BURCH CENTER WORKING PAPER SERIES
University of California, Berkeley
Department of Economics - #3880
Berkeley, CA 94720-3880

Aging, Fiscal Policy and Social Insurances: A European Perspective

Bernd Raffelhüschen

Albert-Ludwigs-University of Freiburg, Germany
University of Bergen, Norway

November 1998
Burch Working Paper No. **B98-8**

I wish to thank the joint investigators and co-authors of the EU-Commission´s project "Generational Accounting in Europe" for both helpful comments and their participation which was a pre condition for this paper. In particular these are Alan Auerbach, Eduard Berenguer, Holger Bonin, Lans Bovenberg, Roberto Cardarelli, Bertrand Crettez, Arnaud Dellis, Karen Feist, Daniele Franco, Thomas Jägers, Svend Eric Hougaard Jensen, Christian Keuschnigg, Reinhard Koman, Larry Kotlikoff, Petter Lundvik, Erik Lueth, Carlos Martinez, Tom McCarthy, Hedwig Onega, Pierre Pestiau, Harry ter Rele, Nicola Sartor, James Sefton, Risto Sullström, Reijo Vanne and Jan Walliser. The usual disclaimer applies. Corresponding address: Institut für Finanzwissenschaft, Albert-Ludwigs-Universität Freiburg, Platz der alten Synagoge 1, D-79085 Freiburg, phone: +49-761-203-2354, fax: -2290, email: raffelhu@vwl.uni-freiburg.de

1 Introduction

In most Member States of the European Union issues concerning sound and sustainable finances are high on the political agenda. Ever growing debt burdens induce rising interest payments and force public decision makers to economize on other spending items. If this is not feasible, Ponzi-strategies or increasing the already high tax load with its negative incentive effects are the worse alternatives. Throughout the Union there is also a clear and present need to reform the Welfare State since population aging, rising unemployment and lack of competitiveness in a globalized economy impose increasing constraints on the generous welfare programs.

This paper investigates the demographic transition and its impact on the intergenerational stance of fiscal policy within the European Union. Traditional fiscal indicators based on cash-flow budgets completely fail to address the long-run stance of today's fiscal policy. Neither do future liabilities of unfunded social security or health care systems show up in annual statistics, nor is the amount of outstanding public debt a reliable indicator for assessing fiscal policy issues. Hence, we use the device of generational accounting developed by Alan Auerbach, Jagadeesh Gokhale and Laurence Kotlikoff (in what follows: AGK) in order to investigate the effects of current fiscal policy on living and future European generations.

The intergenerational analysis provided in this paper is restricted to 12 of the 15 Member States of the EU, that is Austria, Belgium, Denmark, Finland, France, Germany, Italy, Ireland, the Netherlands, Spain, Sweden and the United Kingdom. A team of European and US experts prepared these country studies at the request of the European Commission`s Directorate General XXI (Task Force on Statutory Contributions).[1] Due to severe data problems, we refrain from commenting on the intertemporal aspects of fiscal policy in Greece and Portugal. The same argument holds with respect to the eastern European countries which are also not covered by this study. Finally, for

Luxembourg, the necessary data are available but due to the country's smallness basically no standard incidence assumption for tax payments holds.

The outline of the paper is as follows. Section 2 starts by reporting the demographic trends expected in future Europe. Thereafter the focus turns to the impacts of the future aging process on fiscal policy and social insurance systems in the countries covered by this study. A brief description of generational accounting's method and an improved set of indicators for intergenerational redistribution utilized in this study is provided in section 3. Section 4 presents the baseline results for the twelve selected Member States of the EU and investigates the sources of intergenerational imbalance. Section 5 reports some findings with respect to the sustainability of the pay-as-you-go (paygo) financed social insurance systems or generational contracts found in specific EU Member States. Finally, section 6 summarizes the findings.

2 Fiscal Policy and the Welfare State in an Aging Society

2.1 Demographic Trends

During the last decades basically all developed countries have moved from high levels of fertility during the period following World War II to historically very low birth rates since the 1970s. Moreover, all of them can be characterized by a secular trend towards a growing life-expectancy as well as increasing international migration. Although the exact patterns and timing of these changes varied over time and across countries, most industrialized countries have one phenomenon in common: a significant double-aging of the population.[2] First, the elderly dependency ratio has increased and this process is very likely to increase even more rapidly during the next four decades. Second, the share of the oldest-old among the elderly population is also projected to rise significantly, that is, the general population aging will be accompanied by an aging of the elderly population itself.

In Europe, the double-aging is particularly pronounced, leading to historically unprecedented levels in both the elderly dependency ratio, and in what might be labeled the oldest-old dependency ratio. As can be seen from Table 1, gross fertility is at present well below the stationary level of about 2.1 in all the EU Member States examined. This has been the case in all countries - except Ireland - since about the mid-1970s. In general, fertility rates are lowest in the group of central (Austria, Belgium, France, Germany, Netherlands) and southern (Italy, Spain) European countries, while in the northern European countries (Denmark, Finland, Ireland, Sweden, UK) in which the demographic transition started already in the late 1960s, the figures range only slightly below reproduction level. According to the most likely projections of future fertility, the rates will either stay constant or increase marginally in most countries, that is the weighted average number will rise from 1.5 in 1995 to 1.6 in 2015.[3]

Table 1 also reports the female life expectancy at birth for the years 1980, 1995 and 2015. Common features which can be found for the sub-regions with respect to fertility are not apparent when it comes to national mortality rates. At present, the countries with the highest life expectancy in 1995 are as far from each other as France and Sweden while equally distant countries like Austria and Ireland range last. Although the patterns of mortality vary significantly among the reported countries, an examination of the average trends reveals that life expectancy for females increases by one year every ten years. Similar patterns can be found for the approximately six year lower life expectancy of males.[4]

The overall population change in the selected Member States of the EU is mainly determined by the recent changes in fertility and mortality. Of course, in individual countries, international migration has had and will continue to have significant impacts on the age structure. For example, in Germany, migrants rejuvenate the host population since immigrants are on average 10 years younger [cf. Bonin et al (1997)]. In contrast, in Ireland, immigration and emigration are of the same magnitude but emigrants are on average 4.4 years younger than immigrants, thus even zero net influx leads to

more pronounced aging. For most selected countries, the net influx does not enlarge the population significantly in the long-run while for the first two decades most population projections start at a very high level of (mainly) asylum seekers in the short-run. Thus, the overall population will increase between 1995 and 2015 by 2.6 percent due to both slightly increasing fertility rates and immigration. Between 2015 and 2035, however, the baby-boomer generations will die and the population decreases by 5.3 percent, that is by 0.25 percent on annual average. There are two reasons for deviations from this hump-shaped trend. First, in Denmark and in Sweden, the combination of fairly high fertility and immigration leads to an ever growing population. Second, in Italy fertility is so low that the population decreases continuously.

Table 2 reports the present and future dependency ratios with respect to both the elderly (60+) and the oldest-old (75+) for the selected EU Member States in 1995, 2015, and 2035. Of course, the development is determined partly by the relative size of existing age cohorts, and partly by the assumptions concerning future fertility, mortality and immigration. The elderly dependency ratio - that is, those aged 60+ as a share of the working-aged (20-59) population - will increase from 37.1 percent in 1995 to 47.1 and 66.9 percent in 2015 and 2035, respectively.[5] Obviously, there is a sort of breathing space between now and the beginning of the second decade of the next century. Between 2015 and 2035, however, the elderly dependency ratio is projected to rise rapidly. At its peak, in 2035, six potential workers will supply four retirees with their old-age benefits. Since the potential work force corresponds to approximately two thirds of the working aged, every single European worker will finance the transfers to one retiree on average in the year 2035. After this year, the proportion of elderly will stabilize at a ratio of approximately 68 percent in the long-run. An examination of the relative weight of the oldest-old age group - that is, the ratio of those aged 75+ to the population of working-age - in comparison with the elderly dependency ratio on average shows very similar patterns. During the period 1995-2015 we can identify the same breathing space, since the proportion of oldest-old is projected to increase from 11.5 percent to “only” 16.8 percent

on a weighted average. In the following two decades this rise will accelerate. Already in 2035 the number of very elderly will have more than doubled compared to the present level. The fact that trends in the proportion of oldest-old also differ from trends in the sub-group of elderly can be seen when focussing on the numbers for the year 2055. In contrast to the already stabilizing elderly dependency ratio, the share of oldest-old continues to increase significantly until reaching its peak shortly before 2055, when the last very old baby boomers will have left this world.[6]

Both the elderly dependency ratio and the oldest-old dependency ratio vary considerably across countries. In Austria, Belgium, Denmark, France, Ireland, Spain and the UK, the increase in the elderly dependency ratio between now and 2015 is below average, while in Finland, Germany, Italy, and the Netherlands the increase ranges above average. For the period 2015-2035, the increase in the elderly dependency ratio will be very pronounced in Austria, Italy and Spain. In contrast, the increase will be far below average in the Scandinavian and about average in the remaining countries. A similar demographic transition can be found when focussing on the oldest-old dependency ratio. Countries such as Italy, Ireland and Spain will face oldest-old dependency ratios in 2055 which more than triple the 1995 figure, while for example in Denmark, the UK and Sweden the increase amounts to only 32, 67 and 88 percent, respectively. Hence, one can in fact identify a sort of North-South succession in both the extent and timing of the all-European aging process. In general the further north a country is located, the earlier the demographic transition will be; but the extent of the transition will be more pronounced in the southern areas of Europe.

2.2 Fiscal Policy Issues

With respect to economic performance, the European Union of the 1990s is still a highly diversified region. Although the divergence between the selected Member States declined significantly during the post-war period, the per-capita GDP in 1995 varied from 11,000 ECU in Spain to 25,300 ECU in Denmark, that is from 60 to 137 percent of the unweighted average (see

Table 3). With respect to economic weight, the traditional North-South succession is also recognizable. However, looking at the GDP growth rates reveals three major trends. First, countries with a low per-capita GDP do experience on average higher growth rates, that is the EU Member States continue to converge. Second, there seems to be a growing resemblance in the business cycle, though, of course, some countries are subject to very special developments.[7] Third, North and South Europe had already recovered from the early 1990s recession in 1995, while Central Europe still experienced low growth rates. Nevertheless, the similarity in the business cycle within the selected states is sufficient for the subsequent cross-country comparison.[8]

In all countries the top fiscal policy priority in the 1990s was given to fulfilling the Maastricht criteria which form the condition for joining the European Monetary Union (EMU). Besides the convergence of interest and inflation rates, reducing both the budget deficit to 3 percent and the public debt to 60 percent of GDP by 1997 stood at the top of the political agenda. Table 3 shows the major indicators of fiscal policy stance including the government deficit measured either as a percentage of GDP or as the primary deficit, that is taxes minus non-interest expenditure. Until 1995 the total government deficit had already fallen to 4.7 percent of GDP and has since fallen below the three percent level. Not only the level, but also the variance declined significantly. For example, in 1995 the range varied from 7.7 percent of GDP in Sweden to only 1.9 percent in both Denmark and Ireland. By 1997 all of the reported countries were in a four-percentage-points corridor.

The development of the primary deficit has been similar. Countries like Belgium or Italy face high regular deficits of 4.1 and 7.0 percent of GDP while at the same time realizing primary surpluses of 4.4 and 3.1 percent. This is simply because their GDP ratio is approximately 120 percent in both cases. In Austria, Germany, Denmark, Spain and Ireland, the ratio lay between 60 and 70 percent in 1997. The Netherlands and Sweden are slightly above and France, Finland and the UK slightly below this corridor. The relationship between the debt ratios and the resulting interest burden on public

coffers explains the high correlation between the regular and the primary deficit as reported in Table 3.

