The Czech Fiscal Council

REPORT ON THE LONG-TERM SUSTAINABILITY OF PUBLIC FINANCES

June 2020

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Introduction

A key task of the Czech Fiscal Council (CFC) under Act No. 23/2017 Coll., on the Rules of Budgetary Responsibility (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 basis for assessing public finance sustainability is the future path of public debt. Like the first two Reports in 2018 and 2019, the current Report focuses on projecting public debt over the next 50 years, assuming that the current configuration of fiscal policy and other components of economic policy that affect public debt is maintained.

Sufficient argumentation for the choice of a 50-year timescale was given in the previous two Reports and in the public debates on various platforms initiated by their publication. This year's Report is again based on the latest data and documents published by public institutions (the CZSO's updated demographic projection, the Convergence Programme of the Czech Republic and the General Government Budgetary Strategy of the Czech Republic) and also makes comparisons with the preceding June 2019 Report. The Report also tries as much as possible to reflect and incorporate the suggestions made at meetings of the Chamber of Deputies Budget Committee and in many other places and also the ideas arising from the November 2019 international conference on the role of fiscal councils in EU countries organised by the Czech Fiscal Council under the auspices of the Representation of the European Commission in the Czech Republic.

For the second year, the Report contains alternative scenarios alongside the baseline one. 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 productivity growth due to technological progress. For the first time, the current Report also contains analyses of public finance sustainability-related issues, in particular an international comparison of old-age pension expenditure, the ways of expressing and measuring healthy life expectancy using various indicators, estimates of the sensitivity of the government bond interest rate to the level of public debt, and an analytical look at the fulfilment of the stabilisation function of fiscal policy over the past business cycle.

The structure of the Report is similar to previous years. It begins with an assessment of the starting point in section 2 and goes on to describe the long-term macroeconomic and demographic projections in section 3. Section 4 is devoted to estimating the public finance revenue and expenditure sides, and section 5 describes the resulting balance and debt projections over the 50-year timescale. Section 6 contains a comparison of the results of the current Report with those of the previous Report and presents the alternative scenarios.

As in the first two Reports, population ageing is the main common denominator of future public finance problems. Starting in late February, however, this problem took on different dimensions due to the COVID-19 pandemic. Public finances for 2020 have been hit hard by the combination of a global economic contraction and the economic impacts of measures taken to protect the health of the Czech population and keep the health system afloat, and by the government's subsequent efforts to mitigate the impacts of these measures on firms and individuals.

It will not be possible to assess the total bill of the COVID-19 pandemic until the next Report. However, it is already clear that the starting level of public debt will move from the 30.5% of GDP originally expected in the Czech Ministry of Finance's January 2020 Macroeconomic Forecast to around 40% of GDP. The starting position of the current Report for the projection for the decades ahead has therefore moved significantly, and not only for 2020 itself, but also for the next seven years due to an amendment of the Act on the Rules of Budgetary Responsibility. The weaknesses in public finances that the CFC has been drawing attention to since it was established have been fully confirmed. Procyclical fiscal policy in recent years has made it impossible to create public finance buffers for unexpected negative shocks, so any unexpected, even relatively short-lived, stress will significantly worsen the government's starting position for preparing for population ageing.

The COVID-19 pandemic will recede, but the long-term challenges for public finances, caused primarily by population ageing, will remain relevant. Pension reform-related activities came to a virtual halt during the pandemic. The results of the work of the Fair Pensions Committee also pointed to an urgent need to find suitable solutions as soon as possible. They also showed that if politicians agree to keep the real purchasing power of pensions in the present form, the demands on public finances will be at least equal to what the CFC expects in its projections. In addition, the Czech Republic last year asked the OECD to conduct a pension system analysis and recommend changes to make the system sustainable. The Czech Republic has received the results of the OECD study but does not plan to publish the document until the end of June 2020. It is therefore not possible to include these recommendations and comment on them in this year's CFC Report.

1 Summary

The third *Report on the Long-Term Sustainability of Public Finances* was produced at the time of the coronavirus pandemic. By causing the change in the medium-term projection, the pandemic pointed to insufficient resilience of public finances to withstand shocks of a similar nature. Recent fiscal policy has been highly procyclical, and the use of massive expansionary policy in 2018 and 2019 despite favourable economic developments has drained the government's resources to stimulate the economy in bad times. Due to discretionary measures, the public sector's finances will operate with a large deficit in the coming years. This will contribute to a significant increase in general government debt.

Although from the long-run perspective it is usually essential to disregard the business cycle and temporary effects, the impact of the pandemic is so significant that we have included it in our government debt projection. But this is not the only reason why the debt projection is significantly higher than it was a year ago. Among other things, an increase in pensions beyond the valorisation scheme introduced at the beginning of 2020 will affect the expenditures of the pension system for several years ahead.

The projection of public sector revenues and expenditures rests on two basic assumptions. First, similarly to the previous Report, it is based on real convergence of the Czech economy, characterised by labour productivity growth and an increasing share of wages in the economy. The second key parameter is the updated demographic projection, which reveals a slightly more favourable path, mainly due to a higher migration balance. However, the Czech population continues to age. Should no fundamental changes occur in the pension system, the share of retirement pensions in GDP will increase from the current 7.5% to 12% over the next 40 years. The next generation to draw a pension will not only be larger, but will also live longer. This will affect the pension system significantly. However, the demographic changes will affect other areas of public finances, most of all health care, education and the cash benefits system. Economic growth, which will be reflected in higher wages and consequently higher income tax revenues and social security contributions, will not be enough to offset the higher expenditures.

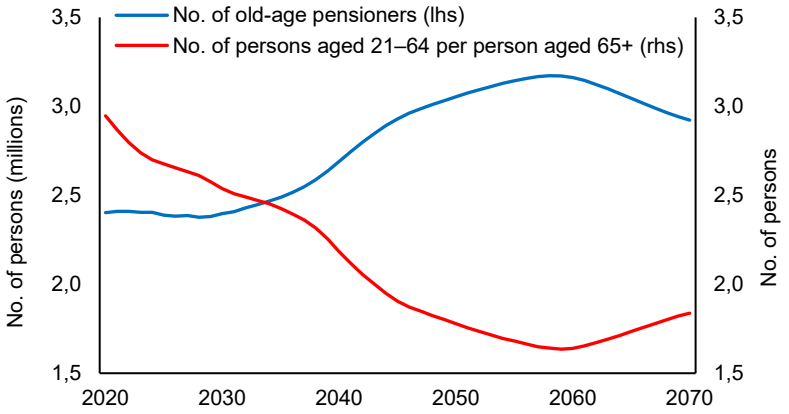
In terms of assessing the sustainability of public finances, the situation has deteriorated significantly compared to last year. If the current tax and expenditure policies are maintained, the "debt brake" threshold, which is legally set at 55% of GDP, will be breached as early as 2043. This is four years earlier than we anticipated in last year's Report. Before the pandemic shock we counted on a positive primary balance of the public sector in the coming years, whereas the government's past fiscal policy and the economic impact of the pandemic will result in the primary balance turning negative right at the beginning of our projection. Subsequent demographic developments, resulting in baby-boom cohorts retiring, will significantly widen the public deficit to 7.5% of GDP.

Under these conditions, the projected government debt will reach 298% of GDP at the end of the 50-year horizon, significantly higher than in the previous projection. This is not only because of unfavourable initial conditions and increasing costs resulting from demographic trends, but also due to rising interest rates in response to higher indebtedness of the economy. On top of that, interest rates on government debt rise earlier because the debt brake will be breached earlier. Even if the financial markets were not to react to the growing indebtedness and the interest rate was kept at zero, the government debt would approach 160% of GDP. But for the government debt to be no higher than the debt brake threshold in fifty years' time, the public balance would have to improve by 3.28% of GDP in each year of the projection. Recall that last year we reported this indicator as being half a percentage point lower.

Being aware of the uncertainty associated with our baseline scenario, we have calculated several alternative scenarios. However, neither the incorporation of any exceptionally positive effects of digitisation and robotics, nor more favourable demographic trends solve the problem of the long-term sustainability of public finances. Even when we consider a rather unrealistic scenario with high fertility at the 1970s level, the pension system deficits remain very large. Despite some improvement, the problem persists even when the retirement age is linked to life expectancy.

The increase in projected debt in the simulated period suggests that the system is in a long-term imbalance. Correcting this imbalance requires more than merely cosmetic changes. A quick response is needed to solve the problem. The remaining time for legislators to adjust tax and spending policies before the country's debt reaches the debt brake threshold is shortening quickly. The later these changes are made, the more painful they will be. It is thus in the interests of all of society that a debate leading to specific measures be launched as soon as possible.

KEY FINDINGS in the baseline scenario



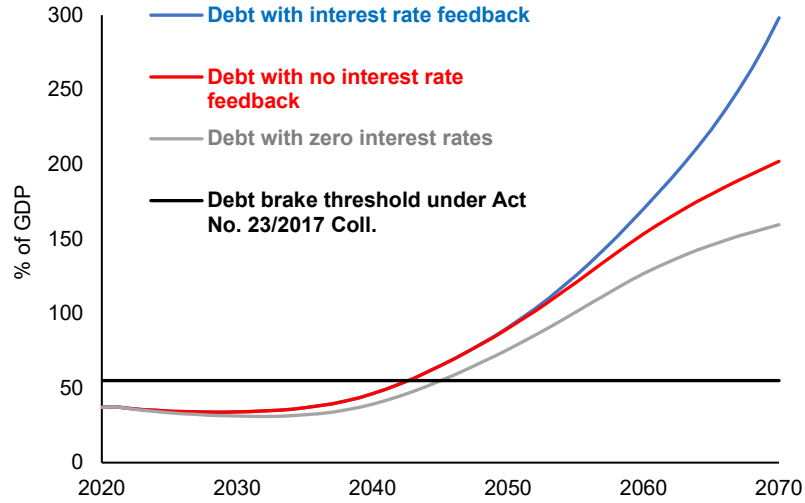
The number of old-age pensioners will peak around 2058 at about

3.2 million.

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

1.6

over the next 40 years.

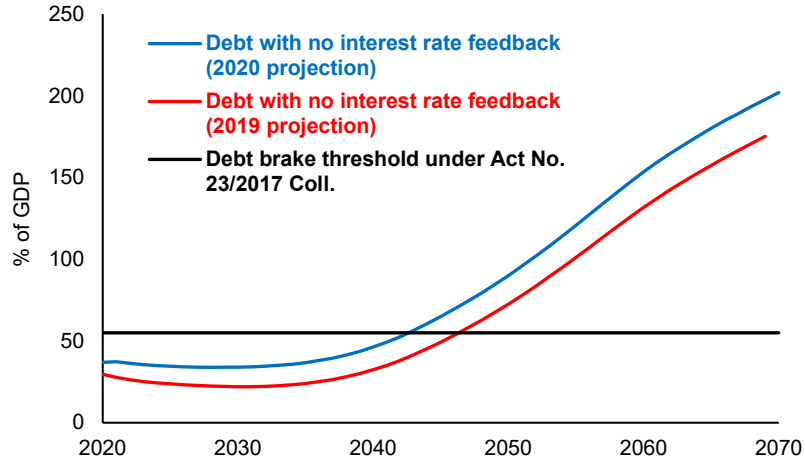


If the current tax and expenditure policies were maintained, the debt brake threshold would probably be breached in

2043.

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

298% of GDP.



With no interest rate feedback, the general government debt is up to

22.7 pp of GDP

higher than in the 2019 projection.

The debt brake threshold would be breached

4 years earlier

than in the 2019 projection.

3.28% of GDP

is the amount by which the primary structural balance would have to be better from 2020 until 2070 for the debt not to exceed the debt brake threshold in 2070.

2 Starting point and medium-term outlook

In the medium-term outlook, we assess fiscal policy primarily in relation to the current and expected course of the business cycle. By medium-term outlook, we mean the outlook for the current year 2020 and for 2021–2023. This is the time frame that the Convergence Programme and the General Government Budgetary Strategy usually operates with.[1] Under the current Convergence Programme, however, some data are only available up to 2021, as the European Commission has temporarily reduced its content requirements for these programmes because of the COVID-19 pandemic and the significant uncertainty surrounding future economic developments.

In normal times, the starting point of the economy for assessing public finance sustainability has less weight than the assumptions made about policy in the longer run. This year's coronavirus crisis, however, is highly unusual in terms of the size of the expected contraction. The change in the initial conditions can therefore be expected to have a long-term impact as well.

2.1 Starting point

The Czech economy recorded GDP growth of 2.6% last year. The growth was driven by household consumption and investment. This year, however, the Czech economy will contract significantly as a result of the COVID-19 pandemic. The current projection of the Ministry of Finance of the Czech Republic (MF CR) for 2020 predicts a real GDP decline of 5.6% for 2020 and a recovery in the following years.[2] However, the size of the economic contraction is subject to a high degree of uncertainty, and at the time of writing the economic figures suggest the decline could be even deeper. As the economic data for the second quarter of 2020 are not yet available, we will continue to work in this Report with an assumption of a 5.6% decline in GDP.

As regards its position in the business cycle, the Czech economy was well below its potential output level last year. This was reflected in wage pressures on the labour market and a rising inflation rate, among other things. The expected contraction this year will give rise to a significant change, with the positive output gap turning negative.

The size of the output gap is affected by how potential output is estimated and what input data are used. In its April macroeconomic forecast, the Ministry of Finance changed its method for estimating potential output, which moved the output gap estimate for 2018–2020 (see Box 2.1). It thus expects the output gap to fall to –3.3% of GDP this year. In subsequent years, though, the gap is projected to close gradually, with the economy reaching equilibrium in 2023.

General government finances ended last year in a modest surplus of 0.3% of GDP. Central government recorded a deficit of –0.6% of GDP, but this was offset by a local government surplus of 0.6% of GDP and a social security funds surplus of 0.2% of GDP.[3] However, the surplus was strongly affected by the good condition the economy, which generated additional (cyclical) revenue. Adjusted for this effect, we obtain a structural deficit of –1% of GDP. Compared with 2018, the government significantly worsened the structural balance (fiscal effort recorded a figure of –1.1 pp), as it implemented quite a sharp fiscal expansion. Given the relatively large positive output gap, such an approach cannot be regarded as optimal in macroeconomic terms. We examine this issue in section 2.2 and Box 2.2.

General government debt stood at 30.8% of GDP at the end of 2019. This represents a year-on-year improvement of 1.8 pp, due mainly to favourable economic developments.

The general government deficit for this year is subject to a high degree of uncertainty, as we know neither the exact figure for the contraction of the economy, nor the final size of the stabilisation measures adopted by the government. The autonomous scenario combines the assumptions of a contraction of 5.6% and stabilisation measures of CZK 140 billion. In this case, the expected overall general government balance would be about –5.5% of GDP and the cyclically adjusted balance –4.3% of GDP. If, in the coming two years, no measures were taken in the tax area and there was no rise in public expenditure except for the mandatory valorisation of benefits, the structural balance would gradually improve to around –1.5% of GDP in 2022 (see Chart 2.1.1).

However, general government finances will probably be less favourable in the coming years than indicated by the autonomous scenario. This is due to a significant easing of fiscal policy arising from an amendment of the Act. This amendment included an increase in the maximum permissible structural deficit

[1] MF CR: The budget strategy of public institutions of the Czech Republic for the period from 2019 to 2021 (2018).
[2] MF CR: Macroeconomic Forecast of the Czech Republic (April 2020, pp. 27 and 29), MF CR: The budget strategy of public institutions of the Czech Republic for the period from 2021 to 2023 (2020, p. 2).
[3] MF CR: Convergence Programme of the Czech Republic (April 2020, p. 45). The summed figures may differ from the total balance due to rounding.

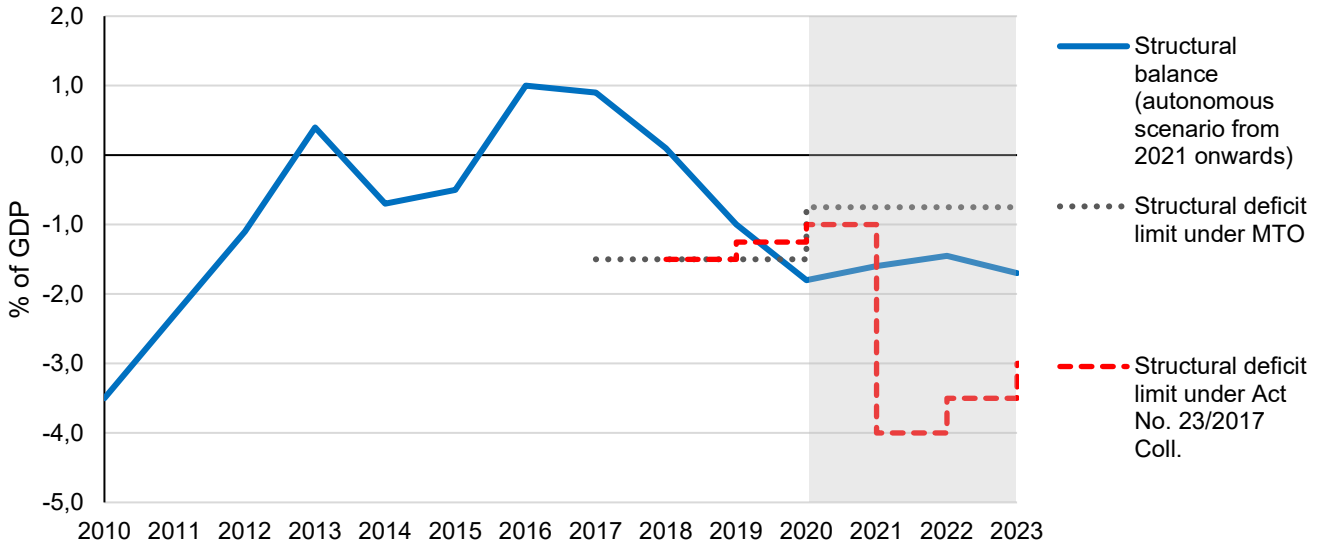
for 2021–2027 from 1% to 4% of GDP for 2021. In subsequent years, the maximum allowable structural deficit should be reduced by 0.5 pp a year to 1% of GDP in 2027 (i.e. the figure in the original version of the Act).

However, the CFC believes it is inappropriate to ease fiscal policy to such an extent. The very form of the amendment of the Act is also problematic, as it includes specific caps on the structural deficits for individual years despite the high uncertainty regarding future economic developments. If there was a need to make changes to the Act, they should – in the view of the CFC – have been universal.

The change to the maximum permissible structural deficit has created additional room for increasing expenditure (or reducing revenue) by approximately CZK 650 billion over the period of 2021–2027. If we put this change to the Act into context with the European Commission's stricter structural deficit requirement (the Medium-Term Budgetary Objective, MTO), this room would increase to CZK 845 billion.[4]

Chart 2.1.1 shows the path of the structural balance in 2010–2019 and its expected course in 2020–2023 under the autonomous scenario, together with the caps on the structural deficit contained in the amended Act. It is clear that by approving the amendment, the government has created significant room to apply discretionary measures in 2021–2023.

Chart 2.1.1 The general government structural balance

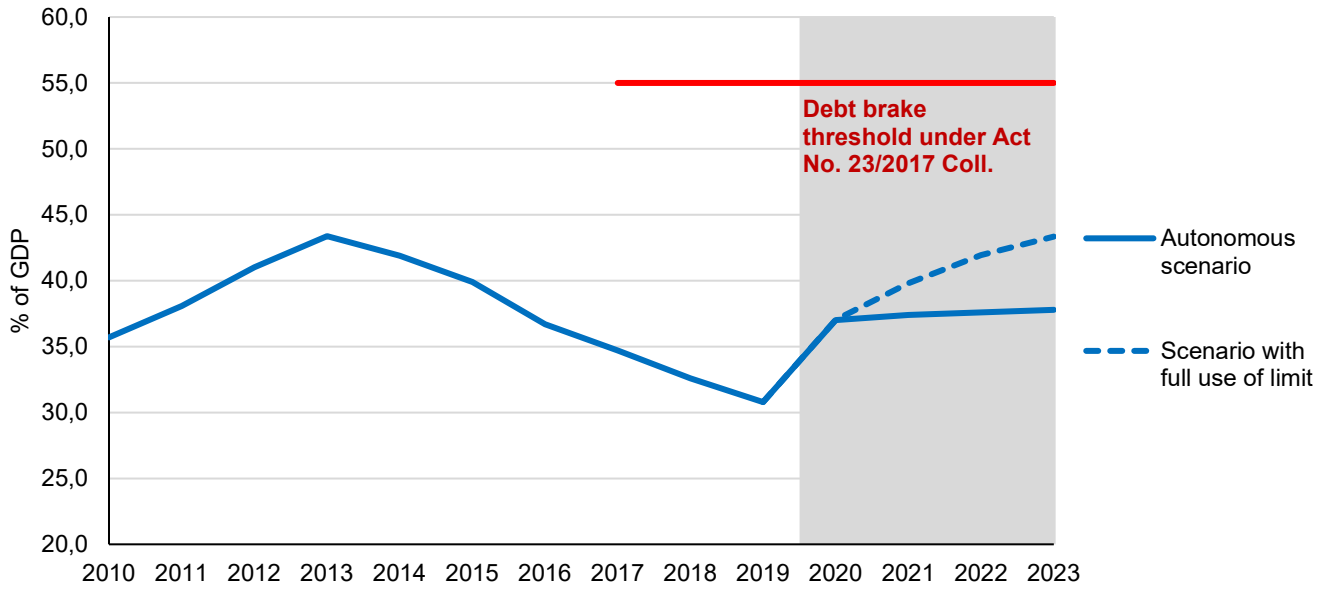


Source: MF CR: Macroeconomic Forecast of the Czech Republic (April 2019 and April 2020); MF CR: General Government Budgetary Strategy of the Czech Republic for 2021–2023 (2020); CFC calculations.
Note: CFC projection for 2020–2023.

The large increases in general government deficits and the decline in GDP in 2020 will lead to a substantial rise in general government debt. According to the CFC's medium-term projection, the debt will grow from 30.8% of GDP at the end of 2019 to 37.8% of GDP at the end of 2023 (see Chart 2.1.2). If the relaxed caps on the structural deficit were to be used fully, the debt ratio would reach 43.3% of GDP by the end of 2023. However, significant uncertainty is associated with the debt estimate for 2020 and the debt projection. The economic growth estimates, and hence also the budget revenue estimates, are changing rapidly, as is the scale of the economic support measures. In this Report, we use the figures from the Ministry of Finance's most recent Macroeconomic Forecast and Convergence Programme (April 2020), which are quickly becoming out of date given the speed of change. If the government's June proposal to increase the budget deficit to CZK 500 billion were to be passed, the debt could reach 40% of GDP already in 2020.

[4] Hlaváček, M., Pavel, J. (2020): Fiscal Costs of the COVID-19 Pandemic in the Czech Republic, OCFC Information Study, updated 5 May 2020.

Chart 2.1.2 General government debt net of 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: Convergence Programme of the Czech Republic (2017–2020), CNB: Government Financial Statistics; CFC calculations.
Note: CFC projection for 2020–2023.

