# DEMOGRAPHIC AGING AND POPULATION DECLINE IN 21ST CENTURY GERMANY – CONSEQUENCES FOR THE SYSTEMS OF SOCIAL INSURANCE

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## 1. INTRODUCTION

There is a fundamental link in most societies between economic production (i.e., output) and demographic reproduction. A population's total fertility rate (TFR), expressed as the number of live births per woman, tends to be lower the higher a country's level of development. I shall discuss the main causes of this "demo-economic paradox" in section 2, and show its adverse consequences for the system of social insurance in Germany. Section 3 will summarize the main findings of our demographic projections computed for Germany in the 21st century, and section 4 will analyze the impact of these projected demographic developments on the social insurance system and set out the consequent policy options. Section 5 will sum up the conclusions to be drawn on the impact of economic globalization on population change and on the ability of social insurance systems to function properly in the future.

## 2. THE DEMO-ECONOMIC PARADOX AND ITS SIGNIFICANCE FOR GERMANY'S SOCIAL INSURANCE SYSTEM

In theoretical biology, evolution is explained in terms of competition between different biological species, and between individuals of the same species, to attain optimum conditions for their life and reproduction. In human populations, too, competition among individuals and groups is an important principle determining action, so the principle's prominence in theoretical demography is similar to that in theoretical biology. Competitive behavior has both positive and negative impacts on how we live together in human societies. Modern societies endeavor to make the best of the positive impact

exerted by the competition for political power and economic success, by developing appropriate rules for democracy and the market economy. In social market economies like Germany, the negative impacts are restrained by means of comprehensive social welfare legislation.

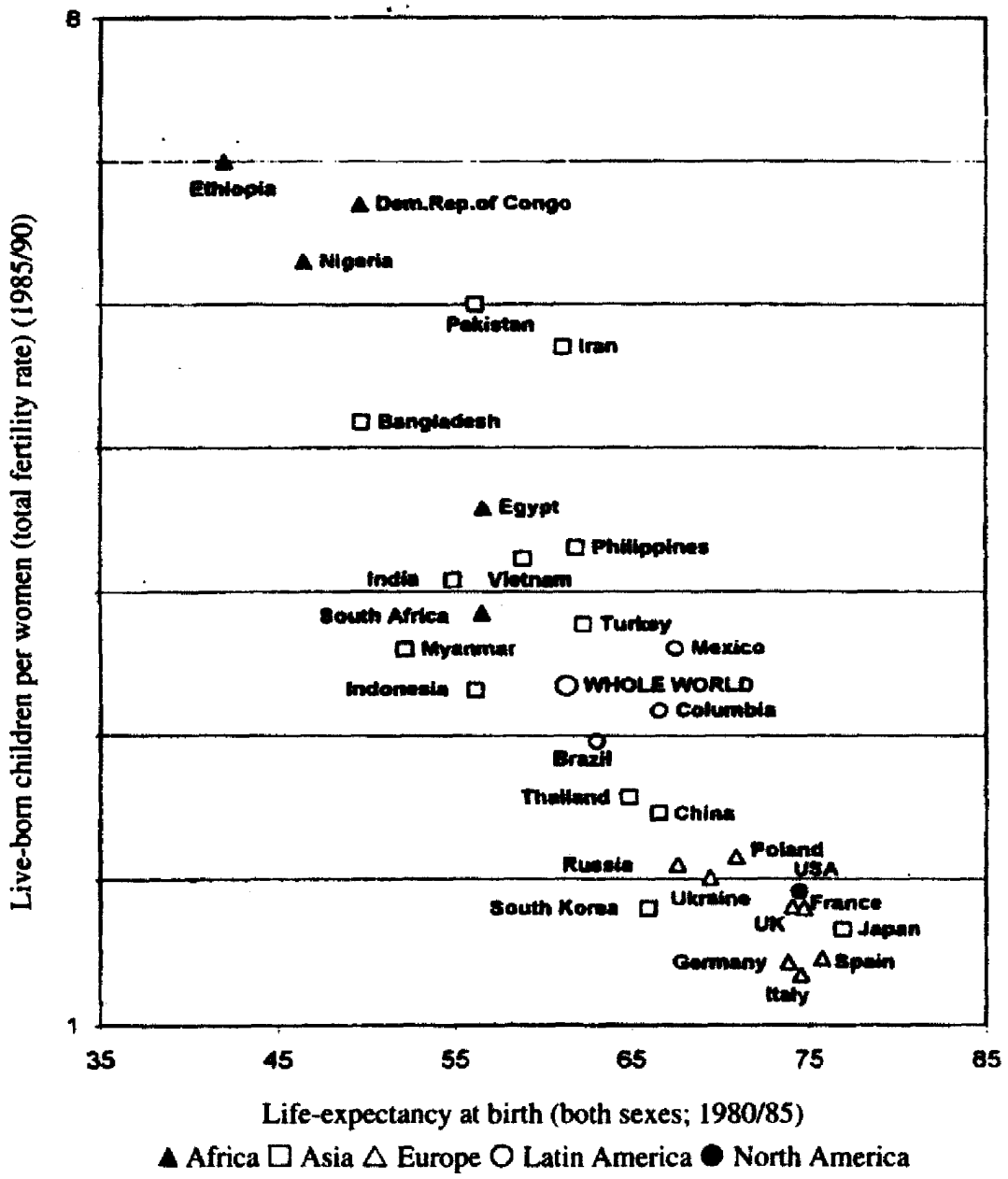
The more successful modern societies are in utilizing the beneficial effects of competition while avoiding its adverse effects, the less people need to rely on having their own families, which always performed these tasks before the emergence of modern societies, and the larger the fall in the value of having children "as an investment". So there is indeed an underlying logic to the inverse relationship that emerges between a country's level of development and its total fertility rate. Yet it still appears a paradoxical outcome that people should be less willing to have children the better they can afford them. In Germany, for example, the number of live births per woman was twice as high in the 1960s as it is today (a TFR of 2.4 versus 1.3) even though real incomes have quadrupled in that time.

For decades, the positive net cost/benefit outcome of the German-style model of the social market economy appeared beyond dispute. However, in the last quarter of the 20th century it became increasingly clear that the economic success generated by this type of society was counterbalanced by a demographic failure that may yet prove destructive for both economy and society in future. The cause of this adverse trend lies in the demo-economic paradox that affects most countries of the world. Whether the comparison is made longitudinally, i.e., by viewing the same country at different points in time, or as a cross-section of countries at the same point in time, the same inverse correlation is found between live births per woman and the level of development, as expressed by quantities such as life expectancy, the UN Human Development Index, or per capita income.

This comparison is brought out in Figure 1, which covers the world's 30 most populous countries, together accounting for 80% of the world population. If the correlation shown in the chart is carried out for other points in time, the same falling curve is in evidence. Evidently, this pattern of correlation is valid across the globe: It holds for most countries in the world, regardless of what kind of economic system or form of society they have, their histories, religions, and cultures. So this has to be a fundamental mechanism, the stringency and force of which derive from the unbridgeable antagonism between the two basic human principles of action, namely competition and the exclusion of rivals on the one hand or solidarity with and the

inclusion of fellow human beings on the other (cf. BIRG and KOCH 1987; BIRG, FLÖTHMANN, and REITER 1991; BIRG and FLÖTHMANN 1996; BIRG 1992; 1998; 12.04.2000).

Figure 1. Correlation between life expectancy in 1980–85 and the number of children per woman (Total Fertility Rate) 1985–90 for the 30 most populous countries, covering 80% of the total world population




*Source*: Birg, IBS, University of Bielefeld, 2000; Data: UNITED NATIONS (1999).

Economic globalization is pushing outward the boundaries of national labor and goods markets. Although individuals still primarily compete as employees with others in their own national labor market, this direct competitive relationship is now supplemented by a less immediately obvious, indirect one that results from global competition in the markets for goods and services. The products of companies within their own country have to compete on the world market with similar goods and services from elsewhere, and these are likely to be all the more competitive, the lower the cost element borne by both companies and their employees via social insurance contributions to cover retirement pensions, health care, and unemployment pay. These are the so-called "non-wage" labor costs which, in Germany, include the additional component of long-term care insurance. As far as the real, demographically generated cost burden is concerned, it is immaterial whether these costs are charged as a percentage of wages and salaries or as a percentage of corporate profits: The increase in costs and the adverse impact on competitiveness are the same either way, and the difference is purely one of economic accounting.

The older a society is, the greater the per capita expenditure on social insurance systems will be, and hence the greater the share of unit labor costs taken up by the non-wage costs which are so important when setting prices for goods and services, and the less favorable the economy's demographically determined competitive position will be in world markets. However, highly developed countries with their high per capita incomes accompanied by high demographically determined non-wage labor costs will not automatically be crowded out of the world markets by countries where both incomes and non-wage labor costs are lower, because the high incomes are based on higher productivity that can make up, or perhaps more than make up, for their less favorable labor-cost situation. So high or rising real incomes do not mean that high-wage countries will be driven out of their markets by less developed countries. In fact, every country has quite a large amount of scope to improve its position in the rankings with regard to productivity and per capita income.

This competition among economies to obtain a favorable position in the rankings has the effect of encouraging employees to invest in their skills and qualifications, so the average real wage level rises continually. On the other side of the coin, the opportunity cost to a parent of turning down work for the sake of bringing up a child also increases just as fast as that real wage

level. In highly developed countries, the resulting low birth rate has created an inverse age profile in the population. Instead of the classic pyramid shape in which the youngest age groups make up the largest cohorts, these are now the middle-aged, and in Germany's case, the 70–74 year olds are destined to become the largest five-year age group in future.

In Germany, the modern welfare state was introduced as long ago as the late 19th century with the Bismarckian social reforms, which were continually improved upon during the 20th century. The system now has a number of different branches to it, including retirement pension, health, accident, and unemployment insurance, as well as provision for surviving dependents and, most recently, long-term care insurance. When it was first introduced in the 1880s, the social insurance system was tailored to an age profile taking the classic "population pyramid" form with a broad base of young people. The system operates on what is known as the "pay-as-you-go" principle, under which those currently in work pay their contributions into the various statutory insurance branches to fund the benefits paid out to the pensioners, sick, or unemployed people at that same time. Benefit payments and contributions fall within the same time period, in contrast to fully funded pensions in which capital is built up over many years to finance future benefits to the same generation.

For almost a century, this statutory benefits insurance system worked so well in Germany that hardly anyone needed to have children of their own to ensure they would be looked after in their old age or if they were in poor health. The very fact that innovations in social policy performed their functions so effectively for many decades was itself one of the reasons why the system ultimately stopped working as the age profile crucially shifted due to the low birth rate. Of course, the modern social insurance system is not the only reason why the birth rate has declined, but it is certainly one of the factors that made sure the demo-economic paradox remained intact, with all its consequences for a declining birth rate.