In the selected EU Member States government deficits have narrowed mainly as a result of tax increases and structural spending reductions, while a broadening of the tax base or a closure of existing tax loopholes are only of minor importance. In fact, the overall burden of average taxes and statutory payments has increased from 42 percent in 1985 to 42.5 and 43.1 percent in 1990 and 1995, respectively. However, a significant variation in both level and development is shown in Table 3. While the taxation is highest in the Netherlands and the Scandinavian Welfare States, the UK, Ireland and the Southern European countries range below average and Central Europe is close to average.

On first inspection the split between taxes and statutory contributions to the social insurances as recorded in Table 3 for the fiscal year 1995 is surprising. On average, taxes make up 30 percent of GDP while contributions account for approximately 13 percent. There is, however, a tremendous divergence: three countries range far below average, that is Ireland (5.5 percent) and the UK (6.7 percent), both of which provide solely for basic pensions, and Denmark (1.7 percent), where a generous basic pension scheme is financed nearly entirely through the federal budget. On the other hand, it are especially the Central European countries like France, Germany and the Netherlands which rely much more upon off-budget authorities and contribution payments while financing their generous paygo-schemes. In fact, contributions account for almost 20 percent in these countries. We will come back to these issues later.

2.3 Social Insurance Systems and Intergenerational Contracts

As mentioned above, most EU Member States have also reduced their government deficits through structural spending reductions. However, the major spending reductions affected government consumption and investment expenditure. With respect to social expenditure, the opposite is true.

Basically all EU Member States suffered from the increasing structural unemployment which requires tremendous benefit payments and/or enlarges their welfare programs. Hence, the average share of social expenditure to GDP has increased from 26.8 percent in 1980 to 29.5 percent in 1995. An exception is Ireland with both a very favorable age-structure and economic development, which has gained significantly from high direct investment from abroad.

As seen from Table 3, a high variation is hidden by the average values. In Italy, Ireland and Spain, social expenditure ranges between 20 and 25 percent of GDP in 1995. Belgium, France and the UK lie between 26 and 30 percent and Austria, Denmark, Finland, Germany, the Netherlands and Sweden between 31 and 36 percent. Clearly the North-South succession applies with all Scandinavian Welfare States spending more than one third of their GDP on social programs while southern European countries tend to spend only about one fifth.

The last column of Table 3 reports the results of projecting total social expenditure for the period 1995 through to 2040. Based on the growth rates estimated in OECD (1988), one finds that due to the aging of the population, social expenditure will increase on average from 29.5 percent to 38.3 percent of GDP. In fact, only Ireland and Spain would spend less than one third of their GDP for social purposes in 2040, while countries like Denmark, France, Germany, the Netherlands and Sweden would experience a ratio exceeding 40 percent. Of course, these projections of age-related public expenditure have to be taken as first guesstimates since they focus exclusively on the initial per-capita transfer level for education, family benefits, health, unemployment and pensions. Hence, they are not comparable with the results of the generational accounting method which encompasses all types of financial transactions between the public and the private sector. Before turning to the methodological description, it is worth taking a closer look at the main items of the overall social expenditure, that is, those for pensions and public health care.

Table 4 shows the OECD projection of pension and health-care expenditure as a percentage of GDP for the period 1995 to 2050. On average, the demographic pressure results in an increase in pension

expenditure from 8.9 percent in 1995 to only 9.0 percent of GDP in 2010, indicating the above mentioned breathing space. In 2020 and 2040, however, these expenditure items will increase to 13.0 and 13.6 percent of GDP, respectively. A cross-country comparison in 1995 reveals that the relative pension expenditure load is highest in Italy, Sweden and Germany and lowest in Ireland and the UK, that is in countries providing only basic pension benefits. With respect to the lower end of the scale, the relative ranking of pension tax loads will still hold in 2030 and 2050. However, at the upper end, things will change somewhat. In 2030, the three highest burdened countries will be Italy, Finland and Germany while in 2050, it will be Italy, Spain and Finland.

The second highest item in the overall social expenditure in Europe is health care. In 1995 about 6.4 percent of GDP were spent on average in the selected EU Member States listed in Table 4. By 2030 the double-aging effects will have increased this expenditure to 8.2 percent of GDP if health costs grow as the same rate as GDP. Since this seems very unlikely, Table 4 also shows the projection for a scenario, in which the growth rate of health care costs exceeds GDP growth by one percent. In this case health expenditure will be 9.3 percent of GDP by 2030. Health expenditure patterns vary significantly across the listed countries: the highest relative expenditure item is 7.4 percent in Austria while the lowest is 5.1 percent of GDP in Ireland.

In the equal growth scenario, the same countries will range highest and lowest, but the divergence between them will be much higher. The difference between the highest and the lowest expenditure to GDP figure increases from 2.3 percentage points in 1995 to 4.8 percent in 2030. In the case of faster growing health costs, the divergence will decline, but we will observe that more than 10 percent of GDP will be spent on health care in Austria, Belgium, France, Germany and Italy. As also shown by the OECD (1988, 1997) projections, the exploding pension and health-care expenditure is offset by both reduced educational expenditure and family benefits. However this effect is rather small (Table 3). We will come back to the issues of financing the generous pension and health-care

schemes, and investigate the tax burdens implied by this double-aging process after having briefly described the method employed in the further line of argument.

3 Measuring Intergenerational Redistribution

The method of generational accounting was developed by AGK (1991, 1992, 1994) as an alternative to annual cash-flow accounting, because the latter completely fails to reflect the intertemporal stance of fiscal policy. While working on standardized accounts in a cross-country study, it was necessary to improve the generational accounting method with respect to the indicator of intergenerational redistribution. We will come back to the differences between the traditional and the improved method, when we outline the *modus operandi* of this study.

Generational accounting[9] begins by considering the government's intertemporal budget constraint as shown in equation (1):

$$(1) \qquad B_t = \sum_{s=0}^{D} N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s}$$

The left-hand side of equation (1) reflects the current net debt (B) of the public sector in the base-year t, which is typically positive for most countries. It is either taken directly from the official statistics or - equivalently - calculated by discounting and adding together the projected government debt service for every future period. The net debt of the public sector induces spending which must be paid for out of two possible sources: 1) the present value of net tax payments projected to be made by generations presently alive, or 2) the present value of net tax payments by future generations. Discounting is done at an assumed pre-tax real interest rate (r). Let D denote the maximum age of an individual, and let $N_{t,k}$ stand for the present value of the net tax payments, that is, taxes net of transfer receipts, to be made in future years by all members of the generation born in year k. The first term on the right-hand-side of equation (1), $N_{t,t\text{-}s}$, then equals the sum of the present

value net taxes of all generations alive in the base-year *t*. The last term in the budget constraint ($N_{t,t+s}$) stands for the sum of the present value net tax payments made by future generations, i.e. those born in year *t+1* and later. For further analysis, the net payments can be decomposed as follows:

$$(2) \qquad N_{t,k} = N^{m}_{t,k} + N^{f}_{t,k} = \sum_{s=t}^{k+D} T^{m}_{s,k} P^{m}_{s,k} (1+r)^{t-s} + \sum_{s=t}^{k+D} T^{f}_{s,k} P^{f}_{s,k} (1+r)^{t-s} .$$

In equation (2), $T^{m}_{s,k}$ and $T^{f}_{s,k}$ refer to the average net payment made in year *s* by a representative male (m) or female (f) member of the cohort born in year *k*, while $P^{m}_{s,k}$ and $P^{f}_{s,k}$ stand for the number of members of the generation born in year *k* who survive until year *s*. Hence, the respective products represent the net taxes paid by all males or females of generation *k* in year *s*. The summation begins in year *t* for generations born prior to the base-year, while for future generations - those born in year $k > t$ - the summation begins in year *k*. Irrespective of the birth year of a generation, the discounting is always back to year *t*.

In order to calculate the current generations' net payments, it is first necessary to specify the demographic structure. This is done using country-specific population projections derived from official statistics, including assumptions concerning future fertility, mortality and net migration. In a second step, the net payments $T_{s,k}$ for all male and female agents of generation $k \leq t$ have to be calculated. Let *i* indicate the type of payment, that is a particular tax or benefit. Then we can simply sum up over all types of payments in order to derive

$$(3) \qquad T^{m}_{s,k} = \sum_{i} h^{m}_{s-k,i,s} ,$$

where $h^{m}_{s-k,i,s}$ stands for the average transfer received or taxes paid by male agents of age *s-k* in year *s*. Of course, the same holds for female or average agents. Let $a=s-k$ represent the age of an

individual and assume that both average payments and receipts grow with overall productivity at a constant rate g. Then, the average tax or transfer for males in year $s>t$ can be obtained from:

$$(4) \qquad h^{m}_{a,i,s} = h^{m}_{a,i,t}(1+g)^{s-t}.$$

Equations (1)-(4) are already sufficient to calculate the net payments of living generations. Observing individuals of age 0 to D in the base-year, we obtain an average payment for all types of tax and transfer payments from micro-data. Thus, we derive age- and gender-specific profiles for each of them. Note that taxes include all forms of statutory payments to public coffers while transfers reflect both in-cash and in-kind benefits. Moreover, some profiles may not vary according to age and gender. This is the case whenever the incidence corresponds to this uniformly distributed profile or whenever sufficient information is not available. The cross-section profiles are extrapolated into the future according to equation (4). In other words, they are taken as being representative for the longitudinal data.[10] From that one derives the net payments of the respective current generation as outlined in equation (2).

Dividing the present value of future net taxes of a living generation born in year $k \leq t$ by the population of that generation still alive in the base-year yields the generational account of that particular cohort - either on average or distinguished by gender:

$$(5) \qquad GA_{t,k} = \frac{N_{t,k}}{P_{t,k}}, \qquad GA^{m}_{t,k} = \frac{N^{m}_{t,k}}{P^{m}_{t,k}}, \qquad GA^{f}_{t,k} = \frac{N^{f}_{t,k}}{P^{f}_{t,k}}.$$

In fact, it should be emphasized that a generational account encompasses only taxes paid net of transfers received in a present value and rest-of-life projection. Due to the exclusively forward-looking concept, accounts between living generations are not comparable. They should rather be viewed as reflecting the per capita burden on particular generations of financing public spending as a whole. This holds for both current and future generations.

In order to illustrate the burden passed from current to future generations via the continuation of today's fiscal policy, the residual required to balance the intertemporal budget constraint must be calculated. This residual can be interpreted as the gap with respect to those demands on future budgets which would ensure a sustainable fiscal policy.[11] In other words, it represents the true government debt (TD) or wealth of the base-year t

$$TD_t = -\sum_{k=t-D}^{\infty} N_{t,k} + B_t \,. \tag{6}$$

The measure accurately reflects those burdens for future generations induced by current generations fiscal policy and thus makes those government liabilities explicit, which are not included in the official debt figures. Such liabilities are for example entitlements to pension benefits that young people obtain in a pay-as-you-go system by paying their contribution.

