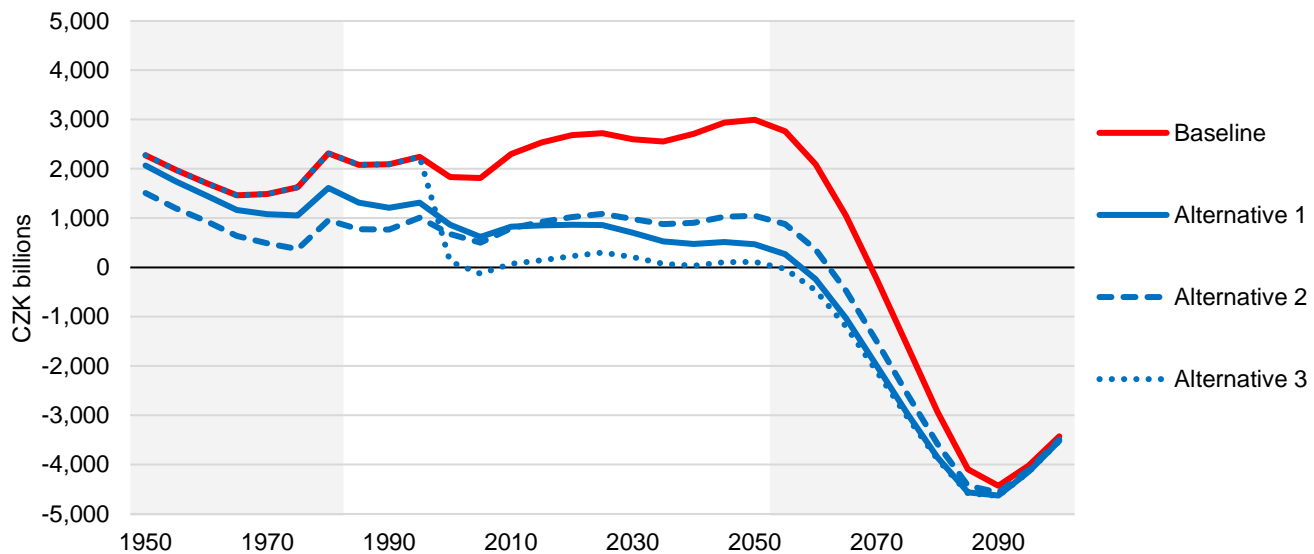
Source: CZSO (2021), CSSA (2021); CFC calculations.
Note: In each alternative, the pension insurance rate is raised in such a way that the pension system is balanced in 2071. In alternative 1 this is achieved by means of a balanced pension system every year, while in alternatives 2 and 3 we consider an increase in rates starting in 2025 (when the debt brake threshold is reached) and in 2040 respectively.

6.5 Comparison with the previous Report

This year's Report is substantially more pessimistic than the one published in 2020 as regards the assessment of public finance sustainability. The debt at the end of the projection period has risen appreciably from 202% of GDP last year to 334% of GDP in this year's Report.

The increase in debt at the projection horizon is due mainly to a deterioration of the starting position linked, among other things, with the impacts of the COVID-19 pandemic. The pandemic is reflected on the one hand in a decline in GDP and a related drop in tax revenue and on the other hand in one-off government stabilisation measures, which have an impact on both the revenue and expenditure sides of the general government sector. These one-off effects will contribute to the balance being significantly negative in 2020 and 2021. General government debt will thus rise by around 14.5% of GDP in total in those years (the growth in 2021 being 6.7% of GDP).

The debt projection has also been influenced by a substantial relaxation of the structural deficit rules, which will imply significantly higher primary deficits in 2022–2025. Those deficits will then cause the debt to rise by a further 13.1% of GDP in the said period (last year we predicted a decrease in debt of 2.9% of GDP for the same period).

The growth in debt will also be affected by changes to revenue and expenditure policy which were approved in 2020 without any direct link to the COVID-19 pandemic and which strongly influence the projection in the long run as well. The main

change was the adoption of a "tax package" by the Chamber of Deputies of the Parliament of the Czech Republic at the end of 2020. Among other things, it abolished the "supergross wage" and increased basic personal income tax relief. The abolition of real estate acquisition tax and changes to excise duties also have major implications. Together, these changes will reduce public budget revenue by around 2.3% of GDP a year. The personal income tax reporting methodology in the national accounts has also been changed. Personal income tax is no longer adjusted for the tax advantage for dependent children. The change will increase personal income tax revenue by approximately 0.5% of GDP. However, as the tax advantage is now simultaneously recorded as a social benefit of the same size, this methodological change has no effect on the overall fiscal balance. On the public budget revenue side, we have also updated our estimate of social security and health insurance contribution revenue in light of more accurate information on the economic impacts of the COVID-19 pandemic.

The increase in primary deficits and the rise in debt are also due to relaxed expenditure policies, in particular an increase in pensions in excess of the statutory indexation scheme at the start of 2021. This increase in pensions and the replacement rate will affect pension system expenditure for many years to come. The excessive indexation will meanwhile outweigh the projected decline in the number of pensioners of roughly 30,000 persons caused by the increased mortality due to the COVID-19 pandemic.

