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Generational accounting in Europe

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Abbreviations and symbols used

Member States

B	Belgium
DK	Denmark
D	Germany
EL	Greece
E	Spain
F	France
IRL	Ireland
I	Italy
L	Luxembourg
NL	The Netherlands
A	Austria
P	Portugal
FIN	Finland
S	Sweden
UK	United Kingdom
WD	West Germany

EU	European Union
EU-12–	European Community, 12 Member States excluding East Germany
EU-12+	European Community, 12 Member States including East Germany
EU-15	European Community, 15 Member States
EUR-11	Group of 11 Member States participating in monetary union (B, D, E, F, IRL, I, L, NL, A, P, FIN)

Currencies

ECU	European currency unit
EUR	Euro
ATS	Austrian schilling
BEF	Belgian franc
DEM	German mark (Deutschmark)
DKK	Danish krone
ESP	Spanish peseta
FIM	Finnish markka
FRF	French franc
GBP	Pound sterling
GRD	Greek drachma
IEP	Irish pound (punt)
ITL	Italian lira
LUF	Luxembourg franc
NLG	Dutch guilder
PTE	Portuguese escudo
SEK	Swedish krona
CAD	Canadian dollar
CHF	Swiss franc
JPY	Japanese yen
SUR	Russian rouble
USD	US dollar

Other abbreviations

CPI	Consumer price index
ECB	European Central Bank
ECSC	European Coal and Steel Community
EDF	European Development Fund
EIB	European Investment Bank
EMCF	European Monetary Cooperation Fund
EMS	European Monetary System
EMU	Economic and monetary union
ERM	Exchange rate mechanism
Euratom	European Atomic Energy Community
Eurostat	Statistical Office of the European Communities
FDI	Foreign direct investment
GDP (GNP)	Gross domestic (national) product
GFCF	Gross fixed capital formation
HICP	Harmonised index of consumer prices
ILO	International Labour Organisation
IMF	International Monetary Fund
LDCs	Less developed countries
Mio	Million
Mrd	1 000 million
NCI	New Community Instrument
OCTs	Overseas countries and territories
OECD	Organisation for Economic Cooperation and Development
OPEC	Organisation of Petroleum Exporting Countries
PPS	Purchasing power standard
SMEs	Small and medium-sized enterprises
VAT	Value added tax
:	Not available
–	None

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1. Generational accounting in Europe: an overview

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1.1. Introduction

In 1996 the European Commission launched a round of studies entitled 'Generational accounting in Europe'. In a first (pilot) study a unified method was developed in order to calculate comparable generational accounts for the Member States of the European Union. In particular, the pilot study identified and evaluated available statistical sources in the EU Member States. In addition, complete generational accounts were calculated for three European countries: Denmark, Germany and Spain.

On the basis of the pilot study which was finished at the end of 1997 a second round of studies was launched in 1998. This time generational accounts were calculated for Belgium, France, Ireland, Italy, the Netherlands, Austria, Finland, Sweden and the United Kingdom. Generational accounts, based on a uniform method, are now available for 12 Member States of the European Union. For the time being it does not seem possible to enlarge the project to Greece and Portugal due to data restrictions or standardisation problems, respectively ([3]). In the case of Luxembourg it is not advisable to undertake generational accounting since the tax and transfer incidence assumptions on which the method is based are unlikely to hold for such a small country.

All 12 studies refer to the base-year 1995. For reasons of data availability and so as to ensure full comparability between the studies it was not possible to base the analysis on a more recent year. When interpreting the generational accounts it should therefore be kept in mind that the results reflect the implications of the fiscal policy of 1995 and those legal changes for later years which had already been decided on by that time. As we know, several countries enacted tax and social security reforms after 1995, some of them in connection with the Maastricht process. These reforms might well have changed the generational accounts significantly. In order to get an idea of the changes that could be expected due to reforms since 1995 some country studies include simulations of policy changes and reforms which were under discussion at the time the studies were being prepared.

Generational accounts are sensitive to the economic situation prevailing in the base-year since the method extrapolates important aspects of the economic situation (e.g. unemployment) into the indefinite future. The choice of the base-year might, thus, have a favourable or adverse effect on generational accounts. For a complete evaluation of the intergenerational stance of fiscal policy it seems therefore desirable to calculate generational accounts on a regular basis.

1.2. Population ageing and budgetary policy in EMU

Generational accounting is an instrument for identifying the long-term implications of current fiscal and social policy. Taking into account the future demographic development, generational accounting shows which effects a prolongation of a given policy will have on the tax and transfer payments of living as well as future generations. In particular, generational accounts show whether the tax and transfer-policy of a selected base-year can be maintained into the indefinite future or whether sooner or later adjustments will be necessary in order to meet the government's intertemporal budget constraint. Generational accounting explicitly addresses the problems that demographic change can pose for fiscal and social policy. However, some EU countries are not yet fully preparing for the financial burden induced by population ageing. A possible reason could be that the quantification of these effects poses a number of diffi-

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([3]) Recently a Portuguese country study has been published, cf. Auerbach, Braga de Macedo et al (1999). Despite the methodological differences used in the generational accounting calculations and, presumably, in the underlying population projection, which prevent ready comparability of the results, we will refer to this study in our international comparison for the sake of information.

culties. It is therefore important that studies quantifying these effects are carried out and brought to the attention of EU policy-makers.

1.3. The generational accounting method

The starting point of generational accounting is the intertemporal budget constraint of the entire public sector (for the sake of brevity we will usually speak of the government). The constraint states that all present and future government expenditures (transfers, investment, debt service etc.) must be covered either by government net wealth or by present and future taxes and social insurance contributions. All expenditures and revenues are discounted to a base-year in order to make payments which occur at different points in time comparable.

The basic message of the intertemporal budget constraint can also be stated in terms of current and future generations' net tax burdens. Specifically, government net debt must equal the sum of discounted net taxes (in a wider sense, i.e. including all social insurance contributions) paid by members of living or future generations.

The value of government net debt can be obtained from official statistics. In principle, this is also true for net tax payments although several adjustments and estimates are necessary. By combining macro-statistics on government's revenues and expenses with micro-statistics on household income and expenditure, age-profiles are calculated. These profiles show, for each gender and age group, the net tax payment (or transfer) of a representative individual in the base-year.

The next step in the calculation of generational accounts is to assume that the age and gender profiles of presently living generations will not change. For example, a 30-year-old man will, in 10 years, pay an annual amount of net taxes which equals the net taxes paid by a 40-year-old man today — taking into account, of course, productivity growth in these 10 years. This assumption implies that base-year fiscal policy is extrapolated into the indefinite future. The only exception from this rule are those legal changes which have already been decided upon in the base-year. The effects of these policy measures on the development of age-specific payments are taken into account. Combining projected age-profiles with the projected population structure one derives the rest-of-life net tax burden of living generations, an integral part of the government's intertemporal budget constraint. The generational account of a certain gender and age group is defined as the sum of discounted net tax payments that an individual of this specific gender and age faces over the remaining life-span. It should be stressed up front that, due to the forward-looking nature of generational accounting, the accounts of existing generations cannot be compared. The accounts of old people will look more favourable than those of middle-aged persons, given that the accounts of retirees do not contain many of the taxes and social insurance contributions the active population has to pay. The generation born in the base-year is recorded over the entire life cycle and therefore exhibits the most comprehensive generational account. From the government's intertemporal budget constraint we can now calculate the net tax burden of future generations as a residual. However, we are interested in the net taxes paid by a representative individual of future generations rather than the aggregate of future generations' net taxes. In order to arrive at this figure it is assumed that (a) all future generations face the same accounts if these accounts are discounted to the time of their birth (and adjusted for productivity growth) and (b) the ratio of the male and female account remains constant at its base-year level. These assumptions allow the calculation of the account of a representative future individual. A generational imbalance exists if the accounts of a base-year newborn and the growth adjusted account of a future newborn deviate.

Obviously, the calculation of generational accounts requires extensive and detailed data and a certain expertise to adjust what is available from several statistical sources in an appropriate way. Moreover, assumptions have to be made regarding the discount rate, the growth rate and the demographic development. The standard assumptions in the studies presented here are a discount rate of 5 % and a real growth rate of 1.5 %. These values are quite realistic. Nevertheless, all country studies include a sensitivity analysis which shows how the results would be affected if other parameters were used. Such alternative scenarios are indispensable since, unfortunately, generational accounts do not always react to parameter changes in a way that might be expected intuitively.

The demographic forecasts are based on data from national authorities and range over 200 years. Thereafter the effects of fiscal policy, due to discounting, are neglegible. While demographic scenarios are described in detail in the country studies, Table 1 gives dependency ratios for 1995, 2015 and 2035.

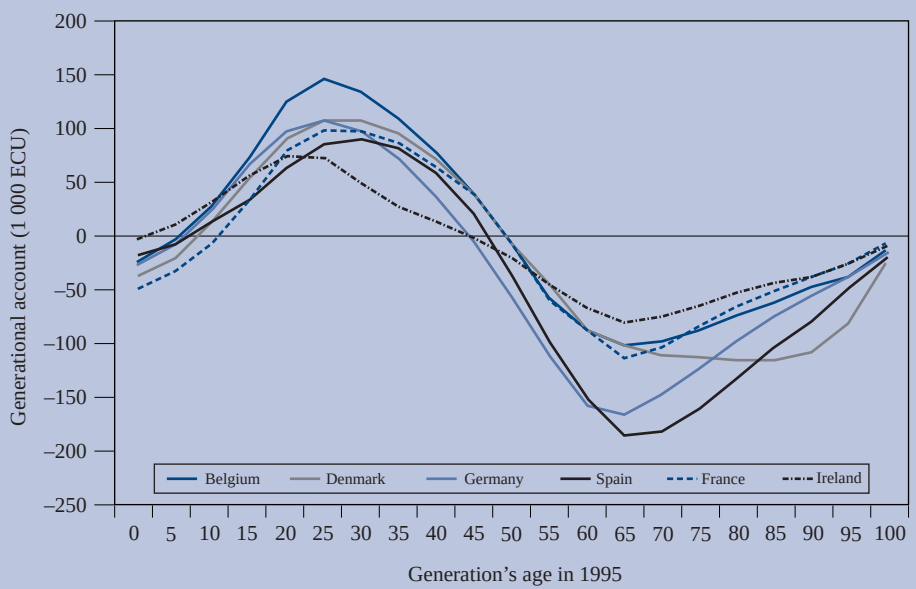
Table 1

Demographic assumptions and dependency ratios in the EU, 1995–2035

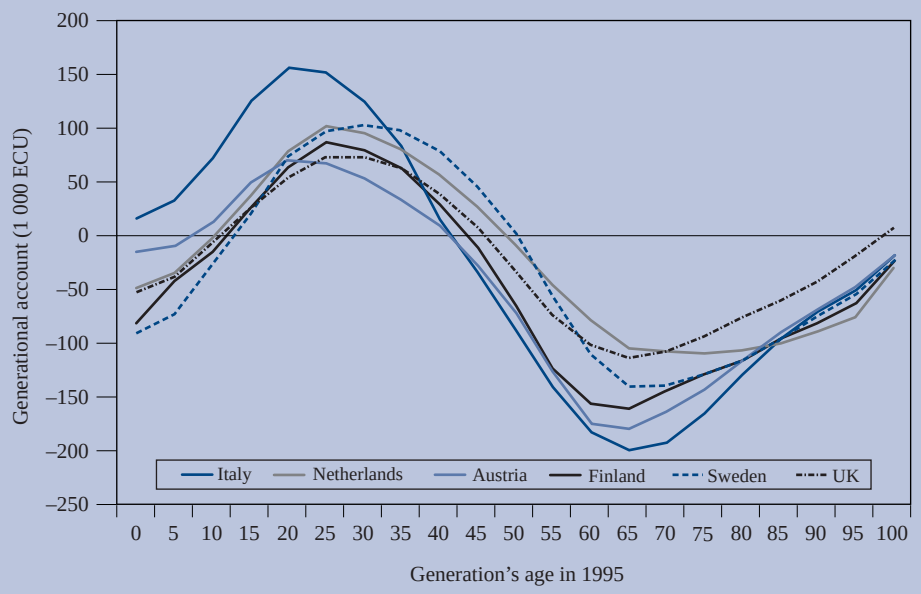
	Elderly dependency			Oldest-old dependency			Gross fertility		Life expectancy	
	1995	2015	2035	1995	2015	2035	1995	2015	1995	2015
B	39.0	45.3	60.5	11.2	15.6	21.8	1.6	1.8	79.8	81.1
DK	35.2	44.0	51.5	12.3	12.4	16.9	1.8	1.9	77.9	78.0
D	35.7	47.3	69.2	10.8	17.4	24.1	1.4	1.4	78.7	81.1
E	38.1	45.1	74.5	11.1	17.0	26.2	1.3	1.3	80.5	82.4
F	37.1	46.9	62.2	11.3	17.0	24.9	1.7	1.7	81.6	83.2
IRL	30.2	37.5	59.2	9.6	10.9	20.3	1.8	1.8	77.9	81.9
I	39.5	53.0	79.7	11.5	20.6	29.0	1.3	1.5	80.4	83.0
NL	30.5	43.6	65.3	9.6	12.9	23.6	1.5	1.7	80.3	83.0
A	34.7	42.3	66.2	10.7	14.1	22.4	1.4	1.5	79.0	81.6
FIN	34.0	51.7	60.9	10.3	15.6	25.1	1.8	1.8	80.5	82.0
S	41.4	54.9	66.8	15.4	19.5	28.8	1.7	1.8	81.5	83.3
UK	37.7	43.8	57.8	12.9	14.4	20.2	1.7	1.8	79.3	80.7

Clearly, there is an all-European ageing process for some countries even resulting in a doubling of the elderly dependency ratio until 2035. This is mainly due to low fertility rates in the past which are assumed to rise moderately over the next 20 years. Since at the same time, life expectancy increases by approximately one year per decade there is a significant double ageing process. In fact, the proportion of oldest-old among the elderly is increasing. This is indicated by an increase of the oldest-old dependency ratio which significantly exceeds the respective increase in the elderly dependency ratio in most of the selected Member States of the EU.

Graph 1: **A comparison of generational accounts within the EU**



Graph 2: **A comparison of generational accounts within the EU**



1.4. The generational accounts of living generations

1.4.1. General aspects

Graphs 1 and 2 show, for the 12 EU Member States covered by this study, rest-of-life net tax payments by age. Note that a negative value illustrates a net transfer from the State to the individual, while a positive figure indicates a net flow from individual to State. In order to make the absolute amounts comparable between the different countries they have been normalised by means of their 1995 per capita GDP. The common pattern can be explained by:

(a) the fact that generational accounts are strictly forward looking. Only the net taxes or transfers which an individual of a certain age group will pay or receive over his or her rest of life enter the accounts,

(b) the usual tax and transfer pattern which benefits very young and old people and taxes people during their working ages, and

(c) the discounting of future payments to the base-year.

While the first two points to a great extent explain the up-down-up movement of the curve, the actual amounts of taxes paid and benefits received determine the curvature and amplitude. Of course, discounting and the demographic trend also influence the shape of the curves. Clearly, all factors interact and there is no simple and straightforward way of disentangling their relative importance.

In most countries the accounts are, from the point of view of the newborn individual, roughly balanced. Often the newborn can even expect net transfer receipts. The present value of imminent schooling and education expenditure by the State which is, in this study, attributed to the young generation together with the strongly discounted old-age benefits more or less balance the expected tax payments during working age. As the young generation grows up, its members benefit less and less from the educational expenditure while the period of employment and tax payments approaches. Around the age of 25 the generational accounts reach a peak since a large part of the age group no longer profits from schooling expenditure while the old-age transfers are discounted too much to outweigh the imminent burden of taxes linked to employment or business activities.

At approximately the age of 45 the tax and contribution payments which the individual faces over the remaining lifetime are offset by old-age pensions, health care, and similar transfers from the State. Around the age of 60 to 65, i.e. the effective age of retirement, taxes are reduced significantly and people start receiving various old-age benefits. At this stage of the life cycle generational accounts exhibit the highest negative value. With increasing age, the generational accounts approach zero again due to declining life-expectancy.

While the basic pattern of benefiting from schooling expenditure, paying taxes during middle age and receiving old-age pensions towards the end of one's life is, quite expectedly, the same in all 12 countries there are some remarkable differences in the amplitudes, peaks and break-even points of the curves. In Belgium and Italy, for example, the amount of rest-of-life taxes to be paid by young persons is about 50 % higher than in the other countries and almost twice as high as in Ireland. While in most countries the peak of rest-of-life net taxes is reached in the mid-20s or even earlier, in Spain and Sweden those around 30 years of age face the highest burden.

There are also differences in the age at which discounted tax and transfer payments break even, with Austria (in the early 40s) and Sweden (at the age of 50) marking the two extremes. Especially remarkable is the diverging generosity of old-age payments. A representative Italian retiree of 65 can look forward to receiving net transfers of around ECU 200 000 (discounted and normalised) while his Irish counterpart will receive not even half this amount.

1.4.2. Gender-specific features

The generational accounts of the various age groups are influenced by a multitude of factors, e.g. life expectancy, occupational habits, retirement age etc. and, of course, by the State's fiscal and social policy. Although these factors differ from one Member State to another all countries show significant similarities in the divergence between male and female accounts.

In general, the male accounts are roughly balanced in many countries which means that a newborn male can expect to receive as much in transfers as he pays in taxes and social insurance contributions. On the other hand the generational accounts for females exhibit negative net tax payments (i.e. positive transfers) for the newborn generation in all EU Member States. Thus, a significant redistribution in terms of gender takes place. Various factors contribute to this result. First, the labour force participation rate of women is lower than that of men in most countries and women work more often in part-time jobs. Moreover, the earnings of women are, on average, lower than those of men. Of course, lower earnings also result in lower taxes and social insurance contributions, and to the extent that transfers (especially old-age pensions) are linked to contributions this also means that women will receive lower transfers. However, as a result of a higher life expectancy, women profit from these transfers six years longer than men, on average.

Table 2

Generational accounts of male and female newly born

(1 000 ECU)

	Average	Male	Female	Difference
Belgium	– 29.1	– 11.0	– 48.2	37.2
Denmark	– 55.0	– 18.7	– 93.0	74.3
Germany	– 35.1	2.0	– 74.2	76.2
Spain	– 12.3	6.4	– 32.4	38.8
France	– 56.2	n.a.	n.a.	n.a.
Ireland	– 4.9	14.0	– 25.0	39.0
Italy	11.0	34.2	– 13.6	47.8
Netherlands	– 52.8	n.a.	n.a.	n.a.
Austria	– 17.8	8.1	– 45.1	53.2
Finland	– 83.2	– 60.3	– 107.0	46.7
Sweden	– 99.0	– 65.6	– 133.8	68.2
UK	– 35.2	– 10.5	– 61.2	50.7

The differences between male and female accounts are also due to characteristics of the States' tax and transfer systems. The more taxes and contributions are linked to earnings the less redistribution between males and females will be observed. On the other hand redistribution will increase with the extent to which transfer payments are not linked to previous contributions but are given according to need. Finally, numerous specific transfers which are usually asserted by women, like, for example, maternity assistance, add to the redistribution.

These general remarks are corroborated by the detailed tables in the country studies which contain gender- (and age-) specific splits of the main tax and transfers categories. Generally, these tables show that men pay higher income taxes and receive higher contributions-related transfers. On the other hand women receive pension and health-care transfers for a longer time. As can be expected, the burden of indirect taxes is relatively equally distributed over men and women.

1.5. How to measure the intergenerational stance of fiscal policies

In all 12 countries in this study apart from Italy the net-tax payments of the newborn are negative. This means that these generations are more than compensated by educational expenditure and old-age transfers for the, often high, tax burden they face during working age. Consequently, the question arises whether there is a net demand of currently living generations and, if this is the case, who is stuck with the bill? Of course, future generations have to pay for these demands on future budgets. In fact, in many European countries there exist severe intergenerational imbalances between present and future generations.

One way to express the intergenerational imbalance is to compare the generational account of a newly (in the base-year) born with the account of a representative future individual. The absolute difference between these accounts constitutes the first indicator for intergenerational imbalances used in this study ([1]). Since the absolute amounts (which are calculated using the 1995 ecu exchange rate) are not directly comparable between countries of divergent economic strength Table 3 (fifth column) also gives scaled accounts using 1995 per capita GDP.

Apart from the absolute difference between present and future generations' accounts the present study relies on three further indicators for intergenerational imbalance:

(a) intertemporal public liabilities (IPL) or intertemporal debt;

([1]) As has been pointed out earlier, the results of the Portuguese country study are not directly comparable to results from the present project. However, a tentative comparison might nevertheless be drawn with respect to the absolute difference in generational accounts. According to the country study by Auerbach, Braga de Macedo et al (1999), which does not treat government consumption as a transfer, this difference amounts to about ECU 25 000 if education expenditure is regarded as a transfer, and about ECU 30 000 if it is not. This would place the intergenerational stance of the Portuguese fiscal policy somewhere between the Belgian and the Dutch ones.

Table 3

Generational (im)balances in Europe

	GA 1995	GA 1996	Absolute difference, 1 000 ECU	Absolute difference, scaled ECU	IPL (% of GDP)	Increase future taxes (%)	Increase all taxes (% of GDP)
B	– 29.1	– 16.9	12.2	11.1	18.8	6.7	0.6
DK	– 55.0	– 12.6	42.4	30.9	71.2	20.3	2.3
D	– 35.1	82.6	117.7	96.0	136.0	58.9	4.7
E	– 12.3	62.0	74.3	124.5	151.9	106.5	5.1
F	– 56.2	– 7.7	48.5	44.2	81.3	33.8	2.6
IRL	– 4.9	– 6.7	– 1.8	– 2.5	– 4.3	– 1.7	– 0.1
I	11.0	76.8	65.8	82.4	107.3	53.2	4.0
NL	– 52.8	– 12.5	40.3	37.5	75.9	25.1	2.5
A	– 17.8	119.4	137.2	114.8	192.5	82.7	6.5
FIN	– 83.2	71.6	154.8	149.3	253.2	91.5	8.8
S	– 99.0	36.1	135.1	122.8	236.5	74.0	7.6
UK	– 35.2	29.8	65.1	94.7	184.8	74.0	6.0

(b) the change in the tax burden of future generations necessary to balance the government's intertemporal budget constraint;

(c) the change in the tax burden of future and present generations necessary to balance the government's intertemporal budget constraint and, at the same time, balance present and future accounts.

The starting point of all three indicators is the following thought experiment: 'What would happen to the intertemporal government budget constraint if future generations faced the same fiscal policy as the newborn base-year generation?' To answer this question the aggregate net tax burden of future generations is not calculated as a residual (see above) but, in analogy to currently living generations, by multiplying the population's age distribution in future years with base-year age-profiles. If the intertemporal government budget constraint does not hold, present fiscal policy is unsustainable and present generations live at the expense of future generations.

The residual necessary to balance this constraint is called 'intertemporal public liabilities' and reveals all uncovered demands on future budgets. Although similar to the notion of public debt, it should not be confused with conventional government debt which is constituted by bank loans, government bonds etc. and, for this reason, is legally enforceable. Moreover, it should be kept in mind that intertemporal public liabilities as discussed here constitute a net debt whereas common government debt statistics (and, for example, the Maastricht criteria) provide gross figures.

Positive intertemporal public liabilities indicate that the intertemporal budget constraint does not hold. Of course, this can only be the case in arithmetic terms and not in reality. At some point in time there must be a change in fiscal policy. This idea is exploited in deriving two further indicators of fiscal imbalance.

The first is the percentage increase in future generations' taxes necessary to satisfy the government's intertemporal budget constraint. Note, that this is exactly the thought experiment underlying the calculation of future generations' accounts. The second is the percentage increase in taxes borne by both living and future generations that will balance the government budget. Given a broader tax base the percentage increase will of course be smaller in the second case. Furthermore, since future and present generations' burdens are identical before the tax increase, they will also be identical thereafter. Consequently, the second thought experiment not only satisfies the government's budget but at the same time warrants that burdens are shared equally by presently living and future generations. At times, the previous experiment is formulated slightly differently. Instead of asking which increase in taxes on present and future generations is necessary to balance the budget constraint, it is asked which transfer cut leads to a sustainable fiscal policy. As can be expected, the effects of an increase in taxes and a cut in transfers on the accounts of present generations differ strongly. While the former mainly affects the young and middle-aged the latter mainly hits the old.

It should be emphasised that these indicators must not be misunderstood as policy recommendations. If the generational accounts show that an increase of x% in current and future taxes would restore generational balance this does not mean that such an increase should be enacted. Indeed, in most European States tax cuts instead of tax increases seem to be called for. Were taxes indeed raised to the extent that is indicated, strong negative repercussions on the economies concerned might be the result and the intergenerational situation could even be aggravated. Whenever 1995 fiscal policy disfavours future generations, restoring fiscal balance requires a mix of various policy measures taking into account the country's specific circumstances.

1.6. Generational imbalances in Europe

The study 'Generational accounting in Europe' found that the 1995 fiscal policies created generational imbalances in all countries but Ireland. For Belgium (and with some qualifications also for Denmark and the Netherlands) the imbalances might be regarded as comparatively small. For the other eight countries covered by the study, however, the present fiscal policy in conjunction with demographic trends will, if no corrections are made, lead to a redistribution to the disadvantage of future generations.

As explained earlier, intergenerational imbalance is indicated by a positive amount of intertemporal public liabilities (IPL). Only in Ireland does there exist a small 'intertemporal wealth'. For the other countries the ratio of IPL to GDP ranges from 18.8% (Belgium) to 253.2% (Finland). IPL can be thought of as consisting of explicit government debt, i.e. the figure which can be derived

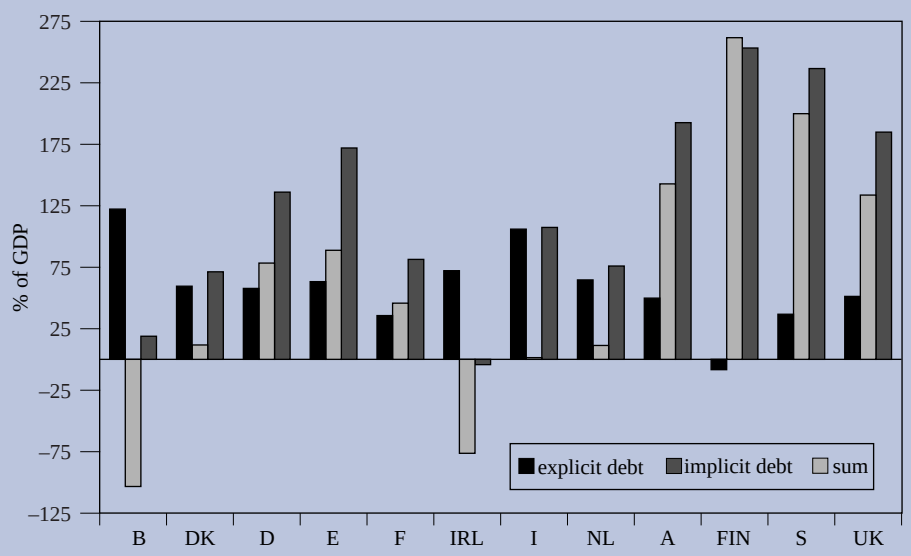
Table 4

Reasons for intergenerational imbalance

	Intertemporal public liabilities		
	Baseline	Explicit debt = 0	No demographic change
B	18.8	– 103.4	– 52.0
DK	71.2	11.7	4.2
D	136.0	78.3	– 11.1
E	151.9	88.7	37.6
F	81.3	45.7	48.3
IRL	– 4.3	– 76.4	– 27.6
I	107.3	1.3	– 87.3
NL	75.9	11.3	– 22.9
A	192.5	142.7	67.7
FIN	253.2	261.6	114.1
S	236.5	199.8	154.5
UK	184.8	133.6	144.8

from official statistics, and implicit government debt, the difference between IPL and explicit government debt. It is of some interest to have a closer look at the size of explicit versus implicit debt (Graph 3). In six cases (Germany, Spain, France, Austria, Sweden and the United Kingdom) we observe an explicit debt which is increased by an even bigger implicit debt. In Denmark, Italy and the Netherlands the implicit debt is comparatively small and does not significantly change the situation as assessed by the official debt figures. In the cases

Graph 3: **The composition of intertemporal public liabilities (IPL)**



of Belgium and Ireland a relatively high official debt is largely or even totally balanced by a redistribute policy in favour of future generations. Finland is in a unique situation as a small positive official government net wealth is offset by a high implicit debt. In sum, explicit and implicit debt result in the highest IPL in Europe.

Implicit debt or intertemporal public liabilities are relatively abstract measures since they are counterfactual. The increase in taxes which future generations will face if the fiscal adjustment is completely up to them might be a more illustrative indicator for fiscal imbalance. Without changes for present generations in Spain, Austria and Finland the tax payments of future generations will have to double. In Germany, France, Italy, Sweden and the United Kingdom future tax increases range from around 55 to 75%, and in Denmark and the Netherlands tax payments will increase by about 20%. In Belgium the increase will be comparatively moderate (6.7%) and in Ireland future generations will even pay less taxes.

If present generations do not want to leave the burden of fiscal adjustment solely to their descendants, present as well as future taxes might be increased. In line with the other indicators it turns out that only relatively moderate adjustment would be necessary in Belgium, Denmark and the Netherlands (around 1 to 2 percentage points of GDP). In most countries the increase necessary for restoring generational balance is around 4 percentage points of GDP, in Austria and Sweden, whose tax quota is already the highest in Europe, an adjustment would require an increase of more than 7 percentage points and in Finland even 8.8 points. In Ireland, on the other hand, the tax quota could even be marginally reduced. Of course, similar reductions or, in the case of Ireland, increases in the public expenditure to GDP ratio are possible to restore generational balance and in many countries the strategy of reducing the public sector might, in fact, work out more efficiently.

Belgium has the highest explicit debt among the 12 countries covered by the study (note again that the definition of this debt is not equal to the Maastricht criterion). However, taking into account the long-run implications of the 1995 fiscal policy changes, the prospects change completely, as Dellis and Lüth found in their generational accounts for Belgium. Since the early 1980s Belgian governments have tried to cut back the high national debt incurred in the decades before. As early as 1984 fiscal policy in Belgium resulted in a primary surplus which has been increased to almost 6% of GDP in the late 1990s. If a similar policy will be conducted in the future a substantial reduction of explicit government debt can be expected.

Like most of the other European countries Belgium is facing an ageing problem. But although the demographic situation is presently somewhat worse than in other countries it is forecasted to improve in relative terms over the next decades. The explicit debt is so high, however, that its importance overshadows the great influence of demographic factors. This becomes obvious when contrasting the following hypothetical experiments. If the demographic structure of 1995 remained constant current fiscal policy would yield a substantial intertemporal wealth of more than 50% of GDP. But if the high explicit government debt is set to zero current fiscal policy even implies an intertemporal wealth which is twice as high as that.

The primary budget surpluses resulting from today's fiscal policy generates an implicit government net wealth of more than 100% of GDP. The Belgian State achieves this, in generational terms, rather favourable result by putting a tax burden on the presently productive (tax paying) population which, compared to other countries, is among the highest for men and exceptionally high for women (note that the latter might be a statistical artefact due to the missing of gender-specific profiles for several taxes and transfers). On the other hand transfers to the old are similar to those in other countries. Thus, currently living generations are already providing the funds with which a major part of the existing public debt can be repaid in the future.

Despite a favourable economic performance in recent years which has substantially reduced unemployment and contributed to the consolidation of government deficits, generational accounting indicates that fiscal policy in **Denmark** is generationally imbalanced. Intertemporal government finances are in comparatively good shape though. According to Jensen and Raffelhüschen the difference between the lifetime net tax burdens of a base-year-born agent and a representative member of future-born generations amounts to ECU 42 400. An immediate raise of the tax quota by 2.3 percentage points of GDP is projected as sufficient to restore fiscal sustainability.

Under status quo conditions, intertemporal public liabilities in Denmark total 71.2% of GDP, the larger part (59.5% of GDP) of which consists of net debt accumu-

lated prior to the base-year 1995. Only 11.7 % of GDP is added by maintaining the 1995 tax and government spending levels. As in most EU Member States, the current demographic situation in Denmark is advantageous regarding the revenue and spending situation of government budgets. Therefore, supposing that the 1995 demographic structure could stay unchanged, intertemporal public liabilities fall to 4.2 % of GDP.

The generational accounts presented for Denmark are special regarding the oldest-old (aged 80 or above) who are projected to receive considerably higher net transfers than in other countries. This result is mainly due to the age distribution of health-care transfers, which are particularly high towards the final years of life. Since the data base underlying the Danish generational accounts is better than usual regarding the fiscal position of the oldest-old, one might conclude that other countries would exhibit similar results, if more profound age-related fiscal data were available.

Policy tests of fiscal sustainability in Denmark show that, if the positive economic development of the first half of the 1990s continues, rising tax revenues and falling unemployment and social transfers might entail the possibility of redeeming a high share of government liabilities within a relatively short period, which would improve intergenerational balance significantly. Moreover, the findings of Jensen and Raffelhüschen suggest that a gradual increase of standard retirement age is perhaps sufficient to accumulate implicit government wealth, which can be used to redeem explicit government liabilities, thereby reducing intertemporal generational imbalance.

The generational accounts for **Germany** prepared by Bonin, Raffelhüschen and Walliser measure intertemporal public liabilities totalling 136.0 % of 1995 GDP, only 57.7 percentage points of which are explicit. In order to finance intertemporal public liabilities, future taxpayer generations are projected to pay 58.9 % higher taxes than present generations. Alternatively all tax payments, present and future, need to be increased by 4.7 percentage points of GDP. Without immediate corrective measures, future generations are projected to face ECU 117 700 higher lifetime net tax burdens than agents born in the base-year. This difference in the accounts — partly due to explicit government debt — is to a major degree due to projected demographic ageing. If, as a counterfactual experiment, the 1995 population structure in Germany is assumed constant, maintaining current tax and transfer levels even redistributes to the advantage of future generations, who could pay 3.1 % less taxes without violating the intertemporal government budget.

The identification of separate generational accounts for the statutory pension, health care and long-term care insurance shows that in Germany social insurance schemes, accumulating implicit liabilities amounting to 114.3 % of GDP, are the main source of overall intergenerational imbalance. In order to achieve intertemporal generational balance, contributions to social insurance scheme systems need to be increased immediately by 24.5 %, or, alternatively, transfers paid need to be cut by 19.6 %. Arguing that the implementation of such extreme measures is associated with undesirable macroeconomic repercussions, the authors recommend a policy mix that raises parts of the required funds by cutting benefits, and parts by raising contributions. Immediate policy adjustments are equivalent to a partial funding of social insurance benefits. Budgetary surpluses during the first years of low old-age dependency serve to accumulate social insurance wealth which are decumulated when benefit claims start increasing due to population ageing.

Bonin, Raffelhüschen and Walliser also show that generational net tax burdens in Germany have been altered by German unification. According to their estimates, the unification-related life-cycle tax burden for a man and woman born in the base-year equals ECU 13 900 and ECU 9 800 respectively. The generational accounts suggest that the unification burden is particularly large for young cohorts in the labour force while being small for pensioner cohorts, because government transfers to the East are mainly financed by increases in labour-related taxes and contributions.

In their study on **Spain**, Berenguer, Bonin and Raffelhüschen measure intertemporal public liabilities amounting to 151.9 % of GDP, less than one half of which are explicit. A rise in present and future taxes of 14.3 or 5.1 % of GDP is shown to be necessary for rendering fiscal policy sustainable. If only taxes paid by future generations are used to meet the intertemporal debt, a tax increase by 106.5 % is required. The latter indicator shows the highest value among the countries included in this study, partly due to the comparatively low tax quota observed in the base-year 1995 when government deficits in Spain reached a peak. Recent budgetary consolidation efforts made by the Spanish government might have improved fiscal sustainability compared to the baseline results presented.

Generational imbalances in Spain appear mainly the result of severe demographic ageing. If generational accounts are constructed employing a constant 1995 population structure, intertemporal public liabilities are significantly lower than under base case conditions. Nevertheless, overall intertemporal debt still amounts to 30.2% of GDP.

Berenguer, Bonin and Raffelhüschen test a range of policies for their potential to mitigate intertemporal generational imbalance of government finances in Spain. The generational accounting viewpoint suggests that the 1997 social security amendments hardly have any effect on the intertemporal public budgets. Neither the transfer of health-care finance to the federal budget, nor the gradual cut in primary pension insurance amounts are likely to improve fiscal sustainability to any sizeable extent.

Finally, the authors evaluate the potential gains from effectively banning tax evasion, and from increasing labour market participation of women. Using what might be considered as a rather optimistic design of the potential tax and transfer effects, it is shown that either strategy might reduce intertemporal public liabilities by about one third.

The country study for **France** by Crettez, Feist and Raffelhüschen indicates overall intertemporal public liabilities amounting to 81.3% of GDP. The larger part of this (45.7% of GDP) is only revealed by generational accounting. In order to achieve an intergenerationally sustainable situation taxes paid by future generations would have to be raised by 33.8%. Alternatively, the intertemporal public liabilities could be covered by increasing all taxes for present as well as future generations by 2.6 percentage points of GDP, or to lower all transfers by the same quota.

A person born in 1995 can expect to obtain a net transfer of ECU 56 200 from the public coffers, whereas future generations will only receive ECU 7 700. As the study shows, the present explicit government net debt of 35.6% of GDP and the ageing of the population are equally responsible for this imbalance.

As the authors show, the 1993 pension reform which aimed at increasing retirement age, indexed pension benefits to consumer prices instead of wages and lowered the replacement rate by relating pension benefits more closely to average life-time earnings, has already been an important move towards intergenerational balance. Without the reform the intertemporal public liabilities would have been by two-thirds higher, amounting to 136% of GDP. However, the reform applied only to pension schemes for private sector employees. Had it been extended to cover the whole aggregate of pension expenditure, the intertemporal public liabilities could have been reduced to 33.5% of GDP. As that roughly corresponds to the explicit net debt, this implies that implicit liabilities could have been eliminated.

The French country study also analyses the effect of the Juppé Plan, a major reform targeted mainly at reducing the fiscal pressures arising from the health system. This plan consists of a variety of measures. Apart from emergency measures to consolidate the social insurance system, i.e. increases of taxes and contributions and cuts in spending, it comprises structural changes which may have more far-reaching effects in the long term. Unfortunately, these structural measures, as, for example, introducing market elements and competition into the health-care sector, cannot presently be integrated in the generational accounting framework with a sufficient degree of reliability. In order to indicate the long-term cash effects of the Juppé Plan, one of the policy experiments assumes that the emergency measures will be maintained in the long run. If this were the case, intertemporal public liabilities could be reduced to 56.7% of GDP.

Thus, although recent measures already significantly improved the intergenerational stance of fiscal policy in France, future generations are still at a disadvantage. The current recovery of the French economy may offer an opportunity for tackling longer-term problems by more far-reaching reforms in pension and health insurance.

In their accounts for **Italy** Franco and Sartor identify a severe ageing problem in the Italian society. As a result of this the 1995 fiscal policy implies intertemporal public liabilities of 107.3% of GDP. As the explicit net debt is comparatively high at 105.9% of GDP, implicit debt makes up only a rather modest 1.4 percentage points. If the burden was fully passed on to future generations, these would have to pay 53.2% higher taxes than their ancestors. Alternatively a 9.7% increase of present and future taxes, i.e. an increase of the tax to GDP quota by 4.0 percentage points, would be sufficient to cover the liabilities. The same result could be obtained by a cut in transfer payments of about the same magnitude.

Although the high explicit debt already poses an important obstacle to achieving generational balance in Italy, the ageing problem distorts generational accounts even

more. In the baseline accounts future Italian newborns will pay ECU 65 800 more in taxes than the representative current newborn. If the explicit debt is assumed to be zero the difference between present and future generations is a mere ECU 800. However, if the population structure remained constant for the indefinite future, the 1995 fiscal policy would even favour future generations. They would have to pay ECU 47 500 less than present generations.

To alleviate the ageing pressure on the public pension system Italian governments enacted two reforms in the first half of the 1990s: the 1992 'Amato reform' and the 1995 'Dini reform'. In order to appreciate the long-run differences between the reformed pension system and the former one Franco and Sartor calculated the generational accounts that would have prevailed in 1995 if at that time the relatively recent reform had already been fully mature and contrasted them with a hypothetical 'no-reform' scenario. It turned out that if the reforms had not been enacted 1995 intertemporal liabilities would have amounted to 181.4% of GDP instead of 107.3%. If, on the other hand the reforms had already been fully mature in 1995, the intertemporal public liabilities would have turned into net assets of 45.8% of GDP. Despite this relatively positive evaluation of the reforms Franco and Sartor found that a more decisive transition to the new system than the one that was actually legislated would have improved intergenerational balance even more.

Although explicit base-year government debt is the third highest among the EU Member States, **Ireland** is the only country where maintaining base-year tax and transfer levels are projected to redistribute consumption possibilities to the advantage of future generations. The aggregation of prospective government deficits (and surpluses) under status quo conditions leads to negative intertemporal public liabilities, or intertemporal public wealth amounting to 4.3% of GDP. According to the findings of McCarthy and Bonin this generationally almost balanced outcome is the result of a comparatively favourable demographic development, in combination with high transfer payments from the European Union. In the base-year 1995, old-age dependency in Ireland was lower than in all other EU Member States. Even though the ratio is projected to rise in Ireland, too, the relative demographic advantage is likely even to increase over the next decades.

The demographic situation in Ireland is more influenced by migration than is the case in other European States. Therefore the Irish generational accounts are calculated for a variety of demographic scenarios. However, McCarthy and Bonin find that the sustainability results are robust for different developments of the Irish population.

Despite impressive economic growth during the last decades Irish citizens still received more net transfers in 1995 from the EU than other Europeans. Claiming that this development is unlikely to continue in the future, the Irish study investigates the intertemporal generational impacts which might result from a possible reduction in EU transfers from the Structural Funds. It becomes apparent that the intertemporal government wealth of the base-line scenario depends largely on the EU transfers. If, for example, EU transfers were eliminated by 2020, maintaining base-year tax and spending levels entails intertemporal liabilities totalling more than 40% of current GDP.

However, reductions in EU transfers will not necessarily lead to intergenerational imbalance in Ireland. Although female participation in the labour market has been increasing over the last years, McCarthy and Bonin argue that there would still be room for a further increase, resulting in higher tax revenue per capita. In addition, projected increases in the productivity of the government sector which are envisaged in official government plans might help to finance losses in EU transfers. Finally, keeping to the current practice of inflation indexation of pensions might help in preventing intergenerational fiscal imbalance.

The generational accounts for **the Netherlands** presented by Bovenberg and ter Rele identify intertemporal public liabilities of 75.9% of GDP, which is the fourth lowest intertemporal debt among the countries covered in the present volume. Unlike other countries faced with unsustainable public finances (with the exception of Denmark), the major share of intertemporal public liabilities was already explicit in the base-year. Implicit liabilities accumulated in the future, according to the generational account projections, total only 11.3% of base-year GDP in the Netherlands. Under status quo conditions, sustainability of fiscal policy is achieved by a uniform immediate tax increase, raising aggregate tax revenue by 2.5% of GDP. If the fiscal adjustment is levied on future-born agents, their tax payments need to be increased by 25.1%. Compared to other EU Member States, the policy adjustments necessary to meet the intertemporal government budgets appear rather moder-

ate. However, judging this result, it has to be considered that the initial tax to GDP ratio in the Netherlands is above the EU average.

Although explicit debt constitutes almost 85% of intertemporal public liabilities, in the Netherlands ageing effects also seem to be the main determinant of intergenerational fiscal imbalance. Given the hypothetical scenario of an indefinitely constant base-year age structure, the continuation of current fiscal policy, accumulating intertemporal public wealth totalling 22.9% of 1995 GDP, even redistributes consumption possibilities to the advantage of future generations.

Acknowledging that the conventions set for the present cross-country study in some respect do not accurately design specific features of the Dutch economy, Bovenberg and ter Rele also provide a more specific country scenario, considering the capitalised finite revenue stream from natural gas resources as government wealth and taking into account a likely future increase in female labour force participation. The effects of these adjustments, together with some minor policy adjustments almost cancel out in the generational accounts for the living. However, sustainability of fiscal policy appears easier to achieve in the modified scenario, mainly due to a more favourable evaluation of natural gas resources.

According to the country study for **Austria** presented by Keuschnigg, Keuschnigg, Koman, Lüth and Raffelhüschen the Austrian implicit debt of 142.7% of GDP is the third highest of the countries presented here, surpassed only by the two Nordic welfare states Finland and Sweden. Without corrective measures future generations will face a tax burden that is 82.7% higher than what the present taxpayer has to pay.

Responsible for the considerable intergenerational redistribution are the generous Austrian social insurance schemes and, in particular, old-age benefits which are organised on a pay-as-you-go basis. In the base-year 1995 the Austrian maximum replacement rate of 80% was among the highest in Europe. A further characteristic of the system is a large portion of disability and early retirement pensions. In 1994, the actual retirement age was 58.5 for men and 57.1 for women. Indeed, in Austria generational accounts of present generations already turn negative (from net rest-of-life taxes to rest-of-life transfers) around the age of 41. Moreover, the maximum of rest-of-life transfer payments in Austria is the highest among the 12 countries in this study while the maximum rest-of-life tax burden which is faced by those aged 20 is comparatively low.

Population ageing is not more pronounced in Austria than in other European States. Still, if the demographic structure of 1995 were held constant implicit public liabilities would be reduced by almost 65%. In the case of Austria the problem is not just an ageing population but ageing in connection with a rather generous system of entitlements.

In order to fulfil the fiscal criteria of Maastricht a 'consolidation package' was legislated in 1996. About 2/3 of the package's total volume (about ECU 33 billion) are to be saved by expenditure cuts, 1/3 are to be gained by tax increases. The savings are achieved by efficiency measures in the government sector, moderated payments to government employees, and by tightening the eligibility for social insurance transfers. The tax increase is achieved by reductions in income tax allowances as well as higher advance payments for the income tax and several other measures. Integrating the consolidation package in the generational accounting calculations reduces public liabilities to 27.3% of GDP. However, the authors of the country study warn that it might not be possible to maintain the huge effort undertaken to meet the Maastricht criteria permanently.

The case of **Finland**, analysed in the study by Feist, Raffelh Üschen, Sullstöm and Vanne, is unique. As the only country in this study, Finland exhibits a small government net wealth. However, this is offset by an outstandingly high implicit debt, amounting to 261.6% of GDP. In sum, the intertemporal public liabilities make up 253.2% of GDP. In order to close this sustainability gap, taxes for future generations would have to be increased by 91.5%, which would result in an absolute difference in generational accounts between current and future newborns of ECU 154 800. The substantial imbalance is to a large extent a result of the low average retirement age in Finland (58 years) as well as of relatively generous age-related government services concerning health and welfare in combination with the ageing of the Finnish society. The amount of net transfers that a retiree around 65 can expect to receive for the rest of his life in Finland is only surpassed by the payments to retirees in Austria and Germany. However, in these countries the net tax burden for those around 25 is much higher too. On balance, a newborn person in Finland can expect a net transfer for his/her entire lifetime of ECU 83 200 — only Swedish babies are welcomed into this world with more generosity by the State.

The demographic forecasts for Finland are not the worst in Europe. Still, keeping the demographic situation of the base-year constant yields a reduction of the intertemporal public liabilities from 253.2 to 141.1 percentage points of GDP. Although this reduction seems impressive it shows that the 1995 fiscal policy in Finland would even be unsustainable without an ageing population.

However, as Feist, Raffelhüschen, Sullström and Vanne emphasise, the Finnish baseline results should be taken with a pinch of salt. The choice of the 1995 base-year met Finland almost at a peak of unemployment. Projecting the corresponding fiscal situation into the indefinite future may draw an inappropriately bleak picture. Taking into the consideration the decrease in unemployment observed until 1998 lowers intertemporal public liabilities to 238% of GDP. If unemployment could be further reduced to 7 to 8% until 2005, intertemporal public liabilities of 208.4% would result.

The Finnish country study presents three policy options which might help to alleviate generational imbalance: an increase of the average retirement age to 63 by 2015; an increase of the total contribution rate from 20.6% to 30% by 2035; and, thirdly, a gradual cut in all public services by 20% until 2010. The simulations show that no single measure would be sufficient to achieve generational sustainability. Even if all three measures were combined, positive public liabilities of 42% of GDP would remain. However, if the reduction in unemployment observed until 1998 is taken into account, the combined policy experiments would reduce the intertemporal public liabilities to 23.7% of GDP. With the optimistic assumption that the employment situation continues to improve until 2005, the combined measures would fully regain intergenerational balance and even result in a small intertemporal wealth.

In many respects the situation in **Sweden** is similar to the one in Finland. In Sweden, too, implicit debt is very high (199.8% of GDP) while the explicit debt is comparatively low, if not negative as in Finland. According to the generational accounts calculated by Lundvik, Lüth and Raffelhüschen a future Swedish taxpayer might face a tax-load 74% higher than the present one which is already the highest in Europe.

Due to its comparatively low level of 36.7% of GDP the official net debt is not considered the main source of intergenerational imbalance in Sweden. If, on the other hand, the present demographic structure remained unchanged in the future, intertemporal public liabilities would be substantially reduced by 82.0 percentage points of GDP. Since there would still remain a substantial debt of 154.4% of GDP the main problem in Sweden seems to be of a structural nature. The relatively generous Swedish welfare state is not designed to cope with long and persistent unemployment as implied by the projections.

The study presents three policy simulations which are currently under discussion in Sweden. In 1998 a pension reform was undertaken aimed at increasing incentives to postpone retirement. One experiment calculates the effect of a further tightening of the reform which would be sufficient to delay retirement for two years. Although two more years of tax and contribution payments and a delayed reception of pensions would increase the net payments by the working population the overall effect would not significantly improve intergenerational balance.

On the other hand a second experiment shows that a 2 percentage point budget surplus which is kept over the business cycle until the explicit debt is completely paid back would significantly reduce public liabilities. Depending on whether the surplus is achieved by higher taxes or by lower transfers, the debt could be reduced to 16.2% or 9.3% of GDP, respectively.

Since there is growing concern in Sweden that in the future more young people might leave the country to avoid the high tax burden a third scenario assesses the effects of youth emigration (i.e. an annual emigration of 2% of the 25-year-old). Although young people are the main contributors to public funds and, in addition, are more fertile, the adverse effects on future generations turn out to be almost negligible.

According to the findings presented by Cardarelli and Sefton the intertemporal public liabilities in the **United Kingdom** amount to 184.8% of GDP, although the initial government net debt, worth 51.2% of GDP, is below the European average. To meet the intertemporal budget constraint, taxes levied on future generations need to be increased by 74.0%. Alternatively, an immediate uniform tax rise totalling 15.7% of tax revenue (or 6% of GDP) is found necessary.

Compared to other EU Member States, demographic ageing has started early in the UK so that old-age dependency develops rather favourably during the next decades. As a consequence the adverse impact of demo-

graphic ageing on fiscal sustainability seems less strong than in other EU Member States, as a comparison of two counterfactual experiments suggests. Without base-year debt intertemporal public liabilities amount to 133.6% of GDP, whereas without future demographic changes, intertemporal public liabilities remain as high as 144.8% of 1995 GDP.

Cardarelli and Sefton point out that the unfavourable sustainability result derived under the standard conditions set for this study is perhaps misleading. In order to ensure cross-country comparability, the base case generational accounts for the United Kingdom employ the assumption that welfare benefits grow in line with earnings in each future year, which builds in a policy change in what are supposed to be status quo projections. In the United Kingdom, social security transfers and welfare support payments are indexed to prices rather than earnings at present. Alternative calculations weakening the assumption of an immediate switch to productivity indexation lead to the notion of significantly more balanced fiscal policy.

The authors also analyse the effects of the 1986 Social Security Act and the 1995 Pension Act. They find that although either reform contributed to a reduction of intertemporal public liabilities, the effects were not far-reaching enough to markedly reduce intergenerational redistribution. In the light of the present study, the measures suggested by the Pensions Green Paper of 1998, not yet incorporated in the calculations, seem useful to move public finances in the United Kingdom closer to sustainability.

Annex: An example of four indicators for intergenerational (im)balances

The four indicators described in Chapter 1.5 can be illustrated by the following stylised example of a stationary economy in which each generation lives only one year and where all generations have the same size. Before t_0 no government activity existed and thus there is no explicit government debt. At the beginning of their lives the members of each generation receive a cash transfer of 100 monetary units (MU) in total. Given an interest rate of 5% the discounted value of all the transfers, present and future, constitutes a need for the government to raise an amount of 2 100 MUs (present value at t_0).

It is assumed that there is no government net wealth to cover the amount. In order to finance the transfers all generations are subject to a tax of 60 MUs. The discounted value of these tax payments equals 1 260 MUs. Obviously the government would not be able to meet its financing needs. The budget constraint does not hold and the implicit debt is 2 100 – 1 260 = 840 MUs (Scenario 1). Since no explicit debt exists the implicit debt is also

Table 5

Ways to measure generational imbalances

Generation	1	2	3	…	N	Total
Time	0	1	2	…	n-1	
Cash transfer at birth	100	100	100	…	100	Inf.
Present value (r = 0.05)	100	95.2	90.7	…	0	2100
Scenario 1 — Unsustainable policy						
Tax at birth	60	60	60	…	60	Inf.
Present value (r = 0.05)	60	57.1	54.4	…	0	1260
Scenario 2 — Increase of present and future taxes						
Tax at birth	100	100	100	…	100	Inf.
Present value (r = 0.05)	100	95.2	90.7	…	0	2100
Scenario 3 — Increase of future taxes						
Tax at birth	60	102	102	…	102	Inf.
Present value (r = 0.05)	60	97.1	92.5	…	0	2100

equal to the intertemporal public liabilities (IPL), the second indicator of intergenerational imbalance.