The overall figure of true intertemporal debt has to be financed by the net tax payments of all future generations. How the burden of this required payment will actually be distributed among future generations is uncertain, because this distribution will be determined by policies adopted in the future. For illustrative purposes, however, we apply the same set of relative tax and transfer profiles as illustrated in equation (4) to future generations. The burden future generations have to bear in order to ensure that TD=0 is met by adjusting specific payments or transfers through a scaling constant γ_i which may depend on the type of payment i. Computing the net payments $T_{s,k}$ for future agents of a generation $k>t$ is thus given by[12]

$$T_{s,k} = \sum_i g_i h_{a,i,s} \tag{7}$$

As above, $h_{a,i,s}$ stands for the average transfer received or taxes paid by agents of age a in year $s>t$, while the scaling constant γ_i ensures that the public budget constraint in equation (1) is balanced. Measuring the degree of intergenerational imbalance thus means exactly specifying a hypothetical fiscal policy which serves as a valid fiscal indicator. For example, the vector γ_i might reflect a

uniform proportional increase in all or specific taxes for all future generations. It might as well reflect a decrease in all transfers necessary to ensure a sustainable and therefore intergenerationally balanced fiscal policy. The result is, in general, an unequal distribution among future and living generations indicated by values of γ_i which differ from unity. Equivalently, one could also measure the intergenerational imbalance through the resulting absolute difference in the accounts of future and current newborns. Note that only the base-year newborns can serve as representatives for current generations, since they are the only ones which are captured over their entire life-cycle. The resulting difference in lifetime net tax payments between current and future generations given that the intertemporal budget constraint of the public sector holds, is used as an indicator for intergenerational redistribution. Of course, *a priori* it is arbitrary which policy is deemed suitable as the basis of this indicator. Another illustration of intergenerational balance is to set the scaling constant γ_i for all current and future generations to a value which ensures a balanced intertemporal budget constraint. This is identical the tax burden or the cut in transfer payments for all generations which would be necessary to service the intertemporal liabilities of the public sector. Taking the intertemporal liabilities or hypothetical tax revenue increases as an indicator for intertemporal redistribution of the actual fiscal policy is the only appropriate way to compare the generational accounting results for different countries. Such international comparisons are, however, only meaningful if the underlying indicator, e.g. the increase in income taxes, relates to equivalent bases, e.g. tax increase in percentage of GDP.

In the traditional method of generational accounting, the residual of the intertempopral budget constraint is distributed equally among all future generations in a growth-adjusted manner. Moreover, government spending for the provision of public goods and services is not ascribed (uniformly) to all present and future generations. Instead, it increases the residual distributed uniformly over future generations alone. Of course, both methods reflect extreme viewpoints since

distributing government consumption implies that even an inefficient waste of public services provided at real cost would reduce the generational accounts. On the other hand, not distributing government consumption means that the purchase of goods and services by the public sector is worth nothing to present generations (see also D. Weils comment in this volume). Every possible split is, however, fully arbitrary.

Since past tax payments and transfer receipts of living generations are not included in the calculations, the accounts represent present-value net payment burdens over the entire lifetimes only for base-year newborns and, of course, all future generations of which the generation born right after the base-year is typically chosen as a representative. A comparison of these generations' accounts is used in the traditional method to reveal whether the current set of policies is generationally imbalanced. This imbalance is typically quantified with the help of an index π defined as:

$$p_t = \frac{GA_{t,t+1}(1+r)}{GA_{t,t}(1+g)}. \tag{8}$$

Conventionally, this ratio serves as an indicator of intertemporal redistribution; that is, a value of π exceeding unity indicates net payments of future generations which are (π-1) percent higher compared to those of current newborns. If π falls short of unity, the distribution is, of course, to the advantage of future generations in the similar magnitude.

Measuring intergenerational redistribution with the help of one numerical indicator is a straightforward illustration, but can not be applied in every case. Indeed, there are country-specific circumstances in which the indicator π is misleading. We will not go into a deep discussion of these issues here. Nevertheless, a short note might be in order: already at a first glance, the traditional indicator has a - seemingly technical - shortcoming which can be easily seen on purely algebraic grounds. Obviously, π is not defined at all if $GA_{t,t}=0$ and it does not make sense if $GA_{t,t}<0$.

Moreover, the indicator will quantitatively and qualitatively be very sensitive for $GA_{t,t} \approx 0$ since

$$\lim_{GA_{t,t=0+e,e\to 0}} p = \infty \text{ and } \lim_{GA_{t,t=0-e,e\to 0}} p = -\infty .$$

This asymptotic behavior [cf. Raffelhüschen (1996)] is empirically relevant for most countries if, as in this study, all non-age-specific expenditure is uniformly distributed over the generations. In fact, it leads in general to a generational account of base-year newborns which is negative. But also while employing the traditional method the problem occurs in some cases.[13] It are exactly these shortcomings which necessitate the methodological adjustments of measuring intergenerational balance developed while working on the country studies reported below.

4 Cross-Country Study: Challenges

The findings of all country studies referred to subsequently are fully compatible since 1) all population projections rest on the same component method, 2) all types of public receipts and expenditures (including education) are treated identically, 3) in all cases the definition of government wealth is the same, 4) all policy reforms passed into law in or prior to the base-year are included in the projections, 5) all studies adjust for the traditional problems of measuring intergenerational redistribution in the way outlined above, and 6) all calculations are done with the identical software package. Former international comparisons severely suffer from incompatibilities with respect to basically all above listed issues. Only the comparison in Kotlikoff and Leibfritz (1998) is nearly as standardized as the one presented here.

Table 5 reports the net tax payments of current average generations, i.e. those aged 0 to 100 in the base-year 1995, as well as the net tax payment of the future generations represented by the newborns of the year 1996. Of course, the accounts of future newborns reflect the γ-adjustment of equation (7) which is necessary to ensure that the public budget constraint in equation (1) is

balanced. If not indicated otherwise, the accounts are calculated on the base of an annual real GDP growth rate of 1.5 percent and an exogenous real interest rate of 5 percent.

On examining the average accounts the first striking point is the similarity in the shapes of the current generations' net payments. This expresses the typical life-cycle patterns in all country studies. With the exception of Italy, all countries display a generational account of base-year newborns which is negative. Although net payments to the public sector remain strictly negative during childhood and youth, the accounts are steadily increasing upon turning positive at around age 10 and reaching a maximum at around age 25 in most countries. This is simply due to both the discounting of future tax and contribution payments and the fact that more and more years of net transfer receipts are not taken into account in this exclusively forward-looking concept. Over the years of active labor market participation, the net payments are in general positive but falling, before turning negative at around age 45. After that age there is a further decline until a maximum of net present value transfers is reached between 60 and 65, when an average agent in Europe retires. With further increasing age of the retirees in the base-year, the absolute value of net transfers decreases as less and less years of life expectancy remain.

In contrast to the very similar qualitative findings, the quantitative figures are fairly different. For example, an average European newborn of the base-year 1995, receives net transfers over the remaining life cycle amounting to 39,400 ECU. In contrast, an Italian newborn will have to pay 11,000 ECU while an average Swede newborn will receive approximately 99,000 ECU in present value transfers. In fact this reflects the tremendous divergence when it comes to the youth assistance. This differs not so much in educational expenditures, but more in the attitude towards young recipients. Typically, the Scandinavian Welfare States, but also the Netherlands pay welfare benefits or youth support directly, whereas the southern European attitude is to donate these transfers indirectly via the head of the family.

With respect to the maximum amount of taxes paid over the remaining life span, the peak is reached at age 20 in Austria and Italy, at age 30 in Spain and Sweden while all other countries top at age 25. These maximum amounts vary from 48,400 ECU in the UK to 161,000 ECU in Belgium. This is more than triple the UK figure. In fact, between age 20 and 40, Belgium and Denmark are taxing highest while the net tax load is lowest in the UK and Ireland between age 20 and 35. As already mentioned, the generational account turns negative between age 42 (Austria) and 51 (Sweden). Nevertheless, the time-span covers a period of nearly 10 years, indicating once more the differences in the tax-transfer patterns across the EU Member States.

With the exception of three countries, all average agents will reach their maximum amount of remaining transfer receipts upon reaching age 65. The exceptions concern those countries which form the archetypes of European Welfare States, that is Denmark, the Netherlands and Sweden. While in Sweden and the Netherlands, the top is in comparison to EU-average delayed by 5 and 10 years, respectively, Denmark is a very special exception since there the maximum amount of transfers is received by the oldest-old. The reason for this deviation is twofold. The first reason is of economic importance, since all of the three countries do have very generous long-term care programs. The second reason is not of economic weight and concerns simply the data constraint for basically all other countries with respect to the benefits to the oldest-old via health treatment and long-term care, both of them distributed fairly uniformly over the last years of life.

What is also striking when it comes to the transfer receipts of the elderly in Europe is again the tremendous divergence in net payments. The variance reaches from fairly low amounts of 58,500 and 77,100 ECU in Ireland and the UK to the maximum figures found in Austria and Germany where a 65-year-old can expect to receive more than 200,000 ECU as a net transfer over his/her remaining life-cycle. From what was argued above, one might conclude that the elderly fare best in northern and central Europe. This can, however, not be concluded from focussing exclusively on the sheer absolute amounts since the selected countries vary significantly with respect to income and living

standard. Thus, Table 6 reports the generational accounts of Table 5 scaled by the ratio of the average per capita GDP in the EU and the national per capita GDP as shown in Table 3.

When it comes to the maximum of GDP-scaled net transfer receipt, we find the highest values for Italy (196,800 ECU) and Spain (186,000 ECU), while formerly leading Austria (176,700) and Germany (167,900) range only third and fourth. From this it might be concluded that elderly fare relatively best in southern and not in central or northern Europe. Nevertheless, this conclusion is still not valid since today's elderly have of course paid their contributions to the respective paygo schemes in the past. Avoiding the calculation of internal rates of return,[14] the ratio between the maximum net transfer receipt and the maximum net taxes paid gives some sort of `return-on-investment`-intuition. From Table 7, it can be seen that in Austria and Sweden the maximum net transfer amounts to 2.6 and 2.1 times the maximum net tax payment of average agents. Among those countries with the lowest ratio, we find two typical European Welfare States, that is Denmark and the Netherlands in which both amounts are approximately of the same size. The lowest ratio is found for Belgium, a country in which the maximum net taxes paid exceed the maximum amount of net transfers received. Obviously, the intuitive north-south succession when it comes to the status of the welfare with respect to the elderly in Europe, is not confirmed by our figures.

Furthermore, with respect to the scaled maximum net tax payment over the rest of life, we can not confirm the ranking found in the absolute accounts. Surprisingly, the highest relative net tax payments in 1995 are realized by an average 20-year old Italian while the formerly absolute highest Belgian figure comes next. Again, a surprising result can be seen while focussing on the lowest amount of maximum net tax payments. Of course, Ireland and the UK do still display comparatively low net tax loads for young individuals. Nevertheless, the lowest maximum is found for an 20-year old Austrian.

The impact of today's fiscal policy on the distribution of net tax burdens between current and future generations is reported in Table 8. The first column shows the traditional indicator of

intergenerational redistribution, that is the percentage difference between the accounts of future and current newborns, π. Due to changes in the sign, the indicator is not valid in the cases of Denmark, Finland, Sweden and the UK. But π is also obviously not a helpful indicator for measuring intergenerational redistribution in most other countries. Hence, we employ the set of indicators outlined in Section 3.

On average, the absolute difference in the net payment of current and future newborns amounts to 77,000 ECU since base-year newborns receive approximately 39,400 ECU while newborns in the following year would face a net tax burden of 37,600. Of course, the latter amount reflects the fact that the future generations are made responsible for the service of the government's true liabilities, which make up 130 percent of GDP on average of the selected EU Member States. Thus, future generations would face a net tax burden which exceeds the respective figure for the newborns by 54 percent. If, however, all generations share the burden of today's fiscal policy by paying γ percent more in all taxes, the necessary tax increment would increase the tax to GDP ratio permanently by 4.4 percent.

