

Technical Commission on Old-Age, Invalidity and Survivors' Insurance

Assessing the impact of AIDS on
social security pension schemes in
developing countries

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Introduction

It is estimated by the joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) that 36.1 million persons were living with HIV by the end of 2000. It resulted in 3 million deaths from AIDS worldwide in 2000. By the end of that year, there are estimated to be 12 million AIDS orphans. The situation is not improving: some 5.3 million people became infected with the HIV virus in 2000.

95 per cent of people with AIDS live in the developing world. This proportion is set to grow as infection rates continue to rise in countries where poverty, poor health systems and limited resources for prevention and care compound the problem. Sub-Saharan Africa is the region of the world most affected by HIV/AIDS. AIDS is now the leading cause of death in Africa, responsible for one in five deaths. Life expectancy in Southern Africa, which rose from 44 years in the early 1950s to 59 years in the early 1990s, is set to drop to 45 years between 2005 and 2010 due to AIDS. Other parts of the world are also hit by the disease. AIDS has killed half a million persons in Asia in 2000.

The socio-economic impact of HIV/AIDS is immense given that the age range for those most affected is between 15 and 49 years, being the most economically productive and sexually active age group. Countries like Botswana, Namibia, Swaziland and Zimbabwe have been among the hardest hit nations with between 20 and 26 per cent of the population aged between 15 and 49 years living with HIV/AIDS. This results in an increase in morbidity and mortality rates, a decrease in population and a decline in the supply of labour.

As HIV/AIDS cuts into the size and quality of the workforce, it becomes increasingly disconcerting to business and economic policy makers. The direct and indirect costs of HIV/AIDS to business and the economy in these countries as a whole are staggering.

The number of households that will be left without an active "middle generation" will increase steeply in the developing world. AIDS deaths will completely modify the age structure of the

population in some countries, principally affecting the very young and the population aged 20 to 49. Even if it can be expected that preventive measures will slow down the epidemic, the shape of the usual population pyramid will be completely modified and AIDS will affect the demographic picture over several decades in the future.

Due to these factors, HIV/AIDS has significant impact on both revenue and expenditure of social security pension schemes in developing countries. On the expenditure side, HIV/AIDS will increase the number of invalidity and survivors' pensions in the short run and decrease the number of old age pensions in the long run. On the revenue side, HIV/AIDS will cause a reduction of the size of the population at working ages, which is the population of potential contributors to these schemes.

This paper presents the effect of HIV/AIDS on the demographic and economic variables that in turn influence the finance of social security pension schemes. The analysis is done through a hypothetical case (Demoland) hard hit by HIV/AIDS. The paper compares different scenarios, with and without the impact of HIV/AIDS, in order to show the sensitivity of pension schemes to the evolution of these various factors.

Presentation of Demoland

Throughout this paper, the impact of HIV/AIDS will be illustrated with the use of a hypothetical case, Demoland, a developing country experiencing a high HIV prevalence. Its characteristics may be summarized as follows.

The population

Demoland has a population of 14.8 million people in 2000. Its population is young: 43 per cent of the total population is under age 15 and only 5 per cent is 60 and over. The total fertility rate is 5.1 children per women.

There are presently 700,000 persons infected by the HIV in the country. Ten per cent of the adult population (aged 15 to 49) is estimated to be HIV positive. AIDS caused 72,000 deaths in 2000. The life expectancy at birth would be 56 for males and 59 for females in the absence of AIDS. Because of AIDS, the life expectancy has dropped to 49 for males and 54 for females. It is supposed that HIV/AIDS prevalence will reach its peak in 2010 and that prevention measures will make AIDS gradually disappear over the period 2010-2050.

The economy

Gross domestic product (GDP) of Demoland is currently growing at a rate of 5 per cent per year. Productivity per worker is increasing at 1.2 per cent per year. Labour force participation rates are 76 per cent for males and 63 per cent for females and the unemployment rate is 13 per cent. It is estimated that 20 per cent of the labour force is in the informal sector. Inflation is low (2 per cent per year).

The pension scheme

Demoland introduced its pension scheme 30 years ago. The social security law provides coverage to the total labour force, but due to compliance problems and the size of the informal sector, only 34 per cent of the total workforce (for both males and females) actually pay contributions to the scheme.

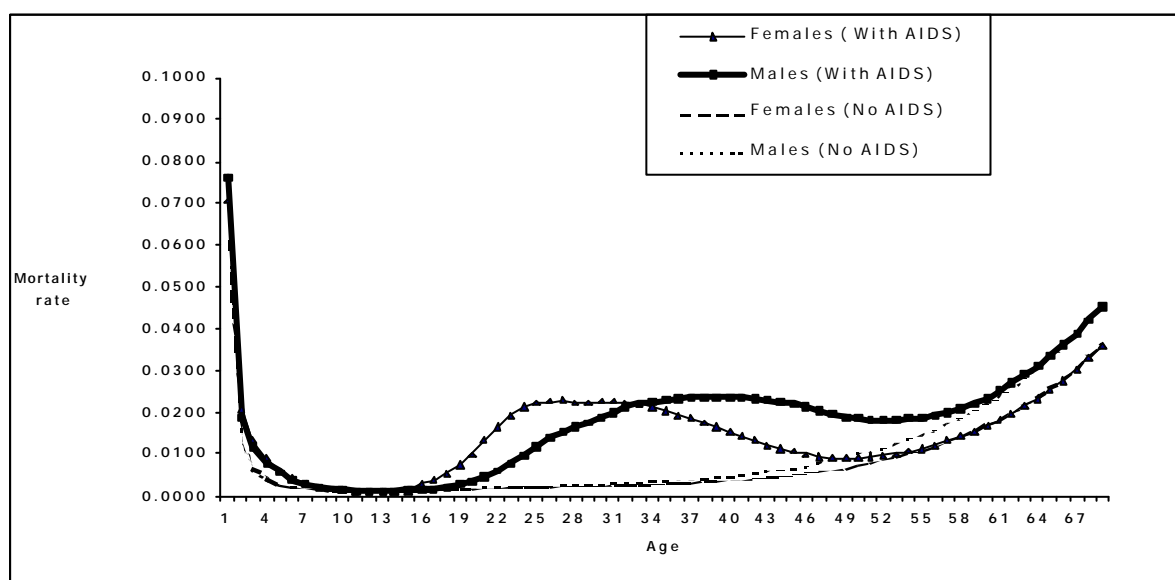
The pension scheme pays at retirement a pension equal to 1.5 per cent of final earnings per year of service. The scheme also provides invalidity pensions, widows' and orphans' pensions and a funeral grant. The present contribution rate is 8.0 per cent of insured earnings (compared to the current pay-as-you-go rate of the scheme of 7.7 per cent). Given the accumulated reserve equal to 3 times the annual expenditure of the scheme at the end of 2000, the present contribution rate of 8.0 per cent was considered sufficient to support the scheme for the next 27 years, in the absence of AIDS.