Box 2.1 Volatility of output gap estimates

The size of the output gap affects the division of the actual budget balance into its structural and cyclical parts, which in turn makes it possible to analyse the nature of fiscal policy in individual years. In the Czech Republic, the output gap also enters the calculation of total general government expenditure under Article 10 of the Act, from which the expenditure frameworks of the state budget and state funds are subsequently derived.

However, the actual value of the output gap is always only an estimate, since it is calculated as the difference between actual GDP and the estimate of potential GDP. When the economy is following a normal trend with no major volatility, the estimate of potential output is fairly robust, and this in turn stabilises the output gap. However, in the event of a significant economic downturn (such as in 2009 or 2020), the estimates of potential output (and hence also of the output gap) will also show relatively sizeable changes, including retroactively.

In the Czech Republic, for the purposes of decomposing the general government balance and for deriving the expenditure frameworks of the state budget and state funds, the level of potential output is estimated using the technique specified in a joint MF CR/CFC methodology.[5] This methodology is based on the production function method and on smoothing the total factor productivity time series using the Hodrick-Prescott filter. However, the estimate of potential output obtained using this statistical technique is strongly affected by the values at the end of the time series. The upshot is that the estimated size of the output gap – be it positive or negative – is underestimated at the end of the time series, i.e. the present economic situation seems to be close to potential. This problem can be partially eliminated by “extending” the input data time series to include its projected future path.[6] However, a risk of this approach is that the instability of the potential output estimate would increase if the actual values were to diverge significantly from the predicted ones.

The COVID-19 pandemic led to a sizeable decline in GDP in the first quarter of 2020, the size of which no one had predicted in January 2020. This negative shock has substantially changed the view of the value of the output gap for 2018 and 2019 and its expected evolution in 2020–2022. Specifically, the new estimates point to a sizeable negative output gap in 2020; by contrast, the positive output gap in 2018 and 2019 has grown significantly (see Chart B2.1.1). A larger positive output gap implies lower structural revenues and hence a worse general government structural balance. Fiscal policy in 2019 was therefore more expansionary and more procyclical than indicated by previous estimates (see Chart B2.1.2).

[5] MF CR and CFC (2018): Methodology of Deriving Expenditure Frameworks of the State Budget and State Funds.
[6] This is what the Ministry of Finance did in its April 2020 Macroeconomic Forecast.

Chart B2.1.1 Output gap estimates

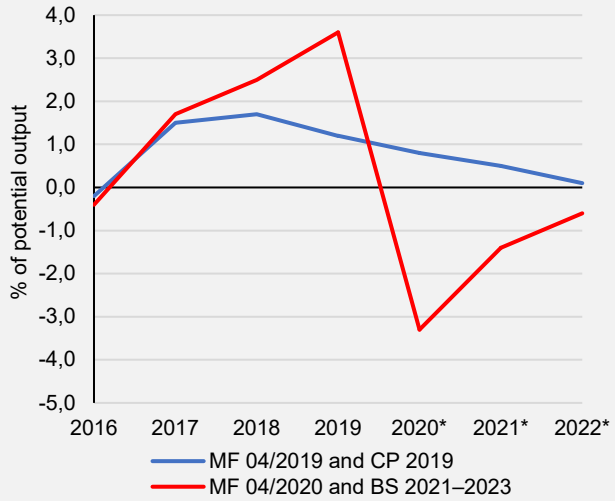
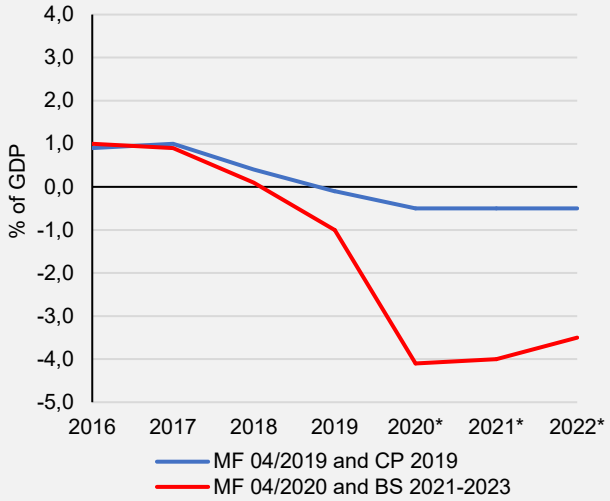


Chart B2.1.2 Structural balance estimates



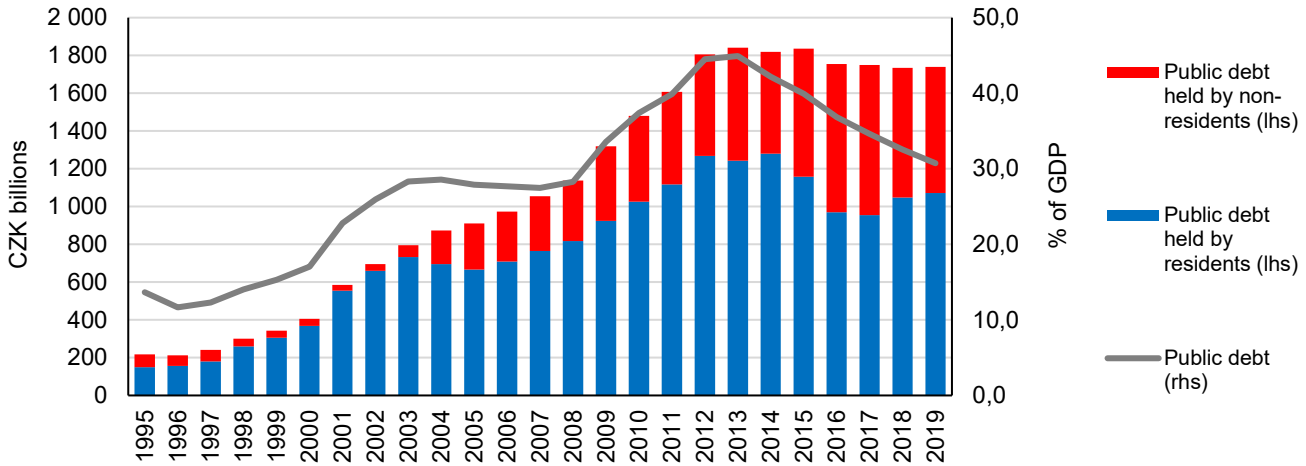
Source: MF CR: Macroeconomic Forecast of the Czech Republic (April 2019 and April 2020), MF CR: Convergence Programme of the Czech Republic (April 2019), MF CR: The budget strategy of public institutions of the Czech Republic for the period from 2021 to 2023 (2020).
Note: Asterisks denote projections. MF = Macroeconomic Forecast, CP = Convergence Programme, BS = Budgetary Strategy; in Chart B2.1.2, the cyclically adjusted balance is given for 2020.

From the 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 paper (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 little during 2019. At the end of 2018 domestic owners held 60.4% of public debt, whereas by the end of 2019 the figure had risen to 61.6% in favour of residents.

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 did not increase during 2019. In line with international practice, the Czech National Bank (CNB) regards 35% as the critical threshold for the proportion of public debt held by foreign entities.[7] However, this threshold has been constantly exceeded since 2015. The current figure is 38.4% (see Chart 2.1.3).

Chart 2.1.3 Public debt held by residents and non-residents



Source: CNB (2020), CZSO (2020); CFC calculations.

[7] CNB (2018): Financial Stability Report 2017/2018.

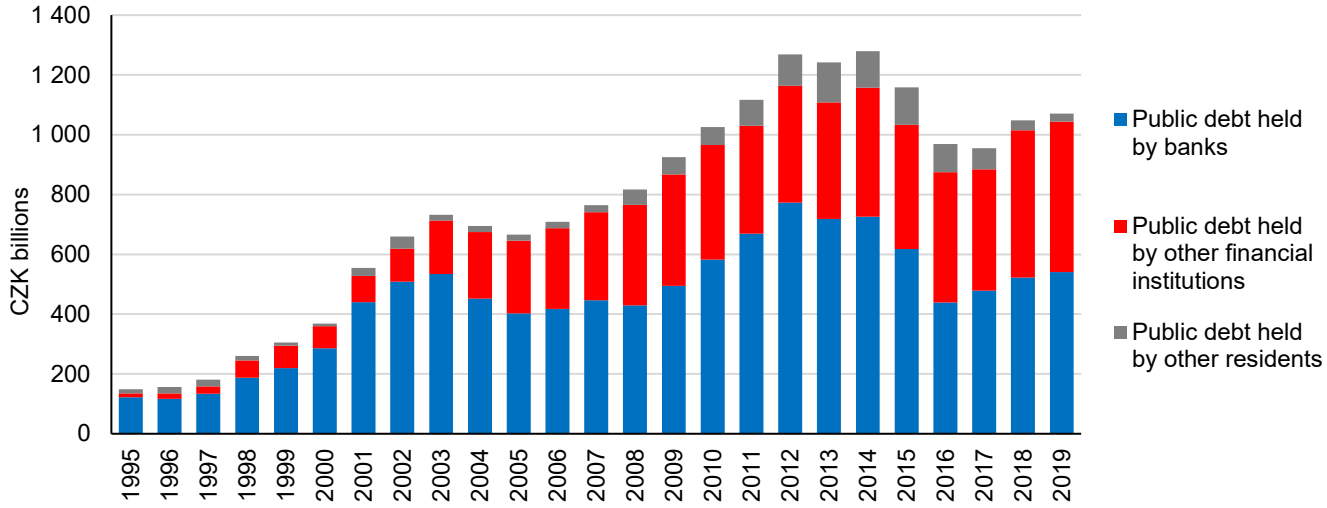
Financial institutions had a completely dominant share of the public debt holdings of domestic entities (residents) at the end of 2019. Holdings of domestic public debt increased by CZK 18.1 billion in the banking sector and by CZK 10.4 billion in other financial institutions (primarily insurance companies and pension funds). This meant there were no major changes during 2019 as regards the debt holding structure in the domestic environment either.

At the end of 2019, domestic banks held 31.1% of public debt, up 1 pp on a year earlier. The share of domestic government bonds in bank assets was approximately 7% at the end of 2019. 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[8] would have significant impacts on the financial system.

Greater changes in the public debt structure can be expected in 2020, as the banking sector made relatively large purchases of government bonds in the first five months of the year. A decrease in the average time to maturity of government debt can also be expected. The average time to maturity was 6.2 years at the end of 2019. During the first four months of 2020 it decreased to 6.1 years.

Chart 2.1.4 Public debt held by residents



Source: CNB (2020); CFC calculations.

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

One of the main functions of fiscal policy at the macroeconomic level is to stabilise the rate of growth of the economy. The stabilisation function of fiscal policy can be implemented through two types of instruments: automatic stabilisers and discretionary measures. Automatic stabilisers act automatically over the economic cycle and include income taxes and some social transfers. Discretionary measures are deliberate government measures that change tax rates, social transfers and government purchases, including capital purchases.

In Chart 2.2.1 below, we assess the cyclicality of fiscal policy using the relationship between the output gap and the change in the primary structural balance. If this balance is rising, the government is using its discretionary measures to reduce aggregate demand, i.e. it is implementing fiscal restriction. The opposite is happening if the balance is falling. For fiscal policy to fulfil its stabilisation function, this balance should be increasing when the output gap is positive, i.e. when the economy is above its potential. Conversely, when the output gap is negative, i.e. the economy is below its potential, it is desirable to reduce the balance through the fiscal policy response. The situation when this is not the case can be termed procyclical fiscal policy, which results in rising output gap volatility rather than the desired smoothing of the economic cycle.

Chart 2.2.1 illustrates the relationship between the output gap and the change in the primary structural balance over 2015–2021. The analysis shows that fiscal policy cannot be described as having been countercyclical over the last three years (2017–2019). From the macroeconomic perspective, it would have been appropriate to implement countercyclical restriction in this period to create additional

[8] 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.

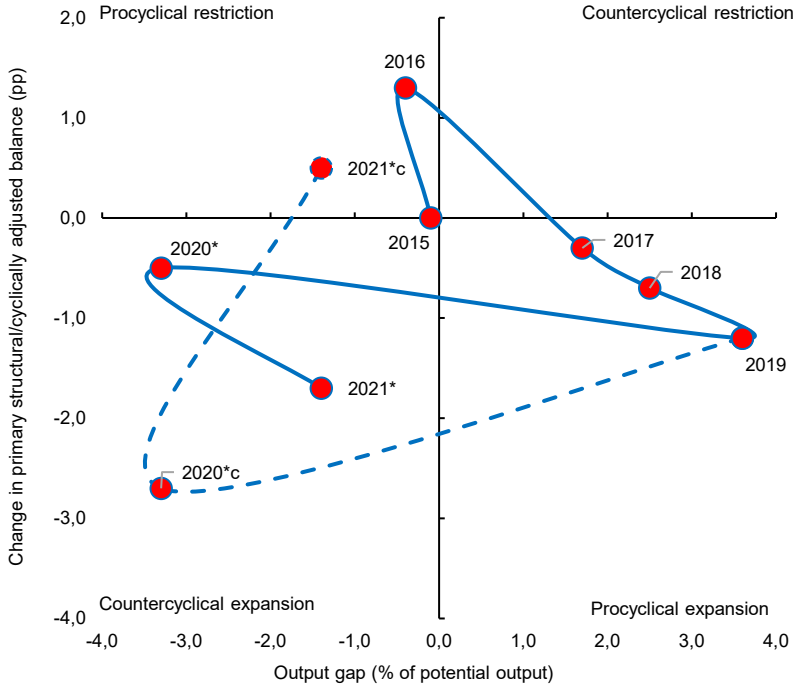
room for fiscal expansion when the outcome gap is negative, which, according to the projection, it will be this year and in 2021–2022. However, the government implemented quite a significant fiscal expansion, which led the structural balance to reach the cap defined in the original Act (–1% of GDP) in 2019.

The trend in 2020 and 2021 is subject to a high degree of uncertainty; in the chart we give the figures corresponding to the government's plans presented in the April 2020 Convergence Programme. In the case of 2020 and 2021, we present the cyclically adjusted balance in addition to the primary structural balance (see the dashed line in Chart 2.2.1). We do so because the one-off and temporary measures that have been adopted are focused predominantly on stabilising aggregate demand, so they need to be taken into account when analysing fiscal policy. The presented figures point to significant fiscal expansion in 2020, which can be described as desirable in a situation where the output gap is highly negative.

The government's plans for 2021 indicate a widening of the structural balance compared with 2020; however, this balance will be more favourable than the cyclically adjusted balance in 2020. In terms of the impact on aggregate demand the stimulation will decrease slightly in size, but as regards public finances the stimuli will move from one-off measures to the structural balance. From the long-term perspective, this may mean a more permanent change in the level and structure of revenues and expenditures that currently appear to be a one-off or temporary solution to the impacts of the pandemic. Public finance sustainability, which was already precarious before this crisis (see the 2019 Report), may be substantially worsened by the pandemic.

See Box 2.2 for an alternative analysis and discussion of the appropriateness of the data used to assess the cyclicality of fiscal policy.

Chart 2.2.1 Relationship between the output gap and the change in the primary structural balance



Source: MF CR: Macroeconomic Forecast of the Czech Republic (April 2020), MF CR: Convergence Programme of the Czech Republic (April 2020); CFC calculations.
Note: The primary cyclically adjusted for 2020 and 2021 is denoted by the letter *c* and the dashed line.

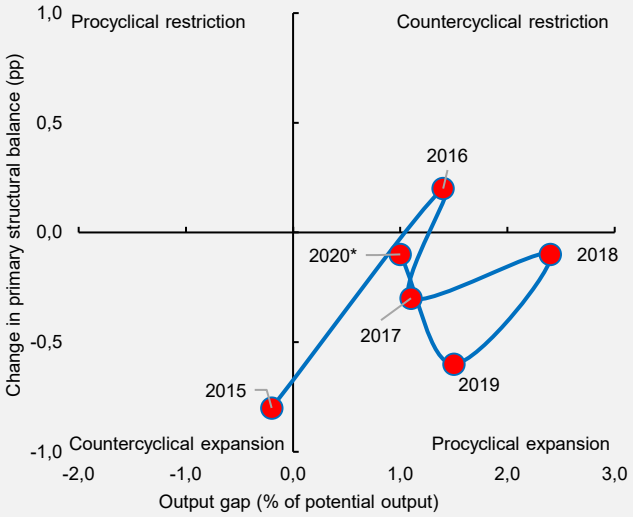
Box 2.2 Assessment of fiscal policy cyclicality from the perspective of "historical" and predicted data

In Chart 2.2.1 in the main text of the Report, we illustrate the procyclicality of fiscal policy in past years. In the case of the data for 2015–2019, this was an analysis of the "historical" (*ex post*) data, i.e. the chart was constructed using the data available at the end of April 2020. In the budget preparation phase, however, these "historical" data are only partially available and account is also taken of projected data for the periods for which the budget is prepared (*ex ante* data).

We therefore created Chart B2.2.1 incorporating this projected data. For the figure in year *t*, we chose its projected value from year *t*–1 (specifically from the Ministry of Finance's Fiscal Outlook published in November of the

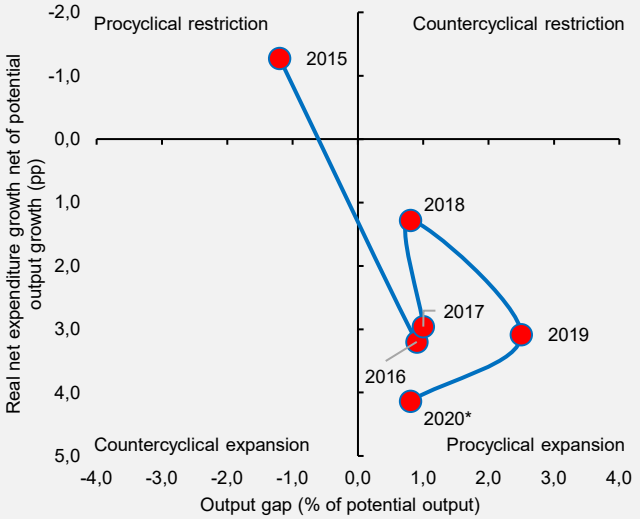
previous year). For example, we found the output gap for 2019 in the Fiscal Outlook published in November 2018. It is apparent from the chart that this approach also shows fiscal policy in the Czech Republic to be procyclical. Comparing Chart B2.2.1 and Chart 2.2.1, we see that the level of procyclicality is rather lower from the *ex ante* than the *ex post* perspective. Part of the procyclical behaviour of fiscal policy therefore stems from the deviation of the actual variables (the output gap and the structural balance) from their originally expected values.

Chart B2.2.1 Relationship between the output gap and the change in the primary structural balance – data from the projection



Source: MF CR Fiscal Outlook of the Czech Republic (2014–2019); CFC calculations.
Note: The projection for 2020 is taken from the 1919 Fiscal Outlook, denoted by an asterisk

Chart B2.2.2 Relationship between the output gap and growth in real net expenditure growth – data from the projection



Source: MF CR: Convergence Programme of the Czech Republic (2014–2019), CFC calculations.
Note: The values on the axis describing growth in real net expenditure (the vertical axis) are presented in reverse order for ease of comparison with Charts 2.2.1 and B2.2.1.

In the case of the projection of the revenue and interest needed to calculate the primary structural balance, the estimation inputs include many factors that can cause them to differ from the expected values. A separate issue is the estimation of potential output, the output gap derived from it and, in turn, the structural balance. If the output gap is revised *ex post*, the structural balance will change as well. In order to eliminate these problems at least partially, we will evaluate the cyclicality of fiscal policy in Chart B2.2.2 using net expenditure.[9]

We adjusted net expenditure for the GDP deflator and computed its year-on-year growth, which we further adjusted for potential output growth. Even so, the level of expenditure may not correspond to what the economy can sustain in the medium to long run. It often rises even when the output gap is positive, implying procyclical expansion. In Chart B2.2.2, procyclical fiscal policy can be observed in 2016–2019. The projection for 2020 also assumed the application of procyclical expansion, but the output gap is currently estimated to be negative due to the pandemic, hence fiscal policy will be countercyclical in a situation of rising real net expenditure.

In most cases, fiscal policy is procyclical whether we use “historical” data or projected data associated with possible prediction errors, or whether we use growth in real net expenditure net of potential output growth instead of the change in the primary structural balance. So, the stabilisation function of public finances is not being applied correctly, and reserves have not been created in “good times” for the “bad times” resulting from the COVID-19 pandemic.

[9] The method for calculating net expenditure is given in European Commission (2019): *Vade Mecum on the Stability and Growth Pact*. In short, net expenditure is general government expenditure net of certain items (interest payments, EU-financed investment, cyclical unemployment benefit and discretionary revenue measures; nationally financed government investment is smoothed over a four-year period).

2.3 Decomposition of the fiscal effort

The fiscal effort is the change in the structural balance between two periods, expressed in percentage points. If it is positive, fiscal policy is getting tighter, and if it is negative, fiscal policy is getting looser.

Table 2.3.1 shows the decomposition of the fiscal effort for 2015–2021. The decomposition is presented using the indirect method (i.e. as the year-on-year change in the structural balance and its subsequent decomposition). The fiscal effort is influenced by, among other things, discretionary government measures (see Table 2.3.1). The fiscal effort was affected in 2019 on the one hand by a decrease in revenue from taxes and social contributions and on the other hand by an increase in expenditure on social transfers and social transfers in kind. Both the revenue side and the expenditure side thus indicated fiscal policy loosening.

Table 2.3.1 Decomposition of the fiscal effort (pp)

	2015	2016	2017	2018	2019	2020	2021
Taxes and social contributions	*-0.7*	*1.4*	*-0.1*	*0.4*	*-0.3*	*1.9*	*0.2*
Other revenue	*0.6*	*-1.6*	*-0.3*	*0.5*	*-0.2*	*0.3*	*-0.2*
REVENUE	-0.2	-0.3	-0.4	0.9	-0.4	2.2	0.0
Compensation of employees and intermediate consumption	*0.3*	*-0.1*	*-0.1*	*-0.9*	*-0.2*	*-1.4*	*-0.1*
Social transfers and social transfers in kind	*0.7*	*-0.3*	*0.4*	*0.0*	*-0.3*	*-2.1*	*-0.5*
Interest	*0.2*	*0.1*	*0.2*	*0.0*	*0.0*	*-0.2*	*-0.1*
Investment	*-1.0*	*1.9*	*-0.1*	*-0.8*	*-0.2*	*0.0*	*-0.1*
Other expenditures	*0.5*	*0.1*	*0.2*	*-0.1*	*0.1*	*-1.3*	*1.2*
One-off measures	*-0.4*	*0.0*	*-0.1*	*0.1*	*-0.1*	*2.2*	*-2.2*
EXPENDITURE	0.3	1.7	0.4	-1.7	-0.7	-2.9	-1.9
FISCAL EFFORT	0.2	1.4	0.0	-0.8	-1.2	-0.7	-1.9

Source: CNB (2020): Government Financial Statistics, MF CR: Convergence Programme of the Czech Republic (April 2020), MF CR: Macroeconomic Forecast of the Czech Republic (April 2020), CZSO (2020); CFC calculations.
Note: Taxes and social contributions are cyclically adjusted but the other items are not. Data for 2020–2021 are projections (2020 Convergence Programme). Positive figures indicate fiscal policy tightening. The subtotals may not add up to the total difference due to rounding.