## 3. Population Projections for Germany in the 21st Century

To show how uncertain forecasts of future developments are, people often point out that weather forecasters repeatedly get it wrong. Yet weather forecasting offers a useful means of illustrating one of the key characteristics of

making demographic projection that sets its reliability apart from that of economic forecasts and various other predictions of future trends. Seasonal changes, and associated aspects such as changes in average temperatures, can be predicted months in advance with greater reliability than, say, temperatures in the coming week. Though it may be generally true that predictions grow more uncertain the further into the future they look, the fields of climatology and demography offer some major exceptions to this rule. One of the most important such exceptions is the phenomenon of demographic inertia, i.e., the in-built momentum of population growth and decline: Once the absolute number of births in a population has fallen due to a change in reproductive patterns rather than to any change in the number of women of childbearing age, this will lead to a further reduction in future births, even if reproductive patterns remain constant following their initial change. Thus the initial change is triggered by a change in reproductive behavior, but subsequent downward movements in the absolute number of births, in a series of waves each a generation apart, are due not to any further behavioral change but to the simple fact that people who have not been born cannot have any offspring of their own. This impact on future births created by the reduction in the number of potential parents can be forecast with a similar degree of certainty to that of the changing seasons in years to come, i.e., almost 100%. Thus, it ought not to surprise us that demographic forecasts are substantially more reliable than, say, economic ones. For example, the forecast changes in the population of former West Germany up to the pre-unification period (1985) based on the 1970 census produced an error of a mere 1.2%.

The TFR in Western Europe initially rose slightly after World War II, but fell back sharply thereafter. It increased from 2.39 in 1950–55 to 2.66 in 1960–65, but had fallen to just 1.48 by 1995–2000. In Germany (East and West combined), the rate went up from 2.16 in 1950–55 to 2.49 in 1960–65, before falling back to 1.30 in 1995–2000. In the whole of Europe, which had a population of 729 million in 2000, the corresponding figures are 2.57 (1950–55), 2.56 (1960–65) and 1.42 (1995–2000) (UNITED NATIONS 1999).

The general downward trend in the total fertility rate in Europe after the 1960–65 period was due to a change in reproductive behavior which in turn had a broad range of causes, including a shift away from traditional "family values", greater sexual permissiveness, women's liberation, the growing number of working women meaning that those who chose to raise children

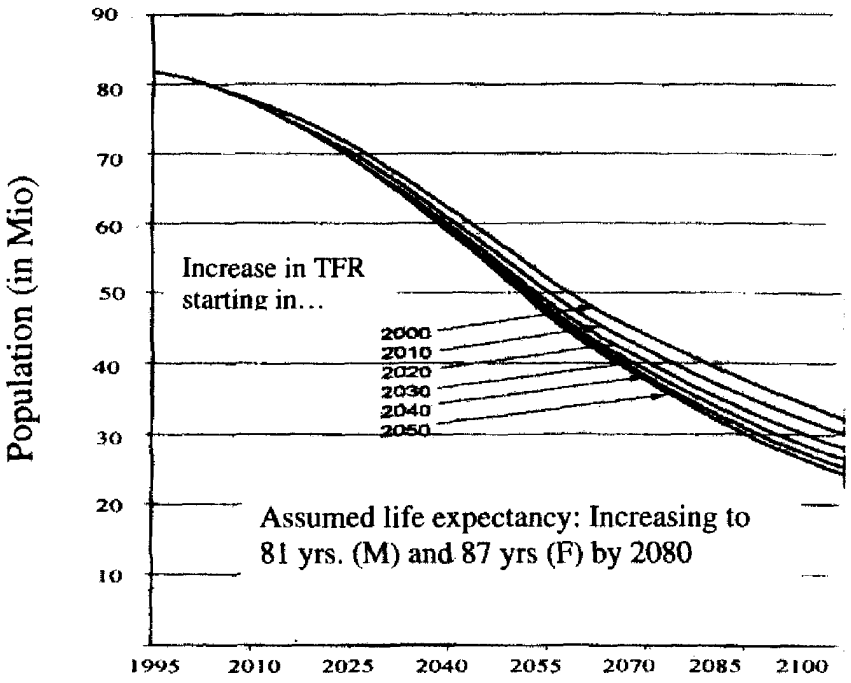
would miss out on greater earning opportunities (known as the "opportunity cost of children"), the increasingly effective cover against key life risks provided by the modern welfare state (making children dispensable as a form of family-based social insurance), all the way through to factors such as the advent of modern contraceptives. Strictly speaking, these factors do not properly explain the change in reproductive behavior because they are mutually dependent and because they themselves require explanation. However, no matter how the explanatory factors are fitted together to compose a cogent theory of reproductive behavior, the impact of the changes that really have occurred on the number of potential parents growing up and the number of children they will have in the coming decades can be computed relatively precisely. The collection of essays by VOLAND (1992) offers an interdisciplinary review of modern theories of reproduction. This also includes the present author's biographical fertility theory, which endeavors to achieve a synthesis between the approaches of a number of disciplines.

If no migration occurred in either direction, Europe's population would fall substantially by the year 2050, even if one were to assume, as the UN does, that the number of live births per woman will recover somewhat from 1.42 in 1995–2000 to 1.77 in 2040–50. On this assumption, the population would fall from 729 million in 2000 to 628 million in 2050 (UNITED NATIONS 2000: 81). The UN projections also assume that the total fertility rate in Germany will pick up from 1.30 in 1995–2000 to 1.64 in 2040–50; yet even assuming the birth rate does grow to this extent, the population net of any migration would then fall from 81.7 million (1995) to 58.8 million (2050) (UNITED NATIONS 2000: 110).

The reasons given above for past changes in reproductive behavior will not lose their validity in future, so there is nothing to suggest that these factors will cease to operate and allow the total fertility rate to increase again as the UN assumes in its projections. So it is interesting to analyze how the population will develop if different assumptions are applied. The main findings of the author's projections based on these differing assumptions (BIRG 1998) will be presented below. Two variants have been computed, one with and one without migration, and each is divided into six sub-variants. The sub-variants are intended to show projected population sizes on a purely hypothetical assumption like the UN's that the number of children per woman will again increase. However, the approach differs from that of the UN in that a choice of start dates for this increase is given, from the year 2000,

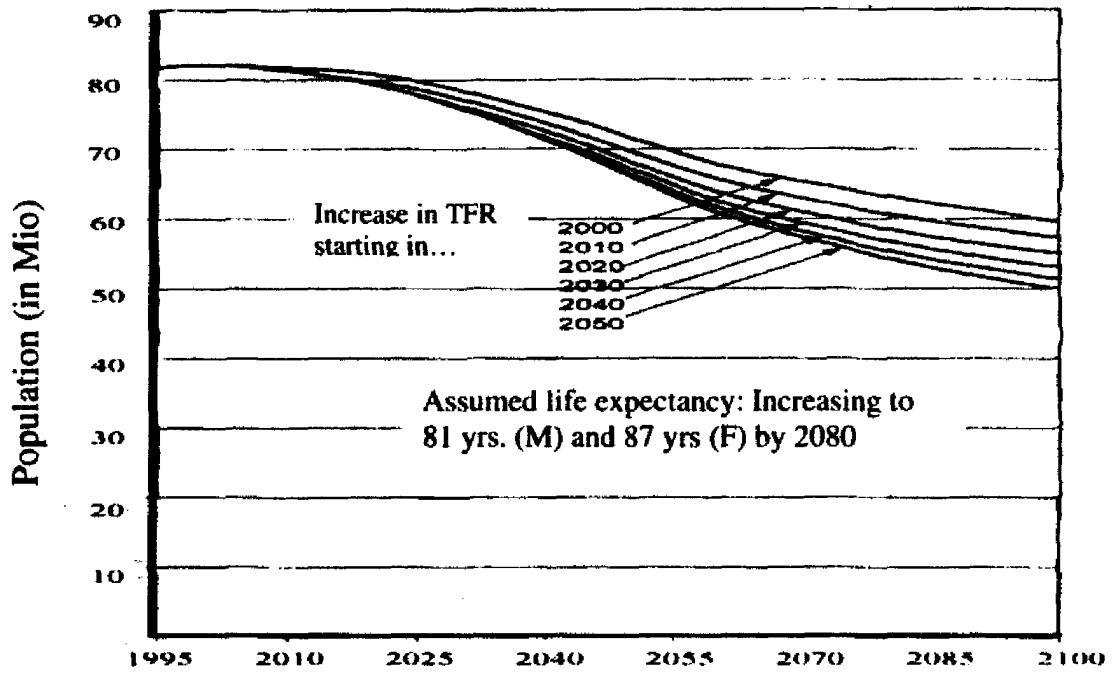
2010, 2020, etc., with the last alternative assuming that the increase does not begin until 2050, the end of the projection period. In each case, the number of children per woman is assumed to increase from 1.25 (1995) to 1.50 over a 15-year period. The last of the sub-variants, in which the TFR remains constant until 2050, tells us how the population would develop up to 2050 if we rejected the UN's assumption that the birth rate will rise. Net of all migration, the population of Germany would shrink to 50.7 million by 2050 and 24.3 million by 2100. Even if we assume annual net immigration of 250,000 young people, the population would still be set to fall to 66.1 million in 2050 and 50.0 million by 2100. The assumed net migration figure of 250,000 immigrants is in fact quite high relative to the average of 170,000 in recent decades. If net inward migration were lower, the shrinkage in the population would be correspondingly more acute (cf. Fig. 2 and 3).

Figure 2. The population of Germany in the 21st century excluding migration effects, assuming an increase in the number of births per woman (TFR) from 1.25 to 1.50 over 15 years, starting from alternative points in time




*Source*: Birg, IBS, University of Bielefeld, 2000.

