2021 report on the long-term sustainability of public finances in Switzerland

COVID-19 crisis, demographics and climate change

Schweizerische Eidgenossenschaft
Confédération suisse
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Federal Department of Finance FDF

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Foreword

The COVID-19 crisis has presented us with major challenges. Due to the healthy financial position, the general government was able to respond extremely quickly and introduced very far-reaching measures to mitigate the economic impact. It had the necessary room for manoeuvre in terms of fiscal policy due to the good economic performance and compliance with the debt brake requirements prior to the crisis. To date, the Confederation alone has approved in the region of CHF 40 billion to support the healthcare system, households, businesses and many other areas. That is more than half an annual budget. Were it not for these measures, the economic repercussions would have been much more severe.

The pandemic has shown how quickly government debt can rise in a crisis and, therefore, how important it is to have a low level of debt at the onset of a crisis. For this reason, it is imperative to look to the future in good time and face the long-term challenges. The budget and financial plan have a relatively short time horizon. That is why this long-term outlook is important and will help us to shape public finances in a sustainable manner and address the necessary reforms at an early stage.

Assuming that the economy and demographics develop as expected, the long-term sustainability report shows that the increasingly ageing population will put a noticeable strain on public finances over the next 30 years. The main demographic pressure will last until the mid-2030s, with the baby-boom generation entering retirement. Predominantly retirement provision and healthcare will be affected, placing additional strain on the social security funds and cantons in particular. The considerable public expenditure triggered by the COVID-19 crisis will have only a relatively minor influence on the long-term development of public finances, provided the coronavirus-related debt can be reduced again in the medium term.

The long-term sustainability report is based on many assumptions with regard to economic and demographic developments, and is thus subject to a degree of uncertainty. It should not be viewed as a set of forecasts. Based on the assumptions made, it shows how all of Switzerland›s public finances will develop up to 2050 in the absence of any measures being taken by the political establishment.

The long-term sustainability report makes it clear that further reform efforts are unavoidable in the

healthcare system and in pension provisions. Besides ageing, climate change is probably the greatest long-term challenge for Switzerland. This report addresses the topic for the first time. However, the effects of climate change are subject to significantly greater uncertainty than the effects of ageing. The qualitative analysis shows that it can be assumed that climate change will put a strain on public finances. Consequently, when it comes to a long-term fiscal policy, it is important to consider the impacts of climate change when making decisions and to use economic policy instruments that are as effective as possible in order to achieve climate goals.

This report clearly shows that low public debt is an important prerequisite for the state to be able to react in a crisis and to be able to cope with long-term challenges. It is therefore important to ensure sound public finances and thus strengthen the resilience of the Swiss economy.

Ueli Maurer, *Federal Councillor and Head of the Federal Department of Finance*

Summary

Background

The Confederation's budget and financial plan do not take long-term developments into account. Consequently, the Confederation needs a tool that allows for a long-term view. The long-term sustainability report shows the implications of demographic trends, i.e. the progressive ageing of the population, for Switzerland's overall public finances in the long term. This report also addresses the financial ramifications of the COVID-19 crisis and shows the need for economic policy action over the longer term to ensure the sustainability of public finances. For the first time, there is also a qualitative assessment of climate change and its potential impact as the biggest long-term challenge for public finances, aside from demographics.

Methodological principles of the long-term sustainability report

As the report is based on projections of long-term development, it inevitably involves uncertainties. Therefore, the results are to be understood as "if-then" hypotheses: if demographics and the economy develop as assumed, then this will mean an additional burden for public budgets due to increased expenditure on AHV and healthcare, for example.

The report is based on a continuation of the legal status quo and the 2023–2025 federal financial plan. For this purpose, the population and education scenarios of the Federal Statistical Office (FSO) and the calculations of the Federal Social Insurance Office (FSIO) for old-age and survivors' insurance and disability insurance are used. The Federal Finance Administration (FFA) projects the development of the finances for the various levels of government and the areas of health and long-term care.

Due to the high degree of uncertainty about the almost unpredictable long-term effects of the COVID-19 crisis, two different economic scenarios are projected for economic development up to 2025: a positive scenario, which assumes a rapid return to the pre-crisis level of the baseline year 2019, and a negative scenario, in which a sluggish recovery is assumed. This impacts the entire projection horizon up to 2050.

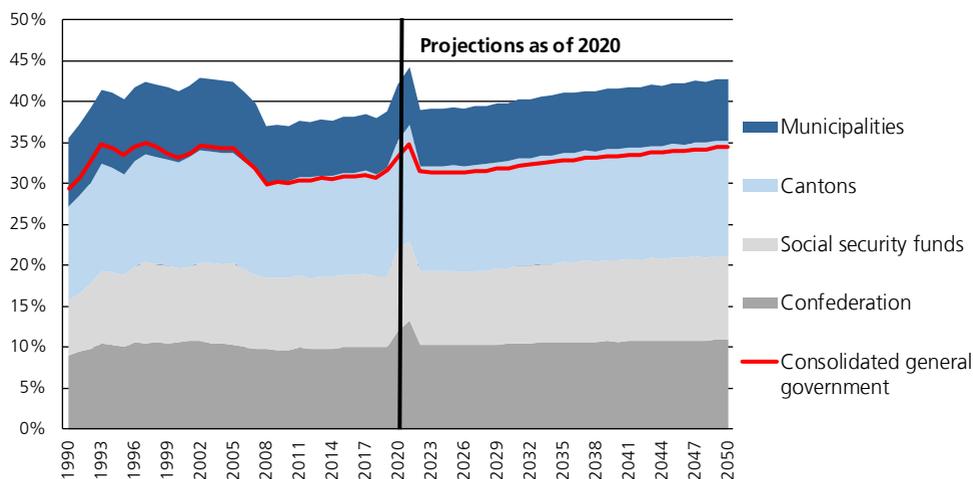**Development of the general government expenditure ratio**

According to the projections, the COVID-19 crisis caused expenditure to rise temporarily from 32% to 35% of GDP in 2020 and 2021. Thereafter, according to the projections, the general government expenditure ratio in the positive scenario returns to virtually the same level as in 2019.

More than 80% of the pandemic-related additional expenditure, e.g. short-time working, hardship assistance, coronavirus tests and vaccinations, is borne by the Confederation. The remainder is largely borne by the cantons.

However, the general government expenditure ratio increases in the long term due to demographic change. Between 2019 and 2050, the general government expenditure ratio climbs from 32% to 35% of GDP in the positive scenario. This is almost entirely due to demographic-dependent expenditure such as old-age and survivors' insurance, disability insurance, healthcare, long-term care and education.

Figure S1: Development of general government expenditure in the past and in the positive scenario (in % of GDP)

Source: FFA

Development of expenditure ratios by level of government

The responsibilities of the levels of government for the various demographic-dependent expenditure areas determine the extent to which the individual levels of government are impacted by the ageing of society (see Table S1).

According to the projections, the Confederation, social security funds and cantons bear the brunt of demographic change. The cost driver for the Confederation and social security funds is AHV expenditure triggered by ageing. With the retirement of the baby-boom generation up to the mid-2030s, the biggest increase is through to 2035,

despite the AHV 21 reform. According to the projections, this rise amounts to +0.6% of GDP for the Confederation and +0.4% of GDP for the social security funds. An additional factor at federal level is the increase in AHV transfer expenditure due to the TRAF reform.

Relative to GDP, expenditure will rise by a moderate +0.1% for the Confederation and +0.2% for the social security funds between 2035 and 2050. The positive development of disability insurance expenditure will attenuate the social security funds' expenditure increase.

Table Z1:   Demographic-dependent expenditure by government level (in % of GDP)

Scenario	2019	2035			2050		
	Baseline year	Positive	Negative	Difference	Positive	Negative	Difference
	(% of GDP)		(% of GDP)			(% of GDP)	
Confederation	3.8	4.4	4.5	0.10	4.5	4.6	0.10
Social security funds	5.5	5.9	5.9	0.05	6.1	6.1	0.05
AHV	4.7	5.2	5.3	0.04	5.5	5.5	0.04
IV	0.8	0.6	0.6	0.01	0.5	0.5	0.00
Cantons	5.5	6.2	6.2	0.08	6.6	6.7	0.08
Municipalities	2.4	2.7	2.7	0.05	2.8	2.8	0.05
General government	17.2	19.3	19.5	0.26	20.1	20.4	0.26

Note: Differences are due to rounding

Demographic-dependent cantonal expenditure is determined by healthcare, long-term care and education. Up to 2035, the demographic pressure comes mainly from healthcare and education expenditure (+0.7 % of GDP). After 2035, healthcare and long-term care are the key expenditure drivers (+0.4% of GDP). The communes are less affected relatively speaking. Their expenditure will increase from its current level of 2.4% of GDP to 2.8% by 2050, driven by education and long-term care. Due to the declining growth in pupil and student numbers, education expenditure will no longer put

pressure on the cantonal and communal finances from 2035 onwards.

In the negative scenario, the same demographic burden leads to a slightly higher expenditure increase of 0.3% of GDP, as this scenario factors in a lower level of GDP. This additional burden is distributed evenly among the Confederation, cantons and communes. The social security funds' expenditure relative to GDP remains virtually unchanged, as the more pessimistic economic forecast from 2021 to 2025 curbs the increase in AHV/IV expenditure as well as economic growth.

Development of the debt ratio and fiscal gap

A fiscal policy is considered sustainable by the international community if it stabilises the debt ratio at the current level. The increase in demographic-dependent expenditure means that current benefit entitlements will have to be lowered in future and/or financed by higher taxes and/or social security contributions. Government debt as a percentage of GDP rises from 25% to 45% between 2019 and 2050 in the positive scenario, and to 51% for the negative scenario.

Public finances are not sustainable due to the rising debt ratio, resulting in a fiscal gap for the general government. This measure indicates the degree to which permanent savings, contribution increases or tax hikes will be necessary from 2025 onwards in order for the debt ratio to be stabilised at the level of the baseline year of 2019 by 2050. In the positive scenario, the general government's fiscal gap is 0.8% of GDP, versus 1.1% of GDP in the negative scenario. 1% of GDP corresponds to CHF 7 billion in the baseline year of 2019. It is also noteworthy that the fiscal gap increases if the start of budget consolidation is postponed until after 2025. The longer the budget consolidation is postponed, the greater the need to bring public finances back into line.

The sustainability of the AHV is most at risk. It has the highest fiscal gap at 0.5% of GDP. The AHV 21 reform can keep the AHV balanced up to 2028. However, the AHV's apportionment result returns to negative territory thereafter. The positive development of disability insurance results in a fiscal gap totalling 0.4% of GDP for the social security funds. In the negative scenario, the fiscal gap rises only moderately to 0.5% of GDP.

Notwithstanding the added burden of the COVID-19 crisis, the Confederation can just about maintain a sustainable fiscal policy in the positive scenario, with a fiscal gap amounting to 0.1% of GDP. Without the supplementary distributions from the Swiss National Bank (SNB) to the Confederation, equating to CHF 1.3 billion per annum, the fiscal gap would double to 0.2% of GDP. In the negative scenario, the fiscal gap rises to 0.4% of GDP, as the COVID-19 crisis leads to significantly lower receipts assuming the same demographic burden.

The cantons have an annual fiscal gap of 0.2% of GDP up to 2050 due to the expenditure pressure for healthcare and long-term care. This is relatively low, not least because of the assumed annual profit distribution by the SNB to the cantons totalling CHF 4 billion. Without the SNB's supplementary distributions of CHF 2.7 billion per annum, the fiscal

gap would double to 0.4% of GDP. A fiscal gap of 0.4% of GDP also applies in the negative scenario. That is due to the assumption that, unlike in the positive scenario, receipts will be lower. The situation is similar for the communes: their fiscal gap amounts to 0.3% of GDP in the positive scenario. In the negative scenario, it is higher again by just under 0.1% of GDP.

Development of disposable income

Even if the additional burdens rise substantially, private households' real disposable income posts a higher annual average increase (positive scenario) than in the past 30 years (+0.8% vs. +0.7%) thanks to the assumed advances in productivity. In the negative scenario, real disposable income grows by 0.7% per annum.

Long-term effects of climate change on public finances

Relative to the effects of demographic change, it is difficult to quantify the effects of climate change on public finances, as there is much inherent uncertainty. Nevertheless, this long-term sustainability outlook presents a qualitative analysis for the first time which takes a closer look at the channels through which it impacts public finances. It is reasonable to assume that climate change will mostly have a negative impact. This may reduce the scope

for fiscal policy leeway through lower tax receipts, additional expenditure and higher financing costs for government debt. It is also to be expected that liability risks resulting from extreme situations will become more of an issue for public finances.

For the purpose of the qualitative analysis, it is important to distinguish between the effects of climate change itself and the effects of the associated mitigation and adjustment measures. The effects of the climate change mitigation measures will probably cost more than climate change itself initially. The adjustment to the gradual increase in the average temperature in Switzerland should be viable on the whole through to 2050. The consequences of extreme weather events are more difficult to assess and they could actually turn out to be more devastating.

As other countries will be more affected by climate change, the consequences of the effects felt by the rest of the world are likely to prove to be a significant channel of influence for Switzerland over the longer term. Even if extreme scenarios are unlikely, they need to be taken into account.

The first consideration in addressing the risk of climate change on public finances is to curb greenhouse gas emissions in Switzerland by making the most efficient use possible of

economic policy instruments such as incentive fees, subsidies and regulations. From a fiscal policy perspective, it is important to maintain low public debt and balanced public finances, as they both allow room for manoeuvre in terms of fiscal policy in order to be able to deal appropriately with the uncertain effects of climate change.