An increase in the flat-rate expenses limits for the self-employed[10] had the biggest negative impact on the revenue side. It caused personal income tax revenue to fall by CZK 1.5 billion. A reduction in the sickness insurance premium rate,[11] implemented as compensation for employers, who now have to pay their employees wage compensation for the first three days of unfitness for work, led to a decrease in revenue of CZK 1.8 billion under social security contributions.

Several measures had an upward effect on general government expenditure. Compensation of employees increased significantly, due, among other things, to growth in teachers' pay. In the social benefits area, substantial changes were made to pensions. The pension assessment base was raised from 9% to 10% of the average wage, and the percentage assessment base for persons drawing those pensions was raised by CZK 1,000.[12] The additional expenditure exceeded CZK 14 billion overall. An increase in the care allowance for persons in the level 3 and level 4 dependence categories[13] generated additional spending of CZK 2.8 billion. Social transfers in kind went up mainly because of increased health system expenditure. A fare discount of 75% for the under 26s and over 65s[14] meant additional spending of CZK 4.2 billion.

[10] Act No. 80/2019 Coll., changing some laws in the area of taxes and some other laws.
[11] Act No. 32/2019 Coll., amending Act No. 262/2006 Coll., the Labour Code, as amended, and some other laws.
[12] Act No. 191/2018 Coll., amending Act No. 155/1995 Coll., on Pension Insurance, as amended.
[13] Act No. 47/2019 Coll., amending Act No. 108/2006 Coll., on Social Services, as amended.
[14] Government Resolution No. 206/2018 of 27 March 2018, *Introduction of new fare discounts in trains and buses for senior citizens, children, school pupils and students.*

Box 2.3 Sustainability in the medium term

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 or even a decline in GDP. The current estimates of the economic contraction for 2020 caused by the COVID-19 pandemic have exceeded even the severe stress scenario for 2020, but the calculations confirmed the interconnectedness of the real economy and the state debt over the entire three-year period. Without discretionary government measures, central government debt would reach approximately 33% of GDP, as indicated in the severe stress scenario contained in the 2019 Report, under the current very optimistic assumption of a 2.2% fall in GDP. Were the economy to recover slowly, the stress scenarios indicate a very rapid rise in debt.

Medium-term sustainability is derived from the initial level of general government debt. Going forward, it is determined by nominal GDP growth, the implicit nominal interest rate on general government debt, and the general government primary deficit, according to the following fundamental debt dynamics equation:

$$d_t = d_{t-1} \cdot \frac{1+r}{1+g_t} - \frac{PB_t}{GDP_t},$$

where: d_t and d_{t-1} are the debt-to-GDP ratios in years *t* and *t*–1 respectively,

r is the implicit (average) nominal interest rate paid on the debt,

g_t is annual nominal GDP growth between years *t* and *t*–1,

PB_t is the general government primary balance in year *t*, and

GDP_t is nominal GDP in year *t*.

When assessing medium-term sustainability, the objective is to evaluate how the level of debt would change in the event of an economic downturn as simulated by a stress scenario. The stress scenario also incorporates refinancing risk, i.e. the risk that the cost of refinancing the part of the debt repayable in the period of materialisation of the scenario will increase by comparison with current market interest rates.

As general government debt has long been made up predominantly of state debt, we focus primarily on this item. The initial state debt level for 2020 of 37.9% of GDP was taken from the Ministry of Finance's central government debt projection published in the April 2020 Convergence Programme of the Czech Republic.[15]

We calculated two stress scenarios (see Table B2.3.1):

a) A *severe stress scenario* assuming flat nominal GDP over the next three years, i.e. in 2021, 2022 and 2023. On the basis of the flat nominal GDP, we also assume flat nominal state budget revenues, while we expect expenditure to be in line with the figures published in the Ministry of Finance's budget strategy (2020).

b) A *moderate stress scenario* assuming annual nominal GDP growth of 2% over the next three years. The same rate of growth is assumed for nominal revenues. The expenditure side in the moderate stress scenario is the same as that in the severe stress scenario.

In both scenarios, we additionally simulate the response of financial markets to the downturn in the domestic economy. Based on the post-2008 experience, and in light of the current financial market situation, this response is estimated by revaluing the interest rate to 2.5% in the first year of both scenarios and 3.0% in the following two years. Bonds maturing in each year (based on the current stock of bonds actually issued) will thus be refinanced under these interest rate conditions. The same financing conditions will apply to the additional state budget deficits generated over the three-year period.

The results are substantially more cautionary than those of the 2019 stress scenarios. The initial implicit interest rate is lower, because the state debt management conditions were very favourable in 2019 and the first five months of 2020. This is one reason why we chose a more moderate interest rate reaction to the stress scenarios by comparison with the 2019 Report. Despite this, the stress scenarios indicate very rapid growth in state debt.

The crucial factor for the subsequent assessment is the sharp rise in central government debt to an initial value of 37.9% for 2020, up 6.2 pp on the end-2019 figure of 31.7%. Recall that the state debt recorded an increase of 5 pp from 26.1% of GDP to 31.1% of GDP in the crisis year 2009.

[15] From the terminological perspective, the state debt is not exactly equivalent to the central government debt. However, this simplification is made for modelling purposes and makes a negligible difference to the resulting figures.

Under the severe stress scenario, the state debt would rise by almost 20 pp from 37.9% of GDP in 2020 to 55.6% of GDP in 2023. The debt brake rule would therefore probably be breached, because the initial conditions in 2020 mean that municipalities and regions cannot be expected to make up the shortfall as they have done in the past. Even the moderate stress of a three-year stagnation of real GDP (given 2% nominal GDP growth) would generate a rise in the state debt-to-GDP ratio from 37.9% to almost 50% (see Table B2.3.1).

In the event of a more substantial deterioration in the budgets of municipalities and regions, moreover, the overall general government debt would reach a higher level than the estimates presented above indicate.

In previous Reports, we used the debt dynamics relationship to set the maximum permissible initial general government debt level at 42% of GDP so that the debt brake would not have to be activated over the three-year horizon of the severe stress scenario. A municipalities and regions surplus of around 2% of GDP was meanwhile assumed for the state debt. It is apparent that if the adverse economic situation were to persist into 2021 and the expected recovery of nominal GDP growth of around 5% failed to occur, the debt brake value would be exceeded. Public debt sustainability – defined after the amendment of the Act up to 2027 de facto solely as a debt brake parameter of 55% of GDP – would certainly be endangered in the event of adverse economic developments.

Table B2.3.1 State debt stress scenarios

	2021	2022	2023	2021	2022	2023
	Flat nominal GDP (severe stress)			2% nominal GDP growth (moderate stress)		
Total state budget balance (CZK billions)	-312.0	-331.0	-345.0	-282.0	-271.0	-254.0
Total balance (% of GDP)	-5.6	-6.0	-6.2	-5.0	-4.7	-4.3
Primary state budget balance (CZK billions)	-260.0	-271.0	-277.0	-230.0	-212.0	-186.0
Primary balance (% of GDP)	-4.7	-4.9	-5.0	-4.1	-3.7	-3.2
Implicit interest rate (%)	2.3	2.3	2.4	2.3	2.3	2.5
State debt (% of GDP)	43.5	49.4	55.6	42.1	45.9	49.3

Source: MF CR: Convergence Programme of the Czech Republic (April 2020), MF CR: General Government Budgetary Strategy of the Czech Republic for 2021–2023 (2020), MF CR: Macroeconomic Forecast of the Czech Republic (April 2020), MF CR: Government Debt Management Report 2019 (2020); CFC calculations.

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. These variables include GDP growth, employment, labour productivity, the volume of wages and the related distribution of gross value added between labour and capital.[16] As we relate our fiscal projection systematically to GDP and other real variables, variables reflecting the evolution of prices, such as the inflation rate, nominal wages and nominal interest rates, are less important. Unlike in the medium-term outlook, in the long-term projection we abstract from the business cycle in order to avoid short-term and temporary effects predominating in our assessment. The estimated evolution of the economy is therefore a simulation of the paths of potential GDP and other corresponding macroeconomic variables. However, the negative economic shock due to the COVID-19 pandemic and the anti-contagion measures was so large that it affected not only the cyclical position of the economy, but also the estimates of present and past potential output (see Box 2.1). Given the considerable uncertainty associated with the estimate of initial potential output, and with regard to comparability with past revenue and expenditure projections, we nevertheless use the end-2019 estimate of potential output as the starting point for our projections. If the change in potential output turns out to be permanent and significant in the coming years, this will be taken into account in future reports.

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. The economy of Austria is assumed to represent the steady state of the Czech economy (i.e. some sort of convergence target). The Austrian economy is a standard mixed economy of an EU Member State that is similar in size to the Czech Republic. The difficult-to-quantify factors that influence the economy and its steady state (such as cultural norms, the legal environment and informal rules) in Austria are, in our opinion, similar enough to those in the Czech Republic.

We model the convergence process as convergence of GDP per worker. The use of the convergence of this indicator allows us to include expected demographic change in the projection of overall GDP. According to the theory, economies should converge to their steady states such that the difference between the steady state and the actual state shrinks 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 2019,[17] has narrowed by roughly 2.3% a year on average over the last 20 years (currently this corresponds to approximately 1 pp of the gap a year). This rate is similar as in other transition countries and is also in line with the usual empirical convergence results, so we use it to project the convergence of whole-economy labour productivity (see Chart 3.1.1).[18]

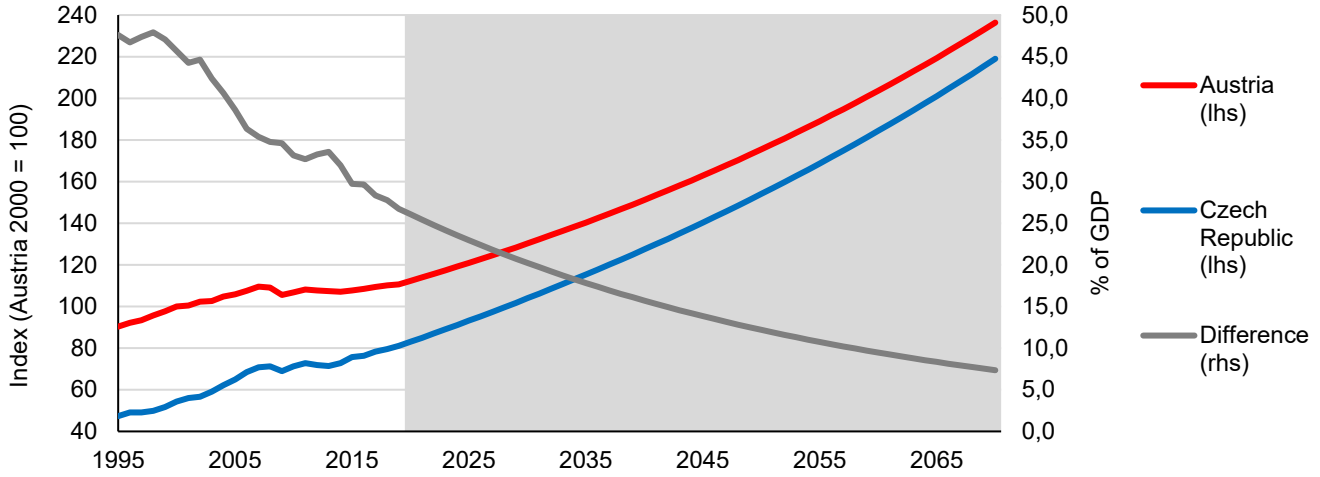
However, the shrinking gap between the economic output of the Czech Republic and its steady state is only one component of long-run growth. An economy that is in the steady state and in which the labour force is not expanding grows at the rate of growth of technology (i.e. the rate of growth of aggregate factor productivity). This growth must therefore be added to the convergence component when estimating the long-run rate of growth of the Czech economy. In our projection we quantify the rate of growth of output per worker in the steady state resulting from growth in technology at 1.5% a year. This is the long-run average for developed countries if we eliminate the effect of the financial crisis in 2008 and 2009, when many European countries saw a sustained decline in whole-economy productivity. In our simulation, the rate of growth of GDP per worker thus falls from 2.4% at present 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% of the future Austrian level at the end of the projection in 2070.

Labour productivity growth will be affected by the ongoing wave of robotisation and digitalisation. However, we do not explicitly model these phenomena (this is quite possibly not even doable), because in our opinion they are merely new forms of technological progress, which has always been present in the economy and hence will not fundamentally change

[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] According to OECD statistics (2020).
[18] For details, again see OCFC (2019): Dlouhodobá makroekonomická projekce ČR.

the functioning of the market economy.[19] In alternative scenarios (see section 6.2), however, we nonetheless test the impact of a productivity growth acceleration of 1 pp a year over the entire projection period. As we show in section 6.2, the impacts of such an acceleration on the fiscal projection do not change our fundamental conclusions.

Chart 3.1.1 Convergence of output per worker to the Austrian level



Source: OECD (2020); CFC calculations.

3.2 Demographic projection

The demographic projection is a key public finance sustainability parameter, as it strongly affects both the expenditure side (pensions, health care, education, social benefits and so on) and the revenue side of public budgets. The demographic projection is also one of the main inputs to the macroeconomic projection, as the simulation of the number of workers is based upon it. The number of workers is affected by both the projected number of citizens and the age structure of the population.

For our purposes, we use the November 2018 CZSO demographic projection, 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).[20] We opted for the medium variant as the baseline scenario for our projections and prepared alternative scenarios based on the other variants.

The CZSO's demographic projection is based on the situation in the Czech Republic at the start of 2018. During 2018 and 2019, however, the actual trend differed from this projection – the total population was 19,472 persons higher than in the medium variant at the end of 2019. This difference was caused largely by higher-than-expected net migration, but the birth rate was also rather higher (see Table 3.2.1). Population growth was conversely slowed by a somewhat higher-than-expected mortality rate.

Table 3.2.1 Materialisation of the CZSO's demographic projection in 2018 and 2019 (‰)

	2018			2019		
	projection	reality	difference	projection	reality	difference
Net migration	2.439	3.635	1.197	2.433	4.149	1.716
Natural growth	-0.090	0.105	0.195	-0.319	-0.012	0.307
Gross mortality rate	*10.489*	*10.626*	*0.138*	*10.516*	*10.531*	*-0.015*
Gross birth rate	*10.399*	*10.731*	*0.332*	*10.197*	*10.519*	*0.322*
GROSS OVERALL GROWTH RATE	2.349	3.740	1.391	2.114	4.137	2.023
Fertility rate (number of children per woman aged 15–49)	1.693	1.708	0.016	1.695	1.715	0.020

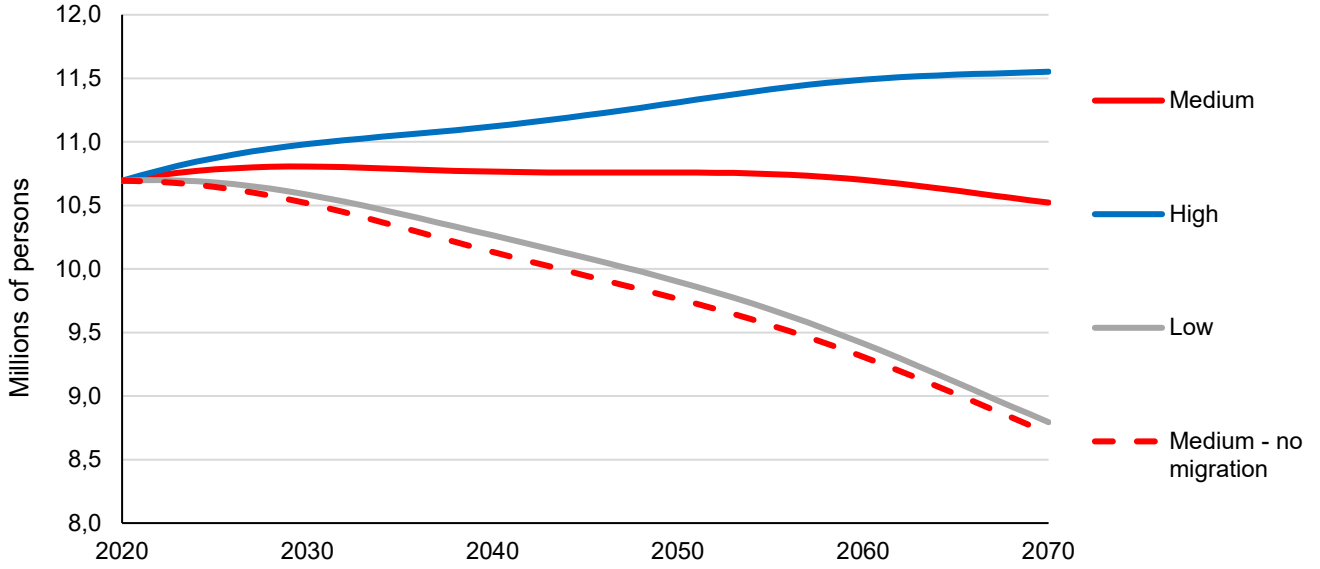
Source: CZSO (2020); CFC calculations.

[19] For more details on the possible consequences and problems associated with automation and robotisation, see Hindls, R., Hronová, S. (2019): Robotizace, rozvoj umělé inteligence a jejich dopad na ekonomiku, ÚNRR [Robotisation and the Development of Artificial Intelligence and their Impact on the Economy, OCFC, available in Czech only].
[20] CZSO (2018): Projekce obyvatelstva České republiky 2018–2100 [Population Projection of the Czech Republic 2018–2100, available in Czech only].

In light of the above-mentioned differences, we updated the CZSO's official demographic projection used in the 2019 Report by incorporating new data as follows. First, we replaced the age structure of the population for 2019 and 2020[21] with the observed figures. Then, for the assumed fertility, mortality and migration rates for 2020–2070, which we took from the individual variants of the 2018 CZSO projection, we generated a new assumed population trend and age structure. This is largely a technical update,[22] but the differences between it and the original demographic projection are quite small (see Box 3.1).

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, which should reach roughly 30% around 2060 in the medium variant. This will be aided by, among other things, an increase in life expectancy of 8.3 years for men and 6.6 years for women by 2070. Population ageing is common to all the projection variants, though there are significant differences in other indicators between the variants. For example, the difference in the total population between the high variant and the medium no-migration variant is almost three million at the end of our projection (see Chart 3.2.1).

Chart 3.2.1 Population paths in the variants of the demographic projection



Source: CZSO (2018): Population Projection of the Czech Republic; 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).

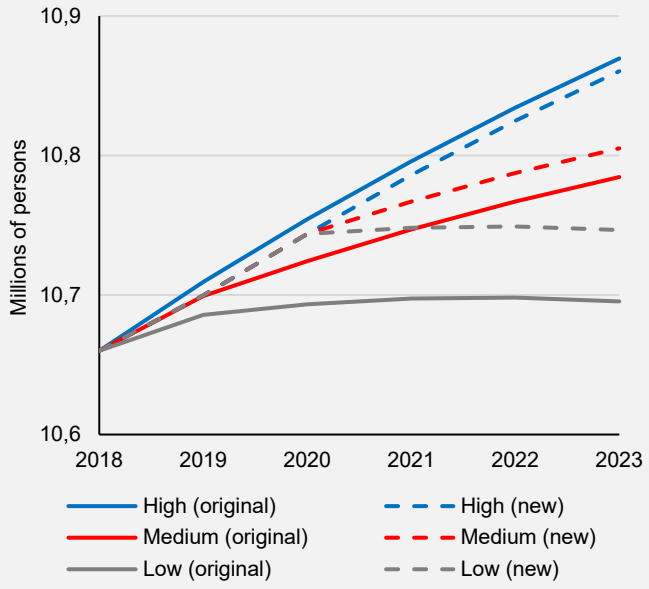
[21] Data for the start of the year.
[22] In the event of larger deviations of reality from the projection, it would be appropriate to consider modifying their key parameters, which would change the projection more fundamentally. However, the observed deviations in the migration rate largely reflect the upward phase of the business cycle and higher demand for foreign workers, and a correction linked with the COVID-19 -related measures, among other things, can be expected in 2020.
[23] The methodology and projection for the number of pension beneficiaries is described in more detail in section 4.1.

Box 3.1 The 2020 demographic projection

In November 2018, the CZSO issued the Population Projection of the Czech Republic 2018–2100,[24] which serves as a basis for this Report. As this demographic projection is for a very long timescale, it is associated with numerous uncertainties. Along with the most likely medium variant, the CZSO therefore presents two main alternatives. In the high variant, it assumes a higher population due to higher total fertility and migration and also to a lower mortality rate. By contrast, the low demographic projection assumes a lower fertility rate and weaker positive net migration than the medium variant, whereas mortality falls more slowly in this variant and is thus higher than in the medium one. The CZSO issues a demographic projection every five years. However, it publishes up-to-date population data each spring.

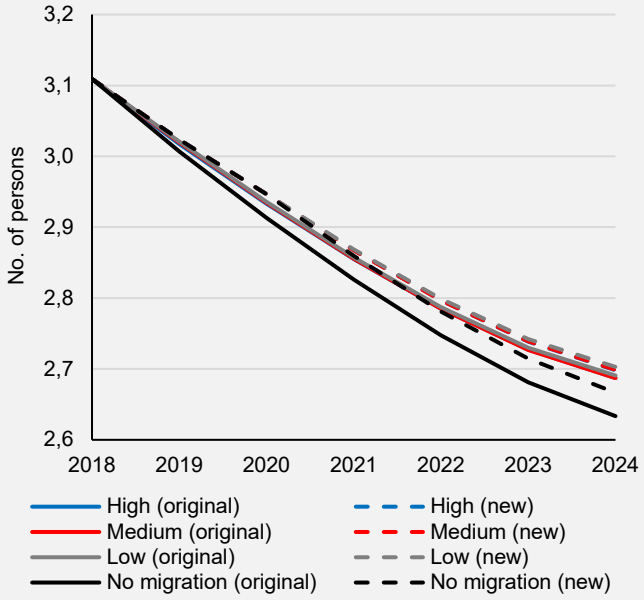
In short, the demographic projection is influenced by three main factors: total fertility, mortality and migration. The forecast for total fertility in the Czech Republic is based on the long-term trend and on convergence to the levels observed in developed countries, taking into account the average number of children per woman and the average age of women giving birth. In the case of mortality, life expectancy in the Czech Republic can similarly be expected to increase to the usual level in the countries to which the Czech Republic is converging in economic terms. The biggest uncertainty in the demographic projection is usually the estimate of migration. It depends on a large number of difficult-to-predict factors, such as the current evolution of the domestic economy relative to other countries, the nature of the relevant laws, and also epidemics and pandemics.