Obviously, the present fiscal policy of the selected EU Member States is - on average – highly advantageous to the currently living generations or - to put it in other words – today's fiscal policy is unsustainable. This is true for all countries except Ireland. Only in Ireland -which has recently been dubbed the Celtic Tiger- is fiscal policy intergenerationally balanced and sustainable since vis-a-vis the explicit debt of 72 percent of GDP there are implicit public assets inherited by future generations in approximately the same magnitude (cf. Figure 1). This is due to a range of reasons, among them the favorable demographic development but also the transfers from the EU amounting to about two percent of GDP annually.

The intergenerational imbalances found in all other countries differ tremendously. In terms of true liabilities, the debt to GDP ratio is only 18.8 percent in Belgium while the figure for Finland is as

high as 253.2 percent. Besides Finland, only Sweden displays a similarly high redistribution to the disadvantage of future generations with a true debt to GDP ratio of 236.5 percent. The composition of these true liabilities reveals an interesting fact which can be easily seen from Figure 1. In the case of Finland (SF), the explicit net debt figure is negative, indicating that Finland has presently explicit public assets in the magnitude of 8 percent of the 1995-GDP. The implicit liabilities, however, correspond to over 260 percent. In contrast, Belgium has the highest explicit net debt figure with over 120 percent of GDP. Since the major aim of the present fiscal policy is to generate high tax revenues and a primary surplus, the implicit liabilities are negative by nearly the same magnitude. In Sweden, the composition of true liabilities corresponds to those of all other countries. In the Swedish case, the positive implicit liabilities amount to 200 percent of GDP, while the explicit debt figure adds another 37 percentage points.

In Austria, the UK and Spain, the generational imbalance is also extreme. In these countries the true debt figure corresponds to 192.5, 184.8 and 151.9 percent of GDP, respectively. A lower, but still severe imbalance can be found in France, Germany and Italy, where the net debt to GDP ratio lies between 136.0 and 107.3 percent. The imbalances run by the Dutch and Danish government are still substantial. Both countries seem to be very similar with respect to generational policy since in both cases we find an average explicit net debt combined with very low implicit debt, resulting in a true debt figure of 76 and 71 percent. Moreover, both countries have very generous welfare systems. The reason for the low generational imbalance is simply the severe tax load on presently living (and future) generations.

Measuring the intergenerational redistribution with the help of the increase in all taxes of all generations necessary to pay-off the entire public debt leads to an identical range in the imbalance of today's fiscal policy in the selected Member States of the EU. As above, the tax to GDP quota which ensures a sustainable growth path of the economy ranges from as high as 8.8 percent in

Finland to as low as 2.3 percent in Denmark. Of course, in Ireland we find the above-mentioned tax decrease of 0.1 percent.

A different scaling of generational imbalance would, however, occur if one focused on the tax increase for future generations necessary to restore a balanced fiscal policy.[15] This is, of course, due to the divergence in the national tax bases. For example, we would find Spain on top since the tax base is much smaller as compared to the other countries. Future Spaniards will thus face tax burdens exceeding those of current newborns by 106.5 percent. With respect to the absolute difference, the scaling is with neither of the other indicators fully identical.[16] Nevertheless, for all indicators, the divergences are of only minor importance and only reflect differences in the tax systems or in living standards. On the other hand, taking either the regular or the primary deficit as a valid fiscal indicator (see Table 3) gives an even more different (and wrong) ranking between the countries. Of course, as pointed out in D. Weir's comment in this volume, the primary deficit fares much better as compared to the regular one.

In light of these findings, it would be useful to know the specific sources of the generational imbalance and their quantitative impact. Table 9 summarizes the results of two hypothetical experiments which address these important questions. The first experiment repeats the baseline for each country while setting the amount of the respective government's explicit net debt to zero. The second experiment calculates the generational imbalance resulting if the fairly advantageous age structure of the base-year 1995 is kept constant. Of course, the first experiment illustrates the relative importance of the accumulated deficits of the recent past while the latter addresses the pure demographic effects.

Table 9 reports the increase in all taxes necessary to restore intergenerational balance in percent of GDP for the baseline, the explicit debt and the demographic experiment for each country. On average, the imbalance would be halved in the absence of any explicit debt while approximately three quarters of the imbalance would disappear if the age structure remained constant. Thus, the

major part of the imbalance in fiscal policy within the selected EU Member States stems from demographic trends. As a rule of thumb, roughly two third of the imbalance can be attributed to the demographic transition, while one third is due to the inherited explicit public debt.

As also shown in Table 9, the variance of the relative importance of explicit and implicit public indebtedness within the countries is rather broad. For example, in Finland, the no-debt-experiment indicates an increase of tax payments exceeding the baseline figure because this country has an explicit stock of public assets. But even if the demographic transition did not occur, Finnish fiscal policy would redistribute to the advantage of current generations. In contrast, Belgian fiscal policy would be sustainable in either of the two hypothetical experiments. In both cases, the baseline tax increase necessary to ensure sustainability would switch into a tax reduction. The same holds with respect to Denmark. In the case of Austria, France, Spain, Sweden and the UK neither of the two experiments would fully reduce the imbalance, while in the case of Germany, Italy and the Netherlands, a constant population structure would suffice.

In seven of the twelve selected country studies, that is Belgium, Denmark, France, Ireland, the Netherlands, Spain and the UK, the imbalance is mainly due to the explicit debt figures, although the demographic impact is mostly of only a little less importance. In Austria, Finland, Germany, Italy and Sweden the source stems predominantly from the demographic transition. Since the major source of generational imbalance is still due to the demographic trends and in particular due to the all-European double-aging process, we will finally comment on the specific problems occurring in maintaining the financial sustainability of the intergenerational contracts, that is mainly the paygo financed pension and - to some extent - the health schemes in the selected country studies.

5 Cross-Country Study: Reforming Social Security

Table 4 already showed that pension expenditure within the selected EU Member States range between only 3.6 percent of GDP in Ireland and 13.3 percent in Italy. Moreover, the long-term expenditure projection for the next five decades made clear that the pension system is not sustainable. Within the twelve selected EU Member States, there is, however no such thing as *a* pension system - there are twelve. In fact, the pension schemes which were set up at very different points of time, vary considerably from country to country with basically only one common feature: they are all financed via paygo schemes.

Beside this feature, European social policy varies from a conceptual point of view between a pure tax-transfer system (e.g. Denmark) and more or less pure insurance approaches with a high linkage between benefits and contributions. These more or less pure *Bismarckian* types of Social Security systems are found, for example, in Austria and Germany. Nevertheless, in these countries federal grants also supplement the contributions, although they represent over 20 percent of the payroll. From the viewpoint of generosity, the divergence is also significant. On the one hand there are fairly generous countries like Austria, Germany and Italy with replacement rates of close to 70 percent while countries like Ireland or the UK provide only for a basic pension ranging slightly above the poverty line. The normal retirement age is on average lower for females and varies overall between 60 and 67. However, in most countries the effective retirement age is much lower. When taking into account early retirement schemes and disability pensions it ranges on average at around age 60. A precise description of the current institutional settings of pension systems within the EU Member States would be a mammoth task and would go far beyond the scope of this paper.[17] Hence, this section will simply discuss some of the directions in which policy reforms for the unfunded Social Security schemes have aimed or will aim in the future.

In most of the selected EU Member States, the reform of the unfunded pension schemes has already been on the political agenda since the late 1980s. With the exception of Ireland - where a severe aging problem does not exist - all governments have already responded to the future challenges through specific policy amendments. In most cases, that happened before 1995. Hence, the above reported baseline results do include the economic effects of these reforms. However, the measures have obviously been far from sufficient to restore generational balance and fiscal sustainability in the respective countries. Nevertheless, in some cases, the fiscal imbalance would be very much higher, if Social Security reforms had not been passed into law.[18]

In principle, there are two basic strategies for Social Security reforms. First, there is the possibility of partially funding a hitherto unfunded system. A move towards funded pensions promises various benefits in an economy which is on an efficient growth path, but it also immediately triggers off the well-known argument of the double burden for the transition generations.[19] The second reform strategy aims to redress an unfunded system, but without questioning the basic principle of paygo financing. This can be done through various immanent measures which will either reduce entitlements or increase tax revenues. Of course, high and growing contribution rates will imply further distortions on the labor markets which were already highly inefficient before reform. Hence, rather than increases in contribution rates, it is increases in federal grants which have generally been the focus of the recent political debates. We will therefore discuss these types of policy reforms in the context of specific country studies.

There are various ways to reduce entitlements for either present or future cohorts of the elderly. First, the minimum years of contribution payments for eligibility can be increased. Second, existing entitlements can be reduced through a switch in the indexation of pension payments from gross wages to net wages or to consumer prices. Both measures were, for example, part of the French 1993 reform, the German pension reform of 1992 or the Italian reforms of 1992 and 1995. Third, new entitlements can be reduced by making the method of calculating the primary insurance amount

(PIA) less favorable for the beneficiaries. This was done in a range of countries, including Austria, Belgium, France, Germany, Italy, Spain and the UK.

As an example, Table 10 reports the effects of the recently introduced Spanish Toledo agreement which prolonged the period to which the PIA calculation referred to from the last eight to the last 15 years of active labor market participation. Specifically, as from 1997, one year of past employment is added until in 2003 the last 15 years will be taken into account. According to Berenguer et al (1999), this ultimately translates into a 7.2 percent overall reduction of the PIA for all newly retired persons. The comparison of the respective generational accounts before and after the reform illustrates the intergenerational impact of the Toledo Agreement. Due to the smooth phasing-in of pension reductions the accounts of current elderly will remain unaffected. In contrast, those retiring in the period 1998 through 2006 will face the highest burdens which amount at the maximum to additional net payments of 3,700 ECU for those aged 45 in the base-year. For future generations of Spaniards, the Toledo Agreement implies a reduced net payment of 54,000 ECU which is 8,000 ECU less than the baseline figure. It services a stock of true public debt amounting to 133.7 percent of GDP. This is still a considerable intergenerational redistribution, but significantly lower when compared to the imbalance indicated by a 151.9 debt to GDP ratio if the Toledo Agreement had not been passed into law.

As a fourth way of reducing pension entitlements, most European countries have changed the legal setting with respect to the retirement age. In Austria, Belgium, Denmark, Finland, Germany, Italy, Sweden and the UK, this was or will be done by either directly changing the legal retirement age or by decreasing the incentives towards early retirement. As an example, we examine the generational impacts of a recently proposed reform which will reverse the strong tendency towards early retirement in Denmark. As in other European countries, the window of retirement opens with relatively advantageous conditions with a specific early retirement scheme, while the standard retirement age is 67 for both males and females. The proposed policy option will narrow this

window by progressively increasing the earliest retirement age from 60 to 63 over the years 2000-2002. Clearly, this planned reform would yield a twofold gain: not only would it increase the labor force, leading to higher labor income taxes. In addition, the large number of public transfer payments recipients would decrease.

The fourth and fifth columns of Table 10 report the generational impacts of this likely Danish pension reform which only adjusts early retirement benefits and income tax revenue. As compared to the baseline figures, the burden of current generations will rise by age reaching a peak at the age of 55 as a result of the five year announcement period. Current elderly, that is those aged 56 and above, remain fully unaffected. With respect to the intergenerational redistribution, we find a significantly reduced burden on future generations. This holds for both the absolute difference in current and future newborns' accounts amounting to 31,100 ECU instead of 42,400 ECU in the baseline, and for the true debt which will be reduced from 71.2 to 52.0 percent.