Demographic impacts

Mortality

AIDS will cause an increase in mortality for two critical age groups: the very young (0-4 years) and young adults (15-49 years). Mortality rates will increase dramatically for these two age groups. Figure 1 shows projected mortality rates in 2010 under the Demoland case. The year 2010 represents the peak of the number of AIDS deaths in our example.

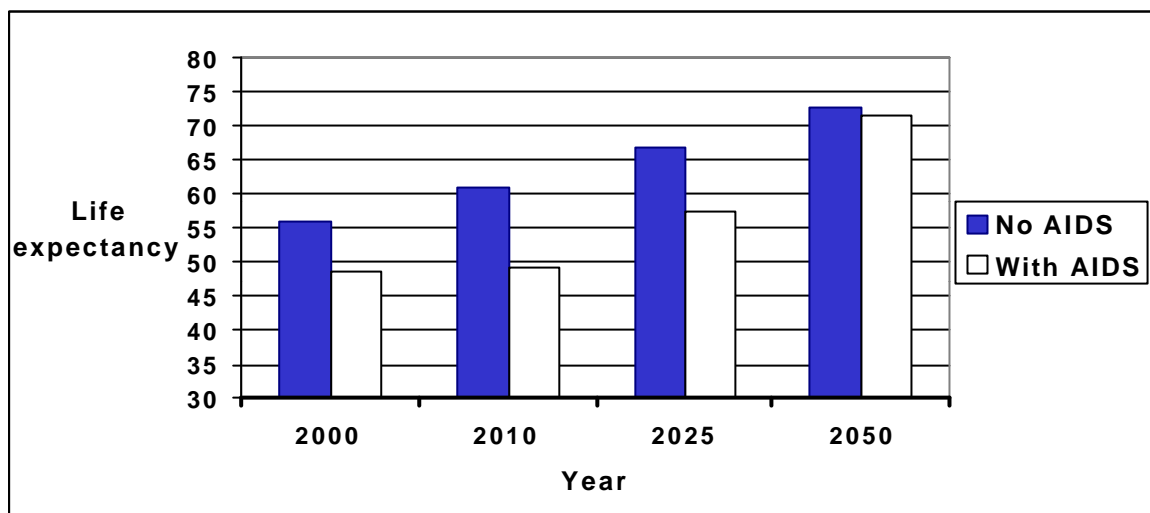
Figure 1. *Mortality rates for Demoland (with and without AIDS) in 2010*



The extra deaths due to AIDS are concentrated between ages 15 and 50. Extra mortality for men is likely to appear at ages slightly higher than for women. What cannot be seen on the graph is the extra mortality at very young ages (0-4 years) where HIV is transmitted from a mother to her child.

These changes in mortality will have a major impact on the life expectancy at birth. Under the scenario without AIDS, the life expectancy at birth is assumed to increase gradually and continuously from its present level of 56 years for males and 59 years for females in 2000 to 72 years for males and 77 years for females in 2050. If AIDS is taken into account, the life expectancy does not improve before 2010 and after then it starts to increase to eventually approach the "non-AIDS" values only in 2050 (see Figure 2).

Figure 2. *Projected life expectancy for men in Demoland (with and without the impact of AIDS)*



Fertility

HIV/AIDS also affects fertility because more women will become widows, thus generally stopping child-bearing. Reduction in fertility may also be caused by the poor health of women infected by HIV or by a decision by infected women to have no more children.

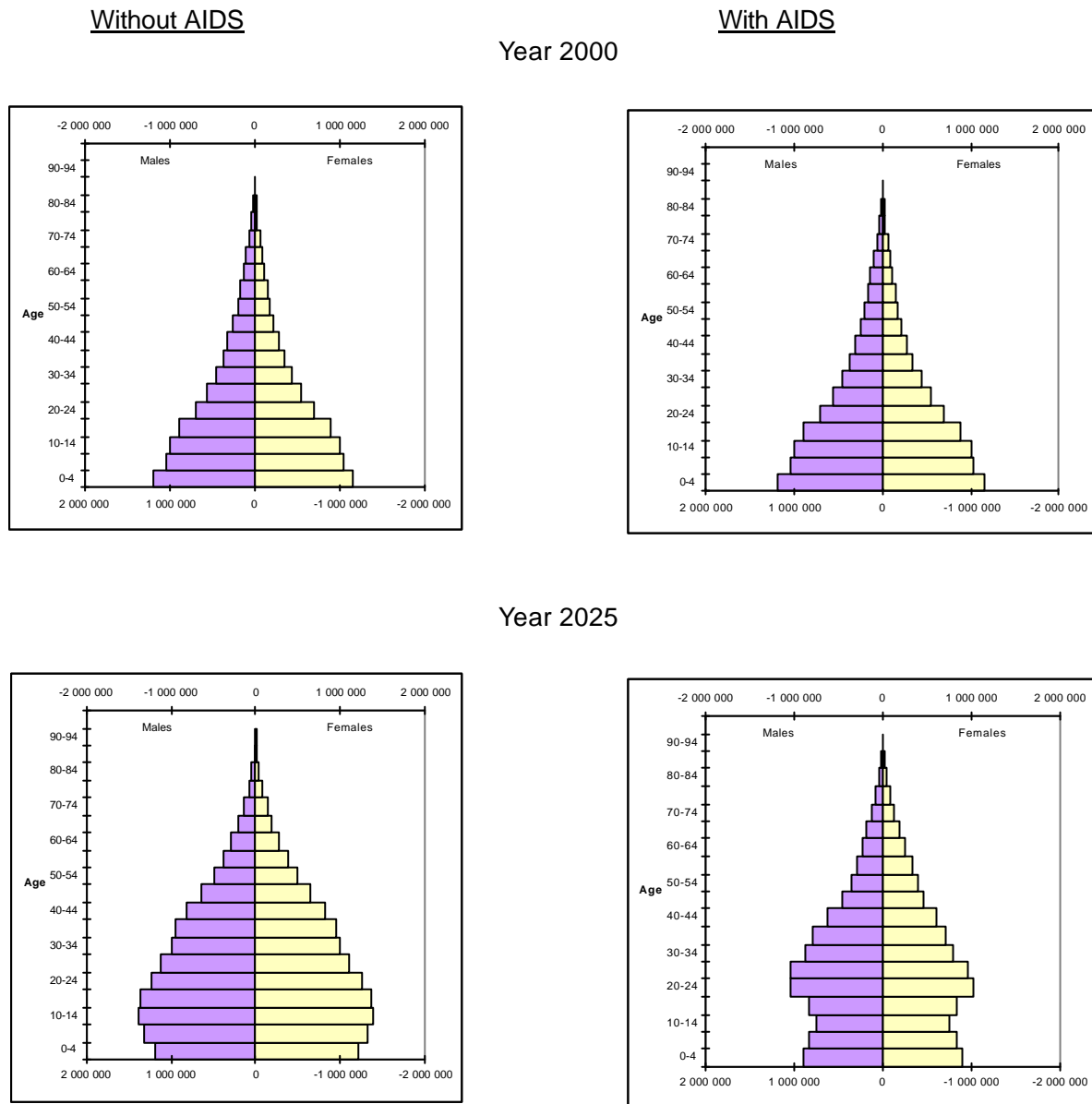
In the base scenario for Demoland (without the impact of HIV/AIDS), it was assumed that the total fertility rate would decrease from 5.1 in 2000 to 2.1 in 2025 and that it would remain at that level thereafter. In the scenario taking into account the impact of HIV/AIDS, it is assumed that the ultimate level of 2.1 will be reached more rapidly, in 2010 instead of 2025.

