Healthcare expenditure projections up to 2045

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Contents

List of abbreviations

AHV	Old-age and survivors' insurance
AHV-HE	AHV allowance for the helpless
AWG	Ageing Working Group of the European Union (Economic Policy Committee and European Commission – Directorate General for Economic and Financial Affairs)
DRG	Diagnosis-related groups, i.e. service-related flat rates or flat-rate payments per case; the Swiss system of flat-rate payments per case is known as "Swiss DRG".
FDF	Federal Department of Finance
FFA	Federal Finance Administration, Federal Department of Finance
FOPH	Federal Office of Public Health, Federal Department of Home Affairs
FTEs	Full-time equivalents, i.e. the size of a workforce after aggregating those who work on a part-time basis
GDP	Gross domestic product
EL	Supplementary benefits
ESA	European System of Accounts
EU	European Union
FSO	Federal Statistical Office, Federal Department of Home Affairs
HeL	Healthcare excluding long-term care
IPR	Individual premium reduction
IV	Disability insurance
IV-HE	IV allowance for the helpless
HIA	Federal Health Insurance Act
LTC	Long-term care from the age of 65
Obsan	Swiss Health Observatory
OECD	Organisation for Economic Co-operation and Development
OKP	Mandatory health insurance

Summary

Healthcare expenditure is currently the equivalent of 11.1% of GDP in Switzerland (2014). This proportion has more or less doubled since 1970, putting Switzerland alongside Sweden, France, Germany and the Netherlands as one of the highest spenders in this area. One reason for this is that healthcare, alongside the cost of retirement provision, is one of the areas most heavily affected by demographic ageing.[1] An ageing population exhibits greater demand for healthcare services, as well having as a greater need for care services.

However, it is not only demographic factors that lie behind the persistent dynamism of healthcare expenditure. Equally important are aspects such as advances in medical technology, the growing demands of the population as a result of rising incomes, and the complexity of the healthcare system, with its many players and the associated incentives to increase volumes. As a consequence, the dynamism of expenditure and the associated financing burden represent an increasingly important area of focus for economic and financial policy-makers.

The expenditure projections for the healthcare system regularly form part of the Report on the Long-Term Sustainability of Public Finances (FDF 2016). This Working Paper looks at the healthcare issues analysed in that report in greater detail. A key objective of this study is to estimate the rise in healthcare expenditure as a result of an ageing Swiss population, together with the resulting financing burden for the public finances and mandatory health insurance. In addition, we look at the adjustment levers through which healthcare policy-makers can influence expenditure development in healthcare.

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1   According to the demographic scenarios of the Federal Statistical Office (FSO), the proportion of people over the age of 80 relative to the population as a whole is set to double from the current level of 5% to 10% by 2045.

Projection methodology and scenarios

The expenditure projections are based on the one hand on the healthcare expenditure profiles, which are broken down by age cohort. On the other, they draw on the demographic scenarios of the FSO for the period from 2015 to 2045. These demographic scenarios assume a decline in fertility, a rise in life expectancy, and an initially high but then declining net immigration rate. This makes it possible to capture the consequences of demographic ageing – particularly on the part of the baby-boomer generation.

In keeping with the practice of the European Commission (AWG 2015) and the OECD (De la Maisonneuve and Oliveira Martins 2014), expenditure for the total healthcare area was projected under the assumption that the prevailing regulatory status quo will remain unchanged ("no policy change"). As the cost drivers in healthcare excluding long-term care on the one hand and long-term care from the age of 65 on the other are in some cases different, these areas are investigated separately. However, in order to ascertain the additional burden for the public finances and mandatory health insurance, expenditure projections for the total healthcare area have to be made in an initial step. The results of the expenditure projections should be interpreted as "if X then Y" hypotheses, rather than forecasts. The projections are an extrapolation of long-term trends and their repercussions for healthcare expenditure. However, they neither can nor should allow any conclusions to be drawn about the precise magnitude of healthcare expenditure in 30 years' time. The objective is rather to provide a rough orientation for expenditure development and to highlight how sensitively expenditure development reacts to various cost drivers.

In order to illustrate the sensitivity of the projection results, a number of different scenarios have been built up. In addition to the immediate repercussions of demographic change, the focus is on varying assumptions regarding the change in the general state of health (morbidity rate) against a background of rising life expectancy. A further uncertainty factor is the development of net immigration. In addition to demographic changes, the effects of key non-demographic cost drivers will be illustrated. First of all, account will be taken of the correlation between national income development and growth in healthcare expenditure. For example, we apply the income elasticity on demand-side as well as supply-side effects, such as the demands of the population and advances in medical technology. The second factor concerns productivity development in healthcare. Lower productivity growth relative to the overall economy results in cost pressure if healthcare wages keep step with wage growth in the remainder of the economy in the longer term. Given a relatively inelastic demand for healthcare services, healthcare prices accordingly rise more strongly than in the remaining economy. This so-called "Baumol" effect (Baumol 1967) is considered to be highly significant for the long-term care area in particular.

Results of the expenditure projections

In the "Reference scenario", total healthcare expenditure rises from 10.8% of GDP in the base year (2013) to 14.0% of GDP by 2045 (see Table Z1).

Table Z1: Expenditure on healthcare by area and source of financing in reference scenario (in GDP %)

Level	2013	2030		2045	
		Ratio	Change 2013-2030	Ratio	Change 2013-2045
Total healthcare	10.8	12.2	+1.4	14.0	+3.2
Healthcare excluding long-term care	8.6	9.3	+0.7	9.9	+1.3
Long-term care (from the age of 65)	1.6	2.3	+0.7	3.4	+1.8
Source of financing					
Government (incl. soc. sec. funds)	3.5	4.2	+0.7	5.0	+1.5
Confederation	0.4	0.5	+0.1	0.5	+0.1
Cantons	2.4	2.9	+0.5	3.5	+1.1
Communes	0.3	0.4	+0.1	0.5	+0.2
AHV/ IV*	0.4	0.3	-0.0	0.4	+0.0
Mandatory health insurance**	3.3	3.7	+0.4	4.1	+0.8
Other expenditure***	4.0	4.3	+0.3	4.8	+0.9
of which: private households******	2.6	2.9	+0.3	3.3	+0.7

*   Allowance for the helpless, contributions to medical services and therapeutic equipment.
**   Without participation of the public sector in the form of individual premium reduction, which is assigned to the general government sector.
***   "Other expenditure" includes the expenditure of private households, mandatory accident insurance (SUVA) and military insurance, as well as supplementary insurance, private foundations, and IV supplementary benefits, which are not affected by demographic ageing.
**** OKP cost contribution and out-of-pocket payments (OOP).
The remaining category in total healthcare expenditure is expenditure on long-term care below the age of 65. A more detailed illustration giving a breakdown of HeL and LTC can be found in Table A2 in the Annex.

Expenditure on long-term care (from the age of 65) rises much more dynami-
cally than expenditure on healthcare excluding long-term care. For example,
expenditure on long-term care rises from 1.6% of GDP to 3.4% of GDP,
whereas healthcare expenditure rises from 8.6% to 9.9% of GDP. On the one
hand, demographic changes (ageing, including the associated change in the
average state of health) feed through into long-term care to a greater extent
(72% of the rise in expenditure) than they do into the remaining healthcare
area (just under 60% of the rise in expenditure). On the other, expenditure on
long-term care rises by an inflation-adjusted 1.2% annually as a result of the
Baumol effect, whereas expenditure on healthcare rises by just under 0.9%
annually as a result of non-demographic cost determinants, i.e. rising income
per capita.

Public healthcare expenditure

Expenditure on long-term care is of greater proportional significance to the
public finances than expenditure on healthcare overall. Accordingly, demo-
graphic ageing is of greater significance for the public finances than it is for
overall healthcare. In the "Reference scenario", public expenditure rises from
3.5% of GDP in 2013 to 5% of GDP in 2045 (see Table Z1). This rise in expen-
diture is primarily borne by the cantons.

Public expenditure on healthcare excluding long-term care encompasses
expenditure on hospitals, individual premium reduction (IPR), and other
healthcare expenditure (expenditure on prevention, research and develop-
ment, and administration). The healthcare excluding long-term care area
accounts for 2.4% of GDP of public spending in 2013, and in the "Reference
scenario" rises to 3.0% of GDP in 2045. The lion's share of the rise in expen-
diture is attributable to contributions to hospitals, which are largely financed
by the cantons, and expenditure on IPR.

Public expenditure in the area of long-term care comprises the expenditure of the cantons and communes on nursing and care homes, as well as outpatient nursing care expenditure (Spitex), which meets the costs of caring for people aged 65 or older. Public expenditure on long-term care also includes a proportion of cantonal AHV supplementary benefits (EL-AHV) and the AHV allowance for the helpless (AHV-HE). General government expenditure on the long-term care area amounts to 0.8% of GDP for the base year before doubling to 1.7% of GDP by 2045. Both in the area of healthcare generally and in the area of long-term care from the age of 65, the cantons currently bear the greatest share of public expenditure on care, namely 70%. Accordingly, some two thirds of the increase in public expenditure on the long-term care area, or 0.6% of GDP, is felt at the cantonal level. The public expenditure of the communes is primarily made up of expenditure on long-term care, which doubles as a proportion of GDP from 0.2% to 0.4%.

Mandatory health insurance

In order to avoid overlap with government expenditure, expenditure on mandatory health insurance (OKP) is set out in Table Z1 after deduction of IPR expenditure. In addition, the cost contributions of private households (deductible, co-payments) have been deducted. Although the starting level is at roughly the same level as for public healthcare expenditure (3.3% vs. 3.5% of GDP), OKP expenditure rises only half as much by 2045 (+0.8% vs. +1.5% of GDP). The latter is attributable to the fact that the proportion of dynamically developing long-term care expenditure is much lower for OKP (9%) than it is for the general government (23%) in the reference year 2013.

Conclusions

These projections show that demographic change will have a significant impact on the dynamism of healthcare expenditure. The effect of an ageing population is most significant in the area of long-term care. For healthcare excluding long-term care, non-demographic cost drivers – such as the Baumol effect and determinants captured indirectly by income elasticity such as advances in medical technology and market failures as a result of asymmetric information – are likewise very significant. As the key player in this area, (acting not just as regulator, but also as a source of financing and service

provider), it is the cantons that will have to bear the main burden of rising healthcare expenditure. In addition, the public sector will be more heavily affected by an ageing population than OKP, as the general government sector spends a greater proportion of its funds on long-term care than OKP.

The projections provide the following pointers for the orientation of healthcare policy. On the one hand, measures should be promoted that sustainably alleviate the illness burden on the population, particularly in the case of chronic conditions, thereby facilitating healthy ageing. The focus here should be on strengthening healthcare skills and promoting healthy lifestyles by means of adequate preventive measures. On the other hand, existing efficiency reserves need to be better exploited by avoiding unnecessary treatments, incorporating cost-benefit considerations more strongly into the design of the OKP service catalogue (health technology assessment), and ensuring that the increasing productivity of medical services is appropriately reflected in the corresponding prices and tariffs. While the new DRG flat-rate payments per case should contribute to reducing misplaced incentives and strengthening competition in the inpatient area, the obsolete fee-for-service remuneration system in the outpatient area generally contains an oversupply incentive, particularly in the case of technical services. A strengthening of Spitex and the improved compatibility of professional life and family-based care would also help to reduce the length of the average care home stay. Finally, the next two decades will see an increase in demand for healthcare and nursing care staff, which will make forward-looking personnel planning and an improvement of working processes more necessary than ever.

1 Introduction

Healthcare expenditure in Switzerland has more than doubled over the last half-century or so, rising from 4.8% of gross domestic product (GDP) in 1960 to 11.1% of GDP in 2014. Swiss society is therefore spending an increasing proportion of its income on healthcare. This is a trend that Switzerland has in common with other developed economies (see Figure 1). Looking back over the last 25 years, it becomes apparent that the rise in healthcare expenditure in Germany and France between 1990 and 2014 echoed that of Switzerland. Switzerland has one of the most expensive healthcare systems of any OECD country, with the GDP share in question (11.1%) being similar to that of Sweden (11.2%), France (11.1%), Germany (11.0%), and the Netherlands (10.9%). Only the US spends a significantly greater proportion of its income on healthcare (16.6%).

Figure 1:   **Healthcare expenditure in an international comparison** (in GDP %)
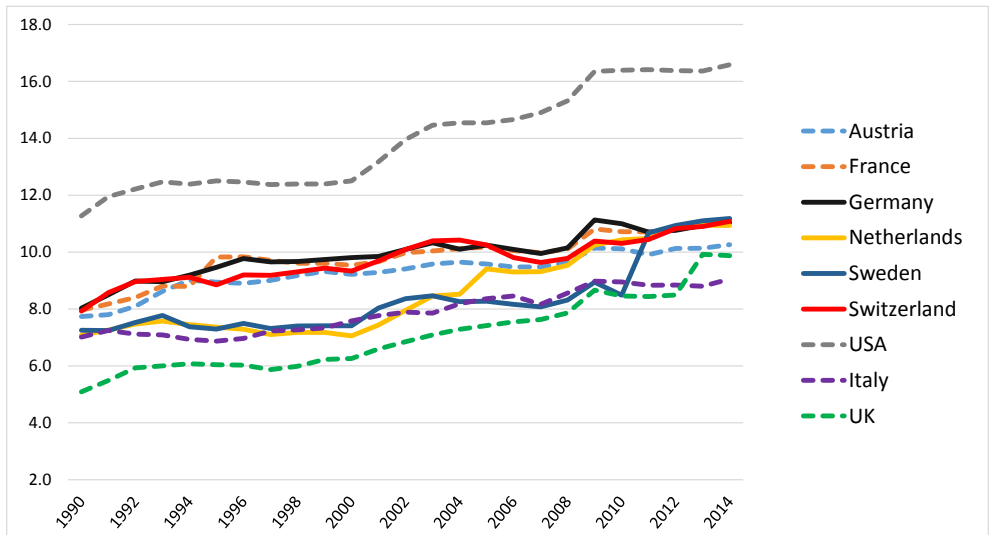
Source: OECD and FSO.

An ageing population exhibits greater demand for healthcare services, as well as a greater need for care services. In addition to this ongoing, age-related increase in demand for healthcare services, the rise in healthcare expenditure is also likely to be driven by a number of aspects that are particular to the healthcare system. Specifically, there can be market failures in healthcare markets as a result of risk selection on the part of health insurers, expenditure-driving incentives as a result of insurance cover ("moral hazard"), and the asymmetrical distribution of information between patients and doctors.[2] In the case of the latter, a superior level of information on the part of doctors can lead to a market failure known as "supplier-induced demand", resulting in a greater degree of treatment than is medically necessary.

A number of different objectives were defined with the introduction of the Health Insurance Act (HIA) in 1996. Access to high-quality provision of healthcare was to be guaranteed (provision objective), and persons with modest incomes would be financially supported (solidarity objective). In addition to these distribution objectives, the increase in healthcare expenditure was also to be contained (cost containment objective). In view of the special characteristics of the healthcare market and the legally defined distribution objectives, strong regulation on the part of the state is required. However, there is also a risk of the actual objectives of regulations getting lost under the influence of the various powerful interest groups that exist in the healthcare system, with the result that healthcare expenditure can potentially balloon. In such a scenario, a market failure is then potentially followed by government failures.[3] Given the complexity of the healthcare system, with its numerous players and the associated transaction costs, it is also difficult to design reforms in a precisely targeted way. For example, the complexity of the healthcare system is also evident in the sheer number of decision-makers and sources of financing invol-

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2   For market failures in healthcare and their macroeconomic significance, see Hsiao and Heller (2007). An overview of the various challenges in healthcare systems is provided in Glied and Smith (2013).