Chart B3.1.1 Original and updated CZSO projections



Source: CZSO (2020); CFC calculations.

Chart B3.1.2 Number of persons aged 21–64 per person aged 65+



Source: CZSO (2020); CFC calculations.

Chart B3.1.1 shows how the actual population trend differed from the 2018 projection over the past two years and how the variants of the CZSO projection will change according to the CFC's calculations if we take into account the actual data from the last two years. The actual trend was closest to the high variant, which has thus changed the least of all the variants. A more detailed analysis reveals almost 2,000 more births underlying the higher population growth over the last two years than expected in the medium variant. However, the most significant reason for the difference between the projection and reality is a larger inflow of migrants as a result of the economic boom. The rise in males of working age (18–50) was almost 17,000 higher in reality than predicted by the medium variant of the CZSO projection in 2018. However, migration is a very variable factor and, given the labour market situation, can currently be expected to drop sharply.

If we incorporate the changes seen in 2019 and 2020 into the CZSO projection while leaving the other assumptions of the projection unchanged, the impact on the demographic structure in the long run is very modest. This can be shown using the ratio of persons aged 21–64 per person aged 65+ (see Chart B3.1.2). We can therefore say that the long-run impact of the revision of the demographic projection on sustainability is minimal.

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

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). In the case of real wage growth, we nonetheless complement this convergence factor with the effect of growth in the ratio of compensation of workers to gross value added (GVA),[25] 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 also narrows by 2.3% a year in our projection.[26] The change in the distribution of GVA is important for, among other things, the level and structure of future general government tax and insurance premium revenues.

The increasing ratio of compensation of workers (and hence also employees) to GDP in our projection means that the volume of wages and salaries is growing faster than GDP in the long term, at the expense of the gross operating surplus of firms. Regardless of the variant of the demographic projection chosen, real wages are rising more quickly than labour productivity. Overall, then, we assume in our projection that real wages will grow by 2.1% a year on average (see Table 3.3.1). This is about 0.2 pp higher than per worker GDP growth. This gap averaged 0.6 pp between 1995 and 2018 (average real wage growth of 3% and average growth in GDP per worker of 2.4%), and even that was not enough to offset the unusually low ratio of wages to GDP in the Czech economy.[27]

Our 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 (%)

	2020–2030	2031–2040	2041–2050	2051–2060	2061–2070	Entire period
GDP per capita	2.3	1.8	1.2	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	1.7	1.2	1.4	2.0	1.7
Average real wage	2.6	2.3	2.1	1.9	1.8	2.1

Source: CZSO (2020), OECD (2020); CFC calculations.

[25] 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.
[26] 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].
[27] OECD (2020) figures.

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 items are directly affected by demographic change. Others are affected 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 simulation 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 constitute 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, and their number will be affected going forward 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.[28]

In estimating pension system expenditure, we start by looking at the number of old-age pension beneficiaries. In the next step, we estimate the level of newly granted and average old-age pensions. The number of old-age pension beneficiaries cannot be derived simply from the demographic projection and the statutory retirement age alone. A substantial role is played by the option of retiring early and, conversely, by the option of working beyond retirement age and thus supplementing one's old-age pension.

For these reasons, we use the "rate of retirement" (i.e. the ratios of the number of pensioners to groups of people defined in terms of age) for the simulation of the number of old-age pensioners. However, we also need to take into account the fact that the number of old-age pension beneficiaries interacts with disability pensions. These two types of pensions are mutually exclusive – disability pension beneficiaries cannot simultaneously be old-age pension beneficiaries, and vice versa (see section 4.1.2 on disability pensions for more details). 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. It turns out that when this approach is applied, the empirical rates of retirement are smoother and not subject to volatility caused by the changing share of disability pensioners.

Another fact we need to consider for projection purposes is the raising of the statutory retirement age. Senior citizens' decisions on the timing of their old-age retirement are determined in the Czech Republic

[28] Section 4a of the Act on Organisation and Implementation of Social Security (No. 582/1991 Coll., as amended) indicates that the statutory retirement age should be changed regularly depending on life expectancy so that, on average, each individual spends a quarter of their life retired. In August 2019, the Ministry of Labour and Social Affairs submitted to the government a *Report on the state of the pension system in the Czech Republic and its projected evolution with regard to the demographic situation in the Czech Republic and to expected population and economic growth*. It concludes that the retirement age for persons born in 1969 or later should be raised above 65 years. However, the Czech government decided not to increase the retirement age above this level. The retirement age could thus be changed again in relation to life expectancy in 2024 in connection with the new CZSO demographic projection and the new Report on the state of the pension system. We consider the linking of the retirement age to life expectancy according to Act No. 582/1991 Coll. as an alternative scenario in section 6. See Box 4.1 in this Report for a discussion of the relationship between the raising of the statutory retirement age, life expectancy and healthy life expectancy indicators.

predominantly by the statutory retirement age. We therefore construct the rates of retirement on the basis of time to the statutory retirement age. The rate of retirement thus tells us, for example, what per cent of those who are, say, two years short of the statutory retirement age and are not disability pension beneficiaries, are already pension beneficiaries.

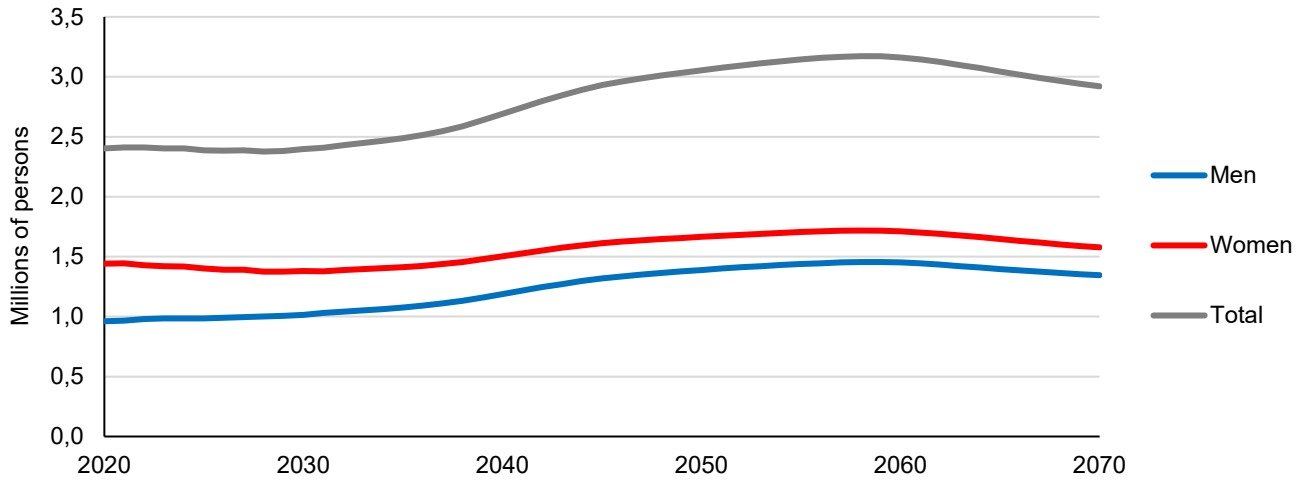
We derived the rates of retirement used in the simulation of the number of old-age pensioners separately for men and women as the average empirical retirement rates recorded in 2013–2018.[29] As the empirical retirement rate curves are derived on the basis of a period in which the retirement age was rising, we need to modify them for the long-run projection. These rates, which are calculated from the current retirement age, have to be adjusted for increases in the statutory retirement age. The modified retirement rates have more gently sloping curves and are used in both the baseline scenario for the period after 2030 and when estimating an alternative scenario in which the retirement age is linked to increasing life expectancy (see section 6.1).[30]

When projecting the number of old-age pension beneficiaries, we proceed 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. In the next step, we apply the relevant rate of retirement to the resulting number and obtain the projected number of old-age pensioners.

The baseline projection scenario initially indicates a broadly constant number of old-age pensioners followed by steady growth in the latter 2030s and the 2040s. This is caused primarily by the baby-boomers born in the 1970s starting to retire. The fact that the retirement age will stop rising also plays a role. According to the projection, the number of old-age pensioners will peak around the year 2058 at around 3.2 million, i.e. roughly one-third higher than today. It will then begin to fall as the baby-bust cohorts born in the 1990s reach retirement age (see Chart 4.1.1).

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 around 40% to 46% in 2070. The persisting predominance of women in the future will be due solely to their higher life expectancy.

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



Source: CZSO (2020), CSSA (2020); CFC calculations.

In order to project old-age pension expenditure, we also need to estimate the average old-age pension level. 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. Let's focus first on the level of newly granted pensions. A pension consists firstly of a "basic assessment", which is tied to the average wage in the economy. In our simulation we assume that the basic assessment will stay at the current level of 10% of the average wage. The second component of the pension is a "percentage assessment", which is derived from the insured person's past earnings indexed according to the average wage and the number of years of premium payments, including credited periods and other adjustments. The

[29] For women, we considered a single aggregated retirement rate only. The model scenario involved a woman with two children.
[30] 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].

calculation also contains two "reduction limits", which are a redistributive element reducing the differences in newly assessed pensions. These reduction limits change every year on the basis of average wage growth.

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 use the latest known figures, according to which the level of new pensions was 46.1% of the average wage for men and 39.2% for women.[31] The lower newly assessed pensions of women are due both to their lower wages and to their lower statutory retirement age and thus shorter insurance period on average. Following the equalisation of the statutory retirement ages for men and women (i.e. after 2030), the insurance period for women will increase and the difference between the newly granted pensions of men and women will therefore drop. However, this difference will persist after 2030 due to the assumption that the gender wage gap is maintained.

For men we thus assume a broadly constant ratio of newly granted pensions to the average wage (46.1%), while for women we gradually raise the ratio in our simulation so that it reaches 44.0% of the average wage in 2030. Such ratios correspond to an insurance period, including credited periods, of 41 years, i.e. around four years more for women than is now the case. In addition, we slightly reduce the ratio of newly granted pensions to the average wage between 2050 and 2055 to a level we maintain until the end of the projection. We thus take account of the fact that periods of university education will no longer be recognised as credited periods.[32]

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 2020, the government – in Order No. 260/2019 Coll. – increased the basic pension assessment by CZK 220 to CZK 3,490 and the percentage assessment by 5.2% and added an extra CZK 151 to pensions so that the overall increase in the average old-age pension was CZK 900. The replacement rate for 2020 thus increased to 39.8%.

In our projection, we assume that the current indexation system under Section 67 of the Act on Pension Insurance, which assumes indexation to real wage growth and inflation such that pensions rise by half of real wage growth and by the full rate of inflation, will be maintained in the future. Existing pensions are indexed either to the inflation rate based on the overall consumer price index, or based on the index of the costs of living of households of pensioners. In any given year, the index that is more favourable for pensioners will be used to index pensions.

In our projection, we assume systematically higher growth in the index of the costs of living of households of pensioners compared with the rate of inflation based on the consumer price index, which 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 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). For indexation purposes, we thus add 0.3 pp to the 2% growth in consumer prices over the entire projection horizon.

In addition to newly granted pensions and indexation, the average old-age pension is affected by the age structure of pensioners. Each year, pensioners with newly granted and hence above-average pensions will swell the total pensioner count. On the other hand, a proportion of pensions will cease to be paid due to the death of their beneficiaries. 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 simulation purposes, we therefore simply assume that the ratio of the average terminated pension to the average old-age pension is constant.[33]

Integrating all these assumptions into our demographic projection implies an average pension that fluctuates in a range of 38.9% to 40.4% of the average wage (see Chart 4.1.2). The growth in the replacement rate in the 2030s and 2040s is caused by a rapid rise in new pensioners and a simultaneous increase in the share of men in the total number of pensioners in this period. Both these groups have higher pensions in relative terms. 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 evolution of the ratio of pensions to the average wage and the number of old-age pensioners, we can derive the path of old-age pension expenditure expressed as a percentage of GDP. It peaks at

[31] Ministry of Labour and Social Affairs (2019): Statistická ročenka z oblasti práce a sociálních věcí 2018 [Statistical Yearbook in the Area of Labour and Social Affairs 2018, available in Czech only]. We use the average ratio of new pensions to the wage for the last two years.
[32] For a more detailed description, see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].
[33] 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.

12.1% of GDP around 2059 (see Chart 4.1.3). The rise in expenditure compared with the present is driven by growth in the number of pensioners. 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 lengthening insurance period.

Chart 4.1.2 Average old-age pension to average wage ratio

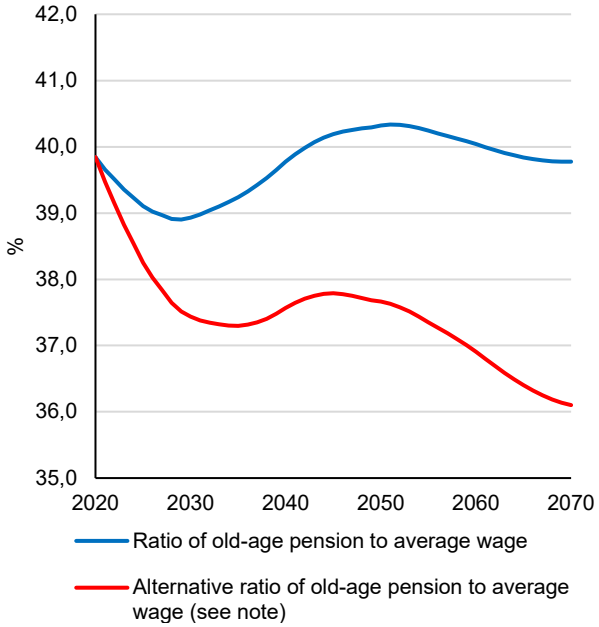
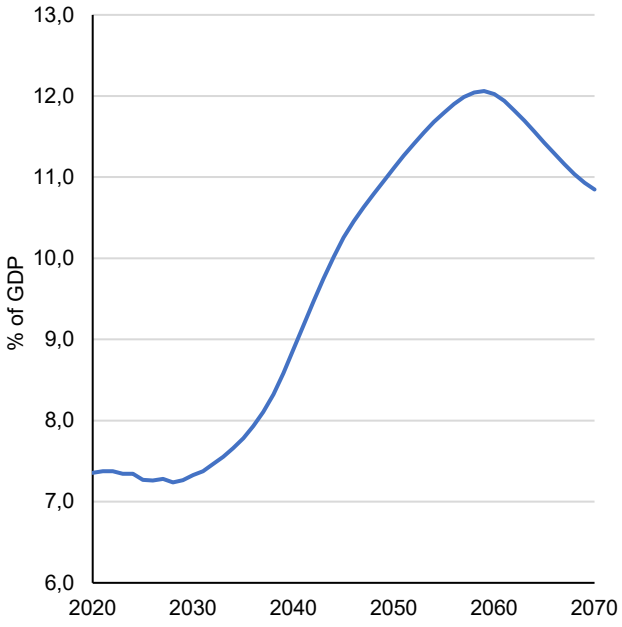


Chart 4.1.3 Old-age pension expenditure



Source: CZSO (2020), CSSA (2020); 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 Healthy life expectancy

Public finance stability is negatively affected in the long run primarily by population ageing, which puts significant pressure on the expenditure side of public budgets. One possible way of reducing this pressure in the pension system is to gradual raise the retirement age in relation to life expectancy. This mechanism is contained in Act No. 582/1991 Coll., on Organisation and Implementation of Social Security. It sets forth an obligation to prepare every five years a Report on the State of the Pension System of the Czech Republic and on the projected evolution of the system, taking into account the demographic situation of the Czech Republic and expected population and economic growth. The retirement age is supposed to be decided on the basis of this Report. It should be set such that, on average, each individual spends a quarter of their life retired. Although the results of the 2019 Report indicated that the retirement age should be increased in order for this rule to be met, the government decided to keep the retirement age capped at 65 years.

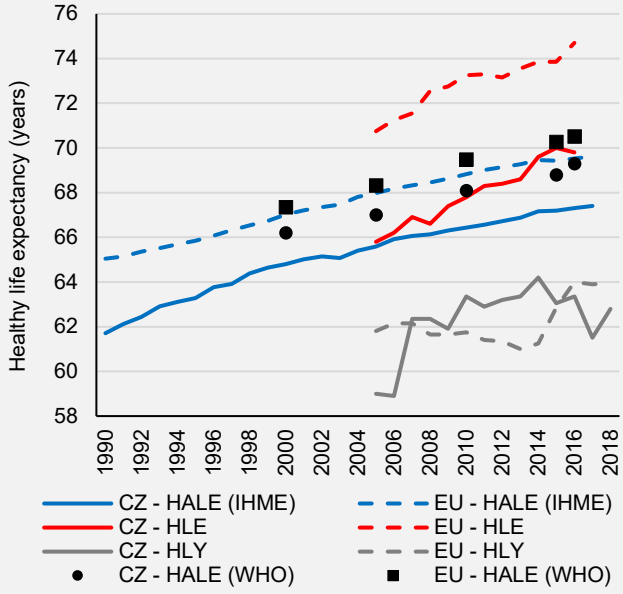
One argument was that despite rising life expectancy, healthy life expectancy is not changing much. In such case, raising the retirement age would merely shift the costs from old-age pensions to disability pensions and social benefits. This argument was based on the “healthy life years” indicator published by Eurostat. However, there are other indicators besides this one (see below) which also measure healthy life expectancy but suggest a different conclusion, namely a rising trend. In other words, they do not support the above argument.

There are three main healthy life expectancy indicators – the above-mentioned healthy life years (HLY) published by Eurostat, healthy life expectancy (HLE), also published by Eurostat, and healthy life expectancy at birth (HALE), published by the Institute for Health Metrics and Evaluation (IHME) and by the World Health Organisation (WHO). All of them are to a large extent subjective, as they usually combine “hard” demographic data with answers to survey questions. The indicator values may thus reflect the respondents’ different degrees of pessimism or optimism and ambiguities regarding how the questions in the questionnaires are worded. Given this subjectivity, what matters for our analysis is not the absolute number of healthy life years measured by the individual indicators,

but the path of the indicators over time and, where relevant, comparisons between the indicators and growth in life expectancy, and cross-country comparisons.

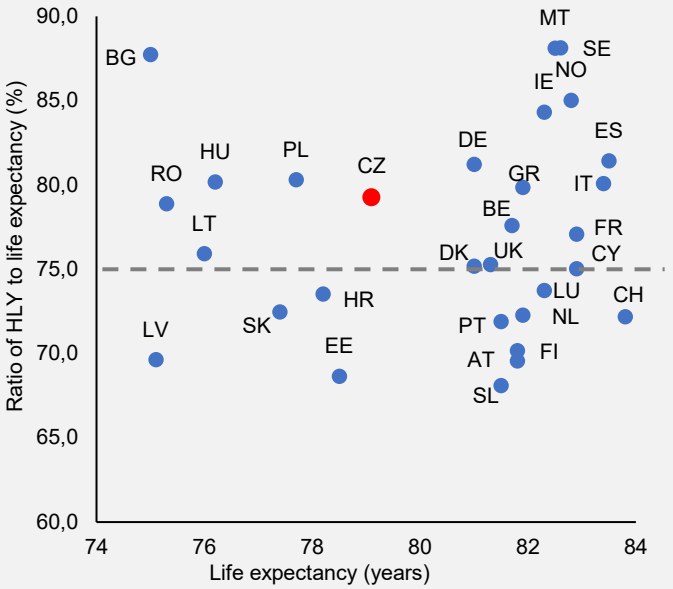
Chart B4.1.1 shows that the average HLY in EU countries varies over time and displays no significant upward trend. It also takes the lowest values of all the indicators – just 62 years in the EU on average. By contrast, the HLE indicator shows a clear rising trend both for the EU average and for the Czech Republic. The HLE for the Czech Republic is around 3 years below the average for the EU countries over the entire period. The HALE indicator shows a similar trend, rising both for the EU and for the Czech Republic. The difference between the EU and the Czech Republic fluctuates around 1.5 years for the WHO's HALE and 2.3 years for the IHME's HALE. The average HALE fluctuates around 70 years, while the average HLE for the EU exceeds 74 years. There are thus differences of more than 10 years between the various healthy ageing indicators, making it very difficult to interpret the possible implications of raising the retirement age.

Chart B4.1.1 Healthy life expectancy (average for men and women) according to various indicators



Source: Eurostat (2020), WHO (2020) and IHME (2020); CFC calculations.

Chart B4.1.2 Ratio of healthy life years (HLY) to life expectancy in EU countries (2018)



Source: Eurostat (2020); CFC calculations.
Note: Horizontal grey line represents quarter of life spent retired (75% of total life).

Across countries, it holds that the higher the life expectancy, the longer the healthy life expectancy. This correlation applies to all the healthy life expectancy indicators, being strongest for HALE and loosest for HLY. However, the ratio of healthy life years (HLY) to life expectancy is quite stable across countries (see Chart B4.1.2). On average, it is a little over 75%, i.e. above the level corresponding to a quarter of life spent retired. HLE and HALE show similar values for economically linked groups of countries and correlate with the level of economic development and life expectancy in the country concerned. HLY, by contrast, shows less realistic values for some EU countries than the other indicators.

We need to exercise caution in interpreting the correlation between life expectancy and healthy life expectancy, because this correlation may arise from the way the healthy life expectancy indicators are computed. Nonetheless, raising the retirement age can be expected to go some way towards resolving the pension system deficits, despite the higher number of people who will not reach the increased retirement age in good health and will therefore draw a disability pension. The correlation between healthy life expectancy and life expectancy is weakest for HLY. This indicator differs considerably from the others overall and is the sole healthy life expectancy indicator that can be used to argue against raising the retirement age. The other healthy life expectancy indicators suggest the opposite. However, despite the sophistication of the methods used to calculate them, none of these indicators is reliable enough to argue convincingly for or against increasing the retirement age above 65 years. The indicators are to a large extent subjective, and their use in the debate on raising the retirement age should reflect that fact.

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. In the past, the rates of disability for given age categories were fairly stable, allowing us to project them into the future.[34] 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 a manifestation of the healthy ageing hypothesis and possibly also of a stricter approach applied by medical examiners.[35]

Close to retirement age, disability rates are affected mainly by the conversion of some disability pensions into old-age pensions. The disability rates fall with age, since a disability pensioner entitled to an old-age pension higher than their current disability pension will opt for the old-age pension and be taken off the disability pensioner register. On the other hand, some disability pensioners with a higher disability pension will draw that pension until the age of 65, when their disability pension is automatically converted into an old-age pension. The rate of disability in the population aged 65+ is thus zero.

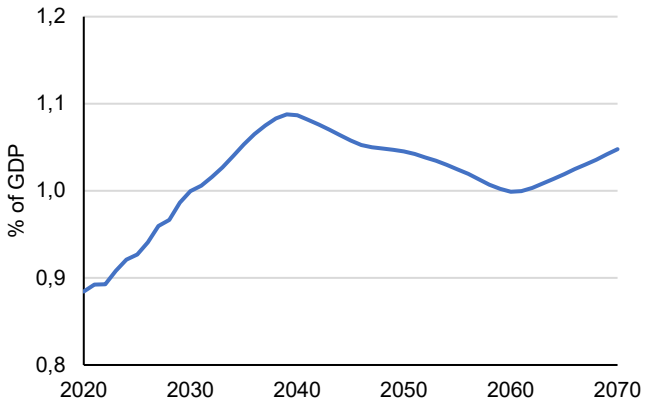
In our projection of age-specific disability rates, we take the rising retirement age into account. For the under-55s, we assume the same disability rates as in the past. We also assume that the disability rate curve will peak two years before retirement age and that the level of this peak will be the same as in 2018.