1   Introduction

Over the next few decades, the Swiss population will continue to age. Against the backdrop of the financial ramifications of the COVID-19 crisis, this report highlights the additional burden that will be placed on public finances from 2019 to 2050 as a result of demographic change, and flags up the longer-term need for economic policy action to ensure the sustainability of public finances. In view of the growing significance of climate change, this report includes for the first time a chapter dedicated to conceptual reflections on the long-term effects of climate change on public finances.

The financial plan, as the main fiscal planning instrument, covers a four-year time horizon.[1] The medium-term outlook focuses on illustrating the fiscal policy priorities of the Confederation, and involves an observation period that runs to 2030. This report supplements these fiscal policy planning instruments with a long-term perspective. This is essential for a comprehensive analysis of the additional demo-graphic-dependent burdens. The report on the long-term sustainability of public finances provides an overview of the financial situation of all government units (Confederation,

cantons, communes and social security funds). The key results of this long-term outlook originally planned for 2020 are contained in the 2021–2023 legislature financial plan issued before the start of the COVID-19 crisis at the beginning of 2020.[2] This report updates these projections in the light of the impact of the COVID-19 crisis on the sustainability of public finances. It also addresses the long-term impact of climate change on public finances from a qualitative perspective.

This long-term sustainability report does not claim to paint a picture of how the future will look; instead, it shows how demographic change will affect public finances in the longer term under the given parameters ("no policy change" assumption). The present legal status quo and the reforms already set out in the Confederation's current legislature financial plan (e.g. AHV 21) are taken into account. The 2050 time horizon was selected because the main effects of the ageing of society on public finances should be evident by then. Furthermore, the demographic scenarios calculated by the Federal Statistical Office (FSO) have the same time horizon.

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1   See Swiss Confederation (2020).
2   See ibid.

The long-term sustainability report serves as a rough point of orientation, and highlights how sensitively public finances react to changes in key drivers. For these projections, certain assumptions have to be made in terms of demographic change and the macroeconomic variables – these have a significant influence on the calculation of the long-term development of public finances.

On the basis of projections for the three levels of government and the social security funds, a number of different fiscal policy ratios are illustrated. These include the development of the general government expenditure ratio, which expresses total general government expenditure relative to GDP, the debt ratio, i.e. the proportion of public debt relative to GDP, and the fiscal gap. The fiscal gap shows the action that would be required for the debt ratio to be stabilised at the same level as the baseline year at the end of the projection period. In addition, the report looks at how the disposable income of Swiss households would develop as a whole if a stabilisation of the debt ratio were to be financed by an increase in general government receipts alone.

At cantonal level, there are multiple institutional restrictions, such as fiscal rules and mandatory financial referenda, which are designed to avoid disproportionate expenditure growth and high deficits. At federal level, the debt brake mechanism ensures the balancing of the budget in the medium term and provides a framework for policy-makers. The Confederation's debt brake mechanism is more restrictive than the sustainability concept applied here, which follows the international standard of the OECD, IMF and European Commission and considers public finances to be sustainable if national debt as a proportion of GDP can be stabilised at a sufficiently low level.[3] In contrast, the debt brake has the effect of stabilising the Confederation's debt level in Swiss francs, i.e. in nominal terms. As a result, the debt ratio falls continuously as GDP rises. For the purpose of this study, it was assumed that fiscal rules are not binding. Otherwise, there would be no added value in conducting such an analysis, as general government debt could not a priori increase any more in the long term.

As with previous reports on the long-term sustainability of public finances, the focus is on those areas of general government activity that are significantly influenced by demographic developments.[4] The baby boomers will retire in the next few years. Meanwhile, the birth rate has dropped dramatically since the

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3   See e.g. European Commission (2021).
4   See FFA (2008), FDF (2012) and FDF (2016).

1970s and life expectancy is continuing to rise, pushing a greater wedge between the number of elderly people and the working-age population. In particular, expenditure for old-age and survivors' insurance and disability insurance, healthcare and long-term care, which together account for 12 % of GDP at present, will grow considerably faster than the economy as a whole.

This report is structured as follows: the second chapter presents the projections of the Federal Statistical Office (FSO) underlying the demographic scenario and the economic development assumptions. In addition, the projection methodology and fiscal policy indicators are explained. Chapter 3 shows the changes in public finances, and particularly demographic-dependent expenditure, up to 2050. Chapter 4 enters uncharted conceptual territory by taking a qualitative look at the long-term effects of climate change on public finances. Chapter 5 draws conclusions.

2   Demographic and economic development: assumptions and methodology

This chapter highlights the foreseeable demographic developments and explains the key macroeconomic assumptions used for the projections. Based on that, the main features of the projection methodology are presented.
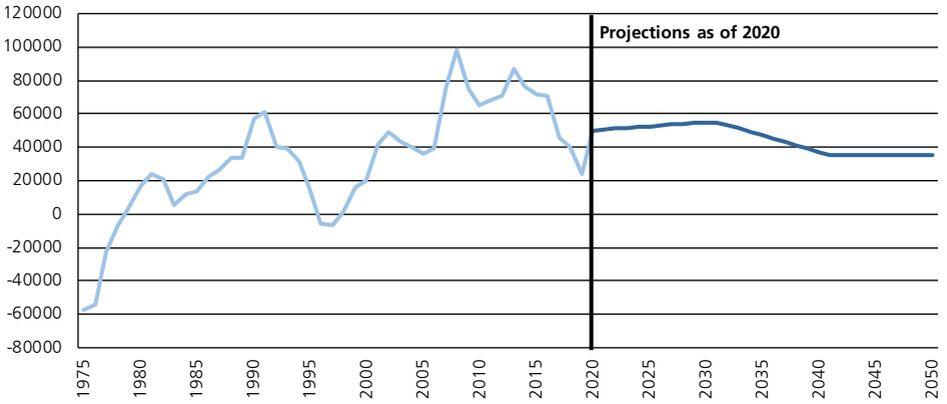
2.1 Demographics

The FSO's reference scenario for population development in Switzerland for the period 2020 to 2050 (A-00-2020) provides the foundation for these projections.[5] The FSO assumes that Switzerland's population will increase from 8.7 million in 2020 to just under 10.4 million in 2050, corresponding to a mean annual growth rate of 0.6%. However, population growth slows down during the projection horizon. While a cumulative population increase of 12.3% is expected in the first years (up to 2035), an increase of only 7% is assumed from 2035 to 2050.

An important factor in determining population growth – but one that is difficult to estimate – is future net migration (the number of immigrants less the number of emigrants each year). The FSO reference scenario assumes net migration of 50,500 people in 2020 (see Figure 1). Net immigration increases to 55,000 people up to 2029, before falling to 35,000 people by 2040 and then remaining constant until the end of the projection period. In the long term, therefore, immigration experiences a decline, which according to the demographic scenarios of the FSO is explained by the decline in the working-age population in European countries, which is in turn attributable to the low birth rates at present.

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5   See FSO (2020).

Figure 1:   Net migration 1975–2019 and FSO reference scenario (number of people)


Projections as of 2020

Source: FSO

The change in the demographic structure has particular implications for overall economic development and public finances. For example, the FSO's reference scenario assumes a rise in average life expectancy for men at birth from 82.2 years in 2020 to 87.2 years in 2050, with life expectancy for women rising from 85.7 to 89.6 years. An ageing population increases the number of elderly people relative to the working-age population. This trend poses a major challenge in terms of fiscal policy, as it means higher expenditure for the non-working population. The shift in the age structure also leads to a change in expenditure in the area of healthcare and long-term care.

Figure 2 shows the change in the size of the labour force in terms of full-time equivalents (FTEs). It highlights developments since 1995, in which a rise in the working-age population from 3.4 million to just under 4.3 million is evident, as well as developments going forward in accordance with the FSO's reference scenario. It is assumed that the labour force will rise to just under 4.8 million by 2050 as a result of net migration. The labour force participation rate remains almost unchanged at 83%.

Figure 2: **Labour force in full-time equivalents 1995–2019 and FSO's reference scenario** (A-00-2020)
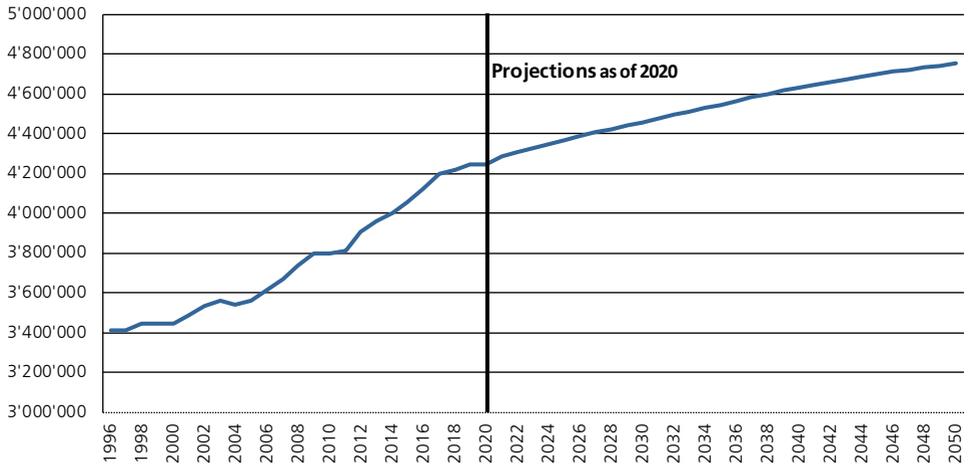
Source: FSO

The population age structure changes noticeably up to 2050 (see Figure 3). As a proportion of the total population, the working-age population declines from an almost constant 62% in 1990 to 2020 to 55% by 2050. The proportion of the population above retirement age under 80 years increases from about 13% in 2020 to just over 15% in 2050. At just under 11% in 2050, the proportion of those over 80 years is almost twice as high as in the baseline year of 2019. Meanwhile, the proportion of those under 20 is slightly lower.

Figure 3:   1990–2019 development of the population structure and FSO's reference scenario (share of the population, in %)
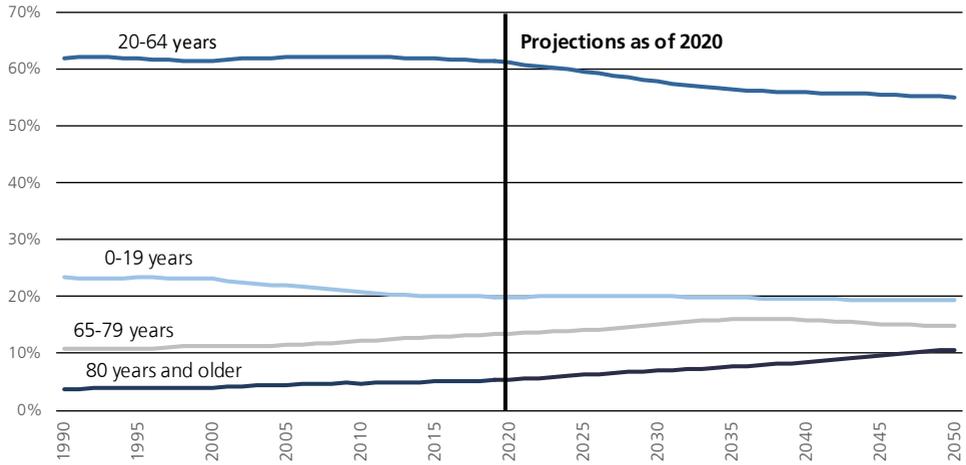
Source: FSO

The old-age dependency ratio shows the number of people over 65 relative to the working-age population. Whereas in 1995 there were just over four persons of working age for each person over the age of 65 (old-age dependency ratio 23.9%), by 2020 this had fallen to 3.2 persons (old-age dependency ratio 30.9%). This ratio declines to 2.1 persons (old-age dependency ratio 46.5%) in 2050 (see Figure 4). The real or "effective" old-age dependency ratio is the number of pensioners relative to the number of people actually in the labour force, measured in full-time equivalents (FTE). This ratio is thus higher than the old-age dependency ratio. The difference between the two ratios increases by almost 2.5 percentage points over the projection period, as the labour force participation rate falls in the meantime.

## 2.2 Economic development: positive and negative scenario

To generate expenditure and receipt projections, fundamental assumptions have to be made in accordance with international standards with respect to macroeconomic variables.[6] For 2021 to 2025, the macroeconomic parameters prepared by the

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6   See European Commission (2021).

Federal Finance Administration (FFA) are used for financial planning. The COVID-19 pandemic had a major impact on public finances in 2020 and 2021. The Confederation shouldered the lion's share of the burden (see Table 1).