Total effect on the projected structure of the population

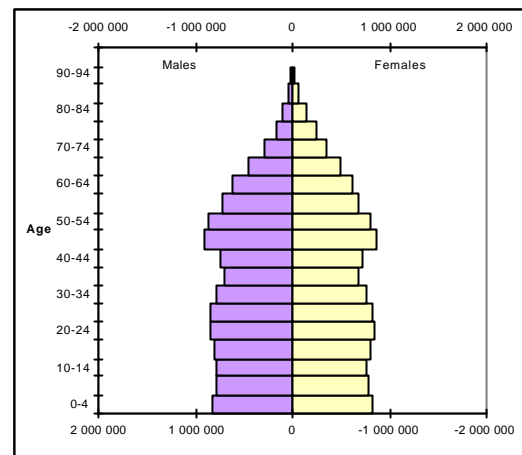
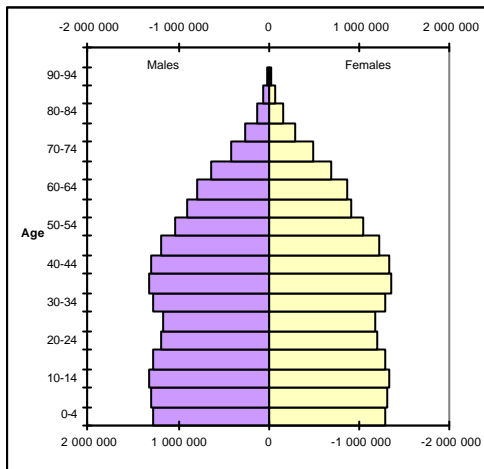
By combining the effects of HIV/AIDS on mortality and fertility, the global impact on the projected population can be very important. Figure 3 illustrates the population structure with and without HIV/AIDS, by using population pyramids. Under the "no AIDS" scenario, the total population of Demoland would increase from 14.8 million in 2000 to 34.1 million in 2050, representing an average annual growth of 1.7 per cent. With the effect of AIDS, the population would be only 22.6 million in 2050 due to the lower number of births and the higher mortality. We can observe in 2025 the combined effect of the lower fertility and the higher infant mortality on the population below age 20, which represents the future work force and social security contributors. Figure

3 also shows that mortality due to AIDS will prevent a large proportion of the population from reaching retirement age.

Figure 3. *Population pyramids, with and without the impact of AIDS*



Year 2050



Economic impacts

General considerations

The macroeconomic impacts of HIV/AIDS are difficult to assess. These impacts are sensitive to assumptions about how AIDS will affect savings and investment rates. If the costs associated with AIDS are financed out of savings, then the reduction in investment could lead to a significant reduction in economic growth. The impact also depends whether AIDS affects the best-educated employees more than others. In southern Africa, for example, there is generally a surplus of unskilled labour and a shortage of certain categories of skilled labour. If the epidemic is primarily located among unskilled and easily replaceable members of the work force, then it will have less of an impact than if it is located among highly skilled, hard to replace workers.¹

A large proportion of HIV infected population is in the age group 20-49. If one makes the assumption that labour force participation rates would remain largely unchanged due to HIV/AIDS, this would imply that the labour force would be proportionately smaller, because of the decrease in the population at those ages. But it is likely that HIV/AIDS will affect the age and sex distribution of the labour force, due to growing number of widows and orphans who will seek employment. Moreover, the fact that a large proportion of the HIV infected population is in the age group 20-49 means greater pressure for an early entry of children into the labour force, and early retirement of infected persons as well as a later exit of non infected persons.

Replacing skilled workers will be difficult and will most likely remain incomplete, resulting in a decline in Gros Domestic Product (GDP). Theoretically, capital and technology could substitute the reduced supply of labour. But this is not always possible, especially with few technicians and inadequate systems of equipment adaptation and modification or maintenance of imported technology.

¹ See Bollinger, 1999, and Seghal, 1999.

There is some evidence that with the already high un- and under-employment in many countries, the economic shock of reduced labour force supply will be compensated by persons seeking employment. In some other cases, import of labour from neighbouring countries may also softened this blow. However, even in case of high unemployment, it is not always possible to match the human resource requirements with available labour supply, in terms of skills and experience.

Since a large proportion of the HIV-infected population falls in the reproductive ages, the impact on productivity, costs and the economic environment is considerable. Employers are likely to face increased labour costs because of low productivity, absenteeism, shortage of labour, shorter working hours, increased sick leave and other benefits, early retirement and additional training costs. Both the well educated/skilled and uneducated/unskilled workers are affected. Even healthy workers also spend time away from work visiting the sick and attending funerals of colleagues.