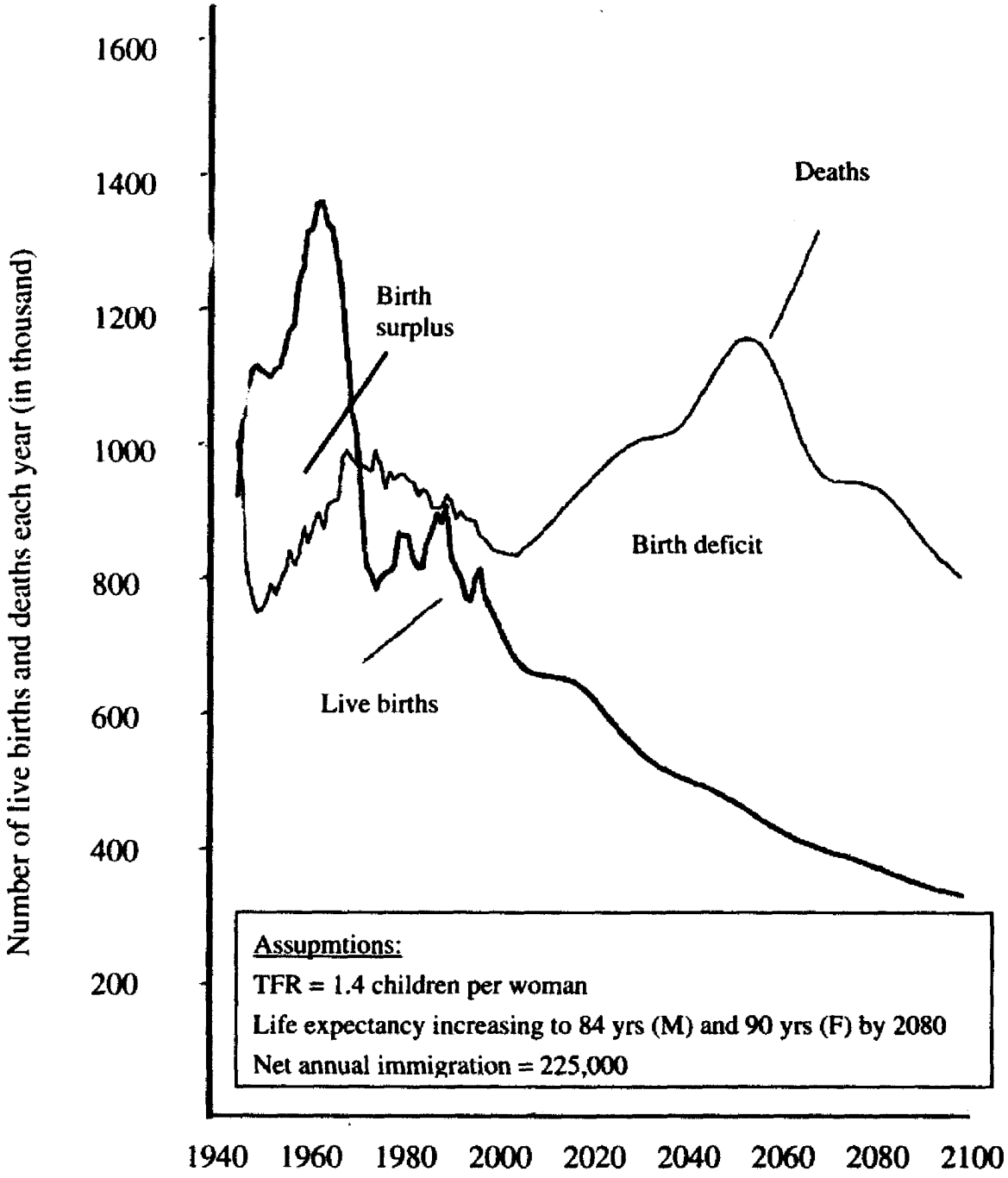
Figure 3. The population of Germany in the 21st century including migration effects, assuming annual net migration of 250,000 and an increase in the number of births per woman (TFR) from 1.25 to 1.50 over 15 years, starting from alternative points in time




*Source*: Birg, IBS, University of Bielefeld, 2000.

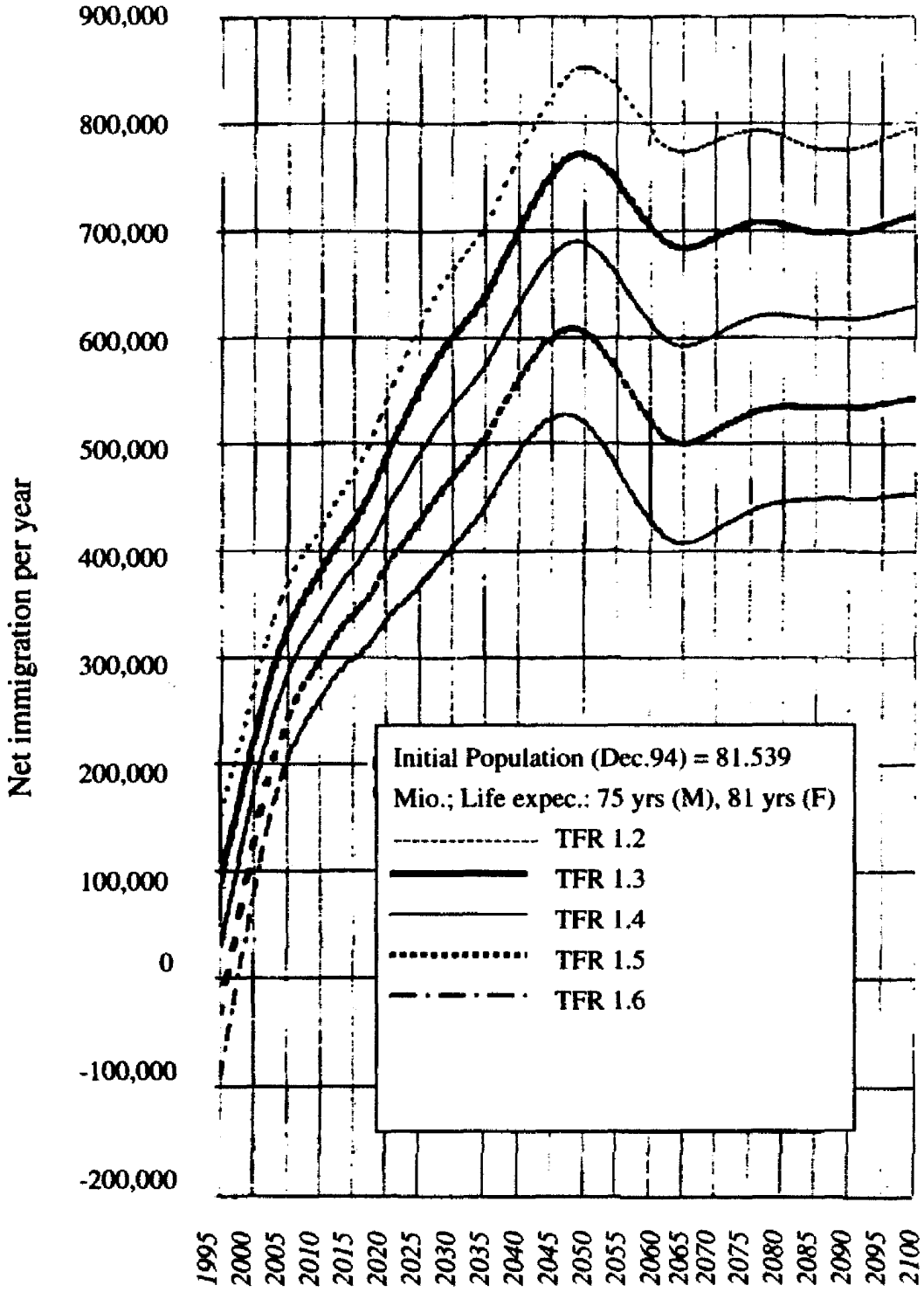
The severity of the decline in population despite assumed net immigration of 250,000 people per annum demonstrates the momentum involved in the process, due to the compound impact in each generation of the potential parents who were never born. This momentum of population decline substantially multiplies the birth deficit (i.e., the excess of deaths over births in a given year) from about 100,000 at present to a peak of some 700,000 in the mid-21st century. Even if net immigration is, say, 225,000 and the TFR holds its level of the last quarter century at around 1.4 live births per woman, the increase in the birth deficit to approximately 700,000 is still inevitable (cf. Fig. 4). So if one sought to counteract the birth deficit by net immigration, as has happened so far, this would call for an ever-increasing number of immigrants each year, rising to between 700,000 and 800,000 – depending on the assumed TFR – by the year 2050. This figure is substantially higher than the uniquely high rate of net immigration into Germany following the collapse of the Soviet bloc (cf. Fig. 5).

Figure 4. The absolute number of births and deaths and the gap between the two in Germany, 1946–1997 and 1998–2100




*Note*: IBS projection variant 8. The curves plotted up to 1997 are based on actual figures.
*Source*: BIRG *et al.* (1998).

Figure 5. Hypothetical net migration rate for a constant population number in Germany




*Source*: Unpublished IBS material.

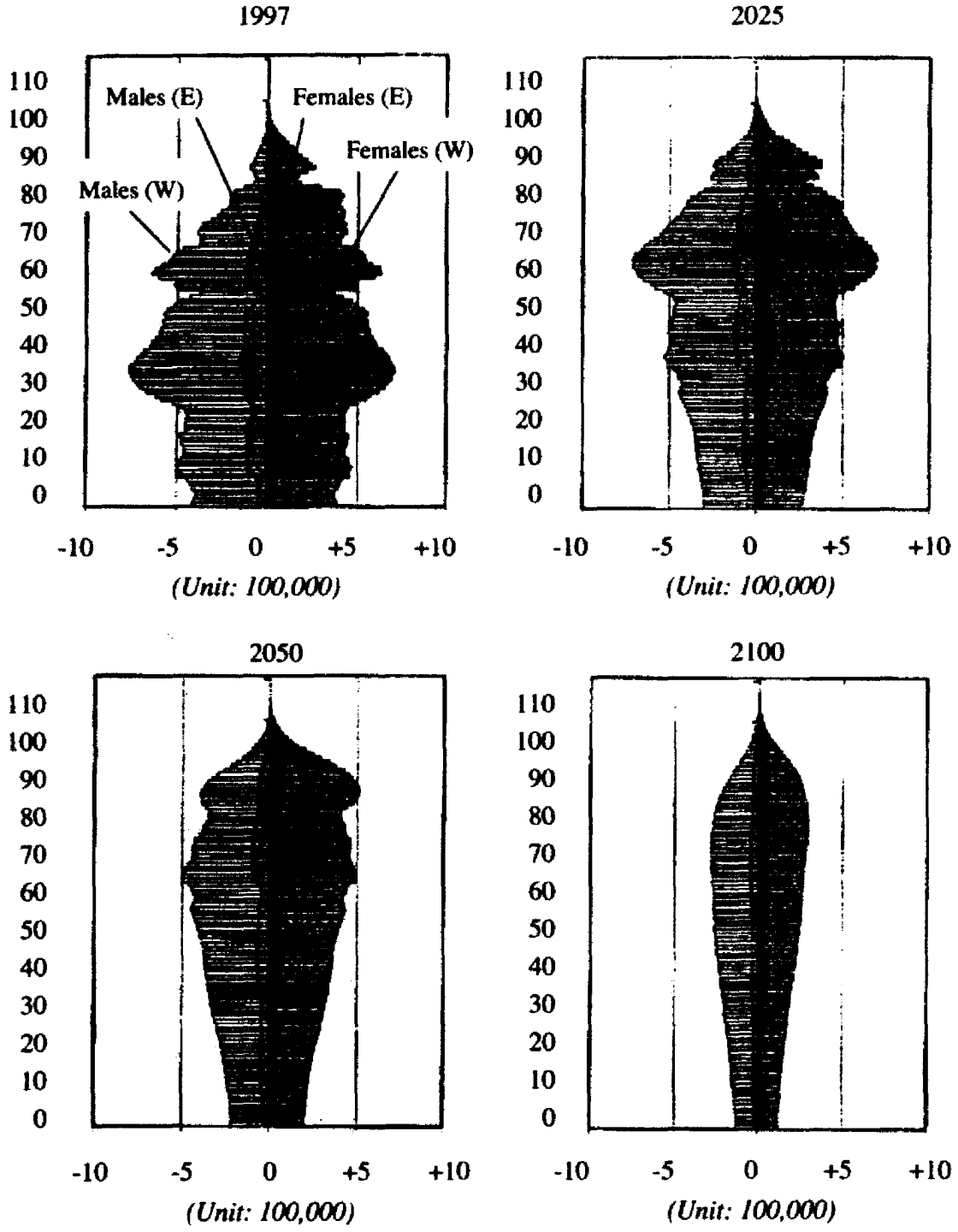
## 4. THE CONSEQUENCES OF DEMOGRAPHIC TRENDS FOR GERMANY'S SOCIAL INSURANCE SYSTEMS AND THE POLICY OPTIONS AVAILABLE

### *4.1 The Extent of Demographic Aging and the Population Decline in the 21st Century*

The decline in absolute population size and the change in the age profile both have their own different impacts on our economy and society. As far as social insurance systems are concerned, the change in the make-up of the population in terms of age groups is a problem that is foreseeable and can be budgeted for decades in advance. The impact of the fall in the absolute population size is rather more difficult to estimate, particularly as the number of older people in society will continue to rise while the number of younger ones is already in decline, leaving a relatively small net reduction in population size over the next 20 years. However, as time goes on the shrinkage will gain ever more momentum. This will have a growing adverse impact on economic growth, thus creating an additional impact on the ability to finance welfare spending, e.g. from tax revenues. Exactly how demographic changes will affect economic growth, and how severely, cannot be forecast precisely. By way of contrast, the effect an aging society will have on the income and expenditure of the social insurance system (retirement pensions, health and long-term care insurance) is clearly apparent even now. The comments that follow will concentrate on the latter issue.