Figure 4:   Old-age dependency ratios[7]
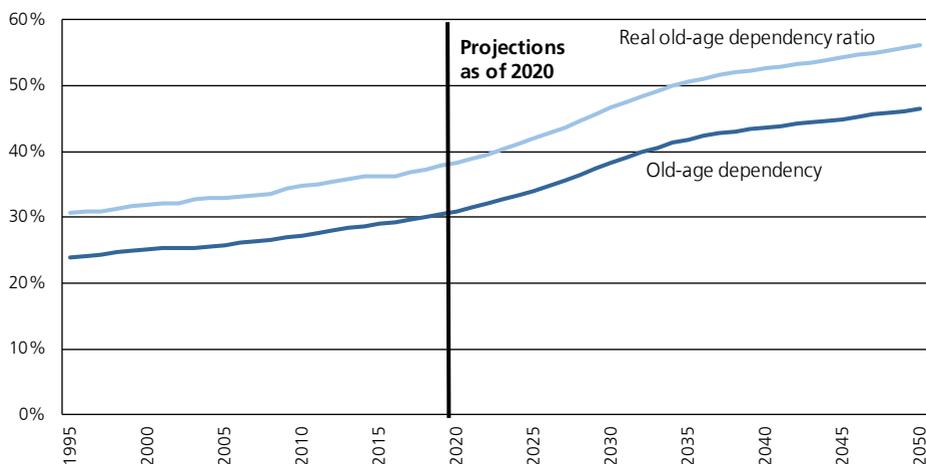
Source: FSO

Table 1:   Government units' pandemic-related expenditure (in CHF bn)

	Actual expenditure in 2020	Approved funds in 2021
Total	**17.3**	**25.7**
By level of government		
Confederation	14.3	22.4
Cantons	2.6	2.6
Communes	0.4	0.7
By function		
Short-time working compensation	10.8	6.0
COVID-19 loss of earnings compensation	2.2	3.1
Hardship assistance	–	10.0
Other (healthcare, sport, culture, export industry, tourism, media, transport, etc.)	4.3	6.6

Source: FFA

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7   Old-age dependency ratio: number of people over 65 relative to the working-age population. Real old-age dependency ratio: number of people over 65 relative to the labour force (FTEs).

As there is considerable uncertainty regarding economic developments over the next few years, parameters have been defined for two different scenarios: positive and negative (see Table 2).

Table 2: **2021–2025 macroeconomic parameters in a positive and negative scenario** (in %)

Positive scenario	2021	2022	2023	2024	2025
Real GDP	3.6	3.3	2.1	1.7	1.6
Nominal GDP	4.0	3.8	2.6	2.2	2.1
CPI	0.4	0.5	0.5	0.5	0.5
Interest (10 years)	-0.2	-0.1	0.2	0.4	0.7
Unemployment rate	3.1	2.8	2.8	2.8	2.8
Negative scenario	**2021**	**2022**	**2023**	**2024**	**2025**
Real GDP	1.8	2.3	2.3	2.3	2.1
Nominal GDP	2.1	2.2	2.7	2.7	2.5
CPI	0.2	-0.2	0.4	0.4	0.4
Interest (10 years)	-0.4	-0.4	-0.3	-0.1	0.2
Unemployment rate	3.3	3.4	3.3	3.2	3.0

The positive scenario is based on the assumption that the extraordinary and unprecedented economic support measures (e.g. short-time working compensation, COVID-19 loss of earnings compensation, COVID-19 credits, hardship measures, etc.), together with the automatic stabilisers, bring stability to large sections of the economy. The unemployment rate returns to its structural level of 2.8% (natural rate) as early as 2022. Following a transition phase of above-average growth from 2021 to 2023, the long-term growth path is reached in 2024. The slump in value added caused by the pandemic in 2020

(-2.6%) is fully compensated and long-term (potential) GDP returns to its pre-crisis growth path (see Figure 5). Real GDP growth for 2019 to 2025 averages out at 1.5% in the positive scenario.

In the negative scenario, the economy recovers more slowly than in the positive scenario. The unemployment rate remains above the structural level for the entire period from 2021 to 2025. The pandemic-related recession from 2020 to 2022 causes a reduction in GDP that is not made up over the projection period, i.e. by 2050. Real GDP growth averages out at 1.3% from

2019 to 2025 in the negative scenario. Unemployment insurance expenditure for short-time working and cyclical unemployment is higher than in the positive scenario.

Figure 5:   Real GDP in 2017–2020 and in the positive and negative scenarios (in CHF mn)
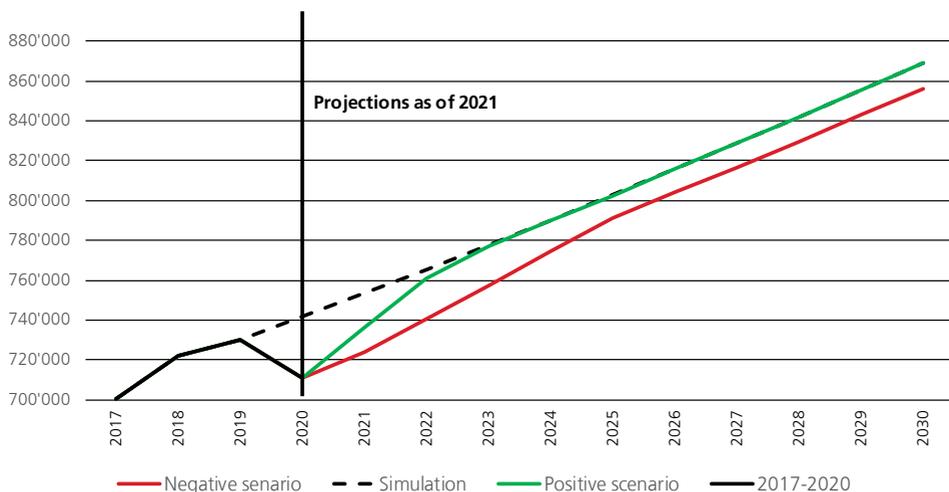
Source: SECO, FFA

It is assumed that Switzerland's economic situation will be robust following the pandemic and the return to the long-term growth path from 2026 onwards. The key parameters for economic development in both scenarios thus differ only for 2021 to 2025; identical growth is assumed from 2026 onwards in both scenarios. The assumptions regarding the remaining long-term macroeconomic parameters (see Table 3) are identical for both scenarios.

Table 3: **Long-term macroeconomic parameters** (in %)

Labour productivity	1.2
Real interest rate (long term)	1.6
Inflation	1.0
Nominal interest rate (real interest rate + inflation)	2.6

Real GDP growth is generated by increases in the labour force (expressed in FTEs) and in labour productivity (see Table 4). It is assumed that labour productivity up to 2050 will develop much as it has in the past. Between 1992 and 2019, annual productivity gains in Switzerland amounted to 1.2% on average.[8]

Table 4: **Economic growth** (in %)

Real GDP	2019–2050	2019–2025	2026–2035	2036–2050
Positive scenario	1.53	1.54	1.60	1.49
Negative scenario	1.49	1.33	1.60	1.49

Aside from the assumption regarding the development of labour productivity, there are assumptions about the development of the real long-term interest rate and inflation (see Table 3). The 1.6% assumption for the real long-term interest rate is plausible looking at the historical trend of ten-year Confederation bonds (average, inflation-adjusted yield 1992–2019).

In order to reflect the current low interest rate environment, it is additionally assumed that the equilibrium long-term nominal interest rate of 2.6% will not be reached until the start of the 2030s. That means there will be a transition leading to the normalisation of interest rates.

For inflation, an annual price increase of 1% is assumed. Furthermore, it is assumed that real wages follow productivity trends in the long term, thereby ensuring distributive neutrality between capital and labour.

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8   An overview of analyses of the development of labour productivity in Switzerland can be found in sources such as Colombier (2014) and issue 1-2/2016 of Die Volkswirtschaft published by the State Secretariat for Economic Affairs.

Labour productivity, real interest rates and inflation are determined exogenously. Repercussions of the general government budget on macroeconomic variables are not taken into account or have no impact on the expected long-term economic growth in the projections. This report also disregards the implications of a declining labour force and thus a fall in labour supply on productivity and wage development.

In view of the extraordinary backdrop, this report focuses on the possible long-term impact of the COVID-19 crisis on public finances. Other alternative scenarios (e.g. higher/lower productivity development, various scenarios for the development of healthcare costs) are not addressed.

2.3 Fiscal policy indicators

The concept of sustainability in relation to long-term fiscal policy development first came up for discussion in economic policy in the early 1990s. Fiscal policy is sustainable if the debt ratio can be stabilised at the desired level, defined by a baseline year according to international convention, for an extended period.[9] A stable debt ratio thus underpins sustainable public finances. The key determining factors for the sustainability of public finances are the primary surplus, i.e. the balance between receipts and expenditure excluding interest payable, and the difference between the interest rate for public debt and economic growth. If the interest rate-growth differential is positive, the general government has to generate a primary surplus to stabilise the debt ratio; if it is negative, primary deficits may be allowed.

2.3.1 General government expenditure ratio and expenditure trend

The expenditure of the Confederation, cantons, communes and social security funds, which is directly affected by demographic developments in areas such as AHV/IV and healthcare, will increase in the future as a result of the ageing of the Swiss population. In order to assess the additional burden on the economy, this demographic-dependent expenditure is expressed as a proportion of national income (GDP). An increase in the general government expenditure ratio indicates the extent to which Switzerland's annual earned income is additionally burdened by demographics. The general government expenditure

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9   Note that neither theoretical nor empirically backed statements can be made regarding the optimal debt ratio (see Schlaffer-Bruchez, 2021).

ratio expresses overall government spending as a proportion of GDP.[10]

2.3.2 Debt ratio and fiscal gap

In order to determine the stability of the debt ratio, two variables have to be compared: the initial value and the target value. If the two values are identical, this is referred to as "stability". However, the initial value may not be a desirable target from a fiscal policy stance, e.g. if current debts are already considered too high. Because an optimum debt level cannot be derived a priori from economic theory, financial sustainability generally has to be defined with respect to a certain target value.[11] This target value may seek to maintain the status quo (with no increase in the debt ratio in the given period), or it may be a specific debt ratio.[12] Sustainability exists if the debt ratio at the end of the given horizon equals the target level.

Various approaches offer different perspectives of the shortfall between the debt ratio and the target. A proven method is to present it as a "fiscal gap". This states the extent to which public finances would need to be improved annually from a certain point in time, in this report from 2025 onwards, to ensure that a certain debt ratio is not exceeded at the end of the period.[13] It is not specified whether this correction is to be made on the expenditure and/or receipts side. If, for example, the fiscal gap for a time horizon up to 2050 is 1% of GDP, the account balances for the three levels of government and the social security funds would have to be improved by around CHF 7 billion a year through to 2050.

In addition to the fiscal gap for the customary international criterion for stabilising the debt ratio, this report also provides details of the fiscal gap for the sustainability target defined in the Confederation's debt brake, the stabilisation of nominal debt.

The assumption regarding unemployment insurance is a return to structural equilibrium after the end of the financial planning period at the latest, i.e. from 2026 (see Table 2).

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10 General government expenditure includes transfers, e.g. social security benefits, which are not taken into account in GDP. A general government expenditure ratio of 100% of GDP therefore does not mean that the general government is spending 100% of GDP (Colombier, 2005).

11 See Schlaffer-Bruchez (2021).

12 For example, the EU's Stability and Growth Pact defines a target debt ratio of 60% of GDP.

13 The equation used for calculating the fiscal gap is given in Annex 1.

2.3.3 Disposable income

In order to show how the general government's demographic-dependent additional expenditure would have an impact on the financial situation of Swiss inhabitants, the development of GDP per capita, i.e. the average income per inhabitant, is displayed after deduction of taxes, social security contributions and compulsory health insurance premiums.[14] Where future development is concerned, it is assumed that general government receipts will have to be increased – in response to the demographic-dependent additional costs of retirement provision, healthcare, long-term care and education – in such a way that the state can stabilise the debt ratio at the level of the baseline year of 2019, i.e. at 25.4% of GDP. This scenario assumes that public finances are financially sustainable, which means that there is no fiscal gap. Disposable per capita income defined in this way is inflation-adjusted. If the inflation-adjusted disposable income per person rises in the future, this means that prosperity rises despite the demographic-dependent additional burden.

2.4 Projected expenditure and receipts

By presenting the individual task areas, any mitigating action that may be required can be identified for specific areas. For the most part, the projections are made in accordance with those of the EU.[15] The public finance projections are based on financial statistics data. The baseline year is 2019, except for the communes. For reasons of data availability, 2018 is used for the communes. The calculations for the Confederation are also based on the FFA's current financial plan for 2023 to 2025 and the FSIO projections for the AHV and IV. The report assumes that the Federal Council's proposal for the AHV 21 reform will be implemented. The most important assumptions made in the methodology are explained below.

2.4.1 Demographic-dependent expenditure

Detailed projections of expenditures at all levels of government including social security funds were made in those areas most affected by demographic change, i.e. old-age and survivors' insurance (AHV),

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14 As occupational benefits are not addressed as part of this report, pillar 2 salary contributions are not factored into calculations.

disability insurance (IV), healthcare and long-term care, and education. Together, these accounted for 33% of total expenditure for the Confederation in 2019, 56% for the cantons and 36% for the communes.

Old-age and survivors' insurance and disability insurance

In the area of old-age and survivors' insurance and disability insurance, the projections for AHV and IV expenditure and receipts are made by the FSIO.

For old-age and survivors' insurance, the FSIO calculates total annuities based on the number of pensioners by age and gender according to the FSO's demographic scenarios, including Swiss and foreign beneficiaries as well as those living outside of the country. These annuities are indexed in accordance with the so-called "mixed index", i.e. fully indexed for inflation but only half-indexed with respect to real wage growth. The average contributor rates (i.e. the number of people paying contributions relative to the total population) and average contributions are calculated by nationality, gender and age. The FSIO calculates the receipts of the AHV fund by adding these contributions to the other contributions, e.g. those of the Confederation, which comprise the portion of VAT receipts

allocated to old-age insurance, the Confederation's contribution to old-age insurance expenditure and casino tax.