AIDS deaths lead directly to a reduction in the number of workers available. If younger and less experienced workers replace experienced workers, productivity is reduced. A shortage of workers leads to higher wages and consequently to higher production costs. This may lead to a loss of international competitiveness and eventually to foreign exchange shortages.

The reduction in the number of employed persons lead to lower government revenues and reduced private savings, causing a drop in savings and capital accumulation, thereby having the effect of reducing employment creation in the formal sector. Some workers will be pushed from high paid jobs in the formal sector to lower paid jobs in the informal sector.

Economic growth is going to be negatively affected by all those factors. Various studies have estimated the expected decline in GDP growth. An early World Bank study, which examined the macroeconomic impact of AIDS in 30 Sub-Saharan countries, predicted a reduction of the annual growth rate of GDP of 0.8 to 1.4 percent per annum.

Our assumptions

For Demoland, it is assumed that HIV/AIDS will cause a reduction of the GDP growth as shown in Table 1.

Table 1. *Assumed future GDP growth for Demoland*

Without AIDS		With AIDS	
Year	GDP growth	Year	GDP growth
2000-2004	5.0 %	2000-2004	3.0 %
2005-2009	4.5 %	2005-2009	3.0 %
2010-2019	4.0 %	2010-2019	3.0 %
2020-2035	3.5 %	2020-2035	3.0 %
2036-2039	3.0 %	2036-2039	2.5 %
2040-2049	2.5 %	2040-2049	2.0 %

Concerning productivity, it is assumed in the base scenario that productivity of labour increases by 1.2 per cent per year. Under the AIDS case, productivity is assumed to increase at 1.0 per cent per year until 2039 and return to 1.2 per cent thereafter. It is assumed, as a simplification, that salary increases follow productivity increases.

As regards the impact of AIDS on the labour supply, it is assumed that the participation rates of men will be lower at all ages except for the 15-19 age group. For women, the need for children and widows to seek employment would cause an increase of their participation rates at all ages below 44. Combined with the lower GDP growth, the unemployment rate under the AIDS scenario increases from 13 per cent in 2000 to 20 per cent in 2015 and then decreases due to the decrease in the total population resulting from AIDS deaths. Detailed economic assumptions for the different scenarios are presented in annex.

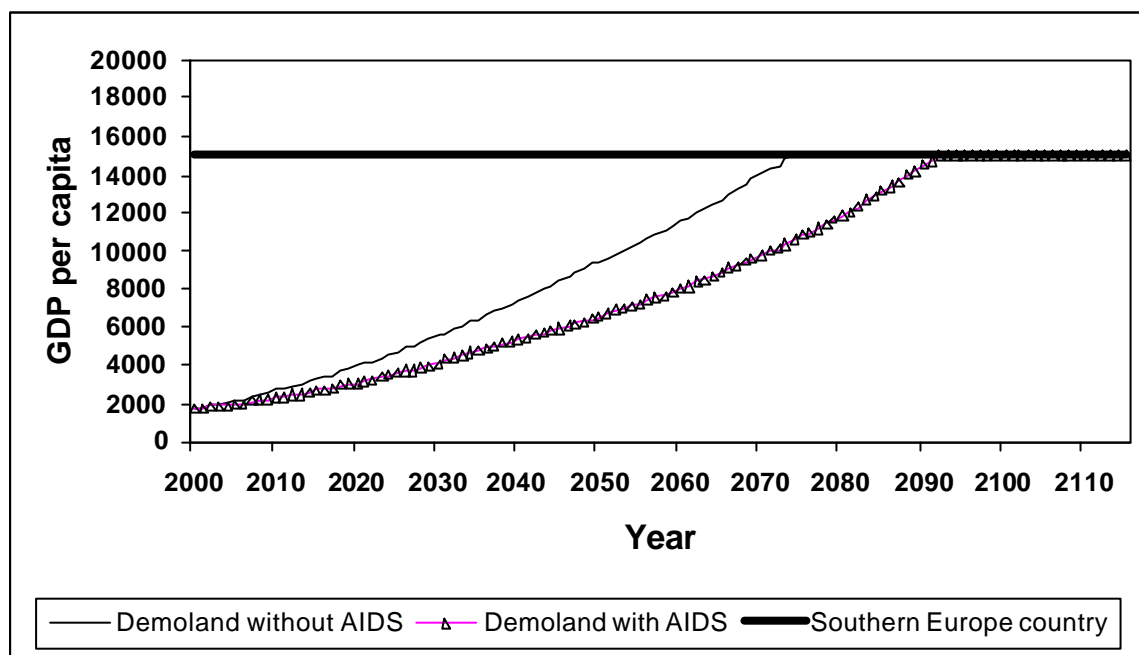
Overall economic consequences

The overall economic consequences of the above assumptions on economic development and the development of the standard of living are dramatic. However, they can only be estimated using a crude indicator. They may be measured by the estimated extension of the time that Demoland would need to catch up to the standard of living of a typical southern European Union country. The GDP per capita measured in purchasing power parities is here used as a crude indicator of the standard of living as well as a measure of economic development. It is assumed that the GDP per capita of Demoland of US\$720, in the year 2000, reflects a purchasing power parity of US\$1,700.² The initial purchasing power parity of the GDP (in 2000) in our comparator country in southern Europe is US\$15,000 (which is similar to that of Portugal). We assume that Demoland's GDP follows the growth paths mapped out for scenarios 1 and 2. The different growth assumptions between the European comparator and Demoland lead to a slow catch-up of Demoland (in terms of per capita GDP measured in purchasing power parities) with the present GDP level of the comparator.

² Such a relationship between the two indicators is observed for example in Côte d'Ivoire.

Without AIDS, Demoland would need about 74 years, under these assumptions, to catch up to the present level of GDP in the comparator country. This in itself is already bad news, but the AIDS pandemic would most likely extend that catch-up period by another 18 years. While one may hope that the economic catch-up to industrialized country levels proceeds faster, one must assume that AIDS throws the development of rapidly growing developing countries back by almost two decades. The authors consider this estimate rather optimistic.

Figure 4. *Projected GDP per capita for Demoland and a southern European country*



The impact on social security pensions

The impact of HIV/AIDS on pension schemes may be viewed from two angles.