The term "demographic aging" refers to the increase in a society's average or, to be more precise, in its median age. The present median age in Germany is 38 years, one out of two males in the population is over 37, while one out of two females is over 40. Median age is set to grow not only because of the declining numbers in successive newly born age groups as the years move on but also because life expectancies are increasing. By the year 2050, one out of two males in Germany will be older than 51, and one out of two females older than 55 years of age. These estimates even include the assumption that there will be net immigration of 150,000 younger people into Germany; if the immigration effect is ignored, the estimated median ages in 2050 will be 53 years for males and 58 for females (cf. Fig. 6; BIRG *et al.* 1998).

Figure 6. Development of the age profile in former West and East Germany (population projection variant 5 – including migration and economic feedback)




*Source*: Birg and Flöthmann, IBS, University of Bielefeld, 1999.

To make the impact of demographic aging on social insurance systems as clear as possible, we can measure it not just via median age but also via the "aging index". This is normally expressed as the number of persons aged 60 and over for every 100 people aged between 20 and 60. The inverse value of the aging index is referred to as the "potential support ratio". Depending on what happens to the birth rate, life expectancy, and net immigration, Germany's aging index will increase to a value between double and three times today's figure by 2050. Even on the hypothetical assumption that life expectancy remains constant, the index will nevertheless at least double. The demographic projections commissioned by the German Insurance Association to address the pension reforms in 2000 offer the following key figures: The number of people 60 years and older will increase from 17.9 million in 1998 to 27.8 million in 2050, while the number of people in the 20–60 age group will fall from 46.5 to 30.4 million in the same period, which means the aging index is projected to rise from 38.6 to 91.4, by a factor of 2.4 (middle variant; BIRG and BÖRSCH-SUPAN 1999: 162).

### *4.2 The Changing Age Profile*

In the report for the German Insurance Association, the author computed dozens of demographic variants incorporating different assumptions as to the birth rate, net immigration levels, and future changes in life expectancy. The account given below summarizes the changes in age profile computed for the middle variant (population projection no. 5). The population projections and the assumptions applied are subdivided into four groups: German citizens in the former West and East Germany, and immigrants in the respective parts of the country. For Germany as a whole, the assumptions applied to these four sub-populations can be summarized as follows:

(1) The mean number of live-born children per woman, which changes over the course of time, is 1.25 for German citizens and 1.64 for immigrants.
(2) Life expectancy at birth rises steadily from 74.0 to 80.9 years for males and from 80.8 to 86.9 years for females. Life expectancy among the immigrants is assumed to be initially approximately five years higher than for German citizens, due to the favorable selection effect of migration, but to gradually fall back to the same level as for Germans.
(3) Net immigration is assumed to average 170,000 per annum.

These assumptions also include the feedback effects of economic growth on the birth rate and net migration.

The number of young people (aged under 20) decreases steadily from 17.7 million in 1998 to 9.7 million in 2050, while the number of people over 80 increases during the same period from 3.0 to approximately 10.0 million. The number of people under 40 in 1998 was still substantially higher than that of people over 60 (42.3 vs. 17.9 million). In the future, this relative picture will be reversed, and there will be more people over 60 than under 40 (Tab. 1 and 2):

Table 1. Projected change of German population (in millions) by age groups at start of the year, 1998–2080

| Age group /Start of the year.. | 1998 | 2030 | 2050 | 2080 |
|---|---|---|---|---|
| younger than 20 | 17.7 | 12.0 | 9.7 | 7.8 |
| 20 – 40 | 24.6 | 16.3 | 13.4 | 10.4 |
| 40 – 60 | 21.9 | 19.9 | 17.1 | 13.1 |
| 60 and older | 17.9 | 29.4 | 27.8 | 21.7 |
| 80 and older | 3.0 | 6.6 | 10.0 | 7.6 |
| Total population | 82.1 | 77.5 | 68.0 | 53.1 |

*Source*: BIRG and BÖRSCH-SUPAN (1999), BIRG and FLÖTHMANN (2001a, 2001b).

Table 2. Projected change in percentage share of total population by age

| Age group /Start of the year.. | 1998 | 2030 | 2050 | 2080 |
|---|---|---|---|---|
| younger than 20 | 21.6 | 15.5 | 14.3 | 14,6 |
| 20 – 40 | 30.0 | 21.0 | 19.7 | 19.6 |
| 40 – 60 | 26.7 | 25.7 | 25.2 | 24.7 |
| 60 and older | 21.8 | 37.9 | 40.9 | 40.9 |
| 80 and older | 3.7 | 8.5 | 14.7 | 14.3 |
| Total population | 100.0 | 100.0 | 100.0 | 100.0 |

*Source*: BIRG and BÖRSCH-SUPAN (1999), BIRG and FLÖTHMANN (2001a, 2001b).

The proportion of the population aged younger than 20 is set to decline from 21.6% to only 14.3% by 2050 while the proportion of people 60 years and older will increase from 21.8% to 40.9%. The increase in age group proportions is most pronounced for the oldest population group, aged 80 or older, which in 1998 accounted for only 3.7% of the population but in 2050 is projected to be 14.7% of the total. From 2050 onwards, the proportion of over-80s remains similar to that of under-20s.

### *4.3 Consequences for the Statutory Pension System*

#### *4.3.1 How the "Pay-As-You-Go" System Works*

For by far the most part, Germany's statutory pension insurance operates on the "pay-as-you-go" principle. In other words, those contributing to the system today are effectively not saving up for their own retirement pensions, but are directly financing the amounts being disbursed to today's pensioners. By the time current contributors have reached retirement age, the contributions they have made during their working lives will already have been spent, so their pensions will have to be funded by the younger generations still working.

If the ratio of people requiring pensions to those effectively paying the pensions increases over a period of time by a factor such as 2.4, the result is either that contribution rates to the statutory pension have to be raised by that same factor or that the level of pensions paid out (expressed as the average pension in relation to average earned income) has to be cut by 1/2.4. Thus the core dilemma facing policymakers is to choose between more than doubling the contribution rate (presently 20%) over that period of time, more than halving the pension level from the present 70%, or funding even more of the statutory pensions system out of general taxation than is already the case.

These alternative prospects, though politically untenable, are nevertheless objectively inevitable. This being so, measures have already been taken over the past ten years, unnoticed by most of the general public, to chip away at the level of benefits paid out by the statutory pension system and hence reduce the size of the necessary increase in contributions. Among the little-known benefit changes now legislated are measures such as heavier deductions in pensions paid to early retirees, the crediting of only a maxi-

mum of three years for school education instead of the previous seven, a reduction in the value now attached to a contributor's early working years, cuts in the pensions paid for partial occupational disability, and overall reductions in the proportional pension level over time in accordance with the "demographic factor", intended to automatically cut real pensions in line with increased demographic aging.

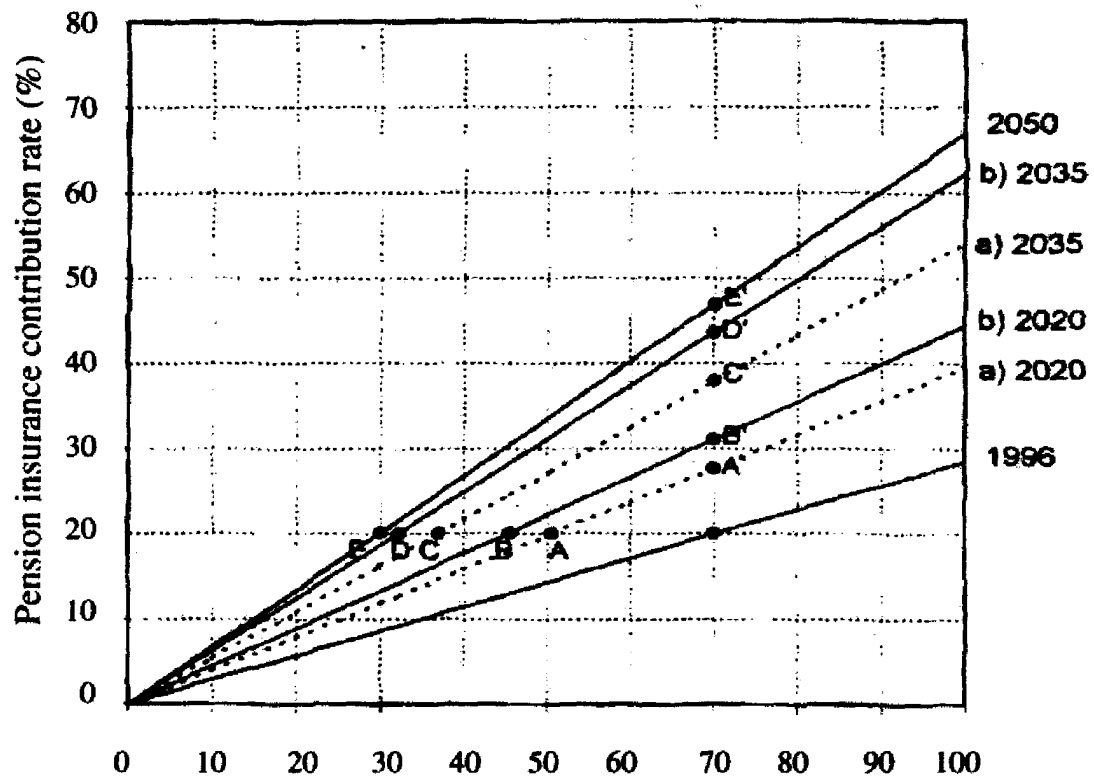
### *4.3.2 Policy Option I: Increased Contribution Rate or Lower Pensions*

Figure 7 illustrates the fundamental interrelationship, inherent in the pay-as-you-go principle, between the statutory pension contribution rate, the aging index, and the pension level as defined above. If policymakers wish to cut the contribution rate, they also have to cut the proportional pension level, or vice versa. The options available are shown as points on a straight-line relationship, the gradient of which is determined by the aging index. At present, demographic aging has not yet been expressed very strongly, so the lowest of the straight lines with the shallowest gradient applies. However, that gradient will increase over time in proportion to the aging index itself. This increase will certainly occur, simply because of the declining number of people in the 20–60 age group. In other words, the gradient will increase even if there is no change whatever in life expectancy. Yet in practice, life expectancy at birth actually doubled during the 20th century, and it is still increasing at an average rate of 6 to 8 weeks each year. So even if the increase tails off in the future, a further growth in life expectancy by at least 5 to 6 years is quite likely. In the report we were commissioned to prepare in connection with the pension reforms, the middle variant envisaged an increase from 74.0 to 80.9 years for males and from 80.8 to 86.9 years for females. The increasing life expectancy (shown for each year as variant "b") makes the gradients in Figure 6 even steeper, raising the contribution rate required to maintain the same pension level even higher than under constant life expectancy.