3   For a detailed study of distribution aspects, market failures, and government failures in the healthcare system, see Rice (2003).

ved, a situation that has historical origins and makes it more difficult to manage costs and allocate clear responsibilities. Moreover, it should not be forgotten that a rise in the general level of prosperity also leads to a rise in the demands made of the healthcare system by the population.

A key challenge for the public finances and mandatory health insurance (OKP) is the ongoing process of demographic ageing. According to the demographic scenarios of the FSO (A-00-2015), the proportion of people over the age of 80 relative to the Swiss population is set to double from the current level of 5% to 10% by 2045. Whereas in 2013 there were just under three full-time workers for every pensioner (effective old-age dependency ratio), this proportion will fall to just 1.7 to 1 by 2045 given the assumptions of the FSO's "Reference scenario".

Healthcare is therefore a task area that will present financial policy-makers with major challenges for the foreseeable future. For that reason, the healthcare area is also incorporated into the calculations of the sustainability of public finances in Switzerland (FDF 2016). The expenditure projections calculated here provide greater detail in this area, and should highlight the additional future burden on the public finances and mandatory health insurance (OKP) as a result of the expected cost pressures in the healthcare system. This Working Paper also aims to illustrate the adjustment levers with which the development in expenditure can be managed by healthcare policy-makers.

The projections are characterised by significant uncertainties in respect of migration development, the assumption about the economic development, the magnitude of the cost effects, and the modelling of non-demographic determinants in the healthcare system. The latter is particularly true of advances in medical technology. These projections should therefore not be understood as forecasts, but represent an extrapolation of long-term trends and their repercussions for healthcare expenditure. The projections neither can nor should be used to draw any conclusions in respect of the precise magnitude of healthcare expenditure in 30 years' time. The objective is rather to provide a rough orientation for expenditure development and to highlight how sensitively expenditure development reacts to various cost drivers. For that reason, scenarios have been drawn up with differing assumptions regarding the impact of the relevant cost

drivers. For purposes of these projections, it is assumed that the political parameters that apply in the healthcare system will not change compared to the status quo ("no policy change").

Despite this cost-side view, it should be emphasised that a well-functioning healthcare system is of great benefit to society, insofar as it contributes to the preservation and improvement of the population's state of health. By improving the general state of health, healthcare can have a positive impact on economic growth (Suhrcke et al. 2006). For example, a good general state of health is conducive to the formation of human capital and therefore productivity growth. Furthermore, a well-functioning healthcare system helps

a country to exploit the potential of its workforce, such as by reducing illness-related absences, for example. In this sense, rising costs in the healthcare system are not a negative development as long as they can be set against an increase in social well-being of at least a similar magnitude.

Section 2 sets out the projection methodology. Section 3 discusses the key cost drivers and describes the various scenarios. Sections 4 to 6 present the results of the projections for the total healthcare area, the public sector and OKP. A comparison of these results with the predecessor study and the work of the OECD and the EU in this area is provided in Section 7. The paper then ends with conclusions for health policy.

2 Projection methodology

Based on the demographic and economic assumptions (section 2.1), this study adopts a cohort-based approach, thereby mirroring the methodology adopted by the EU (AWG 2015) and the OECD (Section 2.2).

2.1 Assumptions regarding demographic and economic development

In keeping with the Report on the Long-Term Sustainability of Public Finances in Switzerland (FDF 2016), the "Reference scenario" of the Federal Statistical Office (A-00-2015) has been used to capture population development for the projection period 2015–2045 (see Table Annex, Table A1). With this timeframe, the costs of demographic ageing – particularly on the part of the baby-boomer generation, which is set to enter retirement in the coming years – can be captured. According to the "Reference scenario", the Swiss population will rise from its current level of some 8.3 million residents to some 10.2 million residents. The driver of this increase is the positive annual net immigration rate. This declines from an initial 80,000 persons to 60,000 persons by 2030, before then levelling out at around 30,000 persons from 2040 onwards. The population nonetheless ages as a result of a persistently low (in relative terms) birth rate, which works out at around 1.5, along with a rise in life expectancy. As a result, there is a rise in the old-age dependency ratio, i.e. the proportion of the working-age population accounted for by those aged over 65, from just under 29% today to 48% by 2045. In order to take account of the sensitivity of the expenditure projections in respect of uncertainty regarding future development of migration, an alternative population scenario with a higher net immigration balance is additionally assumed (A-06-2015).

The expenditure projections also require assumptions to be made regarding future economic development (see Table Annex, Table A1). These assumptions are the same as those used in the Report on the Long-Term Sustainability of Public Finances in Switzerland (see FDF 2016, Section 2). For the years 2016 to 2019, the key economic figures contained in the federal government's Legislature Financial Plan 2017–19 are used. The growth rate of GDP from 2020 onwards is expressed as a product of assumed economic productivity advances (1.2% p.a.) and the development of the working-age population in full-time equivalents (FTE) indicated by the demographic scenarios. No

economic fluctuations are taken into account with respect to the GDP projections, so a growth trend of GDP is assumed. For the years 2013 to 2019, trend GDP is estimated with the assistance of the so-called "k coefficient" (business cycle adjustment factor) as per Switzerland's debt brake rule.

2.2   Methodology

As a number of different cost drivers (or in some cases the same cost drivers) exercise their influence to a differing extent in different areas of the healthcare system, for purposes of the expenditure projections healthcare expenditure is broken down into the areas of healthcare excluding long-term care (HeL) and long-term care from the age of 65 (LTC). The residual area is therefore that of long-term care for persons aged under 65. On the basis of this breakdown, the total expenditure of each area is projected in a first step. In the next step, the proportion of healthcare expenditure financed by both the public sector and OKP are extrapolated along with the expenditure projected for the total healthcare area.[4]

The healthcare expenditure is taken from the FSO's "Costs and Services of the Healthcare System" statistics. The most recent data available at the time the projections were drawn up dates back to 2013, which is why this year forms the base year for the projections. The graphic illustration of expenditure per capita of population by age is described as the expenditure profile for a given year. For example, in Figure 2 the expenditure profile for outpatient treatment in HeL for women is shown for the base year and for the year 2045 under the "Healthy ageing" scenario. In order to project expenditure for the HeL and LTC areas, the expenditure profiles are further divided up by gender as well as by outpatient and inpatient treatment (see Annex). The latter distinction is required for the projections of public healthcare expenditure. If the per capita expenditure for the age cohorts of these expenditure profiles for the base year are multiplied by the development of the population in the relevant age cohorts as per the FSO's projections, the effect on healthcare expenditure of the change in age structure and population size can be seen. Expenditure per capita of population can

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4   For a detailed description of the projection methodology, see Colombier (2012).

effectively be viewed as the price of supplying the population with healthcare services at a given level. This expenditure per capita of population can then be broken down into the price of services per patient on the one hand, and the scope of service (e.g. treatments, medications) per capita of population on the other.[5] It is therefore assumed that demographic changes affect neither the cost side nor the scope of service per resident side. As a consequence, the cost effect of demographic change expresses how a change in the ageing structure of the population and the number of residents in Switzerland changes total demand for healthcare services. For simplicity's sake, expenditure on long-term care for those aged below 65 is extrapolated on the basis of the change in GDP.

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5   The expenditure per capita by age cohort can be broken down into a price effect and volume effect per patient treated on the one hand, and the probability of falling ill on the other: Expenditure per service («price») x utilisation per patient x patients per capita of an age cohort, whereby the product of utilisation per patient and patients per capita of an age cohort results in the scope of service per capita of an age cohort.

Figure 2: Expenditure profile for outpatient treatment of women in HeL by age in the base year and in 2045 under the "Healthy ageing" scenario (CHF)
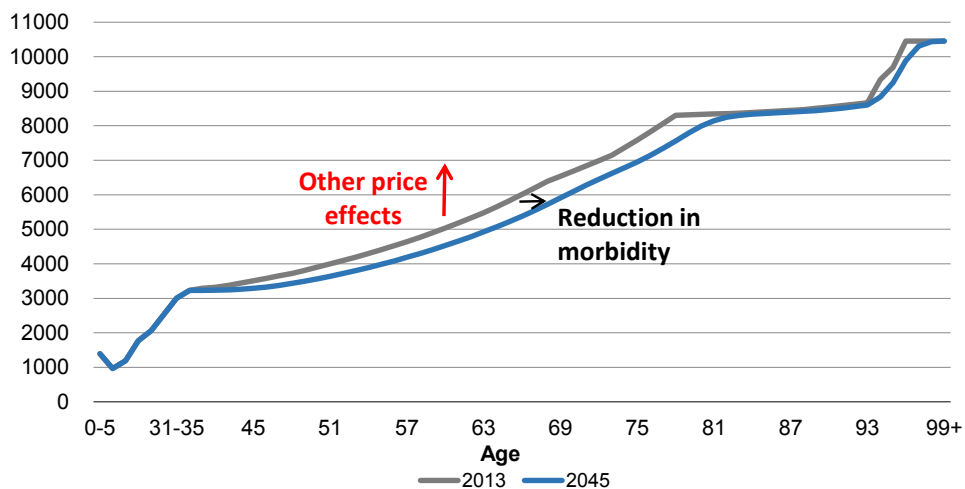
The starting point for the projections is the expenditure profiles broken down by age, gender, and outpatient or inpatient services. The FSO then breaks down these profiles further into five-year age cohorts. According to a number of epidemiological theories, the life expectancy assumed in the demographic scenarios has a close correlation with the development of the population's state of health and need for care (morbidity rate). In order to capture changes in morbidity in the projections adequately, however, healthcare expenditure needs to be annualised. In addition, for the analysis of the impact of

morbidity, the probability of each age group falling ill or requiring care needs to be known. However, information on these illness frequencies is only available in incomplete form, which is why the change in expenditure per inhabitant is used as an approximation for the change in morbidity. In contrast to this study, the EU and the OECD use so-called morbidity rates for the extrapolation of LTC expenditure.

If the state of health of the population improves over the projection period, the expenditure per capita of an age cohort falls, and the expen-

diture profile shifts to the right (see Figure 2). Here it is assumed that the probability of falling ill or requiring care declines. At the same time, for our model this means that a change in morbidity influences neither the expenditure on a medical or care service, nor the degree of utilisation per patient. As the probability of falling ill or requiring care falls, however, so too does the scope of service per capita for an age cohort. The cost pressure exerted by non-demographic cost drivers such as advances in medical technology expresses itself in rising expenditure per capita of an age cohort. As a similar effect of non-demographic cost drivers is assumed for all age cohorts, the expenditure profile accordingly shifts upwards.[6] This increase in expenditure is either caused by rising expenditure per service or by an increasing degree of

utilisation per patient, or by a combination of the two, and has the effect of increasing the price of providing healthcare services for the population. Changes in quality in the provision of services are not taken into account in this approach.[7]

For the HeL area, the annualisation of the expenditure profiles is only undertaken over the age of 40. This is due to the fact that per capita expenditure in the base year 2013 is relatively low up until the age of 40, with a comparatively weak rise, whereas morbidity poses a problem in old age in particular. For the annualisation, it is assumed that the average expenditure of a five-year age cohort corresponds in each case to the expenditure that applies for the median age of this age cohort. For the age cohort "96 and over", it is assumed that expenditure per

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6   There are a number of indications to the effect that the expenditure profile steepens with time, and that the age cohorts are therefore affected to different degrees by the cost pressure of non-demographic cost drivers such as advances in medical technology (e.g. Gregersen 2014). This could imply, for example, that research efforts to develop new medications are particularly focused on medications for the older age cohorts, as old people are disproportionately affected by serious illnesses such as cancer and cardiovascular disease.

7   In the case of a price rise as a result of advances in medical technology, the extent to which the level of provision rises as a result of quality improvements is not clear. Potential quality improvements would have to be offset against the price effect in order to capture the effective price rise. This is an extremely challenging task even for past developments in healthcare expenditure, and goes beyond the methodological approach selected here.

capita remains constant.[8] Due to major differences in life expectancy at different ages, as well as between women and men, morbidity effects are determined not by the change in average life expectancy of the overall population, but by the change in life expectancy based on age and gen-

der. For example, the profile illustrated in Figure 3a shows the per capita expenditure on inpatient hospital care for women and men in the base year 2013. Figures 3b to 3d show the expenditure profiles for the services of care homes and outpatient treatment for HeL and LTC.

Figure 3a: Expenditure profile for inpatient treatment in hospitals – base year 2013 (CHF)

Men   Women

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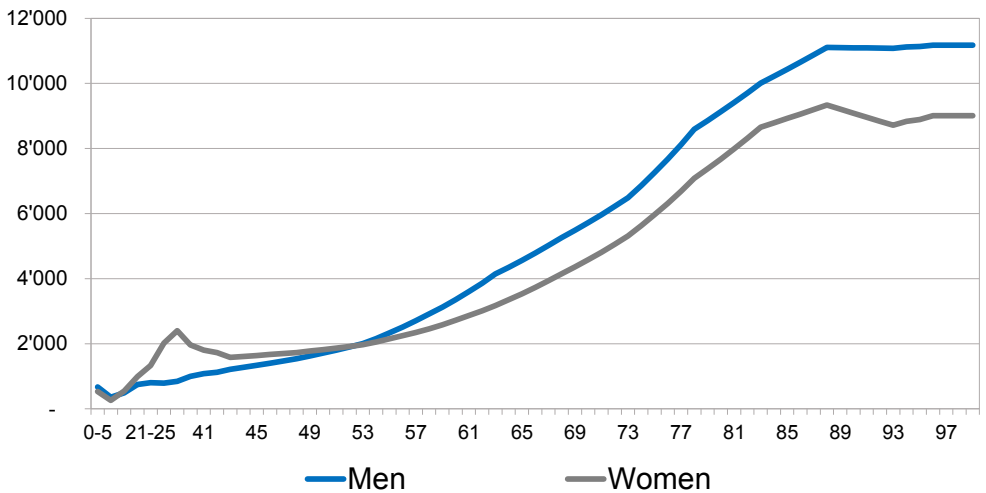
8   The underlying FSO statistics, namely «Costs and Services of Healthcare by Age and Gender», do not go beyond the age cohort «96 and over».