The tax reform and AHV financing (TRAF), in force from 2020, and the Federal Council's AHV 21 proposal form the basis underpinning the long-term outlook for the AHV. The TRAF provides for three measures for financing the AHV. The first is the contribution rate increase of 0.3 percentage points (0.15 percentage points for employer and employee), the second is the demographic percentage point of value added tax, which is fully allocated to the AHV and third is the rise in the federal AHV contribution from 19.55% to 20.20%. The Federal Council's AHV 21 proposal includes an alignment of the retirement ages, with women retiring at 65, and simultaneous compensatory measures (lower reduction rates for early drawing of a pension, more favourable pension calculation formula). The Federal Council's proposal also includes a VAT increase of 0.7 percentage points in favour of the AHV. Although this VAT increase results in additional receipts, they are allocated to the AHV as restricted funds and are thus recognised as federal expenditure.

Disability insurance is financed by social security contributions and the

15 See European Commission (2021).

Confederation's contribution. Effective since 2014, the federal contribution is no longer based on disability insurance expenditure, but rather on the development of VAT receipts.[16] However, the law stipulates that the Confederation's minimum contribution may not fall below 37.7% of disability insurance expenditure.[17] In 2020, due to the pandemic, this rule was applied for the first time since the introduction of the disability insurance reform in 2014. The further development of disability insurance according to the Federal Council dispatch is taken into account in these projections. This reform focuses on more intensive support and management in the case of birth defects, targeted support for young people transitioning into working life and the expansion of counselling and support for people with mental health issues. The Federal Council aims to structure the further development of disability insurance as cost-neutrally as possible, as it is likely to be debt free by around 2030. In the longer term, the rehabilitation measures for recipients of disability benefits are expected to ease the burden on disability insurance.

Healthcare

For healthcare, the projections involve several stages, whereby these are based on an internationally recognised methodology.[18] In a first step, total healthcare expenditure is broken down by age cohort, gender and healthcare services, starting from the baseline year of 2019. In keeping with OECD and European Commission studies, a distinction is made between the area of healthcare expenditure excluding long-term care, and the area of long-term care itself (from the age of 65), as the development of expenditure in these areas is influenced by the cost drivers that apply in healthcare to different degrees.[19] Based on these projections, the next step involves extrapolating public expenditure on healthcare, whereby expenditure on individual premium reductions and AHV supplementary benefits, which are assigned to social welfare in public financial statistics, are likewise factored in. Box 1 shows how healthcare expenditure growth was handled in 2020 and 2021, the years that were particularly affected by the COVID-19 crisis.

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16 As VAT receipts tend to increase more than disability insurance expenditure, the link to VAT receipts is further adjusted by a «discount factor», thereby addressing the fact that the pension system does not follow the general wage trend, but the mixed index.

17 See FSIO (2021).

18 See Colombier (2012).

19 See e.g. European Commission (2021).

Box 1: Healthcare expenditure in 2020 and 2021

The monitoring of health insurance cost development (MOKKE) was used to measure the cost trend in 2020 for reasons of data accessibility. These statistics are published with a slight time lag and therefore allow an estimate of the 2020 cost development for this report. The MOKKE suggests moderate cost growth, which also seems plausible based on other studies.[20] This cost growth is incorporated into the projections for other demographic-dependent healthcare expenditure, such as cantonal contributions to hospitals. The pandemic-related federal healthcare expenditure is not included in the calculations (see Table 5 for 2020 and 2021).

As the available studies do not indicate that significant increases or reductions in expenditure are to be expected for 2021, demographic-dependent healthcare expenditure, with the exception of pandemic-related federal healthcare expenditure, is extrapolated from 2021 with demographic change and other key healthcare cost drivers through to 2050.[21]

The Confederation's pandemic-related healthcare expenditure for 2020 and 2021 is included in the cost projections below (see Table 5). It mainly comprises expenditure for protective measures (incl. vaccines) and tests.

Table 5: COVID-19 healthcare expenditure of the Confederation (in CHF mn)

	Actual expenditure in 2020	Approved funds in 2021
Healthcare	**856**	**3983**
Procurement of medical materials, e.g. masks, vaccines, etc.	618	1200
Assumption of costs for COVID-19 tests	194	2497
Medicinal products, additional FOPH expenses, health protection	45	286

Source: FFA

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20 See Swiss Confederation (2021) and KOF (2021).
21 In view of the official orders to postpone non-urgent treatment in spring 2020, reported revenue was down in the hospital sector (PWC 2021). The possibility of catch-up effects in the second half of 2020 or in 2021 was mentioned, but the reports in question find no clear indications to that effect.

The assumption is that the population's health improves with increasing life expectancy. That means that people born in any given year are half a year younger and correspondingly healthier medically speaking with every extra year of life. As regards healthcare excluding long-term care, the assumption is that expenditure grows by a factor of 1.1 (income elasticity: 1.1) as incomes rise. This disproportional income effect causes the population to want more from the healthcare system, advances in medical technology and increased non medically-indicated care. The assumption for the price increase in healthcare excluding long-term care is 50% higher than general inflation. The above-average increase can be attributed, among other things, to excessive prices and the Baumol effect (relative price effect).[22,23]

The Baumol effect is particularly pronounced in the area of long-term care from the age of 65. For this reason, inflation is assumed to be 75% higher there than in the overall economy. In contrast, the income effect plays no role, as the need for care is not correlated to incomes.[24]

Education

For education expenditure, the number of students in secondary and tertiary education is projected per age cohort. This is based on the FSO's education forecasts, which estimate current demographic trends for all levels of education up to 2027. These projections are extrapolated to 2050 using population trends according to the reference scenario of the Federal Statistical Office (A-00-2020). In this instance, it is assumed that the proportions of pupils and students per age cohort remain constant. The method used for the report is based on the EU's methodology for education, so there are no projections at preschool level. Research expenditure in the area of education is based on the assumption that it is uncorrelated to demographics. Accordingly, it is not projected using

22 The Baumol effect means the following: the high labour intensity in healthcare implies relatively low productivity growth. This creates cost pressure if healthcare wages grow in line with those in the rest of the economy over the longer term. If demand for healthcare services is relatively inelastic, prices rise correspondingly more than in the rest of the economy.

23 Excessive prices can ensue, as there is generally asymmetric information among the social partners, health insurers and providers. This is an important factor in market failure from an economic perspective.

24 See Brändle and Colombier (2017) for a detailed discussion on cost drivers in the context of healthcare expenditure projections.

demographic data, but rather by means of the assumption of a constant proportion of GDP being spent on education. The proportion of third-level expenditure used for research was taken from the assessment guidelines set out in the University Funding Act.

2.4.2 Non-demographic-dependent expenditure

For expenditure that is not demographic-dependent (with the exception of interest expenditure), a simplified assumption is generally made that this grows in line with nominal GDP, thereby maintaining a constant proportion of GDP over time. This assumption is taken in most comparable studies of this type, given the difficulty in making any quantitative estimates regarding the impact of demographic change on such expenditure. Expenditure caused by the COVID-19 crisis is an exception to this rule.

Unemployment insurance expenditure and receipts are likewise extrapolated for the long term on the basis of the nominal GDP growth rate. Here, it is assumed that the structural long-term unemployment rate remains stable at 2.8%, so that unemployment insurance remains balanced over the long term. For 2021 to 2026, the expenditure for short-time working and unemployment resulting from the COVID-19

crisis is taken into account. Unemployment insurance receives extraordinary contributions from the Confederation for short-time working.

2.4.3 Receipts

It is generally assumed that the receipt ratio remains constant under the general assumption of no policy change. Accordingly, receipts increase in line with nominal GDP for the three levels of government. This report deviates from this rule in some respects for the following reasons: the extra financing for the AHV envisaged in the Federal Council's AHV 21 reform proposal is taken into account. This comprises a 0.7 percentage point increase in VAT. Second, the consequences of the pandemic on receipt development for the financial planning years from 2021 to 2025 are included. Third, the SNB's current profit distribution agreement with the Federal Department of Finance (FDF) is assumed to remain as it is from 2020 to 2025. The agreement comprises a maximum annual distribution of CHF 6 billion to the Confederation and cantons, depending on the net profit thresholds. The maximum distribution comprises a base amount of CHF 2 billion and a (maximum) supplementary distribution of CHF 4 billion. The maximum distribution of CHF 6 billion is assumed in nominal terms for the entire projection horizon.

In order to be able to fully capture the effects of the COVID-19 crisis, in deviation from the customary practice, receipts are not adjusted to allow for cyclical fluctuations in the baseline year; instead, they are adjusted after the financial planning period in 2026. The adjustment is intended to prevent a temporary economic slump and resulting deficit from being projected over the long term, for example.

2.4.4 Interest-dependent expenditure and receipts

For expenditure on interest payable, a nominal long-term interest rate of 2.6% and a short-term rate of 1.6% are used. It is further assumed that the composition of federal, cantonal and communal debt in terms of short and long term corresponds to the average of the past ten years (Confederation and communes: 25% short term, 75% long term; cantons: 38% short term, 62% long term). For the cantons' interest payments, an interest premium of 0.3 percentage points is assumed on the basis of past data. An interest premium of 1 percentage point is assumed for the communes. In addition, it is assumed – in view of the current low interest rate environment – that interest rates will not return to their "natural" level until 2029 onwards.[25]

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25 With interest rates at their «natural» level, the economy is in equilibrium and the level of prices stable. For the purposes of this study, the equilibrium rate of inflation is assumed to lie at 1.0%.

3 Results

This chapter addresses the general government expenditure ratio and demographic-dependent expenditure. In a further step, the discussion extends to government debt, the fiscal gap and the consequences for disposable income. The chapter closes with a comparison with the projected results in the 2021–2023 legislature financial plan.

3.1 General government expenditure ratio

The development of the total expenditure of the Confederation, cantons, communes and social security funds up to 2050 as per the projections is shown below. In order to gain a better idea of the extent of the expenditure development, all results are shown as a proportion of cyclically adjusted national income (GDP). This also indicates the proportion of GDP that the general government redistributes through transfer expenditure and uses for consumer and investment expenditure.[26] A disproportionately high increase in expenditure relative to GDP means a rising burden for public finances.

The transfers between the different levels of government are netted off in the overall view, which is why the general government expenditure ratio works out less than the sum of the expenditure ratios of all levels of government. For example, the federal AHV contribution as a receipt on the social security side is offset by social security expenditure in the general government expenditure ratio calculations. By contrast, when calculating the expenditure ratios for the individual levels of government, the transfers between the different levels of government are doubly listed.
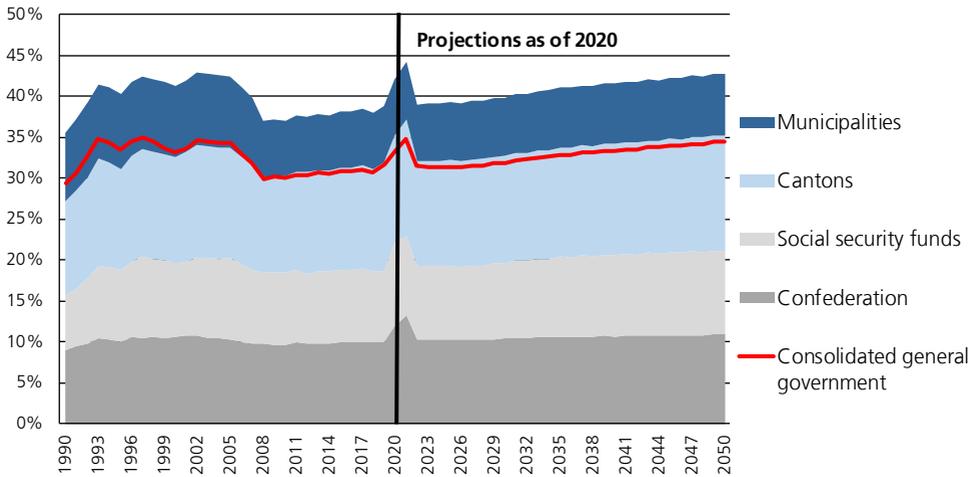
Switzerland's general government expenditure ratio has fluctuated in the past 30 years (see Figure 6). In the 1990s, it rose sharply due to a period of stagnation. Inflation-adjusted GDP growth was a mere 1.1% per annum during the 1990s. Robust economic growth at an inflation-adjusted 2.4% per annum and a revision of the financial statistics led to a reduction in the general government expenditure ratio in the next decade until 2008. Thereafter, with economic growth slowing again

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26 The general government expenditure ratio can be confusing as an indicator, as total general government expenditure is not part of GDP. As a result, the general government expenditure ratio is only shown as the proportion of general government expenditure to GDP (Colombier, 2005).

to an inflation-adjusted 1.6% per annum from 2008 to 2019, the general government expenditure rose by 1.7% of GDP. The annual growth rate of inflation-adjusted general government expenditure easily outstripped GDP at 2.3%. However, excluding the 2009 financial crisis and the rapid recovery in 2010, inflation-adjusted economic growth would have been only slightly lower than the increase in expenditure at 2.0%.

Figure 6:   Development of general government expenditure in the past and in the positive scenario (in % of GDP)

Source: FFA

A rise in expenditure from 32% to 35% of GDP caused by the COVID-19 crisis can be observed in 2020 and 2021. Thereafter, according to the projections, the general government expenditure ratio in the positive scenario returns to virtually the same level as in 2019.

More than 80% of the pandemic-related additional expenditure, e.g. short-time working, hardship measures, tests and vaccinations, is borne by the Confederation. The remainder is largely borne by the cantons. The communes finance a minimum share of less than 3%.