Obviously given the demographic pressure, raising the retirement age is a very effective way of approaching generational balance. However, it can not be utilized to ensure full balance since this would necessitate extremely high retirement ages. Moreover, one should keep in mind that this type of reform measure will predominantly burden older and therefore - in terms of life-cycle planning - not very flexible cohorts. Hence, a long-term announcement is an obligatory part of this type of reform proposals.

Another strategy of restructuring an unfunded system without jeopardizing the basic principle of paygo financing aims to increase the revenues allocated to the elderly through the Social Security budgets. This can either be done through increasing contribution rates or by increasing federal subsidies. Interestingly, most European pension schemes are defined benefit plans according to the legal settings, though there is a political consensus that a target replacement ratio should not be ensured under all circumstances. As a case study, we consider the Finnish Social Security system which is characterized by a particularly low effective retirement age.[20] The basic system features

are fairly similar compared with other Scandinavian countries.

Table 10 shows the Finnish generational accounts for the baseline and for a pension reform which gradually increases the contribution rates to public pension schemes by 0.235 percentage points annually over forty years. Starting at the 1995 total contribution rate of 20.6 percent, this ensures approximately constant per capita spending and increases the contribution rate to eventually to 30 percent in 2035. While this scenario does not affect 1995 pensioners at all, cohorts aged under 65 in 1995 pay significantly higher social security contributions over their remaining lifetime. For a 1995 newborn, the net transfer is reduced from 83,200 ECU in the baseline to 71,800 ECU in the reform scenario. This leaves future generations with generational accounts amounting to 49,600 ECU and thus results in an absolute difference between generational accounts of 121,400 ECU, which is almost 22 percent lower than the baseline value. The fact that future generations' burden will be reduced can also be illustrated by focussing on the true debt figure which decreases from 253 to 200 percent. Similar quantitative and qualitative findings can be derived from experiments which set the contribution rates endogenously, that is in a way which ensures a balanced Social Security budget through the years of the demographic transition.

In all three of the above mentioned case studies, we focussed exclusively on the impacts of immanent changes on the expenditure or receipt side of Social Security budgets. What remains to be discussed is the move towards a (partially) funded system. However, in order to get a clear and unbiased picture of the demographic pressure as well as the impact of alternative reform scenarios, it is instructive to isolate generational accounts of those intergenerational contracts which mainly contribute to the financial burden arising from the aging process. From a European perspective, these are besides the Social Security and health-care insurance also the long-term care insurance recently introduced in Germany and the Netherlands.

As an example, Table 11 reports the isolated generational accounts of the three generational contracts in Germany for the baseline results and three hypothetical experiments.[21] In the baseline,

the maximum net payment in the case of a 20 year old average person amounts to 66,900 ECU. Already at the age of 38, the present value of remaining gross payments breaks even with the respective value for the transfers received over the remaining life-cycle. For a person aged 65, the expected net transfers received during old age peak at 191,300 ECU and decrease thereafter. Summing up all net-of-contribution demands of all currently living cohorts would imply a stock of implicit liabilities of all German social insurance systems amounting to 114.3 percent of GDP. As a rule of thumb, this represents upper European average but by far not the top of the range. In order to service this implicit debt, future Germans would have to face a change in all contribution payments corresponding to 125.7 percent. That would lead to a generational account of those born after the base-year in the magnitude of 120,700 ECU, that is 95,500 ECU more than base-year newborns. Hence, overall contribution rates would have to be raised from approximately 32 percent of gross payroll in the base-year to more than 50 percent in 2035, which even in Europe, is an absolutely unrealistic exercise.

The third and fourth columns of Table 11 offer two hypothetical reforms of the paygo system: either increasing the necessary contribution rates or cutting the benefits in order to fully balance the intertemporal budget constraint of the social insurance systems. The first case implies a Social Security payroll tax rate of 23.2 instead of 18.6 percent in the base-year and all future years, a health insurance payroll tax rate of 16.3 instead of 13.1 percent, and a payroll tax rate of 2.1 instead of 1.7 percent for the recently introduced long-term care insurance.[22] In contrast, generational balance in the social insurance systems could also be restored through an immediate and permanent transfer reduction amounting to 19.6 percent of the 1995 level. In the case of Germany, this translates into a replacement rate of 57.5 percent instead of the present level of 70 percent of net labor income.

It is obvious by comparing the third and fourth columns of Table 11 that the share of the burden necessary to restore generational balance is more equally spread between currently living

generations in the case of the mere benefit reduction. However, neither of the two extreme scenarios seem to be a realistic policy option. Most likely, there will be some kind of linear combination of the two extreme scenarios.

As a guesstimate of what might result from future decision making, the last column of Table 11 reports the generational accounts of a partial funding system which assumes that half of what is necessary to restore the intergenerational balance is financed via increased contribution rates while the other half is financed via benefit reductions. In order to keep the calculations simple, both reform measures are introduced without any pre-announcement period. As compared to the baseline, the resulting differences in the accounts are simply linear combinations of the extreme ways discussed above.

In the first decades, annual surpluses will occur, and social insurance schemes will operate as partially funded systems. When the demographic burden aggravates, these funds are sufficient to partially finance the occurring deficits. The impact on the net payments of presently living agents are fairly, but not fully uniform. In absolute terms working-aged individuals would face net payments which are between 19,000 and 26,000 ECU above those of the baseline scenario in which the future generations are heavily burdened. For a current newborn German, the mixed strategy implies an additional payment of 13,900 ECU which corresponds approximately to the average load levied on the elderly.

The strategy of partially funding the paygo financed social insurance schemes, while at the same time letting the current elderly participate in restoring intergenerational balance between future and current generations has several advantages in both the German and the European context: First, it is superior with respect to intergenerational as well as intragenerational equity. Second, it endows the German or European economy with capital which might trigger off an accelerating growth process. At the same time, this policy increases labor productivity and thereby creates new job opportunities for those unemployed as a result of high wages in central and northern Europe. Third, reduced

benefits might open up a demographic breathing space which in turn could be used to decrease effective labor costs, which are very high in most of the EU Member States.

6 Summary

The pressure to reform the traditionally generous European Welfare States is increasing rapidly. The prospects of an aging population, rising unemployment rates and lack of competitiveness in a globalized world economy are imposing more and more constraints on national welfare programs. Furthermore, growing debt burdens induce high interest payments which also cast substantial doubt on the sustainability of present fiscal policy and force public decision makers to economize on other spending items and/or to increase the already high tax load.

This paper investigates the demographic transition and its impact on the intergenerational stance of current fiscal policy within the European Union with the help of generational accounting. The sustainability of both the so-called generational contracts via pay-as-you-go financed welfare programs and the explicit debt burdens in the situation of an aging society are the focus of this analysis.

Our findings suggest that the present fiscal policy of the selected EU Member States is in severe imbalance to the advantage of currently living generations. This is true for all countries, except Ireland where generous EU transfers imply a small stock of true public assets. In all other countries true public liabilities exist, which are being passed on to future generations. The intergenerational imbalance is highest in Finland and Sweden where the governments transfer a true debt to GDP ratio of over 200 percent of GDP onto future Finns and Swedes. In Austria, the UK and Spain, the generational imbalance is also extreme. A lower but still severe imbalance can be found in France, Germany and Italy. Substantial imbalances are also run by the Dutch and Danish governments,

resulting in a true debt figure of approximately 70 percent. Finally, a minor imbalance to the disadvantage of future generations is found in Belgium.

There are two major sources for the generational imbalance, the stock of explicit public debt and the demographic trend. On average, the imbalance would be halved in the absence of any explicit debt. Without the double-aging of the population, approximately three quarters of the imbalance would disappear. Hence, most of the fiscal policy imbalance in the selected EU Member States stems from demographic trends. As a rule of thumb, roughly two thirds of the imbalance can be attributed to demographic transition, while one third is due to the inherited explicit public debt.

The demographic burden for future generations runs through the social insurance systems, in particular the paygo financed pension schemes, but also the health system and the recently introduced paygo insurance for long-term care. Hence, some directions in which policy reforms for the unfunded schemes have gone or will have to go have been discussed thoroughly in the context of specific country studies. As reform strategies, we investigated the possibility of partially funding hitherto unfunded systems, as well as reforms which do not change the basic principle of paygo financing. We found that partially funding the social insurance systems has advantages with respect to both the long-run intertemporal distribution and the short-run labor market problems.

Whether funding strategies or, in a broader sense, the restructuring of the Welfare States in Europe is politically and economically feasible remains an open question. There is, however, no doubt about the general need to adjust social policies in Europe to both the present economic conditions and the demographic challenges to be expected in the not so far future. Of course, the well-known diversity of the European countries necessitates different ways of adjustment in, for example, the archetypes of Scandinavian Welfare States of northern Europe and the *Bismarckian* social insurance systems of central or southern Europe. Nevertheless, traditional solidarity and social safety nets must be better reconciled with economic efficiency and fiscal sustainability.

References

Auerbach, A. (1997), Quantifying the Current U.S. Fiscal Imbalance, National Tax Journal, 50, 387-398.

Auerbach, A., J. Gokhale and L. Kotlikoff (1991), Generational Accounts: A Meaningful Alternative to Deficit Accounting, in: David Bradford (ed.), Tax Policy and the Economy, Vol. 5, Cambridge, Mass., 55-110.

Auerbach, A., J. Gokhale and L. Kotlikoff (1992), Generational Accounting: A New Approach for Understanding the Effects of Fiscal Policy on Saving, Scandinavian Journal of Economics, 94, 303-318.

Auerbach, A., J. Gokhale and L. Kotlikoff (1994), Generational Accounting: A Meaningful Way to Evaluate Fiscal Policy, Journal of Economic Perspectives, 8, 73-94.

Berenguer, E., H. Bonin and B. Raffelhüschen (1999), Spain: Preparing to Join the EMU, in: European Commission (1999), forth.

Bonin, H., B. Raffelhüschen and J. Walliser (1999), The Germany Squeeze: Unification and Aging, in: European Commission (1999), forth.

Bonin, H., B. Raffelhüschen and J. Walliser (1997), Can Immigration Alleviate the Demographic Burden? - An Assessment With Generational Accounts, University of Freiburg, Discussion Paper of the Institute of Public Finance, no 54.

Börsch-Supan, Axel (1991), Aging Populations: Problems and Policy Optionsin the U.S. and Germany, Economic Policy,12: 104-139.

Bovenberg A. and H. ter Rele (1999), Netherlands: Alleviating the Aging Problem, in: European Commission (1999), forth.

Breyer, F. and M. Straub (1993), Welfare Effects of Unfunded Pension Systems When Labor Supply is Endogenous, Journal of Public Economics, 50: 77--91.

Buiter, W. (1995), Generational Accounts, Aggregate Saving and Intergenerational Distribution, NBER Working Paper no 5087, Cambridge, MA.

Cardarelli, R. and J. Sefton (1999), United Kingdom: Rolling Back the Welfare State? in: European Commission (1999), forth.

CBO - Congressional Budget Office (1995), Who Pays and When? An Assessment of Generational Accounting, Washington D.C.

Crettez, B., K. Feist and B. Raffelhüschen (1999), France: A Back and Forth of Fiscal Policy, in: European Commission (1999), forth.

Dellis, A. and E. Lüth (1999), Belgium: Does Fiscal Policy Cope with Debt and Aging? in: European Commission (1999), forth.

Diamond, P. (1996), Generational Accounts and Generational Balance: An Assessment, National Tax Journal, 49, 597-607.

European Commission (1999), Generational Accounting in Europe, forthcoming in European

Economy, Brussels.

Fehr, H. and L. Kotlikoff (1997), Generational Accounting in General Equilibrium, Finanzarchiv, 53: 1-27.