The disability rate will rise steadily to this peak from the age of 55. For the age of 64, we assume a disability rate equal to the average for this age for 2013–2018 and we again assume an even decline in the disability rate from its peak until the age of 64. With the exception of the alternative scenario in which the retirement age is tied to life expectancy, we assume a zero disability rate from the age of 65 up.

In our projection, the number of disability pensioners rises steadily and peaks in 2037, when it will be 20% higher than it is now. The growth in the number of disability pensioners is linked on the one hand with population ageing and on the other hand with the raising of the statutory retirement age, especially in the case of women. In 2038–2060, the number of disability pensioners will fall as they switch to old-age pensions. In 2060, the number of disability pensioners will be 3.8% lower than it is at present. It will then rise modestly at the projection horizon.

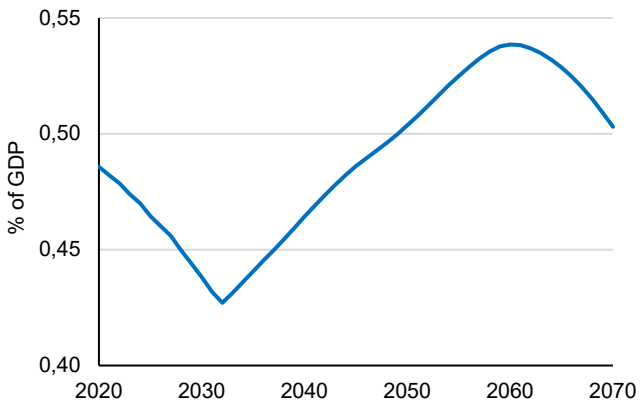
We project the average disability pension by assuming a constant ratio between the average disability pension for a given degree of disability and the average old-age pension. We assume a constant ratio of disability pension beneficiaries at each degree of disability to the total number of disability pensioners. Overall, according to the simulation, expenditure on these pensions will rise from the current roughly 0.86% of GDP to 1.1% of GDP in 2039, primarily due to the assumed growth in the number of disability pension beneficiaries and also due to growth in average disability pensions (see Chart 4.1.4 and Table 4.1.1). The share of spending on disability pensions will subsequently fall to 1% in 2060 and then rise to 1.05% at the end of the projection.

Chart 4.1.4 Expenditure on disability pensions



Source: CSSA (2019); CFC calculations.

Chart 4.1.5 Expenditure on survivors' pensions



Source: CSSA (2019); CFC calculations.

[34] 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].
[35] For more on the healthy ageing hypothesis, see the Report on the Long-Term Sustainability of Public Finances 2018 and also Box 4.1 *Healthy life expectancy* in this Report.

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.[36]

In the case of widows' and widowers' pensions, however, we still need to distinguish between pensions paid out individually (solo) and pensions paid out in combination with old-age (or disability) pensions, as there is a substantial difference in the levels and durations of these 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.[37] This projection method abstracts from the fact that the probability of being widowed is higher in cohorts who are already of retirement age today but will not yet be retired in the future due to the rising retirement age than it is in younger cohorts. As a result, the chosen method may underestimate the projected number. On the other hand, for this part of the population we do not take into account rising life expectancy and the converging life expectancy of men and women, which conversely reduce the probability of being widowed.

According to the simulation, 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 simulate 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).[38] Both these facts reduce the projected number of beneficiaries. The increasing statutory retirement age reduces the number of persons gaining entitlement to a combination survivor's pension, as, ceteris paribus, it reduces the number of pensioners. If life expectancy rises, or if the life expectancy of men and women converges, the event of being widowed moves to a higher age on average. So, despite the increasing number of senior citizens in the population, there is a slight decline in the number of combination survivors' pensions in our projection.

As regards the level of each type of survivor's pension, we will again take advantage of the structural similarity between the determination of survivors' pensions and the calculation of old-age pensions. We will thus 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 simulation 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.[39] 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 under the current legislation will thus go up from the present 8.7% of GDP to approximately 9.5% of GDP at the end of the projection period. However, it is apparent that such growth in the revenue of the system cannot 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 the increase in pensions beyond the valorisation scheme in 2020 (see section 4.1.1 and the international comparison in Box 4.2).

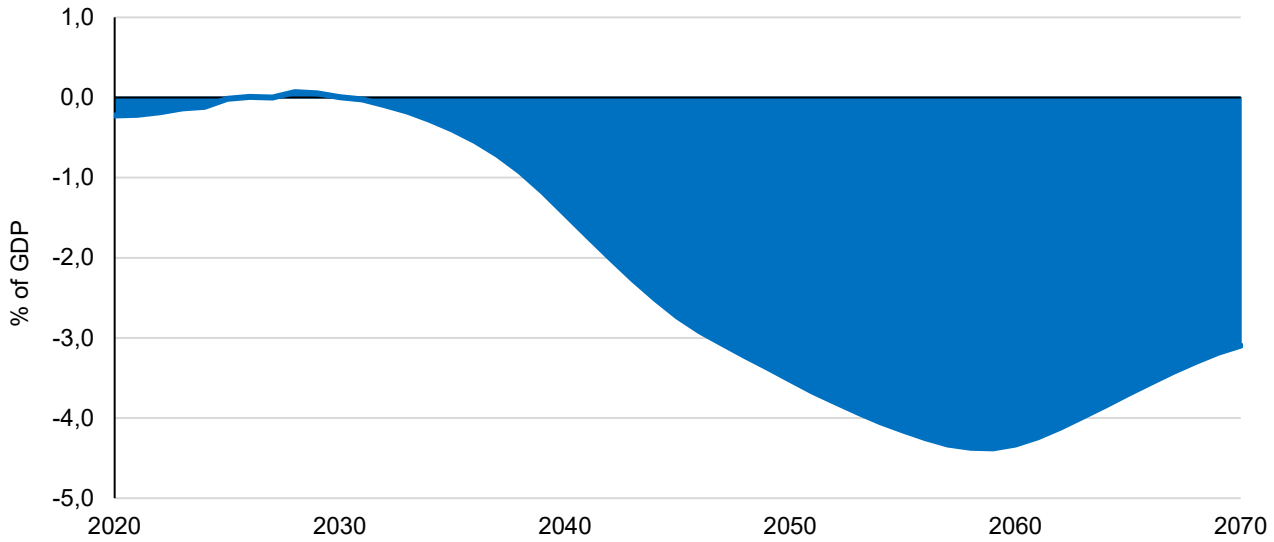
Under unchanged policies, the pension system as a whole will thus switch from the surpluses seen in 2018 and 2019 to modest deficits in the next few years and then be broadly balanced around 2030. After 2030, however, it will start to move into substantial deficits due to sizeable growth in the number of pensioners. The deficits will peak around 2059 at approximately 4.4% of GDP a year according to the simulation (see Chart 4.1.6). The subsequent drop in

[36] An orphan's pension can be drawn by a beneficiary of up to 26 years of age (if studying at university).
[37] We use the empirical shares in the defined population group for 2015–2018.
[38] For details again see OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].
[39] In addition to compensation of employees, compensation of workers comprises compensation of entrepreneurs, estimated as part of mixed income (see section 3).

expenditure and improvement in the balance of the pension system will be due to a reduction in the number of old-age pensioners.

Note that the above growth in pension system deficits is independent of the demographic scenario chosen (see section 6.3) and that we assume in our projection 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 (see section 6.5).

Chart 4.1.6 Annual balances of the pension system



Source: CZSO (2020), CSSA (2020); CFC calculations.

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

	2020	2030	2040	2050	2060	2070
Old-age pensions	*7.6*	*7.5*	*9.0*	*11.3*	*12.2*	*11.0*
Disability pensions	*0.9*	*1.0*	*1.1*	*1.0*	*1.0*	*1.0*
Survivors' pensions	*0.5*	*0.4*	*0.5*	*0.5*	*0.5*	*0.5*
Total expenditure	8.9	8.9	10.6	12.8	13.7	12.6
Total revenue	8.7	8.9	9.1	9.3	9.4	9.5
BALANCE	-0.2	0.0	-1.5	-3.5	-4.3	-3.1

Source: CZSO (2020), CSSA (2020); 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.

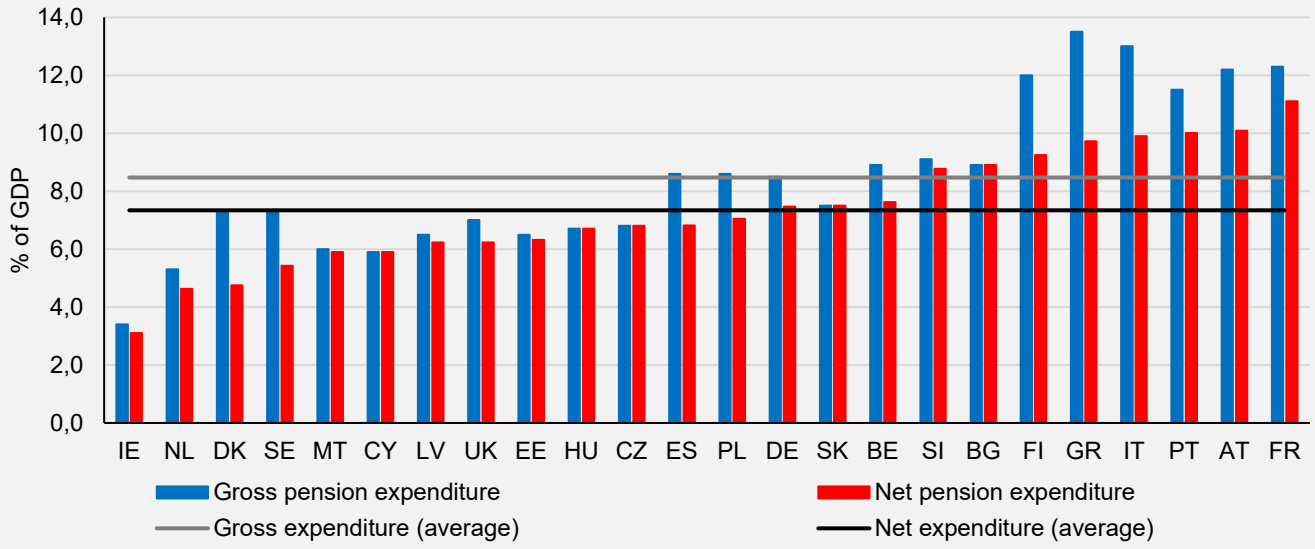
Box 4.2 International comparison of pension expenditure

Public pension spending in relation to GDP differs from country to country, and a simple comparison can give rise to misleading conclusions. Pension expenditure depends on a whole range of factors, in particular the demographic structure, the replacement rate, the pension structure of GDP and on whether pensions are taxed.

Taxing pensions is standard practice in the majority of European countries. The exceptions, besides the Czech Republic, include Bulgaria, Hungary, Lithuania and Slovakia. Countries that tax pensions on the one hand have higher public expenditure, but on the other also show higher public revenue at a similar net pension level. For international comparison purposes, we thus need to adjust pension expenditure using an estimate of the effective rate of taxation of pensions. Chart B4.2.1 shows such a comparison.

The share of pension expenditure in GDP also depends to a large extent on the demographic structure. Countries at a more advanced stage of population ageing than the Czech Republic (such as Germany and Italy) have a higher percentage of old-age pensioners in the total population. Pension expenditure in relation to GDP is therefore higher in those countries. Pension spending in the Czech Republic can be expected to rise as the share of old-age pensioners in its total population increases over the coming years. The age at which people retire likewise affects pension expenditure. A lower retirement age means a higher total number of persons drawing pensions for longer, which in turn increases the amount spent on pensions. The retirement age tends to be higher in countries with higher life expectancy and hence with higher dependency rates among older people.

Chart B4.2.1 Comparison of pension expenditure gross and net of taxation (2017)

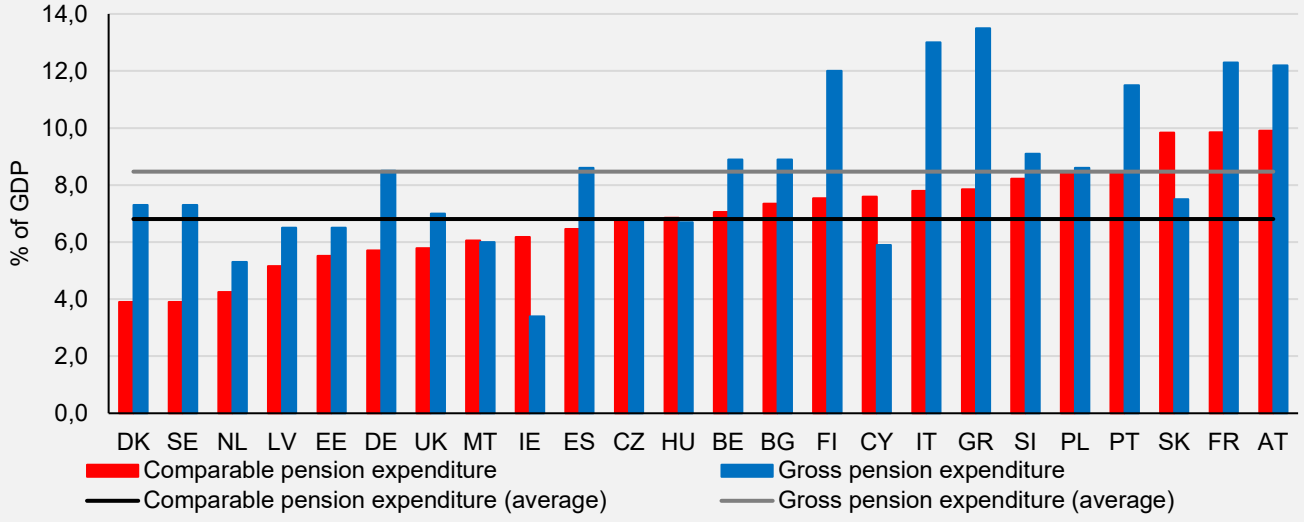


Source: Eurostat – COFOG (2019), MISSOC, EUROMOD – Country Reports (2015–2018); CFC calculations.

The gross replacement rate can also be expected to affect public pension expenditure to some extent. Expenditure on the pension system may also be influenced by the pension structure of GDP, in particular the share of compensation of workers. This is because employees' wages and entrepreneurs' income form the basis for the collection of contributions and for the determination of benefits. So, if the share of compensation of workers in GDP is higher, the share of pension expenditure should also be higher. However, the correlation between the two is only weak according to our analysis.

Chart B4.2.2 shows the simulated comparable expenditure, i.e. the simulated level of pension expenditure in individual EU countries assuming that pensions in those countries not taxed and are based on the same demographic structure, the same replacement rate and the same share of compensation of workers in GDP. Adjusted for these factors, the level of pension spending in the Czech Republic is average by comparison with other EU states. In countries such as France, Portugal, Austria and Italy, which are sometimes given as examples of countries with substantially higher pension expenditure than the Czech Republic, the higher expenditure can be explained largely by these factors. Given the expected population ageing and continuing economic convergence in the Czech Republic, the share of gross pension expenditure in GDP will gradually rise towards the usual levels in these countries. The lower gross spending on pensions in the Czech Republic is therefore not a relevant argument that there is significant room for increasing public expenditure on pensions, for example in the form of a substantial rise in the replacement rate, or conversely for lowering the retirement age.

Chart B4.2.2 Comparable pension expenditure and gross pension expenditure



Source: Eurostat – COFOG (2019), MISSOC, EUROMOD – Country Reports (2015–2018); CFC calculations.

4.2 Health care

Health care expenditure is a significant public budget item in the Czech Republic and is covered largely (up to 80%) from public sources.[40] In our projection, we focus solely on expenditure covered by public health insurance, and we are likewise interested solely in the revenue side of this system.

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. The basic assumption that these costs are sufficiently stable over time. Even so, the cost curve can change over time depending on the long-run income elasticity of demand for health care services and on factors linked with real convergence of the economy.

In our macroeconomic projection, we assume that real wage growth will outpace productivity growth or GDP per capita over the projection period (see section 3.3). If we assume that wages in health care will maintain their current level relative to the average wages, growth in the share of wages in GDP will lead, ceteris paribus, to an upward shift in the 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 last available ten years, using separate curves for men and women.

The stable cost curve over time explicitly 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 health care expenditure (see Chart 4.2.1). Whereas at present health insurance companies costs are covered at a level of 5.6% of GDP, if the medium variant of the demographic projection were to materialise, the total costs covered by public health insurance would peak 1.1 pp higher in approximately the first half of the 2060s (see Chart 4.2.2).

The revenue side of the public health insurance system relies on contributions paid by employees, employers, the self-employed and individuals with no taxable income and on contributions paid by the state for “state insurees”, i.e. children, students, old-age and disability pensioners, the unemployed etc.

We will estimate the contributions collected from the first group as a constant ratio to compensation of workers. Here we project growth in contributions collected from workers due to the assumed rise in the ratio of wages to output. According to our estimate, however, the state-funded contributions for state insurees will increase substantially faster. This is mainly because of a marked increase in the assessment base in the initial period of the projection. In the second half of the projection, the effect of population ageing and the associated rise in the number of pensioners will be felt more strongly.

The Chamber of Deputies has approved an increase in the assessment base for contributions on behalf of state insurees to 142% of the 2019 amount between 2020 and 2021 in order to reduce the drop in revenue and the rise in public health insurance system expenditure connected with the COVID-19 pandemic.[41] However, it is not known that health insurance companies will incur a significant long-term increase in costs as a result of the pandemic. Major one-off payments, for example for the purchase of antibody tests and personal protective equipment for hospital staff, have been covered predominantly by the Ministry of the Interior and the Ministry of Health. The increased demand for doctors and medical facilities as a result of the pandemic has been balanced by the deferral of non-acute cases, some of which will ultimately not be treated at all. For this reason, we assume no direct impact of the pandemic 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 assessment base.

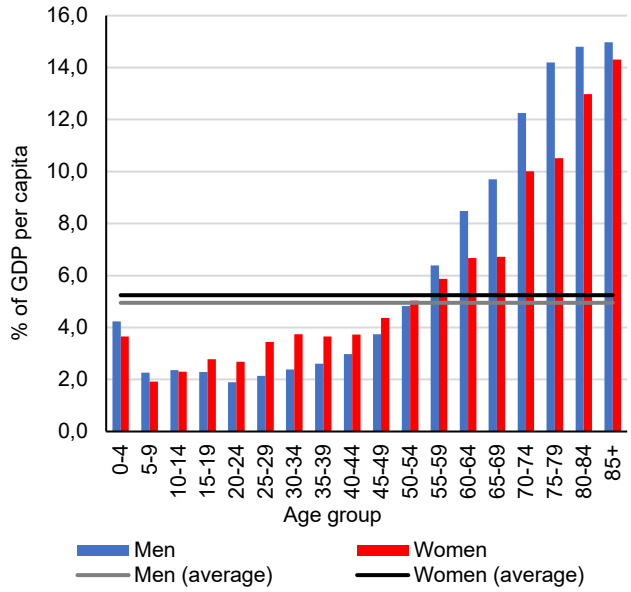
This means that the assessment base will increase from 23% to 36% of the average wage in 2021. No mechanisms further adjusting the payments for state insurees have been set so far for the period beyond 2021. We therefore assume that the assessment

[40] See CZSO (2019): Výsledky zdravotnických účtů ČR 2010–2017 [Health Accounts of the Czech Republic 2010–2017, available in Czech only].
[41] See Parliamentary Print 829/0, section 1/4: novela zákona o pojistném na veřejné zdravotním pojištění [amendment of the act on the contribution in public health insurance, available in Czech only].

base will remain unchanged at CZK 13,088[42] for the next 20 years, when its ratio to the average wage will gradually fall back to the aforementioned 23%. For the rest of the horizon, we assume that the assessment 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.

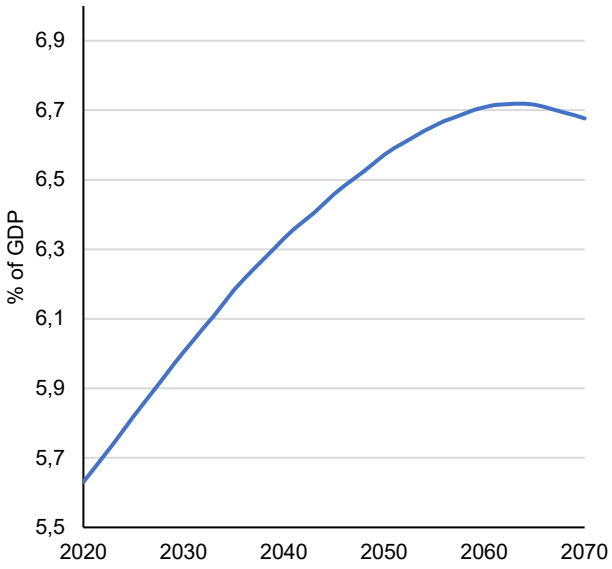
The total revenue of the system will gradually rise from its current level of 5.8% of GDP to around 6.8% of GDP at the end of the period. If the medium variant of the demographic projection materialises, the public health insurance system will thus be in a modest surplus falling steadily from 1.2% of GDP at present to zero over the next 20 years. For the rest of the projection the surplus will stay at about 0.1% of GDP.

Chart 4.2.1 Costs covered by health insurance by age group



Source: CZSO (2019); CFC calculations.

Chart 4.2.2 Public health care expenditure



Source: CZSO (2019), MF CR (2019); CFC calculations.

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

Another item affected by demographic change is spending on certain non-pension social benefits in cash. In the model we simulated expenditure on maternity benefit, parental allowance, care allowance and housing allowance, i.e. expenditure on non-pension social benefits in cash that are both sufficiently fiscally significant, amounting to at least 0.1% of GDP, and identifiably linked to demographics. For benefits that do not meet these two criteria (sickness benefit excluding maternity benefit, unemployment benefit, child allowance, foster care benefit, birth grants, funeral grants and social assistance/need benefit), we assume they maintain a constant share of GDP at the current level.

We simulated expenditure on fiscally significant social benefits separately using the demographic projection. The link to demographics was tested on the basis of the past evolution of the benefit (e.g. housing allowance) or arose directly from how the benefit itself is constructed (e.g. maternity benefit). For the purposes of the projection, we assume that the current average benefit to average wage ratio and likewise the current non-take-up rates of some benefits will be maintained.

The simulation of **maternity benefit** is based on the construction of that benefit. It is determined by the ratio of the average benefit to the average wage and is also shaped by the duration of the benefit. The projection of this benefit is related to the projection of the number of new-borns.