In order to close this sustainability gap and balance the budget constraint the State could increase all present and future taxes by 40 MUs, i.e. by 66.6 % from 60 MUs to 100 MUs (Scenario 2). The necessary increase of 66.6 % represents the fourth indicator of intergenerational imbalance.

Alternatively, only the taxes paid by future generations (generation 2 and later generations) could be increased by 42 MUs, i.e. by 70 % from 60 MUs to 102 MUs. This is the third indicator discussed above.

The last scenario also permits the calculation of the first indicator of fiscal imbalance, the absolute difference between present and future accounts. The account of a currently living individual amounts to 60 MU – 100 MU = – 40 MU, while the account of any individual living in the future amounts to (102 MU – 100 MU) / 1.05 = 1.9 MU. Hence, the absolute difference comes to 41.9 MU.

2. Generational accounting: method, data and limitations

Bernd Raffelhüschen ([1])

2.1. Introduction

Government budgets, and budget deficits in particular, conventionally serve as indicators of fiscal activity ([2]). Based on annual government spending and revenue, they capture the short-term effect of fiscal policy on aggregate demand. However, according to the neoclassical paradigm, rational, forward-looking agents form their economic decisions considering the impacts of fiscal policy on remaining lifetime resources. If this is the case, individual consumption and saving decisions are only to a minor degree influenced by annual government budget figures.

Measuring the long-term impacts of fiscal policy, it is important to understand how government activity today affects the life-cycle resources of current living and future-born generations. Fiscal policy redistributes resources between generations by imposing generation-specific net tax burdens, which affects the accumulation of capital, and thereby long-term economic growth.

Annual cash-flows would have a stronger impact on economic decision making, if agents behaved myopically, or if they faced liquidity constraints. In the opposite extreme, if individuals were perfectly altruistic, intergenerational transfers due to government tax and transfer policy would be counterbalanced by private bequests or *inter vivos* transfers of equal size. However, empirical evidence supporting that the agents would be short-run oriented, bound by significant liquidity constraints or perfectly altruistic is weak.

If the life-cycle hypothesis is empirically relevant, the annual government budget is not only an insufficient instrument to assess whether fiscal policy is expansive or restrictive. It even might be an arbitrary concept since fiscal policies with identical macroeconomic impacts may go along with different short-term budget deficits or surpluses. Besides, policies that change intergenerational redistribution may not affect annual budgetary balance in the short term.

For an illustration of these propositions, consider a simple model of two generations, where no government activity is observed before period 0. Assume further that the interest rate and the population growth are constant at a rate of 20 and 10 % respectively. Under these conditions Table 6, taken from Raffelhüschen and Walliser (1996), analyses four policies of intergenerational redistribution through government budgets.

In scenario (a), the young generation is assumed to receive a debt-financed transfer of 100 units in period 0. Accordingly, the budget deficit and government debt measure 100 units in this period. In the following period, a lump-sum tax of 120 units is levied on the now old generation, which equals principal and interest on the transfer received while being young. Continuing the transfer policy of period 0 for the generation young in period 1 increases transfer expenditure to 110 units due to population growth. In addition, 20 units are spent to serve interest on outstanding public debt. Accordingly, the deficit of period 1 totals 10 units, adding to the government debt of the previous period. Supposing that the established tax and transfer scheme is maintained over time, both deficit and government debt grow at the rate of population growth in subsequent periods.

Scenario (b) in Table 6 illustrates a tax-financed funded pension system. When the system is introduced in period 0, young generations are taxed with an amount of 100 units, resulting in a budget surplus since transfer obligations to the elderly, amounting to 120 units under the funded system, do not occur before period 1. In that period, government receives interest on previously accumulated wealth worth 20 units, plus taxes from young generations amounting to 110 units. The resulting budget

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([2]) For a survey of traditional fiscal indicators, see Gramlich (1990). A radical critique of these indicators was first put forward by Kotlikoff (1986).

Table 6

Annual deficits, government debt and intergenerational transfers

(a) Constant per-capita transfer to the young generation

Period	Taxes, old generation	Interest payments	Transfers, young generation	Budget deficit	Government debt
0	0	–	100	100	100
1	120	20	110	10	110
2	132	22	121	11	121
3	145.2	24.2	133.1	12.1	133.1

(b) Funded social security, tax-financed

Period	Taxes, young generation	Interest receipts	Transfers, old generation	Budget deficit	Government debt
0	100	–	0	– 100	– 100
1	110	20	120	– 10	– 110
2	121	22	132	– 11	– 121
3	133.1	24.2	145.2	– 12.1	– 133.1

(c) Funded social security, debt-financed

	Loan from the young	Interest receipts	Debt service	Budget deficit	Government debt
0	100	0	0	0	0
1	110	20	120	0	0
2	121	22	132	0	0
3	133.1	24.2	145.2	0	0

(d) Paygo social security

	Taxes, young generation	Transfers, old generation	Budget deficit	Government debt
0	100	100	0	0
1	110	110	0	0
2	121	121	0	0
3	133.1	133.1	0	0

Interest rate: 20 %; population growth: 10 %

surplus of 10 units adds to government wealth, which, if this policy is continued, grows in line with the population.

Fiscal policy in scenario (c) is identical to the funded pension system of scenario (b). However, the payments made by the young generation are now labelled as a loan to the public sector. Supposing that the government invests the loan on the capital market, a balanced budget is reported in period 0. In the following period, given perfect capital markets, the return on the investment combined with the principal are sufficient to redeem the outstanding loan and to pay the interest due. Continuing this policy, both government loans from the young generations and government debt service grow at the rate of population growth. However, the government budget is always balanced so that reported government liabilities equal zero.

Economically, the three analysed scenarios are identical since they confront agents with the same lifetime budget constraint (cf. Kotlikoff (1993)). In either case, the present value of taxes paid net transfers received over the life cycle is zero for each generation. Therefore, rational agents would not change their behaviour after the implementation of these policies. This outcome is not reflected by periodical budget indicators. Depending on the respective specification of the fiscal policy, annual gov-

ernment deficits (or surpluses) and government debt (or wealth) show substantially different developments.

Scenario (d) represents a pay-as-you-go financed social security scheme. Under the pay-as-you-go scheme, taxes paid by the young generation equal the transfers received by the old generation in each period. Accordingly, as under the debt-financed funded pension scheme (c), the government budget is always balanced and reported government liabilities equal zero. Nevertheless, the two policies are not equivalent. As is evident from Table 6, the introduction of the pay-as-you-go scheme in period 0 immediately raises the consumption possibilities of the old generation who did not contribute to the system. If the economy is on a dynamically efficient growth path, this introductory gain is financed by reduced consumption possibilities of all subsequent generations since the internal rate of return of the pay-as-you-go is equal to the population growth rate, which is lower than the interest rate (cf. Aaron (1966)). The fall in lifetime resources reduces savings which leads to a lower capital-labour ratio, higher interest rates and lower wages.

The macroeconomic repercussions and intergenerational redistribution caused by the pay-as-you-go system are not indicated by the fiscal indicators based on annual budget accounting, because the pension claims of the elderly are not taken into account. For rational agents, however, they are as good (or bad) as 'nicely printed bonds'.

As a response to the shortcomings of periodical budget accounting, Auerbach, Gokhale and Kotlikoff (1991, 1992, 1994) have developed the method of generational accounting which addresses the intertemporal welfare effects of current fiscal policy. In contrast to traditional budget indicators, generational accounting does not focus on annual cash-flow budgets, but on the intertemporal budget constraint of the government. In the long-term, all government spending must be balanced by the tax payments made by either current or future generations. Generational accounts report, for each generation alive, the present value of rest-of-life net taxes paid to the intertemporal government budget. The resulting intertemporal government deficit (or surplus) is assigned equally to all future-born generations, determining their generational account.

Generational accounting provides meaningful indicators for evaluating the long-term state of government finances in the European Union. In the remainder of this chapter, we introduce the generational accounting framework used throughout this study, before discussing the empirical and methodological imperfections and limitations of the approach.

2.2. How to construct generational accounts

Generational accounting starts from the intertemporal budget constraint of the government, expressed in present value terms of a base-year t:

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

On the left-hand side of equation (1), B_t stands for the government net debt in year t, which is typically positive. Over an infinite time horizon, net government liabilities must be served either by the present value of net tax payments projected for generations alive in the base-year, or the present value of net tax payments made by generations not yet born.

Let D denote agents' maximum age, and $N_{t,k}$ the present value as of year t of net tax payments, i.e., taxes paid net of transfers received, made by all members of a generation born in year k over the remaining life cycle. Then, the first right-hand term of equation (1) represents the aggregate net taxes of all generations alive in the base-year. The second term aggregates the net tax payments made by future generations, who are born in year t or later.

The intertemporal budget constraint of the government can be viewed as a financing constraint. Fiscal policies that change one of its components will induce a change in at least one other component. For example, policies reducing the net tax payments of living generations in the aggregate must be financed by an increase in the present value of aggregate net taxes paid by future generations, since base-year government net debt is exogenous.

To calculate generations' aggregate life-cycle net tax payments, the net payment terms in equation (1) are decomposed into

$$N_{t,k} = \sum_{s=max\{t,k\}}^{k+D} T_{s,k} P_{s,k} (1+r)^{t-s} \qquad (2)$$

In equation (2), $T_{s,k}$ denotes the average net tax paid in year s by a representative member of the generation born in year k, whereas $P_{s,k}$ stands for the number of members of a generation born in year k who survive until year s ([1]). The products aggregated in equation (2) represent the net taxes paid by all members of generation k in year s. For generations born prior to the base-year the summation starts from year t, while for future-born cohorts, the summation starts in year $k > t$. Irrespective of the year of birth, all payments are discounted back to year t by application of a constant pre-tax real interest rate r.

To compute the remaining lifetime net payments of living generations, the future demographic structure is specified conducting long-term population forecasts. In addition, the development of age-specific net tax payments needs to be projected. Let $T_{s,k}$ indicate a specific tax or benefit, then the age-specific net tax payment in year s of male agents born in year k can be decomposed as

$$T_{s,k} = \sum_i h_{s,k,i} \qquad (3)$$

where $h_{s,k,i}$ stands for the average tax or transfer of type paid or received in year s by male agents born in year k, thus of age s-k. In equation (3), $h > 0$ indicates a tax payment, whereas $h < 0$ defines a transfer.

Constructing generational accounts, it is conventionally assumed that initial fiscal policy and economic behaviour do not change. Under this condition, it is possible to project future average tax payments and transfer receipts per capita from the base-year age profile of payments according to

$$h_{s,k,i} = h_{t,t-(s-k),i}(1+g)^{s-t} \qquad (4)$$

where g represents the annual rate of productivity growth, generally assumed constant. Equation (4) assigns to each agent of age s-k in year s the tax and transfer payment observed for agents of the same age in year t, uprated for gains in productivity. The base-year cross-section of age-specific tax and transfer payments per capita is generally determined in two steps. First, the relative position of age cohorts in the tax and transfer system is estimated from micro-data. In a second step, to overcome data deficiencies on the micro level, the relative age profiles are re-evaluated proportionally to fit the observed macroeconomic budget data.

Equation (4) represents the generational accounting standard to project future individual tax and transfer payments. Occasionally, it is necessary to employ more sophisticated projection rules, to cope with peculiarities of countries' tax and transfer systems. First, uniform growth uprating is not always appropriate. It might be temporarily suspended to design the level effects of specific fiscal policies. Second, by equation (4), the base-year cross-section of individual tax and transfer payments is supposed to be representative for the — longitudinal — cohort profile, which might appear as too rigid an assumption at times.

For living generations, division of the aggregate remaining lifetime net tax payments by the number of cohort members alive in the base-year defines the cohort generational account ([2]).

$$GA_{t,k} = \frac{N_{t,k}}{P_{t,k}} \qquad (5)$$

The generational accounts indicate the expected per capita fiscal burden for different generations given that base-year fiscal policy is maintained until death. They are constructed in a purely forward-looking manner, only encompassing taxes paid and transfers received in or after the base-year. As a consequence, generational accounts cannot be compared across living generations, because they incorporate effects of differential lifetime. One may compare, however, the generational accounts of base-year and future-born agents, who are observed over their entire life cycle.

To illustrate the fiscal burden passed over from current living to future generations by current fiscal l policy, generational accountants compute the intertemporal public liabilities accumulated if base-year tax and transfer levels are maintained indefinitely, supposing fiscal policy was not required to balance the intertemporal govern-

([1]) Typically, generational accountants disaggregate equation (2) even further. To incorporate gender-specific differences in average tax payments and transfer receipts by age, separate aggregation of the average net taxes paid by male and female cohort members is required.

([2]) In the following, we follow conventional presentations of the generational accounting framework to ease notation. The technical adjustments necessary to deal correctly with the net fiscal contributions of migrants, worked out by Bonin, Raffelhüschen and Walliser (1999), have been fully incorporated in all computations.

ment budget. In technical terms, the intertemporal public liabilities of the base-year t, are defined as:

$$IPL_t = B_t - \sum_{k=t-D}^{\infty} N_{t,k} \qquad (6)$$

The amount of intertemporal public liabilities measures aggregate unfunded claims on future government budgets, which are not made transparent by short-term oriented budget measures. Such spending commitments include, for example, the entitlement to pension benefits which is obtained by working-age generations contributing to a pay-as-you-go scheme.

Intertemporal public liabilities entail a revision of initial fiscal policy at some point in time. If the government accumulates intertemporal debt, this necessarily leads to a net tax rise. In this case, the government accumulates intertemporal wealth, which permits to lower base-year tax levels, or to increase transfer spending in the future. Only if intertemporal public liabilities are zero, is current fiscal policy sustainable, because it does not violate the intertemporal budget constraint of the government.

How the policy adjustment required to redeem intertemporal public liabilities will affect generations' fiscal burdens is uncertain. For illustrative purposes, generational accounting typically assigns the entire adjustment to future generations. To compute the net tax burden of future generations, generational accounts specify — arbitrary — stylised fiscal policies, which would be consistent with the intertemporal government budget. In this study, we assume that all tax payments made by members of future-born cohorts are adjusted proportionally with help of a uniform scaling factor, set to ensure balance of the intertemporal public budget defined in equation (1) ([1]). In technical terms, this requires to employ

$$h_{s,k,i} = \theta\, h_{t,t-(s-k),i}(1+g)^{s-t} \qquad (7)$$

for and instead of equation (4) when computing the average age-specific net taxes paid by representative future-born agents.

The accumulation of intertemporal government liabilities is indicated by tax adjustment parameters differing from unity if, for example, the continuation of present fiscal policy accumulates intertemporal government debt burdening future generations. Besides, the degree of intertemporal fiscal imbalance can be measured by the resulting difference in lifetime net tax payments between base-year and future-born agents. Selecting the cohort born immediately after the base-year as representative for future generations, the intertemporal generational imbalance due to current fiscal policy is frequently quantified reporting the relative change in generational accounts, denoted,

$$\pi = \frac{GA_{t+1,t+1}}{GA_{t,t}(1+g)} \qquad (8)$$

In equation (8), the generational account of the generation born in period t+1 is corrected for productivity growth, because this cohort is endowed with higher lifecycle pre-tax resources due to gains in labour productivity. If current fiscal policy redistributes it is to the disadvantage of future generations who face a higher lifetime net tax rate than current newborn generations.

The conventional indicator of intertemporal generational imbalance has problematic algebraic properties if generational accounts of base-year newborn agents are small or negative (cf. Raffelhüschen (1996)). This is relevant in the context of the present study, which uses a broad concept of government transfers that assigns net government purchases not transferred to individuals in-cash as an in-kind transfer reducing agents' lifetime fiscal burden ([2]). As a consequence, the generational account of cohorts born in the base year turns negative in most countries. Since the relative change in lifetime net tax rates is ill-defined in this case, we evaluate the degree of intertemporal generational imbalance by the absolute change in the lifetime net tax payments of agents born in periods t and t+1 that satisfies the intertemporal budget constraint of the government.

In addition, we employ the aggregate amount of intertemporal public liabilities as a measure of intertem-

([1]) This structural approach to compute the net tax payments of future generations was first suggested by Auerbach (1997). An alternative illustration of intertemporal generational imbalance would be to assume that government immediately switches to a sustainable path of fiscal policy, adjusting base-year tax (or transfer) levels once-and-for-all. This policy would be designed applying a uniform scaling factor projecting tax payments (or transfer receipts) of both current living and future-born generations.

([2]) The generational accounts hence do not only measure who pays for general government spending, like expenditure for the military, but also who possibly benefits from it. A similarly broad transfer concept was first employed by ter Rele (1997).

poral fiscal imbalance. To allow meaningful comparisons across the EU Member States, intertemporal public debt (or wealth) is related to countries' respective GDP.

2.3. General data description

The empirical evaluation of the intertemporal budget constraint of the government (1) requires two projections. First, one needs a population projection, whose basic principles will be described in Section 2.3.1. Secondly, the average taxes paid and transfers received need to be estimated by age (and preferably by sex). The data required for this procedure are described in Section 2.3.2. Finally, one has to determine the base-year amount of government debt, which is the subject of Section 2.3.3.

Section 2.3.4 debates the growth rate suitable to uprate base-year per capita taxes and government spending, and discusses the appropriate interest rate for discounting future tax payments and transfer receipts. Finally, Section 2.3.5 reflects on the intergenerational incidence of capital income taxes which depends on the national system of investment incentives. This general data description is valid for all country studies presented subsequently. Where country studies had to deviate from the outlined default procedure to cope with national peculiarities, this is stated in the respective country chapter.

2.3.1. Population

Detailed population projections by age and sex, which reach as much as 200 years into the future are the base of the generational accounts presented in this study. Most EU Member States publish population projections conducted by their national statistical offices. However, these official estimates, typically only covering a time span of 30 to 50 years, are not far-sighted enough to meet the requirements of generational accounting. Therefore, it was necessary to conduct our own projections which prolong official forecasts into the very distant future.

The starting point of the population projections employed in this study is the population structure by age and sex observed at the start of 1995. Following the component method, the age composition of the population is updated in each year by first subjecting the initial population structure to age- and gender-specific mortality, and then adding the age-specific number of net immigrants. Finally, the number of newborns is derived combining the female population structure with fertility by age.

The implementation of the component method requires assumptions with respect to the future development of age-specific mortality, fertility and net immigration rates. As the base case, all demographic projections are parameterised first according to the central variants of available official demographic projections. Since demographic parameters are difficult to predict for the distant future, we generally assume that mortality, fertility and migration parameters stay constant from 2010 on.

Since generational accounts are sensitive to the underlying population projections, the country studies usually also analyse alternative demographic parameterisations, to test the impacts of fertility, mortality and migration patterns on intertemporal generational balance.

2.3.2. Age-specific taxes and transfers

As was outlined in the previous chapter, the computation of average net tax payments by age proceeds in two steps. First, the relative tax and transfer position of individual age cohorts is estimated, which is benchmarked against the corresponding base-year government budget aggregate in a second step.

The estimation of relative age-profiles of per capita taxes paid or transfers received requires household or individual micro-statistics. In general, the necessary data were retrieved from micro-data surveys, national panel data, and consumption and expenditure surveys. The construction of relative age profiles from these sources frequently demands assumptions regarding the economic incidence of taxes and transfers, because reported legal incidence does not necessarily indicate agents' effective burdens or benefits. Constructing relative micro profiles for the different EU Member States, the specific characteristics of the tax and transfer systems in each country have been taken into account, to accurately capture likely economic incidence.

As a general rule, the profiles obtained from the micro-data are assumed to stay constant over the entire projection period. This proceeding maintains base-year economic structures indefinitely. In particular, the analysis abstracts from changes in labour force participation and unemployment rates. Furthermore, the calculations do not design changes in the pre-tax income distribution, which could affect the prospective level or shape of the initial relative age profiles.

In all countries, the set of relative tax and transfer profiles by age was re-evaluated to the corresponding over-

all government budget aggregates. Government budgets, including off-budget authorities and social insurance schemes, were usually obtained from national income and product accounts. In some countries, these statistics had to be complemented with additional data, taken, for example, from national government financial statistics or statistical reports issued by the central banks. Where data from disparate sources are used, great care has been taken to control for differing statistical bases. To avoid multiple accounting of specific budget items, all budget data were corrected for intergovernmental transfers. Therefore, the composition of government budgets reported in the individual country studies is frequently not directly comparable to the official statistical sources, from which all data were originally taken.

With the age-specific tax payments and transfer receipts acting as a starting point, the future development of these flows has been generally determined following two rules. First, the level effects of legal amendments which had been passed into law in or prior to the base-year but not yet come into full fiscal effect are taken into account. Otherwise, the simple productivity growth rule specified in equation (4) is employed for the projection of future tax payments and transfer receipts. The application of the latter rule supposes that fiscal policy manages to adjust all tax and transfer regulations, like tax allowance and eligibility rules, regularly to productivity growth. Thus, the original state of fiscal policy is maintained over the entire life cycle of all living generations.

In each country, the generational accounts have been constructed assigning as many tax and transfer items by age as possible. Depending on data availability, the country studies differ in the number taxes and transfers distributed according to age however. Taxes generally distributed by age are taxes on labour and capital income (including corporate taxes), value added taxes, excise taxes, and payroll taxes to social insurance. In addition, revenue from seigniorage is considered as an inflation tax, if central bank gains are transferred to the government budgets. As for transfer benefits, benefits from social insurance schemes, in particular social security, statutory health care and unemployment insurance benefits, general welfare and housing benefits, child, maternity and youth support payments are in general treated as age-specific. Tax payments and transfer receipts for which specific age profiles are unavailable are assigned lump-sum to all age groups.

The per capita value of net government purchases which do not represent in-cash benefits is assigned as a non-age-specific personal transfer. An exception is government spending on education which is only allocated to the young. To estimate the initial aggregate amount of government purchases, base-year total government spending is corrected for expenditure on in-cash transfers, real education transfers and interest paid on outstanding government debt (which is a remuneration for private lending, and thus not a transfer). The remainder splits into public spending for public goods and services, government net investment, and subsidies to private firms. In the country studies, these government purchases are addressed as non-age-specific government spending or government consumption, which is not consistent with the familiar definition of course. Parallel to personal tax and transfer payments, future age-neutral government purchases per capita are assumed to grow annually in line with productivity, except for legally enacted variations in aggregate spending levels.

2.3.3. Government net wealth

The intertemporal government budget constraint requires an accurate estimate of overall government debt or wealth. This estimate does not only have to include government net debt on all federal levels as reported by the official national statistics, but also the accumulated debt of public enterprises. Consequently, the country studies take into account the debt accumulated by telecommunication, postal, railway and housing services under public ownership. Furthermore, hidden liabilities which do not represent government debt in legal but in economic terms are considered where such occur. For example, the liabilities of unification-related debt funds, which are not an official part of the government budget in Germany, are included in the calculations.

To determine the value of government net wealth, it is necessary to balance gross debt with the value of government asset holdings. The evaluation of government assets is not unproblematic, however. The capital stock of producers of government services reported in some statistics is misleading, because the evaluation of government assets needs to be based on market prices. Moreover, government assets need to be corrected for the value of public infrastructure, which is captured by the flow of government infrastructure investment (included in government consumption) rather than by the stock value in the calculations.

As with perfect capital markets the market value of an asset equals the present value of its aggregate future returns, our studies proceed by assuming that the current worth of government assets can be approximated by the

observed base-year revenue net of subsidies from public enterprises, publicly owned land and other assets. One should be aware, however, that this proceeding may yield a fairly inaccurate estimate of government asset worth, due to input-oriented pricing of the government.

2.3.4. Growth and discount rates

The projection of future age-specific tax payments and transfer receipts demands an assumption regarding the annual rate of productivity growth. Since any long-term forecast of future growth must remain arbitrary, the country studies do not make use of sophisticated forecasts. Instead, a supposedly constant rate of productivity growth is applied in all future periods. The growth rate is set to approximate the average long-term rate of productivity growth observed in the past. Considered that the correct value of the growth parameter is uncertain, we have not attempted to design specific growth patterns for the individual EU Member States. Rather, we employ a growth rate of 1.5 per annum for the base case calculations in all country studies, which is subjected to a sensitivity test that tries to corner what would be the actual rate of productivity growth.

Generational accounting considers all future payments in present value terms of the base-year, which makes it necessary to specify an interest rate appropriate for the discounting procedure. Similar to the growth rate parameter, forecasts regarding the prospective interest rate development are uncertain. Therefore, irrespective of national peculiarities, we apply a single uniform discount rate to take all future tax payments and government spending back to the base-year.

A reasonable range of interest rate assumptions is determined by the fact that public receipts and expenditures are significantly more uncertain than non-risky long-term government bonds on the one hand, but not as volatile as the return on risky assets on the other hand. Accordingly, the discount rate chosen should range between the average rates of return on these types of assets. In the light of this argument, we have opted for a standard discount rate of 5% per annum, which reflects the 10-year European average of interest rates. Nevertheless, sensitivity tests are necessary again, to cope with the empirical uncertainty affecting this generational accounting parameter.

2.3.5. Capital income taxes

With regard to capital income taxes, one special problem arises. In most EU Member States, investment incentives like accelerated depreciation allowances imply a higher marginal tax burden on existing capital relative to new capital. This difference is reflected in the current market evaluation of existing capital, which depreciates compared to newly installed capital. As a consequence, the current owners of capital assets eventually bear a loss due to the differential capital income tax treatment of old and new capital.

To take this burden into account, the approach conventionally used in generational accounting is to estimate the capitalised tax advantage of new capital, and to allocate this amount as an immediate one-time tax to living generations. Correspondingly, the current flow of capital income taxes needs to be adjusted, because one overstates the actual fiscal burden levied on future generations otherwise ([1]).

We have not followed this approach in the present study, since it would severely reduce the cross-country comparability of our findings. In fact, in some EU Member States, capital income taxation is not significant. In others, in particular Scandinavian countries, even negative capital income taxes are observed, reflecting a high level of housing subsidies. Instead, in this study, capital income taxes are uniformly assigned across age groups according to generations' asset holdings.

2.4. Imperfections and limitations

From its conception, generational accounting has been exposed to criticism, pointing at the empirical and theoretical limitations of the measurement concept. In this section, we first assess the theoretical objections against the method, before addressing some empirical imperfections and uncertainties in Section 2.4.2.

2.4.1. Theoretical objections

There are two main objections against the theoretical framework behind generational accounting. The first questions the validity of the underlying life-cycle hypothesis. The second criticises the underlying incidence assumptions.

According to neoclassical theory rational agents decide at the beginning of their planning horizon about their life-cycle consumption pattern, taking into account lifetime resources available to them. Lifetime resources

([1]) The conventional procedure adjusts for the difference between the marginal tax rate on new capital and the observable average tax rate on both old and new capital on the base of the user cost of capital approach (cf. Auerbach (1983)).

equal the present value of all future income, which is distributed over the life cycle for consumption by saving (or borrowing). The exact intertemporal distribution of income does not affect optimal life-cycle consumption patterns, as long as the present value of lifetime resources does not change. More exactly, it is the present value of after-tax lifetime resources which enters into agents' consumption decision, and this is where the life-cycle model is related to generational accounting.

In the absence of intergenerational transfers, the present value of rest-of-life net income, determined by gross resources net of discounted future net tax payments, equals agents' remaining lifetime consumption possibilities. Hence, the generational accounts indicate the extent to which the consumption possibilities of different generations are changed by fiscal policy. Although the life-cycle model represents standard economic theory which seems broadly consistent with empirical findings (cf. CBO (1995, p. 59)), its basic assumptions have been challenged occasionally. The planning horizon of individuals, it is argued, actually might differ from their life cycle.

A planning horizon that reaches out over agents' own lifetime requires to assume a concern for subsequent generations. This is the case if bequests are motivated by altruism, which means that the well-being of descendants positively affects parents' own well-being (cf. Barro (1974)). Altruism leads to intergenerational transfers in the form of gifts or bequests, which might offset intergenerational redistribution induced by government tax and transfer policy. In the extreme, perfect altruism implies that generational redistribution through government budgets is fully counterbalanced by private intergenerational transfers.

As a consequence, if the generational accounts indicate, for example, that fiscal policy redistributes consumption possibilities to the disadvantage of future generations, private intergenerational transfers not recorded by the accounts might enable future taxpayer generations to bear a higher tax burden while after-tax resources do not change. If the perfect altruism argument was valid, there would be no need for either accrual or generational accounting. In any case, government policy would not lead to generational redistribution. However, empirical evidence supporting the intergenerational altruism motive is too weak to invalidate the generational accounting results (cf. Auerbach et al. (1994), p. 90, and Altonji et al. (1992)).

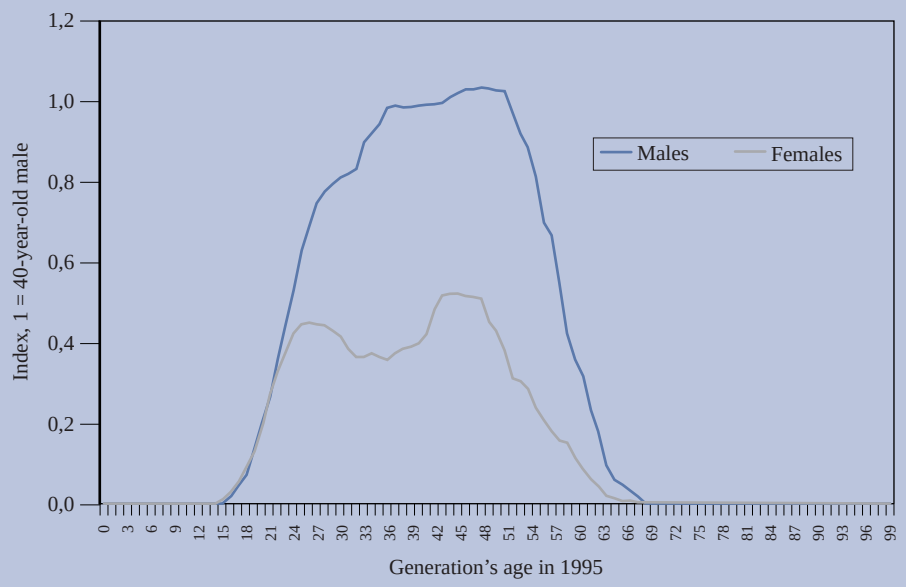
If agents were myopic or liquidity-constrained due to capital market imperfections, the individual planning horizon would be shorter than is postulated by the life-cycle model. Agents would not distribute income resources over their life cycle, but rather base their consumption decision on current income (cf. Buiter (1995)). If this is the case, the timing of income, tax payments and transfer receipts affects individual well-being.

Whether agents respond more strongly to variations in current resources than to variations in lifetime resources is an empirical question. Evidence suggests that the life cycle does not fully explain consumption patterns (cf. CBO (1995, pp. 62n)). Consumers seem to put more weight on current and less on lifetime income than the life-cycle model predicts. Supposing agents do not behave myopically, this observation hints at the existence of credit rationing in the short run. In this case, government borrowing could be preferable to private borrowing, if the tax collecting mechanism is less costly or easier to enforce than private loan contracts (cf. Bohn (1992, p. 9)). However, empirical evidence supporting the existence of significant liquidity constraints in the long run, is rather weak (cf. Hayashi (1987)).

The second theoretical objection against generational accounting concerns the incidence assumptions employed. The method neglects the impacts on net tax burden on quantities and prices of consumption and investment, and the repercussions on factor inputs in the production process. Since pre-tax factor returns are taken as constant, the incidence of all tax payments and transfer receipts falls directly on the respective taxpayers or transfer recipients. This implies that workers bear the entire labour income tax burden, and furthermore that the labour income tax burden of each agent equals the tax amount paid. The suppliers of capital are supposed to bear the entire burden of capital taxation, consumers to bear the entire burden from indirect taxes. Similarly, transfers are regarded as beneficial only for the transfer recipient.

However, tax payments or transfer benefits are not necessarily borne by those who formally pay or receive them. Levying taxes or providing government transfers generally affects pre-tax and pre-transfer incomes, so that the net tax burden may slide. For example, labour income or consumption taxes might be shifted to firms, and hence capital owners. Partial incidence analysis may help to clarify the relevance of macroeconomic repercussions for the validity of generational accounts.

Graph 4: **Labour income tax profile, German country study**



As an example, Graph 4, taken from Fehr and Kotlikoff (1997), depicts Marshall supply (S_0) and demand (D_0) functions for labour in a perfectly competitive market. In the absence of any labour income taxes, (L_0) is the employment level at a market clearing net wage rate of (w_0) which falls together with the gross wage.

When labour is taxed, (S_0) still plots the net-of-tax labour supply. In order to find the market clearing gross wage, (S_0) is converted to a curve (S_1), showing the amount of labour supplied at gross wages, by shifting it vertically by the amount of taxes due. With elastic supply and demand curves, employment decreases to a level of (L_1) while gross wages rise and net wages fall compared to the equilibrium before taxation. However, because gross wages increase, net wages do not fall by the full amount of the tax. As a consequence, the tax burden is partially borne by both parties on the labour market.

The exact welfare changes due to taxation are easily located. In Graph 4, the area represents the loss in workers' surplus, the area the loss in firms' surplus. The combined loss exceeds the gain in government tax revenue, indicated by the area, by the triangle abc, which represents a good approximation of the deadweight loss of taxation due to tax avoidance by workers and firms. Generational accounting, focusing exclusively on cohort tax payments, would indicate workers' welfare loss due to labour income taxation by the collected tax revenue. This approach misrepresents the actual change in workers' utility, as one would have to adjust aggregate tax revenue for the tax-induced increase in gross wages, and the excess burden of taxation abc.

The magnitude of the measurement error is a priori undetermined, and depends on the specific market conditions. In general, the distribution of the tax burden and the magnitude of the deadweight loss depend on the elasticity of supply and demand. If labour supply is perfectly inelastic, there is no excess burden at all, and tax revenues indicate the change in workers' utility correctly. If labour demand is perfectly inelastic, pre-tax wages increase by the income tax. The tax is exclusively borne by firm holders, while the generational accounts would suggest that the burden falls on labour. In contrast, with perfectly elastic labour demand, generational accounts understate the actual labour tax burden on labour, neglecting that the excess tax burden is exclusively borne by workers.

From this partial equilibrium analysis, one might conclude that it would be sufficient to estimate supply and

demand elasticities to check the validity of the generational accounts. However, matters are considerably more complex, because tax reactions on a specific market spill over to other markets. In our example, the wage increase due to the labour income tax is likely to affect commodity prices, increasing the relative price of labour intensive goods. Furthermore, the tax is going to change the relative price of production factors which are substitutes for labour. Changes in relative factor income, in turn, affect savings formation, and thereby the capitalisation of the economy in dynamic equilibrium.

In the event, to accurately assess tax or transfer incidence, only a fully specified dynamic general equilibrium model would be sufficient. Two empirical studies have attempted to analyse to what extent the incorporation macroeconomic feedback effects may change the notion of intergenerational redistribution as measured by generational accounts based on simple incidence assumptions.

Raffelhüschen and Risa (1997) contrast Benthamite welfare analysis with the results of generational accounting in an economy with a pay-as-you-go pension scheme, which is out of steady state due to a permanent decline in fertility. This scenario burdens future generations by an increase in payroll taxes as the population ages. Nevertheless, as can be shown in a stylised overlapping generations framework, the equalisation of generational accounts for current and future generations would not necessarily maximise intertemporal welfare. In fact, partial funding schemes equalising generational accounts would be either time inconsistent or welfare decreasing.

Whereas the analysis of Raffelhüschen and Risa to some extent questions the general validity of generational accounting, a large-scale empirical study undertaken by Fehr and Kotlikoff (1997) shows that generational accounts provide appropriate measures of intergenerational redistribution for a variety of policy options. Within the setting of the Auerbach-Kotlikoff (1987) dynamic general equilibrium model, the welfare dynamic effects of net taxes are decomposed into three components: the immediate tax revenue effect (corresponding to the area in Graph 4), measured by the generational accounts, the dynamic factor income effects (corresponding to the area) and the welfare change due to tax avoidance effects (corresponding to the triangle abc).

The findings indicate that ‘in general changes in generational accounts provide fairly good approximations to generations’ actual changes in utility. The approximations are better for living generations. They are worse for policies that involve significant changes in the degree of tax progression and for economies with sizeable capital adjustment costs. Finally, generational accounting needs to be adjusted in the case of small open economies to take into account the fact that the incidence of corporate taxation is likely to fall on labour. The method of adjustment is simply to allocate changes in corporate tax revenues to generations in proportion to their changes in labour supply.’ (Fehr and Kotlikoff (1997, p.28)).

2.4.2. Empirical objections

Generational accounts result from calculations based on demographic and economic projections. The degree to which they design actual future developments is uncertain. Since parameter variations in long-term projections may considerably alter intertemporal fiscal imbalance, sensitivity tests are a prerequisite for any serious generational accounting study. For a base case, counterfactual status quo projections provide a useful reference. The stylised status quo approach highlights the indicator qualities of generational accounting, which basically attempts to make a statement about current fiscal policy, rather than to predict the future.

Furthermore generational accounts can be used to analyse what might be considered as likely developments of economic policy or population parameters, tolerating the higher variance associated with long-term forecasts. Hence, a comprehensive generational accounting analysis typically investigates intertemporal fiscal imbalance for realistic variations in key economic and demographic parameters, likely changes in fiscal policy, and likely changes in the behaviour of economic actors.

Apart from uncertainties about the future, generational accounts might misrepresent the actual intertemporal state of government finances, because they incorporate business cycle effects. Since the budget aggregates underlying the accounts are not corrected for business cycle effects, as is done constructing annual budget indicators, base-year economic performance is perpetuated indefinitely. This may lead to a substantial bias, as intertemporal fiscal imbalance tends to develop procyclically ([1]).

([1]) For example, fiscal imbalance in Norway has increased significantly since 1992. Generational accounting would attribute the improvement in fiscal sustainability to prudent fiscal policy. However, the reduced fiscal imbalance is actually caused by a more favorable macroeconomic environment (cf. Auerbach et al. (1993) and Steigum and Gjersem (1997)).

Haveman (1994, p.99) and Diamond (1996, p.602) have criticised generational accounting for treating fiscal policy as if it could last forever. Government, they argue, actually is reactive, and will adapt fiscal policy when its liabilities start growing progressively. Therefore, static projections of fiscal policy as used to construct the generational accounts may lead to outcomes which are unlikely from a public choice perspective. This criticism to some degree misses the analytical target of generational accounting, which is to indicate the extent of the future revision of fiscal policy inevitable if current tax and transfer levels are maintained. In this context, the assumption that only future generations will bear the net tax adjustment must be understood as an illustration reflecting that short-sighted policymakers are prone to postpone fiscal reforms.

A more serious empirical criticism concerns the ambiguous discount rate choice. Selecting a theoretically sound discount rate is indeed difficult. If a complete set of perfect capital markets existed, the appropriate rate to discount future payments would be the (uniform) market rate of interest. However, capital markets are imperfect, and offer a wide range of interest rates. Moreover, capital markets are distorted by taxation, which requires distinction of pre- and after-tax interest rates.

Without uncertainty, the discount rate would ideally measure the opportunity cost of resources withdrawn from the private sector by government activity. If net tax burdens displace private consumption, the social rate of time preference indicates opportunity costs. It can be approximated by the after-tax rate on private savings. If, in contrast, private investment is displaced, opportunity costs are indicated by the before-tax rate of return on private assets, which is higher than the social rate of time preference. Unfortunately, this meaningful concept to discount future payment streams, developed for cost-benefit analysis of public investment projects, would be difficult to implement to evaluate fiscal policy as a whole. Nevertheless, it marks what might be the upper and lower bounds of the discount rate.

Uncertainty further complicates discount rate choice. Selecting an interest rate to discount uncertain future government transfer payments or tax revenue, one must take into account that public revenue and expenditure, while uncertain, is less volatile than the risky assets in the private sector. As a consequence, it would be necessary to apply a discount rate higher than the risk-free rate when discounting future revenue, and a discount rate lower than the risk-free rate when discounting prospective expenditure.

In the light of this argument, the application of a single discount rate for either payment streams appears as a serious simplification. A further simplification is the use of a constant discount rate. It postulates that risk attitude is identical for all generations, and remains constant over their life cycle.

2.5. Conclusions

Generational account measures for the intertemporal sustainability of public finances need to be approached with some caution, considering the theoretical and empirical limitations of the method. Nevertheless, the generational accounting focus on intertemporal generational redistribution helps to address some of the long-term financial problems to be solved by the EU Member States during the next decades.

Traditional accounting methods, which judge fiscal burdens by changes in annual government cash-flow deficits (or surpluses), generally fail to indicate the long-term state of public finances. If agents are concerned about life-cycle income, accrual budget concepts basically measure the short-term influence of government activity on aggregate demand. The impacts of current outstanding debt and future deficits raised by implicit claims on future budgets on prospective private consumption possibilities and their generational distribution are not a subject of annual accounting concepts.

Despite being prone to political manipulation (cf. Haveman (1994, p.107)) and certain shortcomings regarding practical realisation, both annual budget accounting and generational accounting are important tools of fiscal policy analysis. The insights conventional budgets analysis provide lie in the realm of political planning and execution. Generational accounting analysis, in contrast, takes a conceptual perspective. It provides a valuable reference to evaluate fiscal policies by their long-term sustainability, and their possible impact on the generational redistribution of personal consumption possibilities.

3. Belgium: can fiscal policy cope with debt and ageing?

Arnaud Delli ([1]) and Erik Lüt ([2])

3.1. Introduction ([3])

The large government debt as well as the upcoming demographic transition are commonly viewed as the greatest challenges for Belgian fiscal policy. Among the Member States of the European Union, Belgium displays the highest government net debt as a percentage of GDP, amounting to 122.2 % while the European Union average totals only 72.1 %. Despite these quite alarming figures, government debt dynamics are rather optimistic. Between 1993 and 1997, government debt has decreased by 13 % while the EU average has increased by 6.2 %.

Often the government deficit or government debt is evaluated in light of investment expenditures. In Belgium, government investment remained at around 1.5 % of GDP from 1993 to 1997, while the EU average decreased from 2.7 to 2.1 % over the same period (European Commission (1998a)). Belgian investment expenditures were not only lower than the government deficit, which means that the burden left to future generations is not counterbalanced by an increase in the capital stock, but also the lowest within the European Union. For instance, roads and railways have severely deteriorated for several years, and as a consequence, government investment spending has to be made in the future, thus increasing the fiscal burden to be born by future generations.

The second challenge for Belgian fiscal policy is population ageing, which will result in higher pension and health-care spending in the years to come. As Casamatta and Pestieau (1998) point out, the real issue is political rather than demographic or economic. Like any pay-as-you-go (paygo) system, Belgian social security is characterised by entitlement problems which cannot be easily solved by coalition governments so common in the Belgian political arena. By entitlement problems, we mean entitlements which were actuarially fair at the time they were introduced but which became actuarially unfair because of rigid rules and changing economic settings (cf. Dellis and Pestieau (1998)). If reforms were implemented, the financial sustainability of the social security system as well as equity objectives could be preserved. But entitlements make reforms difficult to implement, as is evident from the permanent postponement of the reform of the pension scheme for civil servants.

The aim of this paper is to assess how Belgian fiscal policy copes with the above issues by employing a generational accounting approach based on data for 1995. Generational accounting, by taking the entire government sector's intertemporal budget constraint as a starting point, not only allows explicit judgements on the intergenerational sustainability of current fiscal policy. By calculating the rest-of-life net tax burdens of specific generations, it also provides a manageable tool to evaluate the distributive impact of prevailing fiscal policy.

Section 3.2 gives an overview on the stance of fiscal policy in Belgium. Section 3.3 reports the generational accounting results for Belgium as well as the underlying assumptions made by this approach. Furthermore we test the sensitivity of the results to different parameter specifications, namely alternative real interest and growth rates. In Section 3.4, we implement three policy experiments. Departing from our baseline case we first analyse the pension reform of 1997. Subsequently, we assess the impact of two widely discussed measures to reduce fiscal imbalance, specifically a commitment to a 1.5 % annual deficit and the government's commitment to a 6 % primary surplus until 2010. Finally, Section 3.5 summarises the main findings.

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3.2. The stance of fiscal policy

As indicated above, a primary purpose of generational accounting is to assess the impact of fiscal policy on intergenerational distribution, predominantly between current and future generations. Indeed, some past generations took excessive advantage of the government's generosity, and as a consequence, one major source of generational imbalance in Belgium is the large government debt.

As noted by Pressman and Pestieau (1994) with respect to the distributive impact of government debt, two points deserve special attention. First, the distributive impact of government debt strongly depends on the validity of Ricardian equivalence or, stated differently, on the extent to which government transfers are neutralised by private ones (cf. Barro (1974)). Present generations, when taking into account the burden they leave to future generations, may try to compensate their successors through larger bequests. Second, the official government debt is not the only source of generational imbalance; implicit claims on future generations in the form of pension entitlements are in many important respects similar to explicit indebtedness.

Since generational accounting only monitors transfers between the government and private sector the former aspect is fully neglected. The latter, however, enters the calculations by weighting demographic projections with current pension entitlements per capita.

Belgian government debt dates back to the aftermath of World War II. During that period, Belgian GDP increased substantially while at the same time the government got into a debt position. At that time it was common belief that economic growth would be permanent and that indebtedness was a useful way to redistribute future productivity gains between living and future generations. The situation began to topple in the mid-1970s, however, when Belgium, like many other countries, experienced a slow-down of its trend in economic activity. The government tried to stimulate the business cycle by pursuing a Keynesian policy — as a consequence, government debt exploded. With recurrent huge deficits, the debt continuously increased, exceeding the 100% level as early as 1983.

Belgian governments have been trying to reduce government spending since 1981. Primary expenditures, i.e. expenditure minus interest payments, decreased from 52% of GDP in 1981 to 41% at the end of the 1980s, while at the same time government receipts remained at a constant level. Consequently, the primary deficit position improved and in 1984 a primary surplus was reached. The primary surplus has been increasing ever since, reaching a value of 5.6% at the end of 1997.

The decline in interest paid on government debt — from approximately 11% of GDP in 1992 to an estimated 8% in 1996 — reflects both lower interest rates and an active debt management policy. Given the magnitude of government debt, the Belgian budget is especially sensitive to interest rate changes. For instance, a 1 percentage point drop in the average interest rate paid on government debt translates into a decline in the budget deficit of 1.3% of GDP (cf. OECD (1997a)). During the period under inspection, interest rates fell — albeit with strong short-term fluctuations — and in 1996 were considerably lower than in the early 1990s. With respect to debt management policy one observes strong efforts in 1993 and 1994, when over one half of the long-term debt denominated in Belgian francs was refinanced at interest rates which, on average, were 2 percentage points lower. As a consequence, the effective interest rate on overall government debt has declined from 8.8% in 1992 to an estimated 6.7% in 1996. Nevertheless, the budget deficit still amounted to 2.2% in 1997. Government debt, which reached a peak of 140% in 1994, has been decreasing for several years. At present it amounts to less than 120% of GDP according to European fiscal statistics (cf. European Commission (1998a)).

Belgium was admitted as a member of the EMU, but its government debt cannot remain at its present level. In this context two deficit targets are often cited. First, the Belgian government has formally committed itself to reach a primary surplus of 6% of GDP over the medium term. Another well-known target is an annual deficit of 1.5% of GDP. We will assess their implications for intergenerational distribution in Section 3.4.

Apart from government debt, the paygo social security system in combination with an ageing population is a major challenge for fiscal policy. To what extent will the Belgian population be ageing in the years to follow? In order to answer this question a glance at the development of the dependency ratio is helpful. In general two dependency ratios are distinguished, namely the old-age dependency ratio and the total dependency ratio. While the former aims at the retirees, aged 65 and older, the latter focuses on the number of old and young (aged 17 or

younger). Both figures are then related to the number of working people, commonly aged 18 to 64.

In the near future, according to the projections, the old-age dependency ratio stays relatively constant at around 26%. However, when the baby-boomer generation grows old — between 2010 and 2030 — the ratio experiences a sharp increase up to 40% and remains constant thereafter. In other words, while a pensioner may be financed by four employed persons at present, in 2030 the number of contributors per retiree will shrink to little more than two. This picture becomes even more gloomy when making further allowances for dependent children. In that case, the ratio of dependent to productive population amounts to nearly 75% in 2040, implying that one beneficiary will be supported by little more than one employee.

While the dependency ratios are a useful indicator for the challenges that await the social security system in the near future, a quantitative assessment of the burden seems indispensable. Thus, the Federal Planning Bureau attempts to answer this question in terms of contribution rates to social security (cf. Fasquelle and Weemaes (1997)). It estimates that pension spending will increase from 10.6% of GDP in 1995 to 13% in 2030–40 when the members of the baby-boomer generation will be retired. This implies, that contribution rates rise from 18 to 23%.

A somewhat different approach is chosen by Dellis and Perelman (1999) who have calculated what Feldstein (1974) called social security wealth. By summing up the pension rights that specific generations have acquired through paying their contributions, they report what from a government's point of view corresponds to implicit government debt. Obviously, this debt has increased gradually not only in absolute value, namely from BEF 6 224 billion in 1961 to BEF 25 348 billion in 1995 (in constant 1991 Belgian francs.), but also in relative value, from 239 to 354% of GDP. Moreover, the authors have estimated the development of social security wealth for the first half of the coming century. They find that it will rise up to BEF 75 500 billion in 2050, thus being three times higher than in 1995.

By making explicit the social security liabilities, the reported data provide an important component of the overall government debt and thereby provide a more complete picture of the stance of fiscal policy than does the figure of official statistics. However, these approaches still miss some significant aspects. Most importantly, they abstract from government's receipts and in doing so, they prevent the inspection of fiscal policy with regard to sustainability. Furthermore, a meaningful assessment of future financial burdens is impossible without taking into account the entire government sector, comprising all kinds of government receipts and expenditures.

Generational accounting does just that. By multiplying the demographic structure of future years with the age-specific per capita net tax payments of the base-year, while at the same time discounting and adjusting for growth, one derives the true net liabilities of the entire government sector. Moreover, one can infer how much of these intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2) are paid off by living generations and how much are passed over to future generations. In the following section, the generational accounting findings for Belgium will be reported.

3.3. Belgian generational accounts

3.3.1. Basic assumptions

Assumptions underlying our demographic projections are based on the last population projection made jointly by the Federal Planning Bureau and the National Institute of Statistics (cf. INS (1996) as well as Lambrecht (1997) for a synthetic presentation). According to these assumptions the gross fertility rate will increase from 1.56 in 1995 to 1.75 in 2011 and will remain constant thereafter. Furthermore, life expectancy at birth amounting to 73 years for males and 80 years for females in 1995 is assumed to increase by one year until 2010. We deviate from the above population projection by holding life expectancy constant thereafter. Although, this procedure might render the results slightly more favourable, this seems justified on the following grounds. While the official projection covers the period 1995–2050, our projection extends to 2200, which suggests more moderate assumptions. Furthermore, it is in accordance with the generational accounting studies undertaken for the other Member States of the European Union to hold life expectancy constant after 2010 and thus guarantees comparability.

The increase in life expectancy significantly affects the fiscal resources, since it implies more health-care spending and retirement benefits. In conjunction with the ageing of the large baby-boomer generation it accounts for

the sharp increase of social security expenditures reported above.

Net immigration per annum is derived from separate hypotheses with respect to emigration and immigration. The former is modelled by applying emigration rates to the resident population. These rates are supposed to vary with age and gender but remain constant over time. On the other hand, the number of immigrants is fixed to 60 000 per annum from 2000 onwards. This results in a time-path of net immigration which decreases from 10 000 persons in 1995 to merely 3 000 persons in 2050 remaining constant thereafter. Note that the total Belgian population amounts to 10 million individuals.

The annual budget, which is reported in Table 7, is the starting point for our generational accounting calculation. Seven groups of transfers are distinguished, namely retirement benefits, unemployment benefits, which include unemployment and early retirement benefits, health care, education spending, family allowances, birth allowances, and child nursery. Except for the last three all aggregates can be distributed by age and gender.

On the receipt side of the budget, we distinguish tax on labour income and pensions, capital income tax, wealth tax, indirect taxes (including VAT, excise taxes and customs duties), and social security contributions. Gender-specific age profiles are only available for social security contributions. All non-age-specific taxes and transfers are included in the generational accounts by distributing them uniformly over age. Finally, the government net wealth is equal to financial assets net of government debt. In Belgium, this figure is clearly negative.

In order to produce realistic forecasts, we also take into account reforms which first became effective between 1995 and 1998. There have been some changes in indirect tax rates, among them the VAT base rate, which was raised from 20.5 to 21% in 1996. In addition, the property tax rate was increased from 13.4 to 15.0% in 1996. Finally, in specifying baseline values for the real interest and productivity growth rates, we assume a 5% interest rate and a 1.5% real growth rate. Results under alternative parameter specifications will be presented in the subsection after next.

3.3.2. Baseline results

Table 8 provides generational accounts for cohorts ranging from age 0 to 100 in the base-year 1995. While the first column reports the average accounts, the following two columns refer to males and females, respectively. Thus, a person born in the base-year has a lifetime net tax payment equal to ECU – 29 100, i.e., a net transfer of receipts. In other words, if fiscal policy remains unchanged, the discounted value of transfers which a newborn receives until the end of his life will be ECU 29 100 greater than the discounted value of taxes he will have to pay.