Even on the unrealistic assumption that life expectancy will not rise any further, the Scientific Advisory Council to Germany's Federal Ministry of Economics has calculated that the contribution rate would need to rise from today's approximately 20% to around 40% if the government wished to maintain the present proportional pension level of 70% (BUNDESMINISTERIUM FÜR WIRTSCHAFT 1998: 37). Figure 7 shows a similar result. However, if life expectancy keeps on rising, the rate needed to maintain

pension levels will need to increase much more, to some 46%. An alternative would be to maintain today's contribution rate but cut the pension disbursed to about 30% of average earned income. This makes explicit the covert contribution increase implied by using general taxation to help finance the statutory pension.

Figure 7. The relationship between the statutory pension contribution rate, the pension level, and increased life expectancy




1994/96: Males 73.3 yrs, females 79,7 yrs; AI = 37.5
2020 a) no increase; AI = 51.0
2020 b) plus 3.7 yrs; AI = 58.4
2035 a) no increase ; AI = 71.0
2035 b) plus 5.3 yrs ; AI = 81.8
2050: plus 6.7 yrs ; AI = 87.9

*Source:* Birg, IBS, University of Bielefeld, 1999. Data: Simulations, scenario 4; IBS materials, University of Bielefeld.

The general public is largely unaware that the last round of pension reforms was based on demographic projections produced by the Federal Statistical Office (in its "Eighth Coordinated Population Projection") that were founded on the unrealistic assumption of no further increase in life expectancy from January 1st, 2000 onwards (SOMMER 1994: 497). The expert report by the Scientific Advisory Council is also based on these unrealistic figures. It was not until its next projection published in July 2000 (the "Ninth Coordinated Population Projection") that the Federal Statistical Office built in the assumption of further increases in life expectancy, which our Figure 7 has already catered for.

### *4.3.3 Policy Option II: Raising the Retirement Age*

If the options of cutting the level of pensions or raising contribution rates are not acceptable, a drastic increase in the retirement age will be unavoidable. By calculating age indices with a moving retirement age at one-year intervals (61, 62, 63, ..., 73), we can establish in which years the retirement age would need to be raised, and by how much, to maintain the aging index constant by virtue of this boundary shift (cf. Tab. 3):

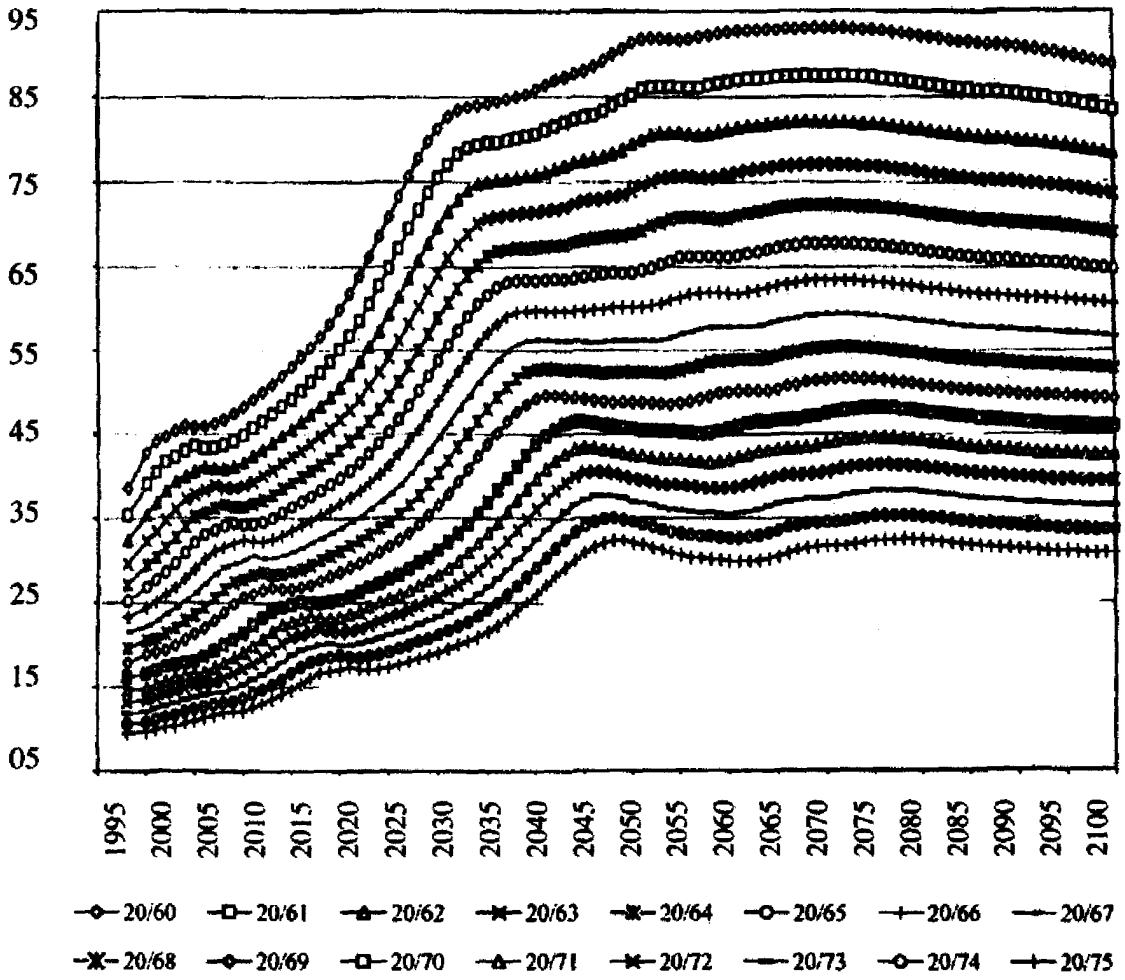
Table 3. The increase in retirement age needed to maintain a constant aging index by shifting the age group boundary

| Increase in the retirement age from ... to ... (in years) | This increase will be needed in the year ... |
|---|---|
| 60–61 | 2000 |
| 61–62 | 2002 |
| 62–63 | 2006 |
| 63–64 | 2014 |
| 64–65 | 2018 |
| 65–66 | 2022 |
| 66–67 | 2026 |
| 67–68 | 2029 |
| 68–69 | 2031 |
| 69–70 | 2036 |
| 70–71 | 2039 |
| 71–72 | 2042 |
| 72–73 | 2074 |

*Source*: BIRG and BÖRSCH-SUPAN (1999), BIRG and FLÖTHMANN (2001a, 2001b).

Retirement age, currently around 60 in practical terms (though formally for men it is still 65 years), would have to be steadily raised to really be 65 years by 2018, 70 years by 2036, and finally 73 years by 2074. If this were not done, the aging index with its crucial impact on increased contribution rates would inevitably increase (Tab. 3, Fig. 8, 9 (next page)).

Figure 8. Course of the aging indices based on differing boundaries between the age groups

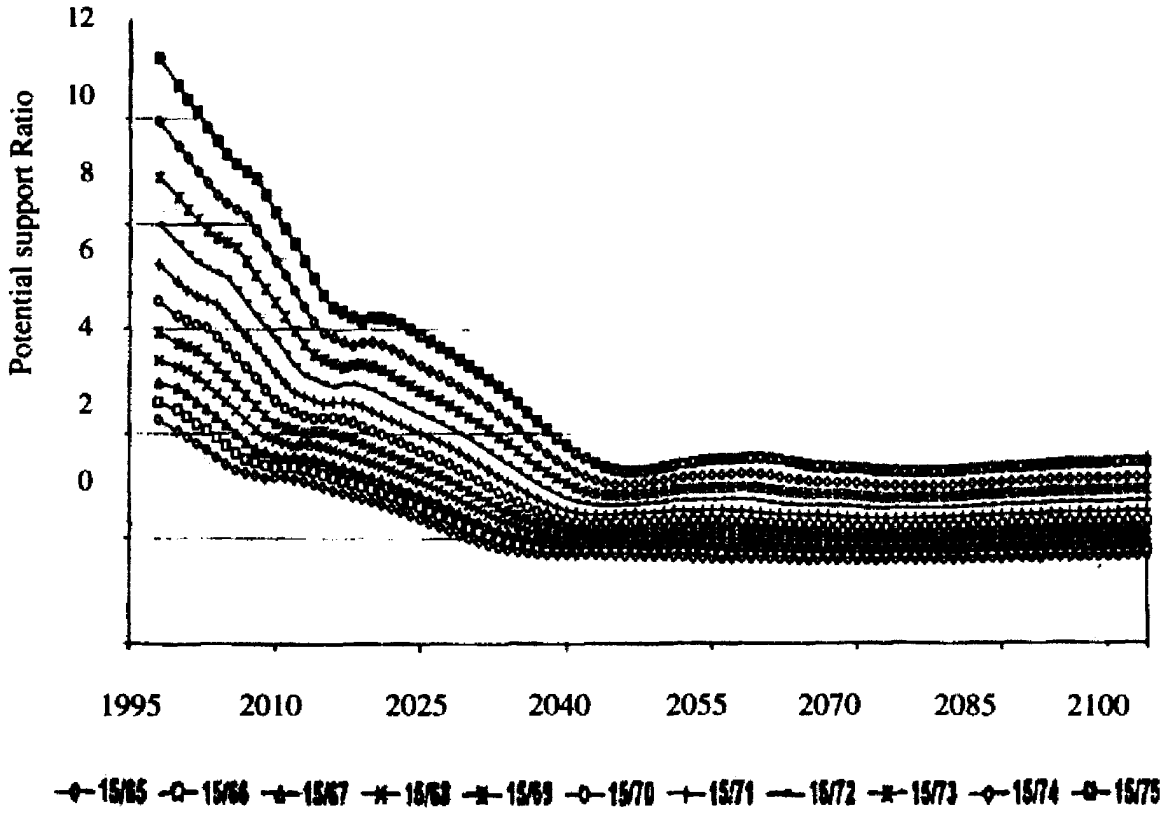



*Sources*: BIRG and FLÖTHMANN (2001a, 2001b; projection variant 5); BIRG (2001).

