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I. INTERTEMPORAL POLICY CONSISTENCY IN SWITZERLAND: IS THE CURRENT SOCIAL INSURANCE SYSTEM SUSTAINABLE?¹

A. Introduction and Summary

1. **Switzerland's short-term fiscal position is improving, but, because of population aging, the long-term outlook remains challenging.** The 2004 structural deficit is estimated at 0.7 percent of GDP and public debt stands at 56 percent of GDP. Although high, public debt is not out of line relative to peer OECD countries. However, Switzerland has one of the lowest rates of output growth, and this may decline further as population aging progresses. Also, and despite considerable assets held in the funded second- and third-pillar pension funds, public spending on pensions, health, and long-term care is expected to grow substantially in the next decades. Official projections suggest that by 2040 there will be 550,000 *more* persons over 65 and 480,000 *fewer* persons of working-age than today; this swing of well over 1 million persons in a country with a population of 7.3 million will almost halve the ratio of workers to elderly from 3.2 to 1.8. Population aging is a slow-moving but powerful force, and, given its long-term influence, it is necessary to calibrate policies well before it peaks around 2035.

2. **Aging can have a wide-ranging impact on the economic and social fabric:**

- The shrinking working-age population will **lower GDP growth** unless offset by increases in the participation rate, immigration, or productivity gains. In turn, lower GDP growth would complicate fiscal policies, especially if these accumulate unfunded liabilities.
- **The social services sector will expand**, and because it is characterized by relatively low productivity, this reallocation of resources could lower overall productivity growth.
- **Aging populations tend to be risk averse and reluctant to change.** And with voters over 50 becoming the majority sooner in Switzerland than in other industrial countries, passing reforms may become even more challenging. This could further slow reforms and lower productivity growth.
- **In the absence of corrective measures, the finances of the redistributive, pay-as-you-go first pillar of the social security system will be strained** because, with the rise in the dependency rate, public spending on pensions and health and long-term care will increase faster than revenue. The strain will be exacerbated by the high income elasticity of demand for health care services and above average price increases in this sector.

¹ Prepared by Anastassios Gagales.

- When retirees from the baby-boom generation decide to run down their assets, there is a risk that **asset prices could drop**, straining the financial position of the funded pension schemes and putting pressure on public guarantee schemes. The magnitude of this effect is difficult to gauge and still debated in the literature, but it is worth bearing in mind when thinking of the role of the funded second and third pillars and their regulatory environment, as well as the macroeconomic conditions for debt sustainability in the public sector.²
- Some policy responses to aging could have **unintended consequences**. For instance, raising payroll taxes to finance social security could, by discouraging labor supply, lower GDP growth further.

3. **This paper attempts to quantify the impact of the demographic shift on growth and public finances in Switzerland, examines the intertemporal consistency between current policy plans and unfunded liabilities, focusing primarily on social security, and explores policy options.** The main findings are as follows:

- So far, the impact of aging on the economy has been moderate. The number of pensioners has risen in recent years, but this is due mainly to early retirees taking advantage of the generous disability and pension systems. The main impact of aging will come after 2015.
- Aging is projected to reduce the annual growth rate from around 1½ percent at present to ¾ percent a year in about a decade unless structural reforms boost productivity.
- Despite having large second and third pillars, Switzerland does not appear fully prepared to meet the burden of aging. Under current policies, the first pillar of the social security system is expected to generate persistent primary deficits that would peak at 5 percent of GDP around 2035, raising debt to 250 percent of GDP. To put this challenge in perspective, an immediate but permanent fiscal adjustment of 3 percent of GDP would be needed to prevent this imbalance; the adjustment required becomes larger if corrective action is delayed.
- The debt brake rule, which focuses on the current level of federal debt and abstracts from the present value of future deficits in the general government, does not capture the full challenge of aging.

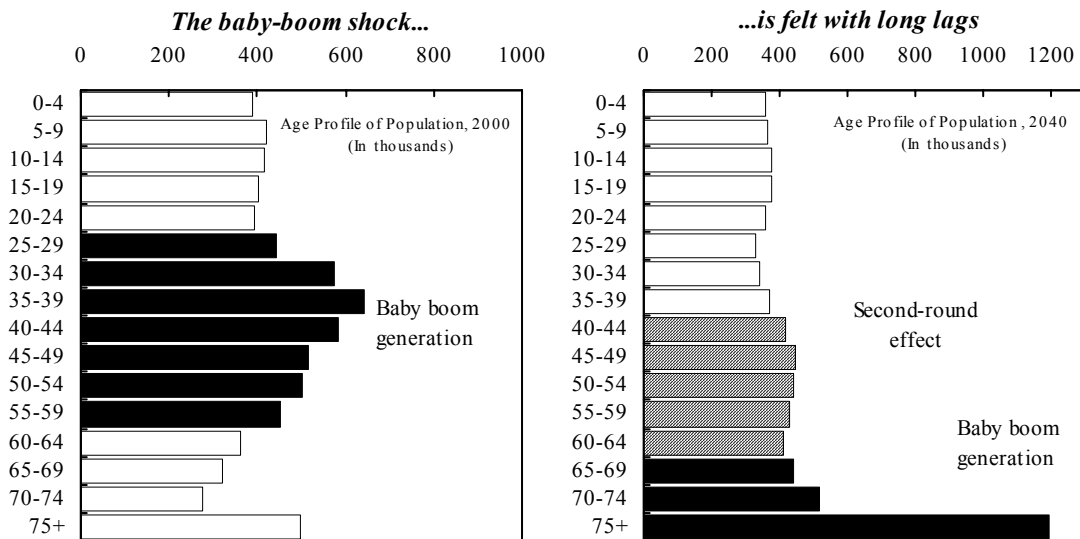
4. **The paper is structured as follows:** the next section discusses Swiss demographic developments and prospects in an international context. Section C examines the effects of

² To the extent that a drop in asset prices will be accompanied by higher yields, it would become more difficult to fund any fiscal deficit.

aging on growth. Section D looks at the impact of aging and moderating growth on public finances. Section E explores reform options and the need to recalibrate current policies with the long-term fiscal challenges. Section F concludes.

B. The Demographic Outlook for Switzerland in International Context

5. **Demographic developments are driven by four main elements: increasing longevity, declining fertility, bursts in immigration, and the baby-boom generation.** Life expectancy in Switzerland has increased by 9 years since 1960 and is currently second only to Japan's. Meanwhile, the fertility rate has declined to 1.5, and is in line with the European Union (EU) average (Figure I-1). Immigration has been substantial, and the share of foreign-born population has risen from 15 to 20 percent (one of the highest among industrial countries). While longer life expectancy and lower fertility have lasting effects on the population pyramid, the baby boom is a one-off shock that will eventually pass through the cohorts, although lagged effects will be visible for a long time.

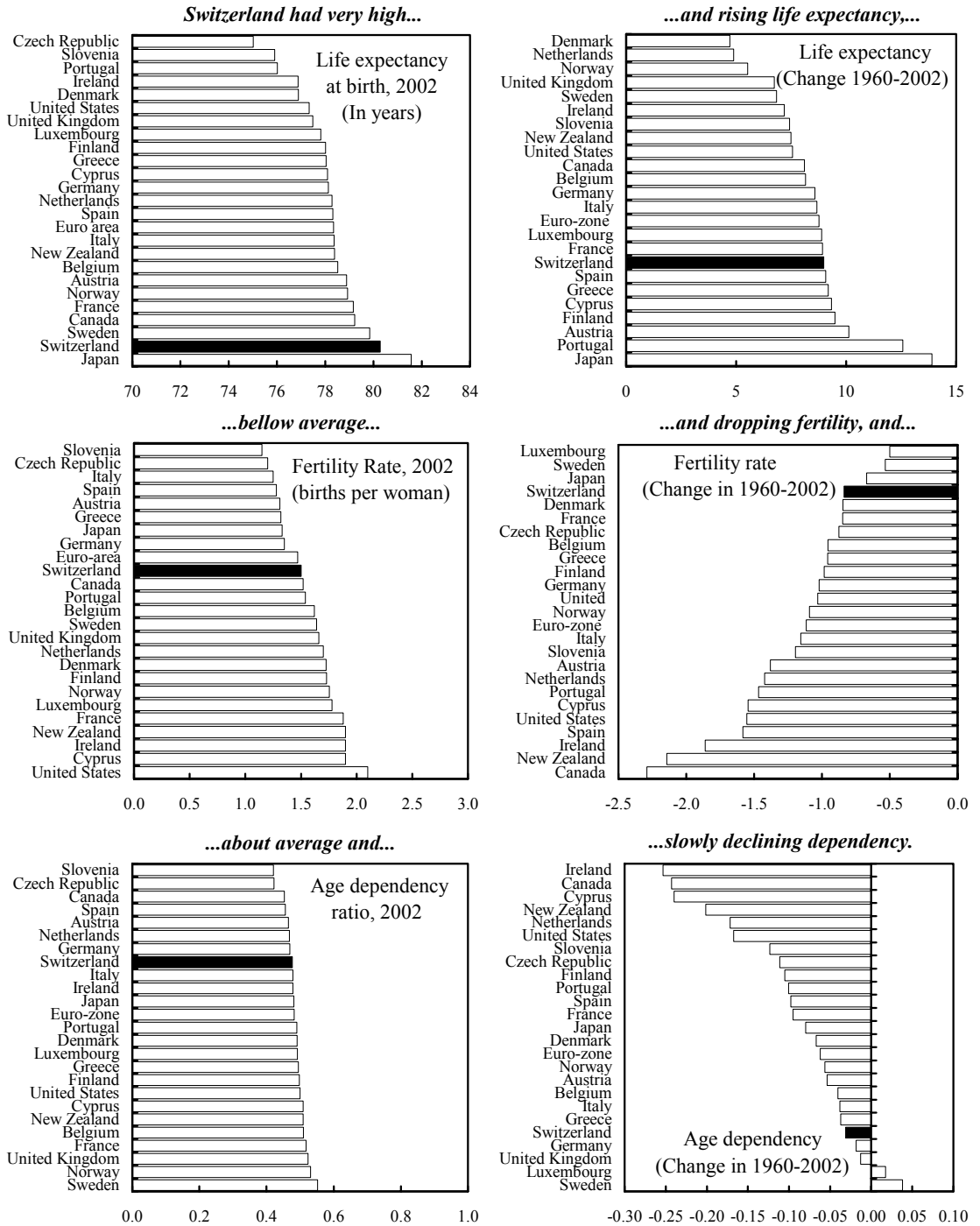


6. The main features of the Swiss demographic transition, drawing from these four elements, can be summarized as follows:³

- The effect of aging on the population pyramid is only now beginning to emerge, as indicated by the relatively stable share of working-age population thus far and, indeed, the small *decline* in the old age dependency ratio since 1960 (Figure I-1). The full force of aging is projected to be felt from 2015 onward.

³ To facilitate international comparisons, the discussion in this section is based on the World Bank's multicountry population projections.

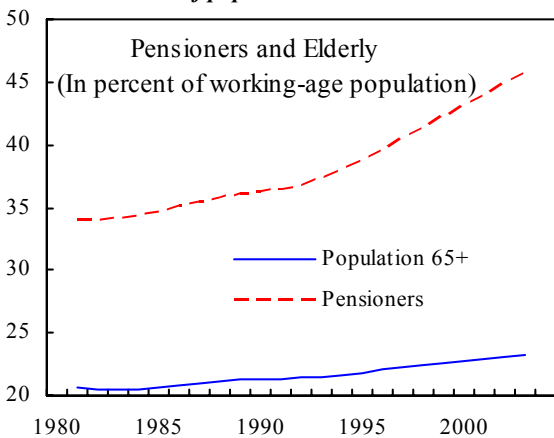
Figure I-1. Switzerland: Demographic Developments, 1960-2002.



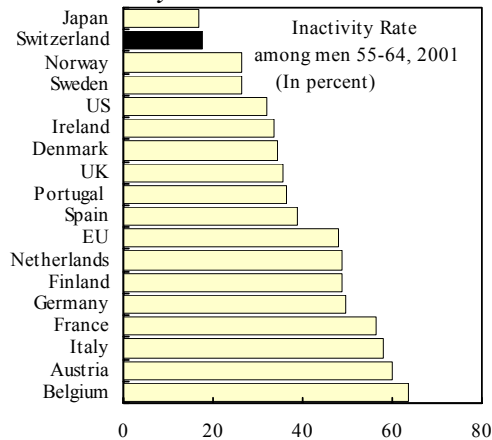
Source: World Bank Development Indicators.