While the COVID-19 crisis only leads to a temporary rise in the general government expenditure ratio, it increases in the long term due to demographic change. Between 2019 and 2050, the general government expenditure ratio climbs from 32% to 35% of GDP in the positive scenario. This is almost entirely due to demographic-dependent expenditure covering old-age and survivors' insurance, disability insurance, healthcare, long-term care (from the age of 65) and education (see section 3.2.2). This expenditure rises from 17% to 20% of GDP between 2019 and 2050. The cantons are most affected by demographic change, followed by the Confederation, social security funds and communes. To a very small extent, interest expenditure is also responsible for the increase in the general government expenditure ratio. The assumption is that the low interest rate environment does not begin to return to normal until the start of the 2030s, with the result that the general government enjoys relatively low rates until the end of the projection period.

In the negative scenario, inflation-adjusted GDP increases by an aggregate 10.8% between 2021 and 2025. That is much lower than the 12.3% in the positive scenario. Accordingly, GDP in the negative scenario is 1.5% lower per annum from 2026 than in the positive scenario. At the same time, expenditure for labour market stabilisation measures, primarily in the form of short-time working allowances financed by the Confederation, is higher from 2021 to 2025. As shown in Table 6, lower GDP and higher expenditure cause the general government expenditure ratio to rise to a somewhat greater extent. This is reflected in a general government expenditure ratio that is 0.6% higher both in the short term up to 2025 and in the long term up to 2050. The trend of the general government expenditure ratio in the negative scenario is almost identical to that in the positive scenario shown in Figure 6.

Table 6: **General government and sub-sector expenditure ratios in the positive and negative scenarios** (in % of GDP)

| Scenario	2019	2035			2050		
	Baseline year	Positive	Negative	Difference	Positive	Negative	Difference
	(% of GDP)		(% of GDP)			(% of GDP)	
Confederation	9.9	10.6	11.0	0.35	10.9	11.3	0.47
Social security funds	8.8	9.8	9.9	0.13	10.2	10.4	0.16
Cantons	13.2	13.4	13.5	0.16	14.1	14.4	0.24
Municipalities	6.9	7.3	7.3	0.08	7.6	7.7	0.12
General government (consolidated)	31.6	32.9	33.4	0.48	34.5	35.0	0.57

Note: Differences are due to rounding

3.2 Demographic-dependent expenditure

3.2.1 Development of expenditure ratios by function

Demographic-dependent expenditure is projected for the three levels of government – Confederation, cantons, communes – and for the social security funds (whereby the transfer payments from other levels of government are not included). A functional distinction is made between the areas of old-age and survivors' insurance/disability insurance, healthcare, long-term care and education.

Figure 7: **Demographic-dependent expenditure by function in the positive scenario**
(in % of GDP)
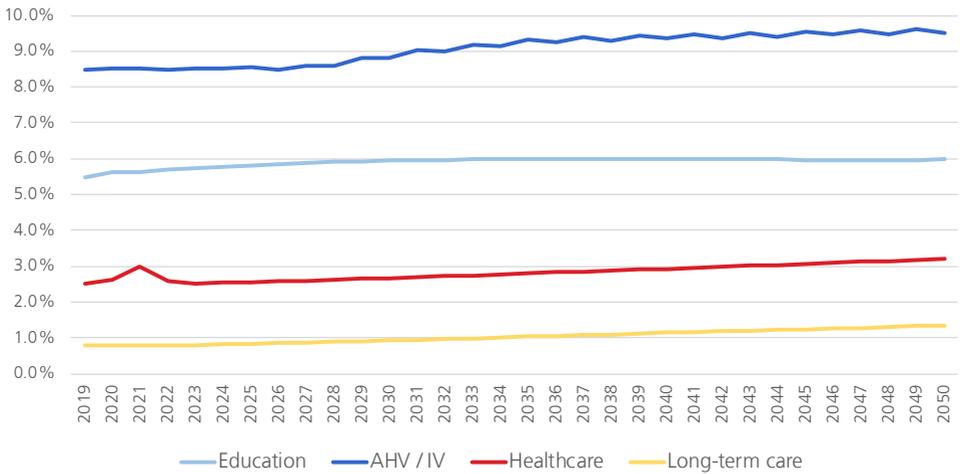
Source: FSO, FSIO, FFA

Figure 7 shows the development of demographic-dependent expenditure by function as a percentage of the cyclically adjusted GDP trend in the positive scenario. The COVID-19 crisis affects the development of AHV/IV expenditure and healthcare expenditure. Expenditure growth for AHV/IV weakens significantly between 2022 and 2024 due to the below-average growth of the mixed index of 0.3% annually relative to the long-term average of 1.1%.[27]

That is due to weak inflation and wage developments during the COVID-19 crisis. Furthermore, disability expenditure grows more slowly than GDP. Due to the pandemic-related expenditure incurred by the Confederation for vaccinations, tests and medical resources, the expenditure ratio for healthcare rises temporarily from 2.5% to 3.0% of GDP between 2019 and 2021.

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27 The zigzag shape of AHV/IV expenditure in Figure 7 results from the biannual adjust-
   ment of expenditure to the development of the mixed index.

Table 7:   **Demographic-dependent expenditure by function in the positive scenario**
(in % of GDP)

	2019	2035		2050	
	Share	Share	Change 2019–35	Share	Change 2019–50
Old-age and survivors' insurance/disability insurance	8.5	9.3	0.86	9.5	1.03
AHV	6.3	7.4	1.12	7.7	1.45
IV	1.4	1.1	-0.29	1.0	-0.39
Healthcare	2.5	2.8	0.30	3.2	0.70
Long-term care	0.8	1.0	0.26	1.3	0.58
Education	5.5	6.0	0.50	6.0	0.48
Total	17.2	19.3	2.02	20.1	2.90

Note: Differences are due to rounding

The long-term effects of demographic change have a varied effect across the different areas (see Figure 7 and Table 7).[28] With AHV/IV, for example, the expenditure ratio increases markedly from 2027 into the mid-2030s due to the AHV, before momentum tails off. Until 2035, the expenditure ratio increases by 1.1% of GDP and then by just 0.3% of GDP until 2050, as the baby boomers retire between the mid-2020s and the 2030s. The demographic burden on the AHV accordingly eases after 2035. Disability insurance has a restraining effect on the development of social security expenditure over the entire period under review. That is because the number of people drawing a disability pension grows more slowly than the labour force. In addition, GDP grows more robustly than the labour force because of assumed productivity advances (see section 2.2, Figure 2 and Table 2). Expenditure therefore falls relative to GDP until 2050.

Both healthcare and long-term care expenditure grow consistently over the entire period under review. According to projections, healthcare and long-term care expenditure grow by 0.7% and 0.6% of GDP, respectively, from 2019 to 2050.

As regards healthcare expenditure, non-demographic cost drivers play an important role in addition to ageing and the general rise in morbidity as life expectancy increases. These non-demographic cost drivers are advances in medical technology, Baumol's cost disease and the growing demands placed on

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28 See appendix, Figures A1 and A2 for the change in demographic-dependent expenditure by area relative to the 2019 baseline year in the positive and negative scenarios

the healthcare system by people as their income grows. These non-demographic cost drivers account for about 60% of the positive scenario's inflation-adjusted expenditure growth.

Demographic change has more of an impact on long-term care than on healthcare. While demographic change accounts for 40% of the inflation-adjusted expenditure increase in healthcare, that figure rises to almost 80% for long-term care. The per capita cost of long-term care rises exponentially as people live longer, with the result that the number of people aged 80 or over is a relevant cost factor. The proportion of this age group relative

to the population will double from 5% to 11% according to the FSO's reference scenario (A-00-2020) between 2019 and 2050. As a result, demographic change brings strong cost pressure to bear on long-term care over the entire projection period.

Education expenditure relative to GDP only rises until the start of the 2030s, due to a relatively high increase in pupil and student numbers. On average, these increase by just under 1% annually. From the mid-2030s onwards, the growth in pupil and student numbers subsides considerably to 0.3% per annum. This explains why education expenditure remains constant relative to GDP between 2035 and 2050.

Table 8: **Demographic-dependent expenditure by function in the negative scenario** (in % of GDP)

	2019	2035		2050	
	Share	Share	Change 2019–35	Share	Change 2019–50
Old-age and survivors' insurance/disability insurance	8.5	9.4	0.96	9.6	1.13
AHV	6.3	7.5	1.19	7.8	1.52
IV	1.4	1.1	-0.27	1.0	-0.38
Healthcare	2.5	2.8	0.33	3.2	0.72
Long-term care	0.8	1.0	0.27	1.4	0.59
Education	5.5	6.1	0.64	6.1	0.62
Total	17.2	19.5	2.28	20.4	3.17

Note: Differences are due to rounding

In the negative scenario, demographic-dependent expenditure growth relative to GDP is slightly higher than in the positive scenario (Table 8) because of weaker economic growth between 2021 and 2025. Expenditure outstrips GDP growth by 0.3% up to 2050, as this effect persists from 2026 to 2050. This outcome is due to the low GDP level set against the same demographic pressure as in the positive scenario.

3.2.2 Development of expenditure ratios by level of government

The responsibilities of the different levels of government for the various demographic-dependent expenditure areas determine the extent to which the individual levels of government are affected by the ageing of society (see Table 9).

Measured in relation to GDP, the cantons bear the greatest burden (+1.1 %) due to the increase in demography-dependent expenditure. Up to 2035, the pressure comes almost exclusively from healthcare and education expenditure, which explains around 85% of the increase in the cantonal expenditure ratio of 0.7% of GDP. The remaining growth driver is long-term care. After 2035, expenditure loses momentum as the demographic pressure eases slightly. Expenditure increases by a further 0.5% of GDP, whereby 60% is attributable to healthcare and the remainder to long-term care.

Table 9: **Demographic-dependent expenditure by government level** (in % of GDP)

Scenario	2019	2035			2050		
	Baseline year	Positive	Negative	Difference	Positive	Negative	Difference
	(% of GDP)		(% of GDP)			(% of GDP)	
Confederation	3.8	4.4	4.5	0.10	4.5	4.6	0.10
Social security funds	5.5	5.9	5.9	0.05	6.1	6.1	0.05
AHV	4.7	5.2	5.3	0.04	5.5	5.5	0.04
IV	0.8	0.6	0.6	0.01	0.5	0.5	0.00
Cantons	5.5	6.2	6.2	0.08	6.6	6.7	0.08
Municipalities	2.4	2.7	2.7	0.05	2.8	2.8	0.05
General government	17.2	19.3	19.5	0.26	20.1	20.4	0.26

Note: Differences are due to rounding

The Confederation incurs the second largest rise in expenditure as a proportion of GDP (+0.7%). Practically all of this increase takes place by 2035 (+0.6%). It results from the relatively high AHV expenditure growth momentum, which in turn is caused by the retirement of the baby boomers. In addition, the TRAF reform includes higher AHV contributions from the Confederation. The demographic pressure eases from the mid-2030s onwards. The increase of just over 0.1% of GDP between 2035 and 2050 is due to the AHV and individual premium reductions, which are part of the healthcare sector.

The extent and trend of the social security funds' expenditure increase relative to GDP mirrors that of the Confederation (+0.6%). Two thirds of the increase takes place before 2035 (+0.4%). In spite of the AHV 21 reform, the ageing effect is felt as the baby boomers retire. Aside from the AHV 21 reform, disability insurance curbs the development of expenditure. The reduction in demographic pressure from 2035 dampens the increase until 2050 (+0.2% of GDP).

The communes are the least affected by demographic change, with a 0.4% increase as a proportion of GDP. Up to 2035, two thirds of the increase of 0.3 % of GDP is attributable to education and one third to long-term care. The further increase

in expenditure of 0.1% of GDP up to 2050 stems entirely from long-term care.

For the negative scenario, the statements made in the previous section also apply to this section. Overall, a somewhat higher expenditure increase of 0.3% relative to GDP is to be expected, due to the lower GDP assumption with identical demographic pressure. This slight additional burden is distributed evenly across the Confederation, cantons and communes. There is no burden change for the social security funds, as the mixed index restrains the AHV/IV expenditure increase relative to the positive scenario because of the more pessimistic short-term economic outlook.

3.3 Debt ratio and fiscal gap

3.3.1 Development of the debt ratio

Demographic-dependent expenditure rises markedly over the projection period when applying the assumptions made for this report. If an increase in the debt ratio is to be prevented, the increased expenditure will have to be financed through higher taxes or social security contributions, or through savings measures.
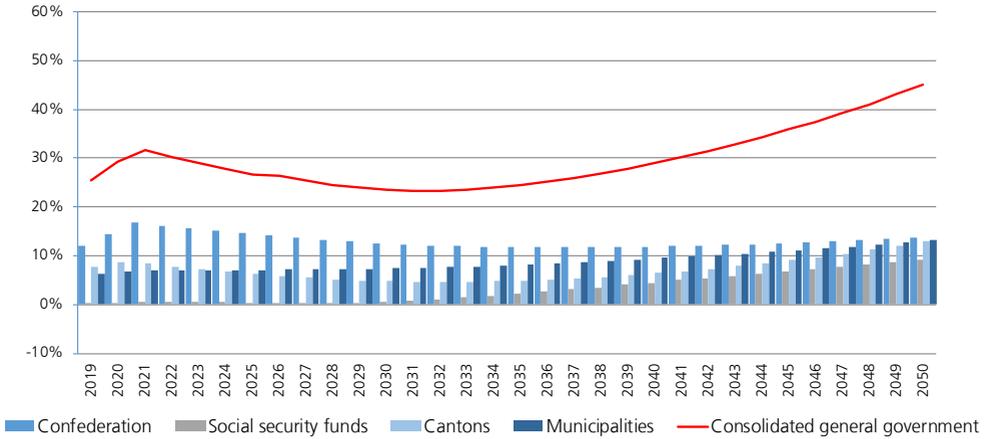
If no steps are taken to restore the financial equilibrium between receipts and expenditure, government indebtedness will rise from

25.4% of GDP to 45.0% of GDP between 2019 and 2050 (see Figure 8). The debt ratio initially rises in 2021 because of the pandemic to 31.7% of GDP. It then falls to a low of 23.3% of GDP by 2032. This decrease is due to the assumed rapid economic recovery following the COVID-19 crisis. Moreover, the AHV runs at a surplus until 2028 thanks to the TRAF and AHV 21 reforms, in spite of the added cost pressure brought by the retirement of the baby-boom generation. In addition, the debt servicing of the public purse is assumed to remain low until the end of the 2020s due to the low interest rate environment. The government debt ratio then increases from 2033, primarily due to demographic factors and reaches 45% of GDP by 2050.