An increase of this magnitude in the retirement age is not only unpopular but also unrealistic. For one thing, only a minority of the elderly population would be healthy enough to keep working right on through to the age of 65, or indeed 73 – male life expectancy is currently at 74 years, and assumed to rise further to 80 years – and for another, businesses mainly prefer to em-

ploy younger people. There are many occupations today, not just pilots and IT experts, in which employees 40 or 50 years of age are already considered rather old for the job. The more dynamically economies develop in the wake of globalization, the more rapidly the "half-life" of the knowledge acquired in occupational training will decline, and the less value will be placed on experience, a form of capital that grows with age.

Figure 9. Course of the potential support ratio based on differing boundaries between the age groups




*Sources*: BIRG and FLÖTHMANN (2001a, 2001b); BIRG (2001).

### *4.3.4 Policy Option III: Immigration and an Increased Birth Rate*

High levels of net immigration adding 600,000 or more per annum to the population still cannot prevent an increase in the aging index, even if life expectancy ceases to rise, let alone if it does keep growing as expected. If net immigration stayed at the level of recent decades (approx. 70,000 per

annum) and life expectancy went on rising to 84 (male) and 90 (female), the aging index would roughly treble from the current 38 to some 115 by 2050.

If an attempt were made to avoid the increase in the aging index solely by allowing younger people to immigrate, the UN has calculated that a total of 188 million people (net) would need to immigrate into Germany by the year 2050 (UNITED NATIONS 2000: 110). The reason this figure is so high is that the immigrants would only cut back the aging index temporarily, before making their own contribution to its increase once they reached retirement age, thus leaving only a small net easing effect, especially since the birth rate among immigrants to Germany is too low to have any lasting effect on the age profile of the population. Statistically, if both parents are foreign nationals, the number of live-born children per woman is 1.5. If the mother is a foreign national and the father a German national, the rate is 1.9 (STATISTISCHES BUNDESAMT 1999: 51). Either way, the TFR is below the 2.1 figure required to assure the long-term stability of the population. Nevertheless, because Germany's immigrant population currently has a younger age profile, it is set to increase from 7.4 million in 1998 to 10.0 million in 2050, even without any additional net immigration, before subsequently declining to 6.8 million by 2100 (BIRG and BÖRSCH-SUPAN 1999: 150).

Another flight of fancy produces an equally sobering result: Any attempt to halt the rise in the aging index solely by increasing the birth rate would call for an increase in the number of live births per woman from around 1.3 to 3.8 (BIRG and KOCH 1987: 174). This, of course, is an utopian notion given that even the developing countries with the highest total fertility rates in the world only average 3.0 live births per woman (UNITED NATIONS 1999).

As already shown in Figure 5, a higher birth rate would indeed somewhat reduce the net number of immigrants needed for the hypothetical purpose of keeping a constant population, but even with a TFR of 1.6 live children per woman, the annual net immigration in mid-century would still have to be 300–500 thousand people.

So, to summarize some of the conclusions so far:

- Because the drops that have already occurred in the number of births will inevitably give rise to further substantial drops in future years, it is impossible to prevent demographic aging whether by changing policy to encourage larger families or by moderately increasing the net number of

relatively young people immigrating into Germany. The demographic aging of society can only be alleviated a little by demographic measures; it cannot be brought to a halt.

- Germany's system of retirement pension insurance was designed in the late 19th century for a population that had a young age profile at that time. The decline in the birth rate during the 20th century will markedly increase the ratio of elderly people to those of working age in the 21st century. The only way of retaining the present pay-as-you-go system of statutory pension insurance without increasing contribution rates and/or lowering the pension level is to raise the retirement age to 70 years and beyond.

The ultimate conclusion is that the statutory pension system, currently based on the pay-as-you-go principle, has to be reformed and adapted to the changing age profile of the population. To avoid both excessive increases in contribution rates and all-too-drastic cuts in the pensions paid out, an additional provision for old age on an individual basis via private savings is needed. This will be substantially less dependent on demographic factors than the current statutory system. However, the statutory, pay-as-you-go pension insurance system cannot be totally replaced by a fully-funded individual retirement provision – it can only be supplemented by it. Total substitution would imply replacing the demographically derived security implicit in raising children by a form of provision totally dependent on the capital markets. By its very nature, this would provide less and less security, the more profitable the investments needed to be, since these would then involve greater risk and increasingly have to be placed in foreign markets.

### *4.4 Impact on Statutory Health Insurance*

At least hypothetically, the lost revenues and increased expenditure for the statutory retirement pension scheme can be restrained by raising the retirement age. However, the health and long-term care insurance systems do not even have this purely theoretical avenue open to them: Increasing per capita expenditure on health care as the population grew older would still be just as inevitable, even if it were not a problem to raise the retirement age.

People at a very advanced age need, on average, about eight times more spent on their health than do people aged 20, as the North Rhine-Westphalian Health Ministry has found out (MINISTERIUM FÜR ARBEIT, GESUND-

HEIT UND SOZIALES NRW 1995: 174). This is partly because older people tend to need more medical attention in the normal course of their lives than younger ones, but partly also because the older the age group, the greater the number of deaths that will occur relative to its size, and health care costs rise rapidly as death approaches. In 1997 just one per 1,000 male persons aged 20–25 years died, whereas the figure was 111 per 1,000 males 80–85 years old, and 256 per 1,000 in the 90-and-older age group. More-over, technical progress in the medical field means that the "center of gravity" in the age profile of per capita health care spending is continually pushing upwards. While the ratio of per capita health spending on young and old age groups was 1:8 in 1992, these shifts could alter the ratio to 1:20 by the year 2040, according to the German Parliamentary Commission of Enquiry on Demographic Change, based on the findings of a study by the Prognos Institute (ENQUÊTE-KOMMISSION „DEMOGRAPHISCHER WANDEL" DES DEUTSCHEN BUNDESTAGES 1998: 230).

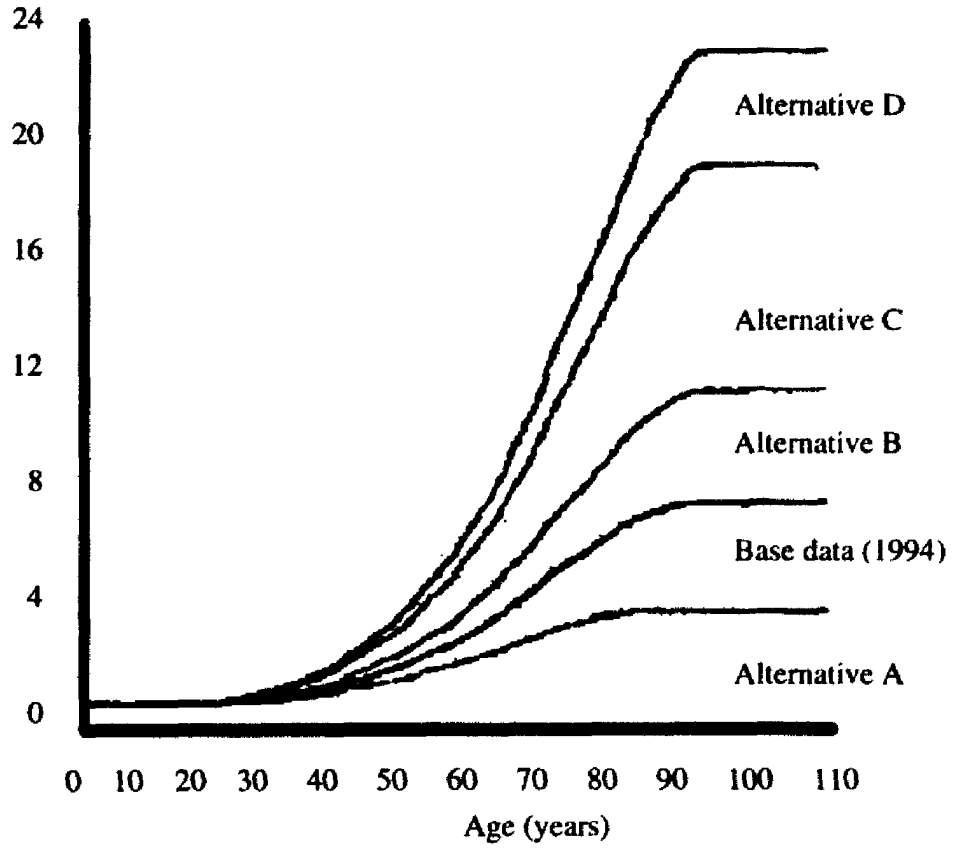
Demographic aging increases the expenditure and lowers the revenues of the statutory health insurance system. Because of the reduced number of people of working age resulting from demographic factors, the system will have fewer contributors and hence suffer a loss of revenue, amounting to some 30% by 2040. Simultaneously, expenditure is set to increase due to two factors, namely an increase in the absolute number of older people coupled with the increase in the per capita expenditure on health care needed for older age groups. Our simulations estimate that these two factors will generate additional expenditure needs at constant prices of some 22% by 2040.

The widening gulf between rising expenditure and falling revenues will require contribution rates to the statutory health insurance organizations to rise from the present average of approximately 12% to about 21%, unless either standards of care are reduced or participants are required to fund a substantially greater proportion of costs themselves. These findings operate on the assumption that future technological advances in medicine will not push up costs at all, or in other words, that there will be no upward shift in the age profile of per capita health care expenditure. If the ratio of per capita expenditure were indeed to rise from 1:8 to, say, 1:20 as discussed above, the contribution rate would have to be further increased from 21% to 24%. This relatively small additional margin of three percentage points for such a drastic shift in the age profile due to medical progress shows that the need

for higher future contribution rates is driven much harder by falling revenue than by increased expenditure, the momentum of which is reduced by the fact that the number of people 60 years and older begins to decline again after rising in the period up to 2030–35 (Figs. 10.1-3).