**Figure 3b: Expenditure profile for inpatient treatment in care homes –
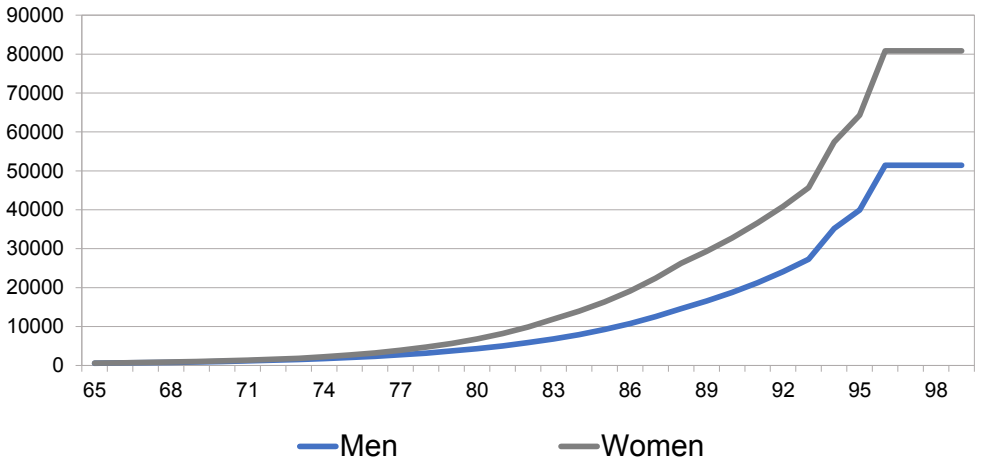base year 2013** (CHF)

**Figure 3c: Expenditure profile for outpatient treatment in healthcare excluding
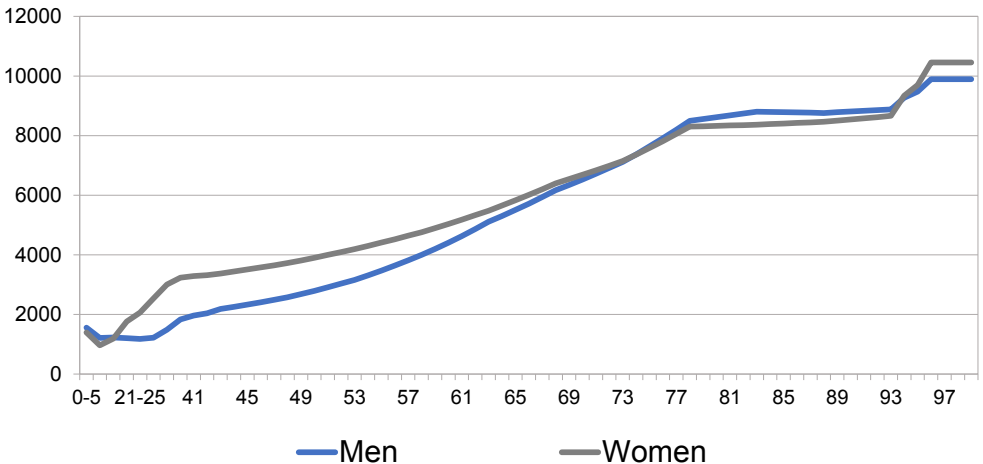long-term care – base year 2013** (CHF)

Figure 3d: Expenditure profile for outpatient treatment in long-term care from the age of 65 – base year 2013 (CHF)
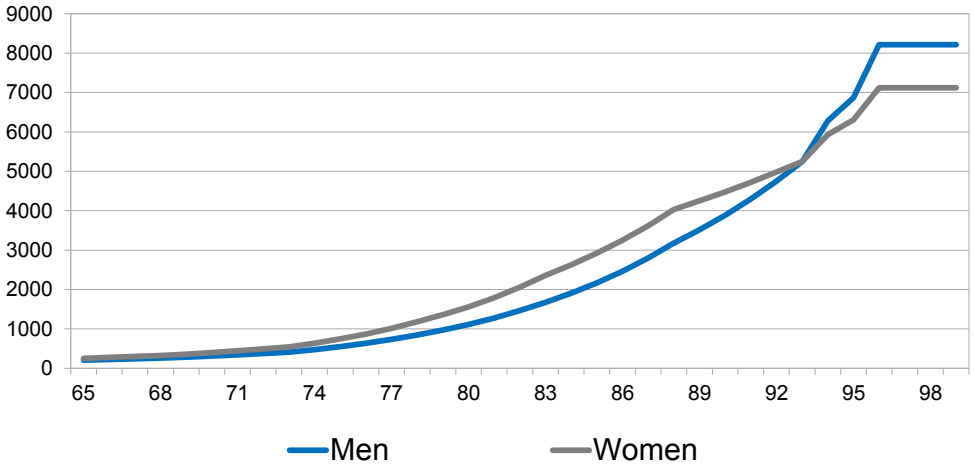
Healthcare expenditure is typically expressed as a proportion of (trend) GDP. GDP is an indicator of national income. Expressing healthcare expenditure as a proportion of GDP shows what proportion of a society's income is effectively spent on health. The extent to which an increase in healthcare expenditure represents an additional burden for society as a whole and for individual sources of financing such as the public sector and OKP can thus also be illustrated. Moreover, if healthcare expenditure is expressed as a percentage of GDP, the effect of population growth on healthcare expenditure is factored out. This can be illustrated very simply: If it is assumed that all age cohorts of the population grow at the same percentage rate, the population structure will not change. Accordingly, the working-age population as a proportion of the total population will remain constant. Correspondingly, the GDP growth resulting from an increase in the working-age population is virtually the same as the increase in healthcare expenditure. As a consequence, population size has no impact on the relationship between healthcare expenditure and GDP.

3 Cost drivers and scenarios

3.1 Cost drivers in healthcare

The key determinants of healthcare expenditure in developed economies as debated in academic literature are ageing, the state of health of the population (morbidity), proximity to death (mortality), income development, advances in medical technology, Baumol's costs disease, and the institutional and political parameters of the healthcare system, such as insurance cover for the population and compensation systems for service providers. However, the extent of the correlation between these different determinants and healthcare expenditure is often far from clear.[9]

Ageing and state of health

In addition to the immediate repercussions of demographic change for healthcare expenditure, the aim is to highlight those effects that can have an expenditure impact as a result of a change in the health situation (morbidity) of an ageing population. Here, the question arises as to whether the morbidity of the population changes in keeping with increasing life expectancy. A number of different competing hypotheses have emerged in this respect. According to the thesis of pure morbidity extension, so-called "pure ageing", the additionally gained years of life are not spent in good health (Gruenberg 1977). The state of health of the population deteriorates. The thesis of a relative reduction in morbidity, so-called "healthy ageing", states that the amount of time spent in a state of illness or in need of care does not change. However, the extra years of life gained are spent in a good state of health (Manton 1982). The thesis of an absolute reduction in morbidity in the event of rising life expectancy is put forward by Fries (1980; 1989), who argues that as a result of better technology and better prevention, the amount of a person's lifetime spent in sickness or in need of care can actually be compressed. The amount of time spent in good health rises more strongly than life expectancy. As there is no clear consensus in empirical studies with respect to the interaction of rising life expectancy and morbidity development, scenarios with different assumptions regarding the change in morbidity have been drawn up.

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9   For an overview, see Martín et al. (2011), De la Maisonneuve and Oliveira Martins (2014), and Gerdtham and Jönsson (2000).

Income development, medical progress, and Baumol's cost disease

Aside from the effects of demographic change, the projections also include the effects of important non-demographic cost drivers. The first non-demographic factor to be taken into consideration is the empirically observable relationship between national income development and healthcare expenditure growth. In the past, the latter grew disproportionately to national income. This relationship covers both supply-side and demand-side effects, such as advances in medical technology and the demand of the population for healthcare services. As advances in medical technology are very difficult to quantify from an empirical standpoint, it is assumed in these projections that the cost effect of advances in medical technology can be indirectly captured through the change in national income development. According to Smith et al. (2009), close interdependencies exist between advances in medical technology and national income: As a society becomes more prosperous, it may be assumed that its demand for medical innovations will rise ("demand pull"). At the same time, as a society becomes increasingly prosperous, so too is there an increase in selling opportunities for healthcare services, which has the effect of increasing the incentive to invest in research and development ("supply push"). Box 1 gives a brief overview of the relationship between income development and healthcare expenditure.

Box 1: Overview of income elasticity of healthcare expenditure

A key question is whether the demand for healthcare services (and therefore healthcare expenditure) rises disproportionately to income, thereby making healthcare services a so-called "luxury good". At an individual level, the extent of income elasticity depends heavily on insurance cover. The greater the degree of insurance cover, the less sensitively demand for healthcare services reacts to changes in income. Where insurance cover is in place, budget restriction kicks in only at the level of the insurance pool. As insurance is mandatory in many developed economies, a strong positive relationship tends to be empirically discernible only at the aggregated, macroeconomic level. Furthermore, the individual income only captures advances in medical technology in an incomplete way – a situation that changes when national income is observed instead.

Early empirical analyses suggest that healthcare expenditure represents a so-called "necessary good" at an individual level and a "luxury good" at aggregated level (see Gerdtham and Jönsson 2000). However, there is no clear consensus on a precise assessment of income elasticity at aggregated level. More recent studies are often based on more comprehensive databases and use advanced empirical methods in order to address problems such as the distortions that arise when important determining factors are neglected or as a result of endogeneity. These studies typically suggest an income elasticity of slightly below 1 (cf. Baltagi and Moscone 2010, Hartwig and Sturm 2014, De la Maisonneuve and Oliveira Martins 2014 for OECD panel analysis, Medeiros and Schwierz for the European Union 2013, Moscone and Tosetti 2010 and Acemoglu et al. 2013 for panel analyses in the US, as well as Costa-Font et al. 2011 for a meta-regression analysis).

In the case of Switzerland, Colombier (2016) uses a time series analysis for total healthcare expenditure to show a systematic, positive partial correlation with national income, whereby the corresponding income elasticity is around 1. For a cantonal panel dataset for the period 1970–2012, Braendle and Colombier (2016) identify – in keeping with the results of the latest research literature – a robust partial correlation between income and cantonal healthcare expenditure, whereby the estimated income elasticity lies just under 1. Vatter and Rueffli (2003), who investigate the determinants of

healthcare expenditure for a cross-section of cantons and communes for the years 1994–1999, find a positive partial correlation between canton income and public healthcare expenditure. Where OKP expenditure is concerned, the authors find a positive but not significant partial correlation. Crivelli et al. (2006) and Reich et al. (2012) investigate the aggregated sum of cantonal healthcare expenditure and OKP expenditure at cantonal level. For a significantly shorter timeframe, namely 1996 to 2002 or 1997 to 2007 (due to the incorporation of OKP data), these studies cannot show any positive correlation between cantonal income and healthcare expenditure.

The second factor concerns productivity development in healthcare. This is difficult to measure empirically, and may indeed differ from area to area. For example, productivity advances in labour-intensive long-term care may be minimal, whereas in the more capital-intensive and technology-intensive hospital sector, productivity gains could reasonably be expected. Lower productivity growth relative to the overall economy results in cost pressure if healthcare wages keep step with wage growth in the remainder of the economy in the longer term. Given a relatively inelastic demand for healthcare services, healthcare prices accordingly rise more strongly than in the remaining economy. In the jargon of healthcare economics, this price effect is known as the "Baumol" effect (Baumol 1967). Significant importance is attached to this effect in the case of long-term care in particular.[10]

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10 Empirical estimates from Switzerland suggest that this effect is only partially applicable in healthcare (see Colombier 2016). Panel analyses for the OECD countries (Hartwig and Sturm 2014; Colombier 2017, Hartwig 2008) and for US federal states (Bates and Santerre 2013) emphasise the significance of the Baumol effect for healthcare expenditure growth.

Determinants and trends not taken into consideration

The thesis that it is not ageing itself that drives up healthcare costs but proximity to death is the subject of considerable attention in academic literature on healthcare economics ("red herring" thesis).[11] It has been pointed out that expenditure per capita is significantly higher for persons who are close to death (mortality cases) than for persons who live longer (survivors). According to the "red herring" thesis, expenditure projections that do not make a distinction between mortality cases and survivors overestimate the ageing effect.[12] However, both the temporal and the macroeconomic dimension are neglected in the corresponding empirical analyses, which leads to different conclusions. Breyer et al. (2015) show that "red herring" literature neglects the impact of continuously rising life expectancy on healthcare expenditure. For example, with rising life expectancy, interventions such as hip operations become worthwhile even at a later stage in life. Breyer et al. (2015) have been able to show the rise in expenditure as a result of ageing through this effect – which they describe as the "Eubie-Blake" effect – for a statutory health insurance dataset in Germany. Colombier and Weber (2011) have also shown (for Swiss data) that the expenditure per mortality case at a high age (above 90 or so) works out below the expenditure per survivor. Accordingly, it is not clear on an a priori basis whether mortality case costs have a restraining effect or a reinforcing effect on total expenditure. According to the demographic scenarios of the FSO, the number of the very elderly increases in line with rising life expectancy. Correspondingly, the ageing effect in an earlier edition of the expenditure projections taking into account mortality cases and survivors was barely any weaker than if this distinction was not made (see Colombier and Weber 2011). Van Baal and Wong (2012) come to a similar conclusion for the Netherlands, showing that the projections do not react very sensitively to the inclusion of mortality

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11 A "red herring" is something that misleads or distracts from the real issue. Healthcare policy is therefore essentially wasting its time by scrutinizing the ageing effect. See for example Zweifel et al. (1999).

12 See Stearns and Norton (2004), Polder et al. (2006) or Breyer and Felder (2006).

costs.[13] In view of the additional data and modelling work involved, therefore, mortality costs have not been taken into consideration in our projections.

Furthermore, institutional and political parameters also play a role in the development of healthcare expenditure. Many institutional differences have been looked at by comparative literature on healthcare economics. Prominent examples here include the repercussions of different insurance and financing regimes, different compensation systems for service providers, and the role of general practitioner models. Clear (empirical) conclusions regarding their cost impact are often not possible, however. No such scenarios have been drawn up for the projections of this study, which takes the existing parameters of the Swiss healthcare system for its basis.

Also not taken into consideration here are trends such as the continuous move away from the tradition of family-based care for the elderly as a result of the increasing female labour participation rate, which goes hand in hand with an increasing burden on institutional care (care homes and Spitex), or medical innovations that have the effect of shifting healthcare treatment from an inpatient to an outpatient basis, such as micro-invasive operations. The degree of uncertainty over the extent and duration of these trends is very high. For example, in the FSO "Reference scenario" (A-00-2015) it is assumed that the female labour participation rate (measured in FTEs) is set to rise by a very small amount between 2015 and 2045, namely from the existing level of just over 40% to 42% (see FSO 2015a, Table TA 13). This does not allow any clear prediction to be made about a future persistent trend of a shift in care for the elderly away from family care to institutional care.

3.2   Scenarios

For the above-mentioned cost drivers, the following assumptions are made for the projections of healthcare expenditure excluding long-term care:

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13 A recent discussion of this can be found in Felder (2013).

- *"Reference scenario"*: With respect to the change in the population's state of health, it is assumed for the healthcare area that the extra years of life gained are spent half in a good state of health and half in a poor state of health. In addition, the increase in national income has a disproportionately high impact on the increase in healthcare expenditure through demand and supply-side effects. An income elasticity of 1.1 is assumed. The Baumol effect is not factored into considerations. Population growth is extrapolated in accordance with scenario A-00-2015 of the Federal Statistical Office.

- In the *"Pure ageing"* scenario, by contrast, it is assumed that the population spends the additional years of life gained in a poor state of health (extension of morbidity).

- In the *"Healthy ageing"* scenario, the population spends the extra years of life gained in good health (relative decrease in morbidity).