The assumed profit distribution (over and above the basic distribution amount) by the Swiss National Bank to the Confederation and cantons benefits public finances over the entire projection period, thus reducing the government debt ratio. Assuming that only the basic amount were to be paid from 2026/27, i.e. a total of CHF 2 billion every year, the general government debt ratio would equate to 53.1% of GDP in 2050.

The debt ratio initially increases more in the negative scenario because of weaker economic growth during the COVID-19 crisis. In 2021, the debt ratio rises to 32.9% of GDP. The government debt ratio then also recovers subsequently – albeit not as much as in the positive scenario. The interim lowest point is reached in 2031 at 27.5% of GDP. The debt ratio then rises to 51.2% of GDP by 2050 due to the demographic factor.

Figure 8:   Debt ratio by government level in the positive scenario (in % of GDP)

Legend: Confederation · Social security funds · Cantons · Municipalities · Consolidated general government
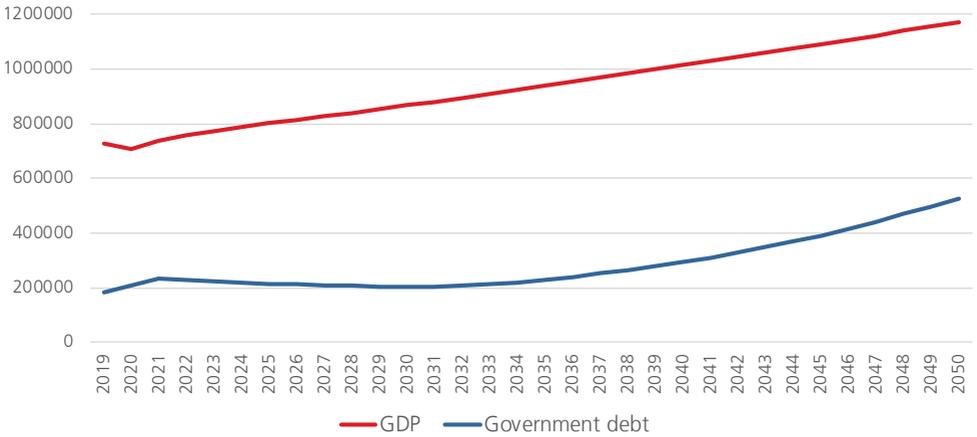
Source: FFA

Government debt at 2019 prices increases between 2019 and 2021 due to the COVID-19 crisis, before falling steadily until 2030 (see Figure 9). In 2030, government debt adjusted for inflation is about CHF 20 billion higher than in 2019. This equates to an annual increase over the baseline year of 0.9%, which is well below GDP adjusted for inflation at 1.6% per annum. Despite the pronounced demographic effect, the mitigating influence of the AHV 21 reform, disability insurance, low interest rate environment and SNB profit distribution are to the fore. The waning impact of the AHV 21 reform, sustained demographic pressure through healthcare and long-term care expenditure and the end of the low interest rate period accelerate debt accumulation considerably from 2031. At 5.1% per annum, it far outstrips inflation-adjusted GDP growth at 1.5%.

Figure 9:   Government debt and GDP in the positive scenario (in CHF mn, at 2019 prices)

Table 10 clearly demonstrates that the debt ratios develop differently depending on the level of government. At the federal level, debt rises from 12.1% to 13.6% over the entire projection period. As shown above, the Confederation bears most of the pandemic-induced debt burden. In the ensuing years, the Confederation is, according to projections, temporarily in a position to reduce debt to below its baseline year level. This is due, inter alia, to the low interest rate environment and favourable progression of disability insurance (IV).

Table 10:   Debt ratio by level of government (in % of GDP)

Scenario	2019	2035			2050		
	Baseline year	Positive	Negative	Difference	Positive	Negative	Difference
	(% of GDP)	(% of GDP)			(% of GDP)		
Confederation	12.1	11.8	15.8	4.04	13.6	21.3	7.73
Social security funds	0.0	2.2	3.6	1.37	9.1	11.3	2.18
Cantons	7.8	4.9	6.9	1.98	12.9	16.8	3.95
Municipalities	6.2	8.2	9.3	1.03	13.1	15.2	2.06
General government (consolidated)	25.4	24.5	28.9	4.39	45.0	51.2	6.12

Note: Differences are due to rounding

As regards social security funds, the mitigating effect of the AHV 21 abates after 2030. Without further AHV reform, the social security debt ratio rises to 9% of GDP by 2050. However, the AHV and IV follow different paths, as shown by the progression of their respective compensation funds. According to projections, the assets of the AHV compensation fund rise to 110% of one year's annual expenditure in 2026. Thereafter, the AHV compensation fund falls consistently, resulting in a debt level of 115% of one year's annual expenditure in 2050. By contrast, the assets of the IV compensation fund are projected to rise once its debts are fully settled in 2034. In 2050, the fund holds 2.8 times its annual expenditure.

An increase in the debt ratio is projected for the cantons and communes over the entire projection period. At cantonal level, the debt ratio goes from 7.8% to 12.9% of GDP. That is due to the dynamic cost momentum for long-term care and healthcare in the cantons. Finances at communal level are impacted primarily by strong growth in education costs until 2035.

The additional government debt is particularly high for the Confederation and cantons in the negative scenario. The less favourable economic development with a slower recovery assumed in the negative scenario particularly impacts public finances as the fiscal balance deteriorates, resulting primarily from lower receipts and increased expenditure, the latter due to short-time working for example.

3.3.2 Fiscal gap

The fiscal gap calculated in the positive scenario in this long-term sustainability report amounts to 0.8% of GDP for 2025 to 2050 (see Table 11). This means that from 2025, 0.8% of GDP has to be saved in the budget every year or raised from elsewhere in order to stabilise the debt ratio at the 2019 level, i.e. 25.4% of GDP. 1% of GDP corresponds to CHF 7 billion in the baseline year of 2019.

The fiscal gap for social insurance as a whole comes to 0.4% a year. As mentioned above, AHV and IV experience contrasting trends. According to projections, IV is sustainably financed, with an annual fiscal gap of -0.15%. The relatively slow increase in expenditure actually enables the disability compensation fund to grow strongly, whereas AHV experiences a fiscal gap of 0.5% a year from 2025 to 2050. New reforms are needed from 2029 at the latest in order to secure the sustainability of AHV finances.

The fiscal gap for the cantons and communes is 0.2% and 0.3% of GDP respectively. The sustainability of the cantonal and communal finances is threatened predominantly by the anticipated cost increase in healthcare and long-term care. These projected added budgetary burdens can be offset to an extent by the SNB's profit distribution to the cantons. Discounting the assumed maximum profit distribution from 2026 onwards instead of the basic amount, i.e. a total of CHF 4 billion for the cantons every year, the cantonal fiscal gap would be 0.4%.

The AHV 21 reform and positive IV development plus the assumed SNB profit distribution mean that the fiscal gap at the federal level – even allowing for the cost of the COVID-19 crisis – is just 0.1% of GDP. Assuming that from 2026 onwards, only the basic amount of the SNB profit distribution is paid (CHF 2 billion in total, including CHF 666 million to the Confederation), the Confederation's fiscal gap would equate to 0.2% of GDP.

The fiscal gap in the negative scenario is higher, as under its parameters 1.1% of GDP would have to be saved every year from 2025 or generated through additional receipts, in order to stabilise the debt ratio at its 2019 level. The weaker economic growth assumed in the negative scenario due to the COVID-19 crisis increases the fiscal gap most of all at Confederation level (+0.3% of GDP) and cantonal level (+0.2% of GDP). The higher expenditure at federal level is important for unemployment insurance; the main outcome for the cantons is in the form of lower receipts.

Table 11:   Fiscal gap: stabilization of the consolidated debt ratio and debt in CHF
(in % of GDP)

	Fiscal gap with stabilization of			
	Debt ratio		Debt	
	2025–2050 annual consolidation needs (in % of GDP)			
	Positive	Negative	Positive	Negative
Confederation	0.1	0.4	0.3	0.7
Social security funds	0.4	0.5	0.4	0.5
Cantons	0.2	0.4	0.4	0.5
Municipalities	0.3	0.3	0.4	0.5
General government	0.8	1.1	1.4	1.6

Factoring in the sustainability criterion of the debt brake, i.e. stabilising the debt level in CHF at the baseline year level, the Confederation has a fiscal gap of 0.3% of GDP every year. The fiscal gap at all government levels rises to 1.4% of GDP, as compared to the goal of stabilising the debt level at 0.8% of GDP. In the negative scenario and assuming a targeted stable debt level in CHF at the 2019 baseline year level, the fiscal gap increases to 1.6% of GDP at all levels of government.

It is also worth noting that the fiscal gap increases when the start of the budget consolidation is postponed to after 2025. The longer the budget consolidation is postponed, the stronger the need for rectifying public finances.
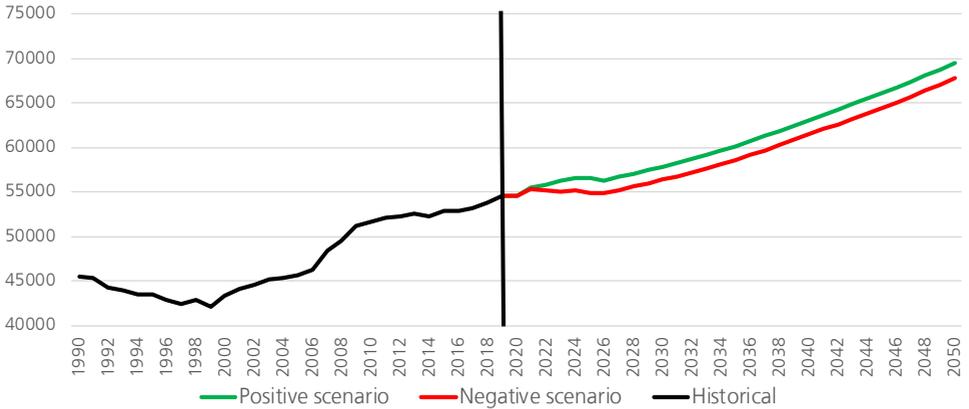
3.4 Disposable income

The disposable income per capita of the Swiss population is used to show how strong the additional burden is felt on average by Swiss residents if the debt ratio of the general government is stabilised at its current level, with the additional demographic-dependent expenditure financed through higher taxes and social security contributions. For the purposes of this report, disposable per capita income is displayed as the inflation-adjusted average income per capita after deduction of taxes, social security contributions and compulsory health insurance premiums (see section 2.3.3).

Despite the additional expenditure needed to close the fiscal gap, per capita disposable income continues to rise on average, assuming annual productivity advances of 1.2 %. The projected annual rise between 2019 and 2050 (0.8%) is slightly higher than for the period 1990 to 2019 (0.7%), as growth was weak in the 1990s. The projected annual increase is 0.7% between 2019 and 2050 in the negative scenario (see Figure 10).

Figure 10: **Disposable income per capita, 1990–2050, positive and negative scenarios**
(at 2019 prices)

According to projections, disposable income per capita rises by CHF 14,916 from CHF 54,586 to CHF 69,502 between 2019 and 2050, despite financing the fiscal gap through higher taxes and social security contributions. Moreover, cyclical movements are not factored into the disposable income projections to the extent that they were in evidence from 1996 to 2019. They had a strong impact on the development of disposable income.

An increase in disposable income also applies to the negative scenario. In 2050, disposable income is CHF 67,834. The main difference between the positive and negative scenarios arises from 2020 to 2025, when the assumptions regarding economic development differ due to the COVID-19 crisis.

In summary, it may be concluded that the Swiss population will experience a significant increase in its prosperity, despite the growing financial burden of the ageing population. That holds true for both the positive and negative scenarios.

3.5 Comparison with the results of the long-term outlook in the legislature financial plan for 2021 to 2023

The projection period for this publication is 30 years, as with the long-term sustainability report relating to the 2021–2023 legislature financial plan.[29] The demographic development assumption is also the same. The FSO's reference scenario for population development in Switzerland for the period 2020 to 2050 (A-00-2020) provides the basis for these projections. The economic development assumptions from 2021 to 2025 (see Chapter 2) in this report differ, owing to the impact of the COVID-19 crisis. Pandemic-related government expenditure is also taken into account. A higher increase in labour productivity is assumed compared to the 2021–2023 legislature financial plan, as the last two years for which data is available have raised the long-term average for productivity growth (1.2% versus 1.1% real). The long-term real interest rate, on the other hand, remains unchanged at 1.6%. The assumption about the SNB's annual profit distribution was adjusted on the receipts side, due to the new profit distribution agreement between the FDF and SNB. This report assumes a nominal annual distribution to the cantons and Confederation totalling CHF 6 billion (formerly 2 bn).