For a five-year-old, the net tax payment is still negative — though higher — while it turns positive thereafter. In fact, the net tax payment increases steadily until a maximum is reached at age 25. At that age, a representative agent is confronted with a rest-of-life net tax burden of ECU 160 700. Successively, the generational accounts decrease until they change sign again at age 50. They stay negative thereafter, reaching a minimum of ECU

Table 7

Government receipts and expenditure in Belgium, 1995

(billion ECU)

Receipts		Expenditure	
Labour income tax	25.9	Retirement benefits	19.0
Capital income tax	10.3	Unemployment benefits	6.0
Wealth tax	2.3	Health care	13.8
Indirect taxes	24.7	Family allowances	4.1
Social security contributions	31.6	Birth allowances	0.1
Government deficit	8.5	Child nursery	0.1
		Education	9.5
		Non-age-specific expenditures	32.0
		Interest payments	18.7
Total	103.3		103.3

Source: OECD (1997b).

– 113 800 at age 65. Note that the maximum net tax payment of ECU 160 700 is very high, while the maximum net transfer payment of ECU 113 800 is very low compared to many other countries in this study. Moreover, in other countries the rest-of-life taxation maximum in young age is often lower than the rest-of-life maximum in old-age-transfers. We will return to this feature, when interpreting the Belgian results in more detail.

The age profile can be explained by the conjunction of two factors. First, generational accounting is a prospective method, which, by definition, takes into account only rest-of-life tax and transfer payments. Hence, the generational account of an elderly person is negative, as his tax-intensive working years lie behind him and for the rest of his life he benefits from pension payments. After age 65, the net transfer declines as the remaining lifetime shortens.

Secondly, due to discounting, payments that occur in the future are of lesser importance than current payments. Accordingly, young agents display negative accounts, as their tax-intensive working years still lie in the distant future. In the same manner it can be explained that the generational account becomes zero between the ages of 45 and 50. It is at this age that the present value of future pension entitlements exactly balances the present value of remaining working year taxes.

Even though for most taxes and some transfers age-specific profiles were not available, males' and females' accounts differ significantly. At birth, the female net transfer receipt is as high as ECU 48 200 whereas it is only ECU 11 000 for a male agent — obviously, females are better off. Due to the lack of age-specific data, the profiles should not be taken too literally. Note however, that the age-specific difference is, at any rate, downward biased.

Some sources of the difference can be identified by inspecting each type of tax and transfer in turn. Tables 9 and 10 display generational accounts for each tax and

Table 8

Baseline generational accounts, Belgium

(1 000 ECU) (*)

Generations in 1995	Age average	Male	Female
0	– 29.1	– 11.0	– 48.2
5	– 5.3	17.3	– 29.0
10	28.9	56.3	0.3
15	78.3	111.1	43.4
20	134.1	173.1	93.7
25	160.7	202.6	117.1
30	146.5	188.4	103.0
35	118.5	156.3	79.6
40	82.9	114.7	50.2
45	39.3	62.7	15.1
50	– 12.4	– 1.0	– 23.9
55	– 66.7	– 70.7	– 62.8
60	– 102.5	– 115.5	– 90.3
65	– 113.8	– 127.2	– 102.0
70	– 110.1	– 119.1	– 102.8
75	– 98.4	– 100.4	– 97.0
80	– 84.9	– 82.3	– 86.4
85	– 70.0	– 65.7	– 71.8
90	– 55.5	– 52.2	– 56.5
95	– 42.9	– 40.8	– 43.4
100	– 16.1	– 15.8	– 16.1
Increase in all taxes, future (%)	6.7	–	–
Future generation account	– 16.9	2.4	– 37.3
Absolute difference	12.2	13.4	10.9
IPL (% of GDP)	18.8	–	–

(*) 1995 value; baseline (g = 0.015, r = 0.05).

transfer item. Turning first to taxes, we find no significant difference between the present value of male and female lifetime tax payments with the exception of social security contributions. This is not astonishing, given that we did not employ gender-specific micro-profiles for taxes. Any continually observable gender gap stems from differences in life expectancy. This becomes obvious when turning to youth transfers (comprising family allowances, birth allowances and child nursery), for which gender-specific profiles were also not disposable. In contrast to the tax payments, there are no gender-specific deviations however, since they occur early in life, at an age where differences in life expectancy are of lesser importance.

Social security contributions differ strongly, amounting to ECU 40 300 for a female newborn versus ECU 81 100 for a male newborn. This result suggests that for other taxes we would also find gender-specific differences if data with respect to gender were available. Therefore our calculations probably overestimate females' lifetime tax payment while underestimating males'.

As to the transfers, we observe a significant gender gap to the disadvantage of males with regard to retirement benefits and health care. In fact, economic inequalities are compensated by 'demographic' inequalities which can be illustrated by, for example, retirement benefits. On average, a female's longer life expectancy more than counterbalances a shorter working career and a lower salary — both implying a lower retirement benefit due to the tax-benefit linkage. Over the life cycle, retirement benefits are ECU 16 200 for females while they are ECU 14 700 for males. As to unemployment benefits, for females this transfer decreases between age 20 and age 60 whereas it increases between age 30 and age 50 for a male. The latter observation can be explained by the extensive use of early retirement schemes in order to reduce unemployment rates ([1]). Since males are predominantly induced to early retirement and since this benefit is higher than the alternative unemployment benefit, females' benefits at the end of the working career are

([1]) People can be entitled to early retirement benefits if they are between the ages of 50 and 64 and if they meet some specific minimum requirements.

Table 9

Taxes and transfers for males

(1 000 ECU) (*)

	Taxes				Transfers					
Age	Income tax	Capital tax	Indirect taxes	Social security contribution	Retirement benefits	Health	Unemployment	Youth	Education	Non-age-specific expenditure
0	43.7	15.9	57.8	81.1	14.7	24.5	11.0	24.7	48.4	86.2
5	51.9	18.8	63.2	96.4	17.5	25.4	13.0	20.0	52.4	84.8
10	61.6	22.1	68.6	114.3	20.8	28.1	15.4	14.6	48.4	82.9
15	73.0	25.8	73.1	135.5	24.6	31.4	18.3	7.9	33.3	80.8
20	86.2	30.0	75.6	159.4	29.3	34.9	21.1	3.9	10.3	78.5
25	93.4	34.3	75.4	170.4	34.9	38.1	20.0	0.1	1.9	75.9
30	92.6	37.7	72.4	161.1	41.6	41.0	19.2	0.0	0.8	72.8
35	87.9	40.6	67.1	142.8	49.5	43.6	19.4	0.0	0.6	69.1
40	79.9	43.0	60.2	121.7	59.1	45.9	19.8	0.0	0.4	64.8
45	67.4	45.1	52.3	96.4	70.5	47.4	20.4	0.0	0.2	60.0
50	51.2	46.3	44.3	64.7	847	47.4	20.7	0.0	0.0	54.7
55	34.2	45.2	36.4	29.7	101.2	46.3	19.8	0.0	0.0	48.8
60	21.6	43.1	29.0	7.9	118.2	43.3	13.3	0.0	0.0	42.5
65	15.2	35.6	22.6	1.1	126.3	39.3	0.0	0.0	0.0	36.1
70	11.5	27.6	17.0	0.1	111.0	34.6	0.0	0.0	0.0	29.8
75	9.2	21.8	12.5	0.0	90.5	29.7	0.0	0.0	0.0	23.8
80	7.2	16.9	9.0	0.0	72.1	24.7	0.0	0.0	0.0	18.6
85	5.5	13.0	6.4	0.0	56.4	19.8	0.0	0.0	0.0	14.3
90	4.2	9.9	4.6	0.0	44.5	15.4	0.0	0.0	0.0	11.0
95	3.2	7.5	3.3	0.0	34.6	11.8	0.0	0.0	0.0	8.4
100	1.2	2.7	1.2	0.0	13.3	4.5	0.0	0.0	0.0	3.2

(*) 1995 value; baseline (r = 0.05, g = 0.015).

lower as compared to the benefits of their male counterparts. Notwithstanding, it can be concluded that there is a pronounced gender-specific redistribution in favour of females hinging on both different life expectancies (e.g. health care, pensions) and unequal labour participation rates (e.g. social security contributions).

Next, we consider Belgian fiscal policy with respect to intergenerational distribution and sustainability. In early generational accounting studies the ratio of present and future generational accounts was utilised in order to indicate the degree of intergenerational distribution. However, this ratio does not in every case generate meaningful results as is illustrated in Chapter 2 of this volume ([2]). For this reason we employ a set of indicators, some emphasising the question of sustainability, others focusing on the concern of intergenerational distribution.

The first indicator we consider is the amount of intertemporal public liabilities. In addition to explicit government debt which can be found in official statistics, this measure uncovers the government sector's implicit liabilities, such as those in the form of pension and health-care entitlements. It is calculated as follows. First, demographic projections give us the population's age structure in subsequent years. Second, the base-year's entire government sector budget is decomposed into age-specific net tax payments per capita. Finally, by weighting the population structures of future years with the per capita net tax payments of 1995, the time-path of government's net receipts is derived. If the present value of this time-path turns out to be negative, government faces intertemporal public liabilities.

According to Table 8, Belgium faces intertemporal public liabilities which amount to 18.8% of GDP. Note that explicit net government debt totals 122.2% in 1995.

([2]) In order to guarantee comparability to a study by Stijns (1999), we also report this indicator (conventionally called) which amounts to 20% in our baseline. At first sight Stijns' results seem to differ from those presented in our paper. For example, when using the same interest and growth rates, he derives at 'a' for the base-year 1995 which amounts to 66% as compared to the 20% in this study. In contrast to Stijns, however, we have taken into account the 1997 and 1998 fiscal reforms. In fact, when neglecting these policy measures, we obtain 'a' equal to 63% thus matching Stijns' figure of 66% quite well.

Table 10

Taxes and transfers for females

(1 000 ECU) (*)

	Taxes				Transfers					
Age	Income tax	Capital tax	Indirect taxes	Social security contribution	Retirement benefits	Health	Unemployment	Youth	Education	Non-age-specific expenditure
0	45.1	17.4	59.2	40.3	16.2	20.4	12.5	24.7	48.2	88.1
5	53.5	20.6	64.8	47.8	19.3	22.6	14.9	20.0	52.0	87.0
10	63.4	24.2	70.5	56.7	22.9	25.5	17.6	14.6	48.4	85.6
15	75.2	28.3	75.3	67.2	27.1	29.1	20.9	7.9	33.8	83.8
20	88.6	32.8	78.0	79.2	32.2	32.9	23.9	3.9	10.2	81.9
25	95.9	37.5	78.0	80.3	38.2	33.9	21.2	0.1	1.5	79.6
30	95.1	41.4	75.2	66.3	45.3	34.6	17.6	0.0	0.6	76.9
35	90.6	44.9	70.1	52.4	53.6	36.2	14.4	0.0	0.4	73.8
40	82.8	47.9	63.5	39.0	63.3	37.6	11.6	0.0	0.3	70.2
45	70.5	50.7	56.1	25.5	74.7	37.8	9.0	0.0	0.2	66.1
50	54.4	52.7	48.3	13.5	87.7	37.7	5.8	0.0	0.0	61.5
55	37.3	52.2	40.6	4.7	100.9	37.4	3.2	0.0	0.0	56.2
60	24.8	50.5	33.4	0.9	112.6	36.9	0.0	0.0	0.0	50.3
65	18.2	42.8	26.7	0.1	110.0	35.9	0.0	0.0	0.0	43.8
70	14.2	34.1	20.6	0.0	100.1	34.7	0.0	0.0	0.0	36.8
75	11.4	27.2	15.3	0.0	87.6	33.7	0.0	0.0	0.0	29.7
80	8.8	20.9	11.0	0.0	72.3	31.8	0.0	0.0	0.0	23.0
85	6.6	15.6	7.6	0.0	57.1	27.3	0.0	0.0	0.0	17.2
90	4.8	11.3	5.2	0.0	44.2	21.1	0.0	0.0	0.0	12.6
95	3.5	8.1	3.5	0.0	34.3	15.2	0.0	0.0	0.0	9.1
100	1.2	2.7	1.2	0.0	12.7	5.3	0.0	0.0	0.0	3.2

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Consequently, current fiscal policy, if pursued into the indefinite future, not only deals with the ageing problem, but also manages to pay off a large part of the explicit government debt. At first sight, this relatively favourable result is surprising, bearing in mind that Belgium, like the other OECD countries, undergoes a severe demographic transition and, in addition, has a far above-average net (explicit) debt position. If it is recalled, however, that Belgian governments since the early 1980s have undertaken enormous efforts to cope with government debt, the result seems less surprising. As we noted earlier these efforts by the government are reflected in very high net tax payments during working life and low net transfers during retirement.

So far, we have not specified which generation pays off the intertemporal public liabilities. In order to answer this question, we now turn to the second indicator which is the absolute difference of a current newborn's and a future newborn's generational account. While the former is calculated under the assumption of an unchanged fiscal policy, the latter is derived by adjusting all taxes in order to meet the government's intertemporal budget constraint. Results are reported in the lower part of Table 8.

First, it is remarkable that both future and living newborns receive a net transfer over their lifetime. This presents the question as to who pays their transfers. Although we know for sure that all presently living generations finance the transfer, we do not know which specific generations are unduly burdened. Due to the prospective nature of the living generations' accounts we can neither compare them among each other nor can we compare them with future generations' accounts. In the following we will therefore compare the lifetime net tax burden of current and future newborns.

The intertemporal public liabilities necessitate an increase of future generations' tax revenues which amounts to 6.7%. This implies that the account of a future newborn raises from ECU – 29 100 to ECU – 16 900 resulting in an absolute difference of ECU 12 200. Taking a closer look at a future male agent reveals that the increase is higher, amounting to ECU 13 400, while for a female agent it totals only ECU 10 900. This imbalance reflects the same gender gap already observed for living generations.

The last indicator to assess fiscal imbalance is the immediate tax increases or transfer reduction for all generations necessary to equalise the generational accounts of current and future newborns. In contrast to the above reported tax increase for the future generations only, all per capita tax payments or all per capita transfers for both future and living generations are adjusted until the government sector's liabilities vanish. As per capita payments are initially assumed identical for future and current newborns, this approach puts fiscal policy back on an intergenerationally sustainable growth path, while at the same time restoring generational balance.

Let us first turn to the tax increase. Under current circumstances, an equalising burden policy requires a once-and-for-all tax increase of 1.4%. This is far below the 6.7% which is necessary if we burden solely future generations. Again, this mirrors the fact that all presently living generations already pay a major part of government liabilities. Hence, the ratio of tax revenue to GDP is not significantly affected. In fact, this policy would imply a minor increase from 46.2 to 46.8%. Moreover, the generational account for a future newborn would decrease, and increase for a current newborn, thus amounting to ECU – 26 600 for each.

If we equalise fiscal burdens by cutting transfers, we get similar results. In particular, a transfer cut of 1.5% is necessary to ensure generational balance, thus only lowering the ratio of transfers to GDP from 40.6% in the baseline to 40.0%. What is much more interesting is how both policies (tax increase and transfer cut) will affect the generational accounts of living generations. The tax increase places heavier burdens on working-age generations, while the transfer reduction affects predominantly young people and the elderly.

We can conclude that all three indicators report a moderate imbalance of current fiscal policy in Belgium. Presently living generations bear a large part of those burdens, which are imposed by both the demographic transition and a debt position far above average.

3.3.3. Sensitivity analysis

For the analysis in the previous subsection the real interest and growth rates were assumed to be 5 and 1.5% respectively. Subsequently, we calculate accounts for a broader range of parameters. Table 11 reports the absolute differences in accounts of present and future newborns. For the baseline calculation the difference amounts to ECU 12 200. Obviously, the higher the interest rate, the lower is the future generations' net tax pay-

Table 11

Sensitivity analysis, Belgium

(1 000 ECU) (*)

Productivity growth		1	
Discount rate	3	5	7
Difference in the accounts of future and current newborns	– 1.9	– 5.4	– 8.4
Productivity growth		1.5	
Discount rate	3	5	7
Difference in the accounts of future and current newborns	18.1	12.2	6.7
Productivity growth		2	
Discount rate	3	5	7
Difference in the accounts of future and current newborns	45.3	37.6	30.4
Policy experiments to baseline identify the sources of imbalance		No government debt	No demographic change
Present newborn's account	– 29.1	– 29.1	– 9.6
Future newborn's account	– 16.9	– 95.7	– 41.6
Difference in the accounts of future and current newborns	12.2	66.7	31.9

(*) 1995 value.

ment relative to present newborns. Moreover, the higher the growth rate, the more pronounced the difference. At first sight the results seem quite sensitive to alternative parameter specifications, implying even different qualitative outcomes. Recall, however, that for the baseline we found a relatively small generational imbalance. Therefore it is not astonishing that the relative variation is quite large and even varying in sign.

Next we conduct two thought experiments in order to better understand the fiscal impact of government debt and population ageing. While resetting the interest and growth rates back to their baseline values, we first simulate the outcome given that the government debt would have been zero in the base-year. The last section of Table 11 reports both the generational accounts and their absolute difference for living and future generations and contrasts them to the baseline results. As the base-year's fiscal policy is unaffected by this hypothetical experiment, the net tax payments for living generations are unchanged. On the other hand, future generations profit if we set explicit debt to zero. Thus, instead of a tax increase of 6.7% in order to meet the government's intertemporal budget constraint, these future generations would benefit from a tax reduction of nearly 40%. Consequently, their lifetime net transfer increases from ECU 29 100 to ECU 95 700, which makes them better off than living generations. In particular, the absolute difference would amount to ECU 66 700 instead of ECU 12 200 in the baseline. Of course, intertemporal public liabilities fall short of the figure in the baseline case by exactly the amount of explicit debt. Accordingly, intertemporal liabilities are reduced to – 103.4% of GDP and thus turn into intertemporal wealth.

This result is not surprising at all. In fact, the priority of the Belgian fiscal policy is to consolidate deficits and government debt and thus impose high taxes on current generations to ensure a large primary surplus. When hypothetically eliminating government debt, this burden will of course be higher than necessary to ensure a balanced generational distribution.

In a second thought experiment it is assumed that the population structure of the base-year remains constant forever. As in the first experiment this reverses the generational imbalance leaving future newborns with a lower generational account than current newborns. In the same manner intertemporal public liabilities turn negative, amounting to – 52.0% of GDP.

The conclusion that can be drawn from these simulations is that government debt and demographic change are indeed major factors in explaining fiscal imbalance. Furthermore, Belgian budgetary policy is designed to face the population ageing and the alleviation of government debt. Yet, as is obvious from our baseline results, this aim is not fully achieved. Thus, in the following section we discuss alternative measures for restoring generational equity.

3.4. Policy experiments

In the following, we consider three alternative policies to further restore fiscal balance: (1) the 1997 pension reform, (2) the government's deficit commitment, and (3) the primary surplus commitment, which have been described in Section 3.2. All of these experiments are modelled to assess their implications for intergenerational distribution.

3.4.1. The pension reform

Belgium has two major pension schemes, one for private sector employees and self-employed and another for civil servants. These schemes operate under different rules for both benefits and contributions. Furthermore, the scheme for civil servants is far more generous than that for self-employed and private sector employees (cf. De Callatay and Turtelboom (1996) and Pestieau and Stijns (1997) for a more detailed description).

In order to secure the financial sustainability of the pension system, the government has recently reformed the scheme for private sector employees and the self-employed. The scheme for civil servants has not yet been reformed. The basic features of the reform are twofold. First, the government tried to mitigate the gender-specific imbalance in the pension schemes by requiring a 45-year career for both males and females to obtain a full pension. Until than a career of 45 years was required for males while 40 years were required for females. (cf. Dellis (1997)). This first reform measure was implemented in July 1997 but affects only females who were not yet retired at that time. Furthermore, females who will be retired between 1997 and 2009 benefit from a smooth phasing-in.

Second, wages received between 1955 and 1974 are artificially revalued by applying a 'revaluation coefficient', keeping pace with the consumer price index. This coefficient will gradually be reduced to zero until 2005.

Our calculations only take into account the first measure by assuming that retirement behaviour is not affected by the reform.

The upper part of Table 12 reports the reform's impact on the generational accounts of females currently living. Since the reform only affects females younger than age 60, the generational accounts of older females remain unchanged. Furthermore, females who are closer to the retirement age are less affected by the reform because they benefit from the phasing-in. Any woman who is affected will then face a higher generational account, since her working years will entitle her to lower pensions as a result of the reform. Thus, the generational account of a female newborn increases from ECU – 48 200 to ECU – 47 000. It should be noted that our calculations are only relatively rough estimates since they are based on the assumption that retirement behaviour will be unaffected.

Hitherto, we have neglected the issue of generational balance. As mentioned above, the degree of imbalance in fiscal policy is measured by comparing the generational account of a current newborn with the one faced by a future newborn. The lower part of Table 12 displays the accounts for average individuals. The present newborn's account increases from ECU – 29 100 to ECU – 28 500 as a result of the pension reform, indicating a lower net transfer over the life cycle. Consequently, the burden imposed on future generations is lower, which is indicat-

Table 12

Pension reform

(1 000 ECU) (*)

Females' age in 1995	Baseline	Pension reform
0	– 48.2	– 47.0
5	– 29.0	– 27.6
10	0.3	2.0
15	43.4	45.4
20	93.7	96.0
25	117.1	119.9
30	103.0	106.3
35	79.6	83.6
40	50.2	54.8
45	15.1	20.6
50	– 23.9	– 19.7
55	– 62.8	– 59.4
60	– 90.3	– 90.3
65	– 102.0	– 102.0
70	– 102.8	– 102.8
75	– 97.0	– 97.0
80	– 86.4	– 86.4
85	– 71.8	– 71.8
90	– 56.5	– 56.5
95	-43.4	– 43.4
100	– 16.1	– 16.1
Increase in all taxes, future (%)	6.7	4.2
Present generational account	– 29.1	– 28.5
Future generational account	– 16.9	– 20.8
Absolute difference	12.2	7.7
IPL (% of GDP)	18.8	11.9

(*) 1995 value; baseline (r = 0.05, g = 0.015).

ed by a smaller increase in taxes necessary to satisfy the intertemporal budget constraint and lower intertemporal public liabilities as compared to the baseline case. Specifically, the future newborn's account is ECU 3 900 less than in the baseline case. Thus, the absolute generational imbalance is reduced from ECU 12 200 to ECU 7 700 but is not completely removed.

Generational accounting does not provide information which allows us to compare the fiscal burden among currently living generations. Nevertheless even without sophisticated calculations, we can perceive an imbalance among the living which is not age-specific, but sector-specific. As already mentioned, there are two pension schemes in Belgium, but only one has been reformed, namely the scheme for private sector employees and self-employed. Considering that even before this reform, civil servants received more generous pension benefits than their private-sector counterparts, the reform seems unbalanced in more than just one respect.

3.4.2. The deficit cut

For several years, the major objective of the Belgian budgetary policy has been to meet the criteria of the Maastricht Treaty. Accordingly, the government has implemented measures to cut the deficit. As a consequence, the deficit has been reduced to 2.2% of GDP. In view of the still very high government debt, however, the Belgian government has committed itself to reach an annual deficit of 1.5% of GDP in the medium term. In the following, this measure will be thoroughly discussed.

Table 13 contrasts the baseline generational accounts with those that would prevail under the deficit consolidation policy. Specifically, in column three and four we distinguish two ways of financing the deficit cut, firstly, by adjusting all transfers, secondly, by adjusting all taxes. Obviously, the policy experiment leads to a worsening of generational imbalance. While in the base-case we observe an absolute difference between current and future newborns' generational accounts of ECU 12 200,

Table 13

Deficit cuts for different targets and means

(1 000 ECU) (*)

		Deficit target		Primary surplus target	
Generation's age in 1995	Baseline	Tax adjustment	Transfer adjustment	Tax adjustment	Transfer adjustment
0	– 29.1	– 31.8	– 32.3	– 26.0	– 26.3
5	– 5.3	– 8.5	– 8.6	– 1.9	– 2.8
10	28.9	25.1	25.9	32.7	31.3
15	78.3	73.9	75.7	82.2	80.6
20	134.1	129.6	131.6	137.8	136.5
25	160.7	156.3	158.1	164.1	163.1
30	146.5	142.5	143.8	149.5	149.0
35	118.5	114.8	115.7	121.0	121.0
40	82.9	79.8	80.0	84.8	85.5
45	39.3	36.9	36.3	40.8	41.9
50	– 12.4	– 14.2	– 15.5	– 11.3	– 9.8
55	– 66.7	– 68.0	– 69.8	– 65.9	– 64.5
60	– 102.5	– 103.5	– 105.3	– 101.9	– 100.7
65	– 113.8	– 114.5	– 116.2	– 113.4	– 112.4
70	– 110.1	– 110.6	– 111.9	– 109.8	– 109.2
75	– 98.4	– 98.8	– 99.8	– 98.3	– 97.9
80	– 84.9	– 85.1	– 85.7	– 84.9	– 84.7
85	– 70.0	– 70.1	– 70.4	– 70.0	– 70.0
90	– 55.5	– 55.5	– 55.6	– 55.5	– 55.5
95	– 42.9	– 42.9	– 42.9	– 42.9	– 42.9
100	– 16.1	– 16.1	– 16.1	– 16.1	– 16.1
Increase in all taxes, future (%)	6.7	13.3	13.5	1.1	0.7
Future generational account	– 16.9	– 8.0	– 8.1	– 26.6	– 24.8
Absolute differenced	12.2	23.8	24.3	– 0.5	1.5
IPL (% of GDP)	18.8	36.8	37.7	3.1	2.1

(*) 1995 value; baseline (r = 0.05; g = 0.015).

this gap increases to ECU 23 800 or ECU 24 300 in the case of the tax increase or the transfer cut, respectively. Correspondingly, the intertemporal public liabilities and the percentage tax increase necessary to meet the government's budget constraint double. This result can be explained as follows. In the absence of the policy experiment, meaning that fiscal policy per capita is kept constant at its present level, the deficit would decrease by far more than 0.7 percentage points, turning even into a surplus around 2006. Thus, keeping the deficit constant at 1.5% of GDP corresponds to a fiscal redistribution from future to present generations.

Finally, we take a closer look at the effect of alternative financing strategies. While the effect on intergenerational distribution is about the same, different living cohorts profit from either way of financing. Thus, working-age cohorts profit more from a tax reduction, whereas the young and elderly profit more from an increase in transfers.

3.4.3. Primary surplus increase

Next we will discuss the case in which policy aims at maintaining a primary surplus of 6% of GDP over the medium term. To understand the details of this hypothetical policy, one has to take a closer look at the time-path of the primary surplus quota in the base-case. In fact, under baseline conditions, the primary surplus will peak at 6% of GDP in 2001 and will decrease thereafter to a level of nearly zero around 2040. However, in the policy experiment, we keep this primary surplus constant at the peak-level until 2010. This is achieved by adjusting either taxes or transfers between 2001 and 2010. Thereafter, taxes and transfers *per capita* cease to be endogenous and remain constant at their 2010 level.

The results of this experiment are reported in the last two columns of Table 13. First, note that the generational accounts of the elderly are not significantly affected. To be more precise, the accounts of cohorts which are 95 or older in the base-year are not affected at all. Indeed they will no longer live when the policy comes into effect in 2001. The impact on the cohorts of age 85 to 95 is so small that it does not show up in the reported decimal places. This can be explained by the very short remaining lifetime in conjunction with the discount factor. With respect to other cohorts, net tax payments are higher. Old workers or retired cohorts would prefer a tax increase to a transfer cut to maintain a primary surplus of 6% of GDP until 2010. Contrary to this, young cohorts would prefer a transfer cut.

Obviously, the described procedure is an adequate measure to restore intergenerational balance. Intertemporal public liabilities are reduced to a mere 2.1% of GDP, thus necessitating a tax increase of only 0.7% for future generations in order to render fiscal policy sustainable. In fact, the gap of future and current newborns' generational accounts is reduced to an insignificant ECU 600 or ECU 1 500, in the case of maintaining the primary surplus through either tax increases or transfer reductions, respectively.

3.5. Conclusion

This paper assesses the stance of Belgian fiscal policy with the help of generational accounting. We find that although corrective measures still have to be implemented, fiscal policy is relatively balanced. This is remarkable given that Belgium, like other countries, undergoes a severe ageing of its population and furthermore faces a government debt which is far above the EU average. How can this be explained? For nearly two decades, Belgian governments have implemented and maintained structural corrective measures for the gradual consolidation of the deficit. Therefore, living generations bear a large part of the fiscal burden and do not pass most of it over to future generations as is the case in many other OECD countries.

Note, that it is not within the scope of generational accounting to uncover the distribution among living generations. More specifically, it is not possible to compare the generational accounts of living generations with one another nor to compare these accounts with those of their descendants due to the prospective nature of generational accounts. In order to make such a comparison, one would have to employ historical data. Thus, Clokeur and Perelman (1994) find that the transfer-tax ratio over the whole life cycle has fallen from 99% for a person born in 1920 to 59% for a person born in 1980. This fact underlines that there exists an uneven distribution among living generations.

In our policy experiments, we find that most of the measures which were recently suggested by policymakers to further restore intergenerational balance fail to serve that purpose. Admittedly, the pension reform from 1997 diminishes the gap between current and future newborn's generational accounts. The quantitative effect, however, is rather small. The commitment to a 1.5% deficit over the medium term is even a step backwards as

compared to current fiscal policy, since it further aggravates intergenerational imbalance.

On the other hand, intergenerational balance can be reached when the government sticks to its recent commitment of maintaining a primary surplus amounting to 6% of GDP over the medium term. The primary surplus can be financed by either tax increases or transfer cuts. While the former approach predominantly burdens currently young generations, the latter mostly affects the currently old. Hence, when implementing these kinds of surplus policies it has to be taken into account that some of the current living generations are already heavily burdened.

4. Denmark: challenges ahead and needs for social security reforms

Svend E. H. Jensen ([1]) and Bernd Raffelhüschen ([2])

4.1. Introduction: the macroeconomic background

From a macroeconomic perspective, the Danish economy has performed very well in recent years. After a long period of recession, the rate of economic growth has been relatively high, the unemployment rate has fallen and no significant wage/price pressure has been evident. The discretionary impact of fiscal policy has on the whole been neutral — with the so-called fiscal 'kick start' in 1993 marking a possible exception — so the upturn has mainly been driven by non-government demand. Also public finances have improved considerably: not only has the ratio of public debt-to-GDP been reduced, the government budget has even turned into surplus. As a result, Denmark could join the EMU if it so wished.

Despite the Danish reservations to fully participate in the final stage of EMU, macroeconomic policy has been conducted in accord with the convergence criteria as stipulated by the Maastricht Treaty. Indeed, the position of the Danish government is to bring public debt down from its current level of almost 60 % of GDP to 40 % of GDP by 2005. Moreover, the government has declared that it would strive to gradually reduce the size of government so as to pave the way for a lower tax burden, currently the second highest in Europe.

When judged from the perspective of the current shape of government finances, existing forecasts of macroeconomic performance and short-to-medium-term demographic projections, which hold out the prospect of a demographic 'breathing-space' in Denmark over the next five to eight years, the government's debt target seems to be within reach. On the other hand, the government budget in a welfare state is typically very sensitive to the business cycle (cf. Andersen and Schmidt (1999)). It would only take a minor economic downturn to threaten what appears to be a favourable budgetary position. While such a situation could originate from developments outside the direct control of the government, it could also follow from policies aiming at, say, a reduction of a deficit on the current account, the traditional Achilles' heel of the Danish economy. Moreover, the fact that the budget deficits are much bigger in 'bad' years than the surpluses in 'good' years points to a deficit bias that may be difficult to overcome.

As to the long-term stance of fiscal policy in Denmark, the important question is whether it would be possible to bring down *both* the ratio of public debt-to-GDP and the overall tax burden. Several factors would be critical for the accomplishment of such an ambitious target. First, transfer payments to people of working-age have increased significantly over the past 25 years, which undoubtedly has raised the size of the structural deficit. Unless people currently prevented from an active working-life can be brought into employment, either through welfare reforms or other initiatives, major improvements of the government budget will be difficult to bring about. Second, the process of changing demographics is likely to lead to a substantial increase in the number of elderly, a phenomenon which will also put pressure on public finances. Third, a tendency towards earlier retirement has been observed, which, unless tempered by adequate welfare reforms, will reinforce the budgetary pressure caused by population ageing.

Although these challenges are in themselves substantive, others could be added. For example, as a result of the rise in transfer payments, other expenditures have been cut back, including public service production and investment in infrastructure. A pressure for more resources to be allocated to these areas might therefore arise. One could also envisage that it will be increasingly difficult to raise the revenues needed to maintain the financial viability of the welfare state. For example, increased

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mobility within Europe may induce some members of the labour force to flee to lower-tax jurisdictions, thereby eroding the tax base.

Our discussion of these issues concentrates on the generational impact of a set of policies which are on the forefront of debate of fiscal policy in Denmark. As a benchmark, we first compute the intergenerational distribution of tax burdens in a baseline scenario where 1995 fiscal policy remains unchanged. The policy issues to be discussed on the basis of this reference situation fall into three broad categories, namely (1) a labour market reform with strong fiscal ingredients, aiming at bringing structural unemployment down, (2) a programme of public debt reduction, designed in line with official medium- and long-term targets of fiscal policy, and (3) an increase in the (effective) retirement age, aiming at tempering the effects of population ageing. All calculations are done on the empirical base as outlined in Jensen and Raffelhüschen (1995, 1997, 1999) and Jensen et al. (1996).

4.2. Trends in fiscal performance

The extent of government involvement in the Danish economy has increased significantly over the last 35 years. Table 14 summarises some basic facts.

The share of general government expenditures to GDP has more than doubled, from 25% in 1960 to 62% in 1995. Though the share of government revenues has also risen strongly in this period, increases have not been sufficient to balance the government budgets. As a result of persistent deficits, primarily since the mid-1970s, there has been a substantial increase in the public debt-to-GDP ratio, from 5% in 1970 to about 79% in 1995.

On the expenditure side, it is mainly within the 'core' areas of the welfare state that outlays have increased more than proportionally with income. The most expanding area has been transfer payments, with a rise of 235%. Government consumption, including health and education costs, grew rapidly in the 1960s, but has grown more or less in line with GDP since the 1970s. Reflecting the steady increase in public debt since the early 1970s, interest expenditures have also risen. Government investment, on the other hand, has been in decline.

On the revenue side, it is mainly personal income taxes that have increased more than GDP. Unlike in many other European countries, contributions of employers and employees have remained almost negligible since Denmark has followed a pure tax-transfer approach with respect to, for example, social security. A recent tax reform (of 1993) will, however, gradually shift the taxation from income taxes to payroll and environmentally

Table 14

Budget and economic key variables in Denmark, 1960–95

(%)

	1960	1970	1980	1990	1995
Total expenditures	24.8	39.5	56.9	59.3	62.5
Government consumption	13.5	20.0	26.7	25.3	25.2
Transfer payments	7.1	13.5	22.9	24.7	28.6
Public investment	2.7	4.7	3.4	2.0	2.0
Interest payments	1.4	1.3	3.9	7.3	6.7
Total receipts	26.6	41.0	53.6	57.8	60.6
Personal income tax	11.1	19.6	23.6	25.6	27.7
Social security contribution	1.2	1.6	0.8	1.5	1.6
Indirect taxes	9.0	14.7	16.8	15.6	15.1
Other receipts	5.3	5.0	12.5	15.1	16.2
Public deficit	– 1.8	– 1.5	3.3	1.5	1.9
Government debt	2.1	5.2	32.1	61.1	79.0
Unemployment rate	1.8	1.3	7.0	9.6	10.3
Real interest rate (RIR)	0.5	– 0.4	6.6	5.2	4.7
GDP growth rate	6.1	2.0	– 0.4	1.4	2.7
Growth adjusted RIR	– 5.6	– 2.4	7.0	3.8	2.0

Source: Jensen et al. (1997); budget items in percent of GDP, key variables in percent, preliminary figures for 1995.

related taxes. Indirect taxes have also increased their share of GDP, particularly VAT.

Public finances have clearly been adversely affected by the rise in unemployment, a phenomenon beginning in the mid-1970s. What matters here is not only the observed rise in those being registered as unemployed, but also the large number of working-age people that have become recipients of some sort of income compensating public transfer payment other than unemployment benefits. Evidence suggests (cf. Ølgaard (1995)) that about 18% of all working-age people are non-employed but should in principle have the ability to work, a figure being twice as great as the registered rate of unemployment. The period considered has also been characterised by a remarkable rise in the real interest rate. The combination of a rising real interest rate and a falling growth rate has indeed led to a 'double' upward pressure on the so-called growth-adjusted real interest rate, a phenomenon which has also had a big impact on the accumulation of public debt.

Behind the trends observed for the period 1960–95 one will, of course, find some cyclical swings. For example, the upturn since 1993 has reduced both the share of public expenditures to GDP and the share of public revenues to GDP. While the former (latter) in 1996 had fallen to 61.7 (60.8)%, the 1997 figure was 56.9 (57.1)% and the preliminary figure of 1998 is 55.3 (56.3)%. Against this, the government budget turned into surplus in 1997, with the current surplus amounting to around 1% of GDP.

Although a rising share of government spending to GDP is a phenomenon that has been observed in most industrial countries (cf. Masson and Mussa (1995)), there may be some distinct features of the Danish economy accounting for the particularly strong growth in the size of government. Denmark has undoubtedly carried the welfare state further than most other European countries, both in terms of coverage and generosity (cf. Hagen et al. (1998)). For example, safety nets have not only been provided for the less fortunate in society, but as a result of the so-called 'universalist' approach to the welfare state, relatively generous social programmes have been extended to the general population.

The variety of welfare programmes and progressivity of the tax system have led to a fairly equitable society. Indeed, the redistributive capacity of the Danish tax and transfer system is quite significant. Although the distribution of incomes between 'rich' and 'poor' is not particularly even before taxes and transfers, the distribution of disposable incomes is much more equal (cf. Förster (1994)). The redistributive effects of taxes and transfers are enhanced by the provision of public services, such as education and subsidised child-care (cf. OECD (1996)).

Tax reform was a key ingredient in a new policy package introduced in January 1993. The reform was designed in the same spirit as most other recent tax reforms in the OECD area. It thus involved cuts in marginal income tax rates, financed by various measures to broaden the tax base and to close existing loopholes. Furthermore, the fall in personal income tax rates was to a large extent financed by increases in energy taxes levied on the household sector and by the introduction of new taxes on refuse, water use and sewage. From 1996 these initiatives were supported by taxes on the emission of carbon dioxides and sulphurdioxides from the business sector. The reform thus marked an important step towards a so-called 'green' tax structure.

In view of the relatively high wage taxes in Denmark, the current debate on fiscal policy also involves the extent to which wage taxes can be further replaced by 'green' taxes. In particular, would it be possible to reap a 'double dividend' in the form of improvements to both the environment and employment? As recent academic research suggests such a switch may lower the efficiency of the tax system as a revenue-raising device (cf. Bovenberg and DeMooij (1994)). Also, the intended substitution of labour for polluting inputs may lower labour productivity. With rigid real wage adjustments, this may lead to higher unemployment. A further concern relates to the fact that so far only few countries in the world impose 'green' taxes on the business sector. Hence there is a lively debate in Denmark on what impact these taxes would have on Danish companies exposed to international competition.

4.3. Baseline results and sensitivity analysis

4.3.1. Basic assumptions

All sources of the Danish data are described in detail in Jensen et al. (1996). Furthermore, all calculations presented below rest on the method developed in Chapter 2. In this section, we will therefore outline only the specific assumptions concerning (1) the long-run gender-specific population projection, (2) the aggregate government budget of the base-year 1995, (3) our estimate of

the government's initial net debt position, and (4) the magnitude of all exogenous parameters, including the GDP growth rate and the real interest rate.

The population projections for Denmark start in 1995. In the baseline projection, we have retained all assumptions about fertility, mortality, and net immigration made in the official Danish population projections. While the end-year of the official projections is 2040, our projections run through 2020. During the first five years of the projection period, the total fertility rate is assumed to increase from 1.8 to 1.9, and it remains constant at that level from 2000 and onwards. Since mortality rates are assumed to fall during the first 10 years of the projection period, life expectancy at birth rises from 77.9 (72.7) to 78.0 (73.0) for females (males). Finally, as to the immigration numbers, the official assumptions imply an annual net inflow of 13 500 persons, about 0.25 % of the base-year population.

Table 15 summarises the overall public budget of the base-year 1995 which, in more detail, serves as the starting point of all calculations on Danish generational accounts. The entire budget includes expenditures and receipts of the federal and local governments as well as public enterprises. All intergovernmental payments have been cancelled out. Public revenues include taxes on labour income, capital income, property, wealth, vehicles, alcohol, tobacco, petrol, employee's unemployment contributions, value-added tax, and other taxes or general revenues. Note that capital income taxes are significantly negative; mainly due to a generous system of tax deductions on owner-occupied housing expenditures. Table 15 also lists various transfer payments, including transfers for social security, health care, unemployment insurance, welfare and housing benefits, child and youth support payments, education and long-term care expenditures as well as other transfers to households and subsidies.

Each aggregate for taxes and transfers is allocated to the representative male and female individuals of each living generation with the help of relative age-gender profiles. These profiles were either taken from various micro-surveys or provided by the Ministry of Economic Affairs. Those taxes and transfers which have not been distributed by age and gender are summarised under other taxes, revenues or transfers. The net interest payments on outstanding government debt (net of seigniorage) amount to ECU 4.1 billion (ECU 1 = DKK 7.332 in 1995). According to official Danish statistics, the government's net financial debt amounts to ECU 78.5 billion (59.5 % of GDP) which is utilised in the Danish intertemporal budget constraint. Real debt resulting from deficits of publicly owned enterprises, land etc. is included in the calculation of government consumption for all future years. Note that this approach excludes public infrastructure which is provided without user fees.

Net investment amounts to ECU 1.1 billion. Hence, in the base-year, the residual of total government revenues minus expenditures on transfers, subsidies and net investments, i.e. government consumption, amounts to ECU 12.2 billion. However, this number is not used in

Table 15

Public receipts and expenditures in Denmark, 1995

(billion ECU)

Receipts		Expenditures	
Labour income taxes	41.50	Social security	14.26
Capital income taxes	– 4.51	Health insurance	7.92
Value added taxes	13.00	Unemployment insurance	4.05
Alcohol and tobacco	1.53	Long-term care insurance	4.28
Petrol tax	1.01	Welfare and housing	3.83
Vehicle tax	0.60	Child and youth support	4.13
Property and wealth tax	1.52	Education	7.85
Unemployment insurance	2.12	Other transfers	7.32
Other taxes	11.70	Net investment	1.09
Other revenues	4.23	Subsidies	3.88
Public deficit	2.17	Net interest payments	4.08
		Government consumption	12.17
Total	74.86		74.86

Source: Statistical Yearbook 1996; data provided on request by the Danish Ministry of Finance.

the calculations. There we constructed a gross figure by including non-age-specific distributed taxes, revenues and transfers, subsidies, net investments and transfers to the rest-of-the-world. This number is projected to grow in line with GDP, and it is adjusted for the demographic transition in a per capita manner. If not indicated otherwise, the generational accounts are calculated on the basis of an annual real GDP growth rate of 1.5% and an exogenous real interest rate of 5%.

The policy package introduced in January 1993 (cf. Section 4.2) is included in the baseline scenarios through the adjustments of the respective budgetary items for the period 1996–98 in line with the official estimates and the overall growth adjustment. Hence, as compared to the base-year, progressive labour and capital income taxes were reduced by 3.1, 4.0 and 4.5% while proportional labour market contributions grow at a rate of 17.0, 19.0 and 3.6% and petrol taxes increase at 9.3, 1.5 and 1.5%. In addition, we installed a 'green' tax revenue of ECU 250 million, ECU 550 million and ECU 830 million and distributed these taxes uniformly. Finally, we reduced government consumption during the phasing in of the reform package (ECU 240 million, ECU 460 million and ECU 860 million) in order to ensure budget neutrality.

4.3.2. Baseline findings

Table 16 reports generational accounts for cohorts ranging in age from 0 to 100 in the base-year 1995. The average column shows net payments for males and females combined, while the other columns report the gender-specific accounts.

The first remarkable result is that the generational account of a current newborn is significantly negative, i.e. a current average newborn will receive ECU 55 000 net of taxes over his/her entire life cycle. Although net payments to the government are strictly negative throughout childhood and youth, the accounts turn out to be positive already at age seven due to the lower discounting of future net tax payments. Thereafter, the net payments steadily increase until a peak is reached with payments in the magnitude of ECU 142 700 at the age of

Table 16

Generational accounts, Denmark

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 55.0	– 18.7	– 93.0
5	– 32.3	11.0	– 77.8
10	15.3	67.0	– 38.7
15	66.4	128.2	1.8
20	121.0	190.9	48.3
25	142.7	215.7	65.8
30	141.3	213.4	64.1
35	126.9	198.3	52.4
40	94.6	165.1	22.3
45	46.7	108.6	– 16.5
50	– 14.7	39.0	– 70.1
55	– 67.7	– 19.0	– 117.1
60	– 126.2	– 87.9	– 162.7
65	– 146.0	– 117.0	– 172.3
70	– 154.6	– 128.1	– 176.5
75	– 158.0	– 128.8	– 179.8
80	– 161.6	– 140.6	– 174.4
85	– 161.0	– 136.9	– 172.4
90	– 152.5	– 129.3	– 160.9
95	– 113.4	– 96.8	– 118.0
100	– 39.5	– 35.4	– 40.7
Increase in all taxes, future (%)	20.3	–	–
Future generational account	– 12.6	29.7	– 56.7
Absolute difference	42.4	48.4	36.1
IPL (% of GDP)	71.2	–	–

(*) 1995 value; baseline (r = 0.05, g = 0.015).

25 — the age when an average agent enters the labour force in Denmark.

Over the years of active labour market participation, the generational accounts are positive but falling, before turning negative again as individuals approach retirement. In Denmark, the break even of discounted future tax payments and transfer receipts is slightly below age 50. Retirees have negative accounts since they pay lower income taxes as well as some indirect taxes while receiving public pensions and other old-age services. With respect to the accounts of the elderly, we find another — by international comparison — remarkable result. The maximum of net transfers received during the rest of life for a retiree is reached not at the age when the average agent leaves the labour force. Instead, it is especially the oldest-old who gain most and receive net transfers amounting to over ECU 161 600 for those being in the early 80s of their life cycle. We will comment on this issue in more detail below.

The reason why the generational account of very young agents is negative can be easily seen from the significant gender-specific differences underlying the average figure. Indeed, while newborn males have a generational account of ECU 18 700, that of a newborn female is much more negative indicating that females receive ECU 93 000 as a net transfer over the remaining life cycle. To understand this, by international standards, fairly high difference between the two sexes, we have to look at the composition of male and female net payments in more detail. Tables 17 and 18 report the components of the male and female accounts for the main taxes paid and transfers received at various stages of the life cycle.

By comparing both tables four main reasons can be identified. First, it can be seen that a newborn male in 1995 would over his entire life-span contribute about 40 % more in labour income taxes than his female counterpart. The reason for this is straightforward. In spite of their relatively high labour market participation rate, Danish women are mostly recruited to low-wage and part-time jobs. Second, women receive more old-age pensions than men. Since the benefit rate is unrelated to gender, this clearly reflects the fact that women have, on average, a longer lifetime than men. For the same reason the

Table 17

Composition of male accounts, Denmark

(1 000 ECU) (*)

	Tax payments					Transfer receipts						
Generation's age in 1995	Labour income	Capital taxes	VAT	Excise	Social insurance	Social security	Health insurance	Unemployment insurance	General welfare	Youth and maternity	Education	Non-age specific expenditure
0	151.9	– 19.9	54.9	22.6	7.3	23.1	15.4	13.3	17.5	53.4	72.5	40.2
5	180.2	– 23.6	58.9	25.8	8.6	27.4	15.8	15.8	20.7	33.7	86.0	39.5
10	213.4	– 28.1	63.8	29.6	10.2	32.5	17.2	18.7	24.6	19.6	70.8	38.6
15	253.0	– 33.4	69.2	34.1	12.1	38.6	18.7	22.2	29.2	12.7	48.0	37.6
20	297.2	– 39.8	73.7	38.2	14.3	45.7	20.6	26.1	32.8	6.6	24.3	36.4
25	322.3	– 46.3	72.6	40.5	15.1	53.7	22.4	24.8	32.0	6.4	14.0	35.1
30	322.4	– 46.7	70.4	41.5	14.6	62.7	24.6	21.6	30.7	6.0	9.6	33.6
35	314.3	– 43.1	66.5	41.0	13.5	72.8	26.6	18.8	29.3	5.8	8.7	31.8
40	288.9	– 35.7	61.4	39.0	12.0	84.2	28.9	16.6	28.7	5.4	7.1	29.8
45	245.8	– 27.6	55.1	35.9	10.0	97.5	31.1	14.7	29.2	4.9	5.6	27.5
50	190.9	– 18.8	49.5	32.8	8.0	113.3	33.5	12.5	31.0	4.1	4.0	25.0
55	154.7	– 11.0	41.8	28.0	5.4	131.3	35.7	9	34.6	2.8	2.2	22.3
60	108.1	– 0.4	33.8	22.3	2.7	153.4	37.2	2.8	40.6	1.1	0.0	19.4
65	77.2	2.7	27.3	18.2	1.0	141.5	38.5	0.5	46.0	0.3	0.0	16.6
70	52.2	3.8	21.6	13.8	0.0	115.8	38.0	0.0	51.7	0.0	0.0	13.9
75	38.1	6.0	17.4	10.4	0.0	94.2	36.9	0.0	58.1	0.0	0.0	11.4
80	25.7	4.2	12.6	6.9	0.0	77.3	34.5	0.0	69.1	0.0	0.0	9.2
85	20.2	4.7	9.9	4.8	0.0	60.0	30.1	0.0	79.1	0.0	0.0	7.2
90	22.4	6.7	8.2	3.6	0.0	48.5	26.1	0.0	90.0	0.0	0.0	5.6
95	16.9	5.1	6.2	2.6	0.0	36.3	19.5	0.0	67.5	0.0	0.0	4.3
100	6.4	2.0	2.3	0.9	0.0	13.3	7.2	0.0	24.8	0.0	0.0	1.6

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Table 18

Composition of female accounts, Denmark

(1 000 ECU) (*)

	Tax payments					Transfer receipts						
Generation's age in 1995	Labour income	Capital taxes	VAT	Excise	Social insurance	Social security	Health insurance	Unem-ployment insurance	General welfare	Youth and maternity	Education	Non-age specific expenditure
0	100.7	– 8.3	53.9	15.6	7.3	26.0	21.8	17.3	22.9	57.7	75.7	40.9
5	119.6	– 9.8	57.6	17.6	8.7	30.9	23.7	20.6	27.2	38.9	89.8	40.3
10	141.8	– 11.6	61.8	19.8	10.3	36.7	26.8	24.4	32.2	26.1	75.1	39.6
15	167.7	– 13.8	66.9	22.5	12.2	43.5	30.2	28.9	38.2	21.3	53.0	38.7
20	196.6	– 16.5	71.2	25.0	14.4	51.5	33.1	34.1	42.6	17.6	25.8	37.7
25	210.5	– 19.1	70.4	26.2	15.3	60.5	34.9	33.2	40.3	17.6	14.3	36.5
30	203.5	– 18.6	68.3	26.1	14.5	70.8	35.3	27.7	38.5	12.4	9.8	35.1
35	192.0	– 15.6	64.7	24.7	12.8	82.4	34.3	22.5	37.3	7.2	9.0	33.5
40	169.6	– 10.9	60.2	22.9	11.0	95.5	34.9	19.0	37.1	4.9	7.5	31.7
45	145.9	– 6.3	56.5	21.2	9.2	110.3	37.3	16.7	39.0	3.9	6.0	29.6
50	112.0	– 0.8	50.9	19.0	6.9	126.9	39.9	14.1	42.9	2.8	4.3	27.3
55	90.1	2.7	43.5	15.9	4.1	144.2	42.1	9.5	48.9	1.6	2.3	24.8
60	70.6	5.1	36.2	12.5	1.8	162.0	44.2	2.5	57.5	0.5	0.0	22.1
65	60.5	6.2	30.5	10.1	0.6	148.7	46.4	0.3	65.3	0.1	0.0	19.4
70	47.3	6.2	24.9	7.7	0.0	126.7	46.7	0.0	72.8	0.0	0.0	16.5
75	35.2	5.3	19.0	5.4	0.0	105.2	46.2	0.0	79.8	0.0	0.0	13.6
80	29.0	4.7	15.1	4.1	0.0	84.5	43.4	0.0	88.7	0.0	0.0	10.7
85	19.8	2.9	11.1	2.4	0.0	64.8	40.6	0.0	95.0	0.0	0.0	8.2
90	14.8	2.6	7.9	1.4	0.0	48.8	32.8	0.0	99.9	0.0	0.0	6.1
95	11.0	1.9	5.8	0.9	0.0	35.8	24.0	0.0	73.3	0.0	0.0	4.5
100	4.0	0.7	2.0	0.2	0.0	12.4	8.3	0.0	25.3	0.0	0.0	1.6

(*) 1995 value; baseline (r = 0.05, g = 0.015).

present value of women's transfers in the form of old-age care is higher than the corresponding number for men.

Third, as a consequence of the fact that women are more exposed to unemployment than men, they receive relatively more unemployment and cash benefits. Fourth, women's receipts of health insurance and other welfare services by far exceed what men receive. For the same reasons, the generational accounts of females in Table 16 evolve on a lower scale as compared to their male counterparts of the same age. Of course, during old age, the net payments are relatively closer to the male figures.