- *"Migration" scenario*: In contrast to the "Reference scenario", the "Migration" scenario is based on demographic scenario A-06-2015, which assumes a higher net immigration rate. Due to the sharper increase in the working-age population, economic growth is stronger than in the reference scenario.

- *"Baumol" scenario*: Unlike in the reference scenario, it is assumed that the Baumol effect manifests itself. It is therefore assumed in the Baumol scenario that productivity advances in healthcare (excluding the long-term care area) are some 40% lower than in the economy as a whole.

- *"Expanded Baumol" scenario*: In the area of healthcare excluding long-term care, a Baumol effect of 60% is assumed. The productivity advance in the area of HeL lags behind overall economic productivity advance by 60%.[14] The long-term care area experiences a low advance in productivity (25% of the overall economic average). Only 75% of the Baumol effect manifests itself in the long-term

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14 According to an empirical analysis for Switzerland, this is the highest possible estimated value for the Baumol effect that is still compatible with the sample (see Colombier 2016).

care area. This figure is based on the level of staff costs as a proportion of overall costs in the care home area (see Credit Suisse 2015, p. 27).

- *"Cost pressure" scenario*: In this scenario, is it assumed that non-demographic cost determinants – such as advances in medical technology, an increase in doctor densities as a result of the incentives that exist in the healthcare system, and the increasing degree to which the population draws on healthcare services – trigger significantly stronger expenditure growth than in the reference scenario. This in turn translates into expenditure rising more strongly in the event of rising income. Based on the corresponding European Commission scenario, income inelasticity of 1.4 is assumed (see AWG, 2015, p. 126).

The same assumptions regarding demographics and morbidity (i.e. the need for care) used for the area of healthcare excluding long-term care are also applied to the scenarios for long-term care itself. However, other than in the "Expanded Baumol" scenario, it is assumed in the scenarios for long-term care that no productivity advances are achievable, and that the Baumol effect is therefore fully effective. In addition, no income effect comes into play in the long-term care area, as the need for care is not voluntary and is independent of income. Accordingly, no "Cost pressure" scenario is drawn up for the long-term care area.

4   Total healthcare expenditure

The projections for healthcare expenditure reveal that the development pattern of the past will continue. According to the "Reference scenario", expenditure will rise from 10.8% of GDP in 2013 to 14.0% of GDP in 2045 (see Figure 4). For the years 1995 to 2013, health expenditure rose from 8.7% of GDP to 10.8% of GDP (whereby GDP is cyclically adjusted). A distinction can be made between two different phases over this timeframe: Between 1995 and 2004, the healthcare sector underwent a significant expansion. Expenditure on healthcare rose by 1.7% of GDP. Thereafter the proportion of GDP accounted for by healthcare expenditure actually declines, and not until 2012 does it rise back above the level it reached back in 2004. This development is attributable primarily to the fact that nominal economic growth between

2005 and 2013 (+3.0%) proved significantly higher than the average for the period 1995 to 2004 (+2.2%). At the same time, the average annual increase in healthcare expenditure slowed slightly from 4.0% to 3.5%. The latter development is attributable to the fact that the momentum of expenditure growth for outpatient and inpatient healthcare services (excluding the long-term care area) slowed significantly, namely from 4.1% to 3.4%. By contrast, annual growth in expenditure on long-term care remained more or less unchanged at around 4.7%. Accordingly, the proportion of expenditure on long-term care as a total of healthcare expenditure increased from 13% to 15% between 2005 and 2013, whereas it rose just one percentage point between 1995 and 2004.

Figure 4: **Healthcare expenditure by area from 1995 to 2013 and in reference scenario** (in GDP %)
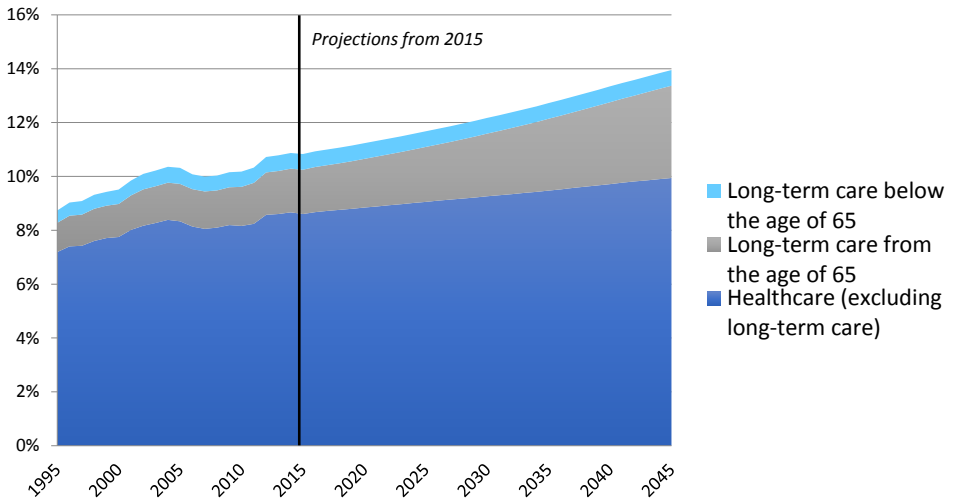
According to the reference scenario, the trend towards significantly higher expenditure growth for long-term care (from 65 years of age) than for healthcare excluding long-term care will continue in the future. Measured as a percentage of GDP, expenditure on long-term care (from the age of 65) more than doubles (rising from 1.6% to 3.4% of GDP), while healthcare expenditure rises from 8.6% to 9.9%. On the one hand, demographic change (ageing, including the associated change in the average state of health) feeds through into the long-term care area to a much greater extent (72% of the rise in expenditure) than it does in the remaining healthcare area (just under 60% of the rise in expenditure). On the other hand, expenditure on long-term care rises by 2.2% annually as a result of the Baumol effect, whereas expenditure on healthcare as a result of rising income per capita rises by just under 1.9% annually.

Figure 5:   Scenarios for total healthcare expenditure 2013–2045 (in GDP %)
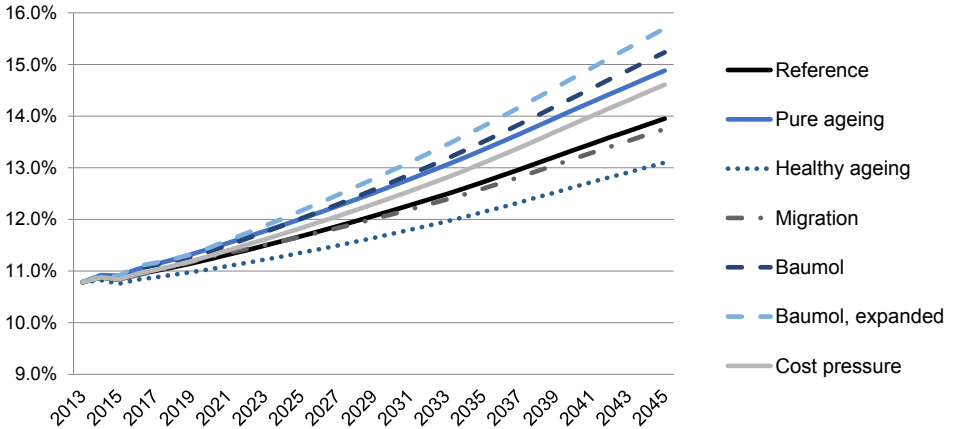
In order to reflect the uncertainty that exists over the future development of healthcare expenditure, various different scenarios are applied (see Figure 5). In the most optimistic scenario, healthy ageing, healthcare expenditure increases by only 13.1% of GDP rather than 14.0% of GDP (as in the "Reference scenario"), thanks to the improved state of the population's health by 2045. In the most pessimistic scenario, the "Expanded Baumol" scenario, healthcare expenditure rises by 15.7% of GDP by 2045. The pronounced Baumol effect in the larger area, HeL, is a significant contributor to this increase.

**Figure 6: Breakdown of expenditure by financing source in 2008, 2013 and
in reference scenario (2045)** (in %)
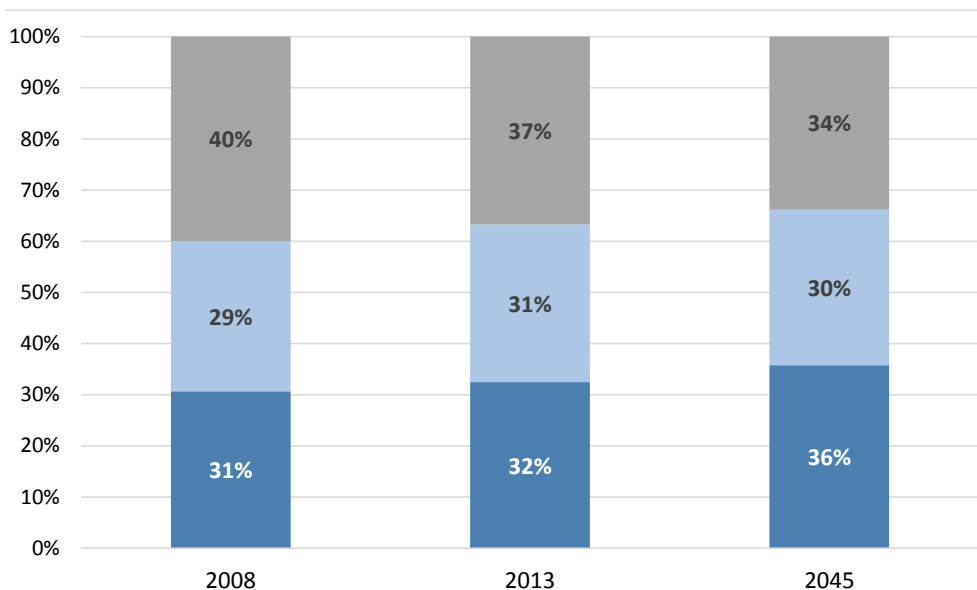
Notes: The source *Other* includes private households, the accident insurance (SUVA) and military insurance,
foundations and supplementary insurances.

The breakdown in healthcare expenditure by source of financing in Figure 6 shows that the proportion of expenditure met by OKP and the government increased from 60% to 63% between 2008 and 2013.[15] This is attributable in particular to the healthcare policy reforms, namely the new care financing model and the new hospital financing model ("Swiss DRG"), which were introduced in 2011 and 2012 respectively.

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15 For a detailed overview of expenditure development in the «Reference scenario» by
healthcare area and financing source, see Table Annex, Table A2.

According to the projections, government healthcare expenditure also rises by a very disproportionate amount by 2045 when compared to OKP expenditure. This is explained primarily by the fact that the proportion of expenditure accounted for by long-term care (from the age of 65) is significantly higher for the general government sector in the base year 2013 (23%) than it is in the case of OKP (9%) and healthcare overall (15%).

4.1   Healthcare excluding long-term care

The HeL area encompasses expenditure on inpatient treatment in hospitals (including psychiatric clinics), outpatient treatment (in medical practices and hospitals, physiotherapy, psychotherapy), medicines, therapeutic devices, dental treatment, administration, prevention, and other services such as laboratory services, transport and

rescue. Expenditure on administration, prevention, and other services, which accounted for some 18% of expenditure on HeL in the base year 2013, is extrapolated on the basis of GDP, as these areas are not exposed to the same cost drivers as the other areas of healthcare. For simplicity's sake, the same approach is used for expenditure on dental treatment – which is negligible for the expenditure of the public sector and OKP – and expenditure on institutions for the disabled and other institutions.[16]

According to the "Reference scenario", expenditure on HeL rises from 8.6% of GDP in 2013 to 9.9% of GDP in 2045 (see Figure 7). Expenditure on inpatient treatment in hospitals and outpatient treatment rises by different degrees on the basis of different expenditure profiles in the base year (see Figures 3a and 3c). Expenditure on outpatient treatment increases in the observed period from 4.3% to 4.9% of GDP. Expenditure

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16 Dental treatment accounts for a very low proportion of public expenditure at the moment, namely 1%, while for OKP it is even lower at 0.3%.
In addition to the institutions for the disabled, the heading «institutions for disabled and other institutions» includes establishments for addicts and people with psychosocial problems. This heading therefore also includes expenditure on long-term care for those below the age of 65, as well as on short-term care and medical services, which makes clear assignment difficult. For simplicity's sake, this heading has been assigned to "other expenditure" in the HeL area. In 2013 this expenditure amounted to just under 0.6% of GDP.

on hospitals rises from 3.0% of GDP in 2013 to 3.7% of GDP in 2045. It should be noted that the dynamism of expenditure for hospitals is on average rather higher (nominal 3.0% rise annually) than it is for outpatient treatment (2.8%). Accordingly, the relative significance of hospital expenditure rises slightly against a backdrop of an ageing population. The relative weighting of other healthcare expenditure, such as for administration and prevention, declines slightly. The share of expenditure accounted for by outpatient treatment remains constant.

Figure 7: Scenarios for healthcare expenditure excluding long-term care 2013–2045 (in GDP %)
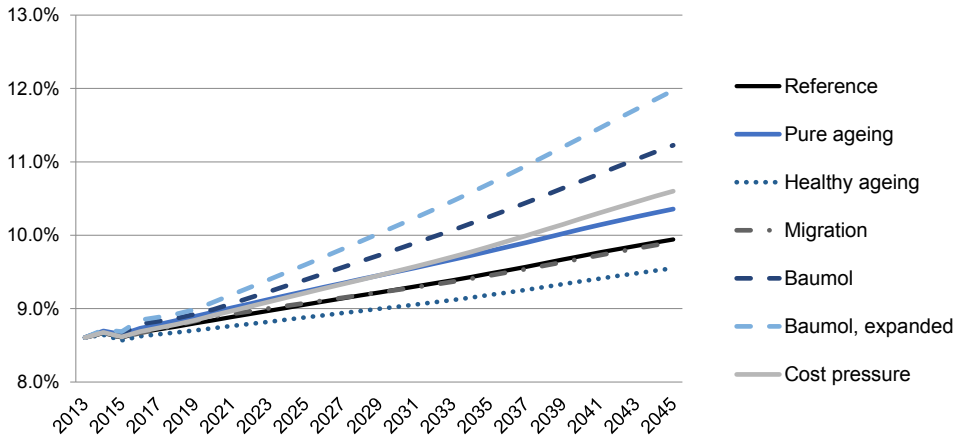
The range between the most optimistic scenario (healthy ageing) and the most pessimistic "Expanded Baumol" scenario amounts to 2.4% of GDP in 2045 (see Figure 7). A striking feature is that changes in assumptions in respect of the Baumol effect and income elasticity have a greater impact on expenditure development in the HeL area than a change in morbidity assumptions with increasing life expectancy. In the "Pure ageing" scenario, expenditure increases more strongly up to 2045 (10.4% of GDP) than in the "Reference scenario" (9.9% of GDP). For

the "Cost pressure" scenario, the "Baumol" scenario and the "Expanded Baumol" scenario, the differences vis-à-vis the "Reference scenario" are significantly greater at +0.7%, +1.3%, and +2% of GDP respectively. These scenarios show that, compared to the "Reference scenario", greater cost pressure can arise over the long term as a result of non-demographic determinants such as the Baumol effect and advances in medical technology. The rise in expenditure in the "Cost pressure" scenario is weaker than in the Baumol scenarios, since per capita income (on an inflation-adjusted basis) rises less strongly each year on average (0.9%) than productivity and therefore wages (1.2%). While the development of labour productivity and wages is key to the Baumol effect, the impact of the other non-demographic cost drivers such

as advances in medical technology is captured in these projections via per capita income. A healthy ageing of the population as per the eponymous scenario would slow the rise in expenditure in the HeL area by just under 0.4% of GDP by 2045. By contrast, higher net immigration, as assumed in the "Migration" scenario, has virtually no impact. It is assumed that the net immigration figure primarily relates to persons of a working age. As a consequence, the ageing structure of the population changes, giving rise to two effects on HeL expenditure that virtually cancel each other out (in GDP terms): On the one hand, demand for healthcare services rises due to the larger population, while on the other hand aggregated GDP rises more strongly than in the "Reference scenario", as the people coming to Switzerland are primarily of a working age.