- The rapid increase in the number of pensioners in relation to the working-age population has been remarkable. This is related to the increasing generosity of the social security system, *not aging itself*, and the tendency to contain long-term unemployment during the protracted stagnation of the 1990s. Since 1990, the number of pensioners increased by 35 percent while persons over 65 by only 17 percent. Still, early retirement has been less prevalent in Switzerland than in other industrial countries.

Although the number of pensioners increased faster than the number of population over 65...



...the inactivity rate in Switzerland is low by international standards.



- By 2040, the baby boomers will crowd at the top cohorts of the population pyramid and their lagged effect will be visible in the middle of the pyramid.
- The population is projected to grow until the mid-2010s and decline by a cumulative 18 percent thereafter until the end of the century.
- The effect of aging on the working-age population is pronounced: working-age population is projected to peak earlier, around 2010, and decline faster and further (by a cumulative 28 percent) than total population.

Working age population is projected to decline faster than total population.

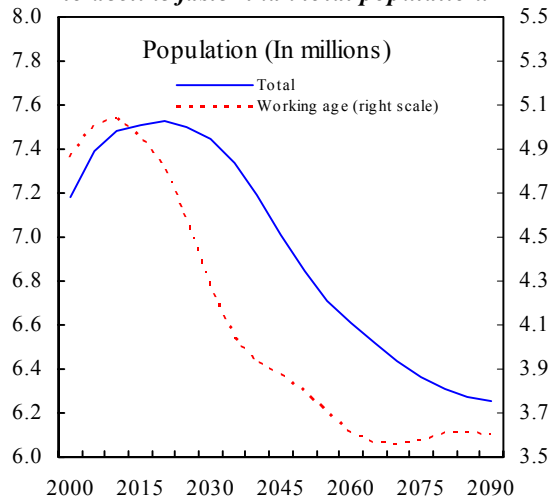
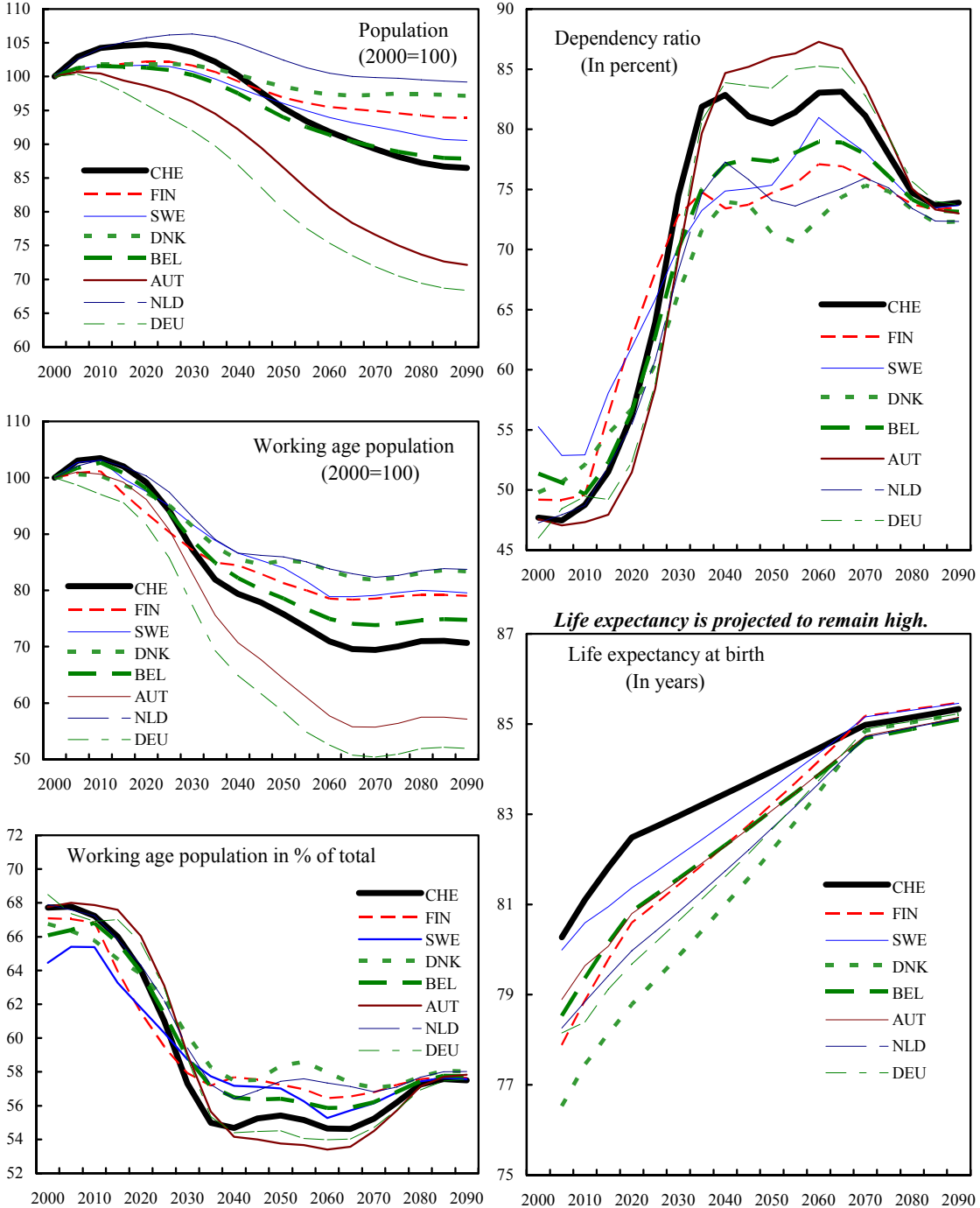


Figure I-2. Switzerland: Population Projections, 2000-90

Population is projected to age faster than in other industrial countries.



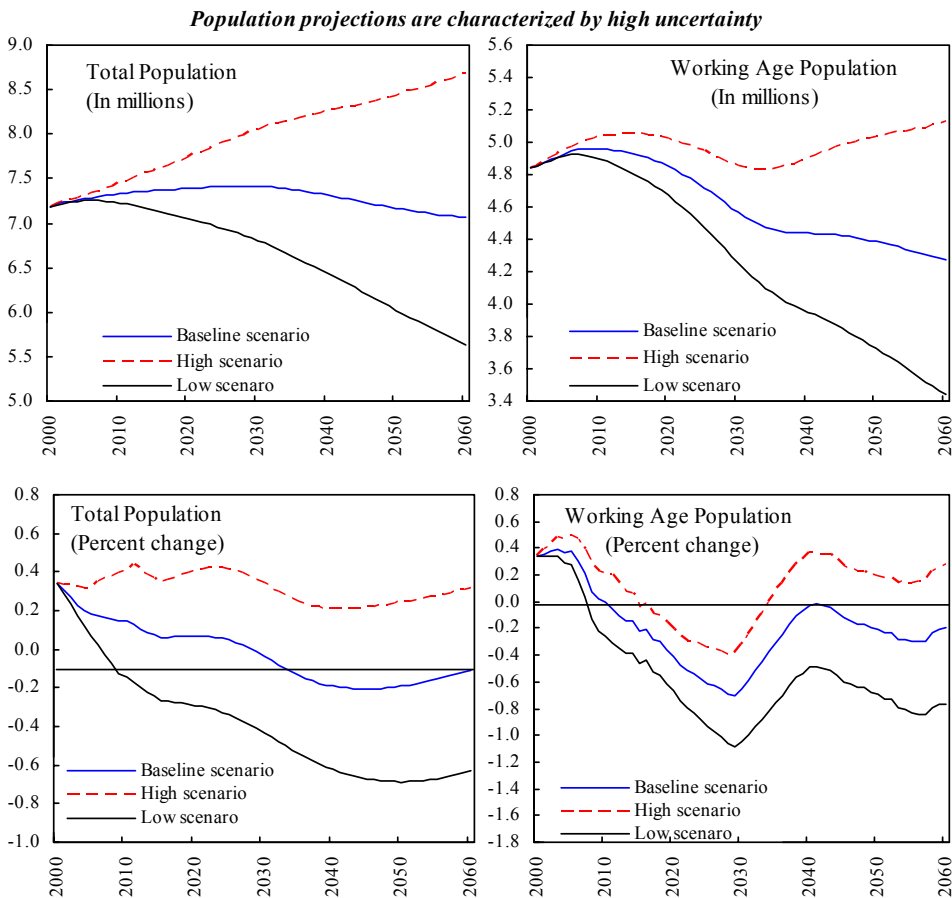
Source: World Bank, and IMF staff calculations.

- Working-age population, in percent of total population, is projected to recover after 2070, when the lagged effects of the baby-boom generation have dissipated (Figure I-2). Projections do not show an improvement in the dependency rate until after 2070.

7. **Switzerland's demographic shift resembles that of most other mature industrial economies** (Figure I-2). The population decline and the rise of the dependency rate are on the high side, but less pronounced than in neighboring Germany and Austria. Life expectancy is significantly higher than in other countries, although the gap is expected to narrow in the future.

8. **Not surprisingly, long-term demographic projections are subject to a substantial margin of error.** The postwar baby boom and the subsequent sharp decline in the fertility rate were not predicted at the time. Looking forward, it is equally difficult to extrapolate trends and current policies. One big uncertainty is the public attitude toward immigration in an environment of declining population. Reflecting such uncertainties, the range between the high and low scenarios of the Swiss Federal Statistical Office (BfS) is for population 2.2 million persons, and, for working-age population, 1.3 million persons (Figure I-3).

Figure I-3. Switzerland: Population Scenarios



9. **The World Bank’s projections are more pessimistic than those of the BFS’s.**

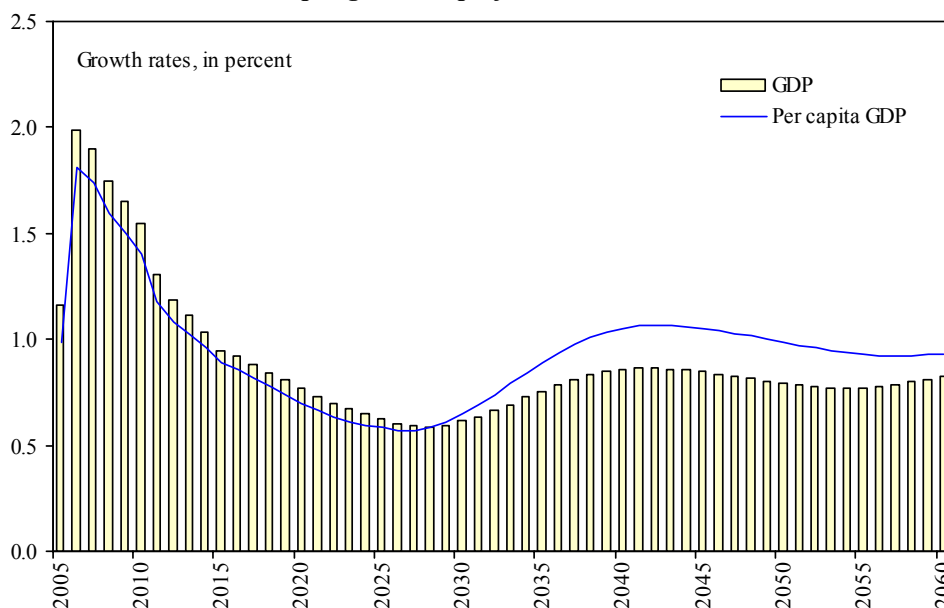
They envisage somewhat larger declines in total and working-age population. However, the time profile of population decline is broadly similar. To enter into more analytical detail, the subsequent sections of the paper use BFS’s projections, which are of more recent vintage.

C. Impact of Demographic Shift on Growth: The Best Years Are Behind

Baseline Scenario

10. **Potential growth is projected to drop from 1½ percent currently to ¾ percent a year after 2020, mainly as a result of slowing labor input.** Capital deepening and technological progress are assumed to keep annual labor productivity growth just over 1 percent, close to its historic average (Table I-1). But the decline in the population and the rise in old-age dependency will reduce total hours worked and shave almost 0.2 percentage point off GDP growth. Increases in the retirement age would provide a temporary relief; participation is already high, and immigration cannot be relied on to sustain growth, given that Switzerland already has the largest share of foreigners in the population (after Liechtenstein and Luxembourg). Structural reforms could boost total factor productivity (TFP) growth, and the baseline calculations in this note assume some TFP increase as a result of reforms under way. If these reforms were to falter, however, potential growth could be lower than envisaged in the baseline.⁴

Output growth is projected to decelerate.



Source: IMF staff projections.