Figure 10 (1–3). Simulations of the demographically induced rise in health care expenditure and of the impact on health insurance contributions in the 21st century

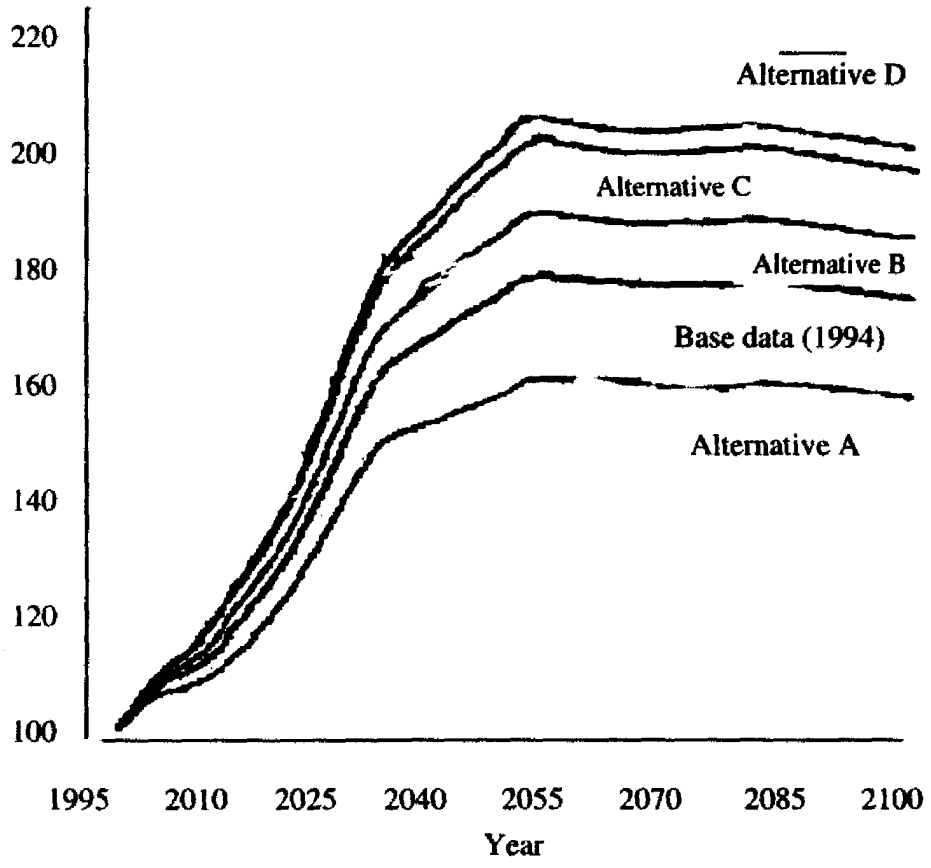
10.1 Variants in per capita health spending (1994 base, and possible future changes)




*Source*: BIRG and FLÖTHMANN (2001a, 2001b); BIRG (2001).

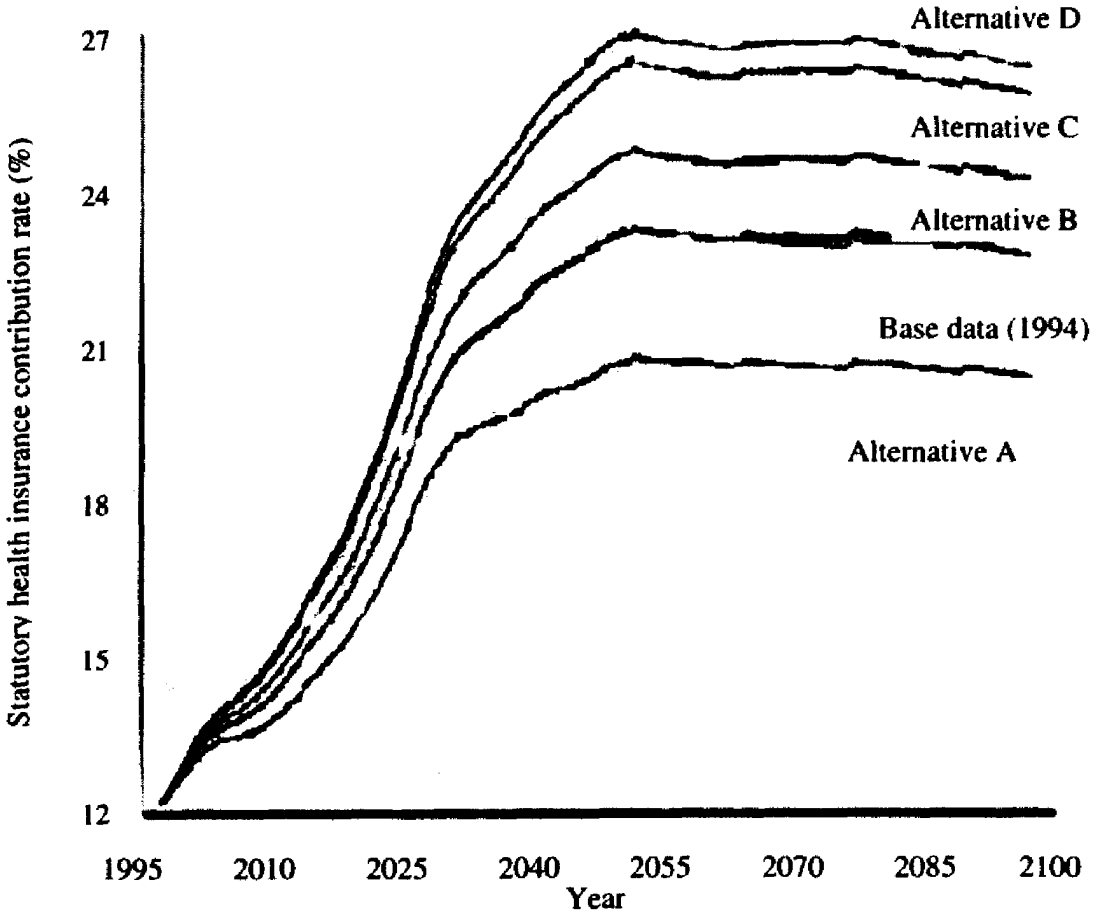
10.2

Associated variants in the ratio of expenditure to revenue for statutory health insurance




*Source:* BIRG and FLÖTHMANN (2001a, 2001b); BIRG (2001).

## 10.3 Statutory health insurance contribution rate




Assumptions: Gradual increase in life expectancy from 73 to 81 years (males) and 80 to 87 years (females) by 2080; TFR = 1.4; annual net immigration = 150,000.

*Source:* BIRG and FLÖTHMANN (2001a, 2001b); BIRG (2001).

### *4.5 Impact on Long-Term Care Insurance*

As in the case of health insurance, the statutory long-term care insurance program will also be affected by demographic aging as it lowers revenues and increases expenditure. A similar pattern emerges in as far as the per capita expenditure on long-term care increases steeply with age. In 1996, for example, four out of 1,000 participants in the statutory scheme in the 35–39 age group received benefits from it, compared with 24 per 1,000 in the 65–69 and 280 per 1,000 in the over-80 age groups. Demographic simulations conducted by a number of institutes have calculated that the contribution rate for long-term care insurance would need to rise from the current 1.7% to between 3% and 6% by 2040 (ENQUETE-KOMMISSION „DEMOGRAPHISCHER WANDEL" DES DEUTSCHEN BUNDESTAGES 1998: 126). Yet even the upper assumption of 6% will probably be insufficient, as the following computations on the increase in the demographic senior citizens' care index shows.

The "demographic senior citizens' care index" used here consists of the number of people of advanced old age (when the need for care is most prevalent) per 100 people in the age group that is 20 to 40 years younger than they are, who normally take responsibility for caring for the elderly. The index has been calculated using alternative borderlines, initially treating "advanced old age" as meaning 80 years and over, then 81 years and over, and so on up to 90 years and over. Correspondingly, the age groups assumed to be responsible for providing care are 40–60, 41–61, and so on. The first alternative is expressed in the formula:

$$\textit{Care index } P80(40\text{-}60) = (\textit{Popul. aged } 80+ \,/\, \textit{Popul. aged } 40\text{–}60) * 100$$

The calculations made on the basis of the middle projection variant for the German Insurance Association produced the following results (cf. Fig. 11 and 12):

a) The 80-and-older age group, in which the largest number of people requiring care are found, will treble in size between 1998 and 2050, i.e., from 3.0 to 9.9 million, as the large cohorts born in the 1960s reach their old age.

Figure 11. Changes in the demographic senior citizens' care indices, using different delineation ages

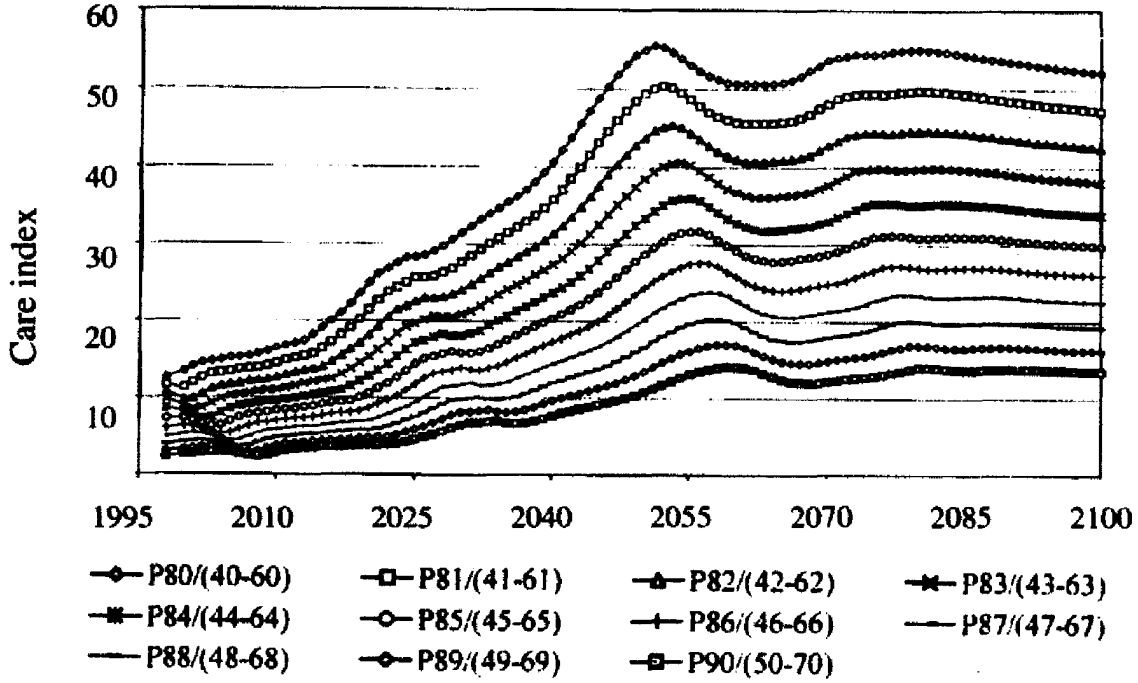
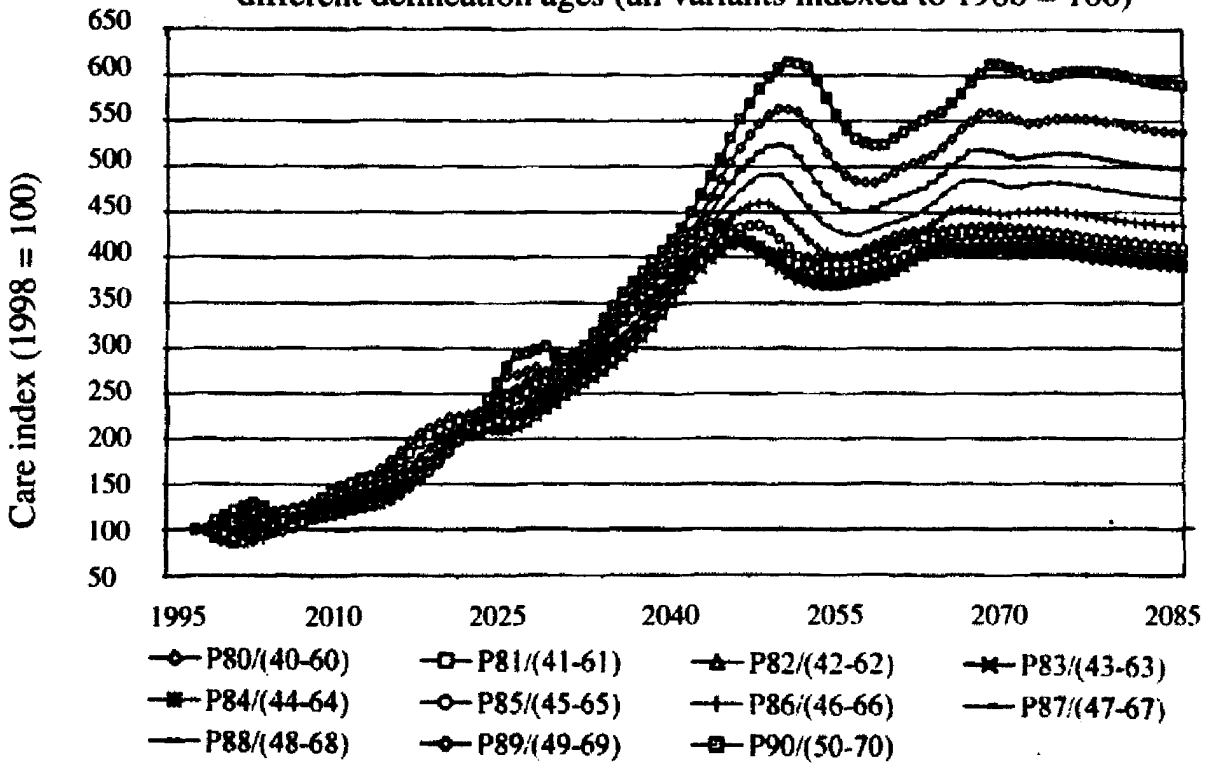