Figure 8: Contributions to the inflation-adjusted rise in healthcare expenditure 2013–2045 (in %)
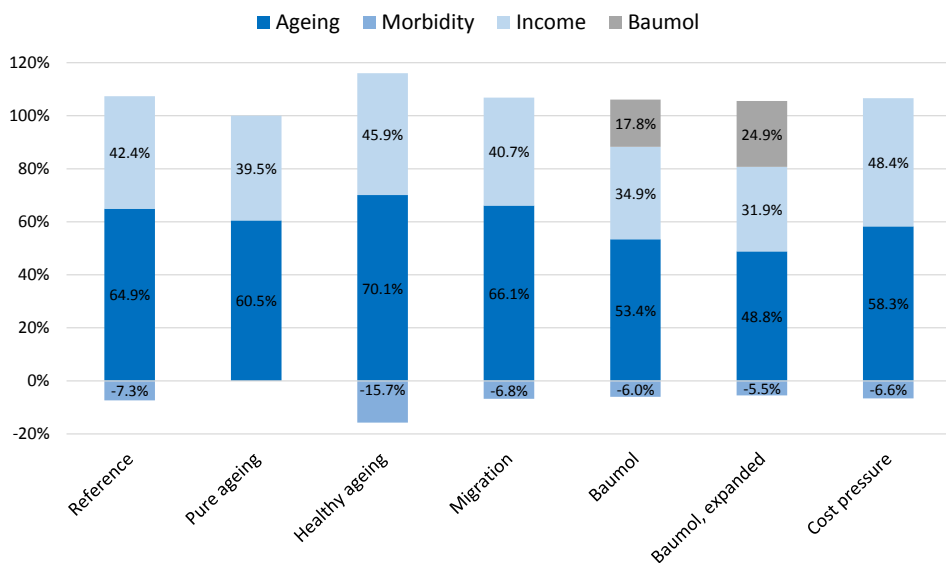
Irrespective of the hypothesised scenario, ageing contributes to the rise in inflation-adjusted expenditure most strongly in the HeL area (see Figure 8). The higher the cost pressure of the non-demographic cost drivers (income and Baumol effect), the lower the relative ageing effect. As is clear from the breakdown of gross contributions of the two Baumol scenarios, the income effect remains the strongest non-demographic cost driver. This is attributable to the fact that the HeL area is assumed to be not wholly affected by Baumol's cost disease.

4.2   Long-term care from the age of 65

The long-term care area comprises expenditure on inpatient services in care homes as well as care services delivered on an outpatient basis (Spitex). It should be noted that the definition of long-term care applied here is restricted to expenditure in respect of persons who are 65 or

older. In the base year 2013, the total expenditure on long-term care (from the age of 65) amounts to 1.6% of GDP. Of this amount, approximately 85% relates to care homes and the remainder to the Spitex area.

Long-term care is more affected by the ageing of society than other areas of healthcare. The ageing of the generation born in the baby-boomer years (from the end of the 1940s to the mid-1960s) and a further increase in life expectancy will lead to a strong rise in the age cohorts above the age of 80 over the next few decades. The cost-driving impact of demographic change is strengthened by the development of wage costs, as in the scenarios for long-term care it is assumed that no (or only minor) productivity advances are achievable in this labour-intensive area. With a full Baumol effect, i.e. with no productivity advances, the cost growth in the LTC area sees the wages of healthcare employees increase in step with wages in the remainder of the economy. A combination of this full Baumol effect and demographic change leads to an average nominal growth rate of 4.8% annually in the "Reference scenario" over the entire projection period – a much greater degree of

expenditure dynamism than is apparent in the case of expenditure on HeL (2.8%). Accordingly, total expenditure on long-term care rises to 3.4% of GDP by 2045 in the "Reference scenario".

The change in the need for care (morbidity rate) is one of the greatest levers for influencing expenditure development in long-term care (see Figure 9). While expenditure on long-term care rises strongly in the "Pure ageing" scenario to 3.9% of GDP by 2045, expenditure in the "Healthy ageing" scenario rises to just 3% of GDP. With greater net immigration ("Migration" scenario), the rise in expenditure compared to the "Reference scenario" can hardly be restrained. As net immigration primarily involves persons of a working age, GDP rises, which in turn leads to a slight reduction in expenditure on long-term care as a proportion of GDP. In the "Expanded Baumol" scenario, only a partial Baumol effect in long-term care is hypothesised. Unlike in the "Reference scenario", a certain advance in productivity in the long-term care area is assumed. In this scenario, expenditure on long-term care is projected to rise to 3.1% of GDP by 2045.

Figure 9: Scenarios for long-term care expenditure (from the age of 65) 2013–2045 (in GDP %)
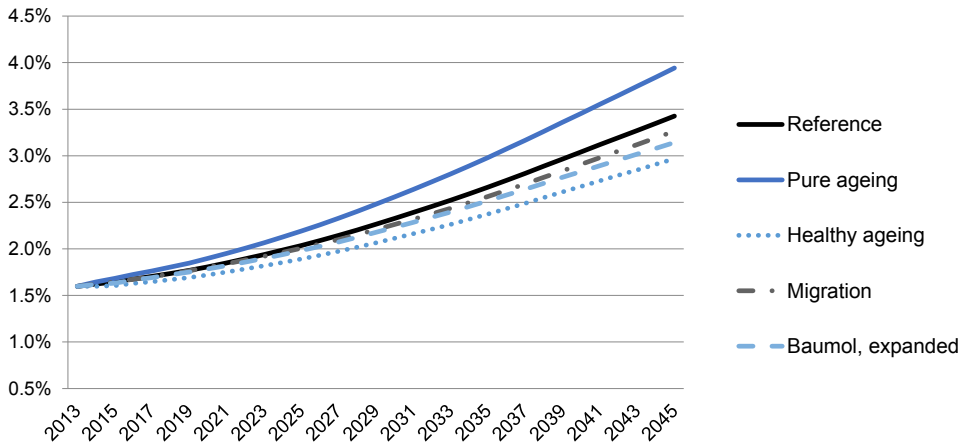
When looking systematically at the contributions of the individual cost drivers, it emerges clearly that ageing and morbidity have a stronger impact in the long-term care area than they do in the area of health-care excluding long-term care (see Figure 10). As in the "Healthy ageing" scenario, the process of ageing can explain up to 94% of the inflation-adjusted rise in expenditure by 2045. Apart from in the "Pure ageing" scenario, however, the cost-driving ageing effect is partly offset in all scenarios by a reduction in the need for care. In the "Healthy ageing" scenario, 68% of the contribution to the rise is explained by demographic cost drivers (ageing plus morbidity). Depending on the scenario, between just under 23% ("Expanded Baumol" scenario) and 32% ("Healthy ageing" scenario) of the price-adjusted rise in expenditure between 2009 and 2045 can be explained by the Baumol effect.

Figure 10: Contributions to the inflation-adjusted rise in expenditure in long-term care (from the age of 65) 2013–2045 (in %)
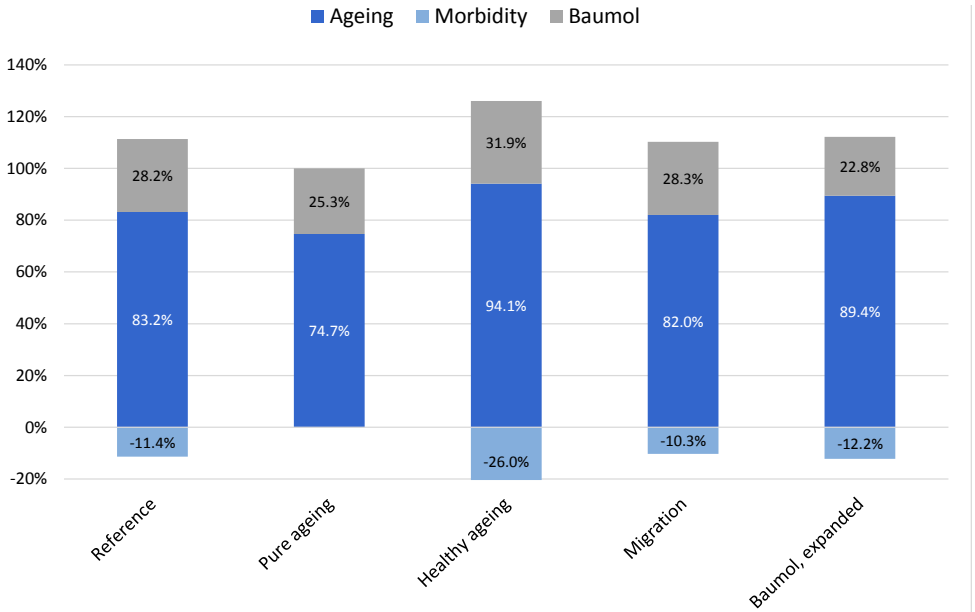
5 Public healthcare expenditure

Public expenditure on healthcare comprises all contributions of the federal government, cantons and communes, as well as the social security funds for financing healthcare. For each of the three levels of government, the expenditure figure in question is that contained under the "Health" section of the national financial statistics (FFA, 2015). Also included are government transfers to private households designed to finance healthcare benefits, such as individual premium reductions and cantonal AHV supplementary bene-fits. Where the social security funds are concerned, the relevant areas are those which belong to the government sector and receive payments from the government sector as per the national accounts. The scope is therefore essentially restricted to AHV and IV.[17] Just like overall expenditure, public healthcare expenditure is broken down into the areas of healthcare excluding long-term care, and long-term care from the age of 65. Other public sector contributions to healthcare, such as preventive measures and administration, are extrapolated in line with GDP.

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17 In contrast to the terminology used in the Federal Health Insurance Act (HIA, Art. 1), OKP does not form part of social insurance in the national accounts. OKP is therefore not included under the social insurance heading in this report.

**Figure 11: Breakdown in public healthcare expenditure by function in
reference scenario, 2013 and 2045** (in %)
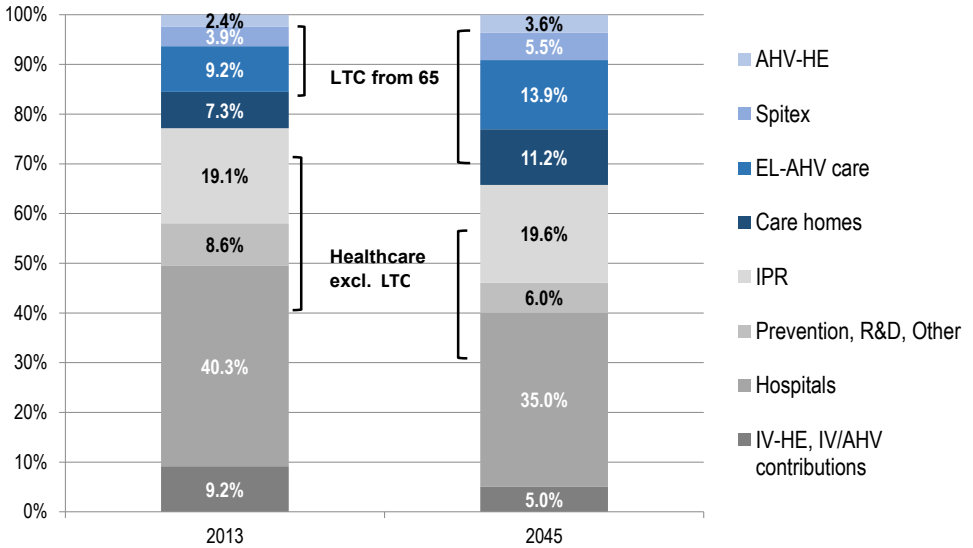
As is clear from Figure 11, the public sector devotes the greatest proportion of its healthcare expenditure to hospitals (40%), followed by individual premium reduction (IPR) (19%), AHV supplementary benefits for care (EL-AHV care) (9%), care homes (7%), and Spitex (4%). The remaining contributions come from the social security funds and encompass the AHV allowance for the helpless (2%) and IV expenditure (IV allowance for the helpless, IV contributions, AHV contributions) on healthcare (9%). A striking point to note

according to the "Reference scenario" is that in 2045 the public sector will have to spend a far greater proportion of its budget on long-term care from the age of 65. On an inflation-adjusted basis, national expenditure on long-term care from the age of 65 rises by an annual average of 4%, more strongly than expenditure in the HeL area (2.1%). Instead of the current level of 23%, the share of expenditure accounted for by care is projected to rise to 34% in 2045. Accordingly, the proportion of expenditure accounted

for by healthcare excluding long-term care is lower in 2045, having declined from 68% to 61%. IV expenditure on healthcare falls from 9% to 5%.

According to the reference scenario, general government expenditure rises over the projection timeframe continuously, namely from 3.5% of GDP to 4.2% of GDP in 2030, and up to 5.0% of GDP by 2045 (see Table 1). The lion's share of general government expenditure here is borne by the cantons, namely 68%. For example, a good two thirds of the increase in public healthcare spending up to 2045, or 1.1% of GDP, is shouldered by the cantons. Where the cantons are concerned, the proportions accounted for by hospitals (2013 share: 58%), AHV supplementary benefits (14%), individual premium reductions (12%) and care homes (5%) are of significance.

Table 1:   Public healthcare expenditure by government level in reference scenario for 2013, 2030, 2045 (in GDP %)

	2013	2030		2045	
	Ratio	**Ratio**	**Change 2013-30**	**Ratio**	**Change 2013-45**
Total healthcare	10.8	12.2	+1.4	14.0	+3.2
Government (incl. social sec. funds)	3.5	4.2	+0.7	5.0	+1.5
Confederation	0.4	0.5	+0.1	0.5	+0.1
Cantons	2.4	2.9	+0.5	3.5	+1.1
Communes	0.3	0.4	+0.1	0.5	+0.2
Social security funds*	0.4	0.3	-0.0	0.4	+0.0
AHV-HE	0.1	0.1	+0.0	0.2	+0.1
IV-HE, IV/AHV contributions	0.3	0.2	-0.1	0.2	-0.1

* The social security funds comprise AHV contributions and the AHV-HE, IV contributions and the IV-HE.

The remainder of healthcare expenditure is currently borne more or less equally by the Confederation, the communes and the social security funds. Following the cantons, the greatest increase in expenditure is exhibited by the communes, whose share in this area almost doubles by 2045 (rising from 0.3% to 0.5% of GDP). The strong increase in expenditure at commune level can be explained by the fact that more than half of healthcare expenditure is allocated to long-term care from the age of 65. At federal level, the increase as a proportion of GDP is equivalent to around a quarter, which is attributable to individual premium reductions. The expenditure of the social security funds remains stable as a proportion of GDP, as the increase in the AHV allowance for the helpless is offset by the reduction in IV expenditure (long-term care below the age of 65).