With respect to the net transfers received during retirement, there are two issues which are striking in the Danish country study. First, social security and other transfers to the retirees are paid mainly on a gross-of-tax basis, i.e. the elderly do pay taxes. Second, general welfare payments to the elderly increase in their absolute amounts despite the fact that they refer to ever-decreasing rest-of-life periods. Due to this, the overall transfers received during retirement show the above-mentioned hump-shaped patterns.

No other country study in the world displays similar results. The reason is, however, obvious. The Danish country study allows for a much more detailed (age- and gender-specific) distribution of transfer payments to the elderly than any other country study, for which reliable data are not available. Among those are benefits concerning the residential institutions, rent subsidies, old people's home and home help to those depending on special care. These items alone make up about 10% of the entire transfers and their age-gender-profiles show a sharp increase when it comes to the oldest-old, i.e. those older than 75.

In order to report the extent of intergenerational redistribution, we employ the set of four valid indicators developed in Chapter 2, which are reported in Table 16. As a main indicator for the intergenerational redistribution, we utilise the difference in lifetime net tax payments between current and future generations given that the intertemporal budget constraint of the public sector holds.

In order to finance the intertemporal liabilities of the entire public sector, it would be necessary to increase the

tax load of future agents by 20.3%. Thus, future newborns would receive only ECU 12 600 net-of-tax transfers which is in absolute terms ECU 42 400 less as compared to base-year newborns. Also this indicator reveals a remarkable gender-specific redistribution since future males pay ECU 48 400 more as compared to current newborns while future females only pay ECU 36 100 in addition to the amount of the current newborn females.

Calculating the intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2) associated with the present stance of fiscal policy for the baseline scenario in Denmark reveals that there are liabilities passed over to future generations adding up to 71.2% of the 1995-GDP. Since the explicit government debt amounted already to 59.5%, the implicit debt does not contribute significantly to the overall figure of the public liabilities.

The intergenerational imbalance could also be illustrated by the policy change for current and future generations which ensures intergenerational sustainability. Specifically, we try to estimate the immediate and permanent adjustment of (a) all taxes, and (b) all transfer payments that would be needed to ensure equality between the net tax payments of future generations and the (growth-adjusted) net tax payments of base-year newborns.

The results of these hypothetical experiments are found in Table 19 for the baseline combination of interest and growth rates.

In particular, the table shows in the first row the necessary fiscal adjustments, reported as percentage differences from what the relevant tax revenue or expenditure level would have been in the absence of these adjustments. Moreover we report the generational accounts for all experiments which restore the generational balance. Consider first a policy where intergenerational balance is restored through a higher overall tax revenue collected from all generations. In this case an additional revenue equal to 5.0% of the existing tax revenue is required. This is a non-negligible fiscal adjustment which raises the tax to GDP ratio by 2.3 percentage points from 46.4 to 48.7%. The net tax payments of current newborns and future generations could also be equalised if all transfer

Table 19

Restoring generational balance in Denmark

(1 000 ECU) (*)

	Baseline accounts	All taxes	All transfers
Immediate change (%)	–	5.0	– 5.0
Generation's age in 1995			
0	– 55.0	– 44.7	– 42.0
5	– 32.3	– 20.4	– 18.9
10	15.3	29.1	28.2
15	66.4	82.4	79.0
20	121.0	139.3	133.1
25	142.7	162.1	154.9
30	141.3	160.4	153.3
35	126.9	145.1	138.7
40	94.6	111.2	106-4
45	46.7	61.2	58.8
50	– 14.7	– 2.9	– 2.3
55	– 67.7	– 58.1	– 54.8
60	– 126.2	– 119.1	– 112.9
65	– 146.0	– 140.4	– 133.3
70	– 154.6	– 150.4	– 142.8
75	– 158.0	– 154.9	– 147.1
80	– 161.6	– 159.2	– 151.3
85	– 161.0	– 159.3	– 151.3
90	– 152.5	– 151.2	– 143.7
95	– 113.4	– 112.4	– 106.8
100	– 39.5	– 39.1	– 37.2
Future generational accounts	– 12.6	– 44.7	– 42.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

payments were reduced by 5.0% which would lower the ratio to the 1995-GDP by 2.2 percentage points from 44.9 to 42.7%. Note that transfers include non-age-specific distributed government consumption.

An important question is what difference it makes whether generational balance is achieved in one way or another. Indeed, the macroeconomic response to a tax increase may be different from the macroeconomic response to a spending cut. Similarly, if contractionary fiscal actions are implemented through higher income taxes, the wage and employment effects may differ significantly from the case where fiscal policy is tightened through higher consumption taxes (cf. Jensen and Raffelhüschen (1997)). However, the traditional method of generational accounting fails to capture such differences which could only be addressed by installing generational accounts in a dynamic CGE-model. Nevertheless, it is of interest to see how sensitive the static generational accounts of existing generations are to the specific way of restoring generational balance.

Table 19 reports the generational accounts by age for current as well as for future generations under each alternative policy change. For comparison we also show the baseline generational accounts. Let us first see how sensitive the generational accounts of existing generations are to whether the generational balance is restored through higher taxes or lower transfers.

Although all generations have to pay higher net taxes in the two scenarios, the distribution of burdens across current generations appears to be quite sensitive to the choice of fiscal instrument. In general, higher tax rates place the fiscal burdens on current cohorts of working age, whereas transfer reductions mainly hit the younger and the older generations.

In the light of these findings it would be useful to know the sources of the generational imbalance and their quantitative impact. On the base of hypothetical experiments, two main sources can be identified, namely the demographic changes and the pre-existing public debt. Even in the full absence of any explicit public debt in the base-year, the intergenerational distribution would be imbalanced. In fact, in order to finance the remaining implicit liabilities of 11.7% of GDP, future generations would have to face a 3.3% surcharge on overall taxes. As compared to the baseline findings which suggest a 20.3% increase in taxes and an overall indebtedness of 71.2% of GDP, this translates into a significant reduction of the additional burdens borne by future generations. In absolute terms, future generations receive about ECU 8 200 less as do 1995-newborns.

If the fairly advantageous age structure of the base-year 1995 was kept constant, the burden on future generations would be even less. This is indicated by the fact that under these circumstances the intertemporal liabilities would only amount to 4.2% which means that current generations do contribute remarkably to reduce even the explicit debt figure. To finance the remaining small amount, future generations have to face only a 1.2% higher tax load as compared to the currently living. If all generations shared in, the corresponding figure would be 0.3%. Hence, changing demographics obviously has a tremendous impact which implies approximately generational balance, since future generations only pay ECU 3 000 more as compared to current newborns. Indeed, the relative weight of the current generations' implicit demands on future budgets in Denmark counts for more than the explicit public indebtedness while in their absence the generational balance would be nearly ensured.

4.3.3. Sensitivity analysis

Table 20 reports the sensitivity of our findings with respect to realistic variations of the key economic variables and demographic assumptions. As a meaningful indicator of the intergenerational redistribution, we choose the difference in the accounts of current and future newborns. A lower discount rate and a higher growth rate both serve to reduce this generational imbalance. At a first glance, the quantitative robustness seems to be fairly low, as witnessed by the fact that for combinations of three real interest rates (3, 5 and 7%) with three alternative GDP growth rates (1, 1.5 and 2%), the absolute difference in the accounts of future and current newborns range between ECU 35 200 and ECU 55 500. Nevertheless, the divergence of about ECU 20 000 over the entire life cycle is, in comparison to the flows of resources between agents and the public sector, not really remarkable. In addition, the qualitative finding of an imbalance in favour of currently living generations in Denmark is absolutely robust to the wide range of variations in the key economic variables.

Table 20 also reports the sensitivity of our findings with respect to the underlying demographic assumptions. For reasons of completeness, the last row in the table lists the figure of ECU 3 000 higher net payments of future generations in comparison to current for the constant base-

Table 20

Sensitivity analysis, Denmark

(1 000 ECU) (*)

Productivity growth (%)		1	
Discount rate (%)	3	5	7
Absolute difference	37.4	44.6	55.5
Productivity growth (%)		1.5	
Discount rate (%)	3	5	7
Absolute difference	36.1	42.4	52.3
Productivity growth (%)		2	
Discount rate (%)	3	5	7
Absolute difference	35.2	40.5	49.4
Population projection	Constant population structure	Baseline assumptions	Decreasing mortality
Absolute difference	3.0	42.4	60.8

(*) 1995 value.

year population structure that has already been discussed above. Since fertility rates in Denmark have increased significantly in the recent past, we do not report the results concerning experiments which increase the base-year fertility rates even more. In combination with the base-year immigration, a fertility rate of 1.9 ensures a slightly growing population at any rate.

What is more interesting in the Danish case study concerns the second component of the double-ageing process, i.e. the growing number of oldest-old. Above, we have seen that the richness of the Danish data permits a detailed investigation of this phenomenon. Moreover, the baseline results reflect an — by international standards — only modest fall in the mortality rates translating into an increasing life expectancy of 0.1 and 0.3 years for females and males, respectively. Assuming that mortality rates further decline will increase the intergenerational imbalance tremendously.

For example, raising life expectancy at birth linearly over a period of 10 years in comparison to the baseline figures by two additional years would translate into a significantly higher imbalance. Future generations would face net payments which are ECU 60 800 higher than those of the current newborns. The respective figure of the absolute difference in the baseline ranged to only ECU 42 800. As compared to the baseline result this extremely aggravated imbalance is mainly driven by the relatively high per-capita benefits especially to the oldest-old. Nevertheless, the assumed mortality resembles current Swedish life expectancies and is, hence, not unrealistic.

4.4. Generational impact of policy reforms

Given the current debt position and the underlying demographic projections, current fiscal policy does pass burdens onto future generations. However, in a case of no demographic change, i.e. if the number of people in each age group could be kept constant, or if there were no public debt in 1995, there would almost be generational balance. Since both of these alternatives — keeping the age structure constant, or getting rid of public debt in an instant — cannot be readily implemented, it is of interest to consider some more realistic policy changes which would also mitigate the generational imbalance. Three alternative scenarios are investigated, each of which is designed with a view to important themes in the current debate on fiscal policy in Denmark.

The first scenario (A) is based on rather optimistic assumptions about the Danish economy. One might want to think of this as a successful outcome of the tax and labour market reforms introduced in recent years. Indeed, these reforms have been motivated by a need for stimulating incentives to work and thereby bringing structural unemployment down. As mentioned already, 1993 marked the starting point of an expansion in the

Danish economy, with rather impressive growth in output and falling rates of unemployment. For example, the registered rate of unemployment has fallen by 3 percentage points since 1994. The question now is whether this is a process likely to continue. It is widely believed that if further underpinned by structural policy adjustments, additional inroads can be made in the number of unemployed.

Following this line of reasoning, the rate of unemployment is assumed to fall by a total of 3.4 percentage points during 1996–99. Due to the operation of built-in fiscal stabilisers, an increase in employment would not only reduce expenditures on unemployment and cash benefits, it also leads to higher tax revenues. In our calculations we use official estimates (cf. DMF (1994)) of the budgetary effects of a fall in the rate of unemployment. Since a better performance of the economy automatically improves the government budget, the question arises whether the extra revenue should solely be used to reduce public debt, or whether it should also translate into a fall in the tax burden on living generations.

We assume that over a period of 15 years, i.e. until 2010, the extra revenue is used to reduce the government's financial net debt, and there will be no discretionary fiscal adjustment (such as a cut in tax rates). As a result, the public debt, amounting to ECU 78.5 billion in 1995, would be reduced to ECU 33.4 billion by 2010. In view of the strength of public finances in 2011, two alternative sub-scenarios are considered.

Scenario A-1 assumes that the process of government financial asset accumulation simply continues, i.e. in 2020 there will be a debt of ECU 10.2 billion while another seven years later, the public sector would accumulate net assets. Scenario A-2, on the other hand, assumes that a permanent cut in labour income taxes is implemented so as to ensure that the level of the government's net financial assets can be kept constant at the 2010-level in the future. The choice of 2010 as a reference line for discrete fiscal adjustments is rather ad hoc, but follows what is envisaged politically.

The effects of scenario A are reported in Table 21. In the absence of any discretionary action (A-1), the generational accounts of living generations are seen to increase relative to the baseline findings. People of working-age face the highest increases in tax payments, whereas the effects on the elderly's accounts are relatively minor, due to the adjustment of transfer aggregates. The benefits resulting from a better economic performance accrue to future generations which turn out to be much better off than in the case of baseline economic performance.

In fact, instead of receiving ECU 12 600, as in the baseline scenario, their net transfers will amount to ECU 53 300 and the generational imbalance is no longer to the disadvantage of future generations. To restore generational balance it would be necessary to reduce the tax load for future generations by 7.2 %, against an increase of 20.3 % as in the baseline. Of course, one would also expect that living generations reap some benefits of a successful macroeconomic performance. For example, the higher employment rate would undoubtedly be felt as an improvement in living conditions of those previously unemployed but the surpluses in this scenario are not accrued to them at all.

More balanced generational results would clearly come out if taxes were lowered in 2011 (A-2) in order also to relieve current generations from the heavier tax load. In this case some, but not the entire, benefits of labour market reforms would accrue to future generations. For current generations, the future income tax relief will thus imply that their accounts range between the baseline and the scenario A-1 (cf. Table 21) that is about 10 % lower transfer receipts. Also the account of future generations ranges between the baseline and the A-1 scenario. In this case, however, net transfers received over the remaining life cycle are double the baseline while the figure in the A-1 scenario is quadrupled. Hence, achieving generational balance in scenario A-2 necessitates a moderate tax increase of 10.8 % in order to finance the intertemporal public liabilities which correspond to only 37.1 % of GDP.

The second scenario is based on less optimistic assumptions about the effects of structural reforms and the international business cycle. In particular, the unemployment rate is assumed to remain at its 1995 level but we assume that policy-makers have equally ambitious public debt targets. Indeed, the Minister of Finance has taken the position that public debt should be eliminated over the next 10 to 15 years (cf. Lykketoft (1995)).

In scenario B, we let scenario A constitute a benchmark for the design of fiscal policy, i.e. rather than getting rid of public debt through automatic stabilisation, debt reduction now has to be implemented through discretionary fiscal initiatives. According to our assumptions, this is achieved through proportional contributions from

Table 21

Generational accounts for policy experiments, Denmark

(1 000 ECU) (*)

Generation's age in 1995	Baseline accounts	Labour market reform		Reduced government activity		Social security reform
		A-1	A-2	B-1	B-2	C
0	– 55.0	– 37.8	– 51.8	– 36.8	– 50.7	– 53.3
5	– 32.3	– 11.9	– 28.4	– 14.1	– 30.5	– 30.3
10	15.3	39.5	21.8	32.8	15.1	17.8
15	66.4	95.0	77.5	83.1	65.7	69.3
20	121.0	151.4	134.6	137.5	120.7	124.4
25	142.7	171.5	156.3	159.1	143.9	146.8
30	141.3	167.1	154.2	157.4	144.5	146.2
35	126.9	149.3	139.3	142.8	132.8	132.6
40	94.6	113.4	105.4	110.7	102.6	101.5
45	46.7	61.5	55.7	63.3	57.4	55.0
50	– 14.7	– 4.2	– 8.4	2.5	– 2.0	– 4.7
55	– 67.7	– 61.8	– 64.6	– 49.8	– 52.8	– 55.4
60	– 126.2	– 124.6	– 126.5	– 108.1	– 110.0	– 126.2
65	– 146.0	– 146.0	– 147.1	– 129.8	– 130.9	– 146.0
70	– 154.6	– 154.6	– 155.1	– 139.6	– 140.2	– 154.6
75	– 158.0	– 158.0	– 158.3	– 144.6	– 144.9	– 158.0
80	161.6	– 161.6	– 161.7	– 149.7	– 149.8	– 161.6
85	– 161.0	– 161.0	– 161.0	– 151.3	– 151.4	– 161.0
90	– 152.5	– 152.5	– 152.5	– 145.6	– 145.6	– 152.5
95	– 113.4	– 113.4	– 113.4	– 109.6	– 109.6	– 113.4
100	– 39.5	– 39.5	– 39.5	– 39.5	– 39.5	– 39.5
Increase in all taxes, future (%)	20.3	– 7.2	10.8	– 7.5	11.3	14.8
Future generational account	– 12.6	– 53.0	– 29.6	– 51.5	– 28.0	– 22.2
Absolute difference	42.4	– 15.2	22.2	– 14.7	22.7	31.1
IPL (% of GDP)	71.2	– 26.2	37.1	– 26.2	11.3	52.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

all age-specific distributed transfer payments of the government budget. In view of the breathing space, as alluded to above, Denmark seems to have a unique opportunity of bringing down public debt relatively fast, although a horizon of 15 years may seem a bit too ambitious.

This scenario will necessarily impose significant burdens on current generations. However, as before, the distribution of tax burdens between current and future generations depends on what happens when the public debt target has been reached in 2010. In scenario B-1 we assume that the policy of debt reduction (or asset accumulation after 2027) is continued after 2010.

As compared to scenario A-1, we of course find very similar net payments for future and current generations. For example, current newborns face slightly lower net payments (ECU 36 800 instead of ECU 37 800) due to the reduced transfers. Hence, the overall increase in the tax load of future generations, necessary to ensure generational balance ranges slightly above the figure found in scenario A-1 (7.5 % instead of 7.2). Moreover, young working-aged will gain while old working-aged and elderly cohorts lose. As compared to our baseline results, all cohorts will realise lower transfer receipts and therefore higher accounts. Clearly, this strategy would especially be advantageous for future generations.

Scenario B-2 is designed with the aim of sharing more equally the changes in net tax payments between current and future generations. Hence it is assumed that labour income taxes are cut in 2011, with the magnitude being determined such that the debt ratio arrived at in 2010 can be kept constant permanently thereafter. The results from this scenario B-2 are also shown in Table 21. Again, as compared to scenario A-2 the accounts of both current living and future generations will decrease. Within the current generations it is, of course, the younger cohorts who will gain while the older cohorts, especially the elderly will face lower net transfers. In comparison to scenario B-1 no generation is worse off since the elderly

also pay 'labour income taxes' due to the Danish gross-of-tax approach. Relative to our baseline, however, every cohort except those aged 10 to 25 in the base-year will be worse off. Note that the gaining cohorts suffer transfer losses only for a few years right after 1995 as well as in the far future while the income tax effect in 2010 is high in terms of present value.

The third strategy (C) relates to initiatives to averting the old-age crisis. While the need for debt reduction is well perceived across a broad political spectrum in Denmark (although its specific form of implementation remains controversial), views certainly differ as to whether debt reduction is enough to combat the underlying pressure on public finances due to population ageing. In view of these perspectives, a strategy is considered with the purpose of reversing the strong tendency towards early retirement.

As in other European countries, the window of retirement opens with relatively advantageous conditions with a specific early retirement scheme. The strategy is designed as a reform of this early retirement scheme, currently allowing members of the workforce to retire already at the age of 60. As a possible policy option, we examine the generational impact of raising that age stepwise to 63 through 2000–02. Clearly, this announced reform would yield a twofold gain: not only would the workforce be expanded, leading to higher labour income taxes, additionally, there would also be a fall in the large number of recipients of public transfer payments.

The last column of Table 21 reports the generational impacts of our scenario C which solely adjusts the early retirement benefits and income tax revenues. As compared to the baseline figures, the burden of current generations will rise by age topping at the age of 55 due to the five-year announcement period. Current elderly, i.e. 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 absolute net payments amounting to ECU 31 100 instead of ECU 42 400 and for the 14.8% instead of 20.3% increase in all tax revenues necessary to ensure generational balance.

In fact, raising the retirement age is a possible way of approaching generational balance under the given demographic pressure. It can however not be utilised to ensure full balance. One should also keep in mind that it will predominantly burden older and therefore — in terms of life-cycle planning — not very flexible cohorts. Hence, a long-sighted announcement has to be part of that type of reform.

4.5. Concluding remarks

Given the size and the structure of the public sector, Denmark can be seen as one of the classic Scandinavian welfare states. In fact, transfer payments have tripled since the 1970s and induce a rise in the explicit debt figure from 5% in 1970 to nearly 80% in 1995. Nevertheless, since the 'kick start' of the early 1990s, the Danish economy has performed very well. At present, the Danish government's fiscal policy aims towards both a reduction of the public debt-to-GDP ratio and a substantial relief of the high load of the current taxpayers.

However, given the demographic transition to be expected in the not so distant future, the stance of fiscal policy in Denmark may not be as good as a casual glance at the current levels of debt and deficits might suggest. In fact, fiscal adjustments are needed to avoid passing tax burdens onto future generations since current living generations — though paying high taxes — also put a high pressure on future public budgets by demanding transfer spending in the hitherto experienced level.

Our findings suggest that even against the favourable economic background, the additional overall tax burdens to be borne by future living generations in order to ensure generational balance would amount to 20.3% more than for the current newborns. In other words, the intergenerational redistribution implies an overall intertemporal public indebtedness of 71.2% and since the explicit debt figure already amounts to 59.5%, the implicit liabilities of the paygo financed social security, health and long-term care programmes amount to only 11.7% of GDP. This is especially surprising given the fact that general rest-of-life welfare payments to an average retiree increases with age in their absolute amount despite the fact that they refer to ever decreasing rest-of-life periods. In other words, Denmark is especially generous to the oldest-old and although the share of oldest-old among the total population will double during the next decades, there is only a surprisingly small intertemporal government debt.

The reasons for this phenomenon are many-fold but one can identify three major points. First, the demographic transition is not as severe as in most other EU Member

States. Second, the more general a tax-transfer programme is, the more it provides only for basic needs while very generous transfer payments are especially targeted to the needy. The third main reason is, of course, the excellent economic performance which induced a significant fall in the unemployment rates. Of course, unemployed need transfers while employed pay taxes and both facts contribute to unburden future generations from an otherwise much higher tax load.

If the double ageing process will be aggravated by a trend towards similar high life expectancies as found in other EU Member States, the imbalance would increase. As compared to the baseline figure of 20.3% necessary to ensure generational balance, future generations would have to face a net payment exceeding the one of current newborns by 28.8% in this case.

Hence, only a delay in addressing the generational imbalances would ultimately necessitate tough policies. Our analysis suggests that the need for additional discretionary fiscal actions would fully diminish if recently introduced initiatives to further reductions of the structural rate of unemployment prove successful. Moreover, averting the old-age crisis could be achieved without undue hardships if the present policy could reverse the strong tendency towards early retirement. In fact, raising the retirement age is a possible way of approaching generational balance under the given demographic pressure in Denmark. But whatever might be done should be done immediately since any failure in responding today necessitates even more painful policies to ensure fiscal sustainability tomorrow.

5. Germany: unification and ageing

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5.1. Introduction

Germany has to deal with a double pressure on its fiscal policy. First, Germany's unification in 1990 revealed the severe inefficiencies from which the centrally planned Eastern German economy had suffered. As a consequence, output in the East fell sharply and a large number of workers were displaced. To cushion the East German adjustment process economically and socially, the federal government continues to transfer resources exceeding 5% of West German GDP to the eastern region. The second pressure concerns the significant population ageing Germany will experience in the medium-term future. If fertility rates continue to be as low as today, about one quarter of the population will be older than 65 by 2030, compared to 15% in 1995. These two pressures call the sustainability of the current path of fiscal spending in Germany into question.

Section 5.2 of this chapter will provide a brief description of macroeconomic performance and fiscal policy in East, West and unified Germany during the recent past. Section 5.3 will show how the fiscal burden imposed by population ageing and maintained West–East transfers redistributes between current and future generations. Using generational accounts, we show that both unification and ageing will impose sizeable burdens on future Germans if current fiscal policy is maintained, despite recent tax and social security reforms enacted to defray the cost of transfers to the elderly and to East Germany. Section 5.4 explores the burden that stems from German reunification in more detail. In Section 5.5, we isolate generational accounts for the pay-as-you-go-financed social insurance system, and investigate the intergenerational impact of alternative reforms of these 'generational contracts'. Section 5.6 seeks to answer the question whether immigration policy could improve the sustainability of German fiscal policy in face of rapid population ageing. Section 5.7 concludes.

5.2. Economic performance and fiscal policy after unification

During the 1980s, West Germany experienced a period of steady if moderate economic growth. The long-lasting economic upswing prior to the unification of East and West Germany in 1990 gave room to consolidate government finances substantially. While tax burdens were lowered, government expenditure fell from about 50% of GDP in the early 1980s to 45% at the end of the decade ([4]). At the same time, budget deficits fell steadily, until in 1989, when economic growth topped at an annual rate of 4%, the overall government sector realised a small surplus. The debt-to-GDP ratio accordingly started to fall. Inflation was low due to tight monetary policy, and national saving rates continued to be high. On the whole, West Germany seemed to be well prepared for the unification, despite rather high unemployment rates that ranged at 8% and above.

The opposite must be said for the East German State. Although the official statistics indicated firm economic progress, the problems of the command economy aggravated during the 1980s. Timid and reluctantly introduced reforms in the early 1980s reintroduced some economic freedom to firms, but failed to induce higher efficiency because prices remained strictly administered. Inefficiencies also arose from the fully controlled labour market characterised by inflexible wage structures and only minor wage differentiation. The attempt to catch up with high-tech industries emerging in the west failed, and the concentration of investment in capital-intensive

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([4]) If not indicated otherwise, all statistical data are taken from SVR (1995, 1996).

areas worsened the already severe deterioration of the eastern capital stock. In particular, industries providing consumer durables (including housing) and public infrastructure suffered from the general waste of capital. As the East German economy was cut off international competition through trade, significant parts of industrial capital had become obsolete when the former two German States were reunited in October 1990 (cf. Sinn and Sinn (1992)).

Two stylised facts may help to illustrate the initial economic differences between the two newly unified States. First, labour productivity as well as per-capita GDP in the East amounted to only one third of the western level. Second, the per-capita endowment with industrial capital and public infrastructure was less than 50% of that in West Germany. Industrial capital was mostly outdated, and considerable parts of housing and public infrastructure were in bad shape. The overall standard of living in East Germany lagged far behind that of West Germany.

A severe adjustment shock caused by monetary policy aggravated the economic situation in the East. When both countries agreed on the economic, monetary, and social union in July 1990, East Germany adopted the German mark and converted wages and prices at par. Many of the former State-owned firms did not survive this shock. At the start of 1991, labour productivity temporarily dropped to 22% of the western level. Both full-employment labour productivity and per capita output in former East Germany have still reached only about 50% of the corresponding western figures. Despite the severe economic depression, though, real wages have more than doubled from about one third of the western level in 1990 to around 70% in 1996.

Not surprisingly, the wedge between labour productivity and actual labour costs induced massive unemployment. After unification, registered unemployment first increased to a maximum of 15.9% of the civilian work force in 1993, and has only slightly decreased thereafter. Unemployment figures in the East would be even higher when considering hidden unemployment. At the same time, unemployment in the West reached a long-term minimum at a rate of 6.6% in 1992, but it has increased afterwards to a level of more than 10% today.

West German social insurance programmes were immediately extended to the East after unification, causing large deficits in the social insurance system. The related fiscal burdens are still at the heart of the political debate. Direct investment in public infrastructure and private investment subsidies are part of a long-term fiscal strategy aimed at triggering higher growth in the East. Given economic recovery would reduce the size of transfers and raise tax revenues, public investment and tax credits for investment might be self-financing in principle. Currently, per-capita tax revenue in the East still amounts to less than 40% of the western figure however. Thus, for the time being, public expenditure for East Germany is to a major part financed by West German taxpayers and through government deficits.

Table 22 shows the fiscal implications of the German unification between 1991 and 1996. During these years, net public transfers increased from ECU 56.3 billion to ECU 85.8 billion (ECU 1 = DEM 1.87). Net transfers to the East are predicted to stay at a level of approximately 5% of western GDP in the medium future. About two thirds of the annual transfers represent income support, one quarter is spent on public investment, and the remainder serves to provide substantial investment subsidies (cf. Bröcker and Raffelhüschen (1997)). The transfers to the East were partly financed by tax increases. Additional revenue was collected through the introduction of an income tax surcharge, higher value added taxes, a significant increase in petrol and insurance taxes, and higher contributions to unemployment insurance and social security.

As Table 22 indicates, additional tax revenue made up only 1.4% of western GDP at the maximum in 1995. As the consequence of the most recent income tax reductions, the increase in receipts has fallen to 0.5% of GDP in 1996. Unification-related tax increases have funded only a minor part of government transfers to the East. Instead, deficits of the government sector have risen sharply. Public debt was pushed further up by the debt of the former East German State and by the privatisation of former State-owned industrial conglomerates. In consequence, the debt-to-GDP ratio rose from 41.1% in 1991 to 57.7% in 1995.

In addition to unification-related fiscal burdens, the German welfare system will suffer from a pronounced ageing of the population. For more than 20 years fertility in both East and West Germany has been well below the replacement level. At present, the West German gross fertility rate is as low as 1.4. In the East, after unification the number has declined even further to 0.7. Low fertility in combination with permanently increasing life expectancy will lead to pronounced population

Table 22

West-East transfers, additional public receipts and public debt

(billion ECU)

	1991	1992	1993	1994	1995	1996
Net transfers						
Total	56.3	69.8	72.4	69.8	85.8	–
% of Western GDP	3.8	4.5	4.6	4.2	5.0	–
Additional public receipts						
Total	8.2	12.5	11.4	20.0	22.8	8.0
% of Western GDP	0.6	0.8	0.8	1.3	1.4	0.5
Public debt						
Total	626.5	717.9	805.5	887.0	1 064.3	–
% of total GDP	41.1	43.7	47.8	50.1	57.7	–

Sources: SVR (1995); Deutsche Bundesbank, *Monatsbericht*, recent issues.

ageing over the next decades. According to official projections (cf. Sommer (1994)), the elderly dependency ratio — measured as the number of individuals aged 65 and above per individual aged 18 to 64 — will rise from 22.9% in 1995 to 47.7% in 2040.

The ageing process will have severe implications on three branches of the social insurance system: the pension system, the public health insurance, and the long-term care insurance introduced only recently in 1996. All of these are financed on paygo schemes and tend to be fairly generous. For example, the pension system ensures a net replacement rate that exceeds 70% for an average production worker. The average retirement age is approximately 60 years for females and only slightly higher for males.

If the current generosity is to be maintained, contributions to the social insurance system will have to rise significantly in the future to keep budgets balanced. Without reforms, social insurance contributions could consume more than 50% of the total payroll in 2035, the year with the most disadvantageous demographic structure: social security contribution rates have been predicted to increase from 18.6% in 1995 to 31.7% in 2035. Contribution rates for long-term care insurance and public health insurance are forecasted to add another 2.7 and 16.8% of gross income, respectively (cf. Boll et al. (1994) or Bonin et al. (1997)).

In 1992, the German government responded to this serious demographic pressure by reducing incentives for early retirement and lowering the replacement rate for future generations. More recently, the payroll contribution rate to social security was increased to 19.2% in 1996, and to 20.3% in 1997. Further, expenditure ceilings were imposed on the suppliers of health care. According to projections of social insurance contribution rates, however, these reforms were not at all sufficient to guarantee the future sustainability of the pay-as-you-go schemes.

5.3. Baseline results and sensitivity analysis

5.3.1. Basic assumptions

Economically, Germany is still divided into two distinct regions. Therefore, it is necessary to calculate region-specific generational accounts for East and West Germany. This requires region-specific demographic projections, and separate forecasts of tax payments and transfer receipts.

The demographic projections take the 1995 population as a starting point, and closely follow the official assumptions of the German Bureau of Census on prospective fertility, mortality, and immigration (cf. Sommer (1994)). In particular, western total fertility is held constant at its 1994 value of 1.39, while the eastern rate increases linearly from an initial value of 0.77 to the western figure until 2005. Total fertility of foreigners and migrants permanently ranges higher at 1.6. Life expectancy at birth of males (females) is assumed to increase from 73.2 (79.6) years in 1994 to 74.7 (81.1) years in 2000 and to remain constant thereafter. Finally, net immigration decreases from 420 000 in 1994 to 200 000 in 2010 and all following years. Immigration of

Table 23

Public receipts and expenditures in Germany, 1995

(billion ECU)

Receipts		Expenditures	
Labour income taxes	185.0	Social security	186.0
Capital income taxes	52.3	Health insurance	120.5
Seigniorage	3.7	Unemployment insurance	32.8
Value added taxes	125.3	Long-term care insurance	3.6
Excise taxes	17.8	Accident insurance	9.3
Petrol tax	34.6	Maternity assistance	3.9
Insurance tax	7.6	Welfare benefits	9.9
Vehicle tax	7.4	Housing benefits	3.0
Other taxes	4.9	Youth support	13.3
Social security	141.4	Child allowances	11.0
Health insurance	88.4	Net investment	32.6
Unemployment insurance	47.2	Education (without investment)	58.8
Long-term care insurance	8.0	Subsidies	40.2
Accident insurance	10.5	Interest payments	60.2
Other revenues	49.5	Government consumption	274.2
Deficit	85.3		
Total	783.5		783.5

Source: Statistisches Bundesamt (1996a, 1996b); BMF (1996); BMA (1996); BLK (1996).

ethnic Germans from eastern Europe which adds about one million migrants in the short-run is phased out until 2010.

The 1995 budget of the overall government sector including all federal, State and local governments and the social insurance system is summarised in Table 23. Although drawn from official statistics, some of the figures are not directly comparable with the original sources for two reasons. First, substantial corrections were necessary to account for intergovernmental or interadministrative payments. Moreover, administrative costs and non-insurance-related expenditure of the social insurance system were allocated as non-age-specific government expenditure.

Aggregate government revenue and expenditure including the payments of the various branches of social insurance are distributed by age and gender in accordance with region-specific relative age-gender profiles mainly derived from two data sources: the German Socio-Economic Panel (GSOEP) conducted by the German Institute of Economic Research and the Consumer Expenditure Survey by the Federal Bureau of Census. Additional micro-data were drawn from the statistical yearbook and provided by the Ministry of Labour and Social Affairs. Altogether, the calculations cover 33 different revenue and 16 expenditure aggregates that were distributed using 27 age-, gender- and region-specific profiles.

All revenue and expenditure projections take enacted and planned policy changes into account. Our computations consider the 1998 reduction of the solidarity surcharge tax by 2 percentage points, the removal of the wealth tax in 1997, the phasing in of long-term care insurance with concomitant reductions in general welfare spending of local authorities, the increase of the social security payroll tax in 1997, and increases in retirement age after 2000. Otherwise, we assume that 1995 per-capita taxes and transfers grow in line with productivity growth which was set to 1.5% in the baseline. To discount future payments a baseline interest rate of 5% was applied.

In 1995, net government debt which directly enters the intertemporal budget constraint of the government amounted to ECU 1 064 billion, of which ECU 333 billion that mainly reflect unification-related off-budget debt funds were allocated to East Germany. Subtracting transfers and other revenue net of subsidies, net investment, education expenditure (without investment) and interest payments from total public spending yields non-age-specific government expenditure. It amounted to ECU 274 billion in the base-year, and is assumed to grow in line with productivity in per capita terms.

At present, both the level and the shape of age-specific tax and transfer payments differ considerably for East and West Germans. To capture their respective lifetime tax burdens correctly, one needs assumptions on the future convergence of the two German regions. In our baseline, we assume full convergence by 2010 which may appear as a fairly optimistic view on the catching-up process, but is in line with recent studies on regional convergence (cf. Bröcker and Raffelhüschen (1997), Burda and Funke (1995)). All eastern per capita tax payments and transfer receipts are adjusted linearly to the corresponding western levels within that period. Since the solidarity surcharge of 7.5% on income tax owed was originally envisaged to be eliminated upon completion of the Eastern transition, it is removed after 2010 in the baseline simulations.

5.3.2. Baseline findings

Table 24 reports the 1995 generational accounts for cohorts between ages 0 and 100 under baseline assumptions. Non-gender-specific lifetime net tax burdens are reported in the second column, while the third and fourth columns display the generational accounts for male and female base-year residents. Irrespective of gender, a typical life-cycle pattern can be observed: only cohorts aged 10 to 40 face positive tax burdens, as their rest-of-life taxes exceed the present value of lifetime transfers. All other living generations receive net transfers in present value terms.

Since non-age-specific government spending is regarded as a transfer, the average present newborn over the entire lifetime receives a net transfer of ECU 35 100 from the government sector. The net tax burden gradually increases with age and reaches a maximum of ECU 130 700 at age 25, when the average individual has entered the labour force. For cohorts with a smaller number of remaining years in the labour market, the generational accounts decrease, and turn negative at age 45. The lifetime net transfer receipts reach their maximum for the cohort that enters retirement in the base-year, i.e. the 65-year-old. It can expect rest-of-life net transfers of ECU 205 700, if current fiscal policy prevails. For older living cohorts, the net transfer revenue gradually decreases due to a shorter life expectancy.

Table 24

Generational accounts, Germany

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 35.1	2.0	– 74.2
5	– 11.7	33.0	– 58.5
10	30.8	84.1	-25.4
15	79.3	143.1	12.1
20	118.8	192.5	42.1
25	130.7	211.2	44.3
30	116.6	197.5	29.1
35	86.3	158.0	10.0
40	44.1	101.9	– 16.0
45	– 8.2	34.8	– 52.7
50	– 73.2	– 48.1	– 98.9
55	– 138.2	– 134.3	– 142.1
60	– 194.4	– 210.4	– 178.7
65	– 205.7	– 228.8	– 185.2
70	– 182.2	– 201.5	– 171.1
75	– 153.1	– 166.8	– 146.2
80	– 121.0	– 132.1	– 116.3
85	– 92.7	– 103.5	– 88.9
90	– 68.8	– 80.4	– 65.2
95	– 47.9	– 59.2	– 45.2
100	– 16.9	– 21.3	– 15.1
Increase in all taxes, future (%)	58.9	–	–
Future generational account	82.6	143.6	18.4
Absolute difference	117.7	141.6	92.6
IPL (% of GDP)	136.0	–	–

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Although living male and female cohorts exhibit similar age-specific patterns of generational accounts, the gender-specific differences in absolute tax burdens are large, as female labour force participation is lower than men's and women receive lower wages on average. In addition, the German social insurance system significantly redistributes to the favour of women. Therefore, the lifetime net tax burden of working-age females is at most half that of men, while female transfer receipts during old-age range only slightly below those of males.

Even if the optimistic baseline assumption on the East German recovery process holds and despite the unification-related tax increases in recent years, current fiscal policy will impose a significant burden on cohorts not yet born. Intertemporal government debt amounts to 136.0% to GDP. Unchanged continuation of current fiscal policy more than doubles base-year government debt which amounted to 57.7% of GDP. Most of the hidden debt stems from living generations' entitlements to benefits from the social insurance system. To service the overall intertemporal liabilities of the government, future generations face a proportional increase of all taxes by 58.9% which leaves them with a growth adjustment net lifetime tax burden of ECU 82 600 on average. The redistribution to the disadvantage of future generations is very significant: future cohorts have to pay ECU 117 700 more to the government over their entire life cycle than base-year newborns.

The strong assumption that intertemporal debt will be imposed on future generations only can be avoided by calculating the immediate once-and-for-all adjustments that would lead to a sustainable fiscal policy. Both future and living generations will share in the service of true public liabilities in this case. To ensure sustainability of fiscal policy in the baseline, all current taxes need to be increased by 11.8%. The tax quota rises from 39.8 to 44.5% of GDP in this case. Alternatively, the transfer quota could be reduced by 4.5 percentage points to 36.1% of GDP. This requires a proportional cut in all government transfer spending by 11.1%.

The sources of intergenerational imbalance in Germany are revealed by two stylised experiments. Assuming that explicit debt does not exist at all in the base-year, of course, improves the sustainability of current fiscal policy. Nevertheless, to service an intertemporal public liability (IPL, cf. equation (6) in Chapter 1) of 78.3% of GDP future generations have to bear a 33.9% surcharge in all taxes which increases their lifetime tax burden by ECU 69 000.

Still, the major source of intergenerational debt in Germany is the severe ageing process ahead. Assuming that the current favourable age structure could be kept constant which eliminates population ageing we find that current fiscal policy would be actually sustainable, even if tax payments of all future generations were cut by 3.1%. Future agents could receive a transfer of ECU 7 500 on average. Without the tax cut, the government sector would accumulate wealth amounting to 11.1% of GDP.

Table 25 decomposes the generational accounts representative for living generations into specific rest-of-life tax payments and transfer receipts. Not surprisingly, the proportional contributions to the social insurance system and the progressive labour income tax which together impose the highest lifetime tax burden tend to be concentrated on the working-aged. Most other taxes are much more evenly spread over the life cycle. Only capital income taxes mainly occur in later years of life. The findings with respect to transfers are equally intuitive. Most social security benefits which include accident insurance payments are paid after the age of 60, and health insurance benefits are also significantly larger for retirees. In contrast, unemployment benefits are targeted towards the working-aged. General welfare payments support poor families, especially with children, as well as the elderly poor. Educational transfers have an important impact on younger generations. They are spread rather evenly among all age groups younger than 25.

5.3.3. Sensitivity analysis

Table 26 summarises our sensitivity experiments. It expresses the degree of intergenerational sustainability of fiscal policy through the absolute change of lifetime tax burdens for future generations associated with intertemporal government debt. Applying alternative interest rate (3, 5 and 7%) and growth rate (1, 1.5 and 2%) combinations we find that the intergenerational imbalance is neither strictly increasing nor strictly decreasing with lower growth rates and higher interest rates. Overall, the absolute difference in generational accounts reacts quite insensitively to parameter variations. It only ranges from ECU 117 700 in the minimum to ECU 124 200 at the maximum. Our finding that post-unification fiscal policy in Germany is unsustainable is hence confirmed for a wide range of growth and discount rates.

Table 25

The composition of generational accounts, Germany

(1 000 ECU) (*)

	Tax payments						Transfer receipts						
Age in 1995	Labour income	Capital taxes	Seignior-age	VAT	Excise	Social insurance	Social security	Health insurance	Unem-ployment insurance	General welfare	Youth and maternity	Education	Non-age-specific expenditure
0	43.9	12.3	0.8	43.6	16.5	73.1	19.6	30.7	5.4	5.3	19.9	48.3	96.2
5	52.4	14.7	1.0	44.1	19.6	87.0	23.5	30.6	6.3	4.6	18.7	51.7	94.9
10	62.3	17.0	1.2	45.2	23	103.2	28.0	33.0	7.5	4.0	14.8	40.6	93.2
15	72.9	19.8	1.5	45.9	26.8	121.5	33.0	35.7	9.5	3.7	9.6	26.6	91.1
20	83.2	19.3	1.4	46.3	29.9	137.4	38.0	38.1	11.6	3.5	4.1	14.6	88.7
25	87.5	19.1	1.4	45.5	29.4	140.5	45.4	40.0	10.7	3.4	2.4	4.7	86.0
30	83.3	19.5	1.4	43.8	27.6	133.9	54.3	41.7	9.8	3.2	1.1	0.0	82.7
35	75.7	18.8	1.3	42.6	25.1	121.4	64.6	43.4	8.3	3.0	0.4	0.0	79.0
40	64.0	18.0	1.3	41.0	22.1	103.7	76.1	45.2	7.1	2.8	0.0	0.0	74.6
45	50.2	16.2	1.1	38.6	18.9	81.9	89.4	46.9	6.4	2.8	0.0	0.0	69.7
50	32.3	13.2	0.9	34.8	15.8	56.6	106.2	48.1	5.5	2.8	0.0	0.0	64.1
55	15.5	11.1	0.8	30.4	12.7	31.0	125.8	49.1	3.8	2.9	0.0	0.0	58.0
60	4.6	9.2	0.7	25.8	9.8	9.5	147.7	49.9	1.6	3.1	0.0	0.0	51.4
65	0.6	7.8	0.6	21.1	7.3	1.2	146.7	50.0	0.0	3.0	0.0	0.0	44.5
70	0.0	6.8	0.5	16.7	5.2	0.1	121.9	48.6	0.0	3.2	0.0	0.0	37.8
75	0.0	5.5	0.4	12.3	3.6	0.0	97.1	44.7	0.0	2.7	0.0	0.0	30.4
80	0.0	4.2	0.3	9.1	2.6	0.0	72.0	39.3	0.0	2.2	0.0	0.0	23.6
85	0.0	3.2	0.2	6.4	1.8	0.0	51.8	33	0.0	1.7	0.0	0.0	17.9
90	0.0	2.6	0.2	4.6	1.3	0.0	37.1	25.6	0.0	1.3	0.0	0.0	13.4
95	0.0	2.0	0.1	3.3	0.9	0.0	25.9	17.8	0.0	1.0	0.0	0.0	9.6
100	0.0	0.7	0.1	1.2	0.3	0.0	10.4	4.9	0.0	0.3	0.0	0.0	3.5

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Table 26

Sensitivity analysis, Germany

Productivity growth (%)		1	
Discount rate (%)	3	5	7
Absolute difference	121.8	117.7	124.2
Productivity growth (%)		1.5	
Discount rate (%)	3	5	7
Absolute difference	123.5	117.7	121.6
Productivity growth (%)		2	
Discount rate (%)	3	5	7
Absolute difference	122.9	118.6	119.5
Population projection	Constant population structure	Baseline assumptions	Increasing fertility
Absolute difference	– 8.7	117.7	115.3
Catching-up until	2010	2020	2030
Absolute difference	117.7	128.6	137.1

Table 26 also reports the sensitivity of our findings with respect to alternative demographic assumptions. As already discussed above, eliminating the future ageing process in a constant population would reverse the intergenerational imbalance. In contrast, more optimistic assumptions with regard to future fertility will not significantly change the results. For example, if fertility increases after 2030 to ensure a stationary population of 54 million from 2100 onwards, the sustainability of current fiscal policy is only marginally improved. Future generations still have to pay ECU 115 300 more than current newborns, as compared to ECU 117 700 in the baseline.

Finally, we test the sensitivity of the baseline findings with respect to the speed of convergence between East and West Germany. Given the high current transfer level and the small eastern tax base, intertemporal government debt is the higher the later full convergence is achieved. If, for example, the adjustment process is only completed in 2020 or 2030 instead of 2010, the absolute difference in current and future generations' accounts increases from the baseline ECU 117 700 to ECU 128 600 and ECU 137 100, respectively. Still, our baseline findings are not seriously altered. Of course, a higher speed of convergence would reduce the burden of future generations. However, in light of East Germany's current macroeconomic performance, assumptions that are more optimistic than the baseline seem to be fully unrealistic at present.

5.4. The burden of unification

So far the analysis has focussed on the burden German unification might impose on future generations. However, present western residents also face an additional tax burden due to the unification-induced tax increments discussed in Section 5.2. To illustrate how this part of the unification-related burden has affected current living western cohorts, we isolate region-specific generational accounts for West Germany (cf. Gokhale et al. (1995)). The additional tax burden due to unification is estimated by comparing the baseline generational accounts for present western residents with their lifetime tax burden in a scenario that withdraws all unification-related tax and contribution increases and excludes all spending on goods and services in the East.

Table 27 reports the rest-of-life net tax payments under the baseline and the scenario that hypothetically reverses German unification, as well as the absolute change in generational accounts for all male and female cohorts alive in the base-year. Although living westerners of any age share in the burden of unification, the additional tax load on those younger than 55 or less is especially large. On average, the relative increase in rest-of-life tax payments for male and female retirees amounts to only about one tenth of the respective figure for younger western residents. At the maximum, unification has added ECU 29 700 to the life-cycle tax payments of a 25-year-old male. Although females of the same age face a smaller absolute lifetime tax increase than men (ECU 18 400), in most age groups they are burdened higher in relative terms. For example, the average 25-year-old female faces a 15 % increase in her generational account. The corresponding change for a man amounts to only 10.8 %.

The increased tax burdens mainly arise from additional social insurance contributions and higher indirect taxation. The progressive income tax surcharge, which burdens males in the labour force relatively more than females ranges only third. Further, as this surcharge will be phased out until 2010, its impact on tax burdens for younger cohorts remains small. A major part of the unification-related tax increases falls on indirect taxes which are more evenly spread over the life cycle and the two genders. In fact, the small additional tax payments of older cohorts almost entirely derive from changes in excise taxation. The importance of indirect taxation for the financing of German unification also explains why female and very young cohorts contribute more than proportionally to the burden of unification.

In the political debate on how to finance unification-related expenditure the income tax surcharge — the so-called 'solidarity surcharge' — has held a prominent position. The solidarity surcharge was first introduced from January 1991 to July 1992 as a proportional 7.5 surcharge on individual income tax. In 1995, the surcharge was reintroduced. Although it is planned to levy the solidarity surcharge as long as it 'deems necessary' to facilitate the East German adjustment process, recent political debates question its persistence into the future. The importance of the income tax surcharge for the sustainability of German fiscal policy will be explored using two policy scenarios. In the first, we assume that the solidarity surcharge is eliminated prematurely in 2000. Alternatively, the solidarity surcharge is levied infinitely. In either case, East German catching-up is assumed to last until 2010.

Table 27

The burden of unification on West German residents

(1 000 ECU) (*)

Generation's age in 1995	Male net payments			Female net payments		
	Without unification	Baseline	Male burden	Without unification	Baseline	Female burden
0	– 11.3	2.6	13.9	– 83.2	– 73.4	9.8
5	16.9	33.1	16.2	– 69.2	– 57.9	11.3
10	64.9	84.3	19.3	– 37.9	– 24.5	13.4
15	123.7	147.0	23.3	1.9	17.9	16.0
20	171.8	198.9	27.1	31.6	49.5	17.9
25	192.5	221.1	28.7	33.1	50.8	17.7
30	184.2	212.6	28.4	18.9	35.5	16.6
35	150.0	177.0	27.0	1.6	17.2	15.6
40	99.3	123.6	24.3	– 21.0	– 6.8	14.2
45	33.8	54.3	20.5	– 56.7	– 44.8	11.9
50	– 45.1	– 29.4	15.8	– 100.2	– 91.1	9.0
55	– 132.9	– 122.6	10.3	– 138.8	– 132.4	6.4
60	– 214.0	– 208.6	5.3	– 172.4	– 168.1	4.3
65	– 230.9	– 228.0	2.9	-178.3	– 175.2	3.1
70	– 202.0	– 200.2	1.9	– 166.4	– 164.1	2.3
75	– 167.1	– 165.8	1.3	– 142.2	– 140.6	1.7
80	– 132.7	– 131.7	1.0	– 112.8	-111.6	1.2
85	– 103.9	– 103.2	0.7	– 85.7	– 84.8	0.9
90	– 80.6	– 80.1	0.5	– 62.6	– 62.0	0.6
95	– 59.4	– 58.9	0.4	-43.7	– 43.2	0.4
100	– 21.4	– 21.3	0.2	– 14.0	– 13.8	0.2

(*) 1995 value; baseline (r = 0.05, g = 0.015)

Premature elimination of the solidarity surcharge transfers an even higher part of unification-related burdens to future generations. The tax reduction for the present living slightly adds to government's intertemporal liabilities and therefore requires higher lifetime tax payments from future newborns. In this scenario, future generations have to pay ECU 121 400 more in net taxes than current newborns which is ECU 3 700 more than in the baseline. Permanent maintenance of the surcharge, on the contrary, imposes additional taxes on the current working-aged. Correspondingly, intertemporal public liabilities are reduced, and intergenerational sustainability of fiscal policy improved. The net tax payments of future generations could decrease by ECU 8 900. However, even maintaining the solidarity surcharge forever hardly improves the intergenerational stance of German fiscal policy. The intertemporal public liabilities remain as high as 127% of GDP.

5.5. Ageing and social insurance systems

Besides the unification-related pressure on fiscal policy, Germany has to deal with a severe ageing phenomenon. To illustrate this pressure, it is useful to isolate generational accounts for the intergenerational contracts which mainly contribute to the financial burden arising from population ageing. As we will show below, unaltered maintenance of the social insurance system calls the sustainability of current fiscal policy into question. To calculate separate generational accounts for that part of German social insurance that is most endangered by population ageing we only take into account the age- and gender-profiles for contributions and transfers of social security, public health care and long-term care insurance. The federal grant to social security can be excluded from the computations, as it roughly equals non-insurance-related expenditure. As the German social insurance system operates on a pure pay-as-you-go scheme, its base-year wealth is assumed zero.

Table 28 summarises our findings. The first two columns report the rest-of-life net payments to the three intergenerational contracts according to age. As with total generational accounts, the maximum net contribution to social insurance is reached when entering the labour force. An average 20-year-old faces a lifetime net burden of ECU 66 900. In present value terms, rest-of-life contributions

Table 28

Accounts of intergenerational contracts, Germany

(1 000 ECU) (*)

Generation's age in 1995	Generational 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 future (%)	125.7	–	–	–
Future generational account	120.7	–	–	–
Absolute difference	95.5	–	–	–
IPL (% of GDP)	114.3	0.0	0.0	0.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

break even with the remaining transfers received from the social insurance system at age 43. Entering retirement, the expected net transfers reach their minimum: an average 65-year-old can expect to receive ECU 192 600. For older base-year cohorts, generational accounts decrease with life expectancy.

If all net-of-contribution demands on the German social insurance system were fulfilled, the IPL would amount to 114.3% of GDP, despite zero indebtedness of the system in the base-year. To finance the liabilities, social insurance contributions made by future generations need to be increased by 125.7%. In consequence, the average lifetime tax burden (ECU 120 700) of any future individual exceeds that of current newborns (ECU 25 200) by ECU 95 500. These results suggest that the current pay-as-you-go social insurance system is the main source for the intertemporal imbalance in German fiscal policy. Even if future generations were willing to bear a burden four times as large as that of current living generations, the disincentives on labour supply and entrepreneurial decisions implied are obvious.

Allocating present generations' implicit demands on pay-as-you-go transfers exclusively to generations not yet born is by no means a realistic scenario. More likely appears intergenerational conflict regarding the distribution of the resources produced by present and future working-aged. This conflict has entered the political debate already with the popular header of an 'age war'.