We simulated **parental allowance** on the basis of the projection of the number of children aged 0–3.

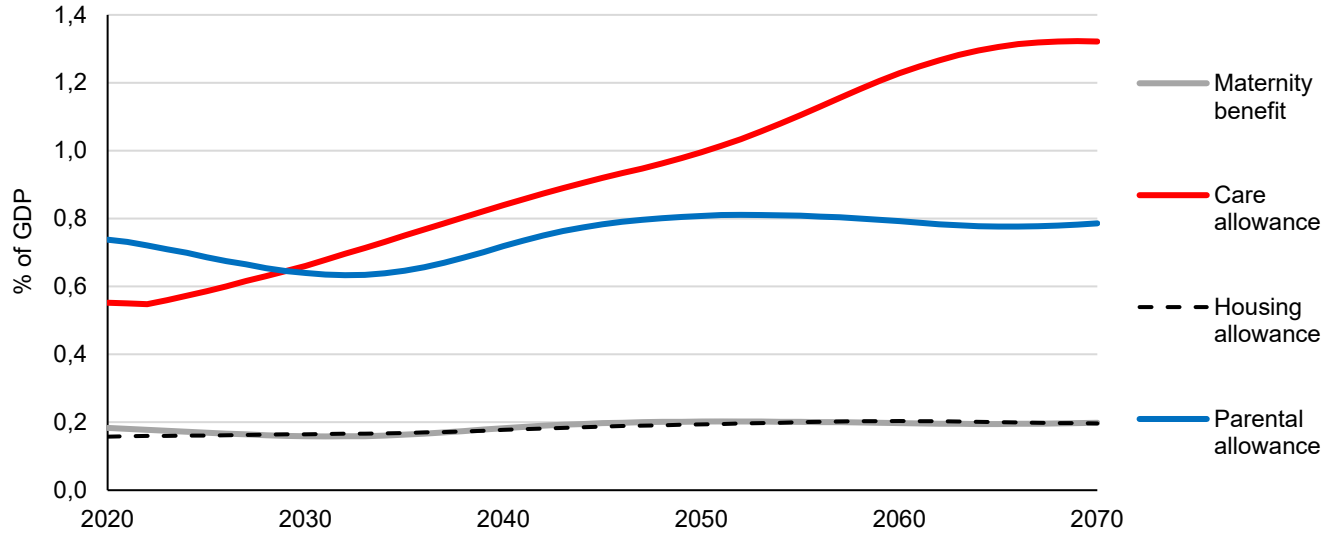
[42] Payments for state insurees appear on both the expenditure and revenue sides of the overall general government budget, so a change in their level has a neutral impact on the overall balance.

We drew on data[43] on the structure of parental allowance recipients by child age. We also used information on the number of parental allowance benefits paid and the number discontinued according to the child's age when the allowance was discontinued. Based on this data, we calculated the share of recipients in each age cohort and their average monthly parental allowance. In the simulation, we assume these shares are fixed. The increase in the total parental allowance benefit from CZK 220,000 to CZK 300,000 effective 1 January 2020 is already incorporated into the calculations.[44]

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 2018.[45] 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%.[46] From 2021 onwards we then assume a constant allowance to average wage ratio. The total volume of allowances paid will rise above 1.3% of GDP, mainly due to population ageing and an increasing share of people aged 75+ in the total Czech population.

We project **housing allowance** on the basis of past developments. We use CZSO information[47] that people aged 65+ account for around 25% of the number of housing allowance benefits paid.[48] The remaining three-quarters of the recipients are thus aged 18–64. According to a Ministry of Labour and Social Affairs (MoLSA) proposal published at the turn of 2020, the provision of state financial housing support (the housing allowance and the housing supplement) is to be revised and combined into a single housing benefit.[49] However, this proposal has not yet been passed, so we do not incorporate it into our housing allowance expenditure projection.

Chart 4.3.1 Projections of non-pension social benefits in cash



Source: CZSO (2019), MoLSA (2019); CFC calculations.

[43] Höhne, S. (2017): Změny v čerpání rodičovského příspěvku v demografických souvislostech [Changes in Parental Allowance Take-up in a Demographic Context, full article available in Czech only]. Demografie. 2017. 59: 5–22., MoLSA database.
[44] For parents of two or more children born at the same time the total benefit is CZK 450,000. In the model, however, we simulate a parental allowance of a single level of CZK 300,000 for all children.
[45] Calculated using Czech Labour Office data. 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].
[46] 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.
[47] CZSO (2014). Kdo pobírá příspěvky na bydlení v České republice [Who Receives Housing Allowance in the Czech Republic].
[48] We checked this figure using EU-SILC data for the Czech Republic for 2015, according to which the share of people aged 65+ receiving housing allowance is 22%.
[49] Under the proposal, the rules of entitlement to this benefit would also be tightened. For example, applicants' cooperation with the Labour Office, their children's school attendance, the persons actually living in their households (regardless of declared permanent residence) and housing quality would all be checked.

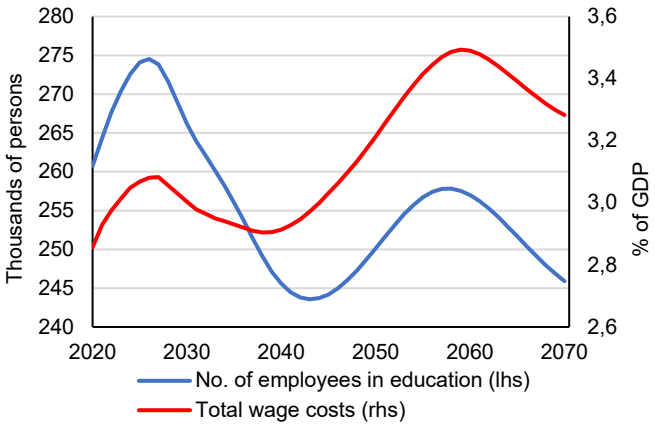
The expenditure projections for each of the benefits as a percentage of GDP are shown in Chart 4.3.1. The share of parental allowance expenditure declines between 2020 and 2030 and then gradually rises. This is due to demographic change, as the number of children aged 0–3 will initially fall then start rising in the first half of the 2030s, only to drop slightly again from the early 2050s on. The ratio of care allowance expenditure to GDP grows over the whole period of interest. This growth does not start to slow until the late 2060s. The total amount of non-pension social benefits will be at a constant level of around 2.5% of GDP until the first half of the 2030s. It will then increase to 3.4% of GDP in 2070, mainly as a result of rising care allowance expenditure. This is due primarily to population ageing.

4.4 Education

Public education expenditure stood at around 4.5% of GDP in 2019. The Ministry of Education, Youth and Sports (MoEYS) accounts for the largest share of this spending. It transfers around 70% of its budget to local public budgets, mostly to cover wage costs. 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. Staff wages and salaries account for the bulk of public education spending, and we expect their share to rise further in the next few years (see Chart 4.4.1). This is due to planned growth in the pay of teaching and non-teaching staff, which, according to the government's programme statement, is to increase to 150% of its 2017 level by 2021.

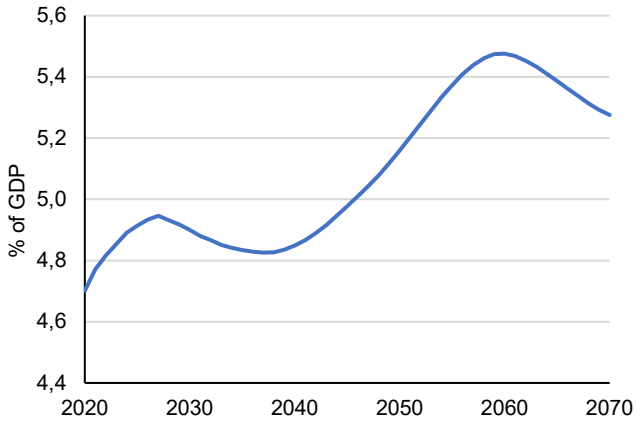
In the education expenditure projection shown in Chart 4.4.2, we assume that the number of teaching and non-teaching staff per 1,000 school pupils will stay unchanged over the entire projection horizon. We also left the share of children participating in the education process provided by educational establishments at the existing level in the projection. Public education costs are thus driven primarily by wage growth, with growth in the average wage in education being significantly higher than growth in the average wage in the economy in the projection up to 2021. In line with our long-term macroeconomic outlook for the later years of the projection, we assume that spending on wages of teachers and other education employees will outpace GDP over the entire projection period, causing education expenditure to increase overall relative to GDP. Following an initial upswing, public education expenditure will slow in the 2030s and 2040s as a result of demographics, as fewer teaching and non-teaching staff will be needed due to a smaller number of schoolchildren (see Chart 4.4.1).

Chart 4.4.1 Projection of staff numbers and wage costs in education



Source: MoEYS (2020), CZSO (2020); CFC calculations.

Chart 4.4.2 Public education expenditure



Source: MoEYS (2020), CZSO (2020); CFC calculations.

Payments direct to universities for regular university activities and R&D make up almost a quarter of MoEYS expenditure. Universities' operating costs will be affected by growth in compensation of academic workers, whose number depends largely on student numbers. Owing to demographic change, the number of university students will rise until the 2030s. 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 one-third of such costs grow at the same rate as GDP.

The proportion of university-educated individuals in the population is lower in the Czech Republic than in Austria, but the number of university students aged 18–26 in relation to the total population is comparable in the two countries. A total of 26% of Czechs in

this age category are studying at university, as against 27% of Austrians. If we keep this share at the current level, the proportion of university-educated individuals in the population will thus gradually converge to the Austrian level.

However, we expect scientific development to be a priority for society in the long run, so universities' R&D spending will also rise considerably. We assume that two-thirds of R&D expenditure is affected by growth in wages in education, while one-third will grow in line with real GDP.

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.

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 it will be affected primarily by rapid wage growth in education. However, education spending will slow over the following 15 years due to demographic change as the number of students in public 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 5.5% of GDP in 2060, although it will slow again in the final 10 years of our projection due to demographic change.

4.5 Expenditure associated with convergence effects and other expenditure

So far, we have focused on expenditure that is associated more or less with demographic change. For the remaining general government expenditure, we 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 economy 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, in our opinion, 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 a variety of reasons for this. First, in the case of less advanced but converging countries, a role may be played by efforts to upgrade infrastructure (such as motorways, railways and urban infrastructure) and the ensuing higher level of public investment. Another possible reason is the higher relative price level of investment goods in less developed countries, which leads directly to a higher investment rate. The higher relative price of investment may be due to the laws of economics (the different capital, labour and technology positions of less developed economies), but the cause may also be a lower standard of public administration, as indicated by quality of governance indexes, for example.[50] The CFC projection foresees both of these effects fading away as the level of economic development rises. In the case of the Czech Republic, this will lead to a decline in the share of public investment of 0.3 pp 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 medium-term plan for the Ministry of Defence budget heading envisages expenditure of around 1.4% of GDP in 2021, rising by 0.2 pp of GDP a year over the following three years to 2% of GDP in 2024.

The convergence of the Czech economy will also affect the **remuneration of employees in the general government sector**, which will be another source of upward pressure on expenditure. 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,

[50] See, for example, World Economic Forum (2019): The Global Competitiveness Report 2019.

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 this effect on health, education and defence spending are not simulated in this subsection, since they are already contained in the partial projections presented in the previous subsections. In the remaining areas, our projection assumes that this effect will gradually increase and will represent an additional 0.4 pp of GDP on the expenditure side at the end of the projection period.

Likewise, besides convergence effects we account for growth in **payments to the EU**. However, the COVID-19 pandemic has complicated the negotiations on the Multiannual Financial Framework for 2021–2027, so Czech public budget revenue and expenditure from/to the EU cannot be estimated exactly at the time of writing. As in previous Reports, we thus assume an increase in payments to the EU of 0.1 pp of GDP compared with the present as from 2028, due mainly to economic convergence.

We assume that the remaining expenditure of 17% of GDP is sensitive neither to demographic change, nor to convergence or other effects and we therefore keep it constant until the end of the projection horizon. Its size is derived from the evolution of general government sector finances in 2012–2019 and from the Ministry of Finance's predictions for 2020–2021.[51]

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

	2020	2030	2040	2050	2060	2070
Other expenditure – baseline scenario	17.0	17.0	17.0	17.0	17.0	17.0
Convergence-related changes in other expenditure	0.0	0.8	0.8	0.8	0.8	0.8
Public investment	*0.0*	*0.0*	*–0.1*	*–0.2*	*–0.2*	*–0.3*
Defence expenditure	*0.0*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
Growth in costs of general government sector	*0.0*	*0.1*	*0.2*	*0.3*	*0.4*	*0.4*
Payments to EU	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
OTHER EXPENDITURE INCLUDING CHANGES	17.0	17.8	17.8	17.8	17.8	17.8

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

4.6 Revenue in the long-term projection

General government revenues will be subject to interlinked demographic and convergence effects in the long-term projection. For the purposes of this Report, government revenues are split into the following categories: revenue from personal and corporate income taxes, statutory social security contributions, revenue from consumption taxes 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 assumptions 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 employees (and 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 share and number of workers.[52] The projected growth in personal income tax revenue from the current 4.6% of GDP to 5.0% of GDP at the end of the projection is thus the result of convergence alone (see Table 4.6.1).

Corporate income tax revenue is very sensitive to the business cycle and therefore fluctuates over time. Also, the construction of the tax base makes this tax hard to predict. However, in the long-term projection we abstract from cyclical effects and, for reasons of logical consistency, we project such revenue on the basis of net operating surplus. It should explain this tax revenue better than GDP, because it is net operating surplus that is the macroeconomic

[51] MF CR: Convergence Programme of the Czech Republic (April 2020).
[52] 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.

counterpart of net operating profit before tax.[53] 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 3.3% at the beginning of the projection to 2.5% 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 form (especially growth in the number of old-age pensioners) we took into account the major change made to the assessment base in 2020 and 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. The reduction of the sickness benefit rate effective mid-2019 had a slightly negative effect on expected contribution revenue (compared with last year's Report).

Taxation of consumption (**taxes on production and imports**) consists primarily of revenue from VAT and selective excise duties. This tax revenue is simulated by the share of the final consumption expenditure of households in GDP, which represents an approximation of the largest part of the tax base for consumption taxes. According to our macroeconomic projection, this share is constant (a change in the structure of pensions in favour of compensation of employees does not necessarily translate into a change in the structure of use of pensions), so consumption taxation revenue will maintain a constant share in GDP.[54] Its increase compared with last year's Report was mainly due to higher expected excise duty revenue, as the rates of duty on tobacco products, alcohol and liquor, and games of chance were increased in 2020. The rate of duty on tobacco products is expected to be raised further in the years ahead. The positive impacts of this change on revenue are slightly offset by changes to VAT and a reduction of the effective road tax rate.

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. In the short run, there are downside risks associated with the drop in revenue resulting from the bark beetle disaster (forestry authority Lesy ČR), the coronavirus crisis, which may cause electricity prices to go down on global markets (power utility ČEZ), and the fall in the revenues of airport operator Letiště Praha. Despite this, we assume that property income will remain constant at 0.5% of GDP in the long run.

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. For example, there is the as yet unapproved draft new multiannual EU budget, which may be increased by the CZK 750 billion Next Generation EU recovery plan. Conversely, total EU revenue will probably be reduced in the coming years by Brexit. 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.

[53] 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).
[54] Again, we diverge slightly here from strict conformity with the legislation, as some excise duties are constructed as a nominal figure for a given amount of goods. We therefore assume that the legislation will change over the long term in such a way that the revenue from this class of taxes evolves as if all the rates were constructed as ad valorem.

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

	2020	2030	2040	2050	2060	2070
Personal income taxes	4.6	4.7	4.8	4.9	5.0	5.0
Corporate income taxes	3.3	3.0	2.8	2.7	2.6	2.5
Other current taxes	0.2	0.2	0.2	0.2	0.2	0.2
Social security contributions	16.3	16.7	16.8	17.3	17.6	17.6
Pension insurance	*8.7*	*8.9*	*9.1*	*9.3*	*9.4*	*9.5*
Public health insurance (excluding SIs)	*4.6*	*4.7*	*4.8*	*4.9*	*5.0*	*5.0*
Payments for state insurees (SIs)	*1.8*	*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	12.1	12.1	12.1	12.1	12.1	12.1
Property income	0.5	0.5	0.5	0.5	0.5	0.5
Other revenue	4.7	4.7	4.7	4.7	4.7	4.7
TOTAL REVENUE	41.7	42.1	42.0	42.4	42.6	42.6

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

5 Overall general government balance and debt

5.1 The specific situation in 2020 and 2021

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, 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 both the depth of the expected economic contraction and the scale of state fiscal support. The 2020 and 2021 balances 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.

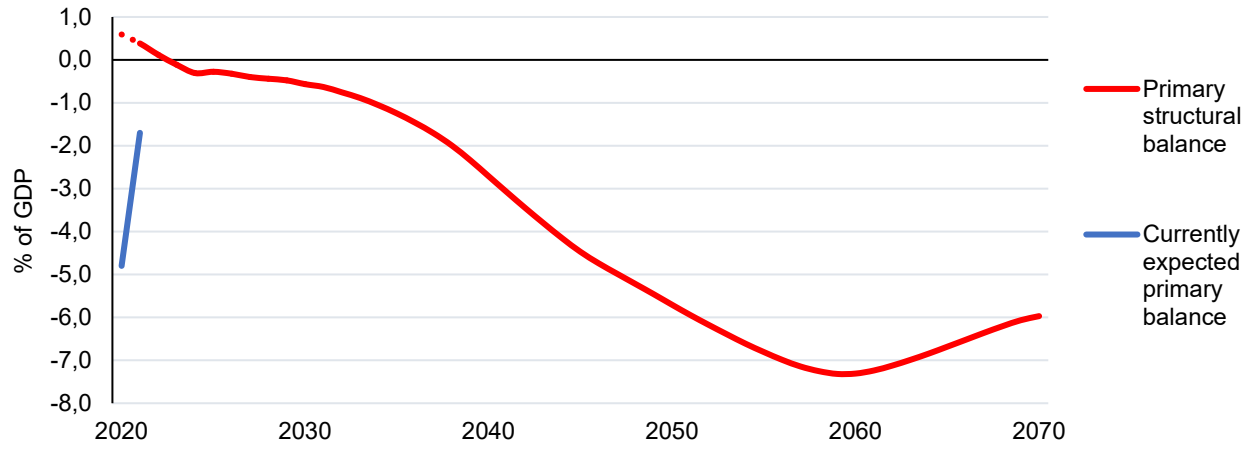
We therefore decided to use a specific approach to take the 2020 and 2021 balances into account. For both years, we calculated the ratios of revenue and expenditure to GDP in the usual way (i.e. in relation to potential output). Subsequently, however, we adjusted the hypothetical structural balance for effects related to the expected economic contraction and fiscal policy response, in particular the cyclical component of the balance, one-off and temporary measures, and the deviations of some expenditure items from their long-term averages. The resulting balance was used as an input to the projection of the debt quota in those years. As we assume that the output gap will be only slightly negative by 2022, we use the structural balance in subsequent periods.

5.2 Primary balance

The projections of the individual revenue and expenditure items allow us to prepare a projection of the primary structural balance of the general government sector (see Chart 5.2.1). It is clear from the chart that the primary balance would have been positive in 2020–2021 but for the economic contraction caused by the COVID-19 pandemic. However, it can be expected to turn negative as a result of the coronavirus-linked contraction.

According to our projection, the budget balance will be negative from 2023 onwards regardless of the economic cycle. A marked downward trend will emerge in the mid-2030s. This will be caused by the expenditure side, which will grow mainly due to demographic change (spending on pensions and health care and the care allowance). However, increased defence and 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, but the annual deficits will remain significant until the end of the projection period. The budget revenue side will increase only moderately over the projection period, as a result of growth in the ratio of compensation of employees to GDP, which is taxed more heavily than net operating surpluses. However, the growth on the revenue side is far from able to offset the growth on the expenditure side.

Chart 5.2.1 Primary general government balance



Source: CFC calculations.
Note: The red curve is derived on the basis of potential output at the end of 2019. The blue curve takes into account the economic contraction and fiscal policy response linked with the COVID-19 pandemic.

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 simulation of nominal interest rates, we assume a 2% inflation rate.

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 simulation. 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 range of instruments, ranging from non-marketable borrowings to a wide palette of debt securities with various maturities, coupon yields and denominations.[55] 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.[56]

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 nominal interest rate in our projection to be constant at 1.9% p.a. This figure corresponds to a real short-term interest rate of -0.1% p.a. (the average real three-month interest rate over the period 2004–2019) plus an inflation rate of 2%.[57] 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.[58] In the baseline scenario, we assume a ten-year nominal interest rate of 3.2% p.a., 1.2 pp of which is the real interest rate (again, the average for the period 2004–2019) and the rest is the expected inflation rate. These assumptions together lead to a gradual increase in the modelled implicit interest rate over the next ten years from 1.68% p.a. to 3% p.a., where it will stay until interest rates start to rise due to the breach of the debt brake.

5.4 Debt

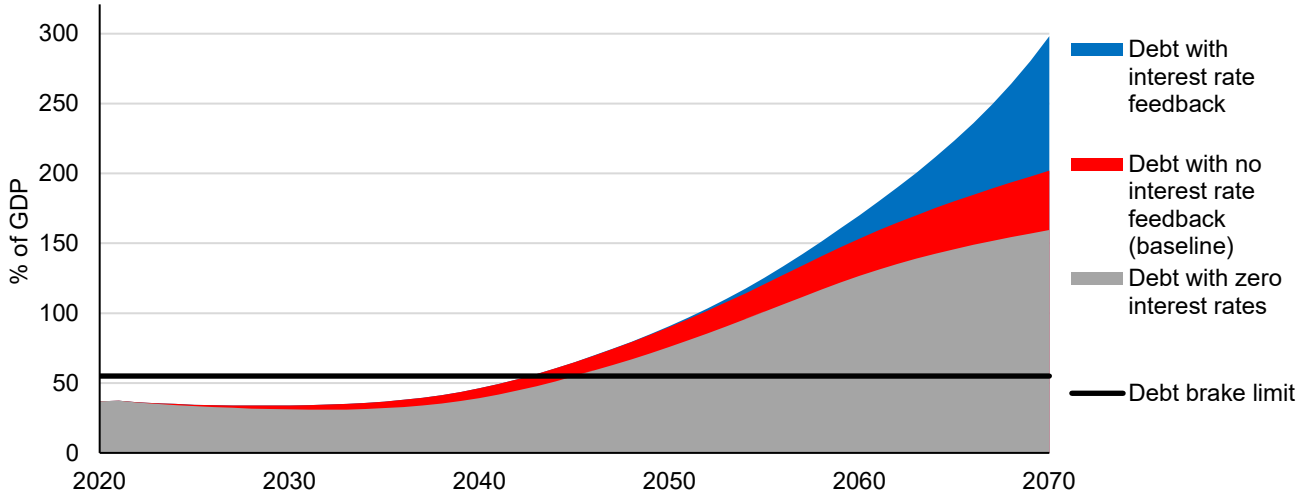
Interest costs enter the calculation of the overall general government balance on the expenditure side and thus increase the annual deficits. Those deficits accumulate in the general government debt, and the growing debt generates further growth in interest costs (see Table 5.4.1 for data for selected years). The general government debt is heading towards approximately 202% of GDP by 2070. 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 and short-term nominal interest rates were zero over the whole projection period, the debt would still head towards roughly 160% of GDP (see Chart 5.4.1).