Feist, K., B. Raffelhüschen, R. Sullström and R. Vanne (1999), Finland: Down, Up and Balance, in: European Commission (1999), forth.

Franco, D. and N. Sartor (1999), Italy: High Public Debt and Population Aging, in: European Commission (1999), forth.

Franco, D and T. Munzi (1996), Public Pension Expenditure Prospects in the European Union: A Survey of National Projections, in: Aging and Pension Expenditure Prospects in the Western World, European Economy Reports and Studies no. 3/1996, European Commission.

Franco, D and T. Munzi (1997), Aging and Fiscal Policies in the European Union, in: The Welfare State in Europe - Challenges and Reforms, European Economy Reports and Studies no. 4/1997, European Commission.

Haveman, R. (1994), Should Generational Accounts Replace Public Budgets and Deficits? Journal of Economic Perspectives, 8(1): 95-111.

Jensen, S. and B. Raffelhüschen (1997), Generational and Gender-Specific Aspects of the Tax and Transfer System in Denmark, Empirical Economics, 22, 615-635.

Jensen, S. and B. Raffelhüschen (1999), Denmark: Reconsidering the Welfare State, in: European Commission (1999), forth.

Keuschnigg, C., M. Keuschnigg, R. Koman, E. Lueth and B. Raffelhüschen (1999), Austria: A Consolidation on its Way, in: European Commission (1999), forth.

Kotlikoff, L. and W. Leibfritz (1998), An International Comparison of Generational Accounts, NBER Working Paper no 6447, Cambridge, MA.

Kotlikoff, L. and J. Walliser (1995), Applying Generational Accounting to Developing Countries, IED Discussion Paper Series no 67, Boston, MA.

Kotlikoff, L., K. Smetters and J. Walliser (1998), The Economic Impact of Privatizing Social Security, in: H. Siebert (ed.), Redesigning Social Security, Tuebingen, 327-348.

Lundvik, P., E. Lüth and B. Raffelhüschen (1999), Sweden: The Welfare State on Trial, in: European Commission (1999), forth.

Martinez, C., H. Onega, T. Jaegers and Bernd Raffelhüschen (1999), Generational Accounting in Europe: An Overview, in: European Commission (1999), forth.

McCarthy, T. and H. Bonin (1999), Ireland: EU Transfers & Demographic Dividends, in: European Commission (1999), forth.

OECD (1988), Aging Populations - The Social Policy Implications, Paris.

OECD (1997), Aging in OECD Countries - A Critical Policy Challenge, Social Policy Studies, no 20, Paris.

Raffelhüschen, B. (1999), Generational Accounting: Method, Data and Limitations, in: European Commission (1999), forth.

Raffelhüschen, B. (1997), Generational Accounting in Europe - Feasibility Study, mimeo, Freiburg and Brussels.

Raffelhüschen, B. (1996), A Note on Measuring Intertemporal Redistribution in Generational Accounting, Discussion Paper of the Institute of Public Finance no 53, University of Freiburg.

Raffelhüschen, B. (1993), Funding Social Security Through Pareto-optimal Conversion Policies, Journal of Economics, Suppl. 7: 105--131.

Raffelhüschen, B. and A. Risa (1997), Generational Accounting and Intergenerational Welfare, Public Choice, 93, 149-163.

Raffelhüschen, B. and J.. Walliser (1999), Unification and Aging: Who Pays and When? in: Auerbach, A., L. Kotlikoff and W. Leibfritz (ed), Generational Accounting Around the World, NBER series, Chicago University Press, forth.

Schnabel, R. (1998), Rates of Return of the German Pay-As-You-Go System, Working Paper, 2/98, Department of Economics, University of Mannheim.

Table 6.1: Trends in Fertility, Life Expectancy and Population Size, 1995-2035

	Gross fertility rate		Life expectancy at birth (female)			Population, mio		
	1995	2015	1980	1995	2015	1995	2015	2035
Austria	1.4	1.5	76.1	79.0	81.6	8.0	8.3	8.0
Belgium	1.6	1.8	76.6	79.8	81.1	10.1	10.3	9.9
Denmark	1.8	1.9	77.4	77.9	78.0	5.2	5.5	5.7
Finland	1.8	1.8	77.6	80.5	82.0	5.1	5.2	5.0
France	1.7	1.7	78.4	81.6	83.2	58.0	61.2	60.2
Germany	1.4	1.4	76.8	78.7	81.1	81.7	82.8	76.0
Italy	1.3	1.5	77.7	80.4	83.0	57.3	56.7	50.7
Ireland	1.8	1.8	75.0	77.9	81.9	3.6	4.0	3.9
Netherlands	1.5	1.7	79.5	80.3	83.0	15.4	16.2	15.9
Spain	1.3	1.3	78.0	80.5	82.4	39.1	39.2	35.0
Sweden	1.7	1.8	79.1	81.5	83.3	8.8	9.3	9.4
UK	1.7	1.8	76.8	79.3	80.7	58.6	61.2	61.1
Average	1.5	1.6	77.5	79.9	82.0			

Source: Country Studies in European Commission (1999)

Table 6.2: Projections of the Elderly and Oldest-old Population, 1995-2055

	Elderly dependency ratio*				Oldest-old dependency ratio**			
	1995	2015	2035	2055	1995	2015	2035	2055
Austria	34.7	42.3	66.2	65.5	10.7	14.1	22.4	26.7
Belgium	39.0	45.3	60.5	58.5	11.2	15.6	21.8	22.7
Denmark	35.2	44.0	51.5	43.9	12.3	12.4	16.9	16.2
Finland	34.0	51.7	60.9	60.6	10.3	15.6	25.1	23.1
France	37.1	46.9	62.2	64.1	11.3	17.0	24.9	27.4
Germany	35.7	47.3	69.2	68.8	10.8	17.4	24.1	27.4
Italy	39.5	53.0	79.7	78.4	11.5	20.6	29.0	38.4
Ireland	30.2	37.5	59.2	75.1	9.6	10.9	20.3	31.6
Netherlands	30.5	43.6	65.3	61.0	9.6	12.9	23.6	24.8
Spain	38.1	45.1	74.5	90.4	11.1	17.0	26.2	44.6
Sweden	41.4	54.9	66.8	66.5	15.4	19.5	28.8	29.0
UK	37.7	43.8	57.8	56.2	12.9	14.4	20.2	21.5
Average	37.1	47.1	66.9	68.1	11.5	16.8	24.3	29.3

* population aged 60+ as a percent of those aged 20-59
** population aged 75+ as a percent of those aged 20-59
Source: Country Studies in European Commission (1999)

Table 6.3: Macroeconomic and Fiscal Indicators

	Per capita GDP 1995		GDP-growth rate			Deficit to GDP Ratio, 1995	
	in ECU	% of average	1990	1992	1995	regular	Primary
Austria	22,000	119.5	4.5	1.3	1.4	5.0	0.6
Belgium	20,300	110.3	3.7	1.7	1.9	4.1	-4.4
Denmark	25,300	137.3	1.4	0.2	2.8	1.9	-1.5
Finland	19,100	103.7	0.0	-3.6	4.2	3.8	2.7
France	20,200	109.8	2.4	1.1	2.2	5.0	1.7
Germany	22,600	122.5	5.7	2.2	1.9	3.6	0.4
Italy	14,700	79.8	2.2	0.6	3.0	7.0	-3.1
Ireland	13,100	71.1	8.4	4.6	10.7	1.9	-3.3
Netherlands	19,800	107.4	4.1	2.0	2.1	4.1	-1.0
Spain	11,000	59.7	3.7	0.7	2.8	5.9	1.0
Sweden	20,300	110.1	1.4	-1.4	3.6	7.7	5.2
UK	12,700	68.8	0.4	-0.5	2.5	6.5	2.2
Average	18,400	100.0	3.2	0.7	3.3	4.7	0.0

Table 6.3, continued

Taxes and Statutory Contributions, % of GDP			Taxes	Share of Social Expenditure to GDP		
1985	990	1995	1995	1983	1995*	2040

Austria	43.6	1.6	42.3	27.0	26.5	32.2	38.4
Belgium	47.9	5.1	46.8	31.1	30.8	28.9	36.5
Denmark	49.1	8.7	51.4	49.7	30.1	33.5	48.0
Finland	40.8	5.4	46.3	31.6	-	33.1	39.5
France	44.5	3.7	44.6	25.3	28.3	30.4	40.2
Germany	41.6	9.5	42.6	24.3	28.8	31.3	45.5
Italy	34.7	8.8	40.7	27.8	22.9	24.7	34.7
Ireland	38.6	5.9	36.3	30.8	24.1	20.4	24.3
Netherlands	45.5	5.1	45.4	26.2	33.4	31.9	44.3
Spain	30.0	5.1	34.8	22.5	19.5	23.6	28.2
Sweden	50.0	5.8	51.5	37.3	-	35.8	46.0
UK	38.2	5.7	34.9	28.2	23.9	28.1	33.4
Average	42.0	2.5	43.1	30.2	26.8	29.5	38.3

Source: EUROSTAT 1997, OECD (1988), Country Studies in European Commission (1999), Projections for Austria, Finland, Ireland and Spain, own calculations; Figures for Germany before 1992 refer to West-Germany; * 1994 for Ireland, Spain and the UK.

Table 6.4: Pension and Health Care Expenditure 1995-2050

	Pension Expenditure, % of GDP				Health Expenditure, % of GDP		
	1995	2010	2030	2050	1995	2030-A	2030-B
Austria	8.8	10.2	14.4	14.9	7.4	10.3	10.7
Belgium	10.4	8.7	13.9	15.1	7.4	9.5	10.5
Denmark	6.8	7.6	10.9	11.5	5.6	7.0	7.8
Finland	10.1	10.7	17.8	17.7	6.9	9.4	9.9
France	10.6	9.7	13.5	14.4	7.0	8.9	11.1
Germany	11.1	11.8	16.5	17.5	6.2	7.8	10.0
Italy	13.3	13.2	20.3	20.3	6.4	8.1	10.4
Ireland	3.6	2.6	2.8	3.0	5.1	5.6	6.4
Netherlands	6.0	6.1	11.2	11.4	6.7	9.8	9.9
Spain	10.0	10.0	14.1	19.1	5.7	7.4	8.1
Sweden	11.8	12.4	15.0	14.5	6.2	7.9	9.0
UK	4.5	5.2	5.5	4.1	6.0	7.0	8.3
Average	8.9	9.0	13.0	13.6	6.4	8.2	9.3

Source: OECD (1997); A: health care costs grow in line with GDP, B: health care costs grow one percent faster than GDP.