As a response to demographic pressure on the social insurance system, imposing a ceiling for future contribution rates is currently high on the political agenda in Germany. However, the discussion is marred by ad hoc estimates of contribution rates that are supposed to restore the long-run viability of social insurance. Generational accounting may add some systematic reasoning to this debate. It allows to determine the immediate once-and-for-all contribution increase or transfer reduction which would ensure intergenerational sustainability of social insurance.

We find that, given that federal subsidies as well as transfers from unemployment insurance grow by the

same proportion, payroll taxes for the generational contracts under investigation need to be raised permanently by 24.5%. Doing so imposes a social security payroll tax rate of 23.2% (instead of 18.6), a health insurance payroll tax rate of 16.3% (instead of 13.1), and a payroll tax rate of 2.1% (instead of 1.7) for long-term care insurance in all future years. The opposite extreme is to achieve intergenerational sustainability by an immediate social insurance transfer cut of 19.6%. This means that the replacement level of the social security would be reduced permanently to 57.5% of net labour income, as compared to 70% at present.

Although both stylised scenarios achieve intergenerational sustainability, they differ in their impact on the generational accounts of the living, as can be seen from the third and fourth columns of Table 28. Raising contribution rates redistributes implicit liabilities from future to currently young cohorts and leaves the accounts of the elderly unaffected. The rise in net payments will be the higher the younger a current working-aged is. While for a 40-year-old and 60-year-old the rest-of-life tax burden is increased by respectively ECU 4 900 and ECU 2 400 only, a 20-year-old on average faces additional net payments of ECU 34 400. For a current newborn, the additional payment remains smaller at ECU 18 200 in present value due to discounting effects.

If transfers received from the social insurance system were uniformly reduced instead of raising contributions, all presently living generations would share in restoring the intergenerational sustainability. In this case, it is the elderly who bear a major part of the adjustments necessary to relieve future generations. Cohorts that are to enter retirement soon after the base-year will experience the highest losses. Net transfers for an average 60-year old fall by ECU 37 800. Younger living cohorts fare better, as for them the reductions in old-age benefits will occur in a more distant future. Still, their additional burdens are far from negligible. Net contributions of current newborns rise by ECU 9 600. For individuals aged 20 and 40, the respective losses amount to ECU 14 500 and ECU 23 100.

Neither of the two extreme scenarios discussed so far seems to be a realistic policy option. They both distribute the burden to restore intergenerational sustainability of the pay-as-you-go systems rather unevenly among different age groups. Most likely the political process will therefore opt for some combination of the two scenarios. The final column of Table 28 reports the effects of a partial funding that finances one half of what is necessary to restore sustainability by increasing contribution rates, and the other half by reducing benefits. The resulting deviations of generational accounts from the baseline case are simple combinations of the two extreme scenarios discussed before. Under this policy the additional net tax burdens are much more uniformly distributed among the living cohorts. For the working aged additional tax burdens range between ECU 19 000 and ECU 26 000. On current newborns the mixed strategy imposes an additional payment of ECU 13 900, and the average load levied on the elderly is of similar size.

Under this financing scheme the three branches of social insurance will run surpluses in the first decades. Accumulating wealth they could operate as partially funded systems. At the time the demographic burden aggravates, the accumulated funds would be sufficient to partially finance the then occurring deficits. The strategy to fund pay-as-you-go social insurance schemes partially, and to let current retirees participate in the funding, is not only superior with respect to intergenerational and intragenerational equity. It is strongly recommended too from a macroeconomic viewpoint. Any funding strategy could endow the German economy with additional capital that might accelerate growth, contribute to raising labour productivity and thereby create new job opportunities for the present unemployed. Reducing benefits — at the expense of the elderly — might open room to decrease the presently high side-cost of labour in the short-run.

A partial funding of the German social insurance system, in particular social security, would both significantly improve the intertemporal sustainability of current fiscal policy and could help solve the present short-run labour market problems. However, whether this policy will prove politically feasible remains an open question.

5.6. Immigration policy

In Germany, as in many other EU Member States, the issue of migration plays a prominent role in the political debate that focuses on the social costs associated with immigration. At present, legal settings in Germany are designed to prevent immigration other than by EU citizens, ethnic Germans and the family-reunion of foreign-born residents. In addition, asylum-seekers and refugees are occasionally granted permanent resident status. Still, the question of whether Germany should officially open its boarders to immigration is a hotly debated issue. In

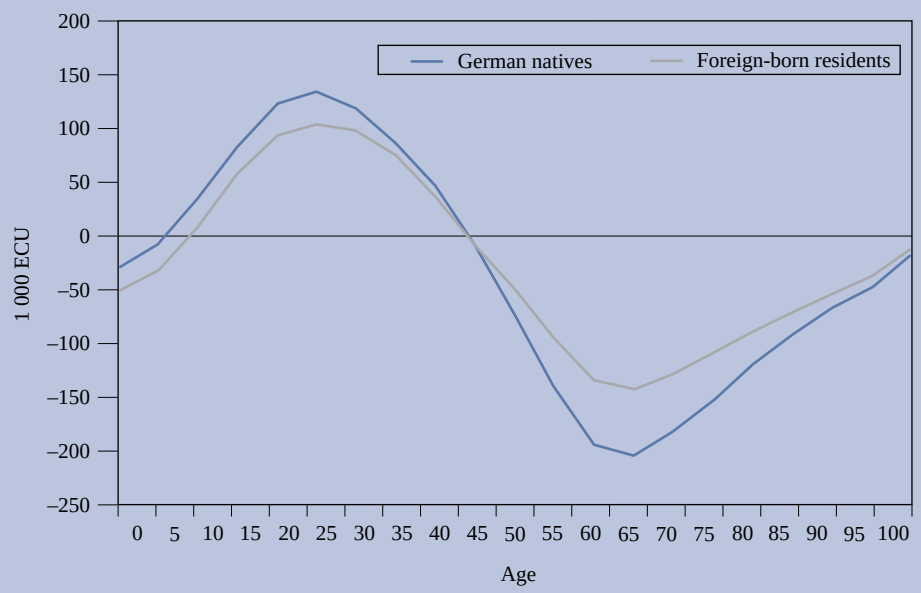
this section which draws partially on Bonin et al. (1997) we focus on the fiscal aspects related to immigration. Generational accounting is employed to assess the impact of migration on the overall revenue and expenditure of the government. As immigrants to Germany are on average 10 years younger than the resident population, they might rejuvenate society and improve the intergenerational sustainability of fiscal policy that is endangered by population ageing.

To investigate the fiscal effects of migratory flows, we employ three alternative migration scenarios. In the first, which was already used in the baseline calculation, we follow the medium projection of the Bureau of Census of 200 000 net migrants in the long-run. Alternatively, we employ an upper and a lower bound of likely developments. As the lower bound, we assume that Germany successfully bans any immigration, which would sharply increase old-age dependency, while the share of foreigners in the German population would continually decrease. In the upper extreme scenario, net immigration is determined endogenously to maintain a population of 85 million residents from 2012. Before, we assume 300 000 annual immigrants to arrive. The migratory inflows to prevent a population decline are quite sizeable. The maximum inflow required amounts to 620 000 individuals, and long-run net immigration figures stabilise at about 520 000. Immigration this high necessarily leads to a sharp increase in the share of the foreign-born population. In 2035, nearly one quarter of the population would be foreign-born.

In order to capture the overall contribution of immigrants to the government sector, we must take into account the specific economic behaviour of migrants. The impact of migration on the intertemporal public liabilities depends crucially on the capacity of domestic labour markets to absorb future migrants. As it is difficult to judge the skill level of future immigrants which is the chief determinant for their success on the labour market, we employ information on foreigners who have already lived in Germany for some years, and assume that future immigrants will resemble them.

Graph 5 compares the rest-of-life net tax payments of native residents and base-year foreigners. Irrespective of citizenship, we find the typical life-cycle pattern of generational accounts for all current generations, although we observe significant differences in the net tax burden at a given age. While the break-even points for foreigners in Germany and native residents are almost identical, the overall net payments of foreigners aged between 10 and 45 are on average 25 % lower than those of natives of identical age. In the last three decades of their life, net

Graph 5: **Generational accounts of natives and residents, Germany**



receipts of foreigners are approximately 40% lower as compared to those of Germans.

The differences in average life-cycle tax payments between German natives and foreigners can be attributed to a number of reasons. On average, the foreigners presently living in Germany are less qualified and work in less qualified jobs with lower average earnings than natives. Foreigners exhibit a higher savings rate and frequently avoid early retirement to complete the minimum contribution period required to become eligible for social security benefits. Due to these stylised facts, they pay on average less labour and capital income tax, lower VAT and excise taxes and, during their first decades of labour force participation, also lower social insurance contributions. Only at the end of their working life do foreigners' contributions to social insurance exceed those of natives'.

Regarding transfers, differences between foreigners and German natives are particularly marked for pension benefits and educational demands which both fall significantly short for foreigners. The on-average low pensions of foreigners which reflect their short earnings history and the high tax-benefit-linkage of the German social security system more than compensate the higher average transfers received from unemployment insurance and general welfare.

Assuming that future immigrants will exhibit the same age-specific tax and transfer pattern as residents of foreign origin in the base-year, Graph 5 indicates that it is favourable for the government to attract immigrants aged 10 to 45 when taking residence. Under the given assumptions, only these immigrant cohorts contribute positively to the government coffers over their remaining lifetime in the host country, thereby reducing the intertemporal public liabilities and improving the sustainability of fiscal policy. The positive contribution of immigrants could be quite remarkable. According to the generational accounts, each immigrant aged between 20 and 30 brings a net gain of about ECU 100 000 to the government sector. In fact, immigration to a major part takes place at a very early stage of the life cycle. In the base-year, almost three quarters of all immigrants to Germany were in the favourable age bracket from 10 to 45. If the currently observed age pattern of immigrants continues, future immigration may thus generate substantial relief for the public sector.

This conclusion is confirmed when comparing the indicators of intergenerational sustainability for the three immigration scenarios outlined above. The total absence of any migratory inflows severely aggravates the intergenerational imbalance. Although the IPL increases only slightly to 142.5% of GDP, the lifetime tax burden of future German natives increases from ECU 82 500 in the baseline to ECU 136 500. Without immigration, intertemporal government debt must be serviced by a significantly lower number of future taxpayers which leads to a sharp increase in their per capita tax burden. Encouraging immigration to stabilise the German population at a total of 85 million leads to the opposite result. In this scenario, future taxpayer generations face a generational account of ECU 50 600 which exceeds the net payments of present newborns by only ECU 85 800, as compared to ECU 117 700 in the baseline.

Our findings show quite clearly that allowing and encouraging immigration is desirable for future generations of Germans, as it substantially reduces their tax burden, despite being insufficient to restore intergenerational sustainability. However, this result is based on rather favourable assumptions regarding the tax and transfer payments of future immigrants. By applying the net tax pattern of current foreign-born residents, we perpetuate the economic behaviour of immigrants who on average entered the country more than a decade ago. We do not fully account for the potentially large fiscal transfers in the first years of integration. Moreover, the composition of immigrants has changed considerably over the last two decades. Therefore, it might be inappropriate to apply the generational account pattern of the current German 'guest worker' population to future migrant cohorts.

To test the validity of the baseline results we vary the capacity of future labour markets to absorb additional immigrants. As German unemployment has risen significantly in recent years, the integration of prospective immigrants might very well become more difficult and require higher welfare benefits and educational training than in the past. In order to illustrate the impact of slower labour market absorption of the migrants, we first assume that future immigrants can be integrated into the German labour market only with a delay of two years. Within that period, they are assumed to receive cash welfare grants in addition to health and educational transfers, and to pay only reduced indirect taxes. As the average contribution of immigrants to the government coffers falls under these assumptions, intertemporal government debt increases and future natives face a higher tax load of ECU 129 000, as compared to ECU 117 700 in the baseline.

If immigrants required six rather than two years before fully entering the labour market, the intergenerational redistribution rises further to an absolute difference of ECU 150 000. Nevertheless, even under this disadvantageous assumption, the intergenerational imbalance still ranges below that resulting in the absence of immigration. Only if labour market integration of immigrants takes more than nine years, does baseline immigration no longer reduce the net tax burden of future generations. This surprisingly long time-span is due to the rejuvenation of the native population associated with immigration. Future newborn cohorts are considerably larger than in the no-migration case. This demographic effect significantly alleviates the burden on future natives, and partially offsets the impact of reduced or even negative lifetime net fiscal contributions of immigrants, when their integration into the labour market becomes more difficult.

Another way of departure from the baseline assumptions is to claim that full integration of future immigrants can be achieved faster than today. This optimistic scenario would require an active immigration and integration policy that selects immigrants according to their skills and the needs of the German labour market. If, for example, the skill-level of future immigrants resembled that of the native population rather than that of foreign-born residents, the more positive rest-of-life net tax payments of the average immigrant would further reduce intertemporal government debt. With baseline migration, rising immigrant skills decreases the absolute difference of present and future generational accounts from ECU 117 000 to approximately ECU 110 000.

Sustainability of current fiscal policy is also improved, if an active immigration policy screens immigrants by age, trying to attract even younger immigrants than currently observed. In 1995, approximately 18 % of immigrants to Germany were between 25 and 35 years old, and 28 % were in the age bracket from 20 to 30. Our final experiments increase the number of immigrants within these age groups by 20 %, while maintaining the absolute inflow of 200 000 migrants in the long-run.

If future immigration policy privileges cohorts aged 25 through 35, intertemporal government debt decreases from 136.0 to 130.1 % of GDP. Overall liabilities could be serviced by a 56.8 % tax increase for all future generations, leaving them with an ECU 113 700 higher tax load than present newborns. Compared to the baseline, the screening of immigrants by age reduces the tax burden of future generations by ECU 4 000. Since the net contribution of immigrants is likely to reach its maximum at age 25, giving preference to those aged between 20 and 30 further enhances the sustainability of present fiscal policy. The IPL are reduced to 129.0 % of GDP, and the tax increase for future generations that meets the debt is reduced from 58.9 % in the baseline to 54.7 %.

Nevertheless, screening immigrants by age could only marginally improve intergenerational sustainability of fiscal policy, as the current age structure of immigrants is already favourable. In any case, encouraging immigration and supporting the integration of migrants into the labour market appears as a suitable strategy for improving the intergenerational stance of the government sector, although it cannot fully compensate the effects of population ageing.

5.7. Conclusion

Germany currently has to finance large transfer programmes to cushion the recovery of the deteriorated East German economy in face of severe population ageing ahead. Applying generational accounting, we find that this double squeeze could impose large additional tax loads on future generations. If current fiscal policy is maintained, overall government will accumulate debt as high as 130 % of GDP. To service intertemporal liabilities, tax rates for cohorts not yet born have to exceed those experienced by the present living by almost 60 %.

Apart from unification-related costs which have already imposed a sizeable additional tax burden on West German living cohorts, the rather generous German pay-as-you-go social insurance system accounts for the major part of Germany's intertemporal debt. A partial funding strategy that immediately raises social security contributions to build up a capital stock used in the years of the most severe demographic pressure could lead to an intergenerationally and intragenerationally more balanced policy, if complemented by transfer reductions to the elderly.

Encouraging immigration and actively screening immigrants by age and profession could further improve the sustainability of German fiscal policy. As immigrant rest-of-life net tax payments after taking residence are likely to be positive on average, migration might significantly unburden future generations of natives. In any case, restoring intergenerational sustainability in Germany will question many cherished political and economic conventions. There is not much time to be wasted — the first wave of population ageing is not far away.

6. Spain: the need for a broader tax base

Eduard Berenguer ([1]), Holger Bonin ([2]) and Bernd Raffelhüschen ([3])

6.1. Recent economic performance

Eleven years after the integration into the European Union, the Spanish economy closely follows the ups and downs of the European business cycle. This significant parallelism of business cycles is a consequence of two dominant factors in economic policy since the early 1980s: the opening of the Spanish economy to foreign trade and the prominent role given to internal free market forces. The period of intense economic growth in the second half of the 1980s that followed the liberalisation of markets eventually came to an end in the early 1990s. In 1993, the Spanish economy entered into a deep recession due to sharply reduced growth of fixed investments. Unemployment rose sharply, while current accounts and government budgets displayed severe imbalances.

In the following years, the devaluation of the peseta which resulted from the 1993 EMS turmoil fostered exports and helped to restore the competitiveness of the Spanish economy. Still, economic growth did not return to the rates experienced before the depression, partly due to a 'saving-for-the-rainy-day' effect (cf. Deaton (1991) and Berenguer (1993)) which discouraged investment. Moreover, fiscal policy which had been expansive since the early 1980s, was tightened from 1994, imposing a restrictive effect on domestic demand.

The reduction of budget deficits without inflation has currently become the main target of fiscal policy in Spain. Ever since 1994, when the central bank was accorded a more independent status, inflation decelerated as a consequence of tightened monetary policy. At the same time, smaller government spending reduced public deficits, which gradually approached the 3% to GDP quota called for by the Maastricht Treaty. Falling prices and decreasing government deficits have significantly reduced interest rates, creating a favourable environment for investment triggering overall growth (cf. Banco de España (1997, pp. 17–19)). Therefore, the recent recovery of the Spanish economy appears to rest on firm ground.

In 1997, when the present business cycle was approaching its height, GDP growth ranged well above 3%. Exports increased significantly, and the domestic demand growth reached the highest value of the last 20 years indicating strong confidence of investors and consumers that current supply-side oriented economic policy will be continued. The remarkable economic recovery has considerably helped Spain fulfil the Maastricht criteria. As recently as 1993, none of the criteria had been met, while by the end of 1997, all but the debt-to-GDP criterion were attained, allowing Spain to join the EMU from the start.

Still, despite the fulfilment of the Maastricht criteria, Spain has not achieved real economic convergence to EU standards in all areas. In particular, the industrial sector in Spain still faces above EU average labour costs. Recent wage restraint has not significantly moderated this problem. Spanish labour markets also appear as being excessively regulated and segmented, preventing the efficient allocation of resources. Although the recent Industrial Relations Act may help to deregulate traditionally sticky labour market conditions and create new job opportunities, unemployment is likely to remain high by EU standards, in spite of relative macroeconomic stability.

The elections of March 1996 installed a new conservative government which is planning important structural reforms directed to sort out market rigidities and distortions. Deregulation in the telecommunication and energy sector is being prepared, and an ambitious schedule of privatising public and nationalised enterprises has been launched. Revenue from privatisation supposedly is dedicated to the redemption of outstanding government debt.

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Altogether, both recent economic performance and economic policy in Spain are characterised by a set of largely positive developments. Still, the Spanish economy is challenged by a serious lack of flexibility. The lack of competitiveness in some industries will become even more obvious now that the euro is introduced, in particular, as it deprives political decision makers from the possibility of absorbing shocks through discrete devaluation of the peseta. Finally, in a more distant future, there is the challenge that an economically more advanced Spain will suffer reduced transfers from the EU Cohesion Fund. Potential new EU members such as, for example, the Czech Republic, Hungary, Poland and Slovenia could be strong rivals for funds within a bigger European Union.

6.2. Fiscal policy

From 1974, the Spanish government sector has been permanently running a deficit. The debt-to-GDP ratio has grown steadily and reached almost 70% in 1996. Following the rather optimistic official budget projections, the current annual deficit can be expected to fall by more than 50% to 1.6% of GDP until 2000. Accordingly, total debt would decrease to about 65% of GDP. To reach this ambitious goal, the government must take action to limit future expenditure growth, or increase its revenue. The following sections briefly analyse past trends in fiscal policy, before commenting on the measures of future fiscal consolidation put forward by the convergence plan from April 1997.

6.2.1. Government expenditure and revenue

After 1974, Spain's government sector witnessed a deep transformation. While government expenditure increased from 24.2 to 47.2% of GDP, its revenue grew at a smaller pace, from 23.8 to 40.5%. As a consequence the debt-to-GDP ratio reached ever new heights. Most of this transformation can be attributed to the economic transition that followed the end of Francoism. Spain's attempt to become a liberalised open market economy was accompanied by the idea of building up a welfare state similar to other European countries. Hence, while government regulations were increasingly dismantled, government transfers grew rapidly. Social benefits relative to GDP almost doubled between 1974 and 1995 for a number of reasons.

First, there was a strong tendency to install universal welfare programmes. The entire population has become entitled to public health care. Compulsory education has been stepwise extended to cover all children younger than 16. Second, the quality of benefits was substantially bettered in many welfare programmes. Third, a first wave of population ageing induced higher spending on pension, health and long-term care expenditure. Fourth, considerable mismanagement prevents cost efficient provision of transfers. Duplication in the administration of welfare programmes is common. Finally, disability pensions are rather high and continue to grow due to lack of control and numerous legal flaws.

Growth in welfare expenditure has slowed down considerably over the last decade however, as first reform measures have been passed into law. Still, the share of total government expenditure in GDP has further increased, mainly due to a rising interest burden. Moreover, wage payments to government sector employees have soared, as the government tried to offset high unemployment by increasing the number of State-employed.

The present Spanish tax system (cf. Kam et al. (1996)) basically originates from 1977 when a personal income tax that was combined with a net-wealth tax was introduced. In the wake of Spain's entry to the EC, indirect taxation was adjusted to EC standards in 1986. At present, social insurance contributions which generate about 40% of government receipts represent the single most important source of government revenue, followed by indirect taxes with a share of about 27%, almost 50% of which come from special excise taxes on, e.g., alcohol and tobacco, the vehicle tax and tariffs. The share of direct personal taxes in total revenue has stabilised at about 25% in the recent past. Finally, corporate and income taxes account for approximately 9% of the entire government revenue.

Since 1974, the share of tax payments in GDP has increased permanently, rising from 21.4 to 36.9% in 1995. The most distinct rise is that of personal income taxes which increased from less than 3% of GDP to 9% today. Over the same period, the share of social insurance contributions and indirect taxes remained comparatively constant, accounting for only 4.4 and 3.5 percentage points of the total increase of the tax-to-GDP quota, respectively. Taxes and contributions represent the major source of financing government outlays. Additional sources like profits from public sector enterprises, transfers, and interest rates from assets held by the government are of minor importance, amounting to a mere 4% of GDP.

6.2.2. Design and performance of the social insurance system

The Spanish social insurance system mainly provides retirement, disability, widow and orphan pensions, as well as health care and unemployment benefits. Following a 'single cash' approach, social insurance contributions, which presently total 35.5% of the payroll, are not earmarked to specific programmes. This revenue is complemented by additional transfers from the central government and the European Social Fund. The social insurance system is thereby partly financed out of supranational grants, general taxes and deficits. It is administered through various autonomous authorities. Each single administrative body receives a specific share of the social insurance contributions, transfers from the central government, and in some cases transfers from other autonomous bodies. The calculation of generational accounts controls for these intergovernmental grants.

As the benefits provided by the system were gradually improved over the last decades, the gap between expenditure and contribution revenue increased. While in 1975 about 88% of all social insurance benefits were covered by payroll contributions, this quota fell to 68% in 1995. Correspondingly, federal grants were augmented from 1.4 to 7.0% of GDP. The entire system still realises deficits. In 1995, social insurance required a loan of ECU 2.7 billion (ECU 1 = ESP 162.95) to fulfil its obligations.

Among the branches of social insurance, only the unemployment insurance may achieve financial balance in the near future, provided the number of unemployed decreases and coverage, as it is currently envisaged, can be broadened successfully. Still, return to fiscal balance would require a very positive labour market development, given that contribution revenue accounts for only 63.3% of unemployment benefits at present.

However, the major concern about the long-run sustainability of social insurance arises from the rapid growth of expenditure on pension and health plans. In Spain, government resources allocated to the health system have grown at a higher rate than GDP for a long period of time, thus bringing public health insurance into a severe deficit. Official medium-run forecasts predict that health expenditure will continue to grow faster than GDP by at least 0.5 percentage points until 2002 (cf. Insalud (1997)). In the light of these forecasts and to avoid even higher future deficits, it has been proposed to separate all health programmes from the 'single cash' budget of the social insurance system and to finance it instead by means of general taxes.

Spain has also found difficulties in financing pension insurance. In order to guarantee the future viability of the pension system, it has been decided to finance pension complements which serve to ensure a minimum benefit level and other non-contributive pensions out of general taxes in the future. In addition, according to the 1997 Pension Reform Act, average pensions will be reduced for all retiring after 1997 by the introduction of a less generous formula to calculate the primary insurance amount.

As will be shown below, the actions taken so far are unlikely to ensure intergenerational sustainability of the social insurance system. The main effect of the present reforms is to clarify the source of funding of the various welfare programmes. However, whether the additional intergovernmental transfers are financed by deficits or tax increases, has not yet been decided. There is a good chance that the system will turn towards a design with a more explicit tax-benefit linkage in the future.

6.2.3. Recent fiscal debates

If short-run balance of the social insurance system can be achieved only by financing parts of social insurance expenditure from general tax revenue, the question arises where to find the resources required in the long-run. In the light of other laws recently approved, which increase spending on education and defence by at least 1% of GDP, it seems unlikely that additional resources will be raised by cutting real government expenditure. At the same time, deficit spending does not appear feasible, as long as the government stays committed to reducing the stock of outstanding debt, which leaves tax increases as the most likely solution to serve the new expenditure needs.

While the policy measures which have lead to the described expenditure increases have been high on the political agenda for some time, there is no frank debate concerning the corresponding tax adjustments in Spain. Politics rather promises additional tax relief. For example, a more favourable treatment of capital income from 1996 implied an annual loss in government revenue of ECU 1.2 billion. In the same year, however, the government succeeded in raising special taxes on oil, alcohol, and tobacco in order to meet its deficit objectives. Concerning personal income taxation, there are political

commitments to reduce the wide number of tax brackets and the top marginal rate to a level of 50 %, but no action has been taken so far which would simplify the income tax system, or reduce the tax load. A major income tax reform is clearly not envisaged at present.

6.3. Baseline results and sensitivity analysis

6.3.1. Basic assumptions

In the recent past, Spain experienced a remarkable change in fertility behaviour. In comparison to most other European countries, the fall in birth rates occurred rather late, but was even more substantial. In the early 1980s Spain still experienced fertility rates well above the replacement level. If population growth was nevertheless moderate at that time, this was due to significant emigration to other European countries. Later, however, the total fertility rate continually decreased, reaching a value of only 1.3 in 1995, and today is the lowest of all EU Member States. In line with this remarkable change, Spain became a net immigration country with a net inflow of about 20 000 immigrants in 1995.

The projection of the future population development, which underlies the calculation of generational accounts, closely follows the official forecasts published by the Instituto de Demografía (1994). It starts from the 1991 population composition which was updated to the base-year according to the official data and assumptions. All projections assume a constant 1995 influx of migrants and decreasing mortality. The latter implies that until 2005 life expectancy at birth increases from 73.4 and 80.5 to 76.2 and 82.4 for males and females, respectively. The additional increase in life expectancy of approximately 1.5 years after 2005 which is found in the official projections is not designed in our forecast to maintain comparability with the other country studies.

In the most pessimistic official projection, fertility is assumed to increase from 1.3 to 1.6 until 2025, while the most optimistic scenario lets fertility return to the replacement level. In contrast, our baseline population projection assumes a constant 1995 fertility rate, which is more in line with the assumptions of comparable country studies. The impact of using the governmental fertility assumptions on intergenerational sustainability in Spain is tested in the sensitivity analysis.

Table 29 shows the Spanish budget of the entire public sector including local authorities. All intergovernmental grants and transfers have been cancelled out. Public revenue includes taxes on labour and capital income, value added tax, excise taxes on alcohol and tobacco, petrol, vehicle, inheritance, wealth and other taxes. The table also reports social insurance contributions including additional tax revenue allocated to the solidarity fund

Table 29

Public revenue and expenditure in Spain, 1995

(billion ECU)

Revenue		Expenditure	
Labour income taxes	31.0	Social security	49.8
Capital income taxes	16.0	Health	25.4
Value added taxes	20.3	Unemployment	11.1
Excise taxes	3.1	Housing benefits	6.5
Petrol tax	7.9	General welfare	7.6
Vehicle tax	0.7	Education	18.5
Gifts and inheritance tax	3.9	Net investment	15.9
Wealth tax	0.2	Subsidies	13.5
Other taxes	4.5	Interest payments	21.1
Social insurance	61.4	Government consumption	28.9
Solidarity Fund	0.6		
Unemployment insurance	0.5		
Accident insurance	0.3		
Other revenue	20.1		
Transfers	2.5		
Deficit	25.2		
Total	198.2		198.2

Sources: INE (1996), Fundación FIES (1997), TGSS (1995), MEH (1995a,b).

which partially finances the support for the unemployed. Seigniorage was not included in public receipts, since there is no transfer from the central bank to the public coffers in Spain.

As seen from Table 29, the 1995 figure for the overall deficit, which includes all public coffers and is therefore not in line with the official EU concept, amounts to almost 13% of total revenue. In addition, about 10% of the overall receipts stem from other revenue which to a considerable degree includes transfers funded by the EU coffers. On the whole, the various types of EU transfers amount to ECU 6.1 billion, or about 3% of all public revenue.

The types of expenditure listed in Table 29 display highly aggregated categories, which have been divided into a series of sub-categories to assign benefits by age and gender. In particular, government expenditure encompasses transfers to the elderly, health care, unemployment insurance, housing and welfare benefits and educational spending.

To project future net tax payments into the future, all aggregates or sub-aggregates of taxes and transfers summarised in Table 29 are distributed among representative female and male individuals of current generations with the help of age-gender profiles that were retrieved from micro-data surveys. The major part of the profiles was calculated from the Families Expenditure Survey and the Consumption Expenditure Survey. Health and educational expenditure were allocated using data provided on request by the National Health Institute (Insalud) and the Ministry of Education and Finance (Ministerio de Educación y Ciencia). In all cases, the construction of age- and gender-profiles follows the incidence assumptions of taxes and transfers laid down in Chapter 2.

In particular, personal income tax is divided between personal labour income and capital income tax in proportions equal to 83.5 and 16.5%. These quotas reflect the labour and capital income share in total income. The capital income share of income taxes is added to other taxes on capital including the corporate income tax, as well as local taxes on the profits from sales of real estate. Second, the incidence of social insurance contributions, although mainly paid by the employers, is assumed to be fully born by the employees. Contributions encompass contributions to social security, health, unemployment, and accidental insurance as well as contributions to the solidarity fund which is destined to pay lay-off indemnities to workers when firms are unable to provide them, as happens frequently in case of bankruptcy.

To forecast future tax payments and transfer revenue we assume that all age- and gender-specific per capita flows will grow at the constant rate of productivity growth which was set to 1.5% for the baseline. Deviating from this rule, our projection of taxes and transfers considers future fiscal changes legally enacted in the base-year. The 1996 and 1997 amendments concerning alcohol, tobacco, petrol and insurance tax rates are considered in the generational accounts. To discount future payments to their present value, we apply a uniform baseline interest rate of 5%.

Net interest payments which correspond to an outstanding government debt amounting to ECU 293.6 billion add another ECU 21.1 billion on the expenditure side. The former figure is directly utilised in the intertemporal budget constraint of the Spanish public sector. In 1995, net investment accounted for ECU 15.9 billion or approximately 8% of overall expenditure. Taking the base-year residual of total government revenue minus expenditure on transfers, subsidies and net investment implies non-age-specific government expenditure of slightly below ECU 29 billion. Non-age-specific government spending is determined by including all revenue and transfers which cannot be distributed by age, subsidies, net investments and transfers from the EU. It is projected to grow in line with productivity, and it is adjusted for the demographic transition in a per-capita manner.

Since we project future tax and government spending levels on the base of the 1995 budget, the generational accounts for Spain presented in the following section only partially capture the notable budgetary consolidation effort observed since then. The intertemporal public liabilities reported in this chapter lie at the upper bound of likely outcomes, since we adhere to the status quo perspective which provides the analytical standard of this report. If we took into account the deficit consolidation after 1995, fiscal policy in Spain would certainly appear less imbalanced intergenerationally, although it seems unlikely that our qualitative findings would be challenged.

6.3.2. Baseline findings

Table 30 shows the base-year 1995 net tax payments for all living and future generations for the base case outlined above. The numbers in the last two columns of Table 30 refer to representative male or female ‘agents’,

while the second column displays average accounts. Since non-age-specific government spending is treated as a uniformly distributed transfer over the 'agent's' life cycle, average generational accounts are negative in the first seven years of life.

The generational accounts exhibit a typical life-cycle pattern. Net rest-of-life tax payments of representative cohort members increase during the first three decades of the life cycle due to discounting effects and sizeable transfers received during childhood. Youth unemployment in Spain is high, and 'agents' enter into working life on average comparatively late. Therefore, the generational accounts for current living generations reach their maximum only at age 30 when they amount to ECU 52 700. For older cohorts, net tax payments gradually decrease, as the individuals approach the phase of high transfer receipts in their retirement period.

For the base year generation aged 47, the present value of future receipts equals the present value of future tax payments over the remaining life cycle. Further decreasing rest-of-life tax payments in combination with less discounted future receipts lead to negative net payments until, for the cohort reaching the standard retirement age of 65, the minimum of generational accounts is reached — amounting to a net transfer of ECU 111 000. Thereafter, net lifetime benefits decrease in line with the reduced life expectancy of the elderly.

Although the qualitative aspects in the various accounts for Spain do not diverge significantly from other European countries, the quantitative results concerning the net payments of current living generations seem to be rather special. In contrast to most other European Member States, the maximum amount of positive net payments (for a 30-year-old) ranges far below the corresponding minimum figure (for a 65-year-old), accounting for only about 50 % of the latter. Hence, according to generational accounts, the effective average tax load for working-age agents is comparatively low in Spain.

Regarding gender-specific accounts, the analysis also reveals some remarkable results. First, the accounts of

Table 30

Generational accounts, Spain

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 12.3	6.4	– 32.4
5	– 6.0	16.4	– 30.0
10	6.0	32.7	– 22.3
15	20.2	52.0	– 13.4
20	37.0	75.2	– 2.6
25	50.1	94.8	0.4
30	52.7	102.4	2.4
35	47.3	99.0	– 4.5
40	33.7	84.1	– 15.7
45	10.7	54.8	– 32.7
50	– 23.4	8.0	– 54.5
55	– 60.6	– 44.8	– 75.5
60	– 91.8	– 89.7	– 93.7
65	– 111.0	– 114.7	– 107.7
70	– 109.4	– 114.2	– 105.4
75	– 96.6	– 102.9	– 92.3
80	– 80.0	– 87.0	– 75.9
85	– 64.4	– 71.5	– 60.7
90	– 48.9	-55.8	– 46.0
95	– 30.0	– 35.3	– 28.2
100	– 12.2	– 15.0	– 11.5
Increase in all taxes, future (%)	106.5	–	–
Future generational account	62.0	105.1	16.1
Absolute difference	74.3	98.7	48.5
IPL (% of GDP)	151.9	–	–

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Table 31

Composition of male generational accounts, Spain

(1 000 ECU) (*)

	Tax payments					Transfer receipts					
Generation's age in 1995	Labour income	Capital taxes	VAT	Excise	Social insurance	Pensions	Health insurance	Unemployment insurance	Welfare and housing	Education	Non-age-specific expenditure
0	20.5	9.8	9.4	9.6	43.4	13.8	9.4	7.3	8.8	19.6	27.2
5	24.3	11.7	10.7	10.8	51.6	16.3	9.0	8.7	10.0	21.9	26.8
10	28.8	13.8	12.0	12.2	61.1	19.2	9.7	10.3	11.2	18.6	26.3
15	34.2	16.4	13.4	13.8	72.5	22.7	10.5	12.3	12.8	14.4	25.6
20	40.6	19.5	15.1	15.3	85.2	26.9	12.1	14.6	14.0	8.1	24.9
25	47.5	22.7	16.7	15.6	95.8	32.0	13.9	16.5	13.2	3.8	24.2
30	51.8	25.2	18.1	15.4	100.5	38.1	15.9	17.4	12.3	1.5	23.3
35	53.7	27.6	19.0	14.8	98.9	45.1	18.0	17.9	10.9	0.7	22.2
40	53.0	29.8	18.9	13.8	90.8	53.1	20.4	17.5	10.0	0.3	21.0
45	48.2	31.0	17.4	12.3	76.5	62.0	22.8	16.4	9.7	0.2	19.6
50	37.2	28.6	15.0	10.4	57.5	72.7	25.4	14.8	9.6	0.1	18.0
55	23.7	26.2	12.0	8.3	34.5	85.0	27.9	11.4	8.9	0	16.3
60	13.5	21.0	8.3	6.1	14.9	98.7	29.2	4.2	6.9	0	14.4
65	7.0	17.9	5.3	4.2	3.0	103.6	31.2	0.0	4.8	0	12.4
70	3.5	14.9	3.3	2.8	0.2	93.9	30.9	0.0	3.7	0	10.4
75	2.5	12.1	2.2	1.9	0.0	79.4	31.0	0.0	2.8	0	8.4
80	1.8	9.0	1.5	1.4	0.0	64.2	27.7	0.0	2.1	0	6.6
85	1.1	6.4	1.0	1.0	0.0	50.2	24.3	0.0	1.6	0	5.0
90	0.7	4.8	0.7	0.7	0.0	37.7	20.0	0.0	1.2	0	3.7
95	0.4	3.0	0.4	0.4	0.0	23.9	12.7	0.0	0.7	0	2.3
100	0.2	1.3	0.2	0.2	0.0	10.2	5.4	0.0	0.3	0	1.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

females are mostly negative: the present value of lifetime taxes falls below the respective figure of transfers received during the life cycle. They are still only slightly positive during the third decade of the life cycle when female labour force participation reaches its maximum. If the generational accounts indicate gender-specific tax incidence correctly, fiscal policy in Spain might redistribute strongly between men and women. Net lifetime benefits received by women in old-age are rather close to those received by men, whereas the net tax burden of working women falls significantly short of that faced by men who are members of the same age cohort.

Disaggregation of the generational accounts might provide some insights into the causes of gender redistribution. According to Tables 31 and 32, indirect tax burdens do not significantly differ by gender. This result reflects that the underlying micro profiles were retrieved from household data. However, labour income tax payments of women amount to only 27%, and social insurance payments to only 32% of the respective male figures, because labour force participation rates are lower than those of men. As for transfer receipts, the beneficiaries are much more uniformly distributed over the two genders. Female pension benefits and welfare benefits including housing make up about three quarters of the respective receipts of males belonging to the same cohort. Education spending is distributed even more uniformly between the sexes, and female health-care payments range about 10% above the male receipts. Only the support for the unemployed is significantly lower for women, reflecting their lower labour force participation.

Turning to intertemporal generational aspects, we find that the continuation of 1995 fiscal policy in Spain may entail severe fiscal imbalance. Maintaining the initial tax and transfer levels in an ageing society adds liabilities to the base year outstanding debt. This development is disadvantageous for future generations who are predicted to face reduced consumption possibilities.

In the baseline scenario, the present value of implicit government liabilities, encompassing mainly future obligations of the social insurance system, adds ECU

Table 32

Composition of female generational accounts, Spain

(1 000 ECU) (*)

	Tax payments					Transfer receipts					
Generation's age in 1995	Labour income	Capital taxes	VAT	Excise	Social insurance	Pensions	Health insurance	Unemployment insurance	Welfare and housing	Education	Non-age-specific expenditure
0	6.1	4.5	9.8	9.8	15.3	10.9	10.9	2.5	5.7	20.1	27.8
5	7.2	5.4	11.1	11.1	18.2	13.0	10.8	2.9	6.4	22.3	27.5
10	8.6	6.4	12.5	12.6	21.5	15.3	12.0	3.5	7.0	19.0	27.1
15	10.1	7.5	14.0	14.3	25.5	18.2	13.4	4.1	7.8	14.8	26.6
20	12.0	8.9	15.7	15.8	29.9	21.5	15.5	4.9	8.8	8.3	26.0
25	13.8	10.2	17.4	16.1	32.4	25.5	17.8	4.9	8.9	3.5	25.4
30	14.0	11.2	18.8	15.9	32.4	30.3	20.2	4.6	9.0	1.2	24.6
35	13.8	12.5	19.7	15.4	30.4	35.8	22.6	4.5	9.3	0.5	23.7
40	12.9	14.2	19.7	14.5	26.6	41.8	25.1	4.4	9.3	0.2	22.6
45	11.0	15.2	18.3	12.9	20.9	48.6	27.4	4.4	9.0	0.2	21.3
50	8.1	14.1	15.9	11.1	14.7	56.3	30.0	3.3	8.7	0.1	19.9
55	5.2	12.8	12.7	8.9	8.8	63.7	32.2	2.0	7.7	0.1	18.3
60	3.2	10.3	8.9	6.6	4.1	70.4	33.2	0.7	6.0	0.0	16.4
65	1.8	8.2	5.8	4.7	1.1	75.6	34.7	0.0	4.5	0.0	14.4
70	1.0	6.7	3.7	3.2	0.0	71.1	33.4	0.0	3.5	0.0	12.1
75	0.9	5.4	2.5	2.2	0.0	59.6	31.4	0.0	2.6	0.0	9.7
80	0.6	3.8	1.7	1.5	0.0	47.9	26.3	0.0	1.9	0.0	7.5
85	0.4	2.5	1.1	1.1	0.0	38.0	21.1	0.0	1.2	0.0	5.6
90	0.3	1.4	0.8	0.7	0.0	28.5	15.9	0.0	0.8	0.0	4.0
95	0.2	0.9	0.5	0.4	0.0	17.5	9.7	0.0	0.5	0.0	2.4
100	0.1	0.4	0.2	0.2	0.0	7.1	4.0	0.0	0.2	0.0	1.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

383 billion to base-year debt. Intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2 of this volume) generational accounting assigns to future cohorts are as high as 151.9% of 1995 GDP, surpassing the share of explicit debt in GDP (63.2%) by 88.7 percentage points. If only future cohorts have to contribute to redeem the intertemporal public liabilities, a representative agent born in 1996, characteristic for the members of all future generations, faces a lifetime net tax payment of ECU 52 000. Considering that base-year newborns receive a lifetime net transfer of ECU 12 300, under the rather loose fiscal policy observed in 1995, the individual tax burden would increase by almost ECU 75 000.

The tax increase required to restore intergenerational balance hits men in particular who are left with an additional tax burden of ECU 98 700. For women, who face a generational account of ECU 16 100, the future tax raise is more moderate in absolute terms, but still considerable, considering that current newborn females are projected to expect a lifetime net transfer of ECU 32 400 from the government.

Although Spain's intertemporal public liabilities in terms of current GDP are significantly lower than the intertemporal debt in some other EU Member States, the proportional tax increase necessary to restore a sustainable fiscal state is the highest of all EU Member States. According to our projections, the serious ageing from the bottom, i.e., the sharp decline in the absolute size of prospective birth cohorts Spain faces over the next decades, deteriorates the future tax base, in particular for income taxation. Even the service intertemporal public liabilities which are not particularly high by European standards thus might require severe increase in tax rates. As is displayed in Table 30, average lifetime tax rates for future generations must more than double the present rates. To meet the intertemporal budget constraint of the government, future generation's taxes have to be increased uniformly by 106.5%.

Measuring the degree of intertemporal fiscal imbalance by the immediate once-and-for-all tax increments and expenditure cuts that would restore intergenerational balance avoids the assumption that only future generations

share in financing the overall debt burden generated by the continuation of current fiscal policy. If the living contribute to serve the intertemporal public liabilities, the policy adjustments required appear far less severe. An immediate increase in all taxes by 14.3% restores intergenerational imbalance. Accordingly, the tax quota would increase from 35.5% to 40.6% of GDP, and both present and future newborns would be left with lifetime tax burdens of ECU 2 400 in present value. Alternatively, transfers need to be cut by 13.2% right from the base-year which reduces the transfer quota from 36.7 to 31.8% of GDP. Present and future newborns face a generational account of ECU 1 500 in this case.

The sources of intergenerational imbalance in Spain can be highlighted by two thought experiments. First, one may assume that there is no outstanding explicit debt in the base-year. As the base-year explicit debt directly enters into the intertemporal public liabilities, this hypothetical scenario reduces intertemporal liabilities by 63.3 percentage points of GDP. All indicators of intertemporal fiscal imbalance change by the same proportion. The tax increase required to finance the reduced gap in the intertemporal budget constraint falls from 106.5 in the baseline down to 62.1%. Correspondingly, the future lifetime tax burden decreases from ECU 74 300 to ECU 43 200. Without explicit government debt, an immediate 7.7% cut of all transfers including non-age-specific government spending would be sufficient to gain intergenerational balance. Alternatively, all taxes would have to be raised by 8.3%.

The second thought experiment aims to eliminate the effects of the demographic transition ahead by entering a constant 1995 population composition into the calculations. Since fertility rates used to be comparatively high in Spain until the late 1970s, the base-year population structure which is perpetuated into the future in this experiment is characterised by large cohorts in working age who support rather small cohorts of elderly and young. Given this advantageous population structure with low old-age dependency is valid infinitely, intertemporal public liabilities fall markedly compared to the baseline. Implicit liabilities only add 30.2 percentage points of GDP to the explicit debt ratio of 63.2%.

Although the overall intertemporal debt still almost equals the current GDP, the tax increase of 37.6% imposed on future generations remains rather moderate, as the labour force does not shrink under the given assumptions. The deterioration of the future tax base which marked the baseline calculations, does not occur in this hypothetical scenario. Without a demographic transition, the immediate policy adjustments are also less severe than in the baseline. The figures closely resemble those in the no-debt scenario, despite the higher overall debt. Intergenerational balance could be restored either by cutting transfers by 8.5% or increasing taxes by 8.7%.

Even the full absence of population ageing does not bring Spain into an intergenerational sustainable situation, although it could significantly reduce the tax burden of future cohorts. Comparing the results of the two stylised experiments, it has to be noted that in Spain, in contrast to most other EU Member States, base-year government debt must be put fully alongside population ageing when explaining the sources of intergenerational imbalance. One should be aware, however, that the generational accounts might overstate the influence of explicit liabilities in this regard, due to our base-year choice which captures Spanish government finances at the peak of a period of rapid accumulation of deficits.

6.3.3. Sensitivity analysis

Table 33 investigates the robustness of our findings with respect to variations of the central economic parameters and the underlying demographic assumptions using both intertemporal government public liabilities and the resulting absolute change in the generational accounts of present and future newborn generations as indicators of intertemporal imbalance. True liabilities range from 493.9% at a maximum to 90.6% of base-year GDP in the minimum for reasonable interest and growth rates. Even under the rather unlikely combination of a 7% discount rate and 1% economic growth overall government liabilities significantly exceed the explicit base-year debt of 63.2% of GDP.

For a wide range of future growth and interest rates, future generations will have to face a net tax increase. The higher tax burden required to service intertemporal public liabilities varies considerably from ECU 115 300 to ECU 66 900. Still, our qualitative finding that maintaining current fiscal policy in Spain is likely to turn out disadvantageous for future generations appears sufficiently robust.

Turning to demographic sensitivity, the stylised case of keeping the advantageous base-year population structure constant was already discussed above. More realistically, one might want to assume that the negative demo-

Table 33

Sensitivity analysis, Spain

(%) (*)

Productivity growth (%)		1	
Discount rate (%)	3	5	7
IPL (% of GDP)	273.3	131.1	90.6
Absolute difference	93.1	70.9	66.9
Productivity growth (%)		1.5	
Discount rate (%)	3	5	7
IPL (% of GDP)	358.6	151.9	97.4
Absolute difference	103.4	78.3	66.9
Productivity growth (%)		2	
Discount Rate (%)	3	5	7
IPL (% of GDP)	493.9	180.5	106.3
Absolute difference	115.3	79.1	67.5
Population projection	Constant population structure	Baseline assumptions	Increasing fertility
IPL (% of GDP)	93.4	151.9	164.3
Absolute difference	35.2	78.3	53.8

(*) Percent of GDP; percentage change in revenue.

graphic shock Spain witnessed in the last decade is reversed in the future. As an upper bound of likely developments, which might be fuelled by population policy, we assume that the total fertility rate linearly returns to replacement level until 2022. The resulting demographic forecast closely resembles the high fertility scenario of the official authorities (cf. Instituto de Demografía (1994)).

Table 33 shows that even this favourable demographic development does only slightly reduce the intergenerational imbalance due to population ageing (and outstanding base-year debt). Higher fertility increases intertemporal public liabilities to 164.3% of GDP, because it raises the number of agents whose generational accounts are negative maintaining the tax and transfer levels of year 1995. Nevertheless, the additional tax burden for future generations generated by the overall government debt is reduced to ECU 53 800, compared to ECU 74 300 in the baseline, since more future-born agents share the burden to redeem intertemporal public liabilities. Still, even a reversed demographic shock is unlikely to mitigate the intergenerational conflicts that might be associated with the ongoing baby bust.

Another lesson can be learned from the demographic sensitivity analysis. Even a tremendous increase in future fertility does not lead to a more favourable dependency ratio than is observed today. Therefore, the tax burden for future generations is higher, if fertility ensures a stationary population, than it is under the condition of a constant current population structure. Considered that the dependency burden reaches its minimum in the present decade, the Spanish social insurance schemes are in a demographically favourable position at present. No realistic demographic development will ever bring back these ‘good times’ in the future. Restructuring social insurance will then become an inescapable task.

6.4. Restructuring social insurance

As described above, Spain follows a ‘single-cash’ approach to finance its social insurance system. There is no earmark of contributions for the different branches of social insurance, i.e. pension, health care, old-age and unemployment insurance, and all deficits are covered by the federal budget — as potential surpluses would go to this public coffer. Although contributions are paid to a major part by the employer, incidence mainly falls on the employee.

A step towards earmarking specific contributions to the single branches of the social insurance system was

undertaken with the 1997 social insurance amendments (SIA-1997). Their purpose was twofold. First, the tax loads related to the respective branches of social insurance should become more transparent. Second, health benefits that traditionally were also covered by the single-cash budget should be transferred to the federal budget and financed out of the general tax revenue. The reform of health-care financing was supposed to stabilise the remaining branches of social insurance throughout the next two decades. In particular, the SIA-1997 included the following.

- A phasing-out of all health expenditure covered by the social insurance administration until 2002; in particular, it is to be decreased from 14.9% of the entire social insurance revenue to 11.8% in 1996, 9.2% in 1997, 5.0% in 1998 and linear reductions in subsequent years.

- Financing all non-contributive pensions through the federal budget. In the base-year, these benefits made up 4.7% of the entire pensions benefits. Note that widow or orphan pensions are regarded as contributive benefits, which contradicts conventional labelling.

From the viewpoint of generational accounting this seemingly substantial reform does not have a fiscal effect at all. What was labelled as a deficit of the social insurance system covered by the federal budget before only turns into an official deficit in the federal budget itself. This change in labelling government deficits leaves the generational accounts fully unchanged.

As a policy experiment, we install the SIA-1997 in the baseline and enter the main suggestions on how to finance that part of health and pensions expenditure no longer covered by social insurance contributions in the future. This scenario consists of two sub-scenarios on how to finance health expenditure. In either, we assume that health expenditure will grow in line with productivity growth.

In the first sub-scenario, we follow the suggestions of the left-wing parties which have proposed an income surcharge tax — the so-called 'welfare tax' — in a magnitude of 1.5% to fill the financial gap in the federal budget. The third column of Table 34 reports the impact of this reform on both future and current generations. We find that this moderate income tax surcharge hardly has any effect. At the maximum, cohorts currently aged between 30 and 35 face additional life-time payments of approximately ECU 700. For all other working-aged, the additional burden is even smaller, and it is negligible for pensioners.

As a consequence, this policy only slightly relieves the tax burden of future generations. As compared to the baseline, their net payments to the government's coffers decrease by only ECU 2 000, reflecting that the improvement of intergenerational sustainability generated by the reform remains faint. Rather than the 151.9% intertemporal debt-to-GDP ratio in the baseline, future generations still face an overall debt of 147.2%. This translates into a proportional tax increase for future generations of 102.8%, instead of 106.5% in the baseline.

As the 1.5% surcharge is not at all sufficient to finance the additional federal expenditure created by the SIA-1997, we have calculated what is actually necessary to fill the financial gap. Under baseline assumptions, we find that only a 24.4% tax surcharge, i.e. 16 times the amount suggested, is sufficient. The fourth column of Table 34 reports the effects of this strategy which fully funds base-year health spending through the central government's budget.

Full coverage achieved by an increase in income tax revenue leads to significantly higher net lifetime tax burdens for all working-aged. Average individuals aged 30, for example, face an additional burden of approximately ECU 9 900, where the respective figure under the 1.5% surcharge tax was only ECU 700. As before, the elderly stay unaffected by this policy, whereas for young cohorts the income tax surcharge implies additional taxes of up to ECU 4 400 in present value. Future generations significantly benefit from the increased tax payments of the living. Their generational accounts are reduced to ECU 30 100. Although redistribution to the advantage of current living generations remains significant, the government's intertemporal liabilities fall to 77.1% of GDP. This finding suggests that funding health expenditure through the federal budget might be an appropriate strategy to avoid future accumulation of liabilities that add to the base-year outstanding debt.