Figure 12. Changes in the demographic senior citizens' care indices, using different delineation ages (all variants indexed to 1988 = 100)



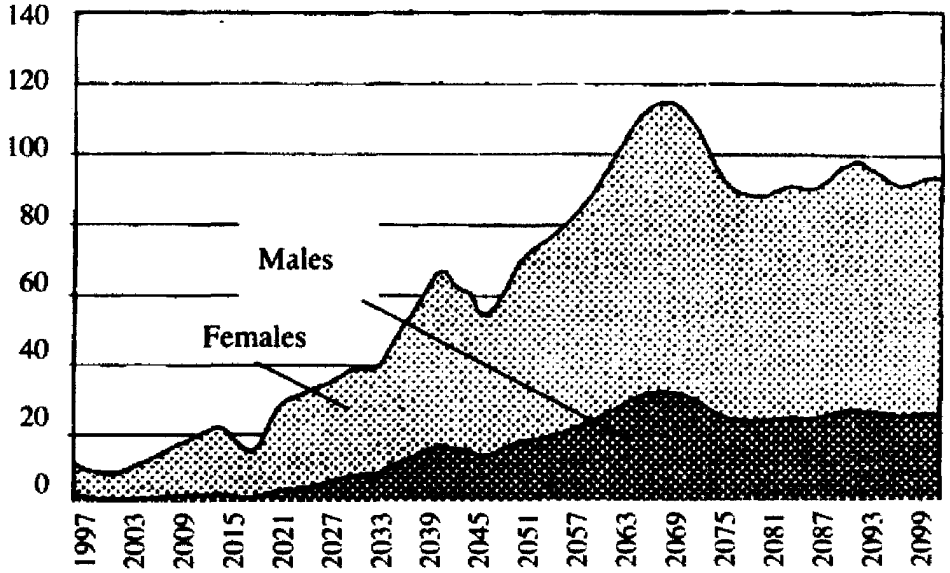

*Source for figs 11, 12*: BIRG and FLÖTHMANN (2001a, 2001b; proj. var. 5); BIRG (2001).

b) The number of men 80 years and older is at present considerably less than the number of women due to wartime losses (0.8 million men vs. 2.2 million women). In future, the number of men in this age group will return to normal, growing to 3.9 million in 2050 while the number of women increases to 6.0 million.
c) The "demographic senior citizens' care index" for people 80 years and older (relative to 100 people in the 40–60 age group) is set to quadruple from 12.6 in 1998 to 55.0 in 2050. In other words, one person in every two aged 40–60 will be "matched" by a person of 80 or older with the much higher likelihood of requiring care. The increase among men will be more marked than among women.
d) The care index relating the number of people 90 years and older to 100 people aged 50–70 was 2.3 in 1998; this is projected to grow to 10.8 in 2050, and by a factor of six to 14.1 in 2059.
e) The life expectancy of people who have already reached 70, 80, or 90 years of age has increased much stronger in recent decades than the further life expectancy of younger people, in which marked advances had already occurred some years ago. This trend will continue in the 21st century. The number of people in the German population aged 100 and over – a significant figure from the care point of view – was estimated at 11,000 in 1998, but is set to increase to 70,000 by 2050 and to peak at 115,000 in 2067 (Fig. 13 and 14).

The care index applied above measures only the direct, demographically determined increase in the cost burden for long-term care associated with the shift in the population's age profile. However, another demographically induced set of costs involving a slightly less direct route flows from the dramatic increase in the number of people who remain childless throughout their lives. In younger generations, one woman in three now lives her life without having children. The upward trend is a continuing one. By far the major part of care for the elderly is still provided by members of their family and those members' children. In future, the number of people requiring care who are childless and have to obtain their care outside the family will increase especially strongly. This raises a problem in that the principle of equity in relation to contributions paid will be breached unless contribution rates somehow take account of how many descendants people have and what part they will play in providing care.

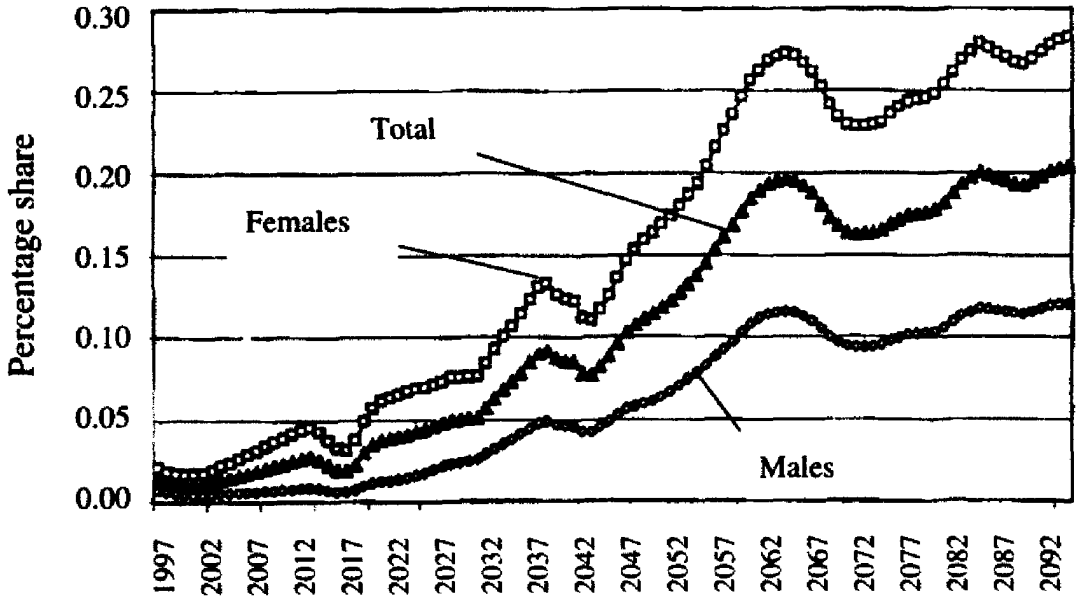
Figure 13. Estimate of the future number of people aged 100 years and over in Germany (projection variant 5)

*In 1000:*




*Source*: BIRG and FLÖTHMANN, IBS, University of Bielefeld, 2000

Figure 14. Estimate of the future share of the total population taken up by people aged 100 years and over in Germany (project. variant 5)




*Source*: BIRG and FLÖTHMANN, IBS, University of Bielefeld, 2000.

## 5. CONCLUSIONS

In the last three decades of the 20th century, the worldwide decline in birth rates and an increased life expectancy generated demographic aging not only in the populations of industrial societies, but in developing ones too. The worldwide process of demographic aging will continue in the 21st century. By mid-century, the aging index in Germany will have doubled or trebled. This is largely attributable to the decreasing numbers in the younger age cohorts coming through, and only secondarily due to an increasing life expectancy. Demographic aging so thoroughly undermines the effectiveness of the statutory insurance system, including the solidarity between generations encapsulated in the pay-as-you-go method of financing state benefits, that it is becoming a matter of ever growing urgency to develop other forces of cultural integration between younger and older generations as a substitute for the solidarity formerly underpinned by the population's demographic structure.

Yet in practice, the opposite trend is operating. Now that competition among economies predominates on a global scale and economic action in general is increasingly driven solely by the competitive principle, the link between economic competitors and their responsibility towards society, based on a principle of solidarity, is steadily on the wane. Indeed, there is even a tendency for the normal competitive principle to be perverted in the phenomenon of hyper-competition, in which cooperation and coexistence are no longer regarded as worthy aims, but the destruction of a competitor's entire trading basis is. The demo-economic paradox of a declining number of live births per woman – while the level of economic development and per capita incomes increase – is one of the key consequences of this underlying trend.

Economic globalization leads to demographic destabilization, compelling drastic reforms to be made in statutory welfare insurance systems. Nor can the pressure for social reform exerted by demographic change be resisted by allowing high levels of immigration of well-qualified people. Indeed, large-scale, uncontrolled immigration of relatively unskilled people into Germany – representing several times the number of "permanent" immigrants to the United States per 1,000 of population (OECD 1997: 15) –

has actually exacerbated the demographically driven problems by posing large additional burdens on the welfare state instead of helping to alleviate them.

In Germany, the "pact between the generations" – i.e., the demographically underpinned basis of solidarity for the statutory social insurance system – has already been so critically weakened that the pay-as-you-go system of funding retirement pensions can now only be maintained with the aid of substantial grants out of general taxation to boost the revenue side. Without these subsidies, the current contribution rate would be 24%, not 20% as it actually is. In the future, the pay-as-you-go system will inevitably have to be supplemented by individual private pension plans, i.e., on a "fully funded" basis for each future pensioner. The investment yield inherent in such fully funded pensions will then be able to accompany (but not fully replace) the demographic guarantee of solidarity inherent in the pay-as-you-go system.

In the wake of globalization, national capital markets are increasingly merging together into a single, world capital market, the main rationale of which is to maximize returns. Yet to seek to provide a secure living in old age on the strength of this risk-dependent principle of yield maximization, of all things, is a strategy destined to become all the more dangerous the more countries forfeit their national "sheltered areas" in the wake of globalization.

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