Table 6.5: Generational Accounts of Some Selected Member States of the EU (baseline, thousands of 1995-ECU)

Generation's Age in 1995	Austria	Belgium	Denmark	Finland	France	Germany	Italy	Ireland	Netherlands	Spain	Sweden	UK	Average
-1	119.4	-16.9	-12.6	71.6	21.4	82.6	76.8	-6.7	-12.5	62.0	36.1	29.8	37.6
0	-17.8	-29.1	-55.0	-83.2	-59.8	-35.1	11.0	-4.9	-52.8	-12.3	-99.0	-35.2	-39.4
5	-12.1	-5.3	-32.3	-42.4	-41.9	-11.7	25.9	5.2	-38.2	-6.0	-79.6	-25.2	-22.0
10	15.9	28.9	15.3	-16.8	-14.1	30.8	56.2	20.5	-2.6	6.0	-29.5	-5.9	8.7
15	57.5	78.3	66.4	25.5	28.4	79.3	98.8	37.4	39.9	20.2	22.1	17.5	47.6
20	81.3	134.0	121.0	63.7	75.4	118.8	122.2	49.4	83.8	37.0	78.5	36.5	83.5
25	78.7	161.0	142.7	87.4	98.2	130.7	119.4	49.8	106.7	50.1	104.9	48.4	98.2
30	62.6	146.0	141.3	80.5	93.4	116.6	97.3	31.8	100.5	52.7	111.4	48.4	90.2
35	39.0	118.0	126.9	63.2	81.9	86.3	65.0	17.5	84.2	47.3	105.2	40.3	72.9
40	11.5	82.9	94.6	29.2	55.6	44.1	11.8	8.7	59.7	33.7	84.5	25.4	45.1
45	-32.2	39.3	46.7	-11.5	20.9	-8.2	-27.3	-2.6	28.4	10.7	49.1	3.7	9.8
50	-83.7	-12.4	-14.7	-67.3	-32.5	-73.2	-69.2	-16.6	-9.3	-23.4	0.4	-22.2	-35.3
55	-148.3	-66.7	-67.7	-127.3	-90.0	-138.2	-110.9	-33.0	-48.2	-60.6	-61.2	-50.4	-83.5
60	-206.1	-102.0	-126.2	-159.4	-116.2	-194.4	-143.8	-48.3	-82.5	-91.8	-119.0	-69.8	-121.6
65	-211.2	-114.0	-146.0	-163.8	-135.1	-205.7	-157.1	-58.5	-110.2	-111.0	-152.0	-77.1	-136.8
70	-191.8	-110.0	-154.6	-148.6	-120.5	-182.2	-151.4	-54.2	-113.8	-109.4	-152.9	-73.8	-130.3
75	-167.5	-98.4	-158.0	-133.3	-98.4	-153.1	-130.2	-46.2	-115.0	-96.6	-139.6	-63.6	-116.7
80	-136.1	-84.9	-161.6	-114.7	-77.9	-121.0	-101.9	-38.9	-112.8	-80.0	-122.3	-51.7	-100.3
85	-106.0	-70.0	-161.0	-101.8	-59.2	-92.7	-76.2	-32.7	-105.8	-64.4	-100.1	-41.6	-84.3
90	-81.6	-55.5	-152.5	-83.3	-44.2	-68.8	-55.5	-28.0	-94.4	-48.9	-78.5	-29.0	-68.4
95	-59.7	-42.9	-113.4	-64.9	-31.3	-47.9	-38.8	-21.0	-80.3	-30.0	-58.4	-13.ss	-50.1
100	-23.2	-16.1	-39.5	-24.5	-10.6	-16.9	-14.6	-7.9	-31.7	-12.2	-20.0	5.3	-17.7

Source: Country Studies in European Commission (1999)

Table 6.6: Scaled Generational Accounts of Some Selected Member States of the EU (baseline, thousands of 1995 ECU, Scaled by Per Capita ECU as a Percent of EU Average)

Generation's Age in 1995	Austria	Belgium	Denmark	Finland	France	Germany	Italy	Ireland	Netherlands	Spain	Sweden	UK	Average
-1	99.9	-15.3	-9.2	69.0	19.5	67.4	96.2	-9.4	-11.6	103.9	32.8	43.3	40.5
0	-14.9	-26.4	-40.0	-80.2	-54.5	-28.6	13.8	-6.9	-49.2	-20.6	-90.0	-51.2	-37.4
5	-10.1	-4.8	-23.5	-40.9	-38.2	-9.5	32.4	7.3	-35.6	-10.1	-72.3	-36.6	-20.2
10	13.3	26.2	11.1	-16.2	-12.8	25.1	70.4	28.8	-2.4	10.1	-26.8	-8.6	9.9
15	48.1	71.0	48.3	24.6	25.9	64.7	123.8	52.6	37.1	33.8	20.1	25.4	48.0
20	68.0	121.5	88.1	61.4	68.7	96.9	153.1	69.5	78.0	62.0	71.3	53.1	82.6
25	65.8	146.0	103.9	84.3	89.5	106.7	149.6	70.1	99.3	83.9	95.3	70.4	97.1
30	52.4	132.4	102.9	77.6	85.1	95.1	121.9	44.7	93.6	88.3	101.2	70.4	88.8
35	32.6	107.0	92.4	60.9	74.6	70.4	81.4	24.6	78.4	79.2	95.6	58.6	71.3
40	9.6	75.2	68.9	28.2	50.7	36.0	14.8	12.2	55.6	56.5	76.8	36.9	43.4
45	-26.9	35.6	34.0	-11.1	19.0	-6.7	-34.2	-3.7	26.4	17.9	44.6	5.4	8.4
50	-70.0	-11.2	-10.7	-64.9	-29.6	-59.7	-86.7	-23.4	-8.7	-39.2	0.4	-32.3	-36.3
55	-124.1	-60.5	-49.3	-122.8	-82.0	-112.8	-138.9	-46.4	-44.9	-101.5	-55.6	-73.3	-84.3
60	-172.4	-92.5	-91.9	-153.7	-105.9	-158.6	-180.1	-68.0	-76.8	-153.8	-108.1	-101.5	-121.9
65	-176.7	-103.4	-106.3	-158.0	-123.1	-167.9	-196.8	-82.3	-102.6	-186.0	-138.1	-112.1	-137.8
70	-160.5	-99.7	-112.6	-143.3	-109.8	-148.7	-189.7	-76.3	-105.9	-183.3	-138.9	-107.3	-131.3
75	-140.1	-89.2	-115.0	-128.5	-89.7	-124.9	-163.1	-65.0	-107.1	-161.8	-126.9	-92.5	-117.0
80	-113.9	-77.0	-117.7	-110.6	-71.0	-98.7	-127.7	-54.7	-105.0	-134.0	-111.1	-75.2	-99.7
85	-88.7	-63.5	-117.2	-98.2	-53.9	-75.6	-95.5	-46.0	-98.5	-107.9	-91.0	-60.5	-83.0
90	-68.3	-50.3	-111.0	-80.3	-40.3	-56.1	-69.5	-39.4	-87.9	-81.9	-71.3	-42.2	-66.5
95	-49.9	-38.9	-82.6	-62.6	-28.5	-39.1	-48.6	-29.5	-74.8	-50.3	-53.1	-18.9	-48.1
100	-19.4	-14.6	-28.8	-23.6	-9.7	-13.8	-18.3	-11.1	-29.5	-20.4	-18.2	7.7	-16.6

Source: Country Studies in European Commission (1999)

Table 6.7: Minima and Maxima in the Generational Accounts

	Unscaled Accounts		Absolute	Scaled Accounts	
	Minimum	Maximum	Ratio	Minimum	Maximum
Austria	-211.2	81.3	2.6	-176.7	68.0
Belgium	-114.0	161.0	0.7	-103.4	146.0
Denmark	-161.6	142.0	1.1	-117.7	103.9
Finland	-163.8	87.4	1.9	-158.0	84.3
France	-135.1	98.2	1.4	-123.1	89.5
Germany	-205.7	130.7	1.6	-167.9	106.7
Italy	-157.1	122.2	1.3	-196.8	153.1
Ireland	-58.5	49.8	1.2	-82.3	70.1
Netherlands	-115.0	106.7	1.1	-107.1	99.3
Spain	-111.0	52.7	2.1	-186.0	83.9
Sweden	-152.9	111.4	1.4	-138.9	101.2
UK	-77.1	48.4	1.6	-112.1	70.4
Average	-138.6	99.3	1.5	-139.2	98.0

(thousands of 1995 ECU)

Table 6.8: Measuring Generational Balance

	Percentage Difference (pi)	Abs. Difference (th. of ECU)	Incr. All Taxes For Fut. Gen. (%)	Incr. All Taxes (% of GDP)	True Liabilities (% of GDP)
Austria	350.1	137.2	82.7	6.5	192.5
Belgium	20.0	12.2	6.7	0.6	18.8
Denmark	-6.3	42.4	20.3	2.3	71.2
Finland	-520.1	154.8	91.5	8.8	253.2
France	1540.2	81.2	56.9	4.3	136.0
Germany	158.6	117.7	58.9	4.7	136.0
Italy	139.3	65.8	53.2	4.0	107.3
Ireland	6.3	-1.8	-1.7	-0.1	-4.3
Netherlands	113.2	40.3	25.1	2.5	75.9
Spain	477.8	74.3	106.5	5.1	151.9
Sweden	-1446.1	135.1	74.0	7.6	236.5
UK	-6928.9	65.1	74.0	6.0	184.8
Average	-508.0	77.0	54.0	4.4	130.0
Deviation from Average, in Percent					
Austria	-168.9	78.1	53.1	49.1	48.1
Belgium	-103.9	-84.2	-87.6	-86.2	-85.5
Denmark	-98.8	-45.0	-62.4	-47.2	-45.2
Finland	2.4	101.0	69.4	101.9	94.8
France	-403.2	5.4	5.4	-1.3	4.6
Germany	-131.2	52.8	9.1	7.8	4.6
Italy	-127.4	-14.6	-1.5	-8.2	-17.5
Ireland	-101.2	-102.3	-103.1	-102.3	-103.3
Netherlands	-122.3	-47.7	-53.5	-42.6	-41.6
Spain	-194.1	-3.5	97.2	17.0	16.9
Sweden	184.7	75.4	37.0	74.4	81.9
UK	1264.0	-15.5	37.0	37.7	42.2

Source: Country Studies in European Commission (1999)