⁴ The Swiss Economic Secretariat projects a similar pattern for growth (SECO, 2004).

11. The long-term growth outlook is based on projections for labor and capital inputs and TFP embedded in a two-factor Cobb-Douglas production function. The analytical framework of the projections is outlined in Appendix I.

12. **Labor input, the first component of growth, is projected to peak around 2020 and start declining thereafter dragging down GDP growth** (Figure I-2). Labor input is measured in hours and is calculated as the product of population, the share of working-age population, the participation rate, the employment rate, and average hours worked per employed. Population projections come from the baseline scenario of the BfS. The following are assumed for each component:

- **Population** will start declining around 2025 when the dynamics become dominated by the declining Swiss population. Total population is projected to decline by a cumulative 2.8 percent between 2005 and 2060, despite a 9 percent increase in immigration. The share of foreigners will rise from 20 percent to 22.8 percent over this period.
- With declining fertility and rising life expectancy, the **share of working-age population** is projected to decline from 68 percent to 61 percent between 2005 and 2060, exacerbating the decline in population.
- The **participation rate** is projected to rise further as women continue to take up work and early retirement dissipates. However, increases are likely to be smaller than in other OECD countries since the Swiss participation rate is already one of the highest in the group. In any case, the increases should be strong enough to offset the effect of aging for the next few years. But after 2010, no further contribution from the participation rate is expected and, as result, the labor force will start declining.
- The **employment rate** is projected to increase over the next few years, in tandem with the decline of unemployment toward the NAIRU, which is estimated at 2.3 percent. With both unemployment and NAIRU already low by international standards, the rise in the employment rate is expected to be limited. An increasing preference for semiretirement and a rising effective retirement age could, however, raise the employment rate.
- **Average hours worked per employed** have been declining since 1970 as a result of more holidays, shorter workweeks and rising part-time employment. This shortening of the workweek may now have reached a limit. Part-time employment is expected to continue expanding as more women enter the labor force, the elderly move into semiretirement, and enterprises rely increasingly on flexible employment arrangements to utilize labor better. As a result, the ratio of hours worked per full-time employee to hours worked per part-time employee is projected to rise slightly. The net effect of these factors is a small further decline in average hours until 2020 and constant hours thereafter.

13. **Capital accumulation affects growth via its impact on capital deepening.** Capital input is measured as the product of capital stock (excluding residential structures) times its utilization rate. Capital stock projections are based on a constant real investment rate of 18 percent of GDP and a depreciation rate of 5 percent, both of which correspond to their averages over the past 15 years. The investment rate does not affect the steady state GDP growth rate; however, it affects the trajectory on which the economy is approaching the steady state. In particular, the growth rate of the capital-labor ratio eases, driving down the growth rate of labor productivity to 1 percent (Table I-1).

14. **Total factor productivity, the third component of growth, is assumed to grow by just under 1 percent a year over the projection period and is the main contributor to long-term GDP growth.** Despite a small increase since the mid-1990s, Swiss TFP growth remains the lowest among OECD countries. Production function estimates suggest that TFP growth was 0.5 percent a year in 1970-81, 0.4 percent in 1982-94, and 0.9 percent in 1995-2004.

15. **The risks to the TFP growth scenario appear balanced.** On the downside, aging may depress TFP growth as older societies could be less innovative and flexible; moreover, the expansion of the services sector (especially elderly care) could slow overall productivity growth. On the upside, the bilateral agreements with the EU, the opening up of the domestic sheltered sectors, and a delayed productivity response to information technology investments would be beneficial for growth.⁵ Moreover, structural reforms could raise TFP growth permanently by making the environment more conducive to innovation.

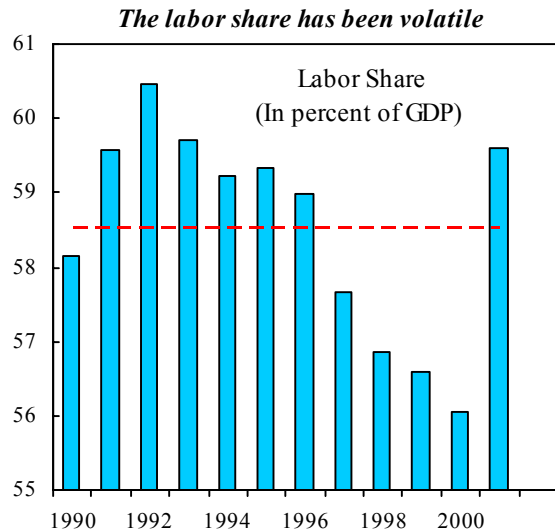
⁵ Product market reforms could add ½ percentage point to growth in the medium term: Gales (2002) estimates that reducing markups to the OECD average could boost productivity growth by 0.1-0.3 percentage point. The OECD (2002) estimates an even stronger effect (a cumulative increase of 4-7 percent of GDP over a ten-year period) from the liberalization of the health, agriculture, electricity, and gas sectors. These results are confirmed by growth regressions, which suggest that, had Switzerland pursued structural reforms more vigorously and maintained its relative rank in terms of market openness, average annual growth could have been ½ percent faster over a five-year period.

Table I-I. Switzerland: Long-Term Growth and its Determinants

	1970-79	1980-89	1990-99	2000-04	2005-09	2000-09	2010-19	2020-29	2030-39	2040-49	2050-59	1970-2009	2010-59
	(Annual rates of change, in percent)												
GDP growth	0.9	2.1	1.1	1.3	1.7	1.5	1.1	0.7	0.7	0.8	0.8	1.4	0.8
Labor productivity	1.4	1.0	0.9	1.4	1.3	1.3	1.2	1.2	1.1	1.0	1.0	1.2	1.1
TFP growth	0.4	0.2	0.4	0.7	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.4	0.7
Capital deepening	1.1	0.8	0.5	0.6	0.4	0.5	0.5	0.5	0.4	0.3	0.3	0.7	0.4
Total hours worked	-0.6	1.1	0.1	-0.1	0.4	0.1	-0.2	-0.5	-0.3	-0.2	-0.2	0.2	-0.3
Hours worked	-0.4	-0.7	-0.4	-0.8	-0.3	-0.5	-0.2	0.0	0.0	0.0	0.0	-0.5	0.0
Hours per full-time employee	-0.1	-0.4	0.0	-0.4	-0.2	-0.3	-0.1	0.0	0.0	0.0	0.0	-0.2	0.0
Hours per part-time employee	-0.1	-0.4	0.0	-0.4	-0.1	-0.2	0.0	0.1	0.0	0.0	0.0	-0.2	0.0
Share of part-time employment	2.6	1.9	2.0	1.5	0.6	1.1	0.4	0.2	0.0	0.0	0.0	1.9	0.1
Employment growth	-0.1	1.8	0.5	0.7	0.7	0.7	0.0	-0.5	-0.3	-0.2	-0.2	0.7	-0.2
Unemployment, change	0.0	0.0	-0.2	-0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0
Participation rate	-0.5	0.9	0.2	0.5	0.4	0.4	0.2	0.1	0.0	-0.1	0.0	0.3	0.0
Activity rate	0.2	0.3	-0.2	0.1	0.0	0.1	-0.3	-0.6	-0.2	0.1	-0.1	0.1	-0.2
Population	0.2	0.5	0.7	0.3	0.2	0.2	0.1	0.0	-0.1	-0.2	-0.2	0.4	-0.1
Memorandum items:													
Per capita real GDP growth	0.7	1.6	0.3	0.9	1.5	1.2	1.0	0.6	0.9	1.0	0.9	1.0	0.9
Capital-output ratio, level	2.2	2.4	2.7	2.9	2.8	2.8	2.9	3.1	3.1	3.1	3.1	2.6	3.1
Capital-output ratio, rate of change	3.2	0.9	1.3	0.8	0.0	0.4	0.3	0.4	0.1	0.0	0.0	1.4	0.2
Capital-labor ratio, rate of change	3.7	2.9	1.7	2.2	1.2	1.7	1.5	1.6	1.2	1.0	1.1	2.5	1.3
Depreciation rate	3.9	4.0	4.6	4.8	4.9	4.9	5.0	5.0	5.0	5.0	5.0	4.3	5.0
Investment rate	15.1	15.9	18.0	18.8	18.4	18.6	18.0	18.0	18.0	18.0	18.0	16.9	18.0
Unemployment rate	0.2	0.6	3.0	2.5	3.3	2.9	2.3	2.3	2.3	2.3	2.3	1.7	2.3
Participation rate	79.4	80.1	86.8	87.4	89.2	88.3	90.7	91.6	92.2	91.7	91.6	83.7	91.5
Activity rate (=1-dependency rate)	65.4	68.1	67.9	67.5	67.9	67.7	67.0	64.0	60.9	61.1	61.0	67.3	62.8

Sources: Federal Statistical Office; OECD; and IMF staff calculations.

16. **The labor elasticity of output in the Cobb-Douglas production function is set at 70 percent.**⁶ This econometric estimate exceeds the national accounts estimate of labor share of 58 percent. The most likely explanation is the presence of monopolistic conditions, which introduce a wedge between price and marginal cost. As shown in Hall (1988), the labor elasticity of output can be expressed as the product of the labor share times a markup.⁷ The latter is around 20 percent, which is reasonable given the pervasiveness of sheltered sectors and the tendency of Swiss firms toward niche markets. The possibility that part of labor income from self-employment in the national accounts is classified as capital income may also have contributed to the wedge between labor elasticity and labor share.



How Robust is The Baseline Growth Scenario?

17. **Long-run GDP growth is driven by three parameters:** growth in hours worked (\hat{H}), TFP growth (\hat{A}), and the labor elasticity of output (θ). They are related to GDP growth (\hat{Y}) through the equation $\hat{Y} = \hat{H} + (1/\theta) \hat{A}$ (see Appendix I). In the baseline scenario with TFP growth and labor elasticity each equal to 0.7, labor productivity grows by 1 percent a year; with population and, thus, hours declining by 0.2 percent a year, average GDP grows by 0.8 percent over the period 2010–60. To gauge the robustness of the baseline scenario, several alternative scenarios are described below. These suggest that the long-run average growth rate of real GDP could vary between 0.5 percent and 1.2 percent a year, with the

⁶ The Cobb-Douglas production function fitted the data (1972–2004) reasonably well but the estimated parameters were not very precise. The confidence interval for the labor elasticity of output ranged from 60 to 90 percent but estimates across alternative specifications were centered on 70 percent.

⁷ Euler's theorem for homothetic functions implies that, in the case of Cobb-Douglas production functions, labor elasticity is equal to $\theta = (w \cdot L) / (c \cdot Q)$, where w and c stand for the wage rate and the marginal cost (the latter equals price in perfect competition). If market power introduces a wedge between the price of output and its marginal cost, $1 + \mu = p/c$, then $\theta = S_L \cdot (1 + \mu)$, where $S_L = (w \cdot L) / (p \cdot Q)$ is the estimate of the labor share in the national accounts.

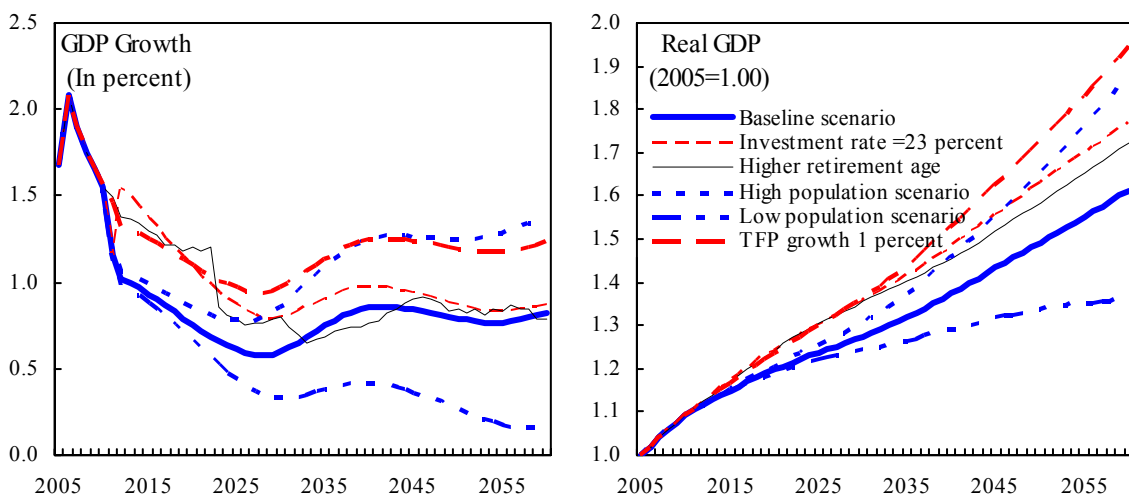
lower bound reflecting the lower-population growth scenario, and the upper bound reflecting the potential impact of reforms on TFP growth.