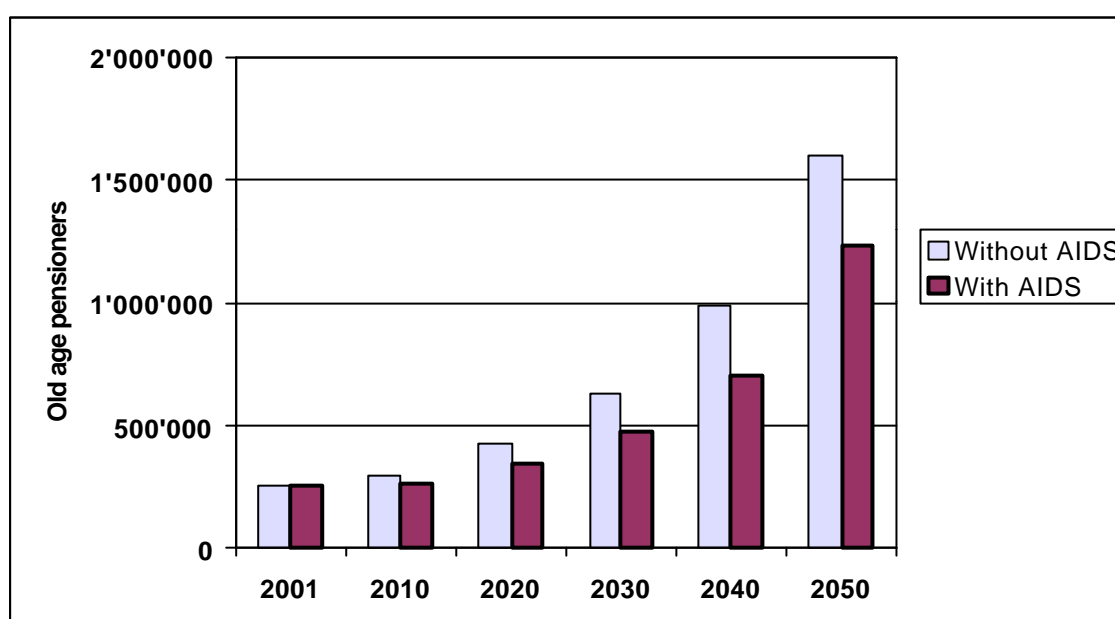
On the expenditure side, AIDS is expected to reduce the number of old age pensions in the long-term, but to increase survivors' and invalidity pensions in the short-term.

On the revenue side, AIDS will have an impact on the scheme to the extent that the reduction in the number of people in the general population will cause a reduction in the number of people in employment. All employed persons are automatically supposed to contribute to the scheme. The reality in most developing countries is that the actual coverage of social security schemes is far from complete and it can be assumed in some cases that new contributors will replace - at least partially - those who die from AIDS. However, the extent of this substitution is unknown. Thus two scenarios are analyzed with respect to the impact of AIDS on the number of contributors to the Demoland scheme: a zero-substitution scenario and a full-substitution scenario.

Old age pensions

The impact of HIV/AIDS on old age pensions varies over time. Initially, the number of old age pensions will be almost unaffected because the disease strikes mainly persons younger than age 50. But when generations now aged less than 50 will reach the retirement age, the scheme will experience a reduction of the number of old age pensioners.

Figure 5. *Projected number of old age pensioners for the Demoland scheme (with and without AIDS)*



Invalidity pensions

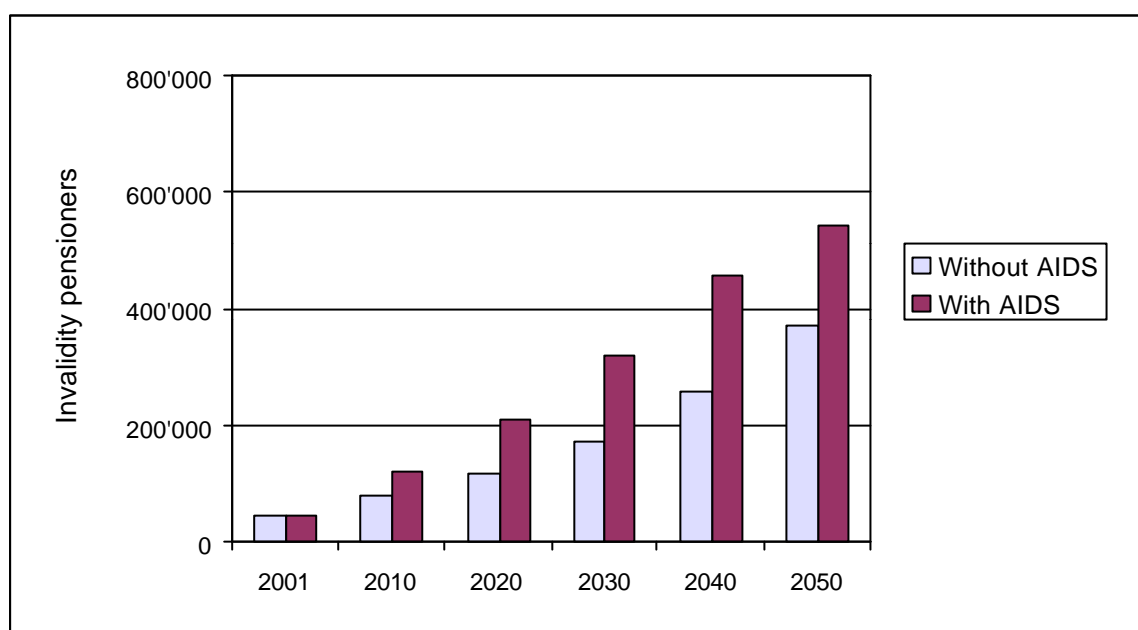
The number of invalidity pensions will be affected by the following factors:

- The incidence of new invalidity pensions should increase as a result of the incapacity to work of persons living with AIDS at a late stage of the disease. The impact on incidence of new cases depends on the length of the waiting period before the pension is paid. In developing countries, the period of time between the beginning of incapacity due to AIDS and the time of death is relatively short because life-prolonging drugs are often not available. Hence, it may well happen that few persons survive to claim the invalidity pension and receive benefits.
- The average duration of invalidity pensions should be reduced because of the rapid evolution of the disease and subsequent death.

Figure 6 presents one possible scenario assuming that the incidence of invalidity, with AIDS, is multiplied by a factor of 5.0 from 2000 to 2010 which gradually reduces to 1.0 between the years 2010 and 2050. To establish that factor, we have assumed that those who die from AIDS will be

eligible for an invalidity pension at least for a short period before death. In addition, it is assumed that the duration of invalidity pensions is reduced for those affected by AIDS. It is assumed that the mortality rates of invalidity pensioners are 5 times higher than in the base scenario from 2000 to 2010 and that this factor thereafter reduces gradually to 1.0 between 2010 and 2050.