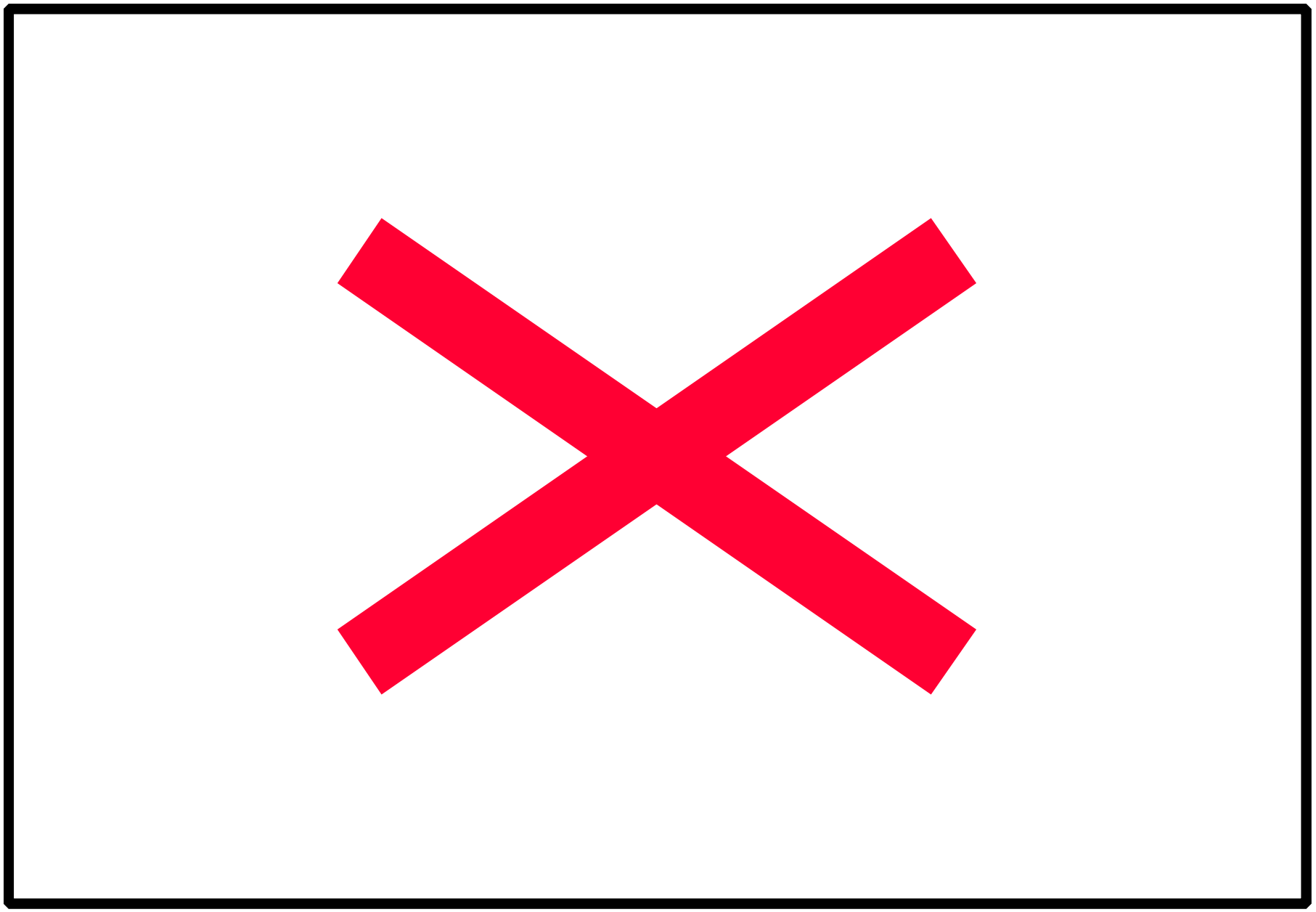

Table 6.9: Sources of Generational Balance

	Baseline Results	No Explicit Debt	No Demo-graphic Change
Austria	6.5	4.8	2.3
Belgium	0.6	-3.5	-1.7
Denmark	2.3	-2.7	-1.7
Finland	8.8	9.1	3.8
France	4.3	1.4	1.6
Germany	4.7	2.2	-0.3
Italy	4.0	0.0	-2.8
Ireland	-0.1	-2.5	-0.9
Netherlands	2.5	0.4	-0.8
Spain	5.1	2.5	2.9
Sweden	7.6	6.4	5.1
UK	6.0	4.3	4.8
Average	4.4	2.4	1.0

Increase in All Taxes Necessary to Restore Generational Balance,

Percent of GDP

Source: Country Studies in European Commission (1999)

Table 6.10: Reforming Public Pension Schemes in Spain, Denmark and Finland

	Spain		Denmark		Finland	
Generations' Age in 1995	Baseline	Toledo Agreement	Baseline	Increasing Ret.Age	Baseline	Increasing Contribution
0	-12.3	-11.4	-55.0	-53.3	-83.2	-71.8
5	-6.0	-5.0	-32.3	-30.3	-42.4	-30.2
10	6.0	7.2	15.3	17.8	-16.8	-4.1
15	20.2	21.7	66.4	69.3	25.5	38.0
20	37.0	38.7	121.0	124.4	63.7	75.4
25	50.1	52.2	142.7	146.8	87.4	97.6
30	52.7	55.1	141.3	146.2	80.5	88.9
35	47.3	50.1	126.9	132.6	63.2	69.7
40	33.7	37.0	94.6	101.5	29.2	33.7
45	10.7	14.4	46.7	55.0	-11.5	-8.7
50	-23.4	-19.2	-14.7	-4.7	-67.3	-66.0
55	-60.6	-57.5	-67.7	-55.4	-127.3	-126.8
60	-91.8	-91.8	-126.2	-126.2	-159.4	-159.4
65	-111.0	-111.0	-146.0	-146.0	-163.8	-163.8
70	-109.4	-109.4	-154.6	-154.6	-148.6	-148.6
75	-96.6	-96.6	-158.0	-158.0	-133.3	-133.3
80	-80.0	-80.0	-161.6	-161.6	-114.7	-114.7
85	-64.4	-64.4	-161.0	-161.0	-101.8	-101.8
90	-48.9	-48.9	-152.5	-152.5	-83.3	-83.3
95	-30.0	-30.0	-113.4	-113.4	-64.9	-64.9
100	-12.2	-12.2	-39.5	-39.5	-24.5	-24.5
Future Gen.	62.0	54.0	-12.6	-22.2	71.6	49.6
Absolute Diff.	74.3	65.4	42.4	31.1	154.8	121.4
True Gov. Debt % of GDP	151.9	133.7	71.2	52.0	253.2	199.8

(thousands of 1995 ECU)

Source: Berenguer et al (1999), Jensen and Raffelhüschen (1999) and Feist et al (1999)

Table 6.11: Reforming Social Insurances in Germany

Generation's Age in 1995	Baseline Account	Increasing Contributions	Decreasing Transfers	Partial Funding
0	25.2	43.4	34.8	39.1
5	35.8	57.4	46.1	51.8
10	45.8	71.5	57.5	64.5
15	57.6	88.0	70.7	79.4
20	66.9	101.3	81.4	91.4
25	61.1	96.3	77.4	86.9
30	44.4	77.9	62.6	70.3
35	20.1	50.6	40.7	45.7
40	-10.6	15.5	12.5	14.0
45	-47.6	-27.0	-21.7	-24.4
50	-91.0	-76.7	-61.6	-69.2
55	-137.7	-129.8	-104.3	-117.1
60	-182.9	-180.5	-145.1	-162.8
65	-191.3	-191.0	-153.5	-172.3
70	-167.0	-167.0	-134.2	-150.6
75	-139.1	-139.1	-111.8	-125.5
80	-109.3	-109.3	-87.8	-98.6
85	-83.2	-83.2	-66.9	-75.1
90	-61.6	-61.6	-49.5	-55.6
95	-42.9	-42.9	-34.5	-38.7
100	-15.0	-15.0	-12.1	-13.6
Increase in All Taxes (percent)	125.7	0.0	0.0	0.0
Future Gen.	120.7	43.4	34.8	39.1
Abs. Diff.	95.5	0.0	0.0	0.0
Soc. Ins. Liab. percent of GDP	114.3	0.0	0.0	0.0

(thousands of 1995 ECU)

Source: Raffelhüschen and Walliser (1999)

[1] Cf. Keuschnigg et al (1999) for Austria, Dellis and Lüth (1999) for Belgium, Jensen and Raffelhüschen (1999) for Denmark, Feist et al (1999) for Finland, Crettez et al (1999) for France, Bonin et al (1999) for Germany, Franco and Sartor (1999) for Italy, McCarthy and Bonin (1999) for Ireland, Bovenberg and ter Rele (1999) for the Netherlands, Berenguer et al (1999) for Spain, Lundvik et al (1999) for Sweden, and Cardarelli and Sefton (1999) for the United Kingdom. The studies can be found in a special issue of European Economy titled "Generational Accounting in Europe" [cf. European Commission (1999)]. See also Martinez et al (1999) for an executive summary and Raffelhüschen (1999) for a brief methodological description.

[2] See Börsch-Supan (1991) or Franco and Munzi (1997) for a more detailed discussion of the double-aging phenomenon.

[3] Gross fertility figures for 1995 are taken from the respective official statistics. The numbers for 2015 reflect the fertility assumptions which were employed in the cross-country studies presented below. They rest either on official projections of the national Bureaus of Census or on the assumptions of the national experts of the EU study.

[4] The most striking deviation from the average is the case of Denmark where no significant rise in life expectancy has been observed in the recent past. This is why the figure has also been held constant for future periods in our calculations.

[5] As compared to Japan this is slightly less, while the figures for the US are much more moderate; see Kotlikoff and Leibfritz (1998).

[6] Not only the dependency ratios, but also the sex composition of the population aged 60+ could be of considerable importance when it comes to projecting social expenditure or calculating the intergenerational redistribution of today's fiscal policy in an aging society. Of course, females outnumber males significantly due to their higher life expectancy (see above). At present, there are

on average slightly less men than women in the first decile of the sub-group of elderly while two out of three European oldest-old are females. In the future, these proportions will stay approximately constant in Europe.

[7] For example, the Finnish recession was especially strong due to the total breakdown of former trade patterns to the East European countries. Another exceptional development is found in Germany with respect to the unification-induced delay in joining the world-wide recession of the early 1990s.

[8] As shown in Raffelhüschen (1997) for the Norwegian example, the results of generational accounting calculations are especially sensitive to the state of the business cycle. Hence, it is of particular importance for a cross-country comparison, that the covered studies refer to a base-year which displays a similar overall growth pattern.

[9]For a brief description of generational accounting's method see, for instance, AGK (1994). A critical survey on the underlying theoretical conventions and empirical issues involved is found in Haveman (1994), CBO (1995) and Diamond (1996). Buiter (1995), Fehr and Kotlikoff (1997), and Raffelhüschen and Risa (1997) emphasize in particular the importance of macroeconomic repercussions and static incidence assumptions. The method employed in this paper follows the standards developed in the European Commission's project [cf. Raffelhüschen (1999)].

[10] Of course, every econometric textbook outlines the problems of this educated guesstimate. Given the fact that sufficient panel data are not yet available for most countries, the procedure might nevertheless be taken as a preliminary second-best approximation.

[11] A similar approach is found in Kotlikoff and Walliser (1995).

[12] The basic idea of this approach is to treat future and current generations absolute identically. Thus we assume that future generations are facing the same fiscal policy as currently living agents.

Auerbach (1997) provides first insights in this particular treatment; the basic idea was also first mentioned by Alan Auerbach - in an e-mail.

[13] See, for example, the Danish country study found in Jensen and Raffelhüschen (1997). Another serious problem in measuring intergenerational redistribution with the help of the percentage difference π occurs whenever post-base-year migration is considered as simply augmenting the residential cohorts already alive in the base-year. Cf. Bonin et al (1997) for details.

[14] For example, Schnabel (1998) provides for a calculation of internal rates of return from Social Security contributions for current living generations in Germany.

[15] The ranking in the imbalance in fiscal policy would be in this case (from high to low): Spain, Finland, Austria, Sweden, the UK, Germany, France, Italy, the Netherlands, Denmark, Belgium and Ireland.

[16] The ranking in the imbalance in fiscal policy would be in this case (from high to low): Finland, Austria, Sweden, Germany, France, Spain, Italy, UK, Denmark, Netherlands, Belgium and Ireland.

[17] An enumerative description of the actual institutional settings can be found in Franco and Munzi (1996), Part II.

[18] For example, in Italy the pension reform reduced the true liabilities from 181.4 percent to the baseline figure of 103.7 percent of GDP. This optimistic point of view corresponds to a mere abolition of implicit liabilities in the Italian case study.

[19] As shown by Breyer and Straub (1993) and Raffelhüschen (1993), the argument does not hold since paygo systems tend to distort the labor-leisure choice. Kotlikoff, Smetters and Walliser (1998) provide for similar experiments for the U.S.

[20] The effective retirement age is on average 58. The standard retirement age for unemployment pensions and disability retirement was progressively increased from 55 to 58 until 1998.

[21] The study on generational contracts in Germany draws from Raffelhüschen and Walliser (1999). In order to calculate separate generational accounts solely, the respective profiles for contributions and transfers of Social Security, health care and long-term care are taken into account. Federal grants to Social Security are neglected because in 1995 they corresponded to the non-insurance related expenditures. Overall, federal grants display the same incidence as the taxes necessary to finance them.

[22] Note that all these results are very optimistic since they assume that per-capita medical expenditure grows in line with the GDP. See also Table 4 for a health care expenditure projection under alternative growth rates for the costs of treatment.