Besides this version of the interest expenditure projection, we also carried out a projection 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 projection, we assume that each percentage point of the debt-to-

[55] For more details, see MF CR (2020): The Czech Republic Government Debt Management Annual Report 2019 and Morda, P. (2019): Vývoj státního dluhu České republiky, OCFC [Evolution of the State Debt of the Czech Republic, available in Czech only].
[56] See MF CR (2019): Strategy for the Financing and Management of the State Debt of the Czech Republic 2020.
[57] CNB nominal interest rate data. We used the GDP deflator from CZSO data to convert to the real interest rate (in the case of past data).
[58] 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.

GDP ratio above the 55% threshold increases the current ten-year real interest rate by 0.039 pp (see Box 5.1). Under these assumptions, starting in 2043, when, according to our projection, the debt will breach the debt brake threshold, the debt growth would be accelerated compared with the no-feedback scenario (see Chart 5.4.1). In the scenario with interest rate feedback, the implicit nominal interest rate exceeds 8% in 2070 and the debt-to-GDP ratio reaches 298%. The feedback between interest rates and the debt thus eliminates the effect of the improvement in the primary balances and the related slower debt growth in the 2060s.

Chart 5.4.1 General government debt



Source: CFC calculations.

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

	2020	2030	2040	2050	2060	2070
Interest costs with no interest rate feedback	0.6	1.0	1.3	2.5	4.3	5.7
Interest costs with interest rate feedback	0.6	1.0	1.3	2.8	8.1	22.4
Total balance with no interest rate feedback	0.0	-1.5	-4.0	-8.2	-11.6	-11.7
Total balance with interest rate feedback	0.0	-1.5	-4.0	-8.5	-15.4	-28.4
Currently expected primary balance	-4.8					

Source: CFC calculations.
Note: The currently expected primary balance is affected by the decline in economic activity resulting from the COVID-19 pandemic and also includes the related fiscal measures.

Box 5.1 Sensitivity of the government bond interest rate to the debt level

The general government balance is also affected by the interest costs of servicing public debt. In a situation where investors demand a risk premium, government bond interest rates become sensitive to the debt-to-GDP ratio. This is because credit risk increases as the debt grows, and investors are only willing to buy government bonds if they are compensated for this risk by a higher rate of return. The ratio of interest costs to the total debt also rises – not necessarily linearly – as the general government debt grows.

In the 2018 and 2019 Reports, we applied a long-term government bond interest rate sensitivity of 3.9 basis points (bp) for each percentage point of general government debt above 55% of GDP. We chose the 55% threshold in line with the statutory debt brake,[59] while we derived the sensitivity value from a fixed effects regression model estimated on a sample of twelve euro area countries for 2009–2017.

However, the estimates of the debt sensitivity of interest costs depend on the period tested, the sample of countries analysed and their institutional set-up, and the estimation method chosen. Given the persisting uncertainty regarding the effect of the risk premium in the general government sector, we prepared a comprehensive study on the sensitivity of the government bond interest rate.[60]

[59] See Section 14 of Act No. 23/2017 Coll., on the Rules of Budgetary Responsibility.
[60] Tománková, I. (2020): The Effect of General Government Debt on Government Bond Interest Rates, OCFC.

We performed our baseline estimate of the sensitivity of the interest rate on long-term government bonds to general government debt on a sample of non-euro EU countries for 2008–2018. The estimated sensitivity is 4 bp per percentage point of debt and only activates when the debt exceeds 55% of GDP. The relatively low past debt levels of the countries in the sample prevent us from estimating the sensitivity the interest rate at the significantly higher debt levels that figure in our projection, so we analysed the data for euro area countries as well. However, we found no debt threshold above which the sensitivity of the interest rate rises sharply. On the contrary, the data indicate that the average sensitivity of the interest rate will drop by 17% if general government debt exceeds 100% of GDP. Applying this to the estimate for the non-euro EU countries implies a decline from 4 bp (per one percentage point of debt in the range of 55–100% of GDP) to 3.3 bp. This reduced sensitivity is probably caused by a combination of pressure from the international community to adopt prudential budgetary measures, the engagement of credible international institutions, and lower risk aversion on average among investors who are willing to hold government bonds at debt-to-GDP ratios exceeding 100%.

Despite being based on a simpler model involving the application of some degree of discretion, the interest rate feedback scenario used in the 2018 and 2019 Reports (i.e. 3.9 bp and 55% of GDP) lies entirely within the tolerance of the estimates obtained from the study in which we applied more sophisticated models and a more rigorous approach. We therefore use it in this year's Report as well. The time series continuity of the debt projection with interest rate feedback is thus preserved between Reports.

However, the sensitivity of the government bond interest rate to general government debt may not activate if the growth in the debt is accompanied by quantitative easing by central banks. In the feedback scenario, the debt starts to affect interest rates in 2043, because the Czech general government debt will exceed 55% of GDP that year according to our projection. The debt-sensitive interest rate scenario may therefore turn out to be overestimated if the accommodative monetary policy and low interest rate environment persist beyond 2043.

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.[61]

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 is an indicator 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 projection, the public finance sustainability gap currently stands at 3.28 (the figure last year was 2.79). This means that if the primary deficit was 3.28% of GDP lower from 2020 onwards over the entire projection period, the debt would head towards 55% of GDP in 2070. 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 2070 will have to be larger than that expressed by the sustainability gap indicator value presented above. If solutions are delayed until the general government structural deficit hits the legal limit[62] (sometime around 2027 according to our simulation), the sustainability gap will grow to 3.68.[63] If the solution is postponed until the debt brake threshold is reached (sometime around 2043 according to the simulation), the gap will widen further to 5.56.[64]

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 (4.1 last year).[65]

[61] For a more detailed description, see European Commission (2020): Debt Sustainability Monitor 2019.
[62] See Act No. 23/2017 Coll., on the Rules of Budgetary Responsibility, as amended by Act No. 207/2020 Coll.
[63] This means that for the debt to head towards 55% of GDP in 2070, the primary deficit would have to be 3.68% of GDP lower from 2027 to 2070.
[64] So, for the debt to head towards 55% of GDP in 2070, the primary deficit would have to be 5.56% of GDP lower from 2043 to 2070.
[65] European Commission (2020): Debt Sustainability Monitor 2019 and European Commission (2019): Fiscal Sustainability Report 2018. The given indicator value was published before the COVID-19 pandemic broke out and so does not take its economic and fiscal impacts into account. The requirement for balanced revenue and expenditure makes S2 stricter than our sustainability gap.

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 be able to illustrate potential deviations from our baseline scenario, which tend to be significant in long-term projections, we prepared a set of alternative scenarios described in more detail below. Two of the alternative scenarios are positioned over 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 other 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, which we prolonged to allow us to perform the projection up to the end of our projection period (i.e. up to 2070).[66] 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 67.7 years at the end of the projection.

The gradual increase in the statutory retirement age in our projection will manifest itself 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).[67] There will be a proportionate increase in general government revenue, but the ratio of revenue to GDP will remain unchanged. 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, but the increasing retirement age will be felt mainly in a fall in spending on old-age pensions and, to a lesser extent, on widows' and widowers' pensions. The fall in spending is due predominantly to a decline in the number of pensioners (of up to 11.2% in 2070 by comparison with the baseline scenario in the case of old-age pensioners). Conversely, the level of newly granted pensions and the pension-to-wage ratio will rise modestly in the long run due to a longer insurance period. The balance of the pension system will be around 1.3–1.5% 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 106.7 pp lower than in the baseline scenario in 2070 (see Chart 6.2.1). This scenario therefore has a large impact on the future debt level. It is nonetheless apparent that linking the retirement age to life expectancy does not in itself lead to public finance sustainability.

6.2 Faster productivity growth due to technological progress

The next alternative scenario tries to capture the effects of robotisation and digitalisation and their impact on labour productivity. To assess this factor we calculate 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.[68] 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 estimated potential output growth (see Box 2.1). The alternative scenario thus serves rather to illustrate the sensitivity of the projection to an acceleration in labour productivity growth.

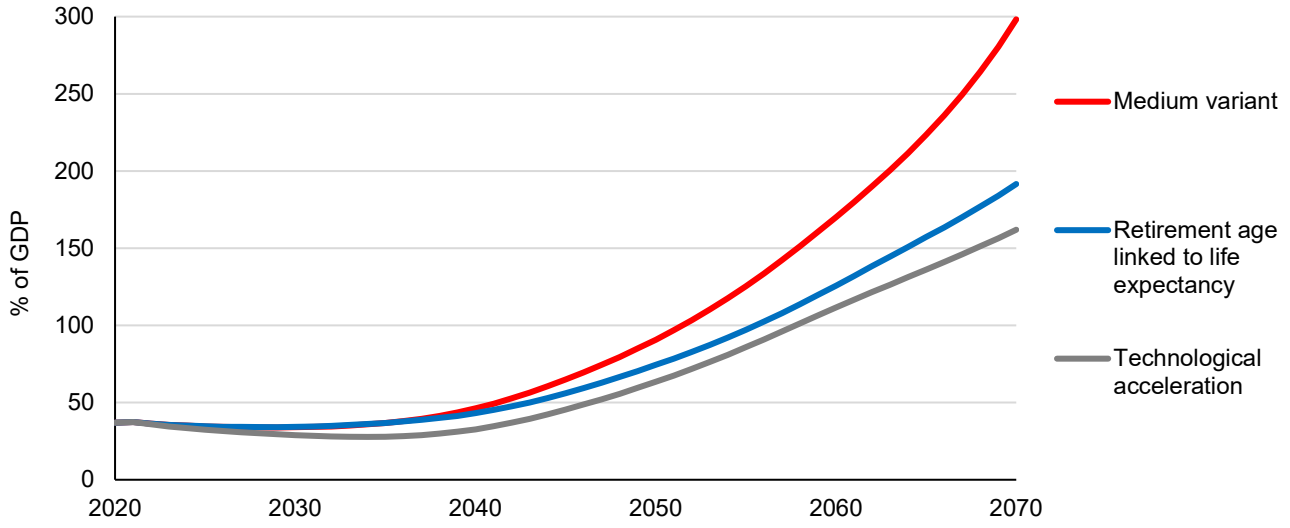
In this technological acceleration scenario, we keep the other parameters, such as the rate of convergence of the Czech economy to other countries and the growth in the ratio of compensation of workers to gross value added, the same as in the baseline

[66] 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]. According to this report, the retirement age is calculated only for persons born in 1994 or earlier, who should reach retirement age in 2061 at the latest. For the years 2062 to 2069 we gradually increased the retirement age by approximately one month in order to have a retirement age for simulation purposes for the entire projection period.
[67] 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, which we assume in our projection.
[68] See section 3.

scenario. Thanks to an increase in GDP growth per worker there will therefore be an equal increase in real wage growth. In the alternative scenario we assume that any structural unemployment which could arise temporarily as a result of the deployment of new technology is eliminated. The number of workers in this scenario is therefore equal to that in the baseline scenario.

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 the pension system area. Permanently higher real wage growth causes pensions granted in previous years to lag further behind real wages than in the baseline scenario, because the indexation of pensions covers only half of the real growth in wages. The average pension to average wage ratio thus falls. This in turn reduces pension system expenditure (relative to GDP). Another key factor as regards general government debt is that GDP rises quickly given the permanent increase in productivity growth, so the debt carried over from previous years is smaller in relation to GDP than in the baseline scenario. The public sector debt ratio is as much as 136 pp lower than in the baseline scenario, but even this very optimistic scenario does not lead to a sustainable public finance path (see Chart 6.2.1).

Chart 6.2.1 Debt – comparison of alternative scenarios with the medium variant

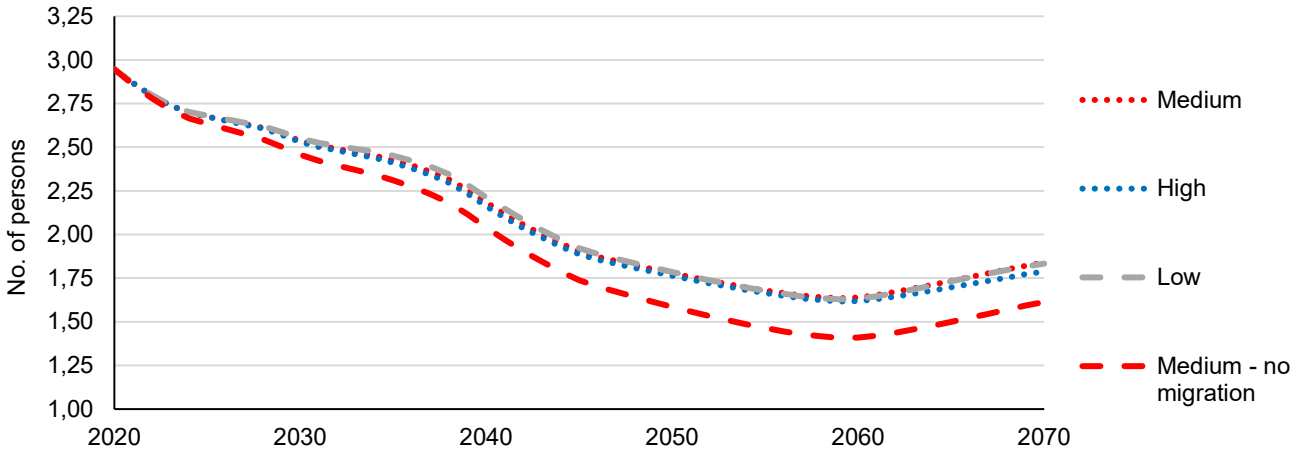


Source: CZSO (2020), CSSA (2020); CFC calculations.

6.3 Different variants of the demographic projection

The next scenarios can be regarded primarily as analyses of the sensitivity of the baseline scenario 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).

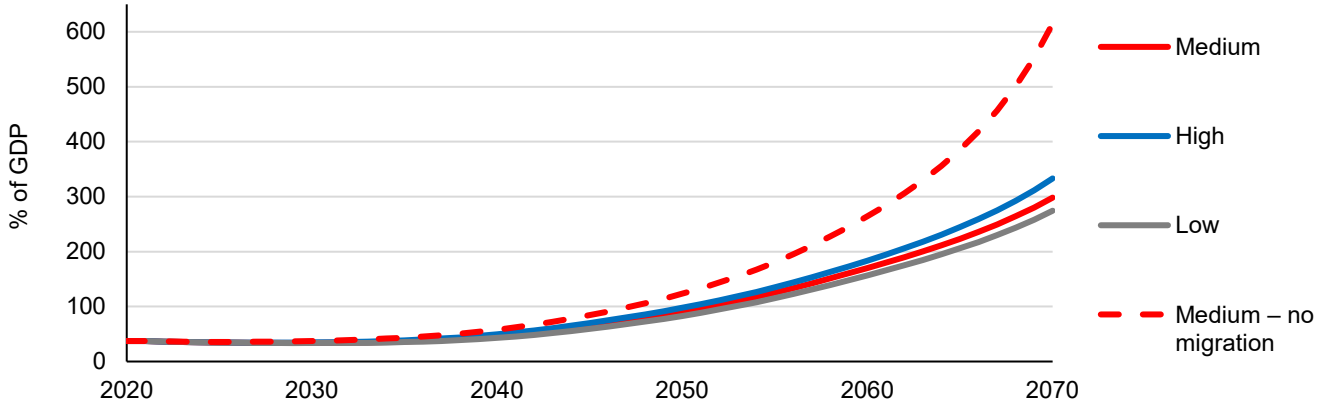
Chart 6.3.1 Number of persons aged 21–64 (inclusive) per person aged 65+



Source: CZSO (2020); CFC calculations.

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

Chart 6.3.2 Comparison of the different variants of the demographic projection – debt in % of GDP



Source: CZSO (2020), CSSA (2020), MF CR (2020); CFC calculations.

Given this similarity between the demographic variants, we prepared sensitivity scenarios in which we combine the parameters of the demographic variants such that the impacts on the pension system are at their extreme levels (see Box 6.1).[69] The main finding of this sensitivity analysis is that even an extremely favourable combination of demographic parameters will not lead to pension system stability.

Aside from the sensitivity scenarios, the no-migration medium variant also stands out from the others in terms of structure. The effect of change in population structure is stronger in this scenario than in the others.[70] The pension system falls into deficits of more than 6% of GDP a year, i.e. as much as 1.9 pp higher than in the medium variant. Another factor here is the effect of the lower population and hence lower GDP. At the end of the projection, GDP is more than 20% lower in the no-migration variant than in the medium one. Increased debt service costs also play a role in this variant, as the economy hits the debt brake earlier. Partly as a result, the simulation heads towards just under 600% 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 simulated.

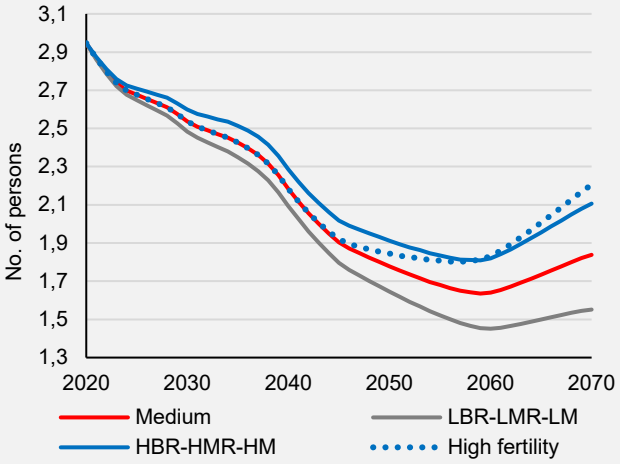
[69] For a more detailed description of the creation of the scenarios, see also OCFC (2019): Citlivostní scénáře demografické projekce ČR [Sensitivity Scenarios of the Demographic Projection of the Czech Republic, available in Czech only].
[70] The medium variant of the demographic projection assumes constant positive net migration of 26,000 persons a year. The cumulative net migration shortfall (and the related birth rate) therefore has a substantial impact on the projected population structure.

Box 6.1 Sensitivity analysis of the demographic projection

The projection in this Report assumes that the medium variant of the CZSO's projection materialises. Although the most likely one, it is by no means the only variant for the demographic structure. The CZSO offers another two variants: a low one, in which the population is relatively low as a result of a lower birth rate and lower migration and a higher mortality rate, and a high one, which conversely assumes a higher population. Although these two variants differ in terms of population size, they have similar population age structures.

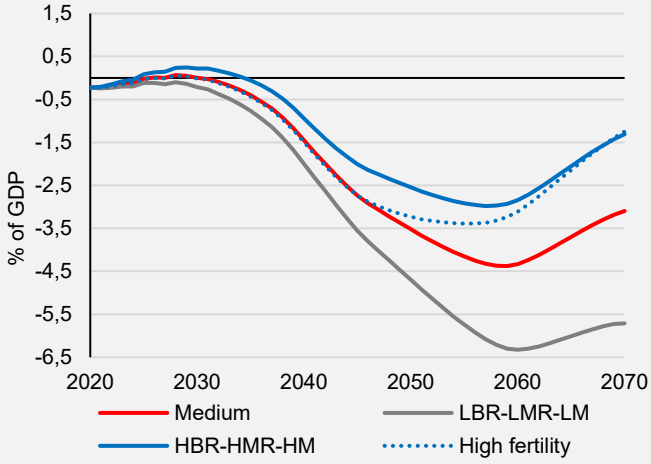
There are countless possible future demographic scenarios. We chose three of them for the purposes of this box. The first two are based on the combination of assumptions used in the different variants of the CZSO demographic projection. In these scenarios, we combine the parameters of the demographic projection so that they are either as favourable as possible (denoted HBR-HMR-HM) or conversely highly unfavourable (denoted LBR-LMR-LM) for the pension system. In the first, we assume that fertility and migration follow the paths used by the CZSO in the high variant of its demographic projection. This leads to a larger working population, higher pension system revenue and higher GDP. In this scenario, we additionally assume a relatively high mortality rate, as in the low variant of the CZSO's demographic projection. This leads to a lower number of pensioners. The impact of population ageing on the pension system will be smaller in this scenario than in the high, low and medium variants of the CZSO demographic projection. Were this scenario to materialise, the ratio of the number of working age persons to the number of persons aged 65+ would rise by 0.2 by comparison with the medium variant of the demographic projection (see Chart B6.1.1; there would thus be 200 more working age persons per 1,000 persons aged 65+).

Chart B6.1.1 Number of persons aged 21–64 (inclusive) per person aged 65+ – alternative scenarios



Source: CZSO (2020); CFC calculations.

Chart B6.1.2 Balances of the pension system



Source: CZSO (2020); CFC calculations.

We refer to the second scenario as the adverse variant, because it will involve the pension system facing a greater burden. It is characterised by the combination of fertility and migration factors from the low variant coupled with high life expectancy. According to our calculations, there will be 189 fewer economically active persons per 1,000 pensioners in 2060 in this case than in the medium variant.

The third variant responds to claims that a suitably chosen population policy could help make the pension system sustainable. We therefore consider a hypothetical scenario in which the fertility rate rises from the current 1.7 to 2.46 children per woman over the next 10 years. This corresponds to the fertility rate of the 1970s, when fertility was at its highest since the late 1950s. We leave the other assumptions – mortality and migration – the same as in the medium variant.

Both the favourable variant and the high fertility variant lead to a fall in pension system deficits (see Chart B6.1.2), which are 1–2 pp lower in 2055–2070 than in our baseline scenario, but even in these scenarios the pension system deficits remain significant (at 2.7–3.4% of GDP around 2055–2060). Moreover, the lower pension system deficits in the high fertility variant than in the medium variant occur too late – from 2045 onwards. Until then, higher expenditure outside the pension system (for example on education) can conversely be expected in this variant. Consequently, even the favourable combination of demographic factors will not lead to pension system stability.