Figure 12: Public healthcare expenditure in various scenarios (in GDP %)
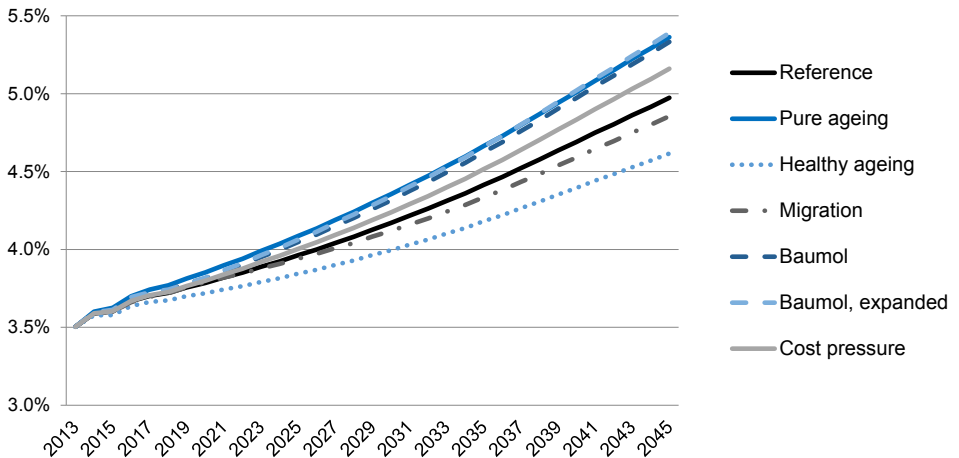
It can be seen in Figure 12 that the rise in public healthcare expenditure works out differently depending on the scenario applied. The span between the most optimistic "Healthy ageing" scenario and the most pessimistic "Pure ageing" scenario amounts to a good 0.7% of

GDP in 2045. This is the equivalent of 15% of all expenditure of the public sector in the reference year 2045, or an inflation-adjusted CHF 7.7 billion.

The strongest impact on the development of public healthcare expenditure can be seen with a change in hypotheses concerning i) the correlation between the increase in the population's life expectancy and its state of health, and ii) the assumption of a Baumol effect in the HeL area. If it is assumed that while the population may be older in the future, it will be neither healthier nor less in need of care than the present population ("Pure ageing" scenario), expenditure as a percentage of GDP rises by almost a third compared to the "Reference scenario" in 2045 (+0.4% of GDP). By contrast, if the population lives out its additional years of life in good health and does not require care during these years ("Healthy ageing" scenario), the increase in expenditure is around a third lower than in the "Reference scenario" (-0.4% of GDP). Government expenditure rises slightly more than in the "Pure ageing" scenario if a substantial Baumol effect of 60% is assumed for HeL, together with lower productivity advances in the area of long-term care from the age of 65 (25% of average advance in productivity ("Expanded Baumol" scenario). The rise in expenditure works out almost as strong if a slightly weaker Baumol effect in the HeL area is assumed, namely 40%, together with a complete Baumol effect in long-term care ("Baumol" scenario). A rise in expenditure compared to the "Reference scenario" is likewise evident (+0.2% of GDP) if stronger cost pressure on the part of non-demographic determinants is assumed ("Cost pressure" scenario), such as advances in medical technology.[18] A higher net immigration rate than in the reference scenario ("Migration" scenario) has a slightly cost-restraining effect.

Overall, demographic change is more significant for public healthcare

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18 It should be emphasised that the additional increase in expenditure in the «Baumol» and «Cost pressure» scenarios relative to the «Reference scenario» is exclusively incurred in the area of healthcare excluding long-term care. In the area of long-term care from the age of 65, the assumptions remain the same as in the «Reference scenario».

expenditure than it is for total healthcare expenditure. The reason for this is that the proportion of public expenditure accounted for by long-term care from the age of 65 is 23%, much higher than in the overall healthcare area (just under 15%). Accordingly, a change in the state of health against a backdrop of increasing life expectancy has significant repercussions for general government expenditure. A change in non-demographic cost drivers (Baumol effect, income effect) has a particularly strong impact on general government expenditure in the hospitals area. At around 40%, the share of public sector expenditure accounted for by hospitals is currently relatively high when compared to the equivalent percentage of hospital expenditure for healthcare as a whole (just under 28%).

5.1   Public expenditure on healthcare excluding long-term care

Public healthcare expenditure excluding long-term care has been captured by taking the expenditure items listed in the "Health" section of the public financial statistics with the exception of the items "Convalescent and nursing home services" and "Outpatient care" (Spitex) (FFA, 2015). In addition, individual premi-

um reduction (IPR) expenditure, which is included under the function "Social welfare" in the financial statistics, has also been taken into account. The inclusion of IPR is justified on the basis that this expenditure is heavily influenced by healthcare expenditure, particularly by the area of healthcare excluding long-term care. For the sake of simplicity, IPR expenditure has been subsumed into national healthcare expenditure. Under this approach, the healthcare expenditure of the public sector now comprises three items: hospitals, IPR expenditure and other healthcare expenditure including preventive healthcare.

Public expenditure on hospitals is linked to the development of overall hospital expenditure, while other healthcare expenditure is linked to the development of nominal GDP. The development of IPR expenditure is dependent on the development of mandatory health insurance expenditure. For the sake of simplicity, it is assumed that the cantonal share of IPR expenditure, which currently lies at around 46%, amounts to 50% over the long term. In other words, the Confederation and cantons are each assumed to be financing half of IPR expenditure. This assumption has been made because the cantons have a greater degree of discretion

when it comes to setting conditions for the granting of IPR benefits, which makes it difficult to arrive at a reliable forecast regarding the development of the cantonal share.

Table 2:   Public healthcare expenditure excluding long-term care by government level and function reference scenario (in GDP %)

	2013	2030		2045	
	Ratio	Ratio	Change 2013-30	Ratio	Change 2013-45
Healthcare (excluding long-term care)	8.6	9.3	+0.7	9.9	+1.3
General government	2.4	2.7	+0.4	3.0	+0.6
Confederation	0.4	0.5	+0.1	0.5	+0.1
Cantons	1.9	2.1	+0.3	2.3	+0.5
Communes	0.1	0.1	+0.0	0.1	+0.0
Function					
Hospital	1.4	1.6	+0.2	1.7	+0.3
IPR	0.7	0.9	+0.2	1.0	+0.3

Public expenditure on HeL rises in the "Reference scenario" from 2.4% to 3.0% of GDP by 2045 (see Table 2). A good 60% of this rise in expenditure is attributable to the ageing of the population. The remainder of the increase can be explained by non-demographic cost drivers such as advances in medical technology and the rise in demand for medical services by the population in keeping with rising incomes. One factor holding back the rise in expenditure in the "Reference scenario" is the assumed partial improvement in people's state of health as life expectancy increases.

As expected, the rise is highest for cantonal expenditure in this area, namely +0.5% of GDP. While two thirds of this increase are attributable to hospital expenditure, a good third is due to the rise in IPR. By contrast, the increase in the expenditure of the Confederation and the communes, something already touched on in the previous section, is relatively small. The expenditure of the communes rises slightly as a result of an increase in hospital expenditure. When general government expenditure is broken down by function, it emerges that hospital expenditure and IPR

expenditure rise by a similar amount
by 2045, namely 0.3% of GDP in
each case.

Figure 13: Public healthcare expenditure excluding long-term care in
         various scenarios (in GDP %)
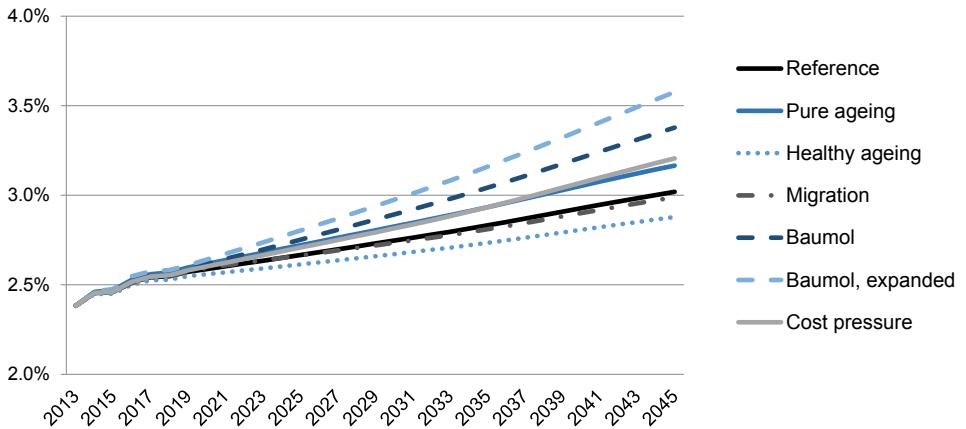
The uncertainty surrounding the
expenditure projections manifests
itself in the results of the different
scenarios (see Figure 13). A change
in non-demographic cost drivers has
a much stronger impact on public
expenditure on HeL than a change in
the population's state of health
against a backdrop of rising life
expectancy. In the most pessimistic
scenario, the "Expanded Baumol"
scenario, which assumes a partial
Baumol effect of 60%, the rise in
public expenditure by 2045 (just
under 1.2% of GDP) works out twice
as high as the rise in expenditure in
the "Reference scenario" (+0.6% of
GDP). If the Baumol effect were to be
somewhat weaker (40% effect), the
rise would still be 0.4% of GDP
higher than in the "Reference scena-
rio". In the event of increased cost
pressure – such as advances in
medical technology or rising needs
on the part of the population – in the
"Cost pressure" scenario, as well as
in a situation where the general state
of health does not improve against a
backdrop of rising life expectancy
("Pure ageing" scenario), the increa-

se in the rise in expenditure compared to that of the "Reference scenario" works out higher at just under 0.2% and just over 0.1% of GDP respectively. By contrast, a good state of health on the part of population has the effect of holding back expenditure increases. In the "Migration" scenario, as with expenditure on HeL overall (see Section 4.1), the effects of an increasing working-age population drives up public expenditure on HeL, but this is offset by an increase in GDP.

5.2   Public expenditure on long-term care from the age of 65 (LTC)

According to the financial statistics, public expenditure in the area of long-term care from the age of 65 comprises the proportion of expenditure of the cantons and communes allocated to convalescent and nursing home services, as well as outpatient care (Spitex), where this care is provided to people over the age of 65 (FFA, 2015). Here it is assumed that the proportion of public expenditure spent on those aged 65 or older corresponds to the relevant proportion of overall care expenditure. According to our estimates, just under 90% of all expenditure on long-term care is accounted for by long-term care for those aged 65 or

older. In addition, public expenditure on long-term care includes the cantons' AHV supplementary benefits, which are subsumed under the "Social security" function in the financial statistics, and AHV allowances for the helpless.

From Table 3 it is apparent that government expenditure as a proportion of GDP increases by a half by 2030 (i.e. from 0.8% to 1.2% of GDP) and more than doubles by 2045 (to 1.7% of GDP). Corresponding to healthcare, the cantons currently bear the greatest share of public expenditure in long-term care from the age of 65, namely 70%. Accordingly, some two thirds of the increase in public expenditure on the long-term care area, or 0.6% of GDP, is felt at a cantonal level. Where the rise of cantonal expenditure is concerned, almost two thirds is attributable to the increase in AHV supplementary benefits. The remaining third is explained by an increase in cantonal expenditure on care homes and (to a lesser extent) by an increase in Spitex. The expenditure of the communes actually doubles as a percentage of GDP, from 0.2% to 0.4%. Three quarters of this dynamism relates to the development of expenditure on care homes and the remaining quarter to expenditure on Spitex. From a low starting level of

0.1% of GDP, AHV helpless allowance expenditure doubles by 2045. The lower section of Table 3 also shows the development of public long-term care expenditure broken down by function.

Table 3:   Expenditure on long-term care from the age of 65 by government level and function in reference scenario (in GDP %)

	2013	2030		2045	
	Ratio	**Ratio**	**Change 2013-30**	**Ratio**	**Change 2013-45**
Long-term care from the age of 65	1.6	2.3	+0.7	3.4	+1.8
General government	0.8	1.2	+0.4	1.7	+0.9
Cantons	0.5	0.8	+0.2	1.1	+0.6
Communes	0.2	0.3	+0.1	0.4	+0.2
AHV-HE	0.1	0.1	+0.0	0.2	+0.1
Function*					
Care homes	0.3	0.4	+0.1	0.6	+0.3
Spitex	0.1	0.2	+0.1	0.3	+0.1
EL-AHV	0.3	0.5	+0.2	0.7	+0.4

*   For purposes of simplification the AHV-HE function is left out, as this expenditure heading already appears in the breakdown by government level.

The uncertainty of the projections is expressed in the fact that the increase in public expenditure on long-term care in the most pessimistic "Pure ageing" scenario up to 2045 is as much as 0.2% of GDP higher than in the "Reference scenario", while in the most optimistic "Healthy ageing" scenario it is 0.2% of GDP lower. In contrast to the "Reference scenario", the "Expanded Baumol" scenario assumes only a partial Baumol effect in the long-term care area, which is why public expenditure on long-term care works out 0.1% of GDP lower here than in the "Reference scenario".

Figure 14: Public healthcare expenditure on long-term care in various scenarios (in GDP %)
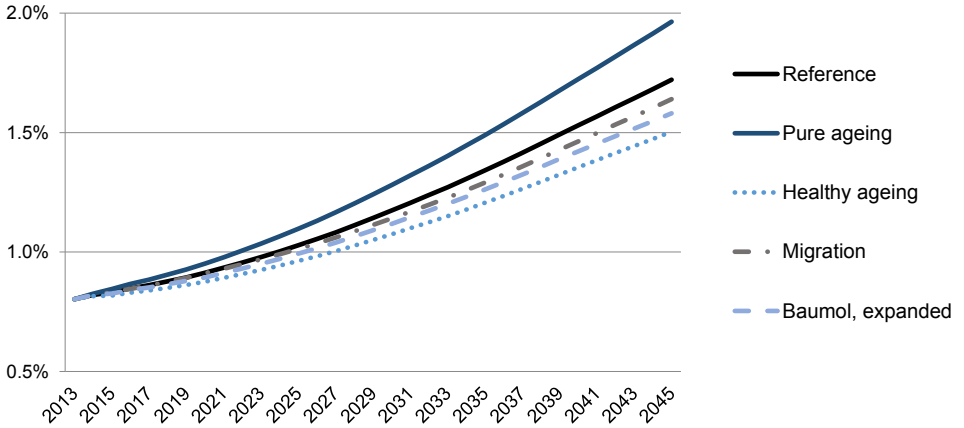
6 Mandatory health insurance (OKP) expenditure

For the purposes of the projections, mandatory health insurance (OKP) expenditure in the areas of healthcare excluding long-term care and long-term care from the age of 65 is broken down into outpatient and inpatient services. For the base year, the breakdown of expenditure has been taken from the statistics of the Federal Statistical Office entitled "Healthcare costs and financing by service and financing regime 2013" (FSO 2015b). In order to avoid the problem of duplicating general government expenditure, OKP expenditure in this study is presented after the deduction of individual premium reduction (IPR) expenditure. In addition, the cost contributions of private households (deductible, co-payments) has been deducted. OKP expenditure is extrapolated using projected expenditure development for healthcare excluding long-term care and long-term care from the age of 65. Accordingly, the differing expenditure developments in healthcare excluding long-term care and in long-term care from the age of 65 feed through into the OKP projections.