As regards demographic-dependent expenditure, the picture is basically unchanged compared to the 2021–2023 legislature financial plan projections. The main expenditure-related burden stems from AHV followed by healthcare (health and long-term care) and education.

The fiscal gap for the general government is lower in spite of the COVID-19 crisis (0.8% vs. 0.9% of GDP). The reasons for the improvement in the financial situation are the change in the labour productivity assumption, the improved starting point for public finances in the 2019 baseline year compared to 2017 and the assumed higher annual receipts from the SNB's profit distribution. These factors benefit the cantons most of all. The cantons also benefit from the fact that their expenditure to mitigate the economic impact of the coronavirus is considerably lower than at Confederation level. As a result, the cantonal fiscal gap is 0.2% of GDP in this report, compared to 0.8% of GDP for the 2021–2023 legislature financial plan.

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29 See Swiss Confederation (2020).

Social security and commune finances are identical to the 2021–2023 legislature financial plan projections. At about 0.1% of GDP, the fiscal gap for the Confederation is higher than the prior projections (-0.3% of GDP), due to the COVID-19 crisis. The number of years in which the Confederation can achieve a surplus is lower than the 2021–2023 legislature financial plan projections because of the pandemic.

4 Effects of climate change on public finances

4.1 Introduction

Climate change is becoming increasingly visible. According to the latest report issued by the United Nations Intergovernmental Panel on Climate Change (IPCC): "It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred".[30] However, assessing the long-term effects of unbridled climate change is a complex and uncertain exercise. Estimates of the global cost involved range from 2.1% to 23% of annual global GDP in 2100.[31] Nonetheless, there is universal agreement that progressive climate change will lead to more frequent and intense extreme weather events including droughts, flooding and forest fires. Higher temperatures and rising sea levels can also change entire regions and influence living conditions. This can necessitate significant investment to adapt to the new conditions.

An ambitious, efficient and coordinated climate policy is needed to mitigate and adapt to the effects of climate change. Both climate change itself and the adjustment it requires can cause macroeconomic turbulence and contribute to financial market upheaval. As a result, supervisory authorities and central banks have started using climate risk analyses and climate stress tests to estimate the potential consequences for financial stability.[32] However, the impact of climate change on public finances has received relatively little attention to date.

An initial attempt to outline initial conceptual correlations between climate change and public finances was made in the 2016 long-term outlook report on public finances. In recent years, the international community has also started examining these correlations in greater depth.[33] The next section builds on that work and aims to provide a qualitative assessment of the findings thus far in the context of an official sustainability report as regards public finances.

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30 See IPCC (2021).
31 See Nordhaus (2017) and Burke et al. (2015).
32 See Network for Greening the Financial System (NGFS, 2019) and Financial Stability Board (2020).
33 See Baur et al. (2021) and Baur and Bruchez (2021) for an overview.

The Intergovernmental Panel on Climate Change (IPCC) estimates that human emissions of greenhouse gases have caused the average temperature to rise by about one degree over pre-industrial levels. The average temperature depends on the carbon dioxide content in the atmosphere. As emitted greenhouse gases (CO_2) are very long lasting, it is imperative to stop net CO_2 emissions in order to stabilise temperatures over the long term. Moreover, the temperature has a lagged response to an increase in the volume of greenhouse gases in the atmosphere. This lag means that temperatures will still rise, even if emissions were to stop immediately. Setting a target for temperature increase is thus primarily an attempt to define the overall volume of greenhouse gas that humanity is still allowed to emit.

It was against this backdrop that the Paris Agreement was signed at the end of 2015, whereby all countries committed for the first time to reduce greenhouse gas emissions from 2020. The Paris target, an increase of 1.5°C to 2°C above pre-industrial temperatures, requires a reduction in emissions to "net zero" over the long term in order to stabilise the emission volume and global temperatures.

Parliament approved the ratification of the Paris Agreement in 2017, whereby Switzerland committed to halve its emissions by 2030 relative to 1990 and announced a target CO_2 reduction of 70–85% by 2050.[34] In 2019, the Federal Council announced a target value for CO_2 neutrality from 2050. Swiss voters rejected the revised CO_2 Act on 13 June 2021. The Federal Council will submit a new legislative proposal for consultation by the end of 2021 and show how Switzerland aims to meet its commitments under the Paris Agreement.

4.2 Effects on public finances

Economic effects of climate change

Climate change is a global challenge with numerous socio-economic impacts. It will affect major economic sectors, such as agriculture, energy provision, infrastructure and healthcare. It will also bring change – to varying degrees – to supply and demand for goods and services in all the economic sectors. In the absence of an orderly transition, these effects could be multiplied by financial crises and political conflicts. Higher temperatures, rising sea levels, more frequent extreme weather events

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34 Taking into account the emission reductions achieved outside the country.

and more besides, will not only cause economic damage but will also impair other aspects of people's lives, such as health and well-being.

Effects on public finances are hard to quantify

Climate change first and foremost impacts the environment, then the economy and finally public finances.

The physical consequences of climate change are uncertain given the complexity of the earth system, specifically the feedback effects that can diminish or amplify the initial impacts. These uncertainties comprise extreme risks, such as tipping points and domino effects. Containing climate change also reduces these uncertainties. As regards the economic consequences, the uncertainty is mainly due to the fact that it is practically impossible to predict technological innovation and economic structure over the long term. It is particularly difficult to assess whether and to what extent

the economy will be able to adapt to the new conditions. There are a number of cumulative factors adding to the uncertainty with regard to public finances a) the uncertainty about the environmental effects of climate change, b) the uncertainty about the economic consequences of certain environmental impacts and, finally, c) the uncertainty regarding the effects of certain economic consequences on the public purse. How this all comes tougher depends to a large extent on cost allocation between the private sector and the state. In addition, the impact on public finances from the measures employed to contain climate change depend on the economic policy instruments used.

The ETH published a comprehensive study on the consequences of climate change for the Swiss economy.[35] Table 12 provides an overview of the main ways in which climate change influences the Swiss economy, as identified by the study.

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35 See Vöhringer et al. (2017).

Table 12:   Overview of the economic effects of climate change on the Swiss economy

	average temperature change	change in precipitation patterns	extreme weather events	influences from abroad
health	cardiovascular, respiratory and vector-borne diseases, mortality, reduced labor productivity		cardiovascular, respiratory and vector-borne diseases, mortality, reduced labor productivity	reduced labor productivity abroad influences terms of trade
buildings & infrastructure	heat-related and frost-related damages, permafrost melting		floods, mudslides, storms, hail, heat, frost	
energy	space heating and cooling, cooling for thermal electricity generation plants	runoff changes influence hydropower, water availability for cooling of thermal electricity generation plants	energy infrastructure: floods, mudslides, storms, hail, heat, frost	European electricity prices
water management		need for irrigation, lower ground water level	drought: irrigation, ground water level, drinking water quality	
agriculture	longer growth periods, heat stress, pests	need for irrigation	losses due to drought, heavy precipitation, heat, frost	higher prices for imported grains & oilseeds
forestry	longer growth periods, heat stress, pests	dry conditions	storm, heat waves, droughts, forest fires	timber price
ecosystems	migration of species, biodiversity		stress and damage to habitat and creatures	migration of species
tourism	reduced snow cover, shift from winter to summer tourism	reduced snow cover, days of sun	damage to alpine infrastructure	international tourism flows, terms of trade
other		water transport		immigration, international conflict, trade volumes and terms of trade, financial flows, reinsurance payments
legend	positive effect			
	important positive effect			
	negative effect			
	important negative effect			
	effect which has not been simulated due to rather low economic importance			
	potentially important effect which has not been simulated due to data constraints			

Source: Taken from Vöhringer et al. (2017, p. 93, Table 34)

Some of the effects are positive, such as new tourism opportunities in summer and lower heating costs; while others are negative, for example heatwaves affecting health and productivity. The aggregate effect is mainly negative. The overall negative economic impact is estimated at 0.43 % of total consumption in 2060. However, the authors do stress that it is not possible to take account of all the effects. The potentially most significant gaps relate to the consequences of extreme weather events and the effects stemming from Switzerland's relations with the rest of the world.

Ways in which climate change influences public finances

In the absence of a comprehensive quantification of the economic effects of climate change in Switzerland, there are no values assigned to the impacts on public finances.[36] However, the main ways in which climate change affects public finances in Switzerland can be presented and prioritised. Table 13 provides an overview of the main budget items in question.

Table 13:   Budget items affected by climate change

Receipts	Public expenditure
• Greenhouse gas levies • Mineral oil tax • Revenue from enterprises affiliated with the Confederation • Other taxes (VAT, income tax, etc.)	• Infrastructure protection • Energy efficiency of public buildings • Subsidies to mitigate climate change • Subsidies to adapt to climate change and repair the damage caused • R&D financing • Negative emissions financing • Foreign aid in the area of climate change

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36 The UK Office for Budget Responsibility, OBR, 2021 has attempted to quantify the consequences of climate change for the United Kingdom's public finances. Similar quantitative evaluations are also available for Germany (Infras and Ecologic, 2009) and Austria (Bachner and Bednar-Friedl, 2019). See also Baur et al. (2021) for further discussion.

Aside from its direct consequences for the public purse, climate change can trigger numerous contingent liabilities. As climate change progresses, the probability of contingent liabilities involving predefined fiscal costs rises, which can adversely affect public finances. Contingent liabilities with fiscal costs that are not predefined also become more likely as climate change progresses and they can have an abrupt impact on the public purse. Extreme weather events, for example, hitherto seen as highly improbable risks, will probably become more frequent and intense.[37]

The effects of the climate change containment measures

The analysis distinguishes between the effects of climate change itself and the effects of its associated preventive and adaptation measures.

The effects of the measures to contain climate change will initially be greater than the effects of climate change itself. Climate policy measures directly and indirectly impact various receipt and expenditure categories of the Confederation.

Regardless of whether they are of a fiscal or other (e.g. regulatory)

nature, climate change containment measures will have economic consequences and therefore will have an effect on public finances, e.g. GDP-dependent tax receipts such as VAT or income tax. Insofar as climate change also brings about innovations in the area of green technologies, growth in those sectors could partly offset the decline in tax receipts.

A CO_2 tax is central to containing climate change. It acts against the central market distortion preventing market forces from solving the climate challenge: prices tend not to factor in climate change (see Box 2). However, the CO_2 tax is regressive as energy is a larger budget item for low-income households. It becomes neutral or (even) progressive when the per capita revenue is redistributed among the people. The revenue should therefore not just flow into the state budget if the tax is to be progressive. Part of the revenue could, for example, be used to finance subsidies to support the fight against climate change, as with the CO_2 tax for fossil fuels. As long as the CO_2 tax revenue is redistributed to the people and economy or used as restricted funds for containing climate change, it has no direct budgetary consequences.[38]

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37 See Coalition of Finance Ministers for Climate Action (CFMCA, 2021).
38 See Green (2021), Best et al. (2020) and OECD (2021) for a current overview of the evaluation of incentive fees.

In the longer term and assuming fossil fuel energy consumption has fallen markedly, budgetary repercussions might be felt, for example, because of the potentially necessary public financing of NET subsidies and technologies (negative emission technologies that help remove greenhouse gases from the atmosphere).

Box 2:   Market distortion and climate instruments

The fact that the costs of climate change are usually not included in prices is the main market shortcoming in managing the climate issue. That makes a strong case for a CO_2 tax. There are, however, other types of market failure that would justify the use of other instruments.

Negative externalities and incentive fees

The failure to factor in environmental costs is a negative externality. The word "externality" means that a pricing signal is distorted by the omission of certain elements. The word "negative" means that the elements omitted from the pricing represent costs. A negative externality leads to prices being too low. The prices of fossil fuels are therefore too low compared to what they would be if environmental costs were included. A negative externality can be corrected by using a price-increasing mechanism, for example an incentive fee such as the CO_2 levy.

Positive externalities and subsidies

An externality is "positive" when the element not included in the price has a positive effect for third parties (not the buyer or the seller). That can happen with research and development. If innovations are not patented, the inventor's competition can benefit from it by copying the innovation. That leads to insufficient investment in innovation, which would justify the introduction of a subsidy

Incomplete information

Incomplete information and considerable uncertainty can, for example, lead to credit bottlenecks on the financial markets. That can hold up investments (mainly the long-term and environmentally friendly ones) and would justify loans at preferential conditions.

The public finance implications of the measures to contain climate change are significant and depend on the instruments used. If the state authorises compulsory measures or bans, the resulting costs will mainly be borne by the population and economy without any direct impact on public finances. Nonetheless, there is an indirect impact as these bans could have an economic cost. The impact of subsidies differs depending on whether they are financed from the public purse or via an incentive fee on fossil fuels. In the latter case, neither the subsidy nor the incentive fee interacts with the rest of the budget.

Furthermore, the state will also have to contribute to the transition effort, for example as the owner of public buildings in need of energy renovation.

The climate change containment measures incur costs initially, but in the long term they mitigate climate change. At the same time, as climate change is a global phenomenon, the benefit will only become apparent when the rest of the world also plays its part.[39] Although the emissions by a small country like Switzerland are insignificant, in no way does that lessen its duty to contribute to the international efforts to contain climate change.