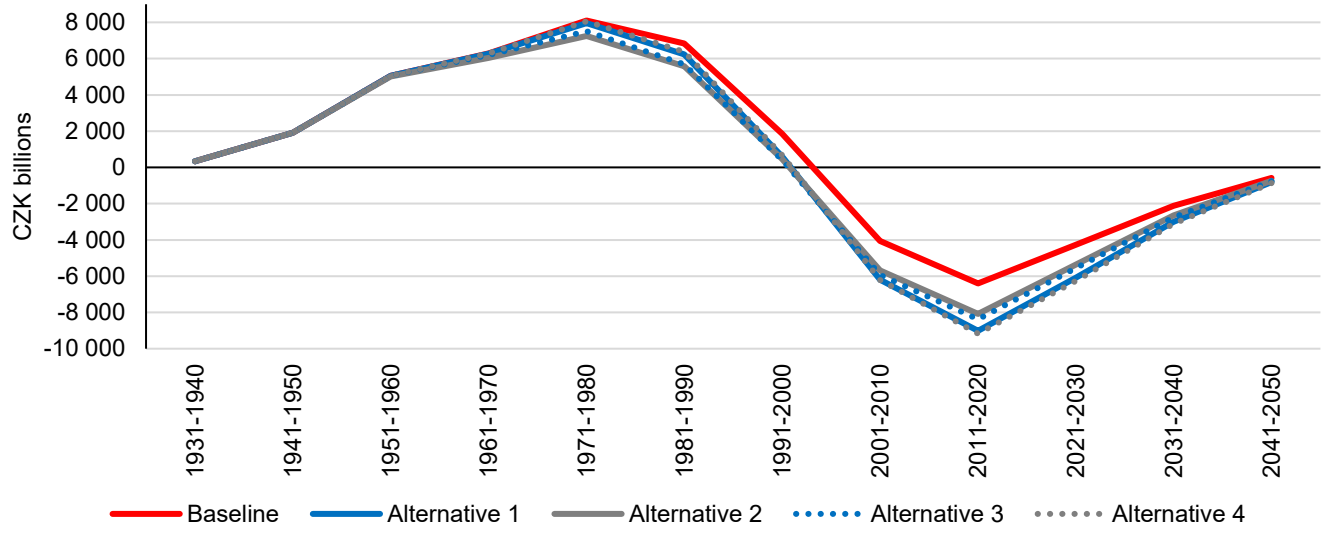
6.4 Generational accounts in the pension system

The Czech pension system is based largely on intergenerational solidarity, with pension insurance paid by the economically active generation being used directly to pay existing pensions ("pay-as-you-go"). The debate on potentially reforming the pension system therefore raises the question of which generations will bear the brunt of the reform and whether the reform will put an asymmetric burden on any generations. It is also not certain that putting off pension reform will have a substantially bigger impact on younger than older generations.

To answer these questions, we drew up a simple generational accounts model focused on the pension system. We thus abstract from other expenditure, such as health care and non-pension social benefits in cash, which can also be identified as generation-specific. In the model, we calculate 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.[71] We treat the population born during one decade as one generation. In the model, we focused on old-age and disability pensions, which make up the vast majority of total pension system expenditure (95% in 2019), and for which an expenditure projection broken down by age cohort is available. For the projection of pension system revenue decomposed into generations, we again 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. We left the average wages, 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 and disability pensions in the period 2020–2070 (see Chart 6.4.1, line: *Baseline scenario*). This calculation is performed on the aggregate level for the whole generation over the entire period 2020–2070 and reflects the net outgoings of the pension system (pensions paid out minus social insurance contributions paid in). The net pension system outgoings for each generation are thus determined by the pension per pensioner and by the generation's relative population size, life expectancy and retirement age. In the period 2020–2070, the current older generations no longer contribute to the system and merely draw pensions. Conversely, the younger generations (including those yet to be born) that do not reach retirement age in our projection period merely contribute to the system in 2020–2070 (disability pensioners excepted).

Chart 6.4.1 Rising insurance rate scenario



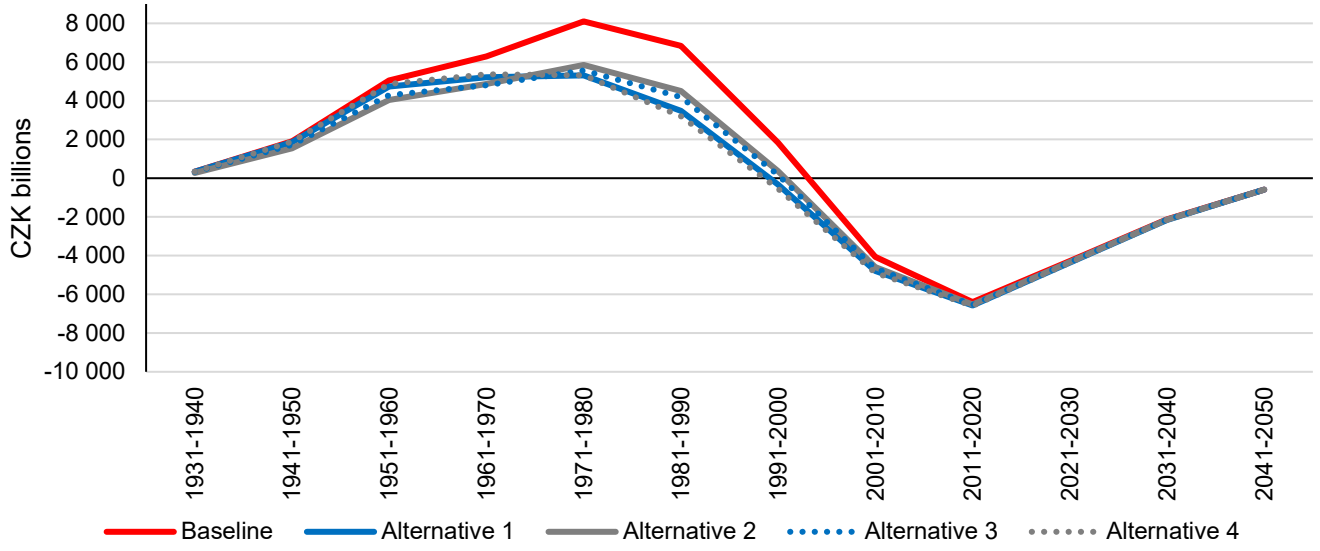
Source: CZSO (2020), CSSA (2020); CFC calculations.
Note: The x-axis depicts the individual generations by decade of birth.

[71] See also OCFC (2019): Projekce důchodového systému [Pension System Projection, available in Czech only].

The generations born in the 1970s and 1980s will receive the most from the system in the projection period. These relatively populous generations will retire at the age of 65 and enjoy a relatively long retirement thanks to growth in the average age. However, the analysis results should be interpreted cautiously and normative judgements should be avoided, as the contributions that these generations paid before 2020 are excluded from the calculation.

As is clear from the Report, the baseline scenario presented above does not lead to a sustainable total debt path. Pension system deficits are one of the main debt escalation factors. We therefore prepared a set of simple possible alternatives, which we construct in such a way that the cumulative pension system deficit is balanced in 2070. 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 pension insurance rate) or change the expenditure side (lower the replacement rate and hence reduce pensions), or perform a combination of the two. Below, we consider two options separately: the situation where only the pension insurance rate rises and pensions stay the same as in the baseline scenario in relation to the average wage (see Chart 6.4.1), and the situation where the insurance rate stays unchanged and pensions fall relative to the wage, i.e. the replacement rate rises (see Chart 6.4.2).

Chart 6.4.2 Falling replacement rate scenario



Source: CZSO (2020), CSSA (2020); CFC calculations.
Note: The x-axis depicts the individual generations by decade of birth.

In both variants we consider various alternative changes. In alternative 1, we assume that the pension system is balanced every year, i.e. for each year we calculate the insurance rate/replacement rate that equalises pension system revenue and expenditure. This alternative leads to pension insurance rates being essentially flat at roughly the current level of 28% until 2030. However, the inflow of pensioners then causes them to rise to 41% in 2060. This means that in 2060, economically active generations would face a pension insurance burden 13 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 around 40% of the average wage to 27% 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 in equilibrium in 2070. Alternatives 2, 3 and 4 differ from each other in terms of when the pension insurance rate starts to rise or the replacement rate starts to fall. In alternative 2, we consider an increase in the rate starting immediately in 2020; in alternative 3 the increase begins in 2028, i.e. after the general government structural deficit hits the statutory limit (see section 5.5); and in alternative 4 it does not start until 2044, i.e. after the debt brake threshold is reached. Needless to say, the greater the delay, the bigger the response required. The insurance rate rises from the current 28% to 35% in alternative 2, 36% in alternative 3 and 40% in alternative 4. The question is, however, whether such a large rise in the insurance rate would cause labour costs to rise above the viable level, with impacts on overall macroeconomic performance.

It is apparent from Chart 6.4.1 that increasing pension insurance rates would put the biggest burden on younger generations. These impacts are greatest in alternatives 1 and 4, with recently born and future generations being hit much harder than those born before 2000. By contrast, raising the rates so that the change towards a balanced pension system budget in 2070 starts this year, as considered in alternative 2, 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 in 2070. Chart 6.4.2 shows that older generations, which will receive the most from the pension system under the baseline scenario, will be the worst hit by the reduction in pensions. If the reduction occurs immediately (alternative 2), the burden will be split across the generations in such a way that the impacts on generations born in the 1970s and later will be the smallest of all the possible outcomes. 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. For instance, it does not take into account the option of increasing the retirement age or the option of funding the pension system from tax items other than social security contributions. However, it shows clearly that putting off changes to the pension system will be most burdensome on younger generations.

6.5 Planned government policies and their impact on public finances

This section aims to quantify the potential impacts of proposed changes in tax and social policy and other areas having a significant impact on general government finances. This assessment of planned government policies that might affect public finance sustainability is conducted on the basis of a legal provision stating that such an assessment must form part of this Report. This section only covers government-proposed changes that, if approved, would affect general government finances in the long run. Temporary changes and one-off measures are not quantified in any detail here but are included in the projected balances for 2020 and 2021 (see section 5.1).

The Fair Pensions Committee[72] also discussed changes to the most significant expenditure block – the pension system – last year. It proposed three reform variants ("fair", "technical" and "economical"). All three are aimed at making the pension system more understandable and assume the introduction of a "pillar zero" offering a guaranteed basic pension for all pensioners. The variants also contain proposed changes to the pension indexation method and to the incorporation of time spent as a caregiver into pensions. The issue of funding the pension system from other tax items was also opened. Nonetheless, all the proposed variants other than the economical one reduce the degree of equivalence in the determination of old-age pensions on the one hand, and increase the replacement rates – and hence the expenditure of the system – on the other. For example, by our calculations, the "fair" variant would increase old-age pension expenditure in 2043–2054 by 2.0–2.1% of GDP a year in the medium variant of the CZSO demographic projection by comparison with the expenditure projection in this Report.

In the debate on the configuration of the pension system, it is also argued that the Czech Republic has room to increase public expenditure on old-age pensions, i.e. to increase the replacement rate, because such expenditure is lower as a percentage of GDP than in other European countries. As we showed in Box 4.2, however, pension expenditure in the Czech Republic adjusted for population ageing, taxation and the ratio of compensation of workers to GDP is average by comparison with other EU states.

It is clear that the proposals presented do not offer a systematic solution to the sustainability of the pension system in the Czech Republic and that in the future the system will have to undergo a fundamental reform targeted primarily at ensuring its long-term sustainability.[73] Such a reform will clearly not avoid combination of several measures, measures which could include raising the retirement age, reducing the replacement rates, increasing insurance rates and raising revenues from tax items other than social security (such as property taxes). The later this reform is carried out, the bigger the changes will be.

The government is currently planning two major changes in the tax area. The first is the introduction of a digital tax[74] applicable to selected digital services (provision of user data, provision of targeted advertising campaigns and use of multilateral digital interfaces) rendered in the Czech Republic. The

[72] See the Fair Pensions Committee.
[73] In 2019, the Czech government commissioned an OECD analysis of the Czech pension system. Among other things, it will assess the costs of population ageing and propose measures to ensure the long-term sustainability and stability of the pension system. The analysis is scheduled to be published at the end of June 2020, and the government is expected to discuss the results in the second half of 2020.
[74] Parliamentary Print 658.

proposed tax rate is 7%.[75] Firms with total global revenues exceeding EUR 750 million and simultaneously with a turnover in the Czech Republic of CZK 100 million or more would be subject to the digital services tax. The planned revenue from this tax of CZK 3.8 billion is equal to around 0.07% of GDP.[76] The approval of this proposal would thus have a positive impact on the general government revenue side over the entire projection period. The estimate of the expected revenues is only tentative, because the market response is hard to quantify.

Another government proposal that has already passed through first reading in the Chamber of Deputies[77] is the Ministry of Finance's proposal to repeal the law on the tax on the acquisition of immovable property. The current law imposes on acquirers of the title to an immovable property a tax of 4% of the acquisition value less eligible expenses. The negative effect of repealing this tax on public budgets is estimated at CZK 13.8 billion a year. However, the government proposal envisages a change to the tax deductibility of interest on new mortgage loans. It would not be possible to apply such tax deductions from 2022 onwards. This measure would bring in additional income of around CZK 5 billion to public budgets. The overall impact of this government proposal on general government revenue would thus be around minus CZK 8.8 billion, or 0.15% of GDP. This negative impact would again be felt over the entire projection period.

A government bill amending some tax laws in connection with the outbreak of the SARS-CoV-2 coronavirus[78] is also in the legislative process. The bill changes the value added tax law, reducing the rate of tax on certain services (e.g. accommodation services, cultural and social events and sports services) from 15% to 10%. This reduction will have a direct negative impact on public budgets of around CZK 3.5 billion, or 0.06% of GDP, a year.

Other plans that could potentially affect the fiscal debt rule include a May 2020 proposal to provide a loan to power utility ČEZ covering up to 70% of the funds needed to complete the construction of Dukovany nuclear power station. The project implementation costs are put at around CZK 160 billion.[79] The state would clearly have to raise the amount needed (about CZK 120 billion) on the capital markets, meaning that the ratio of public debt to GDP would increase. Given the planned implementation of the project in 2030s, this would imply a rise in the projected general government debt ratio of 1.5–2 pp. After the completion of the project, the loan would be repaid, with a positive effect on the debt ratio. However, specific information is not yet available.

[75] On 10 June 2020, the coalition government agreed to reduce the planned digital tax rate from the original 7% to 5%. However, given that this is a proposal which has yet to enter the legislative process, we work with the originally planned digital tax rate in this Report.
[76] The explanatory memorandum of the government bill on the digital services tax states that the benefit of the tax to public budgets inclusive of the effect of taxing the provision of user data will be in the range of CZK 2.4–6.6 billion. The resulting budget impact is estimated near the middle of this range, i.e. at roughly CZK 3.8 billion. Were the digital tax to be introduced in the Czech Republic at the lower 5% rate, the resulting budget impact of its introduction would be correspondingly lower.
[77] Parliamentary Print 866.
[78] Parliamentary Print 874.
[79] See https://www.vlada.cz/cz/media-centrum/tiskove-konference/tiskova-konference-k-jednani-staleho-vyboru-pro-vystavbu-jadernych-zdroju--28--kvetna-2020-181695/.

6.6 Comparison with the previous Report

This year's Report is substantially more pessimistic than the 2019 one as regards the assessment of public finance sustainability. The projected debt at the end of the projection period has risen appreciably from 222% of GDP last year to 298% of GDP in this year's Report. This rise is due to several factors, factors which, given the relative stability of the methodology used between this year's Report and last year's, can be disentangled quite easily.

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 stimulation measures, which have an impact on both the revenue and expenditure sides of the general government sector. These one-off effects mean the balance will be significantly negative in 2020 and 2021 and government sector debt will rise by around 8 pp of GDP in total in those years.

The initial rise in debt is also due to relaxed expenditure policies, such as the increase in pensions beyond the valorisation scheme at the start of 2020. This increase in pensions and the replacement rate will affect pension system expenditure for several years to come and is one of the main reasons for the deterioration in the primary government balance, which is 0.44% of GDP lower on average over the entire projection period compared with last year's Report. The pension system accounts for roughly 70% of this deterioration, while the rest is due to increased estimated spending on health care, education and social benefits. By contrast, higher general government revenues – by around 0.14% of GDP on average – foster a lower primary deficit.

The debt also worsens 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 and the increase in the initial debt level means the debt will hit the debt brake threshold in 2043, i.e. four years earlier than foreseen in last year's Report. This implies earlier activation of interest rate feedback, which will significantly increase the debt service costs after 2043. The scale of the increase in these costs can be illustrated by comparing the debt level in the projection variants with and without interest rate feedback. In last year's Report, the debt-to-GDP ratio increased by 147.4 pp between 2021 and 2069 in the no interest rate feedback variant, whereas in this year's Report it rises by 160.4 pp in the same period (a year-on-year increase of 12.9 pp, reflecting the aforementioned deterioration in primary deficits). In the variant with interest rate feedback, however, the increase in the debt in this period is much bigger in this year's Report than it was last year. In last year's Report, this debt rose by 194 pp between 2021 and 2069, while in this year's Report it grows by 243 pp (i.e. by 48.9 pp more). The effect of the earlier breach of the debt brake can thus be estimated at 36% of GDP. Owing to interest rate feedback, the update of the projection period also plays a role in our projection, with the debt-to-GDP ratio rising by 17.9 pp between 2069 and 2070.

As a result of the rise in the projected primary deficits and debt, the public finance sustainability gap has gone up from 2.79% of GDP last year to 3.28% of GDP this year. The sustainability gap indicates how much the primary structural balance would have to improve over the period 2020–2069 for the debt not to exceed the debt brake threshold in 2070.

Conclusion

As in previous years, the current Report has shown that Czech public finances are not sustainable in the long term. Besides that, however, it has also pointed to considerable public finance vulnerability in the event of adverse macroeconomic developments. Although the expected economic contraction is unprecedented in the history of the Czech Republic, the current expectation is that there will be only one difficult year followed by a return to economic growth. The economy is then expected to return to its long-run potential in two to three years.

However, the only one year of economic contraction has a very adverse effect on public finance sustainability. It shifts the overall public debt path upwards and causes the debt to hit the debt brake earlier. Moreover, this Report does not work with the amended Act on the Rules of Budgetary Responsibility, which has relaxed one of the two key fiscal rules for 2021–2027. Calculations indicate that full use of the expenditure frameworks under the amended Act would move the overall debt path around 10 pp higher and cause the debt to hit the debt brake several years earlier. For this and other reasons, we can only hope that the government will not make full use of the expenditure frameworks over the next seven years and will embark on fiscal consolidation as soon as possible after the consequences of the COVID-19 pandemic have been overcome.

Timely efforts to consolidate public finances are vital for at least two reasons. Czech fiscal policy has long been procyclical and thus does not perform its stabilisation function in terms of smoothing the business cycle. In the Czech economy, which has a high share of procyclical sectors (in particular the automotive and related industries), countercyclical fiscal policy is a key condition for public finance sustainability. Another reason is the demographic structure of the population and expected population ageing, which urgently requires an adjustment of the pension system.

This Report also looks for the first time at the issue of intergenerational differentiation from the perspective of the present configuration of the pension system. It shows clearly that generations born in the 1980s and especially in the 1990s will bear the brunt of the constant deferral of pension reform. It is too early to draw precise conclusions for generations born in this millennium, but their situation is also highly likely to be very precarious unless the fertility rate rises significantly.

In particular, the demographic profile of society will change substantially over the coming decades. The ratio between the working-age population and the population entitled to draw an old-age pension will worsen from the present relatively comfortable situation of around three persons of productive age (21–65 years) per old-age pensioner to less than two.

There are only two options available for stabilising public debt at a tolerable level not exceeding the debt brake threshold and for ensuring public finance sustainability if the retirement age is not increased in accordance with the current legislation linking the retirement age to life expectancy based on the “quarter of life retired” principle. The first is to increase pension system revenues, which would have the biggest impact on generations born in the 1980s and the 1990s, and the second is to reduce the replacement rate between the average wage and the average old-age pension.

These measures would only mitigate the impact of demographic change on the said generations if the reduction of the replacement rate starts in the next few years. This, however, is not very likely, so the 1980s and 1990s generations would first bear the burden of increasing contributions or taxes and then be hit by a forced reduction of the replacement rate due to the need to stabilise the debt. Each of them will have to finance practically half of the average old-age pension of older generations for a large part of their productive life. And after reaching retirement age, their average pension will be financed by less than two persons of active age.

This message needs to be taken into account in the pension reform if the principle of intergenerational solidarity and fairness is to be preserved. The debt projection contained in this Report clearly demonstrates that without fundamental changes – made, if possible, at the earliest opportunity – the burden of future changes will be borne almost entirely by generations born after 1980. Leaving aside raising the retirement age, both remaining options for stabilising the pension system have clearly adverse macroeconomic consequences – increasing the tax burden could slow economic output below the outlook of the current macroeconomic projection, while reducing the replacement rate would cause not only social problems, but also a decrease in the consumption of a large part of the population, again with negative impacts on economic growth.

Appendices

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

	2020	2030	2040	2050	2060	2070
REVENUE						
Personal income taxes	4.6	4.7	4.8	4.9	5.0	5.0
Corporate income taxes	3.3	3.0	2.8	2.7	2.6	2.5
Other current taxes	0.2	0.2	0.2	0.2	0.2	0.2
Social security contributions	16.3	16.7	16.8	17.3	17.6	17.6
Pension insurance	*8.7*	*8.9*	*9.1*	9.3	9.4	9.5
Public health insurance (excluding SIs)	*4.6*	*4.7*	*4.8*	4.9	5.0	5.0
Payments for state insurees (SIs)	*1.8*	*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	12.1	12.1	12.1	12.1	12.1	12.1
Property income	0.5	0.5	0.5	0.5	0.5	0.5
Other revenue	4.7	4.7	4.7	4.7	4.7	4.7
TOTAL REVENUE	41.7	42.1	42.0	42.4	42.6	42.6
EXPENDITURE						
Pensions	8.9	8.9	10.6	12.8	13.7	12.6
Health care (public health insurance system only)	5.6	6.0	6.3	6.6	6.7	6.7
Other social benefits in cash	2.5	2.5	2.8	3.1	3.3	3.4
Payments for state insurees	1.8	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	0.8	1.0	1.0
Education	4.7	4.9	4.9	5.2	5.5	5.3
Other expenditure – baseline scenario	17.0	17.0	17.0	17.0	17.0	17.0
Changes related to convergence	0.0	0.8	0.8	0.8	0.8	0.8
Public investment	0.0	0.0	-0.1	-0.2	-0.2	-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	0.4	0.4
Payments to the EU	0.0	0.1	0.1	0.1	0.1	0.1
Total expenditure excluding interest	41.1	42.6	44.7	48.1	50.0	48.6
Primary balance	0.6	-0.6	-2.7	-5.7	-7.3	-6.0
Interest – no interest rate feedback	0.6	1.0	1.3	2.5	4.3	5.7
Interest – interest rate feedback	0.6	1.0	1.3	2.8	8.1	22.4
TOTAL EXPENDITURE – NO INTEREST RATE FEEDBACK	41.7	43.6	46.0	50.6	54.3	54.3
TOTAL EXPENDITURE – INTEREST RATE FEEDBACK	41.7	43.6	46.0	50.9	58.1	71.1
TOTAL BALANCE – NO INTEREST RATE FEEDBACK	0.0	-1.5	-4.0	-8.2	-11.6	-11.7
TOTAL BALANCE – INTEREST RATE FEEDBACK	0.0	-1.5	-4.0	-8.5	-15.4	-28.4
DEBT – NO INTEREST RATE FEEDBACK	37.0	34.0	46.2	90.0	153.4	202.0
DEBT – INTEREST RATE FEEDBACK	37.0	34.0	46.2	90.8	170.1	298.2

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