Figure 6. *Projected number of invalidity pensioners for the Demoland scheme (with and without AIDS)*

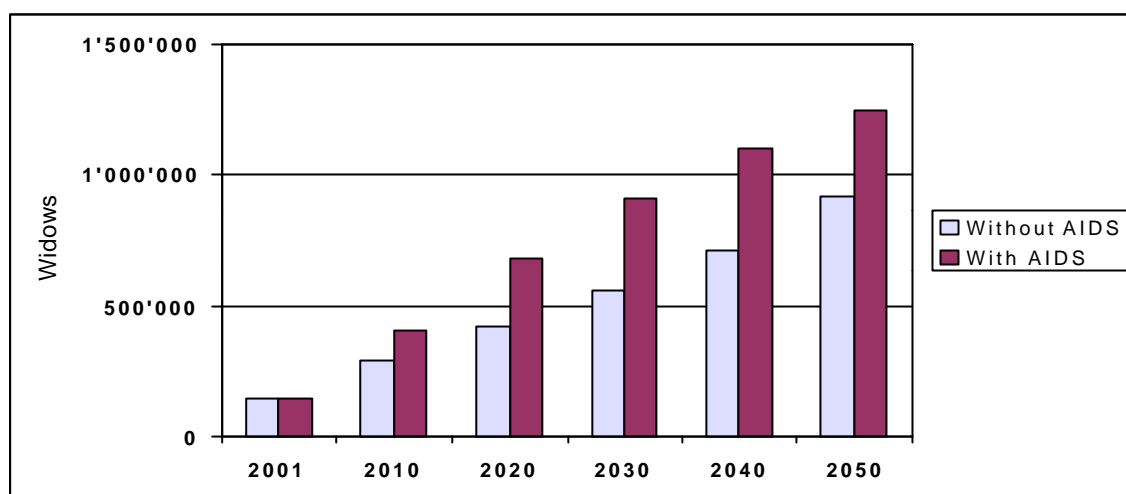


Survivors' benefits

As regards survivors' benefits, AIDS will cause an increase of the number of widows(ers) and an increase of the number of orphans. If the scheme provides for a funeral grant, expenditure on this benefit will increase sharply.

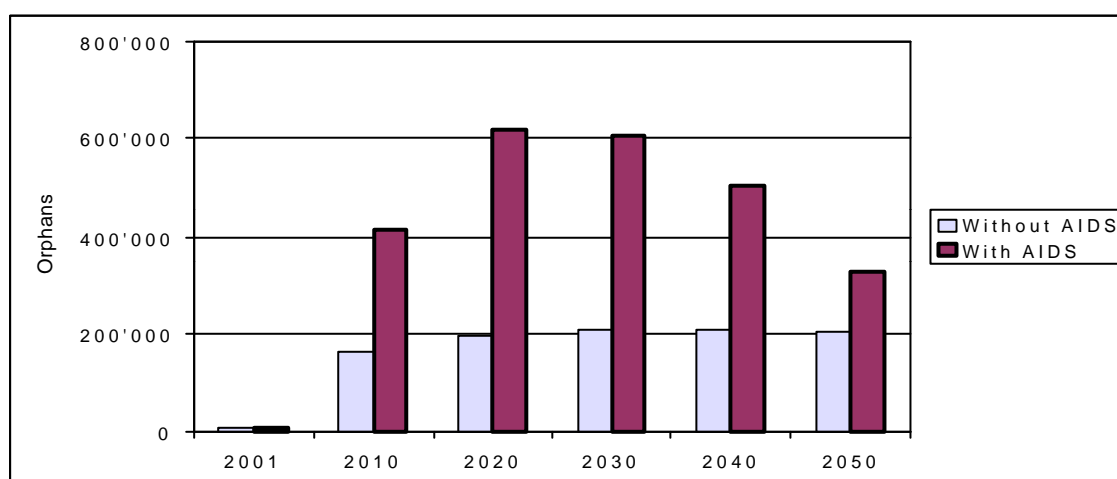
The duration of survivors' pensions should decrease as a result of AIDS, since survivors have a high probability of having been infected by the HIV before the death of the insured person.

Figure 7. *Projected number of widows for the Demoland scheme (with and without AIDS)*



Concerning the orphans' pensions, the increase in the number of pensions is proportionately larger than for widows' pensions because the death of the insured person happens at an early age, at a time when there are more dependent children under the age of 20 (in our case) in the household.

Figure 8. *Projected number of orphans for the Demoland scheme (with and without AIDS)*



Impact on the revenue of the scheme

HIV/AIDS will have an impact on the revenue of the scheme to the extent that it affects the number of contributors and their average contributory earnings. For our simulation on Demoland, we have included three scenarios according to the impact of AIDS on the number of contributors. In Scenario 2, we transfer directly to the pension scheme the reduction in the

number of workers, keeping constant the percentage of workers that are covered by the scheme (constant age-specific coverage rates). In Scenario 3, the number of contributors remains unchanged, thus leaving the revenue of the scheme unaffected. It is assumed, in Scenario 3, that there is high unemployment in the labour force and that (unskilled) workers are easily replaceable. Scenario 4 freezes the number of contributors at its 2000 level, assuming that the AIDS deaths and the lower economic growth prevent any increase in the covered population. See Box 1 for a summary description of the various scenarios.

Box 1 - Summary description of the scenarios

Four Scenarios are studied regarding the impact of AIDS on the number of contributors. They are as follows.

Scenario 1

Base scenario, without AIDS.

Scenario 2

AIDS affects the number of contributors to the social security scheme the same way it affects the total labour force. The coverage rates are set equal to those of the base scenario. So the deaths resulting from AIDS and the lower economic growth affect the number of contributors to the social security scheme in the same proportion as they affect the rest of the labour force.

Scenario 3

The number of contributors to the social security scheme is the same as in the base scenario (without AIDS). It is assumed that, because of the large size of the uncovered population and of the informal sector, there is full substitution of contributors dying from AIDS by workers not previously covered by the scheme.