Although the starting level is at roughly the same level as for public healthcare expenditure (3.3% vs. 3.5% of GDP), OKP expenditure rises only half as much by 2045 (+0.8% vs. +1.5% of GDP, see Table 4). The latter is attributable to the fact that the proportion of dynamically developing long-term care expenditure is much lower for OKP (9%) than it is for the general government (23%) in the reference year 2013.

Table 4:   OKP vs. total and general government expenditure on healthcare (in GDP %)

	2013	2030		2045	
	Ratio	Ratio	Change 2013-30	Ratio	Change 2013-45
Total healthcare	10.8	12.2	+1.4	14.0	+3.2
Government (incl. social sec. funds)	3.5	4.2	+0.7	5.0	+1.5
OKP	**3.3**	**3.7**	**+0.4**	**4.1**	**+0.8**
Healthcare excluding long-term care	8.6	9.3	+0.7	9.9	+1.3
Government (incl. social sec. funds)	2.4	2.7	+0.4	3.0	+0.6
OKP	**2.9**	**3.1**	**+0.2**	**3.4**	**+0.5**
Long-term care from the age of 65	1.6	2.3	+0.7	3.4	+1.8
Government (incl. social sec. funds)	0.8	1.2	+0.4	1.7	+0.9
OKP	**0.3**	**0.4**	**+0.1**	**0.6**	**+0.3**

When viewed by area, the lion's share of the rise in expenditure in OKP by 2045, or +0.5% of GDP, is attributable to the HeL area. The remaining increase of +0.3% of GDP is accounted for by long-term care from the age of 65.

Due to the high proportion of expenditure on healthcare excluding long-term care, OKP expenditure reacts very sensitively to changes in assumptions regarding the Baumol effect and other non-demographic cost drivers such as advances in medical technology (see Figure 15). The stronger the Baumol effect in the HeL area, the higher the rise in expenditure vis-à-vis the "Reference scenario". Accordingly, the increase in OKP expenditure in the "Expanded Baumol" scenario is 0.7% of GDP higher than in the "Reference scenario", while in the "Baumol" scenario it is 0.5% of GDP higher than in the "Reference scenario".

Figure 15: OKP expenditure in various scenarios (in GDP %)
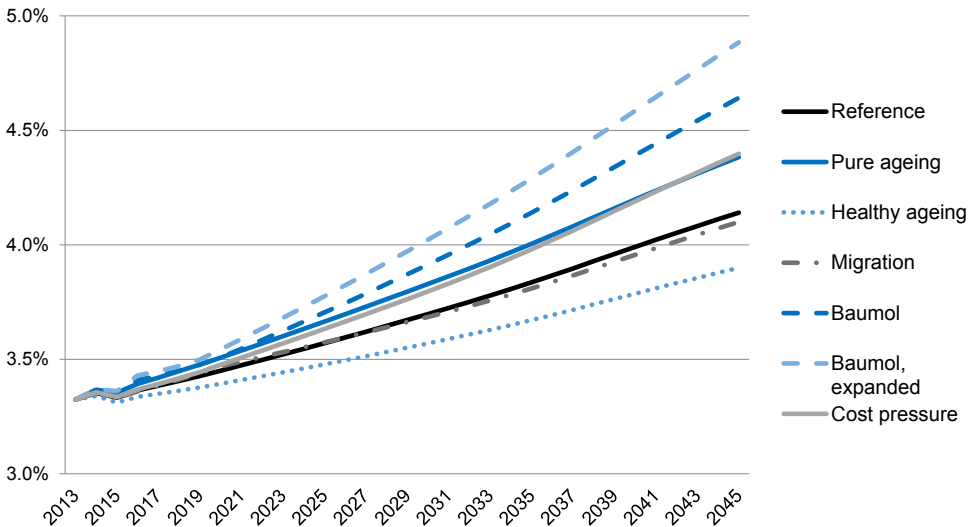
Higher pressure on costs, as would be the case as a result of advances in medical technology ("Cost pressure" scenario), for example, leads to a rise in expenditure of 0.3% of GDP. Expenditure rises similarly strongly if the assumptions regarding the development of the population's state of health and its need for care ("Pure ageing") are more pessimistic. The assumed morbidity development in the "Healthy ageing" scenario has an impact on the projections of a similar magnitude as in the "Pure ageing" scenario, but in this case it has a cost-restraining impact.

7 Comparison with other studies

First of all, a brief comparison is made with the development scenarios in healthcare (Section 7.1) dating back to 2012. Then a comparison is drawn with the work undertaken in this area by the OECD (Section 7.2) and the European Union (Section 7.3).

7.1 Expenditure projections for healthcare in 2012

A comparison with the results of the second expenditure projections undertaken as part of the 2012 development scenarios shows that demographic pressure on healthcare expenditure is persisting.[19] As in those earlier projections, the greatest pressure on expenditure generally and on the public finances in particular comes from the long-term care area. The breakdown by source of financing likewise reveals a very similar picture. As in the 2012 projections, the same assumptions are made in the current "Reference scenario" regarding non-demographic cost drivers (income elasticity of 1.1 in HeL, and the full Baumol effect in LTC). The resulting picture and the degree of dynamism evident are simi-

lar. In the current projections, total healthcare expenditure in the "Reference scenario" rises by 3.2% of GDP – from 10.8% (2013) to 14% (2045). For a comparable project timeframe of 32 years, the "Reference scenario" of the last expenditure projections likewise produces a rise of 3.2% of GDP – from 11.3% (2009) to 14.5% (2041).

For this comparison, it should be borne in mind that a comprehensive adjustment of Switzerland's national accounting system took place in 2014, which has had an impact on healthcare expenditure as a proportion of GDP in the base year. The changeover in national accounting to the European System of Accounts (ESA 2010) resulted in a one-off rise of 5.7% in the level of Swiss GDP. As a result, expenditure on healthcare as a percentage of GDP declined in the base year. Prior to the revision, a value of 11.3% of GDP was arrived at for total healthcare expenditure for the base year (2009) in the last edition of the expenditure projections. As a result of the revision, the equivalent 2009 figure was reduced to 10.4% of GDP (FSO 2016). In

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19 The 2012 development scenarios were drawn up as part of the Legislature Financial Plan 2012–2015 (Federal Council 2012). For a detailed illustration, see Colombier (2012).

addition to these statistical adjustments, two further differences should be taken into account. On the one hand, the projection period was shortened from 2016 to 2045, while on the other the underlying estimate of future economic growth (1.5% versus 1.1% real p.a.) is more optimistic than in the last projections as a result of the assumption of higher gains in productivity and higher net immigration. With a higher level of labour productivity for the economy as a whole and the assumption of no productivity gains in LTC, the relative rise in costs works out greater in LTC as the full Baumol effect is felt. The assumed higher net immigration slightly restrains the age-related rise in expenditure as a result of the immigration of predominantly working-age persons and the corresponding impact on the age cohorts – particularly in LTC.[20] By contrast, in the last projections the rise in expenditure was more attributable to the assumed lower net immigration rate (more pronounced ageing) and less to the Baumol effect (lower productivity gains).

7.2   Expenditure projections of the OECD

De la Maisonneuve and Oliviera Martins (2014) present healthcare expenditure projections for OECD member states, and therefore for Switzerland too. The authors select a projection end date of 2060. An average of the years 2006–2010 is used as the base year. Here too, a distinction is made between the areas of HeL and LTC. By way of deviation from the presentation of the projections of this Working Paper, OKP expenditure – which is offered by private insurers in Switzerland – is assigned to public healthcare expenditure for purposes of better international comparability.

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20 With regard to the development of the Swiss hospital and care market, the existing body of literature has been expanded recently by two Credit Suisse studies (Credit Suisse, 2013 & 2015). Although not the focus of analysis, the studies also touch on the question of how healthcare expenditure will develop in these two specific healthcare areas, particularly against a backdrop of an ageing society. An interesting complementary aspect of these studies is their appraisal of future regional disparities. A study co-authored by UBS and the Research Center for Generational Contracts of the University of Freiburg im Breisgau (Moog et al. 2014) presents a set of generational accounts for the Swiss public finances. This study also makes reference to implied government debt in the area of healthcare and long-term care, i.e. the extent of service requirements that are not covered by existing financing.

Where public expenditure on total healthcare is concerned (government and OKP, HeL, LTC), the projections of the OECD work out higher than those contained in this Working Paper. For example, the OECD shows a rise in public expenditure from 6.9% (average of years 2006-2010) to 8.8% of GDP for 2030 in the basic scenario ("Cost containment" scenario), in which it is assumed that political measures are taken to combat the high rise in healthcare expenditure over the projection period.[21] In the OECD's second basic scenario ("Cost pressure"), in which no political countermeasures are assumed, the rise works out at 9.5% of GDP for the year 2030. By contrast, the projections in this Working Paper only show a rise from 6.8% of GDP in 2013 to 7.9% of GDP by 2034 for the government and OKP combined (see Table A.2). Whereas the OECD's projections of public expenditure on long-term care are very similar to the projections of this Working Paper, the OECD projects a stronger rise in expenditure in the HeL area.

The reasons for these upward deviations are the more pessimistic assumptions regarding demographic development together with the selection of different base years. In addition, differences in the respective projection methodologies should also be noted. A key aspect here is the modelling of advances in medical technology: In the projections of this Working Paper, advances in medical technology are captured indirectly through income elasticity (1.1 in the "Reference scenario" for HeL, 1.4 in the "Cost pressure" scenario for HeL), and are therefore tied to projected economic development. By contrast, the OECD applies a residual approach, in which the unexplained proportion of empirical analysis of healthcare expenditure for OECD countries is assigned to advances in medical technology and other supply-side factors.[22] This residual expenditure growth (which works out at 1.7% on average) is assumed to be either constant for the projection period ("Cost pressure" scenario) or converging towards zero ("Cost containment" scenario), and

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21 The comparison is restricted to the year 2030 as the OECD does not present any results for the year 2045.
22 On the basis of the results of empirical analysis for the OECD countries, the OECD assumes an income elasticity of 0.8 for healthcare expenditure.

is independent of economic development. For the HeL area, this contributes to a much higher rise in expenditure. A further difference lies in the hypothesised change in morbidity: The OECD assumes a "Healthy ageing" scenario, whereas the projections of this Working Paper assume a combination of "Pure ageing" and "Healthy ageing".

7.3 Expenditure projections of the European Union

The Ageing Working Group of the European Commission and the Economic Policy Committee (AWG) investigates at regular intervals how the ageing of the population influences demographic-dependent government expenditure. In its most recent projections (AWG 2015), the AWG likewise takes 2013 as its base year and projects expenditure development up to 2060. The projections of this Working Paper lean heavily on the work of the Ageing Working Group with respect to the selected

methodological approach, as well as with regard to modelling and the selection of scenarios. For example, the assumptions made in the "Reference scenario" regarding morbidity development and hypothesised income elasticity (1.1, or 1.4 in the "Cost pressure" scenario) are based on the work of the EU, particularly the AWG "Reference scenario" and the AWG risk scenario.[23]

With regard to hypothesised demographic developments, both the EU and Switzerland exhibit a strongly ageing population structure. As in Switzerland, the proportion of people over 80 relative to the total population rises in the EU from 5.1% in the base year to 10.1% in the year 2045. In the base year of 2013, the proportion of people over 65 relative to the working-age population amounts to 30% on average in the EU and 28.5% in Switzerland. According to the demographic scenarios, by 2045 the average EU old-age dependency ratio is assumed

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23 However, when extrapolating expenditure on long-term care, the EU projections take into account the probability of needing care (dependency ratio). That said, the projection results should not differ from one another (if all other assumptions remain the same) if the expenditure per dependent over the project period is not influenced by a change in dependency ratios. The concordance of the results of Weaver et al. (2008) and Colombier and Weber (2008) for the Swiss case suggest that this latter prerequisite is met.

to be 53%, versus 48% in Switzerland. Potential economic growth in the EU as a whole is assumed to be relatively stable in the long term, and is very much compatible with the developments assumed in these projections. Estimated economic growth in the EU amounts to 1.4% for the projection timeframe up to 2045, whereas in Switzerland annual average growth is expected to come in at 1.5%.

According to the projections of the EU, public expenditure on healthcare and long-term care rises by 1.7% of GDP by 2045 not just in the EU as a whole, but also in the eurozone, which is likely to be better for comparability purposes. The growth in expenditure for the public sector in Switzerland, which amounts to just over 1.5% of GDP, would therefore be below average (see Figure 16). However, if the rise in OKP expenditure is added to the public sector expenditure for purposes of better comparability (+0.5 GDP % HeL and +0.3 GDP % LTC), Switzerland exhibits a rise in expenditure of 2.4% of GDP, which is higher than the average and indeed higher than

Germany (+1.9 GDP %), and puts Switzerland between Austria +2.1%) and Denmark (+2.5 GP %).[24]

Where the comparison is concerned, it should be noted that the projections for the demographic and economic development of individual countries differ in some cases. For 50% of EU countries (including Germany), it is assumed that the population in 2060 will be smaller than in 2013, whereas it is assumed that the population will rise in the remaining countries. Other differences can be found in respect of the level of healthcare expenditure in the base year, the expenditure profiles, and institutional regulations for national healthcare systems (e.g. special financing regimes). For example, it should be factored into calculations that the proportion of healthcare expenditure which is directly paid by households or offset via private supplementary insurance is much higher in Switzerland in the base year (37%) than it is for the EU average (approximately 20%). Moreover, it should also be noted that this Working Paper assumes a constant income elasticity of 1.1 for the HeL

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24 In contrast to other European countries, mandatory health insurance is offered by private insurers in Switzerland, and is therefore not assigned to the general government sector.

area, whereas in the EU's projections the AWG reference and risk scenarios assume that the elasticities of 1.1 and 1.4 respectively in the base year converge towards 1.0 by 2060. For the area of long-term care, it is assumed in the AWG scenarios that only a proportion of services is subject to increased cost pressure in the form of Baumol's cost disease. These two deviating assumptions result in comparatively lower increases in expenditure in the EU projections.