Pension system expenditure is thus 0.5–0.6% of GDP higher than in last year's Report until 2040 and then gradually converges towards last year's projection. Education expenditure is roughly 0.2–0.3% of GDP higher than last year over the entire projection horizon, reflecting higher projected wage costs. Expected expenditure in 2021 was also raised by around 0.5% of GDP due to increased payments to health insurance companies on behalf of state insurees. However, as these payments are counted symmetrically on both the revenue and expenditure sides, this change has no effect on the overall fiscal balance.

The projected debt also increases automatically as a result of the one-year shift in the projection period, as one year containing relatively favourable primary balances falls out at the beginning of the projection, and one year conversely containing large primary deficits is added at the end.

The significant deterioration in the starting position, the increase in the initial debt level and the worse primary deficit projection mean the debt will hit the debt brake threshold in 2024, i.e. 19 years earlier than we expected in last year's Report. The higher debt projection also implies higher interest costs. This effect amounts to 0.2% of GDP at the start of the projection but gradually rises to 2.7% of GDP at the end as the debt accumulates.

As a result of the rise in the projected primary deficits and debt, the public finance sustainability gap has also widened from 3.28% of GDP last year to 6.98% of GDP this year. The sustainability gap indicates how much the primary structural balance would have to improve every year over the period 2021–2071 for the debt not to exceed the debt brake threshold in 2071.

Conclusion

The current Report not only confirms the none-too-optimistic conclusions of previous years' editions, but also demonstrates that the problem of Czech public finance unsustainability due to current fiscal policy is escalating.

Although the COVID-19 pandemic has put public finances under considerable pressure, a large proportion of the expansionary fiscal policy pursued over the last year is not directly linked to the pandemic and thus represents an additional burden on public budgets. The significant relaxation of fiscal policy is due among other things to a double amendment of the Act on the Rules of Budgetary Responsibility.

Public finances thus face two main problems at present. The first is a medium-term one linked with overly expansionary fiscal policy on both the expenditure and revenue sides. On the expenditure side, we have growth in the wages of staff paid from public budgets and an increase in pensions on top of the indexation formula. Rising public investment is also playing a role, although in contrast to mandatory expenditure this at least offers some hope for the future. On the revenue side, an excessive reduction in the personal income tax burden and the abolition of real estate acquisition tax have major effects. Alongside this medium-term problem is the persisting long-term issue of the implicit debt of the pension system linked with population ageing.

The result is a significant shift in the entire public debt path such that the Czech Republic is in danger of breaching the debt brake threshold (55% of GDP) in just three years' time. Under the current version of the Act, the functioning of the various components of public budgets would be significantly affected if this threshold were reached.

Despite this situation, however, public finances lack a recovery and consolidation strategy for the post-pandemic period. Timely efforts to consolidate public finances are vital for at least two reasons. In the medium term, there is a need to create space for active discretionary fiscal policy so that the stabilisation potential of such policy can be used in the future. It is also necessary to prepare public budgets for expected population ageing, which requires an adjustment of the pension system in particular.

In the medium term, the pressure on public finances could be relieved by a credible public finance recovery plan. In particular, this should involve reviewing the tax mix, rationalising spending policies and making government more efficient.

From the long-term perspective, the priority should be to implement a sustainable reform of the pension system. Besides the financial stability of the system, this reform should take intergenerational equity into account.

Appendices

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

	2021	2031	2041	2051	2061	2071
REVENUE						
Personal income taxes	3.2	3.3	3.3	3.4	3.4	3.4
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	16.5	16.4	16.4	16.8	17.1	17.1
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*	*4.8*
Payments for state insurees	*2.3*	*1.8*	*1.6*	*1.8*	*1.9*	*1.8*
Other	*1.2*	*1.2*	*1.3*	*1.3*	*1.3*	*1.3*
Taxes on production and imports	11.8	11.8	11.8	11.8	11.8	11.8
Property income	0.5	0.5	0.5	0.5	0.5	0.5
Other revenue	4.8	4.8	4.8	4.8	4.8	4.8
TOTAL REVENUE	40.2	39.9	39.8	40.2	40.4	40.3
EXPENDITURE						
Pensions	9.4	9.3	11.2	13.2	13.9	12.5
Health care (public health insurance system only)	5.7	6.0	6.4	6.6	6.7	6.7
Other social benefits in cash	3.1	3.2	3.5	3.8	4.1	4.2
Payments for state insurees	2.3	1.8	1.6	1.8	1.9	1.8
Long-term care outside the public health insurance system	0.6	0.7	0.8	0.9	1.0	1.0
Education	5.0	5.1	5.1	5.5	5.9	5.6
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	43.1	43.8	46.2	49.6	51.2	49.5
Primary balance	-2.9	-3.9	-6.4	-9.4	-10.9	-9.2
Interest (no interest rate feedback)	0.8	1.8	2.8	4.7	6.8	8.4
TOTAL EXPENDITURE (no interest rate feedback)	43.9	45.6	49.1	54.3	58.1	57.9
TOTAL BALANCE (no interest rate feedback)	-3.7	-5.7	-9.2	-14.1	-17.7	-17.6
DEBT (no interest rate feedback)	44.8	73.5	115.0	187.9	274.0	334.1

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