Instead of a labour income tax raise to finance the SIA-1997 restructuring of health expenditure, centre and right wing parties in Spain prefer to increase taxation of consumption. Their political agenda is to augment certain excise taxes, in particular tax rates on petrol, tobacco and alcohol. To generate the same additional tax revenue as

Table 34

Generational accounts for social insurance experiments, Spain

(1 000 ECU) (*)

Generations's age in 1995	Baseline accounts	Income tax surcharge		Excise tax surcharge		Pension Reform Act
		Partial funding	Full funding	Partial funding	Full funding	
0	– 12.3	– 12.0	– 7.6	– 12.0	– 6.7	– 11.4
5	– 6.0	– 5.7	– 0.4	– 5.6	0.5	– 5.0
10	6.0	6.4	12.6	6.4	13.6	7.2
15	20.2	20.7	28.1	20.8	29.0	21.7
20	37.0	37.6	46.1	37.6	46.1	38.7
25	50.1	50.7	60.2	50.7	59.0	52.2
30	52.7	53.4	63.3	53.2	61.1	55.1
35	47.3	48.0	58.2	47.8	55.0	50.1
40	33.7	34.4	44.3	34.1	40.5	37.0
45	10.7	11.2	19.8	11.0	16.4	14.4
50	– 23.4	– 23.0	– 16.3	– 23.1	– 18.8	– 19.2
55	– 60.6	– 60.2	– 55.5	– 60.3	– 57.1	– 57.5
60	– 91.8	– 91.6	– 88.3	– 91.7	– 89.5	– 91.8
65	– 111.0	– 110.8	– 108.6	– 110.9	– 109.5	– 111.0
70	– 109.4	– 109.3	– 107.6	– 109.3	– 108.5	– 109.4
75	– 96.6	– 96.5	– 95.3	– 96.5	– 96.0	– 96.6
80	– 80.0	– 79.9	– 79.2	– 80.0	– 79.6	– 80.0
85	– 64.4	– 64.3	– 63.9	– 64.4	– 64.2	– 64.4
90	– 48.9	– 48.8	– 48.6	– 48.9	– 48.7	– 48.9
95	– 30.0	– 30.0	– 30.0	– 30.0	– 30.0	– 30.0
100	– 12.2	– 12.2	– 12.2	– 12.2	– 12.2	– 12.2
Increase in all taxes, future (%)	106.5	102.8	50.7	103.1	55.9	93.7

(*) Baseline (r = 0.05, g = 0.015).

the 1.5 income tax surcharge, the excise taxes mentioned would have to be increased by 6.2% beginning in 1998. The intergenerational impact of this alternative scenario is reported in the fifth column of Table 34.

For both currently living and future generations, it is hardly relevant, whether health expenditure in the federal budget is financed by an income tax surcharge or an equivalent increase in excise taxes. The two financing strategies have an almost identical impact on all generational accounts. This finding appears somewhat surprising, because indirect taxes typically tend to be more uniformly distributed over the life cycle than labour related taxes. According to the generational accounts, this is not true for excise taxes in Spain which exhibit an age-specific pattern broadly resembling the labour earnings profile. Therefore, raising excise taxation and the introduction of a labour income tax surcharge work as substitutes. Whether this finding is due to peculiarities of the Spanish tax system (or economic behaviour), or reflects deficiencies in the data sources used to construct age profile of excise tax burdens, cannot be decided.

Again, the increase in excise tax receipts does not fully cover all health and pension payments allocated through the federal budget. If full coverage is envisaged, excise tax revenue needs to double. The second last column of Table 34 presents the generational accounts under this policy option. With a major excise tax increase, differences between the two alternative financing schemes become more apparent. We find that in comparison to the income tax surcharge, those individuals particularly who have not yet entered the labour force lose from higher excise taxation. Current generations of working age, in contrast, favour the excise tax strategy. Future generations are likely to be indifferent choosing between the two reform options.

All experiments considered so far were built on the assumption that health expenditure growth can be limited to productivity growth in the future. As base-year health expenditure in Spain amounted to only 5.9% of GDP in 1995, which is far below the current EU average, this does not appear as a too realistic setting. According to government projections, health expenditure is estimat-

ed to grow considerably faster than GDP in the medium-run. The National Health Institute suggests that health expenditure growth will exceed productivity growth by 0.93, 1.0, 0.62 and 0.5 percentage points from 1997 to 2000 (cf. Insalud (1996)). Taking this higher health expenditure growth into account, all presently living generations realise lower net tax payments, as they receive higher health benefits. Future generations, however, will be worse off, if productivity growth temporarily falls short of health expenditure growth. As compared to the baseline scenario, intertemporal public liabilities increase by 5.8 percentage points of GDP. In consequence, newborns of tomorrow face an additional lifetime tax load of ECU 2 600.

A final policy experiment on the reform of the Spanish social insurance system investigates the effects of the 1997 Pension Reform Act. It was agreed to reduce the primary insurance amount (PIA) of future cohorts of pensioners by changing the hitherto very advantageous PIA formula from 1997. Until that year, the pension level when entering retirement was based on the earnings history of the past eight years before retiring. Starting in 1997, one year of past employment will be added to the relevant earnings history, until in 2003 the last 15 years will be fully considered. According to Gil (1997) this measure will eventually translate into a 7.2% overall reduction of the average pension for all newly retired persons.

The last column of Table 34 illustrates the projected intergenerational impact of the 1997 reform. As the measures only concern the pension level of future pensioners, the rest-of-life transfers to cohorts already retired in the base-year do not change. In present value terms, those retiring in the short- and medium-run future are predicted to experience the highest loss in transfer receipts. The base-year 45-year-old, entering retirement around 2015 when the reform will have come into full effect, will face the maximum additional tax burden. Their generational accounts increase by ECU 3 700. For younger cohorts, the reform burdens gradually decline in absolute terms due to discounting effects.

The Pension Reform Act implies that present living generations share part of the burden to finance the social security system when the population ages. Future generations benefit from the additional contributions of the living, which bring down intertemporal public liabilities to 133.7% of GDP. Compared to the baseline, this reduction translates into a per capita gain of ECU 8 000 for future newborns. Nevertheless, the intergenerational imbalance remains high, as lifetime taxes of future generations are still ECU 54 000 higher than those of current newborns. According to our findings, the measures of the 1997 Pension Reform Act do not appear as sufficient to attain intertemporal sustainability of the social insurance system in Spain.

6.5. Labour market experiments

The Spanish economy, especially the labour market is characterised by two important developments. First, there used to be a large underground economy in the past that has been reduced only recently. This process is likely to continue, as more and more loopholes for tax evasion in labour, retail sale and capital markets disappear due to a more efficient administration. Secondly, the traditionally very low labour force participation rate of women is increasing rapidly and catching up with figures observed in central Europe. How these developments, which may considerably broaden the future tax base, might affect the individual generational accounts is the topic of this section.

Estimates on the degree of tax evasion in Spain vary considerably from 5 to 25% of current tax revenue. Since all studies on this matter are only partially reliable, our experiments necessarily depend on ad hoc guesses. We adopt a medium value of available estimates and closely follow Ruesga (1989) who suggests that the Spanish government loses about 8 to 10% of its tax revenue due to black market activities. This estimate would also be in line with figures on tax evasion by the official authorities. A special unit at the Ministry of Finance dedicated to fight tax evasion: the Unidad Especial para el Estudio y Propuestas de Medidas para la Prevención y Corrección del Fraude concludes that tax evasion adds up to approximately 2.5 to 3% of the GDP.

Our black market experiment assumes that tax loopholes on the Spanish labour market are closed gradually within a period of 10 years, and that revenue of labour income taxes as well as social insurance contributions therefore rises by 10%. The intergenerational impact of this scenario on both male and female cohorts is summarised in Table 35. Suppressing tax evasion in the Spanish labour markets leads to higher net tax payments of current living generations over their remaining lifetime. Average per capita net tax payments at a maximum increase by ECU 12 500 for men aged between 20 and 35. For women aged between 15 and 30, the tax burden

only rises by about ECU 4 000, owing to both lower female labour force participation and their comparatively low income.

Preventing tax evasion could prove a powerful strategy for improving the intergenerational sustainability of fiscal policy in Spain. As the intertemporal public liabilities decrease by more than one third to 98.5% of GDP, the future tax adjustment required to fill the gap in the intertemporal government budget falls to 65.0%. Still, despite the favourable effects that may derive from dismantling the underground economy, fiscal policy in Spain remains to be less sustainable intertemporally than in some other EU Member States.

A second type of labour market experiment investigates the intergenerational impact of rising female labour force participation. Official forecasts on the development of female labour force participation rates are unavailable, but recent findings by Blanes et al. (1996, p. 224) indicate that the share of women in working age that are willing to enter the labour market could rise from 37.2% in the base-year to 45.1% in 2026. In a first scenario on future female labour force participation, we adopt this estimate and correspondingly adjust female per capita labour income tax payments, social insurance contributions and unemployment receipts. As the tax benefit linkage in the social security system is comparatively low, we do not adjust future female per capita pensions. The resulting generational accounts for women are reported in the second last column of Table 35.

Higher labour force participation of women induces considerably higher per capita net payments for all working-age female cohorts. The additional tax burden amounts to ECU 3 000 on average, and reaches a maximum for

Table 35

Labour market experiments, Spain

(1 000 ECU) (*)

Generation's age in 1995	Baseline		Black market experiment		Female labour force participation	
					Blanes et al.	German rates
	Male	Female	Male	Female	Female	Female
0	6.4	– 32.4	12.8	– 30.2	– 28.4	– 19.9
5	16.4	– 30.0	24.0	– 27.5	– 25.4	– 16.0
10	32.7	– 22.3	41.7	– 19.3	– 17.2	– 7.3
15	52.0	– 13.4	62.5	– 9.9	– 7.9	2.2
20	75.2	– 2.6	87.0	1.2	3.0	12.6
25	94.8	4.0	107.3	7.8	9.3	17.9
30	102.4	2.4	114.9	6.0	7.2	14.3
35	99.0	– 4.5	110.7	– 1.3	– 0.6	4.9
40	84.1	– 15.7	94.1	– 13.1	– 12.8	– 8.9
45	54.8	– 32.7	62.3	– 30.8	– 30.7	– 28.2
50	8.0	– 54.5	12.8	-53.3	– 53.3	– 51.8
55	– 44.8	– 75.5	– 42.4	– 74.9	– 74.9	– 74.1
60	– 89.7	– 93.7	– 88.8	– 93.4	– 93.4	– 93.0
65	– 114.7	– 107.7	– 114.4	– 107.6	– 107.6	– 107.4
70	– 114.2	– 105.4	– 114.0	– 105.4	– 105.3	– 105.2
75	– 102.9	– 92.3	– 102.8	– 92.3	– 92.3	– 92.2
80	– 87.0	– 75.9	– 86.9	– 75.9	– 75.9	– 75.8
85	– 71.5	– 60.7	– 71.5	– 60.7	– 60.7	– 60.7
90	– 55.8	– 46.0	– 55.7	– 46.0	– 46.0	– 46.0
95	– 35.3	– 28.2	– 35.3	– 28.2	– 28.2	– 28.2
100	– 15.0	– 11.5	– 15.0	– 11.5	– 11.5	– 11.5
Increase all taxes, future (%)	106.5		65.0		91.2	65.5
Future generational accounts	105.1	16.1	77.2	0.8	17.2	19.2
IPL (% of GDP)	151.9		98.5		134.0	102.3

(*) 1995 value; baseline (r = 0.05, g = 0.015).

30-year-old women, who pay ECU 5 800 more on average. Over the entire life cycle, female base-year-born agents receive a smaller net transfer, which falls to ECU 28 400 as compared to ECU 32 400 under baseline labour force participation. The burden passed over to future generations decreases with the higher tax payments of living females, although the improvement of intergenerational sustainability remains rather small. Intertemporal liabilities of the government stay as high as 134.0% of GDP, and taxes for future generations still need to be raised by 91.2%. It is worth noting that the relative reduction in the necessary tax increase is significantly higher than the corresponding reduction of overall debt, since increased female labour force participation broadens the tax base.

To come closer to an intergenerationally sustainable situation, Spain would have to realise an even higher increase in female labour force participation. In a final experiment, we assume that Spanish labour markets could catch up to the German situation, where currently 62.7% of all working-age women actually join the labour force. The adjustment to this figure is assumed to take place linearly within the first 30 years after the base-year. The last column of Table 35 displays the generational accounts for this scenario which amplifies the effects found in the previous experiment.

With an even higher female workforce than before, the lifetime net tax payments of working-age women increase by ECU 7 400 on average. Due to the moderate phasing in of the labour market changes, living cohorts younger than 20 are hit hardest. Base-year 15-year-old women face the highest increase in average net tax burdens, the additional lifetime payment amounting to ECU 15 600 in present value terms. Female generations already participating in the labour force experience smaller additional payments, ranging from ECU 700 for older cohorts to ECU 15 200 for women at the beginning of their working career. Not surprisingly, the relief for future generations is more pronounced than in the previous scenario, because female labour force participation further increases. Compared to the baseline results, intertemporal public liabilities are reduced by almost 50 percentage points, to 102.3% of current GDP, which translates into a 65.5% tax increase for future generations, 41 percentage points less than in the baseline setting.

Despite the remarkable move towards intergenerational sustainability in the last scenario, future changes in female labour market participation are unlikely to ensure generational fiscal balance. Our stylised experiments suggest that Spain has to succeed in dismantling the underground economy, and at the same time needs to encourage female labour participation, in order to evade intergenerational imbalance to the favour of living generations, which would be a likely outcome unless fiscal policy manages to keep to fiscal prudence and restraint (as beginning to show after our base-year 1995).

6.6. Conclusion

The application of generational accounting to investigate the fiscal policy in Spain suggests that maintaining the tax and transfer levels observed in year 1995 might result in a severe fiscal imbalance to the disadvantage of generations not yet born. Future newborns are projected to face overall government debt as high as 151.9% of GDP. Although the overall liabilities accumulated by the government sector in Spain do not range significantly above the EU average, the additional tax burden for future generations necessary to redeem intertemporal public liabilities, given our status quo standard, could be the highest in Europe. In order to meet the intertemporal government budget constraint, lifetime tax rates of future cohorts are computed to more than double those experienced by the present living. This outcome is a consequence of the particularly severe demographic transition ahead in Spain. With total fertility having reached the lowest level of all EU members, the per capita tax burden which is imposed by a given amount of overall government debt increases due to strongly reduced future cohort sizes.

The projected deterioration of the future tax base, according to our findings, is aggravated by the present state of the social insurance system in Spain. Despite stable economic growth and a very favourable demographic state marked by low old-age dependency, social insurance is seriously underfunded at present and rapidly accumulates debt. With rapid population ageing over the next decades, deficits are likely to soar, unless benefits are made less generous, or additional funding is provided. In the light of rather stylised generational accounting experiments, recent attempts to stabilise the financial situation of the social insurance system by financing health-care expenditure directly through the federal budget, are exposed as pure renaming of public debt. The cautious measures to reduce future average pensions taken by the 1997 Pension Reform Act are insufficient given the size of the ageing problem.

Future generations could benefit more from measures directed at broadening the tax base, in particular that of income taxation. Our findings suggest that discouraging tax evasion and supporting women to enter the labour force could significantly reduce the overall future liabilities of the government sector. Still, achieving intertemporal sustainability in Spain appears to require a more radical rethinking of fiscal policy which could turn unaffordable in the not-so-distant future. The budget consolidation currently on its way — not yet incorporated in our calculations — might prove as a first step to limit intertemporal government liabilities.

7. France: generational imbalance and social insurance reform

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7.1. Introduction

In the France of the 1990s, the priorities of fiscal policy were fulfilment of the Maastricht criteria for participation in the European monetary union (EMU) on the one hand, and exchange rate stability of the franc on the other. After the Bank of France had been given independence, it used the short-term interest rates to tie the franc to the German mark in order to ensure monetary stability. The rather tight monetary policy showed fully convincing results with respect to both prices and interest rates. Meanwhile, fiscal and especially welfare policy were reshaped in order to qualify France for the EMU. The restructuring of fiscal policy has been a slow and difficult process due to political turbulences in the aftermath of both presidential and government elections.

At the end of the 1980s, France had room for fiscal policy manœuvre since the debt-to-GDP ratio was quite low, and the sale of public assets in the course of a gradual withdrawal of the State from the still vast public enterprise sector provided a comfortable source of revenue. During the early 1990s, however, like many other European economies, France went through a deep recession since the driving forces of earlier growth patterns, exports and investment, failed to fulfil their previous role. As a consequence, fiscal deficits occurred whose level was not compatible with participation in the EMU. At the same time the stock of public assets melted away in a range of privatisation campaigns that could not meet previous revenue expectations.

Since the mid-1990s, fiscal policy changed significantly in order to satisfy the Maastricht criteria, especially the deficit criterion. This policy switch encompassed severe expenditure cuts and significant tax increases as well as several measures to reform the social insurance system in view of the upcoming double ageing process. In particular, the Pension Reform Act of 1993 will open up some breathing space for social security, although it does not really solve the problem of an ageing population. Moreover, the tax reforms were both timid and not permanent. This was due to the back and forth of political decision making occurring whenever elections lead to a change in political power. In France, this was experienced not only in the presidential campaign of 1995 which resulted in President Chirac's (Conservative) succession to former President Mitterrand (Socialist), but also in the 1997 government elections which resulted in Prime Minister Jospin's (Socialist) following Juppé (Conservative). As a consequence, the switch from direct to more indirect taxation which was a central issue of the conservative Juppé administration is at the moment rolled back. As will be shown subsequently, this back and forth policy is not really sufficient to ensure an intergenerationally sustainable and well-balanced path of future government spending and taxation in France.

In this study, we employ the method of generational accounting presented in Chapter 2 of this volume in order to analyse the generational impact of current fiscal policy. We are aware of two other generational accounting studies for France. The first was done by Doré and Lévy (1997) as a part of the worldwide series of country studies provided by Auerbach et al. (1999). The second study by Accardo (1997), though quite similar, points out some mistakes in the computations of the first. Besides, it attempts to study formally the sensitivity of generational accounting imbalances to incorrect or inexact age profiles, and to take into account private intergenerational transfers. In the present study, we use more detailed data and rely on more accurate procedures in order to compute various notions of intergenerational imbalances within a standardised methodological framework that to a large extent ensures cross-country comparability.

We start with a brief review of France's recent economic performance and fiscal policy in Section 7.2. This sec-

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tion also includes a short survey of the French social insurance system. After outlining the assumptions and data forming the base of our empirical analysis, Section 7.3 reports the baseline generational accounting results for France as well as their sensitivity with respect to realistic parameter variations. Section 7.4 discusses and evaluates the intergenerational impact of the two most important fiscal reforms of the recent past: the Pension Reform Act of 1993, and the 1995 Juppé Plan which mainly aimed at reforming health insurance. Section 7.5 summarises our results.

7.2. Economic performance and fiscal policy

7.2.1. Recent economic performance

After a period of moderate but continuous growth during the second half of the 1980s, the French economy faced a severe deceleration in the 1990s. The impact of the worldwide crisis took its toll. In 1993, a substantial decrease in exports turned the slow growth of the previous years into recession. Real GDP decreased by 1.3% ([1]).

Due to a rise in external demand and investment, the economic situation improved again in 1994. Triggering a real GDP growth of 2.8%, the recovery was remarkable. However, the employment level failed to recover. On the contrary, it fell further by 0.7%, if by a lower rate than the 1.2% experienced in the year before. In 1995, the GDP growth rate was a little lower than in the previous year, though it still reached a remarkable 2%.

In 1996, real GDP growth was still positive although, compared to both previous years, at a lower rate of 1.5%. At the same time private and public consumption increased by 2.0 and 1.6%, respectively. Not to a minor degree was the increase in public expenditures a direct consequence of the electoral promises of the newly elected president. But such a traditional Keynesian-type fiscal strategy seemed to be in contrast to what was necessary in order to join the EMU. Hence, a fiscal policy was launched which represented exactly the opposite of the previous doctrine. Instead of increasing public expenditures, they have been decreased; instead of triggering private demand by lowering taxes, taxes, especially indirect ones, have been raised in order to reduce deficits from both the expenditure and the revenue side of government budgets.

([1]) Figures in this section taken from INSEE (1997).

It was not until 1997 that growth recovered: real GDP growth reached a rate of 2.3%. This was due to a dramatic surge in foreign demand, raising real exports by 12.1%. A higher indirect and therefore more regressive tax load combined with the constant unemployment figures had notable influence on the 1997 elections. The election of June 1997 installed a more left-wing government. At the end of 1997, the Jospin administration launched an ambitious youth employment programme that aims at creating 350 000 new jobs until 2000. The beneficiaries receiving these subsidised jobs — mostly young unemployed aged 18 to 25 — will rely on five-year contracts with a monthly payoff corresponding to the minimum wage of about ECU 1 000 (FRF 6 666). Also this minimum wage has been increased by the Jospin administration, as it had been in the aftermath of the election of President Chirac in May 1995.

In 1998, the statutory working week, which had been 39 hours before, was fixed at 35 hours as from 2000. This reduction in working time had already been encouraged by a law in 1996 by providing the possibility of reduced employer's social insurance contributions. However, the impact on unemployment remains to be seen. For the short term, the OECD (1999) expects the working week reduction to be less effective than the youth employment programme.

The economic recovery has been even stronger in the following years. Compared to 1997, exports lost momentum but domestic demand largely replaced them as employment rose and disposable income accelerated. If the French government succeeds in its declared ambition of sustaining current growth rates, the prospects are rather favourable as the expansion seems to have a higher job content than earlier recoveries. However, unemployment is still on a very high level. In the event of a stronger slowdown, there may be little room for offsetting fiscal policy measures as general government debt is approaching the Maastricht benchmark of 60% of GDP.

7.2.2. Fiscal policy and general government budget

In the years following the 1992 Maastricht meeting, to satisfy the criteria for participation in the European Monetary Union was the most prominent goal of French fiscal policy. Among these, the 3% deficit criterion was the most challenging, whereas the initial level of general government debt — 40% of GDP on Maastricht definition in 1992 — was rather low.

Starting out from a surplus in 1980, the general government had since been running increasingly high deficits. In the year of the Maastricht meeting, the deficit was still relatively low at 3.8% on Maastricht definition, but in 1993 and 1994, peak values of 5.6% of GDP each were reached. In 1997, the 3% benchmark for EMU participation could nevertheless be respected after deficits had been steadily reduced. Although nearly 0.5 percentage point of the reduction was brought about by an accounting transaction facilitating the partial privatisation of France Télécom, these figures prove that considerable consolidation has taken place. However, the decrease in deficits was not sufficient to prevent further substantial increases in the debt ratio, which evolved from the 53% induced by the peak deficits in 1993 and 1994, to 58% in 1998.

In relation to the overall economic performance, both expenditures and revenue of the general government have been growing over the last 25 years, inducing an ever-increasing public sector participation in the economic process. In the two decades between 1974 and 1995, public expenditures have increased from 41 to 55% of GDP. Thus, the 1995 ratio of public expenditures to GDP slightly exceeds the EU average of approximately 50%. Starting out from the same level of 41% in 1974, public receipts have increased at a rather smaller pace to 51% in 1995.

Expenditure growth has been mainly driven by social transfers. The ratio of social transfers to GDP rose from 15.5% in 1974 to 23.3% in 1995. It stems from tremendously increasing unemployment benefits and health expenditures, and a rise in compulsory education expenditures. The fourth pushing factor which has become increasingly important are pension benefits. They grew even faster than the other expenditure items, and were paid to younger and younger cohorts. In 1982, normal retirement age was decreased from 65 to 60. Additionally, since 1988 there has been an important effort to grant the poorest a minimum income transfer. The most ambitious attempts to halt unsustainable social transfers growth have been the 1993 Pension Reform Act and the Juppé Plan in 1995–96 ([1]).

On the revenue side, the increase in the past decades can mostly be attributed to social insurance contributions. They amounted to 13.6% in 1974 but surged to 19.3% until 1985, remaining constant at that level thereafter. Tax revenues have been more slowly increasing from 22% of GDP in 1974 to approximately a quarter of GDP in 1995. The most recent major changes in tax policy occurred through the installation of the Juppé Plan in 1995/6 and — though to a lesser extent — through the corporate income tax reform of the Jospin administration in June 1997.

Despite the fulfilment of the Maastricht criteria, it can still be stated that efforts to tackle fiscal problems arising from demographic development may not have been sufficient. Discretionary tax increases and expenditure freezes, which to a large extent facilitated the decreasing deficit ratio, are not necessarily the most effective measures when viewed from a longer-term perspective. Current deficits may be misleading in this respect. As the vast French social insurance system is the most prominent candidate for future fiscal pressures, we will briefly survey its recent development before turning to the generational accounting analysis.

7.2.3. Social insurance in France: a brief survey

The French social insurance system includes retirement, disability, and some non-contributive pensions as well as health care and unemployment insurance. This system is financed by both employers' and employees' contributions in a Bismarckian way, that is, with a direct tax-benefit linkage. The split between employers' and employees' contributions is 62 to 38 although, of course, the effective incidence falls heavily — if not exclusively — on labour.

Recently, some steps towards a more Beveridgian system have been undertaken. On the revenue side, there is a very obvious tendency to broaden the tax base. After the Juppé Plan legislation we find two income tax surcharges, raised at a flat rate on a very broad taxable income base, which are used to finance social insurance. The *contribution sociale généralisée* (CSG) was introduced in 1991. In 1997, the rate was increased by 4.1 percentage points to 7.5%, while at the same time employee health insurance contributions were cut by 4.75 percentage points to 0.75%. The *contribution pour le remboursement de la dette sociale* (RDS) was introduced in February 1996 and is intended to fund an institution that will service and repay the accumulated social security debt. On the benefits side, pre-existing non-con-

([1]) The various elements of the 1993 Pension Reform Act will be discussed, and evaluated with respect to their impact on intergenerational redistribution, in Section 7.4.1. A thorough study of the details of the Juppé Plan, embedded in a close analysis of the French welfare state, is found in Darnaut (1997). The intergenerational impact of the Juppé Plan will be studied in Section 7.4.2, which also gives a more detailed account of this reform.

tributive pensions (the *minimum vieillesse*) have been extended in order to fight poverty among the elderly. There has also been an important attempt towards donating a minimum income transfer (*revenu minimum d'insertion*) but under the restriction that the beneficiary is at least 24 years old.

The benefits of the social insurance system are administered through numerous independent authorities which until very recently were managed by representative committees elected proportionally by both unions and employer associations. With the Juppé Plan, the French Parliament regained control in the sense that at least it can decide upon total expected expenditures and receipts. All different branches of the social insurance system run deficits. Between 1980 and 1995, the share of social transfers financed by contributions fell from 93 to 83 % ([1]).

A somehow surprisingly favourable financial stance used to be displayed by the unemployment insurance system which, as the only social insurance scheme, started to run into a surplus in 1996. This was basically a by-product of the fact that the boom reduced unemployment rates, and more and more of those being still unemployed ran out of eligibility. Since 1997, contributions to the unemployment insurance system have been decreased accordingly.

In 1998, the deficit of the entire social insurance system also started to decrease as a consequence of increased contribution revenues resulting from economic recovery. Nevertheless, many experts are concerned about the efficiency of the Juppé Plan since the expenditures started to increase sharply too. The recent debate on this issue focuses on whether more administrative control and regulation should be introduced, or if simple price and incentive mechanisms should be reactivated.

As for the long-run future, there is a steadily growing concern about the sustainability of the pension system. Some argue against the generosity of the system and point to the fact that today the average pension amounts to even slightly more than average labour income. Thus, the retirees are relatively better off than workers. This raises the question of intergenerational justice, especially when the generosity cannot be expected to last forever.

In fact, the increase in contributions has already started. The Balladur administration's 1993 Pension Reform Act also introduced a hidden increase in the retirement age. Future pensions benefits are also subject to further reductions due to a change in the index system. Pensions will be indexed to the consumer price index (CPI) rather than to wages (and thus to labour productivity). Besides, the calculation of new pensions has been reformed so that they will be based on wages in a less advantageous way. Finally, there was an attempt to create a pension fund, which was delayed after the June 1997 election of Prime Minister Jospin. Again, the Parliament decided in favour of these funding strategies while the government did not. The pension funds should be introduced with another system of fiscal subsidies for savings invested in old-age-insurance companies.

The consequences of this eclectic policy mix for intergenerational balance have not yet found their way into the debates that tend to remain on a rather intuitive surface. Relying on the statistical instrument of generational accounting, the present study might be helpful in revealing what the 1993 Pension Reform Act has achieved — and what it has not.

7.3. Baseline results and sensitivity analysis

7.3.1. Basic assumptions and data description

Before the presentation of generational accounting results for France in Section 7.3.2, the demographic as well as economic assumptions and data used in the calculations will be outlined in this section.

The population projection underlying the baseline calculations closely follows the official one done by Dinh (1995) for Insee France. Some slight deviations from the main parameters used in the official projections should however be pointed out. For reasons of comparability with the other studies in this project, in the baseline population projection, the 1995 total fertility rate of 1.7 is kept constant, which marks a slight departure from the official assumption of a total fertility rate (TFR) of 1.8. We did, however, prepare an alternative population projection taking account of the official assumptions. In that, we let TFR slowly increase from its 1995 value of 1.7 to the officially assumed long-run-level of 1.8.

The official assumption on mortality could not be strictly followed either, as the official population projections

([1]) INSEE (1997). See also SESI (1996).

assume an increase in life-expectancy by 8.8 years until 2050. This is rather optimistic. As life-expectancy in the baseline projections is by standard adjusted only quite carefully in order to allow comparability across countries, the official rate of life-expectancy growth, i.e. 1.5 to 1.6 years per decade, is used and applied up to 2005 or, in the alternative population projection, up to 2010. As to migration, the base-year figure for net immigration is kept constant for the baseline projection; an alternative projection with zero migration has been done so that the impact of migration can be evaluated. By assuming a steady net influx of 49 396 migrants per annum, the baseline population projection closely follows the official population forecasts which quote an annual net immigration of 50 000.

The sources for the demographic data used in the population projections are as follows. Base-year population by age and gender in one-year age groups was found in Kerjosse and Tamby (1996), which also served as the source for age-specific fertility rates. The total of net male and female immigrants in the base-year is quoted from *Population* (1997), while age and gender structures of net immigrants have been taken from Dinh (1995). The baseline population projection with life-expectancy adjustment until 2005 and constant TFR of 1.7 results in a population growing to a maximum of 61 million in 2020, then decreasing to 54 million in 2060 and only 46 million in 2 100. This development implies that the old-age dependency ratio (ratio of number of persons aged over 64 to number of persons aged 18 to 64) will increase from 24% in the base-year over 33% in 2020 to a maximum of almost 44% in 2040, slightly decreasing thereafter.

The absolute 1995 values of general government receipts and expenditures are reported in Table 36. The calculations are based on the 1995 exchange rate of FRF 6.53 per ecu (Insee (1997)). Intergovernmental grants and transfers have been cancelled out. Revenues include taxes on labour and capital incomes, value added tax, excise taxes on alcohol and tobacco, petrol, vehicle, inheritance, wealth and other taxes. Social insurance contributions have also been taken into account.

Using Comptes de la Nation data, the expenditures have been aggregated in gross categories. These include pensions, health care, unemployment insurance, housing, minimum income transfer (RMI), child and youth support, disability and invalidity benefits, and education. Note that non-age-specific expenditure as reported in Table 36 has been calculated by subtracting from total

Table 36

Public receipts and expenditures in France, 1995

(billion ECU)

Receipts		Expenditures	
Labour income tax	43.9	Social security benefits	144.7
Capital income taxes	66.2	Housing	13.5
Value added tax	87.7	RMI (minimum income transfer)	4.2
Inheritance tax	4.2	Unemployment benefits	21.9
Petrol and vehicle taxes	21.9	Disability and invalidity benefits	19.5
Tobacco taxes	6.3	Child and youth support	18.1
Landed property tax	13.0	Health benefits	94.0
Poll tax	8.7	Education	68.5
CSG	14.8	Subsidies	33.7
Social contributions	226.6	Net interest payments	41.5
Other taxes	29.5	Non-age-specific expenditure	201.6
Other receipts	75.0		
Deficit	63.2		
Total	661.0	Total	661.0

Source: INSEE (1997), pp. 166, 181, 185.

government expenditure all age-specifically distributed expenditure, as well as subsidies and net interest payments. The aggregates for taxes and transfers are distributed to individuals of current generations according to the age profiles, whenever possible ([1]).

The computation of the profiles for France was not a simple task. First of all, there is, as often, a discrepancy between micro- and macro-data: the categories of taxes and transfers in the household survey do not correspond to the categories found in the national income and products accounts. For example, taking account of social transfers to persons currently living abroad (which are found in the NIPA but not in the household survey) required additional information which in this case has been drawn from SESI (1995). Another difficulty consists in the fact that the decomposition by age does not refer to cohorts since the household survey decomposes the agents in quite large age groups. One should also notice that health and education expenditures are allocated over the life cycle on the basis of a different micro census using more narrow age groups albeit incompatible with the other household surveys. Note that for most profiles it is not possible to specify gender-specific data. All calculations are based on the standardised method as described in Chapter 2 of this volume. The baseline parameters for the economic key variables are 5 and 1.5% for the real rate of interest and the productivity growth rate, respectively.

7.3.2. Baseline findings

Table 37 reports the generational accounting results for the 1995 base-year under baseline parameters. The second column displays the total age-specific rest-of-life per capita net payments for all living cohorts aged 0 to 100 years in 1995, the third and following columns give further information on the composition of the total generational accounts.

The pattern of total generational accounts is quite typical. Current newborns and children receive a net transfer over their remaining lifetime, amounting to ECU 56 200 for the 1995 newborn. This transfer is, however, not of a remarkable scale since it is smaller than the present value of the non-age-specific expenditures attributed to these cohorts (ECU 62 100 for the 1995 newborn). Taking into account that most profiles were based on household vs. individual statistics, and therefore taxes attributed to children tend to be underrated, while only the health and education profiles were calculated from individual data, puts the extent of the net transfer received by the very young cohorts even more into perspective. Generational accounts turn positive at the age of 12, and reach their maximum of ECU 107 800 at the age of 26, which is the typical age in France to enter the labour force. As can be seen from Table 37, the generational accounts of these cohorts are dominated by social insurance contributions, which reach their maximum present value at this age.

With increasing age, generational accounts decrease, turning negative at age 49. While capital taxes have gained in importance, the net present value of rest-of-life social insurance contributions has decreased. On the transfers receipts side, the net discounted value of pensions slowly approaches its maximum: at the age of 66 the average net transfer from the public coffers has its maximum value of ECU 128 600, which reflects mainly pension and health benefits, earnings-related tax and contribution payments having fallen away. Since with proceeding age less and less years of receiving these benefits remain, the absolute value of generational accounts decreases until the 100-year-old, who is assumed to live only one more year, is left with a net transfer of ECU 10 600.

The distribution of net payments between current and future generations is documented in the lower part of Table 37. From the total rest-of-life net taxes of all living cohorts and the general government net financial debt, which amounts to 35.6% of GDP, the gap in the intertemporal budget constraint can be calculated that represents the intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2 of this volume). These liabilities, amounting to 81.3% of GDP, could be financed by increasing all taxes for future generations by 33.8% while leaving current generations' net taxes unchanged, which results in a generational account of ECU – 7 700 for future newborns. The main indicator for intergenerational redistribution, i.e. the absolute difference between current and future newborns' rest-of-life net payments, thus amounts to ECU 48 500.

Alternatively, the intertemporal public liabilities could be financed by an increase in all taxes for current as well

([1]) Most profiles have been computed using data given in the household survey *Le budget des ménages en 1995* (Clément et al. (1997)). This reference includes profiles of tax payments and contributions and of welfare benefits. Other social benefits, e.g. health insurance, can be found in Mormiche and Urbaniak (1994). Education enrolment and expenditures are to be found in *Repères et références sur les statistiques sur les enseignements et la formation* (1996). Note that non-age-specific government expenditure has been distributed evenly, i.e. using a flat profile, to all age groups.

Table 37

Composition of generational accounts for France

(1 000 ECU) (*)

		Tax payments					Transfer receipts						
Age in 1995	Total GA	Labour income	Capital taxes	VAT	Excise taxes	Social insurance	Pensions	Health	Unemployment insurance	Welfare and housing	Child and youth	Education	Non-age-specific expenditure
0	– 56.2	13.1	22.7	25.4	8.9	73.6	21.0	40.3	6.9	6.4	6.3	57.1	62.1
5	– 37.6	15.5	26.9	30.1	10.6	87.5	24.9	41.1	8.2	7.6	7.5	57.9	61.2
10	– 9.1	18.4	31.9	35.7	12.5	103.7	29.5	44.1	9.7	9.0	8.8	50.2	60.1
15	34.4	21.9	37.8	42.3	14.9	122.9	35.0	46.6	11.5	10.6	10.5	32.5	58.7
20	82.5	25.9	44.7	49.5	17.2	144.1	41.6	49.5	13.4	12.0	12.2	12.8	57.3
25	106.6	29.6	52.1	52.0	17.4	154.2	49.5	52.6	14.3	10.2	12.6	3.8	55.6
30	103.3	31.3	58.5	51.9	16.7	148.9	59.0	55.2	13.7	9.0	11.9	1.5	53.7
35	93.8	32.7	65.1	51.2	15.7	139.6	70.3	57.3	12.7	7.8	10.7	0.2	51.5
40	69.8	32.9	68.6	48.8	14.3	123.9	83.9	59.5	12.0	6.6	7.8	0.0	48.9
45	37.4	32.6	71.6	45.6	12.7	104.0	100.4	61.6	11.2	5.4	4.4	0.0	45.9
50	– 13.7	29.4	71.5	40.7	10.6	76.5	119.9	62.1	10.7	4.6	2.5	0.0	42.6
55	– 69.5	25.4	70.7	35.2	8.3	45.6	141.4	59.7	10.0	3.9	0.7	0.0	39.0
60	– 99.4	21.2	66.6	30.4	6.6	26.5	150.4	55.0	6.5	3.3	0.3	0.0	35.1
65	– 127.3	16.5	61.3	25.3	4.8	7.5	159.2	47.9	2.0	2.8	0.0	0.0	30.9
70	– 116.6	12.6	52.1	19.4	3.3	2.7	135.6	41.4	0.8	2.5	0.0	0.0	26.4
75	– 94.9	8.4	41.7	12.9	1.8	0.4	102.0	34.1	0.1	2.3	0.0	0.0	21.7
80	– 75.5	6.3	32.5	9.7	1.3	0.0	79.0	27.5	0.0	1.8	0.0	0.0	17.0
85	– 57.8	4.7	24.5	7.3	1.0	0.0	59.9	21.2	0.0	1.4	0.0	0.0	12.8
90	– 43.5	3.5	18.0	5.4	0.7	0.0	44.3	16.3	0.0	1.0	0.0	0.0	9.4
95	– 31.0	2.4	12.7	3.8	0.5	0.0	31.5	11.6	0.0	0.7	0.0	0.0	6.6
100	– 10.6	0.8	4.3	1.3	0.2	0.0	10.8	3.9	0.0	0.2	0.0	0.0	2.3
Increase in all taxes, future (%)				33.8									
Future generations' account				– 7.7									
Absolute difference				48.5									
IPL (% of GDP)				81.3									

(*) Baseline (r = 0.05, g = 0.015).

as future generations by 6.1%. This would raise the tax quota by 2.6 percentage points to a new value of 44.6% of GDP. On the other hand, cutting all transfers for current as well as for future generations by 5.9% would cover the intertemporal debt. This would decrease the transfer quota by 2.6 percentage points to 41.3% of GDP. The latter two thought experiments would, of course, burden current and future newborns fully equivalently, so that their respective generational accounts resulting from these policies would fall together. In the case of an increase in all taxes, the new generational accounts for current as well as future newborns would amount to a net transfer of ECU 47 500, making a difference to current newborns of ECU 8 800. Financing the intertemporal public liabilities by cutting down all benefits results in generational accounts for current as well as future newborns of ECU – 44 500, which marks a loss to current newborns of ECU 11 800.

Better understanding of the sources of intergenerational imbalance may be attained by analysing some hypothetical scenarios, the results of which are reported in Table 38a. First, net financial wealth is assumed to be zero, which results in an absolute difference between generational accounts of ECU 27 300. Compared to the baseline results, the no-debt scenario implies a reduction of the absolute difference by almost 44%. Besides outstanding debt, the other main suspect for intergenerational imbalance is found in the demographic development. Therefore, a hypothetical scenario assuming the base-year population structure to remain unchanged for all future is tested. It leads to an absolute difference between current and future newborns' generational accounts of ECU 28 000, thus reducing the baseline value by 42%. Consequently, the impact of population ageing on future budgets can be estimated to be of similar importance as the general government debt.

Table 38a

Sources of intergenerational imbalance

(1 000 ECU) (*)

Scenario	Baseline	No debt	No demographic change
Absolute difference	48.5	27.3	28.0

Table 38b

Demographic sensitivity

(1 000 ECU) (*)

Scenario	Baseline	Alternative population projection	Zero migration
Absolute difference	48.5	51.4	55.0

Table 38c

Productivity growth and real interest rates

Productivity growth		1.0	
Discount rate	3.0	5.0	7.0
Absolute difference	55.9	54.1	58.3
Productivity growth		1.5	
Discount rate	3.0	5.0	7.0
Absolute difference	50.9	48.5	52.4
Productivity growth		2.0	
Discount rate	3.0	5.0	7.0
Absolute difference	46.0	43.3	46.7

Productivity growth rates and real interest (discount) rates in %. Absolute differences between current and future newborn's generational accounts in 1 000 ECU.

7.3.3. Sensitivity analysis

After testing the hypothetical scenarios concerning the sources of intergenerational imbalance in France, we will subsequently assess the robustness of the baseline results with respect to demographic variations and variations in interest and productivity growth rates. In contrast to the baseline projection that assumes TFR to remain at its 1995 level of 1.7, life-expectancy at birth to increase until 2005 to 83.2 years for females and 75 years for males, and net migration to remain constant at its 1995 value of 49 396, the alternative population projection lets fertility increase to a new TFR of 1.8 in 2027, while life-expectancy at birth continues its increase until 2010, reaching values of 84 years for females and 75.8 years for males. Migration is again assumed to remain constant at its 1995 level.

While this alternative population projection with both higher fertility and lower mortality serves as a kind of sensitivity analysis against uncertainties in the underlying population projection, the effect on the generational accounting results is minor. As reported in Table 38b, the absolute difference between current and future generational accounts that amount to ECU 48 500 in the baseline case is increased by ECU 2 900 or 6% to ECU 51 400. This result is obviously mainly driven by higher life-expectancy implying higher expenditure on pension and health benefits as older cohorts grow more numerous. But in sum, the effect of varying the underlying pop-

ulation projection clearly falls short even of ignoring net migration. The hypothetical scenario assuming zero net immigration in the base-year and all following years results in an absolute difference of ECU 55 000. The almost 50 000 annual net immigrants assumed in the baseline calculation thus reduce the absolute difference between generational accounts by 8.8 %.

Table 38c reports the absolute difference between current and future newborns' generational accounts for the combinations of productivity growth rates ranging from 1.0 over 1.5 to 2.0 % with real interest rates ranging from 3.0 over 5.0 to 7.0 %. While increasing growth rates generally lower the absolute difference in generational accounts, the effects of varying the real interest rate used as discount rate in the calculations is not so straightforward.

On the one hand, a higher discount rate implies that generational accounts of (current and future) newborns are lower as net benefits in childhood gain weight compared to future earnings-related tax and contribution payments. On the other, benefits to be received by currently living generations are more heavily discounted as well, so that the earlier net payments to the public budget, especially by the cohorts working-aged in the base-year, gain relative importance, too. Therefore the intertemporal debt is lowered by an increase in the discount rate, while the relative change in all taxes paid by future generations is necessarily higher as their tax payments are more heavily discounted.

The total effect of varying the real interest rate is unclear, depending on which of the single effects dominates. In the case of France, the absolute difference decreases when the discount rate is raised from 3.0 to 5.0 %, and then increases again when the discount rate is further increased. Accordingly, the most favourable combination is a productivity growth rate of 2.0 % annually and a real interest rate of 5.0 %, resulting in an absolute difference between generational accounts of ECU 43 300. The most unfavourable one is the combination of a 1.0 % productivity growth rate with a 7.0 % interest rate which results in an absolute difference of ECU 58 300, implying a span of ECU 15 000. The mean value of the nine values resulting from the productivity growth rate and real interest rate combinations amounts to ECU 50 677. The standard deviation from this mean is ECU 4 678, or roughly 9 % of the mean value.

One important reason why the reagibility of the absolute difference is comparatively low in the case of France has already been mentioned above. It lies in the fact that the baseline case happens to coincide with a turning point in interest rate reagibility. Another is that as most profiles, relying on household data, tend to attribute payments rather to parents than to children, the generational accounts for very young cohorts are quite robust.

7.4. Restructuring social insurance

In the current decade, the French social insurance system has been in the focus of fiscal debate. The most important policy measures in this respect, triggered by short-run financing problems, were reforms in the old age and health sectors. Accordingly, the following sections will analyse the intergenerational impact of both the 1993 pension reform and of the Juppé Plan enacted in late 1995 and followed by further revenue and expenditure measures, in order to tackle mainly the problem of exploding health expenditure.

7.4.1. The 1993 pension reform — an *ex-post* analysis

The 1993 pension reform was an important step towards fiscal sustainability. To assess the degree to which this reform has improved the intergenerational stance of the French fiscal policy, a range of calculations have been carried through that allow the evaluation of the isolated elements of the 1993 pension reform. Furthermore, a hypothetical 'no reform' scenario has been analysed that ignores the effects of this reform. The main elements of the 1993 pension reform are constrained to the private sector employees' pension schemes and thus applied only to roughly 42 % of all pension expenditure. Therefore a second hypothetical scenario has been analysed that extends the 1993 pension reform to the total pension expenditure aggregate. The main elements of the 1993 pension reform may be briefly summarised as follows ([1]).

- From 2003 onward, the number of contribution quarters required to receive a full pension will be 160 (before the reform, it was 150). The transition will take place gradually, demanding an additional quarter of contributions each year after 1993. This is expected to result in a moderate increase in average

([1]) For further details, see Franco and Munzi (1996). The following description of the design of the 1993 pension reform partly draws on their excellent overview. Alternatively, see Darnaut (1997). Additional information, especially on the phasing-in of the separate measures as well as on estimates of medium-to-long-term consequences of the reform, has been found in Briet (1995).

retirement age. Although activity rates in the respective age bracket are quite low and have displayed a falling tendency in recent years, forecasts are far from unanimous ([1]). But as the institutional settings formerly strongly favouring early retirement have been modified, a two-year increase in average retirement age, attained until 2003, does not seem to be too optimistic an estimate.

- From 1993 onward, pension benefits are indexed to consumer prices. While before the reform pension adjustments were, *de jure*, to be calculated according to the development of wages, de facto benefits had actually been price indexed since 1987, because wage indexation had annually been suspended ([2]).

- For a closer link of contributions and benefits, basic pensions will be calculated on an average of the 25 best-paid years from 2008 onwards. Before the reform, the relevant value had been 10 years. The transition to the new value is done gradually by taking into account one more year each year between 1993 and 2008. This measure will mainly result in an effective decrease in the average pension level, with an estimated long-run value of 5%.

- Additionally, a new fund was created that serves to transfer the responsibility for welfare pension expenditure from the pension schemes to the central government (*fonds de solidarité vieillesse*). For the general government including social insurance institutions, however, this measure has the character of merely shifting the burden from one pocket into the other; therefore it does not show any effect in the generational accounting calculations.

For the baseline calculations, these measures have been carefully implemented in the programme, taking account also of the respective phasing-in modalities. Therefore the baseline findings as reported in the previous section reflect the intergenerational stance of the French fiscal policy in the base-year 1995, including already the fiscal consequences of the 1993 pension reform. In order to isolate the effects of the various elements of this reform, a range of additional calculations has been carried through where the single measures were implemented separately.

The first experiment takes account of the two-year increase in average retirement age only, ignoring the switch in pension benefit indexation and the change in the calculation of basic pensions. Had the increase in retirement age been the only element of the 1993 pension reform, the absolute difference would have been by 43% higher than the baseline result (full 1993 pension reform) ([3]). The switch to consumer price indexation alone results in an absolute difference of ECU 62 700, which is by 29% higher than the baseline value. If the change in the basic pension calculation (25 instead of 10 best-paid years), interpreted as an effective cut in the average pension level, had been the only reform measure, the absolute difference in generational accounts would have been by 61% higher than with the full reform.

This allows the conclusion that the most important part of the reform is the switch from wage to consumer price indexation. Note, however, that pensions are still earnings-related, so that pension expenditure growth will only temporarily be dampened: from the point of time when all pensioners alive will have retired after the switch, pension expenditure per capita will resume its wage growth rate. But as this measure effectively reduces the rest-of-life pension benefits to be received by currently living cohorts, the net payments by living generations are increased, which in turn decreases the intertemporal public liabilities.

The full fiscal effects of the 1993 pension reform can be best appreciated with the help of Table 39. For comparison, the first column presents the baseline generational accounts for the cohorts aged 0 to 100 in the base-year; the second column reports the values that would have resulted without the 1993 pension reform. Virtually all living cohorts have been affected, but the burden is quite unevenly spread. While the deviation from the baseline results is minor for the very old cohorts, it increases with additional years of pension benefits yet to be received, and increases even more for cohorts affected by the increase in average retirement age. Newborns in 1995

([1]) Cf. for example Blanchet and Marchand (1991). Recent data on activity rates can be found in Marchand and Thelot (1997).

([2]) For serious generational accounting calculations, the difference is however marked. Only the official legislation of CPI indexation allows to reliably calculate the long-run path of per capita pensions on the basis of consumer price indexation.

([3]) Obviously, an increase in retirement age not only affects pensions expenditure, but also implies longer payment of labour income taxes and social insurance contributions. On the other hand, if later retirement leads to higher unemployment in the 55 to 65 age bracket, increased spending on unemployment benefits might partly offset the favourable fiscal effects of the retirement age increase. Of course, this has been taken account of in the calculations.

have only slightly been touched by the reform: their generational accounts would have been only by ECU 3 600, or roughly 6%, lower without the pension reform. The main burden is concentrated on the working-aged; the maximum deviation is reached for the 55-year-olds in 1995. As a consequence of the reform, they face additional future net payments amounting to ECU 20 500, that is, their generational account is by 29% lower in the 'no reform' scenario.

Obviously, the fact that the 1993 pension reform considerably affected the living generations must bear its fruits when the focus turns to intergenerational redistribution. The lower part of Table 39 reports the effects on future newborns' generational accounts. Without the pension reform, the increase for future generations in all taxes necessary to close the intertemporal budget would have been almost 57%, resulting in future newborns' generational accounts amounting to ECU 21 400. Thus, the absolute difference between future and base-year newborns' generational accounts would have been ECU 81 200, which is by two-thirds higher than the baseline result of ECU 48 500. The intertemporal debt-to-GDP ratio would have been 136% had the 1993 pension reform not been legislated.

Reconsidered in the light of the intergenerational effect of the full pension reform, the contribution of its separate elements might be more easily appreciated. In relation to the 'no reform' scenario, the reform in the calculation of basic pensions alone implies a less than 4% decrease in the absolute difference in generational accounts, the increase in contribution quarters alone results in a 15% decrease, and the indexation switch leads to a 23% decrease ([1]).

([1]) Of course, these values do not exactly add up to the full decrease in intergenerational imbalance of 40 % of the 'no reform' absolute difference in generational accounts, as there exists a degree of interdependence between the separate elements, especially between the effective cut in basic pensions and the change in average retirement age.

Table 39

Generational impact of policy experiments

(1 000 ECU) (*)

Generation's age in 1995	Baseline	1993 Pension reform		Juppé Plan	
		Without reform	All pensions	Employment measures non-permanent	Employment measures permanent
0	– 56.2	– 59.8	– 53.3	– 56.0	– 54.4
5	– 37.6	– 41.9	– 34.2	– 37.4	– 35.6
10	– 9.1	– 14.1	– 5.0	– 8.7	– 6.8
15	34.4	28.4	39.2	35.0	37.2
20	82.5	75.4	88.3	83.5	85.9
25	106.6	98.2	113.5	107.9	110.5
30	103.3	93.4	111.5	105.0	107.7
35	93.8	81.9	103.6	95.9	98.7
40	69.8	55.6	81.5	72.3	75.1
45	37.4	20.9	50.8	40.3	43.4
50	– 13.7	– 32.5	1.2	– 10.4	– 7.2
55	– 69.5	– 90.0	– 52.8	– 65.8	– 62.7
60	– 99.4	– 116.2	– 84.9	– 95.7	– 92.8
65	– 127.3	– 135.1	– 115.8	– 123.8	– 121.3
70	– 116.6	– 120.5	– 108.6	– 113.7	– 111.8
75	– 94.9	– 98.4	– 89.7	– 92.7	– 91.3
80	– 75.5	– 77.9	– 72.3	– 73.9	– 73.0
85	– 57.8	– 59.2	– 56.0	– 56.7	– 56.1
90	– 43.5	– 44.2	– 42.5	– 42.7	– 42.4
95	– 31.0	– 31.3	– 30.6	– 30.6	– 30.4
100	– 10.6	– 10.6	– 10.6	– 10.6	– 10.6
Increase in all taxes, future (%)	33.8	56.9	13.9	29.7	23.5
Future generation account	– 7.7	21.4	– 33.3	– 13.6	– 21.1
Absolute difference	48.5	81.2	20.0	42.5	33.3
IPL (% of GDP)	81.3	136.0	33.5	71.5	56.7

(*) Baseline (r = 0.05, g = 0.015).

It deserves to be pointed out once more that the 1993 pension reform applied only to the general scheme for private sector employees. The special pension schemes, covering mainly public employees, have not been touched. Had the 1993 pension reform affected all pension expenditure instead of only some 40 % of the total pension aggregate, the effect on intergenerational redistribution would obviously have been even more favourable. The last column of Table 39 reports the generational accounts for this hypothetical scenario. Quite expectedly, living generations are somewhat more strongly affected in this scenario, while the distribution of additional burdens displays the same pattern as before. The maximum additional burden, again to be borne by the 55-year-olds, amounts to ECU 37 200, implying a loss in net rest-of-life transfers of more than 41 % compared to the hypothetical scenario without the 1993 pension reform.