18. **An increase in the retirement age by 3 years postpones the time when the labor force starts declining.** Such an increase, which is assumed to be phased in over a period of 12 years, does not affect the long-term growth rate but raises the level of GDP by 7 percentage points by 2060 (0.1 percent additional growth a year on average). An increase in the retirement age of 3 years would only partially offset the rise in life expectancy over the past 30 years and its prospective increase over the next 20 years.

Table I-2. Switzerland: Alternative Growth Scenarios

	2010-19	2020-29	2030-39	2040-49	2050-59	2010-59
	(Annual average GDP growth rates, in percent)					
Baseline scenario	1.0	0.6	0.7	0.8	0.8	0.8
Low population growth	1.0	0.5	0.4	0.4	0.2	0.5
Retirement age raised by 3 years	1.3	0.9	0.7	0.8	0.8	0.9
Investment rate raised from 18 to 23 percent	1.3	0.9	0.9	0.9	0.8	1.0
High population growth	1.1	0.8	1.1	1.3	1.3	1.1
TFP growth raised from 0.7 to 1 percent	1.3	1.0	1.1	1.2	1.2	1.2

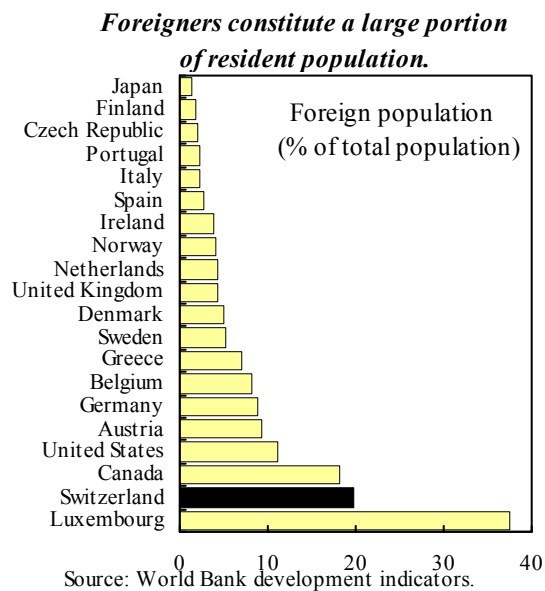
Source: IMF staff projections.



19. **The investment rate affects the *level* of the GDP trajectory but not its long-run growth rate.** Nevertheless, a higher level is important for fiscal sustainability because it reduces fiscal imbalances in flow terms. If as a result of reforms that make Switzerland more attractive as a business location, the investment rate increases by 5 percentage points over its baseline of 18 percent, the level of GDP would be higher by 10 percentage points by 2060. Average growth would be 1.0 percent a year, compared with 0.8 percent in the baseline.

20. **The forecast is sensitive to assumptions on TFP growth.** Raising TFP growth by 0.3 percentage point raises GDP growth by 0.4 percentage point (from an average of 0.8 percent a year in the baseline to an average of 1.2 percent a year). This “magnifies” growth by a factor of $(1/\theta)$ because higher TFP growth raises the steady state capital/labor ratio and, through this channel, adds an additional 0.1 percentage point to labor productivity growth.

21. **The “high” population scenario would raise average growth in 2010-2060 from 0.8 to 1.1 percent; the “low” population growth scenario would reduce it to 0.5 percent.** An important ingredient of this projection is immigration, which is assumed to continue until 2020 and raise the share of foreigners from 20 to 23 percent. With the opening up of the labor market in 2003 under the bilateral agreements with the EU, immigration would be governed by relative labor market conditions and transaction costs. Moreover, the public could become less skeptical about the size and costs of immigration once the working-age population starts declining.



22. **The above projections abstract from interactions among growth, the fiscal situation, and policies.** For example, if along any of these paths public debt reaches a level that makes investors uncomfortable, credit ratings could suffer and interest rates rise, exacerbating the pressure on public finances. As a result, investment and growth would also suffer. Policies can also affect behavior and distort choices. For example, to improve the fiscal situation the authorities may need to raise taxes, which could discourage work and capital accumulation and reduce growth. These important considerations can be analyzed properly only in connection with very specific policy proposals, which is beyond the scope of this paper.

D. Impact of Demographic Shift on Public Finances: Pressures Likely to Intensify

Current Fiscal Situation

23. **The social security system has come under increasing pressure** because of population aging, the growing generosity of the pension system, and the rapid increase in the costs of health care:

- The **first pillar** of the pension system—combining old-age and survivor pensions (AHV) and disability pensions (IV)—has been running deficits, notwithstanding a revenue injection from an earmarked value-added tax (VAT) increase. Indeed, the deficit has more than doubled in percent of GDP since the beginning of the 1990s and is projected to reach 2.7 percent of GDP in 2005 (Table I-3).⁸ The main reason for this deterioration has been the greater propensity for early retirement and disability pensions allowed by the generosity of the system. Population aging by itself has not yet had a large impact on the pension system.
- **Health care** expenditure has been rising rapidly, but the impact on public finances so far has been tempered by the increase in co-payments, which have risen to an effective rate of nearly 13 percent of household expenditure from 7½ percent in the early 1990s. Public expenditure for health care, which mainly takes the form of subsidies to low-income households (KV) and hospitals, is projected to reach 2.8 percent of GDP in 2005.⁹

24. **To offset these deficits, the general government has been running large primary surpluses before transfers to social security.** In 2000–05, the primary surplus before transfers to social security averaged 6 percent of GDP resulting in an overall primary surplus of 0.6 percent of GDP (Table I-3).

25. **With gross debt at 56 percent of GDP (50 percent in net terms) and end-2004, Switzerland is no longer a low debt country.**¹⁰ Despite repeated consolidation efforts at all levels of government, the debt ratio has nearly doubled since the early 1990s as the very low nominal GDP growth has led to unfavorable debt dynamics.

⁸ The primary deficit of social security is defined as the difference between noninterest expenditure and revenue from contributions, co-payments, and earmarked taxes. It is financed with subsidies from the federation and the cantons, plus a run-down of assets.

⁹ For a detailed discussion on the growing costs of health care, see Chapter II on “The Need for Health Care Reform.”

¹⁰ The proceeds from the sale of excess gold reserves that were transferred to the federation and cantons in 2005 could reduce public debt by up to 4.6 percent of GDP.

Table I-3. Switzerland: Fiscal Accounts, 1990-2005

	1990	1995	2000 1/	2005 2/	2000-05
	(In billions of Swiss francs)				
Overall balance	-0.7	-8.0	9.1	-6.6	...
Interest service, net	-3.6	-6.5	-6.9	-6.8	...
Overall primary balance	2.8	-1.5	16.0	0.2	...
Primary balance, excl. transfers to social security 3/	13.6	15.8	36.0	25.7	...
Social security primary balance 4/	-10.8	-17.3	-20.0	-25.4	...
Old age and disability pensions (first pillar)	-4.0	-9.3	-10.3	-12.4	...
Health care 5/	-6.8	-8.0	-9.7	-13.0	...
	(In percent of GDP)				
Overall balance	-0.2	-2.1	2.2	-1.4	-0.9
Interest service, net	-1.1	-1.7	-1.7	-1.5	-1.6
Overall primary balance	0.9	-0.4	3.8	0.1	0.6
Primary balance, excl. transfers to social security 3/	4.2	4.3	8.7	5.6	6.0
Social security primary balance 4/	-3.3	-4.6	-4.8	-5.6	-5.4
Old age and disability pensions (first pillar)	-1.2	-2.5	-2.5	-2.7	-2.7
Health care 5/	-2.1	-2.1	-2.3	-2.9	-2.7
Memorandum items:					
Nominal GDP, in SwF billions	327.6	372.3	415.5	455.2	...
Gross debt	29.9	45.8	49.9	50.6	...

Sources: Federal Finance Administration; and IMF staff calculations.

1/ The balance in 2000 was buoyed by temporary strong stamp duty revenues, estimated at about 1 percent of GDP.

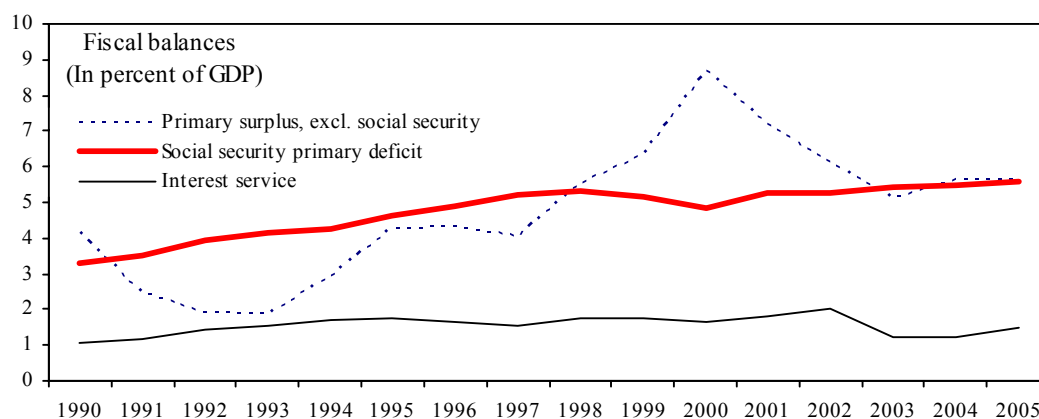
2/ The proceeds from the gold sale (4.6 percent of GDP) that were transferred in 2005 to the federation and the cantons are excluded from revenue but are assumed to be applied toward debt reduction in that year.

3/ Includes the federation, cantons and communes.

4/ Includes revenue from earmarked taxes and contributions but excludes net interest revenue and transfers from the federation and cantons. Excludes also transfers to unemployment insurance (ALV).

5/ Comprises the operational balance of health insurers (KV) and budgetary subsidies to hospitals.

The deficit of social security has been trending upwards.



Long-Term Fiscal Outlook

26. **Under current policies, aging is projected to raise the fiscal deficit and public debt to unsustainable levels.**¹¹ By 2040, the social security primary deficit is projected to have deteriorated by 5½ percentage points of GDP from its current level (Figure I-4). Subsequently, the deficit is projected to decline slightly as an improvement in the position of the first pillar should more than offset the steadily widening deficit in health care. Throughout the projection period, only a small part (½ percent of GDP) of the increase in the primary deficit of social security will be offset by the primary surplus in general government. As a result of the widening overall primary deficits, the public debt ratio is projected to reach 265 percent of GDP and the overall deficit 10 percent of GDP in 2060, even under the technical (and untenable) assumptions of unchanged interest rates and an unimpaired credit rating.¹² The present value of future primary deficits is equivalent to 170 percent of GDP.

¹¹ The projections incorporate, in addition to the aging-related assumptions outlined in Section I-C, the following assumptions:

- The nominal interest rate is set at 0.4 percentage point over nominal GDP growth, the average differential in the past 20 years.
- The general government runs a structural primary surplus (excluding transfers to the first pillar and health care) of 6 percent of GDP, its level at the base year of the projections adjusted for the effect of ongoing fiscal consolidation measures.
- Benefits in the first-pillar pension system grow at half the rate of productivity growth and the incidence of early retirement and disability declines after 2015 (Appendix III).
- In health care (Appendix IV), expenditure on health per insured person (deflated by GDP) grows faster than productivity, reflecting (i) a unitary income elasticity of health care demand; (ii) health care costs that grow at a faster pace than inflation; and (iii) the increasing share of elderly in the population (evidence from other industrial countries suggests that the health care expenditure of persons in the 75+ and 55-74 age cohort are, respectively, about four and two times higher than the expenditure of persons in the 0-54 cohort). These assumptions are considerably more optimistic than the baseline projections on health expenditure presented in the accompanying health care chapter. Underpinning these assumptions is the assessment that the rapid increase so far reflects the transition to a new, more technologically intensive environment, and the expectation that benefits from the bilateral agreements with the EU and further progress in strengthening competition will temper price increases in the health care sector. Nevertheless, a more difficult outcome cannot be excluded.

¹² A discussion of the concept and measurement of fiscal sustainability can be found in Appendix II.

This implicit and yet unfunded liability would be additional to the already existing registered net public debt of 45 percent of GDP (including the proceeds from the gold sale).