The effects of the climate policy are clearly demonstrated by the mineral oil tax, receipts of which have been falling since 2008. That is not only due to falling fuel consumption by vehicles in Switzerland,[40] but most likely also to a reduction in the number of kilometres travelled and the rising market share of electric vehicles. With regard to the aim of net-zero emissions, fuel consumption by overland transport would have to tend towards zero in the medium term.

The effects of the incremental average temperature increase in Switzerland are likely to be relatively mild up to 2050

Aside from the effects of climate policy itself, the effects of the adjustment and remedial measures are also significant. The public purse will be affected by the adjustment and remediation costs of capital assets, such as infrastructure. To some extent, the state may have to provide support to the people and economy by assuming these costs. The consequences of global warming for economic growth will ultimately impact on the state. At the same time, the consequences of the incremental rise in the average temperature in Switzerland are likely to be relatively mild up to 2050.

According to a study conducted by ETHZ Zurich will have the same climate as Milan does now in 2050.[41] This suggests that the consequences attributable solely to the incremental temperature increase in Switzerland will probably be mild up to 2050: Zurich should be able to adapt to a Milan climate. However, the warming will not stop in 2050.

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39 Positive local side effects (e.g. less local pollution) would still happen, even if the rest of the world were not to proceed with containing climate change. This benefit would, however, be a lot smaller, particularly in a country like Switzerland, where a lot of effort has already been put into combating local pollution.

40 The appreciation of the Swiss franc has increased the cost of fuel in Switzerland relative to its neighbouring countries, which has changed the practice of petrol tourism.

41 Vgl. Bastin et al. (2019)

The effects will most likely be more pronounced in rural areas outside the cities. Winter tourism will feel the effects of lower average snowfall, while the mountain regions will attract tourists in summer who want to escape the heat. The results of the ETHZ study confirm that the consequences of the temperature increase will be relatively mild.

The effects of extreme weather events are likely to remain limited

It is harder to estimate the effects of extreme weather events. First of all, because the connection between certain extreme weather events and climate change, although proven, still needs to be researched in more detail.[42] Secondly, because there is less certainty regarding the nature of the adjustment measures required for relatively rare events compared to the measures needed to counter an incremental increase in the average temperature. In Switzerland, extreme weather events can cause flooding, landslides, avalanches, hail or, by

contrast, heatwaves and drought. The consequences of the extreme weather events may be greater than those of the incremental average temperature increase. Tornadoes or tsunamis are not an issue for Switzerland, instead it is exposed to events to which it is largely able to adapt.

The effects of climate change on the rest of the world are likely to exercise significant influence on Switzerland over the long term

Climate change will affect other countries a lot more than Switzerland. For example, some countries will suffer from rising sea levels or have a hot and humid climate, where rising temperatures will have a more severe impact. There are also poor countries that are less able to direct funds towards adapting to climate change. The effects on international trade are likely to be keenly felt in Switzerland, a small and open market economy.[43] However, Switzerland's main trading partners do not include those countries that

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42 Laut IPCC (2021): «Many changes in the climate system become larger in direct relation to increasing global warming. They include increases in the frequency and intensity of hot extremes, marine heatwaves, and heavy precipitation, agricultural and ecological droughts in some regions, and proportion of intense tropical cyclones, as well as reductions in Arctic sea ice, snow cover and permafrost».

43 The trade in goods and services and capital market transactions. The share of international trade will fall to the extent that trading partners will find it harder to trade. A sector like reinsurance, on the other hand, will benefit from climate change, as demand for its services will keep growing.

are most exposed to climate change. Another tangible effect of climate change could be an increase in foreign aid and immigration from severely affected parts of the world.

Taking account of uncertainties and extreme scenarios

The points raised above refer to scenarios with a probable likelihood of occurrence. However, the uncertainties arising from extreme scenarios must also be considered.

Climate change is a complex phenomenon beset by major uncertainties, such as the longer-term effects on the average temperature of doubling the volume of CO_2 in the atmosphere. There are other uncertainties as well, especially with regard to extreme weather events and to flora and fauna. The outcome of this uncertainty is scenario-based thinking.

Apart from these uncertainties, there are highly unlikely scenarios with extreme consequences that may or may not occur depending on how well we manage climate change. There are threshold values or limits, known as tipping points, the crossing of which would unleash a vicious circle with ever more devastating consequences. One example would be the release of methane gas (a greenhouse gas) from the thawing of the Arctic permafrost. These extreme scenarios are even more unnerving

given that climate change advances slowly and some consequences may be very difficult to reverse, or even irreversible.

Taking account of these extreme scenarios should lead to stricter measures being taken to contain climate change. At the same time, the inclusion of extreme scenarios must not lead to the state focusing solely on these risks at the expense of other issues, nor must the state refrain from effective action either.

4.3 Closing remarks

It is hard to assess the long-term effects of climate change on public finances. It is reasonable to assume that the incremental increase in the average temperature in Switzerland will have a negative overall effect, although the consequences will be moderate. The consequences of an increase in the frequency and intensity of extreme weather events are harder to estimate, although they will probably be more severe than those of the gradual temperature increase. As other states will be more affected than Switzerland, the effects on the rest of the world are set to be significant. These consequences in turn depend on the extent of climate change and, hence, the adopted countermeasures across the world. Containing climate change will also help to mitigate the uncertainty.

Measures to contain climate change are centred on limiting greenhouse gas emissions in Switzerland and advocating such measures at the international level. With regard to the most efficient goal achievement, i.e. at the lowest possible economic cost, the choice of economic instrument matters. Aside from incentive fees (CO_2 levy) and the emissions trading system, subsidies and regulation also play an important part.

From a fiscal perspective, the state needs to keep public sector debt low and maintain a balanced budget in view of the highly uncertain effects of climate change on public finances. That will allow the state considerable fiscal room for manoeuvre if an unexpected and severe climate event occurs with serious financial implications or contingent liability risks for public finances.

To ensure an orderly transition, it is important to be able to analyse climate change plus its associated containment and adjustment measures. A quantitative assessment of the long-term implications of climate change for public finances in Switzerland is an important component of that. As a first step, this requires broad recognition of the economic consequences of climate change. That especially applies with regard to the effects of extreme weather events and the consequences arising from Switzerland's foreign trade linkages. Following on from that, the second step would involve experts and the Federal Administration working together to perform a quantitative assessment of the consequences of climate change on public finances. Moreover, a review of all the budgetary risks would prevent other risks falling under the radar and rank the risk of climate change in relation to the other risks.

5 Conclusion

The report shows that public finances will be put under significant strain by the ageing population over the next three decades. The impact of ageing will be particularly noticeable through to 2035 as baby boomers retire. If demographics and the economy develop as assumed, the general government expenditure ratio will rise from its current level of 31.6% of GDP to 34.5% by 2050.

Even if the AHV 21 reform is implemented as planned, new reforms will be needed by no later than the beginning of the 2030s to ensure a sustainable AHV. Due to the persistently high financial pressure in the healthcare and long-term care sectors, the demographic-dependent expenditure of the cantons will increase the most. The assumed profit distribution by the SNB (CHF 6 bn, with 2 bn for the Confederation and 4 bn for the cantons) mainly reduces the consolidation require-ment at cantonal level. Nonetheless, measures that dampen growth expenditure in healthcare, such as the target proposed by the Federal Council, are still required to ensure sustainable financing.[44] The Confed-eration, on the other hand, has a relatively small need for consolida-tion.

Even assuming that the COVID-19 crisis also has a long-term negative impact on economic performance and general government receipts, the 30-year debt ratio rises to 35% instead of 34.5% of GDP. The debt ratio in 2050 would rise to 51% of GDP instead of 45%. In other words, the state would have to consolidate an extra 0.3% of GDP a year to stabilise debt at the 2019 baseline year level.

Aside from the ageing of the population, climate change is probably the greatest long-term challenge for Switzerland. That is why, for the first time, this long-term sustainability report dedicates a sepa-rate chapter to the possible impact of climate change on public finances. The effects of climate change are a lot more uncertain than the effects of ageing and therefore very hard to quantify. The qualitative analysis in this report shows that climate change impacts public finances in terms of both receipts and expendi-ture. The overall effect of these impacts will be negative. Lower tax receipts and higher expenditure are to be expected, which will most likely reduce the fiscal room for ma-noeuvre. These considerations need to be explored in greater depth

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44 See Brändle and Colombier (2020) and Brändle et al. (2018) for relevant evaluations of international experiences for Switzerland.

against the backdrop of advancing climate change.

In conclusion: the lower the level of public debt, the better the state can react in a crisis. Low debt also means added leeway in managing long-term challenges. It is therefore important to maintain a balanced budget in order to enhance the resilience of the Swiss economy.

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Appendix

1. Calculation of the fiscal gap

The fiscal gap f for a target λ, a time horizon T and a consolidation start after p years is illustrated in the following equation:

$$f_{\lambda,T} = \frac{B_p - \frac{\lambda}{\varphi_{T-p}} B_0 - \sum_{j=1}^{T-p}\left(\frac{PB_{j+p}}{\varphi_j}\right)}{\sum_{j=1}^{T-p}\left(\frac{Y_{j+p}}{\varphi_j}\right)}$$

where B_0 denotes the initial nominal debt in 2019, B_p the nominal debt at the time of the envisaged consolidation start, e.g. the year 2025 with p = 6, Y_j the annual nominal GDP. The time horizon goes from 2019 to 2050 (with T = 31). The fiscal gap is always expressed as a percentage of GDP.

In calculating the fiscal gap, a target debt ratio must first be defined. The ratio between the target and initial debt is λ. Thus, for example, if the current debt ratio equals the target debt ratio, then λ is also the ratio between target-year GDP and baseline-year GDP. If debt remains unchanged in nominal terms, then $\lambda = 1$. The fiscal gap calculation takes account of the annual interest rate (i_j) (cost of borrowing) by way of the discount factor φ_j ($=(1+i)^j$) and of budget projections by way of the annual primary surplus PB_{j+p}. The difference $B_p - \frac{\lambda}{\varphi_{T-p}} B_0$ in the above equation corresponds to the debt level at the start of consolidation minus the discounted debt target. If the debt exceeds the debt target at the start of the consolidation, this causes an increase in the fiscal gap and vice versa.
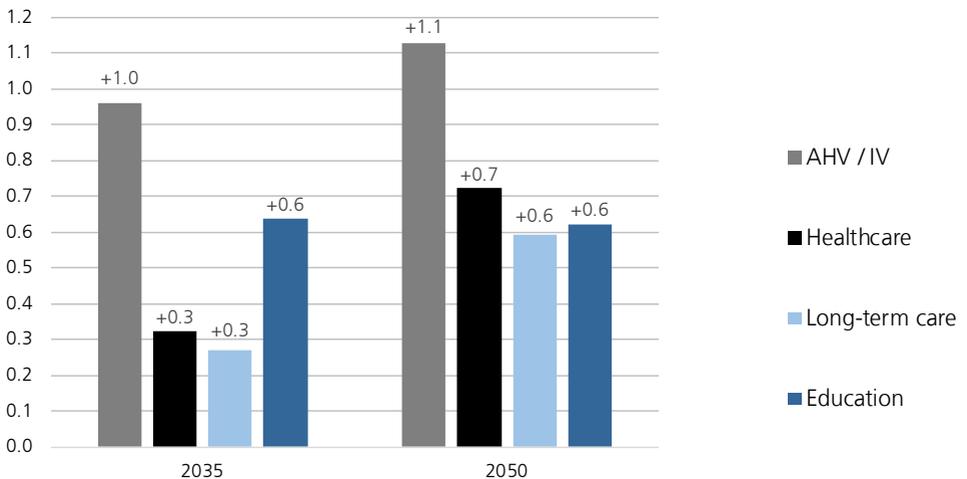
2. Appendix figures

Figure A1:   Demographic-dependent expenditure in the positive scenario (in % of GDP)
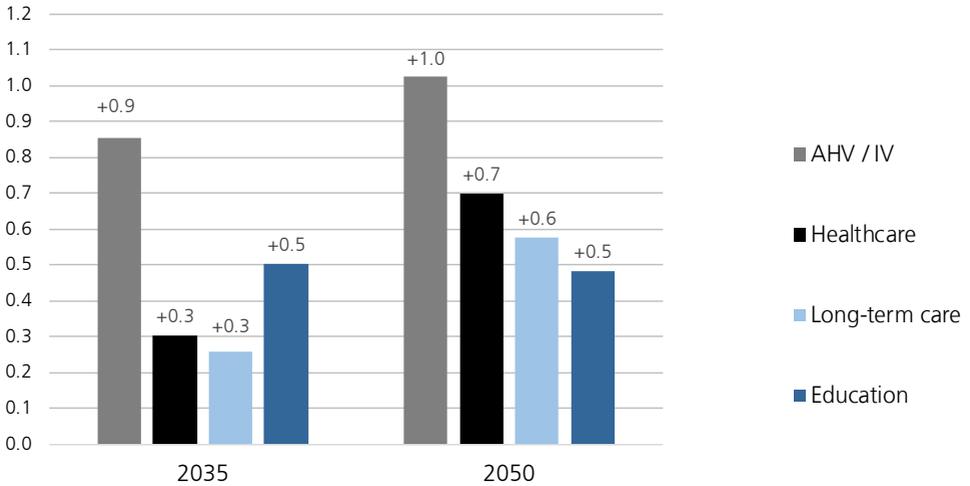
Source: FFA, FSIO, FSO

Figure A2:   Demographic-dependent expenditure in the negative scenario (in % of GDP)

Source: FFA, FSIO, FSO