The necessary increase in all taxes for future generations would then fall short of 14 %, resulting in future newborns' accounts of ECU – 33 300. As in the baseline scenario, future generations would thus also receive a net over their lifetime. The absolute difference between current and future newborns' generational accounts would amount to just ECU 20 000, reflecting an intertemporal debt of 33.5 % of GDP. Taking account of the fact that net financial debt as officially reported is 35.6 % of GDP, the obvious conclusion is that this hypothetical reform scenario, extending the considerable effects of the 1993 pension reform to total pension expenditure, would be sufficient to cover the implicit debt mainly caused by the demographic development. However, the reactions of the public to any plans of extending the reform efforts taken in the 1993 pension reform to other pension schemes were so drastic that the hypothetical scenario has to be regarded as a mere thought experiment.

7.4.2. The Juppé Plan

The dreary fiscal implications of population ageing cannot be combated by reforming the pension system alone since a non-negligible share of fiscal problems arises in other subsystems of social insurance. This is also reflected in the recent French policy: only two years after the 1993 pension reform, the next serious efforts towards fiscal sustainability have been undertaken in the form of the Juppé Plan. While this reform is aimed at the whole social protection sector, its main effects are felt in the subsystem of health care and health insurance, thus tackling the next important system where population ageing is expected to worsen financial imbalances.

The Juppé Plan embraces two parts. First, a range of emergency measures designed to lead to the consolidation of social security accounts by 1997 has been enacted. These emergency measures include both revenue measures like tax increases and contribution increases for pensioners and unemployed persons, and expenditure cuts. The branches of social security mainly affected by these cuts are health expenditures, but also family allowances and benefits and expenditures in favour of housing ([1]). There has not been any commitment as to the continuation of these measures after 1997.

In addition to these adjustment measures, an additional direct tax was introduced in February 1996: the *contribution pour le remboursement de la dette sociale* (RDS). As its name reveals, it is intended to fund an institution (the *Caisse d'amortissement de la dette sociale*) that will service and repay the accumulated debt of the social security institution. To this end, almost all income — only statutory minimum income, income from tax-exempt savings accounts, industrial accident allowances and military disability pensions are exempt — is taxed with a flat rate of 0.5 %. It is intended to maintain the tax for 13 years. The implementation of the fiscal consequences of this first part of the Juppé Plan in a policy experiment is straightforward.

The second part of the Juppé Plan, which can be expected to be of greater long-run importance, consists of structural changes in various fields of social security, with the structural reform of the health insurance and health-care system as the very core. Most of these structural changes as, for example, introducing parliamentary control over social security spending, or introducing market mechanisms and competitive elements into the health-care sector to ensure compliance with the spending targets set by Parliament are, however, of an institutional nature, so that their long-run fiscal implications are quite difficult to quantify. Therefore they do not offer themselves readily to generational accounting analysis.

In fact, adhering to the principles of careful analysis forbids relying on mere guesstimates for the long-run development of health expenditure that might, or might not, result from these institutional changes alone. For this reason, some parts of the Juppé Plan structural measures that may be expected to have some dampening effects

([1]) For a more detailed analysis of the Juppé Plan, cf. Darnaut (1997).

mainly on expenditure growth in the hospital and ambulatory sectors have been left out of consideration in the following policy experiments. It is to be expected that detailed and reliable microsimulations focusing on these measures will be available in the future. So this omission should be kept in mind for future research.

In contrast to the uncertainties met on the expenditure side, the reform in health insurance finance, enacted in late 1996, is more manageable in generational accounting terms. The general idea of the measures taken in this respect is to relieve labour cost from the growing social insurance contribution burden and thus to reduce the labour market distortions. To this end, the rate of employees' health insurance contributions has been lowered by 1.3 points, while a proportional tax on almost all income (the *contribution sociale généralisée* (CSG) which was set up in 1991) has been both broadened and increased. The net fiscal effect of this financing switch was expected to amount to about ECU 0.8 billion annually.

We have analysed in detail the effects of isolated elements of the Juppé Plan on intergenerational redistribution. Two cases are considered. In the first one, the emergency measures, which do not have any binding long-term legislative basis, are treated as one-off measures for 1996 and 1997. In contrast to this, in the second case we treat them as permanent. The emergency measures taken account of comprise expenditure cuts or savings in the health sector, a tax on insurance premiums from enterprises, a penalty on pharma-enterprises (one-off for 1996 in both emergency measure scenarios), and savings in the family and housing branches of social security. Conforming to expectations, these measures hardly have any perceivable effects on intergenerational redistribution when regarded as short-term, one-off measures. In this case, the absolute difference between generational accounts is decreased by ECU 400, which is less than 1% of the baseline absolute difference of ECU 48 500. If the emergency measures were infinitely sustained, on the other hand, the intergenerational imbalance found in the baseline calculations would be reduced by almost 20%, resulting in a new absolute difference in generational accounts of ECU 39 000.

The intergenerational effect of the RDS proportional tax introduced in 1996 and intended to be sustained for 13 years is, while moderate, still marked for a time-limited measure. Considered in isolation, it decreases the absolute difference in generational accounts by more than 9%. If the RDS is considered together with the switch in health insurance finance, the resulting reduction in intergenerational redistribution amounts to almost 12% compared to the baseline calculation.

The total generational impact of the Juppé Plan as considered in these calculations is reported in the fourth and fifth columns of Table 39. The emergency measures have been taken into account for 1996 and 1997 only in the fourth column, while in the fifth column they have been sustained infinitely. The living generations are only moderately affected by the Juppé Plan. The largest burdens are concentrated on the cohorts aged 55 to 60 in 1995: in the case of non-permanent emergency measures, their generational accounts are increased by ECU 3 700. In the case of permanent emergency measures, the largest burden weighs on the generation aged 55 in the base-year and raises its generational account by ECU 6 800.

While the cohorts alive in 1995 are only moderately affected, respectively, by the Juppé Plan, in sum these individual burdens for living generations add up to a non-trivial increase in living generations' net payments, allowing the intertemporal debt to shrink by almost 10 percentage points of GDP in the case of non-permanent emergency measures, and by almost a quarter if the emergency measures are maintained forever. Accordingly, with non-permanent emergency measures of the Juppé Plan future newborns' generational accounts amount to ECU – 13 600, implying an absolute difference between current and future newborns' generational accounts of ECU 42 500. In comparison to the baseline result, this marks a decrease in absolute difference of 12%. If the emergency measures were maintained forever, the generational impact of the Juppé Plan would be even more favourable: future newborns would then receive, over their lifetime, a net transfer of ECU 21 100, which implies an absolute difference in generational accounts amounting to ECU 33 300. Thus, the intergenerational imbalance found in the baseline case could be reduced by 31%.

7.5. Conclusion

From the preceding sections, the conclusion may be drawn that although basic fiscal policy displays a substantial degree of intergenerational imbalance at the cost of future generations, recent reforms have already tried to address these problems. Without the

1993 pension reform, intergenerational redistribution would have been by two-thirds higher. The social security and social insurance reforms included in the Juppé Plan further decrease the imbalance. However, even in the best-case scenario analysed up to now, taking account of the 1993 pension reform and of the Juppé Plan, with the 1996 and 1997 emergency measures interpreted as being permanent, generational accounting has revealed an implicit debt amounting to over 20% of GDP. Together with the officially reported explicit net financial debt of the general government, it results in intertemporal public liabilities of 56.7% of GDP. So while the reforms recently enacted in France may well have been an important contribution to the reduction of the burden imposed on future generations, they have not been sufficient to remove it.

A thought-experiment may show the extent of intergenerational improvement that would have been possible had the reforms been further extended. The 1993 pension reform, if extended to all pension schemes, and combined with the non-permanent variant of the Juppé Plan, would leave current newborns with a net transfer over their lifetime amounting to ECU 53 100, which implies a reduction by ECU 3 100 compared to the baseline result. Future newborns could receive a net transfer exceeding the baseline value by ECU 31 400. Thus the absolute difference in generational accounts could be lowered from ECU 48 500 in the baseline case to ECU 14 000, implying a reduction by over 70%. If, in addition to an extension of the pension reform to all pension expenditure, the Juppé Plan emergency measures were legislated as permanent, the absolute difference in generational accounts could be brought down to only ECU 5 400, reflecting a reduction of intergenerational imbalance of almost 90%.

After our base-year 1995, economic trends have been more favourable. Still, it remains to be seen if the recovery can be turned into sustained growth, but any conclusions to be drawn from 1995 data should be qualified in this respect. However, the evaluation of the two reforms analysed in our policy experiments cannot be fully enthusiastic in the light of our findings. While certainly they significantly contributed to the improvement of intergenerational balance, the fiscal problems arising mainly from population ageing have partly been postponed instead of solved. Important opportunities to tackle longer term problems may have been missed.

8. Ireland: EU transfers and demographic dividends

Tom McCarthy ([1]) and Holger Bonin ([2])

8.1. Introduction

Ireland joined the European Economic Community in 1973, along with Denmark and the UK, in the first expansion of what is now a European Union of 15 countries. At that time agriculture still accounted for a large share of total output in Ireland. As a consequence, the common agricultural policy was a significant benefit to Ireland of entry to the Community. However, the agricultural sector has been in constant decline. In 1973 agricultural output accounted for 16 % of GDP, down from 22 % in 1960. In 1995 the share stood at 7 %.

The transition from a rural traditional economy has been facilitated by access to a large European market. However, the transition was well advanced at the time of accession to the Community and was driven largely by an active industrial policy. Ireland joined the monetary union, having satisfied the entry requirements for EMU with ease. This outcome is credited to an era of sound budgetary management which is dated to 1987 and record growth rates in recent years.

However, Ireland is also the largest net recipient in relative terms from the EU budget. This is a position that has sustained for some time. Ireland's transition towards the EU average means that the relatively high transfers received today from the EU budget will not be maintained in the long-term. It may be the case that a reduction in EU transfers will not directly weaken the growth potential of the economy. Still, the question remains as to the budgetary implications of such a change. This question is all the more important in the European monetary union where members are subject to a Stability Pact cap on budget deficits. In this chapter, we utilise the standardised and advanced concept of generational accounting developed in Chapter 2 for Ireland, to provide an assessment of the intergenerational implications of a likely future reduction in EU transfers.

In addition, Ireland serves as an interesting complement to the set of rapidly ageing countries under investigation in this volume. Ireland's 'baby boom' occurred much later than that in other developed countries. As a consequence the Irish ageing profile differs significantly from that of other EU Member States. The support ratio (defined as percentage of working age to needs adjusted population total) for Ireland has historically been below that of the European OECD countries. It is now identical and is predicted to be 6 percentage points higher than that of OECD Europe by 2030. For Ireland this represents a figure no worse than 1990 and significantly better than 1960. The other OECD Europe countries are predicted to experience figures below anything in their recent history (cf. Leibfritz et al. (1995)).

Female participation in the Irish labour market has, in common with some other European countries, increased in recent times. There still exists significant potential for further improvement: in 1995 the female participation rate was 36 % as compared to 69 % for males. Given the relationship between labour force participation and generational accounts we use the accounts to examine the budgetary implications of this labour market trend.

Recent Irish government policy planning has set improved government sector efficiency and smaller government as desirable goals. We also use generational accounting to draw out the implications for present and future generations' lifetime tax payments of such changes. In doing this we ask whether the population and labour market changes provide a dividend from which planned structural changes to the budget can be affected.

This chapter is organised as follows. Section 8.2 discusses Ireland's recent economic performance and

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examines the historical evolution of Irish budgetary policy. The baseline analysis of the generational accounts is presented in the following section. Section 8.4 investigates the consequences of a reduction in EU transfers while the potential for a demographic dividend is examined in Section 8.5. Brief conclusions are contained in Section 8.6.

8.2. Fiscal policy and recent economic performance

The recent growth performance of the Irish economy has attracted a considerable amount of attention. In what may be an ominous comparison to the past performance of Asian economies the country has been referred to as the Celtic Tiger. Agencies such as the IMF and OECD predict Irish GDP growth for 1998 and 1999 to be in the range of 7 to 8%. From the early 1970s, Irish growth has on average always exceeded that of the EU average. In particular in the last decade there has been a remarkable turnaround, going from a relatively poor economic performance in the late 1980s to a situation where the growth performance is almost four times the EU average.

It is still too soon to draw firm conclusions on the sources of this economic growth. However, there has undoubtedly been a significant contribution from the supply side arising from underutilised capacity and past investments in human capital. In a small open economy demand side features will drive the economy both directly in output markets and indirectly as a recipient of foreign direct investment. The growth of recent years has used up much idle capacity. Concern is now being expressed about infrastructure and labour market constraints. However, some of these constraints, while binding at the peak of the cycle, may be less of a problem in the long-run steady state.

Recorded output activity in Ireland, GDP, is significantly above income available for Irish residents. This arises — quite naturally given the extent of foreign direct investment — because large volumes of profits flow out of the country. In 1995 net factor income (which was negative) was in excess of 10% of GDP. In this context GNP per capita is a surer measure of average well-being. The record is one of significant improvement since 1970. However, it should be noted that in Ireland, in common with many developed countries, this improvement has been accompanied by a growth in inequality. In this context the soundness of the welfare state — and the ability to contemplate increased generosity — is of fundamental importance.

In the last decade price inflation in Ireland has been lower than the EU average, in contrast to the first decade of membership of the Community. A significant development for Ireland was the creation of the European monetary system in the late 1970s. Ireland, in contrast to the UK, joined the exchange rate mechanism from the beginning thus breaking parity with sterling that had existed since the start of the 19th century. Real interest rates have fallen significantly in the 1990s and the stubbornly high unemployment rates have improved more recently. By 1997 the unemployment rate was below the EU average, down from a situation where it had been 30% above the average in 1981, and 60% higher in 1990.

Assessing past developments in Irish budgetary policy, the evolution of net payments, i.e. gross receipts net of payments received, from the rest of the world draws particular attention. In the Irish case the single largest element in rest of world receipts is the transfer from the European Social Fund. Net transfers from the rest of the world relative to GDP were 20 times higher in 1995 than at the point of accession to the European Community (2.0% instead of 0.1%) largely as a consequence of the growth of this Fund and Ireland's relative success in attracting funds under this heading. The likely reduction in such transfers will be, as we noted in the introduction, a significant challenge for Irish budgetary policy in the first decade of the next century.

There has been considerable movement in the size of government rising from 40% of GDP in 1970 to over 60% by the mid-1980s and falling back to 50% by 1995 (the pattern is similar when we use GNP in the denominator). Borrowing has been the most variable component on the receipt side, running at almost 20% of GDP in the 1980s and falling back to under 10% in the 1990s. Taxation is now back to its level of significance in relation to GDP that prevailed in 1980. However, this is approximately 3 percentage points above the level at entry to the Community. In *Shaping our future*, Forfas (1996) recommended that the amount taken in taxation should return to such levels. If this desire is combined with the challenge arising from reduced transfers this places a heavy burden on achieving a dividend from positive developments in relation to demography and labour force participation. The generational accounts will be

used to assess the intergenerational feasibility of such budgetary planning.

The institutional features of taxation and transfers have been varied annually in government budgetary statements. One of the underlying concerns has been with the integration of the tax and benefit systems, particularly as it relates to labour market transitions. This concern gave rise to the establishment of an Expert Working Group on the Integration of the Tax and Social Welfare Systems which presented a comprehensive assessment of the shortcomings of the present tax and transfer system and set out principles to guide reform. These are that there must be a reward for working, the transition to work should be facilitated, tax burdens on the lower paid should be reduced, the tax and social welfare systems should be simpler, and the tax and social welfare systems should be coordinated.

This assessment did not come in a vacuum. It followed on from the extensive analysis of the 1980's Commission on Taxation. A significant contribution of this work was the improved collection mechanisms for taxation. As a consequence the buoyancy of tax revenue now tends to contemporaneously track economic growth. However, there simultaneously exist calls for higher transfers as, for instance, in the recommendations of the Commission on Social Welfare and the Commission on the Status of People with Disabilities.

The structure and level of taxes and transfers will be determined in a corporatist environment. A tradition of national wage agreements in the 1970s has developed into a full-scale economic and social plan in the 1990s. The current agreement, 'Partnership 2000', was concluded in December 1996 and runs to the end of the century. It was signed by government, unions, employers' groups and the voluntary sector. The agreement covers both the government and private sectors. In addition to agreed increases in pay, the document contains specific objectives for personal taxation — a cumulative reduction, over three years, of about ECU 1 100 (ECU 1 = IEP 0.82) on a full year cost basis in the planned tax take. There is also wide-ranging agreement on aspirations for improving social inclusion.

A corporatist strategy, it would appear, has served Ireland well during its transition from the budgetary gloom of the mid-1980s. The question now is whether this has created expectations of a return for those who participated in the agreement. If this is the case, meeting this expectation might have implications for the sustainability of current fiscal policy.

8.3. Baseline analysis

8.3.1. Population projections

The economic history of Ireland over the last two centuries has been dominated by demography. Total population in the mid-20th century was less than half the level of the early 19th century. While there is debate about the origins of population change there can be no doubting the level impact of the catastrophic famine of the 1840s. The scale of excess mortality in this period and the associated out-migration have affected Ireland's social, economic and political development.

Emigration of both a permanent and seasonal character has been a significant feature of the history of the independent Irish State that was established in 1923. National income was boosted for many years by remittances to family in Ireland from emigrants. In fact the scale of payments merited a separate entry in the balance of payments accounts (today GDP exceeds GNP on account of an outward flow of remittances to migrant capital).

The character of migration in the 1990s is very different from that of earlier periods. The era of the emigrants' remittances has long since passed. It was not until the census of 1979, however, that there was a record of positive net migration. Furthermore, as might be expected for a small country with unimpeded labour mobility to adjacent larger countries (and historic links to the United States that have facilitated illegal immigration), large changes in the pattern of migration can occur resulting in swings from a large positive to a large negative figure for net migration. In the 25 years to 1996 net migration was positive in only 12 of the years. It swung from a high positive of 8 000 to a high negative of 42 000 in an average population of about 3.3 million.

This migration pattern makes the job of population projection quite difficult. The most recent official projections (CSO (1995)) take a pessimistic view of migration trends. This view was formed by the experience of the latest data year on which the projection work was based and on the net migration observed during the 1980s. This pattern changed dramatically in 1995. We therefore needed to develop our own projections in view of the importance of the demographic scenario for generational accounting. In doing the projection we were anxious to avoid the static expectations underlying the official pro-

jections. We recognise that our projections are also based on extrapolation of past trends. However, we wanted to use a longer run of historical experience in making our extrapolation.

We investigate three migration scenarios (the first two of which closely follow parts of the official 1995 projection but had to be extended to 2030 given that the official projection ended in 2026). The baseline migration scenario supposes zero net migration in all years after the base-year. Our second scenario is an emigration scenario which assumes an annual net outflow of 7 500 migrants to 2006 and zero net migration thereafter. The third scenario assumes that the migratory pattern from 1996 to 2025 will be a reflection of the 1971 to 1995 record. In specific terms this 'historic' migration scenario involves an average annual rate of net migration per 1 000 of average population as follows: 4.3 for 1996 to 2004, – 0.7 for 2005 to 2007, – 4.1 for 2008 to 2013, – 7.6 for 2014 to 2019, 0.5 for 2020 to 2025, and zero thereafter. In all scenarios, the age and gender shares of emigrants and immigrants reflect average historical experience. The net migration figures were achieved from a base level of 35 000 for emigrants and immigrants, i.e. zero net migration in 1996 would imply exactly this number of immigrants and emigrants. In future years this actual number is adjusted proportionately in the projections in order to keep it in line with the development of total population.

The Irish baby boom occurred much later than that in other OECD countries. In the post-war years age at marriage was still quite old. While the average number of children for married couples was high the number of couples was relatively low. The boom was fostered both by changes in the marriage pattern and in the change in migration in the 1970s noted above. This boom peaked in the early 1980s. In recent years, however, there has been a significant break — particularly the case of young mothers — in the link between births and marriage. Birth numbers are now increasing again. It is difficult to determine whether this process will translate into a change in the total fertility rate (TFR) or merely in the age distribution at maternity. For this reason we utilise TFR projections employed by the 1995 Central Statistics Office projection which amounts to assuming the latter.

There are two alternative fertility scenarios. First, a high fertility scenario which serves as the baseline sets the TFR at 1.88 in 1996 and lets it decline at a constant rate to 1.8 in 2026 at which rate it is maintained thereafter. Second, a pessimistic low fertility scenario involves a more dramatic decline in the TFR to 1.5 in 2006, the annual rate of decline being constant and the TFR unchanged from 2007.

Combining these migration and fertility assumptions yields six demographic scenarios. In view of the historical importance of demography in Irish economic history we examine the sensitivity of our findings to these demographic scenarios, the zero migration and high fertility case serving as the baseline. In all demographic scenarios, life expectancy at birth increases by about two years in 2015 for both males and females and remains constant thereafter.

The significant demographic difference between Ireland and other OECD countries is readily apparent from the future dependency ratios that result from our population projections. The comparison of the development of old-age dependency in Ireland with the 1994 Work Bank projections for other countries is indeed striking. In 1995 old dependency in Ireland was approximately 4 percentage points lower than the OECD average. This gap is predicted by our projections to grow on average to 10 percentage points by 2030.

To understand the nature of the ageing process it is useful to introduce the idea of a very old, i.e. those 80 and over, dependency ratio. The average rate of increase for this ratio always exceeds the rate of growth of the old-age dependency ratio. This fact obviously reflects increased life expectancy. The significance of this ratio for the demographic pressure on future budgets stems from the size of health transfers to the oldest-old.

Over the medium-run future, i.e. over the next 30 to 40 years, the differences in old-age dependency across projection scenarios remain relatively small. On this basis one might expect that the extent of intergenerational redistribution might not be very responsive to demographic sensitivity. However, more significant differences across our demographic scenarios arise in relation to young dependency. As a consequence policy changes with implications for transfers to the young could magnify the differences across projection scenarios.

8.3.2. Baseline budget

The Irish government budget for 1995 on a national accounts basis is presented in Table 40. Trends in the government finances have been discussed in Section 8.2. Here we will focus on the classification of taxes and the methods used in constructing tax and transfer profiles.

Table 40

Public revenue and expenditure, Ireland, 1995

(billion ECU)

Revenue		Expenditure	
Labour income taxes	7.259	Social welfare	5.935
Capital income taxes	0.332	Health	0.928
Indirect taxes	6.823	Education	0.723
Social insurance contributions	2.402	Subsidies	0.848
Transfers from rest of world	0.986	Net investment	1.071
Deficit	0.897	Government consumption	6.727
		Interest payments	2.472
Total	18.704	**Total**	18.704

Under labour income taxes we include: income tax, corporation tax, income levies and EU taxes. The figure for capital income taxes in Table 40 is the sum of capital gains tax, capital acquisitions tax, household motor vehicle duties, mineral fees, residential property tax and Finance Act levies. This allocation reflects a small open economy incidence assumption where the burden of capital income taxes is borne by labour. Social security contributions are also assumed to fall as a burden on labour. Taxes on the stock and transfer of assets have fallen in significance relative to total taxation in the last two decades. As a consequence the level of taxation assigned to capital is very small.

Transfers are, by their nature, categorical in terms of age and gender. This facilitates the development of transfer profiles. Each transfer programme was assigned by age and gender. In particular, profiles were constructed for social welfare, health and education. In terms of precision the social welfare profile is the most robust, as it distinguishes five-year age groups. The health and education profiles are robust by time of life, but it was difficult to be as precise by five-year category.

The Revenue Commissioners are not, in general, concerned about the age of taxpayers. As a consequence administrative records are of no use in constructing a profile of tax payments. A number of additional data sets were combined in order to come up with the required profiles. In the case of the labour tax profile we used the Labour Force Survey. For capital and indirect taxes we used the Household Budget Survey to construct indices of wealth holding and expenditure by age and gender.

Flat profiles were used in allocating government expenditure while receipts from the rest of the world were allocated according to the social welfare profile. This latter category is largely composed of EU Social Fund transfers. In Section 8.4 we analyse the implications for generational balance of a reduction in such transfers. As we noted in Section 8.1 the recent growth performance of the Irish economy threatens Ireland's eligibility for future transfers under the Structural Funds, in particular, since presently poorer countries such as Greece and Portugal are treated less generously.

The Irish government is the sole or major shareholder in a number of commercial enterprises ranging from the airport authority to investment banks to power generation. The budget underlying the generational accounts takes account of this position.

The State operates a pay-as-you-go pension scheme with the age of retirement set at 65. The State pension is paid as a contributory pension (for those with a record of paying social insurance) and as a non-contributory pension. This pension is not income related and it is adjusted by the finance minister according to movements in the consumer price index. However, as permanent indexation to inflation deteriorates the replacement level of pensions (notwithstanding real transfers being maintained) in the course of very long-term projections, we do not follow this policy when constructing the generational accounts. Instead, pensions are adjusted according to productivity growth, which maintains the initial replacement level indefinitely. Interpreting fiscal sustainability in Ireland, one should be aware that this design builds in a policy change into what is otherwise a status quo projection. As is shown in the country study for the United Kingdom, keeping to inflation indexation of social benefits for some period of time might improve fiscal sustainability. Accordingly, our baseline design measures the upper

bound of what might be the actual amount of intertemporal public liabilities.

The vast majority of schools in the State receive either partial or total State funding. The State also operates subsidised school transport for certain categories of students. The university sector is again dominated by publicly funded institutions. There are no fees for undergraduate students in a normal year of study. Fees are charged for postgraduate study but they do not reflect true cost.

Social welfare transfers are managed through the government Department of Social, Community and Family Affairs. This covers transfers relating to labour market status (unemployment payments and a supplement to the working poor), age, disability status, and family type and composition (e.g. single parent's allowance and a children's benefit).

8.3.3. Baseline results

The age and gender specific generational accounts of all living and future generations which use baseline demographics, i.e. zero net migration and the reduction in the total fertility rate to 1.8 by 2026, are presented in Table 41. Following the conventions set up for this study, the interest rate is set at 5% and the growth rate at 1.5% in the baseline.

The figures in columns two, three and four are *remaining* rest-of-life net payments for all living generations discounted to the base-year 1995. Recall that the intertemporal budget constraint underlying generational accounting is forward looking, hence past receipts and payments are irrelevant for the accounting exercise. Entitlements that arise as a consequence of past payments are not ignored, however. These will determine the profile that an average citizen can expect upon reaching the relevant age.

The first remarkable finding is that the expected lifetime net tax burden of an average newborn in the base-year is close to zero, i.e. lifetime tax payments almost equal lifetime government transfers including non-age-specific transfers. Still, current newborns receive a net transfer from the government coffers over their life cycle. The

Table 41

Generational accounts, Ireland

(1 000 ECU) (*)

Generations's age in 1995	Average	Male	Female
0	– 4.9	14.0	– 25.0
5	5.2	27.7	– 18.5
10	20.5	46.7	– 7.3
15	37.4	68.4	4.4
20	49.4	87.5	9.6
25	49.8	95.5	3.8
30	31.8	84.8	– 18.6
35	17.5	70.3	– 33.7
40	8.7	56.8	– 39.2
45	– 2.6	37.7	– 42.7
50	– 16.6	14.0	– 47.9
55	– 33.0	– 13.3	– 53.6
60	– 48.3	– 36.9	– 59.7
65	– 58.5	– 52.9	– 63.8
70	– 54.2	– 48.5	– 59.0
75	– 46.2	– 40.6	– 50.6
80	– 38.9	– 33.8	– 42.2
85	– 32.7	– 28.6	– 34.9
90	– 28.0	– 25.6	– 28.9
95	– 21.0	– 20.0	– 21.3
100	– 7.9	– 8.1	– 7.8
Increase in all taxes, future (%)	– 1.7	–	–
Future generational account	– 6.7	11.9	– 26.5
Absolute difference	– 1.8	– 2.1	– 1.5
IPL (% of GDP)	– 4.3	–	–

(*) 1995 value; baseline (r = 0.05, g = 0.015).

present value of government transfer receipts exceeds lifetime tax payments by ECU 4 900.

During childhood generational accounts quickly turn positive due to lower educational transfers. Since education transfers are concentrated on the young, and given non-participation in the labour force until the late teens, the peak for remaining net payments can be expected to fall somewhere in the third decade of life. On average this occurs in the mid-20s and involves a net payment of circa ECU 50 000. By the same token the age of largest net receipt will tend to occur around retirement when the burden of labour taxes is past and a full retirement beckons. This occurs on average in Ireland in the mid-60s and involves a net receipt of ECU 58 500.

As a precursor to a formal analysis of intergenerational balance, examination of this payment profile is instructive. The peak net payment is 85% of the peak net receipt. Furthermore the average recipient is a net contributor during most of the working life, and the net transfers to the youngest cohorts are rather small. A priori this might give us grounds for expecting balance between generations in Ireland for the baseline scenario.

In order to get a precise assessment of the intergenerational impact of current fiscal policy, however, we need to apply the intertemporal budget constraint to see what would happen if current policy is maintained into the future. If the constraint holds with equality we have generational balance. However, a residual gap — either positive or negative — may develop. The sign and size of this gap is a measure of intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2 of this volume), with a positive number designating a liability. If we operate on the principle that the intertemporal budget constraint is binding, payments for future generations must be adjusted in order to meet intertemporal public liabilities.

In the Irish baseline case government's intertemporal liabilities are negative. The surplus in the intertemporal governmental budget constraint generated by the continuation of present fiscal policy is 4.3% of GDP. Despite current explicit debt which amounts to 72.1% of GDP, future newborns will inherit a bonus. As a consequence, all taxes for future cohorts can be reduced by 1.7%. This gives the result that, on average, future newborns can expect to pay ECU 1 800 less than the 1995 generation.

A measure of the additional information regarding intergenerational redistribution contained in generational accounts can be obtained from a cross-country comparison of the explicit debt to intertemporal liabilities relationship. Countries with very similar explicit debt-to-GDP ratios can have very different measures of intertemporal debt. For instance the Dutch explicit debt-to-GDP ratio in 1995 is similar to that of Ireland while the Dutch intertemporal public liabilities are significantly higher (cf. Chapter 10 in this volume).

To this point we have focused on the average profile. This masks significant differences between males and females. For instance the newborn male is a net contributor while his female counterpart is a significant net recipient. This pattern holds at all stages in the life cycle — the typical female in 1995 is a net contributor in lifetime terms only if she is in her mid-teens to mid-20s in the base-year. It is interesting to note, however, that application of the benefit due to negative intertemporal public liabilities brings larger absolute benefit to future males than it does to similar females. The explanation for this can be seen by a detailed examination of the composition of the total net payments in Table 41. Tables 42 and 43 decompose the aggregate generational accounts for both males and females.

Comparing the gender-specific remaining lifetime tax payments we find that the age profile of capital tax payments is almost identical for every cohort and the differences in indirect taxation are modest, being higher for females with the difference peaking at around 14% of the male payment. The major difference occurs in respect of labour taxes and social insurance contributions. In some cases the male cohort pays six times the contribution of a similarly aged average female. In addition, even though indirect taxes account for 40% of tax revenues in any year their payment is more evenly distributed over the lifetime. From the perspective of a newborn there is more front-end loading of labour taxes. Therefore the difference between male and female cohorts will be more pronounced in youth than in old age assuming no significant difference in transfer patterns.

Comparing the transfer section of Tables 42 and 43 reveals that transfer receipts by cohort are fairly even across genders. Differences in social welfare transfers, in particular, emerge in old age. However, this is merely a reflection of the greater life expectancy of females — a 60-year-old female in 1995 can expect to live four years longer than her male counterpart. Hence the ceteris paribus assumption of the previous paragraph holds thereby reinforcing the importance of the gender difference in labour tax profiles.

Table 42

Composition of male accounts, Ireland

(1 000 ECU) (*)

Age	Tax payments					Transfer receipts		
	Labour income taxes	Capital income taxes	Indirect taxes	Social insurance	Social welfare	Health	Education	Non-age-specific expenditure
0	59.1	1.3	45.4	19.6	33.1	6.0	7.0	66.6
5	70.2	1.5	47.8	23.2	36.6	6.0	8.1	65.8
10	83.2	1.8	50.4	27.5	40.6	5.9	6.7	64.8
15	98.4	2.2	52.8	32.6	45.0	6.0	5.0	63.6
20	113.3	2.6	51.4	37.5	48.7	6.0	2.8	62.1
25	118.1	3.0	48.8	39.1	49.3	6.0	0.2	60.4
30	110.8	3.4	45.5	36.7	49.6	6.3	0.0	58.4
35	99.8	3.7	43.2	33.0	49.8	6.7	0.0	56.0
40	88.3	3.9	42.2	29.2	50.1	7.0	0.0	53.2
45	72.3	4.0	40.7	23.9	50.1	7.3	0.0	50.0
50	53.9	4.0	38.2	17.8	51.0	7.5	0.0	46.3
55	32.5	4.0	34.5	10.7	51.0	7.3	0.0	42.1
60	14.6	3.9	29.9	4.8	51.5	7.1	0.0	37.4
65	3.4	3.6	24.3	1.1	52.1	6.6	0.0	32.3
70	1.1	3.1	19.7	0.4	45.4	5.6	0.0	27.0
75	0.1	2.5	15.6	0.0	36.2	5.3	0.0	21.7
80	0.0	1.9	12.1	0.0	28.8	5.7	0.0	16.5
85	0.0	1.5	9.2	0.0	22.1	6.9	0.0	12.3
90	0.0	1.1	7.1	0.0	17.1	8.9	0.0	9.1
95	0.0	0.8	5.3	0.0	13.0	7.3	0.0	6.5
100	0.0	0.3	2.2	0.0	5.3	3.0	0.0	2.4

(*) 1995 value; baseline (r = 0.05, g = 0.015)

This analysis of the details of payments and transfers helps us to understand why future generations of males gain relatively more due to the negative true government debt. The tax reduction is applied in a uniform fashion and is therefore quantitatively more significant to them.

Finally we seek to quantify the contribution to intergenerational distribution of two factors — the demographic trend underlying a set of accounts and the stock of net debt (what we have referred to above as explicit debt). If dependency ratios remained constant at their 1995 levels we would get a figure for true government debt of – 27.6%. This would benefit current as well as future newborns relative to the baseline. However, future newborns would gain relatively more, the absolute difference between current and future newborns is five times greater than the baseline case.

Suppose instead that explicit debt was zero. What would have been the state of generational balance with all other baseline parameters unchanged? By definition, using baseline parameters, the intertemporal public liabilities become – 76.4%. In terms of absolute gain for future relative to current newborns the size of the gain is 18 times higher in this case relative to the baseline. Kotlikoff and Leibfritz (1998, p. 15) note that the majority of the countries in their study 'would still face very significant generational imbalances even were there no official net debt'. Ireland follows the minority in this case, being more like Belgium than Italy. While both of these countries have similar levels of explicit debt the former gains more relative to a constant dependency ratio than does the latter. This is an example of the power of generational accounts. In the Irish case it is a very useful piece of information. We will analyse this issue in more depth when we look at the consequences for Irish generational balance of a reduction in EU transfers. There we will ask whether infrastructural investment or repayment of debt is the more pressing priority.

8.3.4. Sensitivity analysis

The standard sensitivity analysis in generational accounting analysis involves using a set of interest rates and growth rates in combination with the baseline demographic scenario. Table 44 presents the numerical results of such an exercise.

Table 43

Composition of female accounts, Ireland

(1 000 ECU) (*)

Age	Tax payments					Transfer receipts		
	Labour income taxes	Capital income taxes	Indirect taxes	Social insurance	Social welfare	Health	Education	Non-age-specific expenditure
0	28.9	1.4	49.4	9.6	33.7	6.4	7.6	66.6
5	34.4	1.7	52.5	11.4	37.2	6.5	8.9	65.8
10	40.8	2.0	56.0	13.5	41.2	6.5	7.0	64.8
15	47.9	2.4	59.4	15.9	45.8	6.6	5.2	63.6
20	52.4	2.8	58.3	17.3	49.5	6.7	2.9	62.1
25	46.6	3.3	55.3	15.4	49.3	6.8	0.2	60.4
30	31.3	3.7	50.8	10.3	49.1	7.3	0.0	58.4
35	19.9	4.1	48.3	6.6	48.9	7.6	0.0	56.0
40	15.0	4.4	46.7	5.0	49.3	7.8	0.0	53.2
45	11.4	4.6	45.5	3.8	50.0	7.9	0.0	50.0
50	8.3	4.7	42.5	2.8	52.0	7.9	0.0	46.3
55	5.0	4.7	38.5	1.7	53.7	7.7	0.0	42.1
60	1.9	4.7	33.4	0.6	55.4	7.5	0.0	37.4
65	0.4	4.4	27.0	0.1	56.3	7.2	0.0	32.3
70	0.1	3.8	22.3	0.0	51.6	6.7	0.0	27.0
75	0.0	3.1	17.9	0.0	43.4	6.4	0.0	21.7
80	0.0	2.4	13.6	0.0	35.1	6.6	0.0	16.5
85	0.0	1.8	10.1	0.0	27.1	7.4	0.0	12.3
90	0.0	1.3	7.5	0.0	20.0	8.6	0.0	9.1
95	0.0	0.9	5.4	0.0	14.4	6.7	0.0	6.5
100	0.0	0.3	2.0	0.0	5.3	2.5	0.0	2.4

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Intertemporal public liabilities are negative in four of the nine runs. The baseline is the second largest negative value for intertemporal debt. The largest positive value for the intertemporal public liabilities occurs for the combination r = 3 %, g = 2 %. The pattern of variation is erratic and we cannot draw any generalisations. It vindicates the point made by Kotlikoff and Leibfritz (1998) that the sensitivity to growth and interest rate variation depends on the country.

The weakness of our sensitivity analysis, in common with most simulation methodology, is that we do not

Table 44

Sensitivity analysis — discount rate and growth rate

Growth rate (%)	Interest rate (%)	IPL (% of GDP)	Present newborns (1 000 ECU)	Future newborns (1 000 ECU)	Absolute difference (1 000 ECU)
	3.0	– 2.5	0.0	– 0.8	– 0.7
1.0	5.0	– 2.0	– 6.8	– 7.7	– 0.9
	7.0	9.2	– 12.2	– 6.1	6.0
	3.0	6.1	0.4	1.8	1.4
1.5	5.0	– 4.3	– 4.9	– 6.7	– 1.8
	7.0	6.2	– 11.1	– 7.3	3.8
	3.0	25.7	– 0.8	3.9	4.7
2.0	5.0	– 5.7	– 3.0	– 5.2	– 2.2
	7.0	3.2	– 9.7	– 7.9	1.8

have a basis for statistical inference. Fortunately, while the switches in intertemporal public liabilities appear rather large, the corresponding numbers for the absolute difference between the net payments of current and future newborns do not vary much. In any case, Ireland is close to intergenerational balance for a reasonable range of the growth and discount rates.

Holding the interest and growth rates constant, we also examine generational balance in the variety of demographic scenarios discussed in Section 8.3.1. It was noted there that demographic projections for Ireland can quickly go out of date if there is a switch in the pattern of migration such as has occurred since 1995. Ireland with a traditionally high fertility rate has now moved closer to a European norm. In the demographic sensitivity analysis, we ask whether this uncertainty about demographic trends undermines the value of generational accounting in the Irish case.

We find that the assessment of generational balance is robust to a variety of demographic scenarios. Given baseline fertility TGD is negative for all three migration scenarios. If migration follows the historic pattern of the last two decades, the value of intertemporal public liabilities (– 3.4% of GDP) slightly increases as compared to the baseline assumption of zero net migration (– 4.3%). Emigration thus generates a less favourable outcome for future generations. Therefore the scenario with annual net emigration of 7 500 individuals leads even closer to perfect intergenerational balance, with intertemporal debt reduced to – 0.2% of GDP. A positive value for intertemporal public liabilities and thus redistribution in favour of current newborns would require an even more substantial negative number for net migration occurring close to the base-year. It is not reasonable to posit such a scenario under current conditions.

Permanent zero net migration, which is our migration baseline, is hardly likely to hold exactly. The historic migration scenario is a reasonable guess as to what could happen with a mixture of net outward and net inward migration. As the results for this case are very similar to the zero migration scenario, they lend additional credence to its use as the baseline.

For all three migration scenarios, the low fertility assumption implies a higher redistribution in favour of future generations as compared to baseline fertility. Due to a lower number of transfer-receiving newborns the surplus in the government's intertemporal budget constraint is higher. In addition, the increased surplus is shared among a smaller number of individuals. The joint effects lead to larger per capita gains than under baseline fertility. The gain for future generations from lower fertility amounts to ECU 1 300, ECU 1 400 and ECU 900 in the baseline, historic migration and emigration scenario, respectively.

8.4. Structural Fund transfers

Ireland has been the highest net recipient, relative to GDP, from the EU budget throughout the 1980s and 1990s. The entire country has been classified as Objective 1 for the purpose of Structural Fund transfers. In 1986 every Irish citizen received a net transfer of ECU 374 as compared to ECU 128 in Greece, ECU 82 in Denmark, ECU 22 in Portugal and ECU 15 in the Netherlands, which were the other net recipients. By 1995 Ireland continued to be the largest net recipient per capita (ECU 527) significantly ahead of Greece (ECU 333), Portugal (ECU 242), Spain (ECU 184) and Denmark (ECU 59).

This is extraordinary when one considers that GDP per head in Ireland was 85% of the EU average in 1995 while that in Spain, Portugal and Greece was respectively 76, 68 and 60%. Recent economic growth means that Ireland will no longer qualify for such favourable treatment. However, the transition from this status is not yet clear. It is recognised that it may be necessary to wean Ireland off the funds. As a consequence there have been suggestions that a category 'Objective 1 in transition' may be established. This might involve a scaled reduction in transfers after 2000.

The experiment in Table 45 examines a number of scenarios in which EU transfers are reduced. Ireland will receive transfers under all cases. Our intention in this experiment is to undo the changes that occurred when the various funds were consolidated and expanded in the reforms of the late 1980s. We use as our base amount of transfer a sum that is approximately 2% of GDP in 1995. In our accounts in Table 40 this is recorded as a receipt under the heading 'transfers from the rest of the world'. This is in fact mainly transfer from the European Social Fund. Our experiment is not suggesting that changes occur only in Social Fund spending. We are using this 2% as a means of 'ring-fencing' total reductions in EU transfers. Note that net receipts from the EU budget to Ireland amount to approximately 5% of GDP. Hence it is only 40% of this that is subject to elimination. This can

Table 45

Intergenerational impact of reduced EU transfers

EU transfers eliminated in year	IPL (% of GDP)	Present newborns (1 000 ECU)	Future newborns (1 000 ECU)	Absolute difference (1 000 ECU)
2000	58.7	– 4.9	19.8	24.8
2010	50.2	– 4.9	16.3	21.2
2020	42.9	– 4.9	13.2	18.1

Baseline (r = 0.05, g = 0.015).

be seen as a realistic scenario if Ireland continues to ascend the EU ranking in per capita income terms and especially in the context of expansion of the EU to the east.

The starting point is our baseline discussed in Section 8.3.3. We consider elimination of transfers after 2000, gradual reduction between 2000 and 2009 with elimination thereafter and elimination from 2020 with gradual reduction from 2000 to 2019. This experiment maintains the lifetime net payments of current newborns ([1]). Increases in intertemporal public liabilities must be met by increasing taxes on future generations.

If EU transfers are entirely eliminated after 2000, the intertemporal debt jumps to 58.7% of GDP. This debt implies a sizeable burden on future generations. Their generational accounts increase by ECU 26 600 as compared to the baseline and are ECU 24 800 higher than the net lifetime tax payments of current newborns. Even in the gradual reduction cases the intergenerational imbalance remains substantial with only slightly reduced levels of increased payments to future generations.

These findings suggest that generational balance in Ireland is a direct consequence of EU transfers, which in turn raises questions as to the appropriate use of transfers in the transition stage. Before exploring this point it is important to slay a popular misconception. It may be true that EU transfers explain a very small part of Ireland's record growth in recent years. One cannot deduce from this that the reduction of transfers will be neutral. This is because of the large budgetary effect that we have identified in Table 45.

([1]) Note that while receipts from the rest of the world are taken into account calculating true government debt, they must not be included in the generational accounts. Transfers from abroad are financed by foreign taxpayers and do not impose a burden on Irish residents.

EU transfers have been in the form of matching grants with an additionality requirement. This latter clause is now impossible to police given the time-span over which transfers have flowed. Hence it is possible for leakages to have occurred. Imagine, for instance, that the Irish government demand for capital goods is inelastic. The matching formula would result in a smaller public capital programme net of EU transfers. The money might instead be ploughed into more consumption spending or retirement of debt. The former use might be a store for later trouble. In contrast the latter might be very wise and indeed possibly more beneficial than the infrastructural spending for which the transfer was intended.

In Section 8.3.3 we noted that Ireland was a country where, as in the case of Belgium, the elimination of explicit debt was relatively more beneficial than the maintenance of current dependency ratios. The results in Table 45 suggest the necessity of reducing explicit debt in advance of withdrawal of EU transfers to the extent considered here. Therefore the transition phase from Objective 1 status might best involve transfers to repay debt rather than the plethora of infrastructural and human capital investments normally associated with a Community Support Framework.

8.5. Using a demographic dividend

In view of our discussion in the last section it might be suggested that the title of this section is somewhat inappropriate. However, it is true that Ireland is predicted to enjoy favourable dependency ratios over the medium term for a variety of demographic scenarios. Moreover recent trends in female labour force participation will tend to reinforce the benign influence of these ratios on generational balance. In this context we ask whether the Irish government can take actions which will contribute to generational balance at a future date when dependen-

cy ratios will place a more significant burden on the welfare state. This 'window of opportunity' for fiscal planning may thus generate a demographic dividend.

National and European policy commitments both constrain the scope for action and indicate possible directions of reform. At the European level the taxation of labour is now of concern to the Commission as a consequence of the commitment to a reduction in the statutory charges on labour in the White Paper 'Growth, competitiveness, employment'. On the other hand the European Central Bank has emphasised its interest in cyclical aspects of budgetary policy, particularly in relation to the taxation of labour. The view has been expressed by the bank that cuts in labour taxes in the 1998 budget are unwarranted in view of current growth experience.

National policy is framed in terms of a short- to medium-term social partnership arrangement, involving government, employers' groups, unions and the voluntary sector. The current agreement, which was concluded in December 1996, is known as 'Partnership 2000'. The corporatist model has evolved in the last decade from the national wage agreements of the 1970s to a social and economic programme for government. Longer-term strategy is contained in 'Shaping our future' which is essentially an enterprise plan. This was developed by Forfas (1996), the Irish policy advisory and coordination board for industrial development and science and technology.

Partnership 2000 contains a commitment to tax reductions. So too does the Forfas document. The targets are outlined in a slightly different format. The former calculates a notional sum that would be collected from employed labour over the period of the agreement. A commitment is then given to cut the amount that is planned to be taken. It is for the Finance Minister to determine how this is to be achieved, i.e. the combination of changes in tax rate, band and allowances to get the required outcome. In contrast the Forfas document suggests that 'a target of taxation to GNP of 35% by 2010 would make clear the implied relative shift of resources towards the market sector of the economy as the main driver of economic growth' (Forfas (1996), pp. 37–38). In relation to the personal income tax the report calls for 80% of all taxable personal income to be liable at a standard 25% rate (in comparison to 26% at the time of publication) with the remainder taxed at 40% (compared to a higher rate of 48% in 1996).

The various strands of policy identified above do not even in themselves imply a coherent set of policy actions. However, there is a clear preference — setting aside short-term cyclical considerations — for reducing the tax burden on labour. In practical terms this would need to be done in a 'balanced budget' (here we use the term in a static administrative budget sense) fashion, i.e. through the identification of other taxation sources or through reductions in non-age-specific expenditure. In Table 46 we use generational accounting to determine the scale of adjustment that would be required to meet a reduction in labour taxes. The scenario is our original baseline. In the baseline labour income taxes — or more precisely the income taxes that are a burden on labour — are 15.3% in relation to GDP. The experiment in Table 46 involves reducing this by 1.3 percentage points in equal increments between 1996 and 2005. The consequence is an increase in the intertemporal public liabilities from – 4.3% to 28.8% of GDP. In conventional budgetary terms this is akin to increasing current net debt by 50%.

The positive intertemporal liabilities impose a burden on future newborn cohorts. In order to finance the labour income tax cut taxes for present generations, tax payments of future generations have to be proportionately increased by 11.7%. This translates into an ECU 12 100 higher lifetime tax burden of future generations as compared to present newborns. We want to ask to what extent this burden on future generations can be reduced by alleviating factors.

Therefore, we consider below the type of scenario envisaged by 'Shaping our future'. Here two balancing factors are identified: increased labour force participation by females, which allows a reduction in tax rates, and improved productivity in the government sector.

Table 46 also contains the results of an experiment involving increased labour force participation by females. As with the other experiments the starting point is our baseline. Increases in female labour force participation have been dramatic in recent years (going from 32.4% in 1990 to 38.6% in 1996). This is largely due to the baby boomers entering employment where the labour market behaviour of males and females is similar. There still exist significant differences in the labour market attachment of older male and female workers. Virtually all the spouses of working heads of households who are on home duties are female (as recorded in the 1994 Household Budget Survey). In order to capture this pattern we replace the labour tax profile for females cohorts aged 25 and under in 1995 with the male profile. Three

Table 46

Intergenerational impact of labour tax reduction and increased female labour force participation

	IPL (% of GDP)	Present newborns (1 000 ECU)	Future newborns (1 000 ECU)	Absolute difference (1 000 ECU)
			Labour tax reduction	
	28.8	– 8.7	3.4	12.1
Birth year of first fully assimilated cohort	Increased female labour-market participation			
	Assimilation of labour tax payments and social welfare receipts			
1970	– 141.6	13.1	– 46.5	– 59.6
1995	– 86.8	13.1	– 23.5	– 36.5
2020	– 60.4	4.4	– 19.5	– 24.0
	Assimilation of labour tax payments only			
1970	– 147.4	13.7	– 48.3	– 62.0
1995	– 90.2	13.7	– 24.2	– 38.0
2020	– 62.7	4.8	– 20.1	– 24.9

Baseline (r = 0.05, g = 0.015)

scenarios are recorded in the table. In the first, immediate assimilation for female cohorts 25 (born in 1970) and younger is assumed. The other two scenarios investigate a more gradual assimilation so that it is only newborn females in 1995 that are fully assigned the male tax profile, or full assimilation does not occur until the cohort of female newborns in 2020. Further, we distinguish the case in which the labour tax and social welfare profiles were adjusted from a scenario which confines adjustment to switch to the male labour tax profile.

The results are quite dramatic even when we phase full adjustment up to 2020. Intertemporal public liabilities fall to approximately – 60 % even when social welfare profiles are also adjusted. The message here is that increased labour force participation by females, the way modelled here, could more than adequately fund — in an intergenerational balance sense — the tax reductions contemplated in the upper part of Table 46.

The above comparison of Tables 42 and 43 gave adequate grounds for expecting this effect. However, there is a caveat that we should enter. For one the increased participation now being observed by young females may not be maintained at the same level over the lifetime. Hence the female labour tax profile might best be set at a fraction of the full male profile. Second we have ignored income effects that might impact on the participation of men — on average middle-aged men with working spouses might consume more leisure than their fathers. In spite of the reservations as noted the magnitude of absolute difference in newborn accounts is likely to be significant.

The final aspect of this set of experiments relates to efficiency gains in the government sector. One of the advantages of the demographic 'window of opportunity' is the ability to plan for changes impossible to make in the short term. Adjustment in government sector employment practices is a prime example. Significant increases in government expenditure have, in the past, been associated with increased government sector employment. These have literally been jobs for life in that pensions were not funded. Downward adjustment of the stock of employment is costly except that it is done through natural attrition with partial replacement.

The Irish government sector has, in recent times, been committed to a strategic management initiative. Productivity gains are at the core of this strategy. In addition scope for special pay increases above the national norm, as agreed in Partnership 2000, require productivity

improvements. In this experiment we model productivity improvement in the government sector. This is done by setting g = 0 for non-age-specific government spending, the idea being that service remains constant but the unit cost falls. In Table 47 we present results for this experiment where we vary the year in which the productivity improvements are exhausted. For example, the 2005 row involves setting the growth of non-age related government transfers to zero until 2005 and then returning it to 1.5% thereafter.

Intertemporal liabilities are reduced significantly even when the productivity improvements cease in 2000. Productivity gains of this magnitude over this period would result in benign changes in intertemporal debt that would match the deterioration that would arise from pursuing the objectives as set out in 'Shaping our future'.

The caveat to be entered here concerns the measurement of productivity gains in non-marketed services. This task is notoriously difficult. Our approximation here is likely an upper bound. In Table 47 we have experimented with different termination dates for productivity gains. We could also set $g^{gov}<g$, but greater than zero. Here we could ask, for a given terminal date, what would be the required productivity improvement in order to change intertemporal public liabilities by a given amount?

Finally there is a shortcoming with the assignment of impact on individuals. We have measured lifetime payments where non-age-specific government expenditure is assigned as a transfer. As the consequence the reduction in g shows up as a fall in transfers, which because of the benign change in intertemporal public liabilities rebounds as a benefit to future generations. Living cohorts might appear to be hurt on the basis of the accounts. However, the idea is that the service level of the government sector is maintained so that living cohorts are not experiencing a reduction in utility from this source. To fully get the flavour of this experiment one should consider the change underlying Table 46 in conjunction with the modelled productivity gains.