Present Value of Primary Balances
(In percent of GDP)

Primary balance of gen. government excl. soc. Security (baseline scenario)	-30
Old Age and Survivor Pensions, AHV	81
Disability Pensions, IV	62
Health Insurance, KV, plus hospitals	56
Total	170

27. **The fiscal adjustment needed to reverse the projected deterioration is large.** To restore the net debt position to 45 percent of GDP by 2060, the general government would need to raise permanently as from 2007 its primary surplus to 4 $\frac{1}{3}$ percent of GDP (Figure I-5), which would imply an overall surplus of the general government of 1.7 percent of GDP on average in 2007–20. This would be equivalent to raising the basic VAT rate by 5 $\frac{1}{2}$ percentage points to 13 percent,¹³ increasing income tax revenue by 35 percent, cutting consolidated government expenditure by 9 $\frac{1}{2}$ percent across the board, or raising contribution rates by 6 $\frac{1}{3}$ percentage points.¹⁴ Other measures—for instance, raising the effective retirement age, reducing the indexation of pensions, and better linking pension benefits to lifetime earnings—would reduce the magnitude of the required fiscal adjustment.

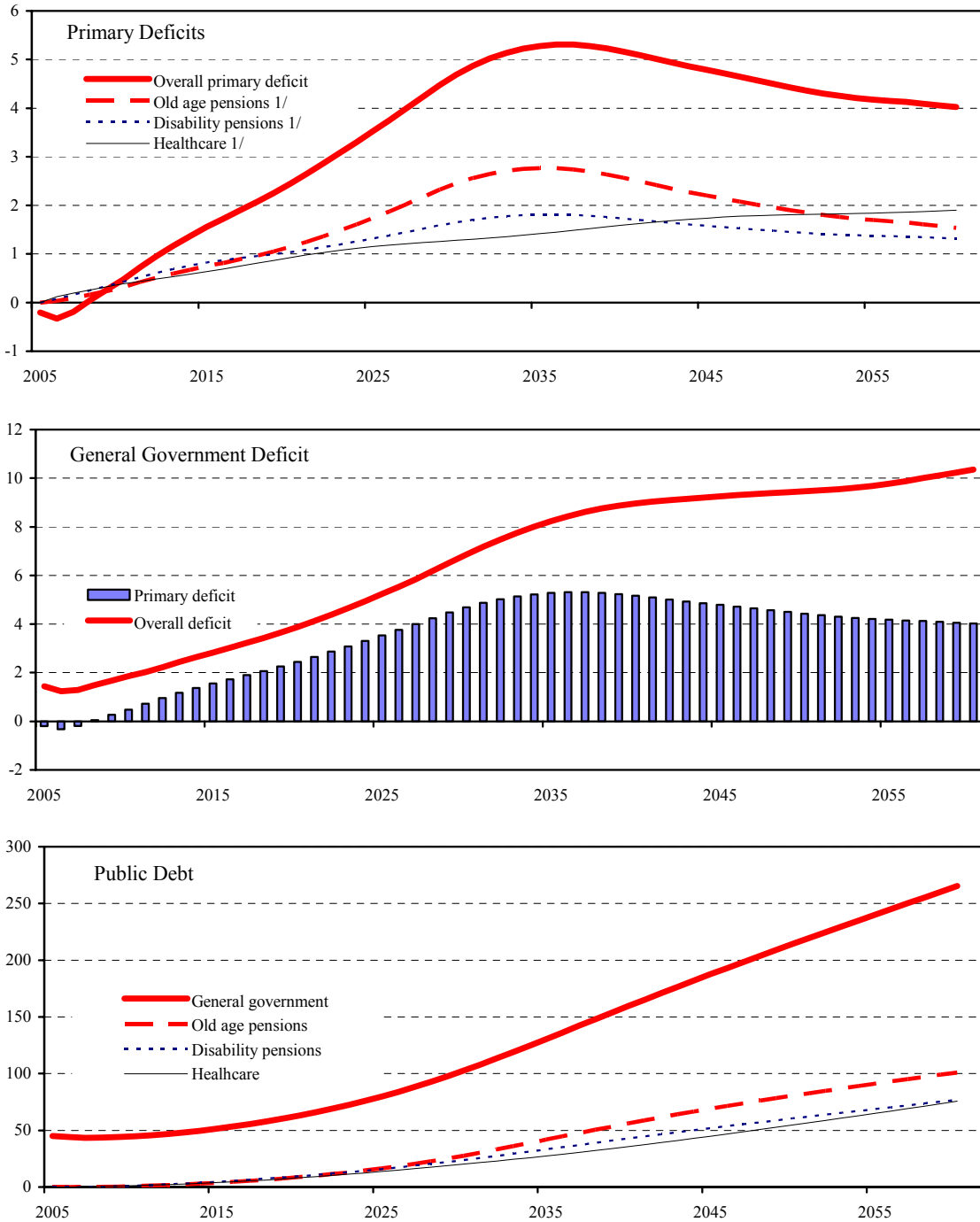
28. **The use of GNP rather than GDP as the scale factor does not alter the assessment that the required adjustment is large.** The point is made that Switzerland has a very large current account surplus in factor services—currently about 9 percent of GDP—that is captured by GNP rather than GDP (e.g., Kohli, 2004, 2005). However, even if this surplus were all part of Swiss private income, it would not be a source of social security contributions. Moreover, being very mobile internationally, these assets are not likely to be available as a tax base to fund the public part of social security and would therefore not alleviate public finance pressures.

29. **Delaying the adjustment would necessitate a larger fiscal adjustment in the future.** A delay of, say, ten years would mean that the adjustment in the primary balance would have to be raised by 0.9 percentage point of GDP in order to offset the additional debt that would have accumulated during the delay (Figure I-5). Correspondingly, the VAT rate that would restore fiscal sustainability would need to raise to 14.2 percent (1.2 percentage points higher than in the previous scenario). There is a limit to the trade-off between the timing and the size of the adjustment: the fiscal adjustment should take place before debt reaches a level that starts making financial markets uncomfortable.

¹³ The authorities recently proposed a phased rise in the VAT rate of a cumulative 2.5 percentage points, but this was rejected in a referendum.

¹⁴ These calculations abstract from the adverse effects that such a fiscal measures would have on output.

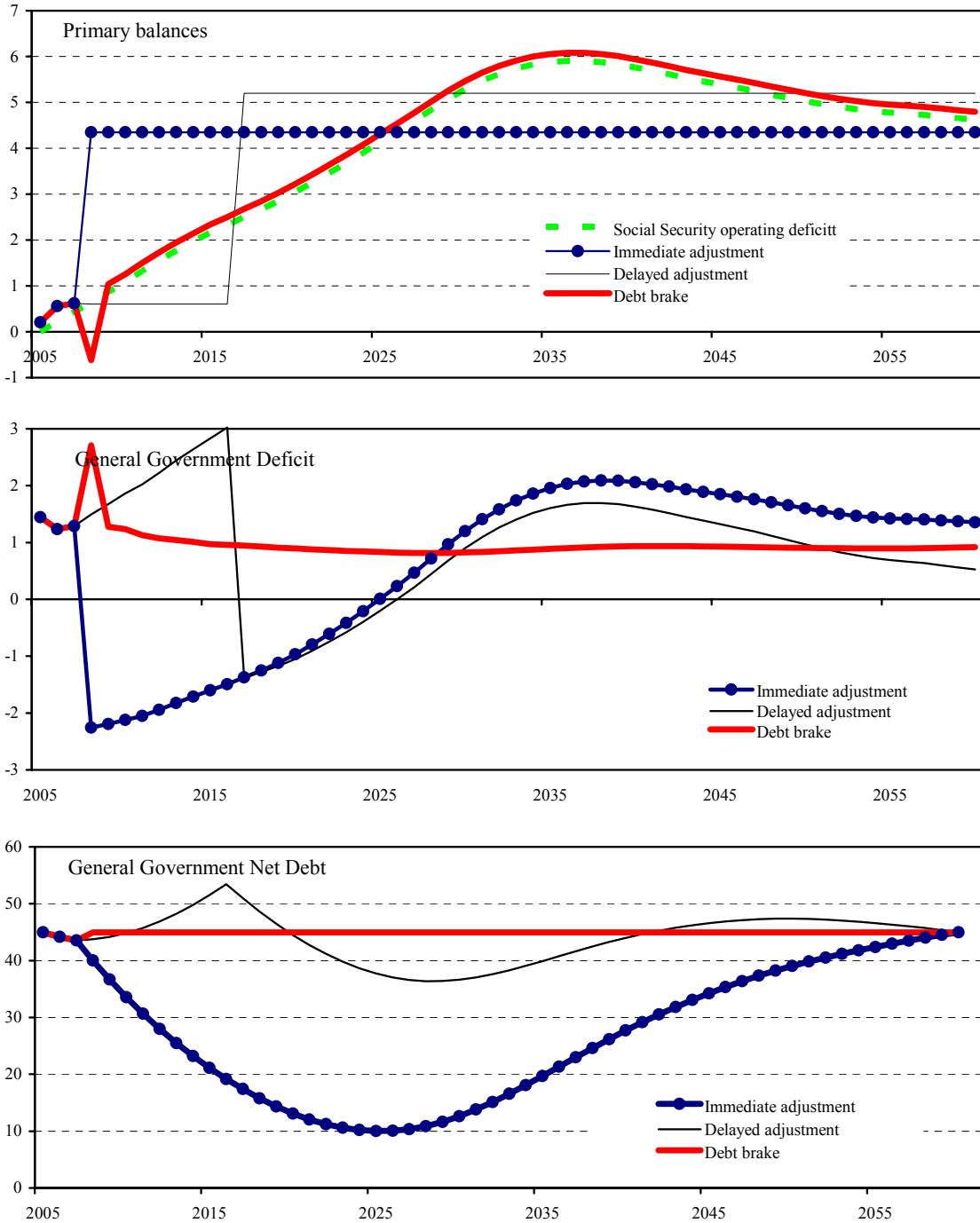
Figure I-4. Switzerland: Debt Dynamics, 2005-60
(In percent of GDP)



Source: IMF staff calculations.

1. Change since 2005.

Figure I-5. Switzerland: Adjustment Scenarios, 2005-60
(In percent of GDP)



Source: IMF staff calculations.

30. **The debt-brake rule is helpful, but even if applied at the level of the general government it would not prevent a painful adjustment.**¹⁵ To stabilize the debt ratio at its present level requires the general government (excluding social security) to run growing primary surpluses to offset the growing operating deficit of social security: by 2035, the primary surplus would need to rise by 6 percent of GDP above its current level (Figure I-5).

How Robust Is the Baseline Fiscal Scenario?

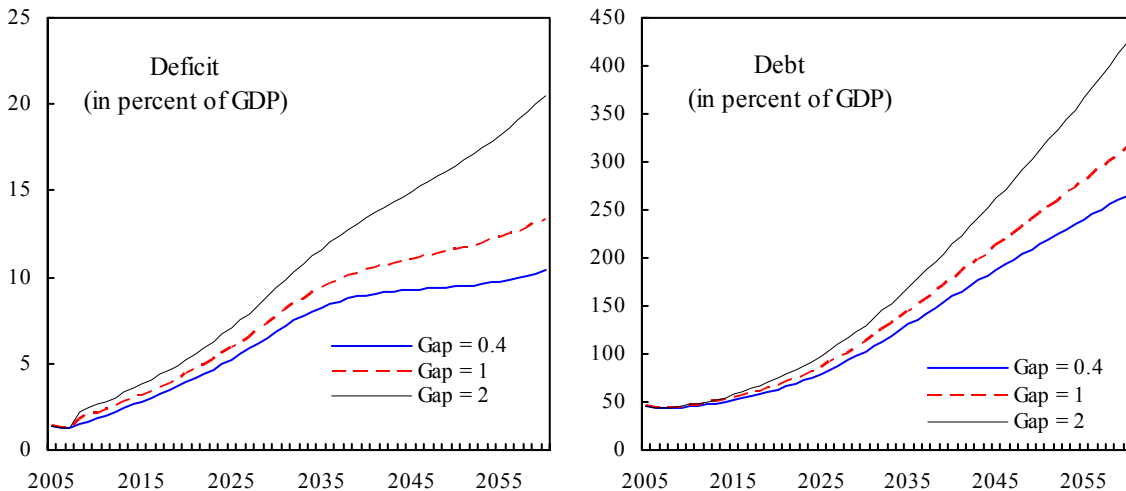
31. **The conclusion that the required fiscal adjustment is substantial is robust, notwithstanding uncertainty about several key parameters.**

- **Public debt.** Contingent liabilities related to guarantees for certain pension funds could add 5-10 percentage points to the debt ratio. However, privatization revenue could offset some of these additional liabilities. Moreover, proceeds from the sale of the gold reserves could be used to lower debt.¹⁶ This paper assumes that all the proceed (4.6 percent of GDP) are used for this purpose.
- **Discount factor.** Any forecast of the differential between the interest rate and nominal growth 50 years hence is little more than an educated guess. A higher differential would raise the debt service and thus accelerate the timing and the magnitude of the adjustment. It would also lower growth. At the same time it would ease, in present value terms, the fiscal burden since future deficits would be discounted at a higher rate. In the baseline scenario, raising the differential between the interest rate and nominal GDP growth from 0.4 to 1 percent over the projection period (but keeping the path of output growth unchanged), reduces the required (instantaneous) increase in the primary surplus from 3.7 to 3.9 percent of GDP. It also

¹⁵ The debt-brake rule, which was introduced in 2002 in response to the doubling of federal debt in the 1990s, requires the federal accounts to be in balance after adjusting for the business cycle. In operational terms, expenditure is set equal to projected cyclically-adjusted revenue. Unanticipated deficits must be reversed in the following years. The ceiling under the debt-brake rule can be over-ridden in exceptional circumstances if supported by a majority of members in both chambers of parliament. This was done in 2004, when loans to the Unemployment Insurance (ALV) were excluded from the ceiling under the debt-brake rule in an effort to allow automatic stabilizers to operate fully.