Figure 16:   Increase in public expenditure on healthcare and long-term care in an international comparison, 2013–2045 (in GDP %)
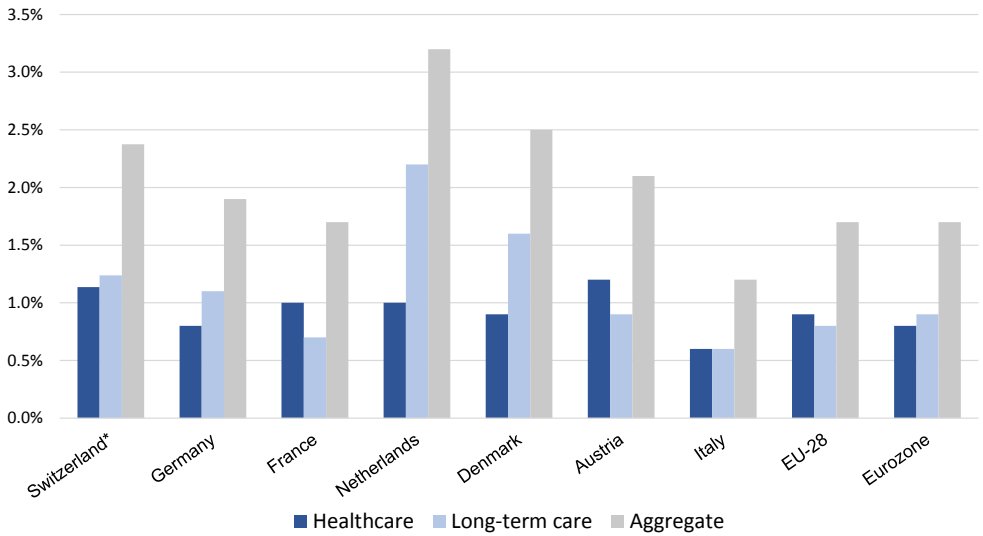
Note: *including mandatory health insurance expenditure.

8 Conclusions for healthcare policy

The projections of this Working Paper show that demographic change will exercise a significant influence on the dynamism of healthcare expenditure, thereby confirming the results of predecessor studies (Colombier 2012; Colombier and Weber 2008). The effect of an ageing population is most significant in the area of long-term care (from the age of 65). For healthcare excluding long-term care, non-demographic cost drivers – such as the Baumol effect and determinants captured indirectly by income elasticity such as advances in medical progress and market failures as a result of asymmetric information – are likewise very significant. As the key player in this area, (acting not just as regulator, but also as a source of financing and service provider), it is the cantons that will have to bear the main burden of rising healthcare expenditure. In addition, the public sector will be more heavily affected by an ageing population than OKP, as the government spends a greater proportion of its funds on long-term care (from the age of 65) than OKP.

The projections provide the following pointers for the orientation of healthcare policy. On the one hand, measures should be promoted that sustainably alleviate the illness burden on the population, particular-ly in the case of chronic conditions, thereby facilitating healthy ageing. On the other hand, existing efficiency reserves need to be better exploited by avoiding unnecessary treatments, incorporating cost-benefit considerations more strongly into the design of the OKP service catalogue, and ensuring that the increasing productivity of medical services is appropriately reflected in the corresponding prices and tariffs. Finally, measures that counteract Baumol's cost disease – such as forward-looking staff planning and improved working processes – will also prove beneficial.

Preventive measures and the strengthening of the population's own healthcare competencies can make a significant contribution to the avoidance of chronic conditions. Treating the five most frequent non-contagious illnesses (cardiovascular disease, diabetes, cancer, respiratory problems, and disorders of the musculoskeletal system) accounts for around 40% of direct healthcare costs in Switzerland. If one additionally adds psychiatric disorders and dementia, this figure rises to around 51% of all healthcare expenditure. According to the World Health Organization, some 50% of non-contagious chronic conditions could be prevented or at least de-

layed through a healthy lifestyle. The focus accordingly is on preventive measures that promote healthy nutritional and mobility behaviour, as well as a reduction in consumption of addictive substances (particularly alcohol and tobacco). Special offers for older people –for example, measures to prevent falls such as movement therapies – help to reduce the number of typically age-related accidents such as femoral neck fractures, and thereby reduce the number of hospitalisations. Movement therapies can additionally help older people to live independently for longer, thereby postponing their admission to a care home and reducing the length of their stay in such an institution. From the financing perspective, preventive measures would have a greater cost-restraining impact for the public sector than they would for OKP, as a result of the relatively high proportion spent by the public sector on long-term care (from the age of 65) in comparison to OKP (23% vs. 9%).

In the area of long-term care (from the age of 65), strengthening outpatient care as opposed to inpatient care (combined with measures to relieve the burden on caring relatives) would help to reduce costs, given the much lower costs of Spitex when it comes to caring for dependents. The focus here should be above all on improving the compatibility of working life and family care (e.g. through care leave). This would also deliver major efficiency gains, as, according to Federal Office of Public Health (FOPH), care homes are overused. This means that although ambulatory care would suffice for a substantial share of dependent elderly, they are admitted to care homes. In view of the large number of financing systems at work in the long-term care area (from the age of 65) – namely OKP, the cantons, AHV supplementary benefits, AHV allowance for the helpless, private households – a bundling of financing in a single source, e.g. in the form of care insurance, could facilitate better cost management and clearer responsibilities in this area.[25]

While the hospital financing reform of 2012 – which had the transition from daily flat-rate costs to diagnosis-related costs at its core – improved incentives to increase efficiency in the inpatient area, fee-for-service

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25 In a recently published postulate report, the Federal Council discusses various options for a reform of care financing, including the introduction of mandatory care insurance (Federal Council 2016).

remuneration remains the rule in the outpatient area. Such a model contains an inherent incentive to expand volumes. In particular, the obsolete TARMED tariff in outpatient medical services does not take sufficient account of technological advances, which means too high a valuation is placed on technical services in many cases. A dynamic adjustment mechanism linking such tariffs to advances in medical technology could restrain dynamism on both the volume and the cost side.

Furthermore, a systematic review of healthcare technologies (medical procedures, medications, therapies) with a view to establishing their cost-benefit ratios (health technology assessment) could help to increase the efficiency of healthcare supply. For example, inefficient and ineffective procedures, medications and therapies are not systematically identified under the current system, and are therefore not excluded from OKP.

A study produced by the Swiss Health Observatory suggests that Switzerland will have a significant personnel requirement by 2030 as a result of demographic change and the ageing of existing health care personnel (Jaccard et al. 2009).[26] The high level of turnover of staff in the healthcare industry and a parallel demographic development in neighbouring European countries is likely to compound this problem further. For that reason, forward-looking personnel planning and the corresponding training of a sufficient number of healthcare professionals will be needed if costs are to be contained and the level of supply maintained. In the absence of such measures, the inevitable consequence would be additional wage pressure – which would only be intensified by the Baumol effect in healthcare – and a rationing of services as a result of staff scarcity.

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26 According to this study, some 120,000 to 190,000 persons will have to be recruited by 2030. Around a third of this figure is attributable to the additional requirement for health and care services as a result of the increasing ageing of the Swiss population. However, Jaccard et al. (2009) rely on older demographic scenarios of the FSO in which a lower level of net immigration is assumed.

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Table annex

Table A1: Key figures for population and economic growth

	2015	2030	2045
Key figures for population growth in the FSO's reference scenario (A-00-2015)			
Total permanent residential population (m)	8 339.5	9 541.5	10 176.1
Balance of migration (net positive migration)	80 000	60 000	30 000
Balance in migration scenario*	90 000	80 000	40 000
Average number of children per woman	1.51	1.56	1.58
Life expectancy at birth			
Men	81.2	84.2	86.2
Women	85.1	87.6	89.4
Old-age dependency ratio**	29.1%	39.6%	48.1%
Youth ratio	32.3%	34.3%	33.9%
Real old-age dependency ratio***	36.1%	48.3%	58.2%
Labour force participation rate, 15 to 64-year-olds	84.0%	83.7%	83.9%
Working-age population in FTEs ('000)	4158.0	4500.0	4626.0
Economic growth	**2020-2045****		
Labour productivity growth rate	1.2%		
Average growth rate of working-age population	0.3%		
Real interest rate (long-term)	1.5%		
Inflation	1.0%		
Nominal interest rate (real interest rate + inflation)	2.5%		

*   As a result of the adjusted balance of migration in the "Migration" scenario (A-06-2015), other key figures also change relative to the "Reference scenario", such as the residential population and working-age population, for example. The average growth of the working-age population in the "Migration" scenario amounts to 0.5%, for example. For a detailed illustration, see FSO (2015a).
**   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).
**** Previously the key figures of the Legislature Financial Plan applied (see Long-Term Report on Sustainability 2016, section 2).

Table A2: **Expenditure on healthcare in reference scenario by area and source of financing** (in GDP %)

Level	2013	2030 Ratio	2030 Change 2013-2030	2045 Ratio	2045 Change 2013-2045
Total healthcare	10.8	12.2	+1.4	14.0	+3.2
Healthcare excluding long-term care	8.6	9.3	+0.7	9.9	+1.3
Long-term care (from the age of 65)	1.6	2.3	+0.7	3.4	+1.8
Source of financing					
Government (incl. social sec. funds)	3.5	4.2	+0.7	5.0	+1.5
Confederation	0.4	0.5	+0.1	0.5	+0.1
Cantons	2.4	2.9	+0.5	3.5	+1.1
Communes	0.3	0.4	+0.1	0.5	+0.2
AHV/ IV*	0.4	0.3	-0.0	0.4	+0.0
Healthcare excluding long-term care	2.4	2.7	+0.4	3.0	+0.6
Confederation	0.4	0.5	+0.1	0.5	+0.1
Cantons	1.9	2.1	+0.3	2.3	+0.5
Communes	0.1	0.1	+0.0	0.1	+0.0
Long-term care (from the age of 65)	0.8	1.2	+0.4	1.7	+0.9
Confederation	–	–		–	
Cantons	0.5	0.8	+0.2	1.1	+0.6
Communes	0.2	0.3	+0.1	0.4	+0.2
AHV-HE	0.1	0.1	+0.0	0.2	+0.1
Mandatory health insurance (OKP)**	3.3	3.7	+0.4	4.1	+0.8
Healthcare excluding long-term care	2.9	3.1	+0.2	3.4	+0.5
Long-term care (from the age of 65)	0.3	0.4	+0.1	0.6	+0.3
Other expenditure***	4.0	4.3	+0.3	4.8	+0.9
of which: private households****	2.6	2.9	+0.3	3.3	+0.7

* AHV/IV allowance for the helpless, AHV/IV contributions to medical services and therapeutic equipment.
** Without participation of the public sector in the form of individual premium reduction, which is assigned to the general government sector.
*** "Other expenditure" includes the expenditure of private households, mandatory accident insurance (SUVA) and military insurance, as well as supplementary insurances, private foundations, and IV supplementary benefits, which are not affected by demographic ageing.
**** OKP cost contribution and out-of-pocket payments (OOP). Cost contributions extrapolated on the basis of OKP expenditure projections. An approximation for the basis of the extrapolation of OOP was the breakdown of expenditure from 2013, i.e. 34% for outpatient healthcare excluding long-term care, 19% for inpatient long-term care, while the residual expenditure was extrapolated on the basis of GDP (particularly dental care treatment).

The residual category in total healthcare is expenditure on long-term care below the age of 65.

Appendix

Formal illustration of projection methodology

The projections of expenditure per capita of age cohort j for year t can be illustrated by the following equation, which is the underlying formula for the expenditure projections.

(A1.1)

$$\frac{E(t,j)}{Pop(t,j)} = \underbrace{\left(\frac{12-\lambda}{12} * \frac{E(0, j-\tau)}{Pop(0, j-\tau)} + \frac{\lambda}{12} * \frac{E(0, j-\tau-1)}{Pop(0, j-\tau-1)}\right)}_{\text{Morbidity}} * \underbrace{\prod_{i=1}^{t}(1+(1+\eta(i))*y(i))}_{\text{Income effect}} * \underbrace{(1+\mu*\omega)^{t}}_{\text{Baumol effect}} * (1+\pi)^{t}$$

whereby:

t= 1,....,32 and 0:= base year.

E(t,j):= expenditure (nominal) on healthcare excluding long-term care or long-term care (from the age of 65) per capita of age cohort j in year t, in each case divided between men and women.

Pop(t,j):= number of men or women of age cohort j in year t according to FSO demographic scenario A-00-2015 or A-06-2015.

Morbidity parameter: additional period of life of age cohort j in a better state of health (morbidity rate) in year t compared to age cohort j in the base year.

$\tau(t,j)$: number of years in better state of health.

$\lambda(t,j)$: period of less than one year spent in better state of health measured in months.

For the area of healthcare excluding-long-term care, an improvement in the state of health is assumed from the age of 41, j≥41, and for long-term care (from the age of 65), j≥65.

y(i):= growth rate of real GDP per capita in year i, i≤t.

Appendix

1+η(i):= "income elasticity" in year i, η(i)≥0, i≤t.

π:= long-term rate of inflation.

ω:= long-term growth rate of average annual real wages.

μ:= Baumol parameter; μ=1: full Baumol effect, i.e. no productivity gains in health care; μ=0: no Baumol effect.

The **right-hand side of the basic formula (A1.1)** can be understood as follows:

The **first factor** describes the correlation between an increase in life expectancy and the change in morbidity of an age cohort j in year t. Here it is assumed that with an increase in life expectancy there is a change vis-à-vis the base year in the probability of falling ill or requiring care at a given age. Let us assume that the life expectancy of 50-year-old women in 2045 is 1 year and 8 months higher than in the base year 2013, and that 50-year-old women spend these additional years of life in a better state of health than 50-year-old women in the base year ("Healthy ageing" scenario). For the sake of simplicity, we can then assume that 50-year-old women in 2045 are in the same state of health as women who are 1 year and 8 months younger in the base year, i.e. women aged 48 years and 4 months. The morbidity parameter accordingly equates to τ(32, 50)=1.[27] As only annual data is available for expenditure per capita, the annual expenditure for the age cohorts of 48-year-old and 49-year-old women in the base year have to be weighted with the number of months. In this example, λ(32, 50) equals eight. There has been a de facto shift of the expenditure profile in year t to the right compared to the base year (cf. Figure 2). This approach is selected for all age cohorts of 41 and upwards in the case of healthcare excluding long-term care, and for all age cohorts of 65 and upwards in the case of long-term care.

The **second factor** describes the demand-side and supply-side effects triggered by the increase in national income, which are only assumed to have an impact on healthcare expenditure excluding long-term care. If η>0, it is

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27 As the base year is 2013 (t=0), t=32 is equivalent to 2045.

assumed that an increase in real GDP per capita has a disproportionate impact on the expenditure per capita of an age cohort. As expenditure per capita is given in nominal amounts, the inflation rate π likewise has to be taken into account. In both cases, the expenditure profile in a given year t shifts upward compared to the expenditure profile of the base year (see Figure 2).

The **third factor** captures the Baumol effect, which is a supply-side effect. For the Baumol effect it is assumed that (real) wage growth in healthcare (or in a sub-area of healthcare) is in step with wage growth in the overall economy. Furthermore, average real wage growth in the real economy corresponds to advances in productivity. If no productivity advances are achieved in healthcare, the Baumol effect is felt in full, and μ is equal to one. Wage growth then feeds through fully into a price effect, leading to an above-average rate of inflation in healthcare. If $0 < \mu < 1$, the Baumol effect can be described as partial, whereby although there are productivity advances in healthcare, these are less pronounced than for the overall economy. In other words, wage growth is not fully transferred to prices.

After ascertaining the expenditure per capita of an age cohort j for each year t, total expenditure is then calculated for year t. In order to determine total expenditure, the expenditure per capita of an age cohort is initially multiplied by the population size of the corresponding age cohort and then aggregated across all age cohorts (c.f. equation (A1.2)). This is done separately for men and women before then arriving at total healthcare expenditure.

$$E(t) = \sum_{j} \frac{E(t, j)}{Pop(t, j)} * Pop(t, j) \qquad (A1.2)$$

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