Scenario 4

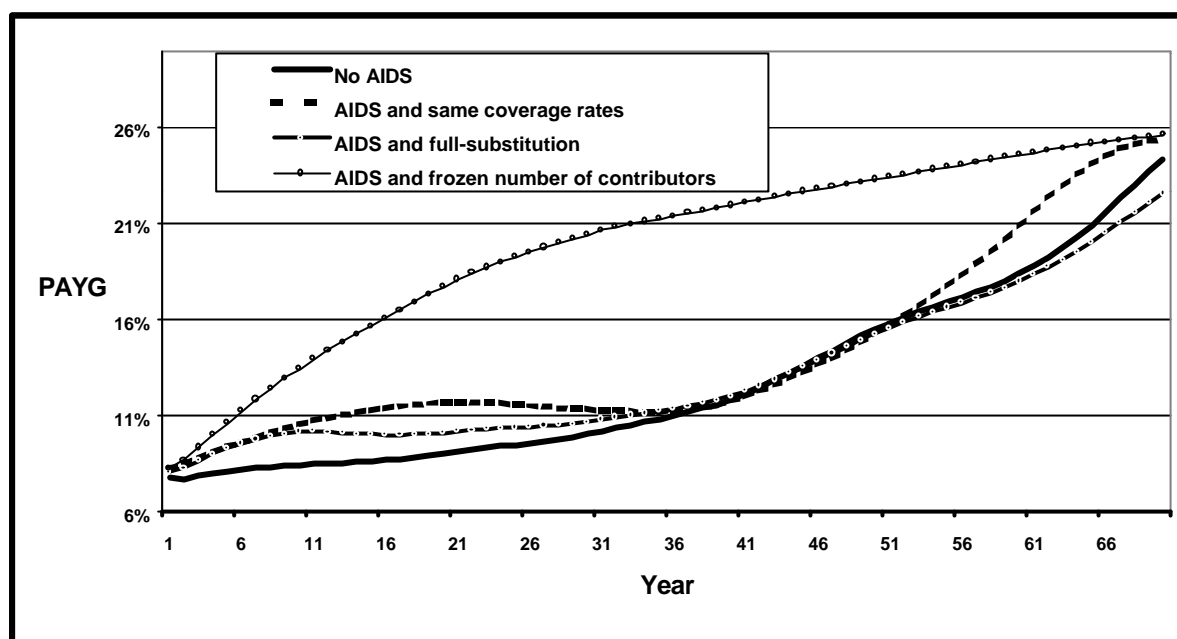
The number of contributors is constant and equal to the absolute number observed in 2000. It is assumed that AIDS will freeze the participation in the social security scheme at its 2000 level.

Global impact on the cost of the scheme

The global impact of HIV/AIDS on the cost of a social security pension scheme will vary over time. In the short run, the additional survivors' and invalidity pensions will increase the expenditure of the scheme and HIV/AIDS may have the effect of reducing the number of contributors because of the death or incapacity to work of these people. In the longer run, AIDS is expected to reduce the number of persons who reach the retirement age, thus reducing the expenditure relative to old age pensions.

Under the less favourable case (frozen contributor population), the Pay-as-you-go (PAYG) rate increases dramatically from its present level of 7.7 per cent to 20 per cent in 2030 and eventually to 23 per cent in 2050. On the other hand, if we assume that those who die from AIDS are rapidly replaced by new contributors to the scheme (Scenario 3), then the impact on the overall cost is slightly reduced with a PAYG rate under 12 per cent for the next 40 years. Figure 7 presents the pay-as-you-go cost of the scheme under the various scenarios.

Figure 9. *Pay-as-you-go cost of the Demoland scheme under various scenarios*



It may be helpful to compare the general average premium (GAP) under the various scenarios. The general average premium is defined here as the constant contribution rate that is necessary to finance all benefits of the scheme over the period 2000-2050. Under the base scenario without the impact of AIDS, the GAP would be 10.3 per cent. Under Scenario 2, the GAP is 11.4 per cent. This means that AIDS would require an immediate and constant increase of 1.1 per cent of the contribution rate over the next 50 years. On the other hand, if we assume that AIDS does not affect the number of contributors because of a full substitution of the labour force (Scenario 3), then the GAP would increase to 11.0 per cent. Under the less favourable Scenario 4, the GAP would be 16.5 per cent over the next 50 years.

Impact on contribution rates

As mentioned in the presentation of Demoland, the present contribution rate of 8 per cent was considered sufficient, in the absence of AIDS, to support the scheme until 2027. The presence of AIDS will change the picture and force an early increase of the contribution rate because of the short-term deficit caused by the increase in expenditure and the possible shrinking of the contributor population. Table 2 presents the contribution rates under the different scenarios. These contribution rates are determined starting with the present 8 per cent rate and increasing it only to face the pay-as-you-go cost of the scheme when the present contribution rate becomes insufficient.

Table 2. *Required contribution rates for Demoland, with and without HIV/AIDS*

Year	Contribution rate			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
2000	8.0 %	8.2 %	8.0 %	8.3 %
2001	8.0 %	8.5 %	8.2 %	8.9 %
2002	8.0 %	8.8 %	8.6 %	9.6 %
2003	8.0 %	9.1 %	9.0 %	10.4 %
2004	8.0 %	9.4 %	9.3 %	11.1 %
2005	8.1 %	9.6 %	9.5 %	11.7 %
2010	8.4 %	10.5 %	10.1 %	14.1 %
2020	9.0 %	11.7 %	10.1 %	17.3 %
2030	10.0 %	11.3 %	10.7 %	19.9 %
2040	11.8 %	11.7 %	12.0 %	21.6 %
2050	15.5 %	15.2 %	15.2 %	23.2 %

In the second scenario where AIDS affects the number of contributors in the same proportion as the entire labour force, we observe that the present contribution rate of 8 per cent is not sufficient as early as in 2000. The contribution rate must be increased gradually to reach 10.5 per cent in 2010 in order to face the increasing expenditure pattern and the lower contributory salary base resulting from HIV/AIDS. The third scenario, where AIDS does not affect the number of contributors, also requires a faster contribution rate increase (compared to the base scenario without AIDS) but at a slower pace than in Scenario 2. According to the worst-case scenario, the contribution rate would have to increase rapidly to 17.3 per cent in 2020 and eventually to 23.2 per cent in 2050.

Conclusion: What can be done?

As long as a pension scheme is able to replace the workers who are prematurely dying of AIDS, the impact of AIDS on national pension schemes appears to be manageable from the financial point of view. The higher cost of invalidity and survivors' pension will eventually be counterbalanced by lower expenditure on old age pensions.