¹⁶ Between May 2000 and March 2005, and in coordination with the ECB and European national central banks, the SNB sold 1,300 tons of gold raising SwF 21 billion or 4.6 percent of GDP. The parliament has decided to allocate $\frac{1}{3}$ of these proceeds to the federal government and $\frac{2}{3}$ to the cantons.

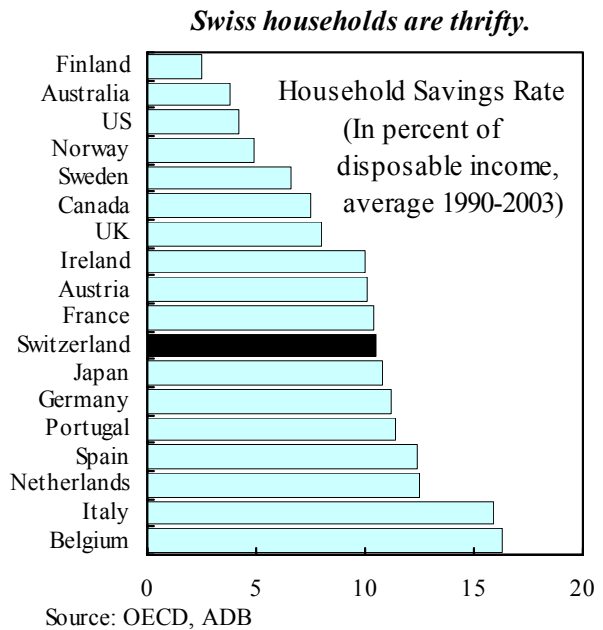
raises eventually the deficit and the public debt would exceed 10 and 300 percent of GDP, respectively.



- **Pensions.** The calculations are sensitive to the incidence of early retirement and indexation rules. Critical aspects are the ratio of the average pension to the average productivity of labor and the indexation rule.
- **Health care.** The scenarios are sensitive to the income elasticity of demand and the differential between health care and overall inflation. The companion paper on health care (Chapter II) models the incidence of health care subsidies that would be required for low-income families; it projects that, on the basis of unchanged policies and past trends, public subsidies could grow by 8 percentage points of GDP through 2050.
- **Primary structural surplus.** If the primary surplus turns out to be lower than the baseline estimate of 0.4 percent of GDP, the size of the fiscal adjustment would need to be raised accordingly.
- **Underfunding in the second pillar, especially in defined-benefit plans.** This could burden public finances via explicit and implicit public guarantees to the second pillar and demands on the social safety net. Barring a financial meltdown, the fiscal implications from underfunding in the second pillar are generally expected to be of second-order importance relative to the prospective problems in the first pillar and health care.

E. Some Policy Options

32. **Switzerland has substantial funding in its second and third pension pillars and is better prepared than many other countries; nevertheless, the aging challenge is significant.** The outlook for the financial cost of aging is comparable to that for other industrial countries.¹⁷ However, Switzerland may have more degrees of freedom to address the problem since (i) its first pillar accounts for only 40 percent of pensioners' income; (ii) the fully funded second pillar accounts for 30 percent of pensioners' income¹⁸ and had accumulated assets worth 107 percent of GDP in 2003;¹⁹ and (iii) the thrifty Swiss households save about 10 percent of their disposable income and also have accumulated significant private assets.



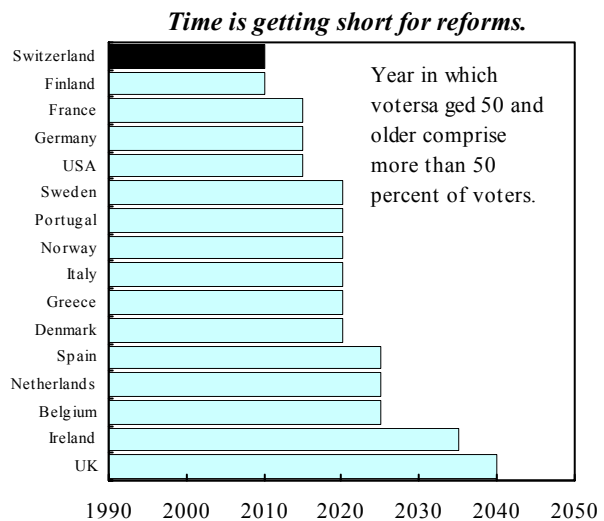
33. **The projections suggest two policy inconsistencies.** The social security system does not have enough resources to honor its promises to future generations and the current fiscal stance, barring corrective measures, is inconsistent with long-run fiscal sustainability. Meeting the challenge of population aging requires corrective measures in three areas: benefits rationalization, structural reforms to boost growth, and fiscal adjustment. Given the size of the problem, any viable solution would probably require a combination of these ingredients.

¹⁷ See Kraemer (2005), European Commission (2002), Frederiksen (2001) and recent IMF staff reports, for instance, Country Report 05/36 for Finland.

¹⁸ This compares with 40 percent in the Netherlands, 25 percent in the United Kingdom, 13 percent in the United States, and only 5 percent in Germany. See Deutsches Institut für Altersvorsorge (<http://www.dia-vorsorge.de>).

¹⁹ This compares with 95 percent in the United Kingdom, 84 percent in the United States, 7 percent in Germany, 5 percent in France, and 4 percent in Austria. See Deutsches Institut für Altersvorsorge (<http://www.dia-vorsorge.de>).

34. **With respect to the first area, benefits rationalization, generous pension benefits need to be recalibrated and made contingent on life expectancy.** This would entail removing incentives for early retirement, creating incentives to work longer, aligning the statutory retirement age with the rising life expectancy, reducing the replacement rate, reducing the weight of wages in the pension indexation formula, and/or lowering the frequency of pension adjustment (currently, every two years). On equity grounds, the rationalization of benefits should be means tested and accompanied by a strengthening of the social safety net for low-income pensioners. A balanced mix of incentives to work longer and disincentives to retire early may be the least distortionary of policy options and may also boost growth by encouraging labor supply. Given that (i) the elderly are expected soon to constitute a majority and (ii) the measures will be felt fully only after long lags because of grandfathering clauses, there is a strong political economy argument not to delay action.



Source: World Economic Outlook, September 2004.

35. **The option of increasing the retirement age should be considered seriously.** Although less extensively used than in other industrial countries, early retirement has been instrumental since the mid-1990s in Switzerland in holding down long-term unemployment in the 55-65 age cohort. A rise in the statutory retirement age would need to be phased in gradually and accompanied by actuarially fair adjustments for those who decide to retire early or work longer. Asking the elderly to work longer might also require more flexible work arrangements (for instance, temporary employment and telecommuting), as well as structural reforms that would raise output and employment growth.

36. **Benefits rationalization could be accompanied by a rethinking of the role of the pay-as-you-go first pillar and its significance relative to the fully funded second pillar.** Relevant questions worth considering are the following: What level of benefits is affordable? Should the first pillar meet only basic needs of pensioners, with anything beyond provided from private saving? Would the current level of private saving and rates of return provide replacement incomes commensurate with household expectations?

37. In **health care**, the hardening of budget constraints (for instance, by making investment in new facilities conditional on the availability of local financing), the consolidation and more efficient utilization of the health care infrastructure (i.e., reducing fragmentation), and higher co-payments could reduce costs. Moreover, increasing

competition in health care services and liberalizing imports of pharmaceuticals and generics could also limit costs.

38. **Structural reforms that raise productivity and employment growth—the second kind of corrective measure—would ease the burden of fiscal adjustment, provided that pension benefits are not fully indexed to productivity gains.** In this spirit, a structural reform agenda was launched in 2004 (SECO, 2004). Immigration is not a panacea. It will boost output growth and strengthen the finances of the first pillar, but the costs of integrating immigrants into society are not negligible. Finally, in Switzerland GNI exceeds GDP both in levels and growth rates, but factor income is very mobile and is unlikely to provide a meaningful tax base.

39. **Fiscal adjustment—the third area where corrective action can be taken—needs to be tilted toward expenditure containment.** The scope to raise income taxes is limited by tax competition, and higher payroll taxes could lower growth. However, moderate increases in revenue from the VAT, as the authorities are already contemplating, might be employed, as the VAT is seen as a less distortive tax.

40. **The fiscal policy framework needs to be recast in a form suitable for addressing the long-term challenges of population aging.** First, fiscal policy would benefit from stronger cooperation between the levels of government. The current arrangement whereby responsibility for financing the first pillar is shared between the federal and cantonal governments diffuses responsibility and nurtures inaction. In practice, the burden of adjustment tends then to be shifted to the federal budget, which accounts for only one-third of general government resources. Second, there is scope to supplement the current three-year rolling financial plan of the *federal* budget with a long term fiscal sustainability plan for the *general government* that has a horizon sufficiently long to capture the effects of aging. In this connection, the preparation of a comprehensive periodic report on the financial position of social security would deepen public awareness of the aging pressures and available options, and facilitate consensus towards a solution.²⁰

F. Concluding Remarks

41. **Unless policies are changed, population aging in Switzerland is expected to hamper growth and generate fiscal pressures over the longer-term.** Delays in addressing

²⁰ Currently, the Federal Social Security Service (Bundesamt für Sozialversicherung) prepares an annual report on the state of social security, including prospects for the next five-ten years. This horizon, however, fails to capture the problem since the effects of population aging are expected to peak around 2040. Occasional reports cover longer horizons—for instance, Bundesamt für Sozialversicherung 2003, 2004a, 2004c, Keel et.al. 2003, and Borgmann and Raffelhüschen 2004—but these are not an integral part of long-term budgetary planning.

the problem would make the solution more difficult in the future. Ultimately, the phasing in of fiscal adjustment would reflect social time preferences, views on intergenerational equity, and political economy considerations.

42. **The fiscal policy framework needs fine-tuning.** A forward-looking target path for public debt and improved coordination of fiscal policies among the various levels of government are needed to ensure the intertemporal consistency of fiscal policy.

Appendix I. The Framework for Long-Term Growth Projections

Production function:	$Y_t = A_t (u_t \cdot C_t)^{1-\theta} H_t^\theta = (u_t \cdot C_t)^{1-\theta} (B_t \cdot H_t)^\theta$
Total factor productivity:	$A_t = (1 + \hat{A}) \cdot A_{t-1}$
Capital accumulation:	$C_t = (1 - \delta) \cdot C_{t-1} + i \cdot Y_{t-1}$
Hours worked	$H_t = L_t \cdot h_t$
Hours per employed:	$h_t = hf_t \cdot (1 - \pi_t) + hp_t \cdot \pi_t$
Employment:	$L_t = (\text{Population})_t \cdot (\text{activity rate})_t \cdot (\text{participation rate})_t \cdot (1 - UR_t)$

where the circumflex $\hat{}$ denotes percent change

Y = real GDP

A = total factor productivity, which grows at a constant rate \hat{A}

B = Harrod neutral technical progress, related to total factor productivity by $A_t = B_t^\theta$

u = capacity utilization. It is constant after the completion of the current cycle.

C = capital stock

H = total hours worked

hf, hp = hours worked per full-time and per part-time employee

π = share of part-time employment

L = employment

UR = unemployment rate. It is set equal to the NAIRU after the completion of the cycle.