However, the great unknown is the impact of HIV/AIDS on the number of contributors to these schemes. For developing countries, it may be assumed that the high unemployment and the large size of the informal sector will make it possible to replace AIDS deaths in the workforce to a considerable degree by workers not presently employed in the formal sector. But even under this assumption, it is possible that overall growth rates will drop as the productivity of these replacements is not likely to be as high as the productivity of the workers replaced, and the cost of training the new workers will increase the overall cost to the enterprise and hence affect

growth. However, the dramatic results of the non-replacement scenario (which certainly describes an improbable extreme case) shows that the financial risks of pension schemes affiliated with a potential draining of the economy of qualified workers is substantial. Hence, investments in awareness campaigns at workplaces and elsewhere which would reduce the incidence of AIDS, could contribute substantially to the safeguarding of the future financial well-being of the social security pension system. Some co-sponsoring of awareness campaigns by social security pension schemes thus seems to be fully justified and a rational course of action.

Given that the impact on the social security scheme itself is likely to be manageable, the efforts of policy makers should be concentrated on ways to adapt the present schemes to the reality of AIDS in order to offer a better support to those persons affected by the disease. There are ways to modify the provisions of social security schemes to better protect infected persons and their families without putting undue pressure on the finances of the schemes. Some examples follow:

- Introduction of provisions in the regulations to participate in the co-sponsoring of AIDS awareness campaigns (called the "social vaccine") at the workplace.
- Pre-payment of funeral benefits during the last stage of the illness in order to help insured persons to face the high medical expenses associated with AIDS.
- Adjust, if necessary, the eligibility conditions for invalidity and survivors' benefits so that access to benefits is open to the young workers and their families, keeping in mind that the population most affected is below the age of 40.
- Ensure adequate coordination between sickness benefits offered by employers or by the state and the invalidity pension offered by the national pension scheme, in order to avoid "holes of coverage" before the invalidity pension is paid.
- Review the waiting period for the invalidity pension so that people entering the AIDS status have time to claim benefits.
- Review the administrative procedure for the assessment of the invalidity status in order to shorten the period before the benefits are paid.
- Review the coverage provisions and the procedures to enforce compliance so that every worker of the formal sector may claim benefits when in need.
- Since employment is a prerequisite for social security coverage, adopt regulations to eliminate HIV testing at employment so that more people, through their employment status, may participate to the national pension scheme.

In the middle of dire suffering, the fact that AIDS will not necessarily put public pension schemes into bankruptcy is a small piece of good news. It means that those schemes can afford to adjust their benefit structures in order to help people affected by AIDS and active participation in prevention campaigns is a fully rational course of action for national pension schemes. However, the uncertainty about the severity and the duration of the pandemic leave considerable financial risks. It thus seems advisable to proceed carefully and on a step-by-step basis with benefit restructuring.

Alternatively, the potential financial leeway of pension schemes might have to be used to support other social benefit schemes such as health care schemes. The overall dimension of the economic, fiscal and financial challenge that AIDS poses for national social governance can only be estimated by a full social expenditure review with a social budget exercise. The Financial, Actuarial and Statistical Branch of the ILO is presently researching the issue.

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Annex

Description of the main economic assumptions used for projections

1. Description of the four scenarios

The paper compares projections under four scenarios, according to the presence or not of AIDS, and to what extent AIDS affects the number of contributors to the social security scheme. The scenarios are as follows:

Scenario 1: Base scenario, without AIDS

Scenario 2: AIDS affects the number of contributors to the social security scheme the same way it affects the total labour force. The coverage rates are set equal to those of the base scenario.

Scenario 3: The number of contributors to the social security scheme is the same as in the base scenario (without AIDS). It is assumed that there is full substitution of contributors dying from AIDS by workers previously not covered by the scheme.

Scenario 4: The number of contributors is constant and equal to the absolute number observed in 2000.

2. Rate of growth of GDP

Year	Scenario 1	Year	Scenarios 2, 3 and 4
2000-2004	5.0 %	2000-2004	3.0 %
2005-2009	4.5 %	2005-2009	3.0 %
2010-2019	4.0 %	2010-2019	3.0 %
2020-2035	3.5 %	2020-2035	3.0 %
2036-2039	3.0 %	2036-2039	2.5 %
2040-2049	2.5 %	2040-2049	2.0 %

3. Rate of growth of the productivity per worker

Year	Scenario 1	Year	Scenarios 2, 3 and 4
2000 +	1.2 %	2000-2039	1.0 %
		2040 +	1.2 %

4. Participation rates

Age	Scenario 1		Scenarios 2, 3 and 4	
	Males	Females	Males	Females
15-19	58 %	37 %	65 %	50 %
20-24	89 %	44 %	90 %	60 %
25-29	97 %	47 %	90 %	60 %
30-34	98 %	49 %	90 %	60 %
35-39	99 %	49 %	90 %	60 %
40-44	98 %	51 %	90 %	60 %
45-49	97 %	51 %	90 %	50 %
50-54	97 %	49 %	90 %	50 %
55-59	90 %	46 %	60 %	30 %
60-64	88 %	39 %	20 %	20 %
65-69	72 %	23 %	20 %	20 %

5. Unemployment rates

Year	Scenario 1	Scenarios 2, 3 and 4
2000	13 %	14 %
2005	12 %	17 %
2010	12 %	18 %
2015	13 %	20 %
2020	14 %	19 %
2025	16 %	17 %
2030	17 %	12 %
2035	17 %	7 %
2040	16 %	6 %
2045	15 %	6 %
2050	13 %	6 %

6. Percentage of workers covered by the social security scheme

The following coverage rates are assumed for Scenario 1 without AIDS. Under Scenario 2, the same coverage rates are applied to a reduced labour force, resulting in a reduced covered population.

Age	Age-specific coverage rates	
	Males	Females
15-19	20 %	20 %
20-24	25 %	25 %
25-29	30 %	30 %
30-34	40 %	35 %
35-39	40 %	40 %
40-44	50 %	45 %
45-49	50 %	50 %
50-54	60 %	55 %
55-59	60 %	60 %

Year	Global coverage rate	
	Males	Females
2000	34 %	34 %
2010	35 %	35 %
2020	36 %	36 %
2030	37 %	37 %
2040	38 %	38 %
2050	37 %	38 %

Scenario 3 uses the same number of insured persons as Scenario 1. Scenario 4 uses a constant absolute number of insured persons equal to the observed covered population in 2000.