The above model enables us to express GDP growth as the sum of seven components:

$$\hat{Y} = [\hat{A} + (1-\theta)(\text{capital deepening})] + \hat{h} + (\text{population growth}) + (\text{aging}) + (\text{participation growth}) - (\text{unemployment decline})$$

where the bracketed term equals average productivity growth.

At the steady state, the following relations hold among the key variables:

- Output growth is the sum of growth in labor productivity and hours worked:
 $\hat{Y} = (1/\theta) \hat{A} + \hat{H}$.
- The output-capital ratio remains unchanged: $\hat{Y} = \hat{C}$.
- The capital-labor ratio, expressed in efficiency units, $C_t/(B_t \cdot H_t)$, remains constant.
- Expressed in physical units, the capital-labor ratio increases at the rate of $\hat{C} - \hat{H} = (1/\theta) \hat{A}$.
- Labor productivity per hour worked depends on TFP growth and the labor elasticity of output:
 $\hat{Y} - \hat{H} = \hat{A} + (1-\theta)(\hat{C} - \hat{H}) = (1/\theta) \hat{A}$.

Appendix II. Fiscal Sustainability: Some Theoretical Considerations

43. For analytic purposes it is useful to divide public expenditure into three categories: public pension payments and medical benefits, S_t ; all other expenditure excluding interest, G_t ; and interest on public debt, $R_t \cdot D_{t-1}$, where D_t denotes the end-of-period level of net debt and R_t is the nominal interest rate on this debt. The distinction between the assets of the public pension system and public debt is only of accounting nature because, ultimately, the public sector will be responsible for the unfunded pension liabilities of the first pillar and, through guarantee schemes, for the second pillar. In view of this, the discussion below is cast in terms of net public debt, i.e. gross debt minus the assets of social security.²¹

44. Debt dynamics are governed by the one-period government budget constraint:

$$D_t = (1+R_t) \cdot D_{t-1} + (G_t + S_t - T_t - NT_t),$$

where T_t denotes tax revenue plus contributions, NT_t nontax revenue, including seigniorage, and $(G_t + S_t - T_t - NT_t)$ the primary deficit. In terms of ratios to GDP, indicated by lowercase letters, the evolution of public debt is governed by

$$d_t = (1+\zeta_t) \cdot d_{t-1} + (g_t + s_t - \tau_t - n\tau_t), \quad (1)$$

where $(1+\zeta_t) = (1+R_t) \cdot (1+\eta_t)^{-1}$ and η_t stands for the growth rate of nominal GDP. Assuming for simplicity and without loss of generality that ζ_t is constant, equation (1) can be solved recursively to give the financial worth of the public sector as the present value of future stream of primary deficits, PV , plus the initial level of debt:

$$(1+\zeta)^{-n} \cdot d_n = d_0 + \sum_{j=1}^{n-1} (1+\zeta)^{-j} (g_j + s_j - \tau_j - n\tau_j) = d_0 + PV. \quad (2)$$

45. Since PV is additive in the stream of primary balances $\{(g_j + s_j - \tau_j - n\tau_j)\}$ it can be expressed as the sum of present values of the primary deficits of general government (excluding social security), PV_G , and those of social security, PV_A , PV_I , PV_K (old age and survivor pensions, disability insurance, sickness insurance):

$$(1+\zeta)^{-n} \cdot d_n - d_0 = PV_G + PV_A + PV_I + PV_K. \quad (3)$$

²¹ The aggregation of assets and liabilities into net debt is not innocuous when the return on assets differs from the interest rate paid on government debt. However, with assets amounting to only 10 percent of net debt and return on the public pension system's portfolio being moderate owing to a conservative investment strategy, the quantitative implications of this simplifying assumption are of second order of importance. The relation between the interest rates on net and on gross debt and assets (respectively, R_N , R_D , R_A) is given by $R_N = R_D + (R_D - R_A) \cdot A / (D - A)$.

We can use equation (3) to quantify how much each individual component of social security contributes to the increase of public sector's indebtedness.

46. Because of its additivity, PV can be further decomposed as $PV = PV(\mathcal{B}) + PV(\mathcal{V})$, where the indicators \mathcal{B} and \mathcal{V} denote, respectively, the stream of primary balances in the absence of any further population aging and the impact of the impending population aging on the future stream of primary balances. Substituting this in equation (3) gives

$$(1+\zeta)^{-n} \cdot d_n - d_0 = PV(\mathcal{B}) + PV_A(\mathcal{V}) + PV_I(\mathcal{V}) + PV_K(\mathcal{V}). \quad (4)$$

That is, the increase on public indebtedness is equal to the present value of the general government primary balance in the absence of aging plus the present value of the change in the primary balance due to aging.

47. Following Blanchard (1990), we define fiscal policy as sustainable if the current policies can be continued in the future without raising the public debt-to-GDP ratio to levels that the market is not prepared to finance at prevailing interest rates. In a partial equilibrium model like the present one, the critical level of debt is determined outside the model and, as a first approximation, it is set equal to the current level of debt. Thus, $[(1+\zeta)^{-n} \cdot d_n - d_0]$ measures the size of the fiscal imbalance.

48. **Neither the metric of the imbalance nor the definition of sustainability is unique.** The **metric** can also be expressed in terms of revenue/expenditure (e.g. by how much should taxes be raised to restore sustainability) or specific measures (e.g. how much is the need to raise contribution rates or cut public pensions to sustain the current generosity of the pension/health care system). The **definition** of sustainability may be strengthened to ensure that the debt/GDP ratio does not exceed a certain ceiling at all times. Cast in a generational context, policies can be defined as sustainable if their burden is affordable and equitably distributed among generations (e.g., Kotlikoff, 2001).

49. **The present value metric of fiscal imbalance is sensitive to the choice of the discount factor.** If future fiscal balances are projected to be in deficit, the present value is monotonically decreasing in the discount factor, ζ , since future deficits are discounted at a higher rate. Depending on the choice of the discount factor, this could lead to a situation where the present value of future deficits is low while at the same time future deficit and debt reach levels that could lead to serious downgrading of credit ratings and refinancing problems that, in turn, could trigger a disorderly fiscal adjustment. Thus, the present value metric is not a sufficient summary measure of the fiscal imbalance and a low present value does not obviate the need to look at the future path of debt. A useful supplementary indicator is the number of years it would take for debt to reach a critical threshold beyond which rating agencies are likely to start downgrading the public sector's creditworthiness.

Appendix III. A Framework for Old Age and Disability Pension Projections

50. The **primary expenditure** for old age and disability pensions can be modeled as the product of the average pension (which for simplicity and without loss of generality includes also administrative costs) times the number of pensioners, and in percent of GDP can be expressed as²²

$$\begin{aligned} E &= a \cdot I / (p \cdot Y) = a (I / PO) \cdot (PO / E) \cdot E / (p \cdot Y) = \\ &= a \cdot i \cdot \xi \cdot / (p \cdot y) = \\ &= (a \cdot p^{-1} \cdot y^{-1}) \cdot i \cdot \xi, \end{aligned}$$

where a = average nominal pension, including administrative costs. It is based on lifetime earnings (adjusted for inflation), it is subject to a ceiling (2004: SwF 2110 per month for individual pensioner) and the replacement rate for an average income earner is 45 percent. $i = I / PO$ = pensioners in percent of the elderly, which depends on the coverage of the pension insurance and the extent of early retirement. The ratio is boosted by the existence of pensioners, primarily former foreign workers, who live outside Switzerland.

$\xi = PO / E$ = old-age dependency, that is the number of elderly per employed. It can be expressed as the share of elderly in the population divided by the activity rate, the participation rate and the unemployment rate: $\xi = (PO/POP) \cdot (POP/POPT) \cdot (POPT/LF) \cdot (1+UR)$
 $y = Y/E$ = average labor productivity.

51. Thus, **the change of primary pension expenditure** (in percent of GDP) relative to base period expenditure is given by

$$\begin{aligned} E_t &= E_0 \cdot \{ (a_t / p_t) \cdot i_t \cdot \xi_t / y_t \} / \{ (a_0 / p_0) \cdot i_0 \cdot \xi_0 / y_0 \} \\ &= E_0 \cdot [(a_t / a_0) \cdot (p_t / p_0)^{-1} \cdot (y_t / y_0)^{-1}] \cdot (i_t / i_0) \cdot (\xi_t / \xi_0). \end{aligned}$$

Pension expenditure increases when (i) the average pension rises faster than inflation plus labor productivity growth, (ii) the share of pensioners in the elderly rises, and (iii) old age dependency rises. In the past quarter century, average pensions increased at an annual rate of 2.7 percent, practically at the same rate as the growth of the GDP deflator plus labor productivity, leaving the bracketed term roughly unchanged.²³ As a result, the evolution of

²² Alternatively, expenditure can be expressed in terms of per capita GDP and the share of pensioners in the population: $E = a \cdot (I / POP) / [p \cdot (Y / POP)]$. The disadvantage of this simpler formulation is that it conceals the role of fundamental variables such as old-age dependence, participation rate, and productivity.

²³ Pensions are adjusted every two years for the increase in consumer prices and inflation, each with 50 percent weight, which is equivalent to full indexation for inflation plus half the increase in real wages. However, average pensions increase is faster due to wage drift.

expenditure has been driven by the rise in old-age dependence (ξ) and early retirement (i). Higher immigration reduces pension expenditure in percent of GDP to the extent that it reduces old-age dependence (ξ). Similarly, an increase in the effective retirement age reduces pension expenditure by raising the participation rate.

Annual average rate of change in 1980-2003	
Old age and survivor pensions	2.7
Disability pensions	2.6
GDP deflator	2.3
Labor productivity	0.4

52. **Primary revenue** of the pension system comprise contributions and earmarked VAT rates:

$$R = c \cdot W \cdot B / (p \cdot Y) + v \cdot h$$

$$= c \cdot (B/E) \cdot (W/p) / y + v \cdot h,$$

where

W = average nominal wage

B = persons contributing to the pension system (includes also Swiss working abroad)

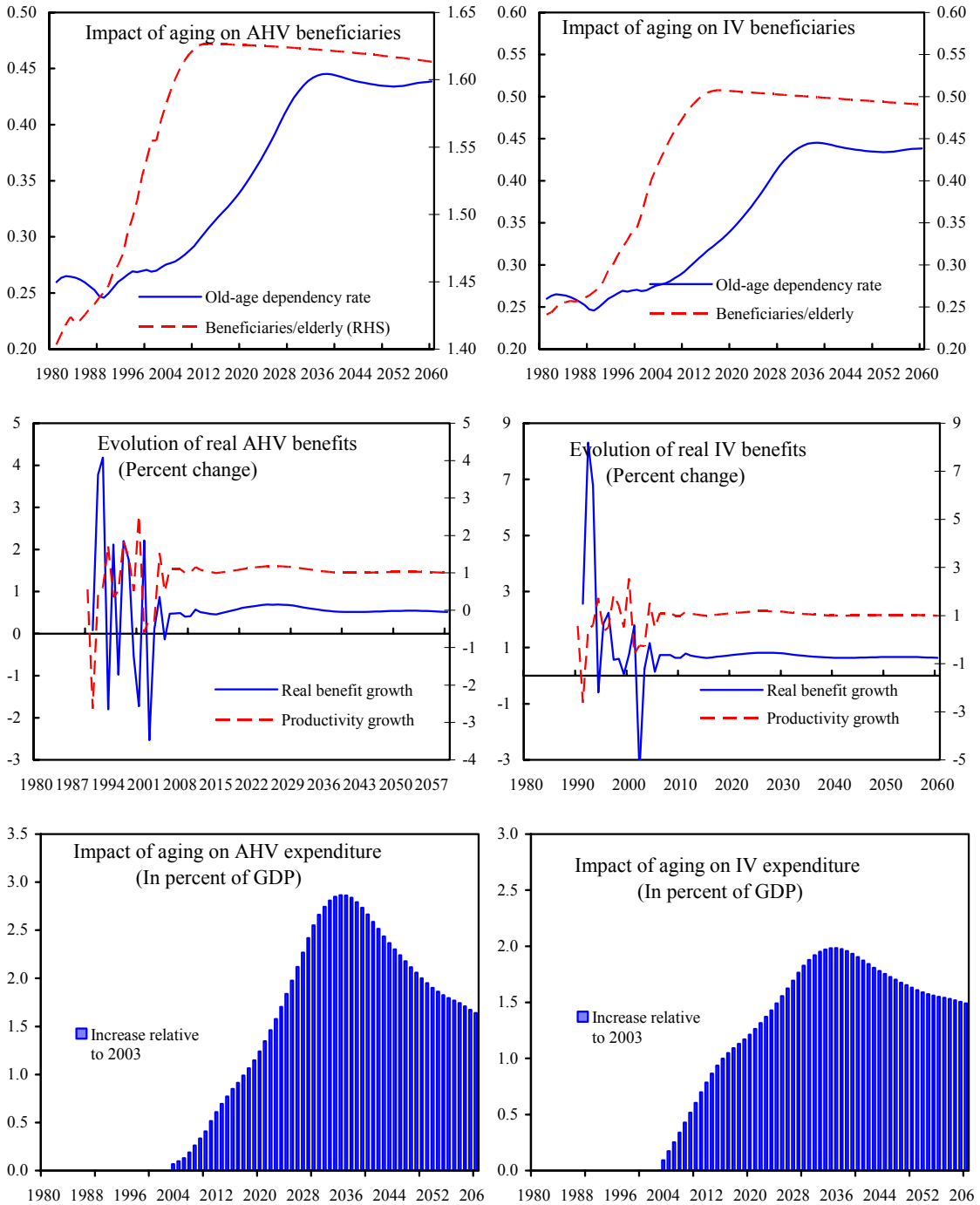
v = the VAT rate that is earmarked for the financing of pensions, and

h = incidence of VAT.

53. If, as it has been the case in Switzerland, real wages increase in line with labor productivity (leaving the labor share practically unchanged) and the ratio of contributors to employment remains constant, revenue dynamics are driven by the evolution of contribution and earmarked VAT rates. An increase in the effective retirement age or immigration would raise revenue in absolute terms but not in percent of GDP. Hence, in the absence of measures the evolution of the primary balance of the first pillar is driven exclusively by expenditure.

54. The projected increases in the deficit of old age and disability pensions, along with the evolution of the number of pensioners and the ratio of benefits vis-à-vis productivity growth, are given in Figure I-6.

Figure I-6. Switzerland: Impact of Aging on Pension Expenditure



Source: Bundesamt für Sozialversicherung; and IMF staff calculations.

Appendix IV. A Framework for Health Care Projections

55. **Primary health care expenditure** is modeled as the product of the average expenditure per insured times the number of insured persons and, in percent of GDP, is expressed as

$$\begin{aligned} E &= h \cdot (I/POP) \cdot (POP/E) / (p \cdot y) = \\ &= (h/p) \cdot i \cdot e^{-1} \cdot y^{-1} = \\ &= (h p^{-1} y^{-1}) \cdot i \cdot e^{-1} , \end{aligned}$$

and the evolution of expenditure relative to the base period is given by

$$E_t = E_0 [(h_t/h_0) (p_t/p_0)^{-1} (y_t/y_0)^{-1}] (i_t/i_0) (e_t/e_0)^{-1} ,$$

where

h = average health care expenditure per insured person. It depends on inflation in the health care sector, the generosity of the health care system (how extensive is the list of covered diagnostic procedures and treatable illnesses) and the average age of the insured (expenditure increase rapidly for persons over 50 and for octogenarians they are four times the expenditure for person under 50).

i = insured individuals in percent of the population.

e = employment as percent of the population, which equals the product of the activity rate, participation rate and the unemployment rate.

56. **Primary revenue** is modeled as the product of the contribution rate, c (which is defined to include co-payments by insured), times the number of insured persons. In percent of GDP, revenue are given by

$$\begin{aligned} R &= c \cdot (I/POP) \cdot (POP/E) / (p \cdot y) = \\ &= (c/p) \cdot i \cdot e^{-1} \cdot y^{-1} = \\ &= (c p^{-1} y^{-1}) \cdot i \cdot e^{-1} . \end{aligned}$$

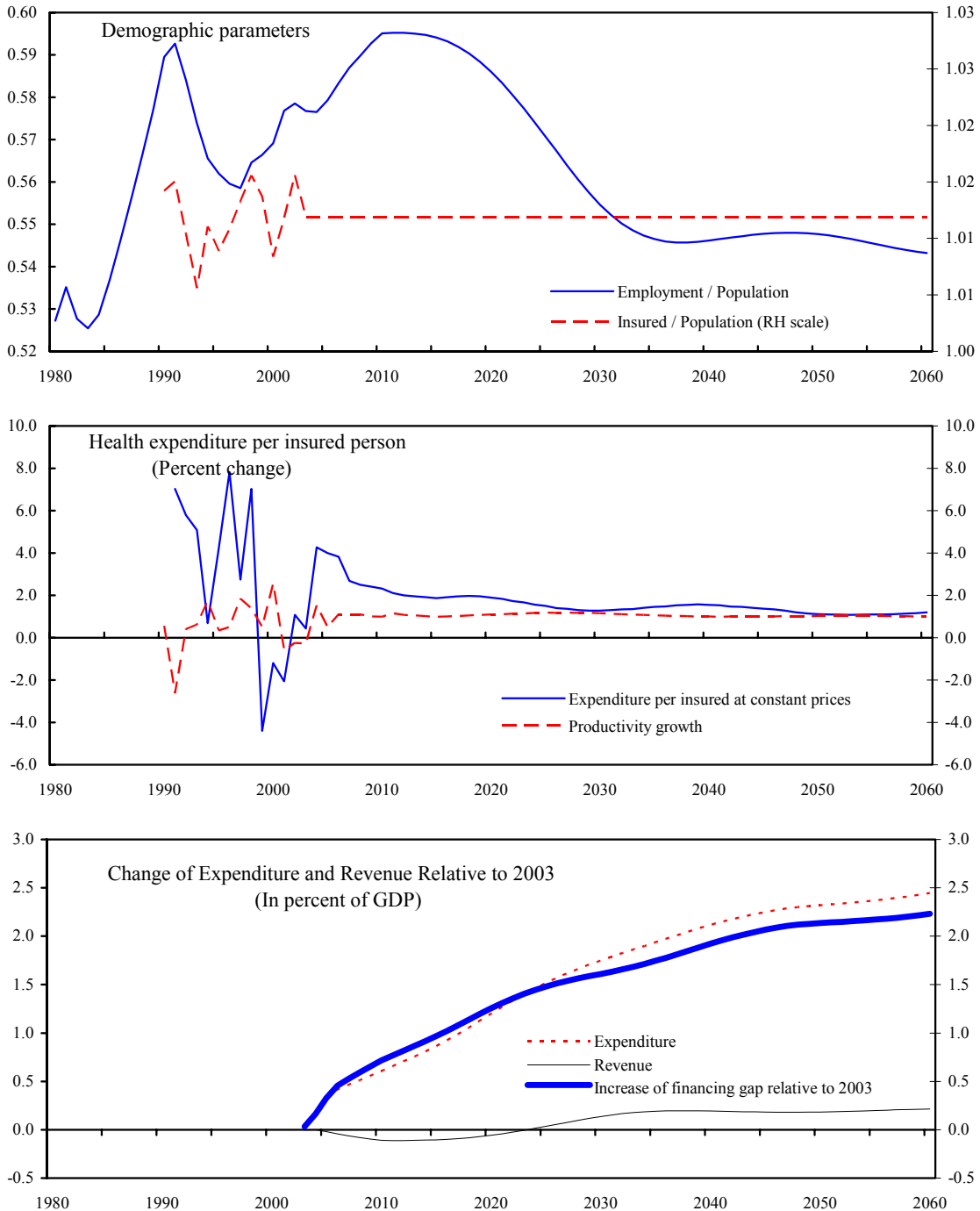
57. Thus, the **operating balance** and its evolution relative to the base year are given by

$$E - R = [(c - h) p^{-1} y^{-1}] \cdot i \cdot e^{-1} \quad \text{and}$$

$$(E_t - R_t) = (E_0 - R_0) [(c_t - h_t)/(c_0 - h_0)] (p_t/p_0)^{-1} (y_t/y_0)^{-1}] (i_t/i_0) (e_t/e_0)^{-1} .$$

58. The evolution of the deficit (Figure I-7) is driven primarily by the shortfall of the contribution rate from per capita expenditure ($c-h$) and employment rate e . The projections assume that the contribution rate and the government subsidy (in percent of GDP) remain unchanged at their present level.

Figure I-7. Switzerland: Impact of Aging on Health Expenditure



Source: Bundesamt für Sozialversicherung; and IMF staff calculations.

Appendix V. Data Sources

59. **Population and working-age population:** OECD Analytical Data Base (ADB) until 2000. From 2001 onwards, the two growth rates are set equal to the ones reported in BfS' baseline scenario.

60. The **labor force** series is constructed as the sum of employment and registered unemployment. **Employment** figures up to 2003 are obtained from ADB. The 2004 estimate is based on the rate of change reported in the BfS employment statistics. From 2005 onward, employment is linked to GDP and is based on the assumption that labor productivity will grow at an average rate of 1.1 percent per year. The **registered unemployment** series is from ADB. Unemployment is projected to decline to the NAIRU (2.3 percent) by 2010.

61. Data on **hours worked**, with a breakdown between full- and part-time employed, are available since 1991 from the Federal Statistical Office, BfS. The series are backcasted using the product of the number of work-weeks per year times the average contractual hours per week as reported by BfS. In 1991-2002, full-timers worked 2.5 times more hours than part-timers. This ratio, which has been fairly stable, is used to link the hours of full- and part-time workers in earlier years.

62. The share of **part-time employment** in total employment is derived from the hours statistics.

63. In the absence of official estimates, **capital stock** is computed from investment at constant prices (excluding residential construction)²⁴ using as starting value the 1968 capital stock estimate in Lüscher and Ruoss (1996) and applying exponential depreciation. Depreciation rates are based on an expected life of 50 years for structures, 15 years for machinery and equipment, and 4 years for software. These values are similar to those used by the Federal Statistical Office. In addition to ordinary depreciation, additional depreciation is applied in years of extensive restructuring, such as in the period after the oil shocks and the protracted recession in the 1990s. With the composition of investment changing over time, the average depreciation rate rose gradually from 4 percent in early 1970s to 5 percent in the early 2000s.

64. **Capacity utilization** in industry is obtained from the KOF data bank. Due to a break in the series, pre-1999 values are reduced by 3 percentage points.

²⁴ Pre-1980 investment figures are obtained by linking the ESA78 and ESA95 series. Figures on residential construction are from the ADB.

References

- Blanchard, O., 1990, "Suggestions for a New Set of Fiscal Indicators," OECD Economics and Statistics Department Working Paper No. 79
- Borgmann, C. and B. Raffelhüschen, 2004, "Zur Entwicklung der Nachhaltigkeit der schweizerischen Fiskal- und Generationenbilanzen 1995-2001", Swiss Economic Secretariat (seco), Bern.
- Braumann, B., 2005, "The Need for Health Care Reform", companion Selected Issues Paper.
- Bundesamt für Sozialversicherung, 2003, "Finanzierungsbedarf in der AHV (inkl. EL)", Beiträge zur Sozialen Sicherheit, Forschungsbericht Nr. 10/03, Bern.
- Bundesamt für Sozialversicherung, 2004, "Jahresbericht 2003 über die Sozialversicherungen", Bern.
- Bundesamt für Sozialversicherung, 2004a, "Jahresbericht Schweizer Sozialversicherungsstatistik, 2004", Bern.
- Bundesamt für Sozialversicherung, 2004b, "AHV-Statistik 2004", Bern.
- Bundesamt für Sozialversicherung, 2004c, "Bericht für die Festlegung von Szenarien für die AHV", Bern.
- Commission of the European Communities, 2005, "Green Paper 'Confronting demographic change: a new solidarity between generations'", COM(2005) 94 final.
- Duval, R., 2003, "The Retirement Effects of Old-Age Pension and Early Retirement Schemes in OECD Countries", OECD, Economics Department Working Paper No. 370.
- European Commission, 2002, "Public Finances in the EMU-2002", *European Economy*, 3.
- Frederiksen, Niels, 2001, "Fiscal Sustainability in the OECD: A Simple Method and Some Preliminary Results", Working Paper No. 3/2001, Finansministeriet, Denmark.
- Gagales, A., 2002, "Growth in Switzerland: Can Better Performance be Sustained?" IMF Working Paper 02/153.
- Hall, R., 1988, "The Relation between Price and Marginal Cost in U.S. Industry," *Journal of Political Economy*, vol. 96 (October), pp. 921-47.
- Keel, A., K. Frauendorfer and U. Jacoby, 2003, "Studie über die kurz- und mittelfristigen Finanzierungsrisiken von Vorsorgeeinrichtungen—Schlussbericht", Institut für Unternehmensforschung, Universität St. Gallen.