The experiments in this section should be seen as complimentary. Tax reduction strategies appear both at the national and European policy level. Here we use generational accounts to identify complementary policy or market behaviour changes that could achieve the tax reduction strategies while maintaining generational balance.

8.6. Conclusion

Two factors combine to yield the result that Ireland is in generational balance: the relative youth of the population and the relative lack of generosity, at least in relation to retirement (even supposed earnings uprating of benefits, which is in contrast to current practice), of the transfer system. In respect of the latter Ireland has maintained a mid-60s retirement age and State pensions are not directly income related. The conclusion in regard to generational balance appears robust to different specifications for the discount rate, the rate of productivity growth and variation in the pattern of migration.

The challenge for Ireland comes in the form of its maturing relationship with the European Union. The emerging economy that joined the EEC in 1973 is now the fastest growing developed country. It is converging on the EU average in relation to income levels. While the extent of

Table 47

Intergenerational impact of increased public sector productivity

Return to growth adjustment of non-age-specific transfers in ([1])	IPL (% of GDP)	Present newborns (1 000 ECU)	Future newborns (1 000 ECU)	Absolute difference (1 000 ECU)
2000	– 34.5	– 1.4	– 15.7	– 14.3
2005	– 64.0	2.0	– 24.7	– 26.8
2010	– 87.4	4.7	– 31.8	– 36.5
2015	– 105.5	6.7	– 37.4	– 44.1
2020	– 119.5	8.2	– 41.7	– 49.9
2025	– 130.2	9.4	– 45.0	– 54.4
2030	– 138.4	10.3	– 47.5	– 57.8
Infinity	– 163.4	12.4	– 55.8	– 68.2

([1]) Until that year zero growth of per capita government spending; Baseline (r = 0.05, g = 0.015).

national infrastructure, particularly in relation to transport, still lags the richer EU countries there has been significant investment arising from the Structural and Cohesion Funds. The expectation must be of less generous transfers from the EU budget in the future. We saw that this change, ceteris paribus, was sufficient to create imbalance in the generational accounts.

When the foregoing is combined with a desire — and indeed nationally agreed commitments in respect of personal taxation — to reduce taxation without the immediate prospect of significant new revenue sources (although environmental taxation and charges for environmental services may eventually grow in size), there is a daunting challenge to maintain generational balance even in benign demographic circumstances.

It is possible, as we saw, for such budgetary imbalance to be avoided through increased female labour force participation and increased government sector productivity. Both of these will be achieved to some extent. However, in a corporatist environment it is desirable that such changes be explicit pre-conditions in future agreements.

9. Italy: high public debt and population ageing

Daniele Franco ([1]) and Nicola Sartor ([2]), ([3])

9.1. Introduction

Since the 1980s, concerns over the Italian fiscal policy have mainly been of a macroeconomic nature. From the mid-1980s onwards, stabilisation of public-debt-to-GDP represented the main fiscal policy target, finally reached in 1995. The pace of fiscal consolidation was accelerated in the second half of 1992, following the exchange rate crisis, and in 1997 in order to fulfil the Maastricht fiscal criteria. In 1997 the primary surplus rose to nearly 7%; the deficit declined to 2.7% of GDP. These results allowed Italy to participate in the euro area from the launch date in 1999.

The future budgetary policy framework is defined by the Stability and Growth Pact. The commitment to achieve a close to balance structural budget requires Italy to run extremely high primary surpluses. Present generations of Italian citizens will have to pay higher taxes and receive lower benefits, in terms of GDP, than the citizens of most other EU countries. Achieving a budgetary position close to balance will provide Italian government with margins of flexibility to run stabilisation policies in a setting in which monetary policy and the exchange rate will be managed at Community level. Moreover, it will gradually reduce the debt ratio and mitigate the repercussions of any increases in interest rates on the public finances. In addition, reducing the debt will put Italy in a stronger financial position to cope with the period of most acute population ageing and the associated decrease in interest payments will compensate for the expansionary effects of spending on pensions and health care.

Over recent years the pension system and the national health insurance system have been substantially reformed. Budgetary procedures have been revised. Public employment has been reduced. The fiscal responsibilities of regional and local authorities have been increased. Public companies have been privatised. But durable fiscal consolidation requires further policy action. The reform of the pension system, which absorbs a large share of social protection expenditure and is particularly affected by population ageing, is at the core of the adjustment of Italian social policies to new demographic, economic and social conditions. Although present expenditure trends are not dramatic, further reforms are required to prevent increases in compulsory social contribution rates and general taxation levels and to provide resources to meet the increasing demands on the public finances stemming from demographic trends and changes in the structure of households. The reform of the welfare system is currently on the agenda of the Italian government. The relative generosity of the pension system and the minor role played by unemployment compensation and family allowances renders young and large families particularly vulnerable. Means-tested poverty relief will be experimented in some municipalities to evaluate the feasibility of their extension at the national level.

The need for tighter expenditure control is strengthened by revenue trends. Growing economic integration and factor mobility facilitate the transfer of taxable activities to countries with lower tax rates. This deterioration in the tax base can be accentuated by tax competition. Moreover, in view of the large number of self-employed workers and small companies, which makes it particularly difficult to assess some taxable income accurately, a high level of taxation places a particularly heavy burden on some categories of Italian taxpayers and causes significant distortions in the allocation of resources. A reduction in tax rates is essential to reduce tax evasion and allow Italy to be competitive in an increasingly integrated economic environment. The adjustment of the tax system to these new objectives was started in 1997 with the implementation of several tax reforms aimed at

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reducing distortions in corporate finance and the use of the factors of production and increasing the fiscal autonomy of lower levels of government.

The present study is aimed at assessing the intergenerational sustainability and equity of fiscal policy in the light of the results of generational accounting as originally developed by Auerbach et al. (1991, 1992). Particular attention is paid to the long-run effects of the recent pension reform and to the gloomy prospects caused by the demographic scenario. The study is organised as follows. The next section presents a brief overview of the recent trends in fiscal performance. Sections 9.3 and 9.4 discuss the main sources of imbalances in intergenerational equity, namely the mandatory pension scheme and the demographic prospects. Section 9.5 reports baseline results and sensitivity analysis of generational accounting, while Sections 9.6 and 9.7 highlight respectively the results of alternative immigration scenarios and transitions to the new public pension scheme for employees. Finally, some conclusions are presented in Section 9.8.

9.2. Recent developments in fiscal performance

The root of current Italian budgetary problems can be traced to the debt accumulation stemming from the primary deficits recorded between 1965 and 1990. Between 1964 and 1979 government expenditure increased from 30 to 42% of GDP (Franco, 1993). The expansion of outlays, which proceeded at a pace similar to that of other European countries, was not matched by revenue growth: the ratio of revenues to GDP increased only from 29 to 32%. As a result, sizeable primary deficits were recorded from 1965 onwards, with a peak of 8 percentage points in 1975. The increase in the debt-to-GDP ratio was moderated by high inflation and negative real interest rate.

Revenues were substantially increased in the early 1980s (to 39% of GDP in 1985), but further expenditure growth (to 51% of GDP in 1985) precluded the reduction of the deficit. The Italian expenditure to GDP ratio, which has long been below the average of the other EU countries, moved above it in 1983. While fiscal consolidation prevailed elsewhere in Europe, Italian imbalances increased even further. In the mid-1980s Italy's public finances exhibited much more serious imbalances than those of the other main European countries.

In the late half of the 1980s Italy probably lost the last chance of implementing a gradual fiscal adjustment policy. It also missed the opportunity of stabilising the debt-to-GDP ratio without necessarily achieving high primary surpluses. In spite of favourable macroeconomic conditions (the reverse oil-shock, allowing government to absorb the fall in the price of oil products with tax increases), the success of fiscal consolidation policies was limited. The achievements of the period appear rather modest when account is taken of the fact that budgetary measures of a temporary nature (anticipating revenues, deferring expenditures, increasing tax credits) significantly contributed to the improvement in the primary balance (Sartor, 1998b).

Eventually, the process of correcting the imbalances accelerated considerably under the rising pressure of external constraints. The first occasion occurred in the second half of 1992, with the exchange rate crisis. The looming financial crisis induced the government to take unprecedented corrective action. In order to curb the deficit expected for 1993, expenditure cuts and revenue increases amounting to nearly 6% of GDP were implemented. Structural measures were also adopted to attenuate the expansionary trends in the major expenditure items. The pension system was eventually reformed after the long inconclusive debate of the 1980s (cf. Section 1.3). The organisation and the financial structure of the National Health Service was reshaped with a view to decentralising decisions and responsibilities. Public employment rules were reformed; an independent body was set up to conduct bargaining. Local authority powers of taxation were broadened, while stringent criteria were introduced for other forms of local financing. Although the budgetary outcomes were still rather unsatisfactory, 1993 represented a turning point in Italian budgetary performance.

After the start of the second stage of EMU in 1994, compliance with the deficit requirement set in the Maastricht Treaty has been the second external constraint of paramount importance for Italian budgetary targets. The progress towards the 3% threshold was not linear, with the consolidation process accelerating in 1995 and 1997. The debt-to-GDP ratio peaked in 1994 at 125% and declined thereafter. These results were decisive for Italy's participation in the euro area from the launch date in 1999.

The process of fiscal consolidation, although successful in meeting the criteria set for EMU, was less satisfactory

in some aspects. While over the period 1993–97 the consolidation of public finances was based mainly on reductions in primary expenditure (thus moving in the direction required to produce lasting results), over a longer time span the adjustment has been primarily revenue based (Bank of Italy, 1998). Between 1985 and 1997 the primary expenditure ratio declined by 1 percentage point. On the other hand, the revenue ratio rose by 10 points and reached a peak of 48% of GDP. In view of the fragmented nature of production in Italy, which makes it particularly difficult to assess some taxable income accurately, a high level of nominal tax rates places a particularly heavy burden on some categories of taxpayers and causes significant distortions in the allocation of resources.

A significant part of the improvement in the primary balance was due to the decline in direct investment and investment grants, in other words to the reduction in the public sector's contribution to capital formation. Between 1985 and 1997 direct investments fell from 3.7 to 2.4% of GDP. Total capital expenditure declined from 6 to 3.5%. More generally, the rise of social spending gradually crowded out the other expenditure items.

9.3. Structural reforms: the pension system

Table 48 reports the structure of pension expenditure. The largest fraction is represented by seniority, old-age and survivor pensions, totalling 75% of pension expenditure, or 12.1 percentage points of GDP. The remaining pensions (whose expenditure totals 3.9% of GDP) are represented by those paid to the disabled, the sick and accident victims, only a minor part being explicitly devoted to poverty relief.

The generosity of the Italian pension system, considerable if compared to the situation prevailing in other countries, is due to the interplay of a high replacement rate and the possibility of retiring at a relatively low age because of (i) generous eligibility requirements for old-age benefits and (ii) the provision of the so-called 'seniority pension', allowing public employees to retire during middle-age. The relaxation of eligibility rules and increasing benefits have been a common feature for four decades (cf. Franco and Frasca (1992), Franco and Munzi (1996), and Flora (1986)). While initially the improvements were mainly aimed at hedging retired individuals against inflation (through the move toward a pay-as-you-go funding), in the late 1960s and 1970s they were aimed at calming social unrest and supporting incomes in underdeveloped areas ([1]). Since the 1980s, increasing pension expenditures, inconsistent with the long-run sustainability of government debt, and the existence of some blatant inequities, have led to the gradual tightening of eligibility rules for disability pensions. However, the first attempt at thoroughly reforming the pension system was only made in 1992, in the aftermath of the dramatic exchange-rate devaluation, with the so-called 'Amato reform'. The second was made three years later, with the 'Dini reform'. Both reforms were aimed at changing eligibility rules for junior workers and newcomers, in an attempt to hedge the public pension system against the gloomy demographic outlook. Restrictions on future benefits applicable to senior workers were minor, under both reforms, being represented by a switch from wage to price indexation.

The most striking feature of the old mandatory pension scheme for employees is its generosity and the variability of eligibility rules both across and within sectors, particularly regarding seniority pensions. While private sector workers were eligible for a seniority pension after 35 years, the minimum requirement for public sector employees varies between 15 and 20 years of contribution. The replacement rate displays some variability as well: while fixed at 2% per year for private employees, the replacement rate decreases from 2.33% (raised to 2.5% for employees of local bodies) for the first 15 years of contribution to 1.80% for the remaining contributions for public employees. Finally, pension benefits were not computed on the basis of lifetime earnings, but on the basis of the five highest annual salaries (the last salary for public employees).

The 'Amato reform' of 1992 has gradually equalised the eligibility rules for public and private sector employees, as far as seniority pensions and the replacement rate are concerned. Moreover, the period over which pension benefits are computed will be gradually extended to the entire working life for both categories. In terms of macroeconomic effects, the latter tightening and the above-mentioned change in the indexation mechanism

([1]) For a certain number of years, the eligibility criterion for disability pensions was the loss of earning capacity instead of work-disability. While the second criterion depends on the condition of the applicant, the former also depends on the overall economic situation. De facto, many of the disability pensions represented government subsidies to long-term unemployed. Moreover, the rather flexible criteria in some areas has transformed the disability pension into a form of political patronage.

were the main sources of financial effects, as the relevance of private employment (77% of employees) together with the continuity of rules for seniority retirement would have allowed most private employees to maintain their original retirement plans since many of the workers affected by the reform would have met the 35 years of contribution requirement for receiving a seniority pension before reaching the new old-age limit of 65 years. The merits of the reform lie more in equity and microeconomic efficiency. By removing the privileges previously enjoyed by public employees, the main source of inequality and of lock-in effects has been removed from the Italian labour market.

The 'Dini' reform of 1995 has completed the overhaul of the mandatory pension system by abolishing seniority retirement and by increasing the degree of actuarial fairness to the calculation of pension benefits. Under the new rules, retirement will be allowed when workers meet one of the following requirements: (i) 65 years of age; (ii) 40 years of contribution, regardless of age; (iii) 57 years of age and 5 years of contribution, with an actuarial discount applied to benefits. As for the amount of pension, the reform, which will be applied fully only to individuals entering the labour market in 1995, determines benefits by applying a replacement rate to the contributions paid, negatively related to life expectancy, compounded at the nominal GDP growth rate. As a new law, the reform to date has produced only a limited portion of its long-term effects. The relative slowness in reaching full maturity is due to the very benign transition granted to current workers. In the absence of effects observable from micro data, the evaluation of the long-run features of the reform, such as those highlighted with generational accounting, requires the simulation of a separate model.

For the current analysis, the methodology developed by Sartor (1998a) has been used. The model is aimed at estimating the average income of a member of a cohort, as well as per-capita income of all individuals alive in a given year (cf. Sartor (1998a) for a detailed description of the model). The first piece of information is needed to simulate the new profiles for pension benefits and social security contributions for each representative member of living cohorts. The second piece of information allows the observer to simulate the reduction in overall pension expenditure when the new regime reaches full maturity. Given the legislated transition toward the new regime, the combination of old and new pension profiles, on the one hand, and the overall expenditure of a matured regime, on the other, allow simulation of the future path of pension expenditure. While the effects on intergenerational equity and government debt sustainability will be illustrated in paragraph 1.5, the final part of this section will compare the main long-term features of the reform.

Table 49, taken from Sartor (1998a), reports three groups of indexes of pension incidence: the first refers to the relative incidence of retired individuals, while the remaining two refer to the amount of pension benefits. All indexes are calculated with respect to the conditions that a member of a cohort born in the base-year will experience during his/her lifetime, and are therefore independent of the current population structure. Indexes related to benefits are normalised to the average wage paid in the base-year to a non-graduate male employed in the same sector. All indexes are calculated for eight different individuals, each characterised by gender, education (with or without university degree) and sector (private or public). Furthermore, the degree of dispersion among the different categories is reported, and the set of indexes is calculated with reference to the representative member of the cohort as well.

The first index, denoted 'Frequency' in Table 49, measures the relative incidence of retirement during the lifetime of an individual. The 'Retirement during lifetime' index could be compared to the dependency ratio for a stationary population, as the relative dimension of cohorts alive in a given year depends only on the survival rate ([1]). It can be noted that the retirement span is reduced for all categories, except a non-graduate male employed in the private sector. As expected, the reduction is larger for public employees, particularly for women with dependants, as in the past they were entitled to a special early retirement scheme. Overall, the incidence of retirement is reduced by almost 10%. A much larger reduction is achieved as far as per capita benefits are concerned. This point is illustrated by the remaining two indexes, referring respectively to the average pension benefit at the age of 60 and to the net present value of the pension stream. Overall, the reduction in pension benefits approximates one third for the average pension earned at the age of 60. The reduction reaches one half if the lifetime stream of pension benefits is taken into

([1]) The abolition of real-growth indexing makes the reduction of pension benefits dependent on the hypothesis of per-capita productivity growth. Simulations reported in Table 49 are based on a 1.5 % productivity growth, while the discount rate is assumed to be 3.0 %.

account. The reason for this further reduction in the net present value of benefits is twofold. Firstly, fewer years, on average, will be spent on pension (the 'frequency effect'); secondly, the 'Amato' reform has abolished the indexation of pension benefits to productivity growth ([1]). Finally, another important feature of the reform is the increase in equity across categories. This aspect is summarised in Table 49 by the degree of dispersion of benefits, which shows a halving of the mean absolute deviation. While in terms of net present value the greatest reduction is suffered by public employees (because of the above-mentioned 'frequency effect' and the abolition of real growth indexation), their average effective pension at the age of 60 is not decreased by much, as lengthening the working period offsets the reduction in their replacement rate.

9.4. Looking into the future: the bleak demographic outlook

The Italian population is expected to experience substantial changes in its structure and size (Istat 1997a,b). The most dramatic changes are revealed in fertility rates. The total fertility rate has been below replacement since 1977; currently, having reached 1.3, it is the world's lowest. Cohort completed fertility shows that women born since 1948 have less than two children during their lifetime; moreover, cohort fertility is on a continuously decreasing trend, which is expected to reach a value of 1.6 for women born in 1963. Meanwhile, life expectancy at birth is on an upward trend, having almost doubled during the first 60 years of the century.

The absolute number of births has dramatically decreased since the mid-1960s, and appears to have remained stable for the last 10 years. The above pattern represents three different phenomena pointing in the same direction: (i) the number of women without descendants has steadily increased; (ii) households with more than three descendants have declined substantially; (iii) in recent years, an increasing number of women are postponing the time for delivering their first child. This overall trend, however, encompasses heterogeneous family structures and behaviours, due to regional disparities. Simplifying the matter, Italian families can be classified into two different groups:

(i) The 'Northern', where: (a) the single child model has been prevalent for a long time (cohorts completed fertility is currently 1.3) and (b) women, on average, have substantially increased the age at which they deliver their first baby (from 25.4 years in 1980 to 28.4 in 1993).

(ii) The 'Southern', where: (a) 75% of women have two or more descendants, (b) a very limited number of women have only one child, but (c) the proportion of those without children is larger than in the North. The contribution of this region to the total number of Italian births has substantially decreased in the last decade for which data are available because of the halving of the proportion of women having three or more children: the latest data on cohort fertility show values marginally below replacement levels (1.9).

Currently, the causes and consequences of the decline in fertility are attracting increasing public attention. Several interpretations have been proposed for explaining recent fertility trends, reflecting the multitude of elements (cultural, social and economic) affecting households' reproductive decisions.

On the one hand, demographers point to the consequences of the exogenous change in the social role of women, characterised by a greater equality vis-à-vis men's role (cf Moors and Palomba (1995)): (i) the increasing female labour participation rate, particularly for career-professions, and the consequent need to reconcile work with household responsibilities; (ii) the substitution of 'quantity' (the number of children) with 'quality' (proxied by the per-capita expenditures on health, education and the time devoted to child care); (iii) the behavioural change displayed by young adults, as they first seek economic independence while living with their parents and only later forming a new household (De Sandre et al. (1997)).

On the other hand, researchers adhering to the 'economics of the family' suggest that the decline in fertility is caused by the development of public pension schemes. According to the theory, generous old-age government transfers, by providing an effective hedge against the decline in earning capacity, substitute the re-distribution

([1]) The index is determined by the ratio of the cumulative frequencies of retirement over the cumulated survival rates from age 18 to death. The larger the number of years spent as a pensioner, the larger the index. In an extreme case (such as that referring to a disabled individual receiving a pension from the age of 18 years) the index is equal to one. Note that the index differs from the actual dependency ratio, as the latter measures the ratio of retired individuals over the labour force, therefore also depending on the relative dimension of each cohort alive in a given year.

from middle-aged children to elderly parents (empirical evidence is provided by Cigno and Rosati (1996)).

For the purpose of generational accounting, the baseline demographic scenario closely resembles the 'main variant' of the projections recently published by the Central Statistical Office (Istat (1997a)). The projection is based on the assumption that cohorts' completed fertility will continue its downward trend, until it reaches a stationary value of 1.45 for women born in 1975 ([1]). According to this hypothesis, the total fertility rate will recover from its current lows (1.3) and will reach the steady state value in 2005. In contrast to the Istat projections we assume only a 1.3 year increase in life expectancy at birth in the next 10 years, i.e. we do not assume an increase of another 1.6 years increase in 2005–15. Following Istat (1997a) a net immigration of 50 000 per year is expected.

The demographic outlook emerging from the baseline scenario is rather bleak: after an initial five-year rise (due to immigration), population will shrink from the current 57.3 million to 44.1 million in 2050 and 26.5 million in 2100. Old-age dependency ratio (e.g. the fraction of Italians aged 65 and older over the population aged 18 to 64), will increase from the current 25.3% to 57.7% (its peak value) in 2050, decreasing to 52.9% in 2100. Total labour force (including immigrants) will decrease from current 32.9 million to 21.0 million in 2050 (corresponding to 36% fewer potential workers) and 12.8 million in 2100.

Such a scenario, as well as those prepared by the National Statistical Office, raises two important issues: (i) irrespective of the assumptions about the future fertility trend, the Italian population is bound to experience a sharp increase in the elderly dependency ratio, whose value will rise by almost 50% in the next 20 years; (ii) if prevailing in the long-run, the 'demographic vacuum' created by the low fertility rate will be filled by immigration flows far more relevant than those assumed in the projections. In the generational accounting simulations illustrated in the next paragraphs, the effects on public finances of some variants to the baseline demographic scenario will be considered.

9.5. The Italian generational accounts

In order to estimate generational accounts, the 1995 general government appropriation account has been re-classified according to the following methodology.

9.5.1. Data sources and methods

The general government appropriation account and data on gross domestic product (GDP) were taken from the annual 'General report on the economic situation of the country' (cf. Ministero del tesoro e del bilancio (1997), Tables CN 9, CN 1 and CN 5).

In order to break down the appropriation account's items 'Transfers to households' and 'Government consumption' into 'Pensions, health care, households' 'Responsibility' and 'Other social security outlays', data reported in Table TS 1 and CN 17 of the 'General report' were used. For education, data were obtained by applying to the 1995 aggregates its relative weight on 'Government consumption' and 'Government investment' observed for 1994 in the 'Government outlays by programme' account (cf. Istat (1996c), Tables 2.2 and 2.4). Subsidies (or transfers) to firms were subtracted from gross indirect taxes, thus assuming the same degree of shifting into retail prices. Non-age-specific expenditures are determined as a residual, by subtracting previously mentioned spending items from total primary expenditures. The total of direct taxes is split between 'Labour' and 'Capital' income according to their share in GDP.

As for general government net debt, data were derived from Banca d'Italia (1997) by subtracting gross financial assets (Table aD 40) from gross financial liabilities (Table aC 3). Similarly, net interest payments are obtained from the appropriation account by subtracting capital income from gross payments (Table CN 9 of the 'General report').

As far as population projections are concerned, all data were provided by the National Statistical Office (Istat). Istat (1996b) provides data on the size and composition of the population in 1995. Currently observed fertility and survival rates can be found in Istat (1997b) and (1996a) respectively; projections on their future developments are provided by Istat (1997a).

Finally, age and gender profiles were obtained applying the methodology as described in Franco et al. (1994, Section 4). Most of the profiles are inferred from the Bank of Italy's Survey on Household Income and

([1]) The remaining two variants mainly differ on the assumptions about the future trend of fertility rates. According to the 'high' variant, cohort completed fertility rate recovers to 1.75 children for women born in 1980, and remains constant thereafter. Total fertility rate reaches its steady state level in 2015. According to the 'low' variant, the decrease in cohort fertility stops at the 1.1 level at the same years as for the 'high' variant.

Wealth. Per capita tax and contributions, as well as means-tested transfers, were estimated by applying statutory rates to taxable bases (labour earnings and spending), taking into account households' characteristics (cf. Franco and Sartor (1990), Appendix II). Data on households' spending are taken from the National Statistical Office's survey on household consumption. As for pensions, profiles consistent with the reform legislated in 1995 were obtained from the simulation model described by Sartor (1998a). The age profiles for health expenditure were obtained from hospital and ambulatory care utilisation profiles and from pharmaceutical consumption profiles, as described in Franco (1993). For education, profiles were obtained using the data on the Ministry of Education's expenditure per student in each educational level from infant school to university.

The results are presented in Table 48, the largest revenue and expenditure items being represented respectively by social security contributions and by pensions. Overall, social security contributions yield revenues slightly smaller than total direct taxes, while pensions exceed by far the remaining expenditure items (non-age-specific expenditures and net interest payments representing respectively the second and third largest items, both having a similar size). For the purpose of generational accounting, fiscal policy measures legislated after 1995 have not been incorporated, although more favourable to the future fiscal policy outlook. The future path of non-age-specific expenditures has been projected assuming that per-capita values will increase with productivity growth. Similarly, it is assumed that 1995 per-capita taxes and transfers increase with the rate of productivity growth. The only relevant exception is represented by the effect that the transition towards the new pension regime for employees will produce on per-capita pension benefits and social security contributions payments in the years to come. The reason for ignoring the effects of the reform on the self-employed is twofold: (i) their pension benefits represent a small fraction of total pension expenditures (6.2 % in 1995 — Table 48); (ii) the reform is expected to offset the expansionary effects that the increase in benefits enacted in 1990 would have otherwise produced in the years to come.

As for the macroeconomic scenario, a 1.5 productivity growth and a 5.0 real interest rate represent the baseline. While such a scenario ensures full comparability with the remaining country studies, it should be noted that the interest rate assumption is somewhat larger than the rate currently paid on new government bond issues. Finally, aggregate tax and transfers are allocated to the representative male and female of each Italian generation with the help of the relative age-gender profiles estimated by Franco et al. (1994) and Sartor (1998a). Note that, as compared with previous generational accounting studies, age-and-gender profiles are applied not only to living generations, but also to future generations, according to the methodology described by Raffelhüschen in Chapter 2 of this issue.

Table 48

Public receipts and expenditures in Italy — generational accounts' aggregates

(1 000 ECU)

Receipts		Expenditures	
Labour income taxes	88.8	Pensions (1)	136.5
Capital income taxes	39.0	of which:	
Indirect taxes	85.7	Seniority, old age and survival (2)	102.0
Social security contributions	124.8	Health insurance	48.7
Seignorage	1.9	Households' responsibility	4.6
Other revenues	28.8	Other social security	8.9
Deficit	58.5	of which: Unemployment benefits	4.1
		Education	41.2
		Government consumption	95.7
		Net interest payments	91.9
Total	427.5	**Total**	427.5

(1) Including lump-sum allowances (severance pay benefits).
(2) Excluding disability benefits paid to individuals eligible for old-age pensions.

Sources: Estimates based on Ministero del tesoro e del bilancio (1997) and Sartor (1998a).

Table 49

Indicators of the Italian mandatory pension scheme for employees. Old-age and seniority pensions for employees

			Frequency				Average effective pension at 60 (c)		Net present values			
			Retirement during lifetime (a)		Retirement over work (b)				Pension (d)		Lifetime earnings (d)	
			Before 'Amato'	'Dini'	Before 'Amato'	'Dini'	Before 'Amato'	'Dini'	Before 'Amato'	'Dini'	Before 'Amato'	'Dini'
Private sector	Males	non-graduates	0.33	0.35	0.49	0.52	2.57	1.58	2.93	1.66	20.01	18.50
		university graduates	0.35	0.33	0.64	0.57	3.471	.65	7.02	2.91	35.39	32.76
	Females	non-graduates	0.43	0.40	0.77	0.66	1.96	1.33	2.61	1.45	15.07	14.42
		university graduates	0.43	0.38	0.86	0.71	1.95	1.19	4.22	2.02	21.67	20.58
General government (e)	Males	non-graduates	0.49	0.34	1.01	0.53	1.34	1.30	3.06	1.51	16.62	17.92
		university graduates	0.47	0.33	1.13	0.59	1.70	1.28	5.05	1.99	21.43	23.14
	Females	non-graduates	0.53	0.39	1.23	0.68	1.91	1.29	4.68	1.67	17.49	17.56
		university graduates	0.54	0.38	1.46	0.73	1.65	1.33	4.68	1.94	7.48	19.41
Overall (d)			0.41	0.37	0.72	0.59	2.16	1.43	3.23	1.63	18.09	17.44
Mean absolute deviation			0.06	0.07	0.34	0.14	0.62	0.29	1.54	0.48	5.60	5.23

(a) Ratio of cumulative retirement frequencies to the cumulated survival rates between age 18 and age 90+.
(b) Ratio of cumulative retirement frequencies to cumulative employment frequencies.
(c) As a ratio to the average salary earned in the base year by a male employed in the same sector with seniority lower than five years.
(d) Based on mortality rates observed in the base year and a 3% real interest rate. Also see footnote (c).
(e) Average seniority at early retirement based on data reported by Pandimiglio (1990).

Source: Sartor (1998a).

9.5.2. Baseline findings and sensitivity analysis

Table 50 reports generational accounts for cohorts ranging from age 0 to 100 years in the 1995-base-year. The first column of Table 50 shows future total net payments to the government for the average (e.g. non-gender-specific) representative Italian, while the second and third columns report the generational accounts for representative male and female living generations. If the current fiscal policy remained unchanged, each 1995-newborn would be expected to pay, on average, ECU 11 000 (ECU 1 = ITL 2 107.2) to the Italian general government during his/her lifetime. As individuals age, their relative position vis-à-vis the government changes: from the age of 45 onwards, individuals receive, on balance, net transfers. At middle-age, the effect is mainly due to discounting, as individuals approach the age at which the most relevant transfer programme is received — notably pensions. From the age of 60 onwards, the above effect is reinforced by retirement (the effect is to substantially lower social security payments), and by the relevance of health-care programmes for aged individuals.

Table 50

Generational accounts, Italy

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	11.0	34.2	– 13.6
5	25.9	53.6	– 3.1
10	56.2	89.1	21.9
15	98.8	138.2	57.6
20	122.2	167.7	75.0
25	119.4	168.9	68.6
30	97.3	148.9	45.0
35	65.0	116.3	13.3
40	11.8	58.1	– 34.1
45	– 27.3	13.5	– 67.6
50	– 69.2	– 36.3	– 101.3
55	– 110.9	– 88.7	– 132.1
60	– 143.8	– 132.6	– 153.9
65	– 157.1	– 151.5	– 161.9
70	– 151.4	– 148.2	– 153.8
75	– 130.2	– 127.6	– 131.9
80	– 101.9	– 99.5	– 103.4
85	– 76.2	– 74.3	– 77.2
90	– 55.5	– 55.5	– 55.5
95	– 38.8	– 41.1	– 38.1
100	– 14.6	– 15.4	– 14.3
Increase in all taxes, future (%)	53.2	–	–
Future generational account	76.8	111.3	40.4
Absolute difference	65.8	77.1	54.0
IPL (% of GDP)	107.3	–	–

(*) Present 1995 value; baseline (r = 0.05, g = 0.015).

The above figures, however, encompass remarkably different gender-specific situations. While men are net payers (the net-present 1995-value of future taxes reaching ECU 34 200), women benefit, on average, from a net government transfer (corresponding to ECU 13 600). The reason for this sharp quantitative difference lies in the relatively low female participation rate in the labour market: while 95% of men aged 25 to 39 years describe themselves as active, the percentage drops to only 57% of women in the same age group. The lower female participation rate implies lower labour income taxes and social security contributions. For a male newborn, the sum of the net present 1995-values of the above two government receipts exceeds by ECU 47 400 the amount that a newborn female will pay in her lifetime (in relative terms, males pay, on average, 88% more taxes based on labour earnings). At the same time, non-active women are entitled to many government programmes, such as health care and survivors' pensions. In the case of pensions, the net present value of transfers is larger for women, notwithstanding the lower labour participation rate, because of the longer life expectancy and the relative generosity of Italian survivors' pensions. As a consequence, also the break-even age (viz. the age at which people become net receivers) differs according to gender. While men, on average, break even at the age of 50, women reach the same stage a decade earlier.

Table 51 illustrates the generational accounts for average (e.g. non-gender-specific) Italian citizens, as they display the breakdown of the accounts into the main tax-transfer programmes. In terms of relative size, it is worth noting that generational accounting changes the ranking among the different tax and expenditure items as compared to conventional accounting (contrast the results for a newborn citised — the first row of Table 51 — with Table 48). This is entirely due to discounting. The most striking effects can be seen on the benefit side. Public education and non-age specific expenditures by far outlay pensions (the first approaches ECU 43 400, while the second is 14 000). In the case of education, the benefits affect individuals during the first two decades of life, while pensions are received in the years following the fifth decade. Only in the 20 years following the age of 25

does generational accounting display the same ranking of the various revenue and expenditure items as the one observed under conventional accounting.

The long-term sustainability of the 1995 fiscal policy, as well as the degree of intergenerational equity, can be appreciated with the help of the indicators described in Chapter 2. In particular, reference will be made to the intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2) and to the tax change for future generations needed to ensure government debt sustainability if entitlements are kept constant at their 1995 values (cf. equation (7) in Chapter 2). These indicators are reported in the second part of Table 50.

If the 1995 fiscal policy stance remained unchanged, the IPL would be 107.3% of GDP. Because of the existence of future liabilities not reported under conventional accounting, the intertemporal public liabilities turn out to be 1.4 percentage point higher than outstanding (or explicit) debt. Note that under a no-reform scenario the IPL would be equal to 181.4% of GDP. Long-term debt sustainability would require future generations to pay an amount of net taxes that would exceed those paid by a newborn by ECU 65 800. In other words, while a 1995-newborn can expect to pay ECU 11 000 of net taxes, future generations will have to pay ECU 76 800. Ensuring long-term government debt sustainability therefore requires either future expenditure cuts, or tax increases or some combination of the two measures. In the case of revenue increases, Table 50 shows that a 53.2% increase in all taxes paid by future generations would balance the intertemporal budget constraints. However, due to the dissimilar gender-specific participation rate in the labour market, the above average percentage rate subsumes much larger absolute net-tax increases for men, whose payments rise from ECU 34 200 for the current newborns to ECU 111 300 for the unborn.

An alternative, and more equitable policy would require redetermining tax and spending policies for current as well as future generations, thus abandoning the commitment to constant entitlements for living Italians. Under this hypothesis, a 9.7% increase in all taxes paid would be sufficient to restore generational balance and to

Table 51

Composition of average generational accounts — Italy

	Tax payments						Transfer receipts				
Generation's age in 1995	Labour income	Capital income	Indirect taxes	Social insurance	Seignorage	Pensions	Health insurance	Household responsibility	Other social security	Education	Non-age-specific expenditures
0	29.1	11.5	33.8	48.8	0.6	14.0	16.3	1.4	2.7	43.4	35.1
5	34.5	13.6	38.2	57.8	0.7	16.6	17.1	1.7	3.1	45.9	34.6
10	40.9	16.1	43.4	68.5	0.8	19.6	18.1	2.0	3.5	36.3	34.0
15	47.9	19.1	49.2	80.8	1.0	23.3	19.3	2.4	4.0	17.0	33.3
20	52.1	21.6	52.8	89.2	1.0	28.3	20.5	2.8	4.5	6.0	32.5
25	53.2	22.4	51.3	88.3	1.0	35.7	21.5	2.8	4.6	0.6	31.5
30	51.4	22.3	46.6	81.0	1.0	44.7	22.6	2.7	4.5	0.0	30.5
35	47.2	21.8	41.3	69.0	0.9	55.6	23.5	2.4	4.5	0.0	29.2
40	41.9	20.5	36.2	52.0	0.9	81.0	24.5	2.1	4.5	0.0	27.8
45	36.3	18.5	31.4	38.6	0.8	95.3	25.3	1.7	4.5	0.0	26.0
50	29.5	16.3	26.7	24.9	0.7	111.5	25.8	1.4	4.6	0.0	24.1
55	22.4	13.8	22.6	11.7	0.6	128.7	25.7	1.2	4.5	0.0	21.9
60	16.4	11.4	19.0	2.0	0.5	144.0	25.0	1.1	3.5	0.0	19.5
65	12.3	8.7	15.8	0.1	0.4	150.8	23.4	1.0	2.3	0.0	17.0
70	9.4	6.3	13.5	0.0	0.4	143.1	21.0	0.8	1.6	0.0	14.4
75	6.8	4.4	11.4	0.0	0.3	121.6	17.8	0.7	1.3	0.0	11.7
80	4.7	2.9	8.8	0.0	0.2	93.8	14.1	0.5	1.0	0.0	9.0
85	3.0	1.9	6.6	0.0	0.1	69.3	10.6	0.4	0.8	0.0	6.7
90	1.9	1.3	4.8	0.0	0.1	50.1	7.7	0.3	0.6	0.0	4.9
95	1.1	0.9	3.3	0.0	0.1	34.9	5.4	0.2	0.4	0.0	3.4
100	0.3	0.3	1.2	0.0	0.0	13.0	2.0	0.1	0.1	0.0	1.3

ensure that government debt remains on a sustainable path. However, since the mid-1980s all Italian governments have committed themselves to avoiding tax increases. An alternative measure of fiscal tightening, consistent with the above policy guidelines, is represented by the percentage change in all pension benefits for current as well as future generations needed to restore balance. Under this hypothesis, generational balance could also be achieved by a 19.8% cut in all pensions.

The sources of the generational imbalance can be identified by means of a sensitivity analysis, whose results are summarised in Table 52.

Contrary to expectations, the large outstanding government debt does not represent the major source of fiscal tightening. To appreciate the above statement, it is useful to compare the results of two experiments: under the first, it is assumed that there is no outstanding debt at all; under the second one, while keeping government debt at its currently observed level, it is assumed that the size and composition of the Italian population will be equal to the base-year for all future periods (a situation that would be relevant if and only if the current Italian population were at its stationary level). As compared to the baseline situation, the reduction in generational imbalance is far greater under the 'constant population' hypothesis than under the 'zero debt' scenario. On the one hand, debt sustainability would be consistent with an ECU 47 500 *reduction* in lifetime net payments under the unchanged demographic scenario, thus showing that the current stance of fiscal policy would impose an excessive amount of taxes upon future generations were 1995 population at its stationary level. On the other, zero government debt would require no significant changes to the 1995 fiscal stance, as future taxes should be

Table 52

Sensitivity analysis, Italy

(1 000 ECU) (*)

Productivity growth (%)		1.0	
Discount rate (%)	3.0	5.0	7.0
Difference in the accounts of future and current newborns	56.1	69.1	83.3
Productivity growth (%)		1.5	
Discount rate (%)	3.0	5.0	7.0
Difference in the accounts of future and current newborns	51.4	65.8	79.2
Productivity growth (%)		2.0	
Discount rate (%)	3.0	5.0	7.0
Difference in the accounts of future and current newborns	44.1	62.7	75.4
Population projection	Constant population structure	Baseline assumptions	Increasing fertility
Difference in the accounts of future and current newborns	– 47.5	65.8	55.0
Population projection and zero debt	Constant population structure	Baseline assumptions	Increasing fertility
Difference in the accounts of future and current newborns	– 105.2	0.8	1.9
Population projection	Constant population structure	Baseline assumptions	Increasing fertility
Percentage change needed to restore generationalal balance:			
– All taxes	– 6.9	9.7	9.4
– All pensions	19.8	– 19.8	– 19.7

(*) 1995 value unless otherwise specified.

increased by a modest ECU 800. In other words, most of the ECU 65 800 increase in all taxes needed under the baseline scenario to ensure intergenerational sustainability would be required to offset the negative effects that the dreary demographic scenario would produce on public finances via increased spending on the elderly and reduced revenues from the labour force.

Table 52 also reports the main findings of sensitivity experiments with respect to alternative macroeconomic scenarios, in terms of the difference in the accounts of current and future newborns. As for the remaining country studies, the effects of the combination of three productivity growth rates (1, 1.5 and 2%) and three real interest rates (3, 5 and 7%) are applied to the Italian case. The difference in generational accounts is reduced the higher the growth rate and the lower the interest rate. Considering the nine scenarios, the mean difference in accounts is ECU 65 200, with a standard error of ECU 4 400 (corresponding to 6.7% of the mean value). The difference between the most favourable scenario (r = 3%; g = 2%) and the least favourable (r = 7%; g = 1%) is significant: from ECU 44 100 (corresponding to one third less than the baseline case) to ECU 83 300 (or 26.6% more than baseline). However wide, the degree of dispersion of the results is much smaller that that caused by demographic changes. For this reason, the next two paragraphs will explore in more detail the combined effects of alternative demographic scenarios and transitions to the new pension system.

9.6. The effects of alternative demographic policies

From the preceding analysis it is clear that fiscal policy imbalance is mainly due to the demographic scenario. Among the three scenarios recently prepared by the National Statistical Office, the baseline projection discussed in this paper is based on the 'main variant'. More favourable demographic outlooks would reduce, albeit minimally, the degree of generational imbalance. If the Italian population develops according to what the Statistical Office defines as the 'high fertility' scenario, characterised by a gradual increase of cohort completed fertility rates from current values to 1.76 in 2015, the difference in the accounts of future and current newborns will be reduced by ECU 10 800 (Table 52). Generational balance would be restored by a 9.4% increase in all taxes, an amount only marginally lower than the 9.7% increase required under the 'main variant' (or baseline) hypothesis.

A major consequence of the ongoing demographic change is represented by the significant decline in the labour force. The relative scarcity of labour, particularly of blue-collar workers, has already induced some firms to recruit foreign workers. This scenario is unprecedented in the Italian economy, as in the first half of this century Italy was characterised by net emigration. The unprecedented phenomenon of immigration is currently a source of public concern, some citizens being in favour of a limitation of the number of inflows. However, satisfying the labour shortage in certain segments of the labour market may well de facto supersede citizen resistance.

In order to evaluate the consequences on public finances of a relevant immigration flow, a scenario based on an influx necessary to keep labour force constant at its 1995 level has been developed (endogenous migration scenario). (Alternatively, the scenario can be viewed as a rough approximation of the consequence of an increase in the labour participation rate of Italian citizens — recall that the female participation rate is considerably low). While over the next six years 50 000 immigrants would ensure a constant labour force, after 2001 the inflow progressively exceeds this baseline number and would reaches a peak in 2033 with 625 000 immigrants. Generational accounting shows under this migration scenario the degree of generational imbalance would be significantly reduced. The absolute difference in net taxes paid by the newborns and the unborn amounts to ECU 15 600, i.e. ECU 50 200 less than for baseline while generational balance requires a modest 3.3% increase in all taxes. Alternatively, generational balance would be restored by, for example, a 7.3% cut in all pensions; a reduction that could easily be achieved.

9.7. Alternative transitions to the new pension system

The generational accounts illustrated in the previous paragraph are based on the estimate of the legislated transition to the new public pension system. To appreciate the long-run differences between the new pension regime and the old one (viz. the one prevailing before the 1993 'Amato' reform), Table 53 reports the generational accounts that would be observed in 1995 if, at that time, the two regimes were fully mature. For a newborn, the effect of the reform is to decrease the net present value of pension benefits by ECU 7 000 (corresponding to a cut of one third of what he/she would have received under the previous regime) and to increase social securi-

ty contributions by ECU 3 800. Note that the latter effect is due to the longer period spent working, and not to rate increases. As the above values are reduced by the effect of discounting, it is also worth considering the reduction in the net present value of benefits at the age of 55, when individuals, on average, approach the age of retirement. At that age, the absolute size of pension cuts are much larger, totalling almost ECU 40 000.

If the new pension regime were fully matured, the degree of generational imbalance would be the opposite of what emerges from the baseline case. Debt sustainability would require a reduction in all taxes paid by future generations of 22.7%. Under these circumstances, future generations would benefit, on average, from a net transfer of ECU 17 200, as opposed to the ECU 11 000 of net taxes that current newborns would pay during their lifetime under present entitlements. In this case, intergenerational balance would be restored by a 4.1% cut in all taxes paid by current as well as future generations (or an 11.5% increase in all pensions). On the contrary, in the absence of any pension reform the degree of fiscal policy imbalance would be much larger compared to baseline. Debt sustainability would require, in this case, a 92.8% increase in all taxes paid by future generations who, on average, would have to pay ECU 111 400 more in net taxes (ECU 45 600 more than the increase needed under the baseline case). In this case, intergenerational equity would require a 16.7% increase in taxes paid by all generations (or a 30.6% cut in present and future pension benefits).

The net effect of the reform on the long-term intergenerational sustainability of public finances can be appreciated by making reference to the IPL figures. If the pension reform were not legislated, intertemporal liabilities would amount to 181.4% of GDP. Under the legislated transition, it is equal to 107.3% (Table 50); if the pension reform were fully mature in 1995, the intertemporal financial balance of the Italian public sector would turn into net *assets* equal to 45.8% of GDP. It is worth noting that for all the above three cases, conventional debt figures — by referring to outstanding liabilities only — would be constant at 105.9% of GDP.

Under the traditional method of generational accounting, the above results would represent the only possible evaluation of the reform. The degree of intergenerational imbalance would have been measured by comparing the present 1995-value of net taxes paid by newborns (under the two alternative regimes) with net taxes required from the unborns to ensure government debt sustainability. The latter, in turn, would have been determined by calculating the amount of per-capita net taxes that would equal the sum of government debt outstanding in 1995 and the net present 1995-value of future non-age-specific expenditures (cf. Chapter 2.2). This is tantamount to ignoring the medium-term path of government debt from the base-year to the time of death of the youngest cohort alive in the base-year (the 1995 newborns).

As, by assumption, base-year entitlements are applied to all living generations, and if these entitlements are inconsistent with government debt sustainability, the size of government debt in the years to come would diverge from the base-year level, thus requiring a different amount of net taxes from future generations.

The methodological adjustments presented in Chapter 2 permit an explicit consideration of the effects of the transition, by applying current entitlements to future generations and then determining the change in net taxes needed to ensure government debt sustainability. These adjustments are of special relevance to the Italian case, as they allow the observer to evaluate the effects of the transition to the new pension entitlements and to simulate the effects of alternative paths.

The much-discussed pension reform was legislated in 1995. Before passing the law, the most heated political debate concerned almost exclusively the issue of entitlements to individuals already retired and those currently employed, thus confirming the public-choice view about the political relevance of the financial effects on voters of the rules applied to the newcomers. Among economists, it is widely held that the transition could have been more equitable toward the different cohorts and more incisive in reaching maturity. The legislated transition is extremely generous not only toward those already retired (unscathed by the reform) but also with respect to some individuals employed in 1995.

Under the legislated transition, all individuals employed in 1995 are allowed to retire under the old rules ([1]). However, as for the determination of benefits, individuals with more than 17 years seniority in 1995 are allowed

(1) The rules are those established by the 1992 'Amato' reform. As for the eligibility requirements, the main effect of the reform is to increase to 35 years the minimum seniority for public employees, with a phase-in transition applied to workers with more than 8 years of seniority. The 'Dini' reform has subsequently increased the requirement to 40 years seniority (or 57 years of age and 5 years of contribution).

Table 53

Generational accounts under mature pension system

(1 000 ECU)

Age in 1995	1995 Pension ('Dini') reform			Before 1993 ('Amato') reform			Absolute difference		
	Total	Pensions	Social security contributions	Total	Pensions	Social security contributions	Total	Pensions	Social security contributions
0	11.0	14.0	48.8	0.2	21.0	45.0	10.8	– 7.0	3.8
5	25.9	16.6	57.8	13.1	24.9	53.3	12.8	– 8.3	4.5
10	56.2	19.6	68.5	41.0	29.5	63.2	15.2	– 9.9	5.3
15	98.9	23.3	80.9	80.9	35.0	74.6	18.0	– 11.7	6.3
20	123.4	27.6	89.7	102.5	41.5	82.7	20.9	– 13.9	7.0
25	123.8	32.8	89.7	100.4	49.2	82.7	23.4	– 16.4	7.0
30	105.4	38.8	83.2	79.6	58.1	76.7	25.8	– 19.3	6.5
35	77.2	45.9	71.6	49.0	68.6	66.1	28.2	– 22.7	5.5
40	42.7	54.4	56.4	11.8	81.0	52.0	30.9	– 26.6	4.4
45	7.0	64.3	41.9	– 27.3	95.3	38.6	34.3	– 31.0	3.3
50	– 31.6	76.0	27.0	– 69.2	111.5	24.9	37.6	– 35.5	2.1
55	– 70.4	89.1	12.7	– 110.9	128.7	11.7	40.5	– 39.6	1.0
60	– 98.0	98.4	2.2	– 143.8	144.0	2.0	45.8	– 45.6	0.2
65	– 107.5	101.2	0.1	– 157.1	150.8	0.1	49.6	– 49.6	0.0
70	– 102.5	94.1	0.0	– 151.4	143.1	0.0	48.9	– 49.0	0.0
75	– 87.0	78.4	0.0	– 130.2	121.6	0.0	43.2	– 43.2	0.0
80	– 67.4	59.3	0.0	– 101.9	93.8	0.0	34.5	– 34.5	0.0
85	– 50.0	43.1	0.0	– 76.2	69.3	0.0	26.2	– 26.2	0.0
90	– 36.2	30.9	0.0	– 55.5	50.1	0.0	19.3	– 19.2	0.0
95	– 25.5	21.5	0.0	– 38.8	34.9	0.0	13.3	– 13.4	0.0
100	– 9.6	8.0	0.0	– 14.6	13.0	0.0	5.0	– 5.0	0.0

to retain the more favourable rules, while the remaining employees will receive a pension determined by a pro rata mechanism. The mechanism is such that the benefit will be based on the old and new rules according to the proportion of the entire seniority spent respectively before and after 1995.

An alternative, and more equitable, transition rule would have applied the pro rata mechanism to all existing workers. While an estimate of the generational accounts for the legislated transition is reported in the baseline case, the accounts for the alternative transition as well as the difference with respect to the baseline are reported in Table 54. Data show that under the alternative transition individuals aged 40 to 55 in 1995 would be the only affected cohorts. Since, on average, Italians start their working activity at 18, under the legislated reform the pro rata mechanism is already applied to workers aged less than 36 in 1995. Individuals aged 40 would experience a reduction in pension benefits whose net present 1995-value is ECU 12 000 less than the baseline (corresponding to a 14.8 percentage reduction).

As the speeding up of the transition toward the new system reduces government expenditures in the years following 1995, the degree of intergenerational equity would be improved. The absolute difference in accounts is reduced from ECU 65 800 under the baseline to ECU 54 300. It is worth recalling that the improvement is entirely due to the reduction in net taxes required from future generations (from ECU 76 800 to ECU 65 300), as the unborn will be asked to ensure the intergenerational sustainability of a smaller amount of government debt. Under the new transition, intergenerational equity would require an 8.0 percentage increase in all taxes, 1.7 points less than under the legislated transition.

9.8. Conclusions

Like most industrialised western countries, Italy will be severely affected by current demographic trends over the next decades. The demographic transition, more than the large outstanding government debt, will be responsible for the generational imbalance in the current fiscal policy.

Table 54

Generational accounts under alternative pension transitions

(1 000 ECU)

Age in 1995	1995 legislated transition			Alternative pro rata transition			Percentage difference		
	Total	Pensions	Social security contributions	Total	Pensions	Social security contributions	Total	Pensions	Social security contributions
0	11.0	14.0	48.8	11.0	14.0	48.8	0.0	0.0	0.0
5	25.9	16.6	57.8	25.9	16.6	57.8	0.0	0.0	0.0
10	56.2	19.6	68.5	56.2	19.6	68.5	0.0	0.0	0.0
15	98.9	23.3	80.8	98.8	23.3	80.8	0.0	0.0	0.0
20	122.2	28.3	89.2	122.2	28.3	89.2	0.0	0.0	0.0
25	119.4	35.7	88.3	119.4	35.7	88.3	0.0	0.0	0.0
30	97.3	44.7	81.0	97.3	44.7	81.0	0.0	0.0	0.0
35	65.0	55.6	69.0	65.0	55.6	69.0	0.0	0.0	0.0
40	11.8	81.0	52.0	25.5	69.0	53.8	116.1	– 14.8	3.5
45	– 27.3	95.3	38.6	– 16.4	85.3	39.5	– 39.9	– 10.5	2.3
50	– 69.2	111.5	24.9	– 61.8	104.5	25.3	– 10.7	– 6.3	1.6
55	– 110.9	128.7	11.7	– 107.9	125.8	11.7	– 2.7	– 2.3	0.0
60	– 143.8	144.0	2.0	– 143.8	144.0	2.0	0.0	0.0	0.0
65	– 157.1	150.8	0.1	– 157.1	150.8	0.1	0.0	0.0	0.0
70	– 151.4	143.1	0.0	– 151.4	143.1	0.0	0.0	0.0	0.0
75	– 130.2	121.6	0.0	– 130.2	121.6	0.0	0.0	0.0	0.0
80	– 101.9	93.8	0.0	– 101.9	93.8	0.0	0.0	0.0	0.0
85	– 76.2	69.3	0.0	– 76.2	69.3	0.0	0.0	0.0	0.0
90	– 55.5	50.1	0.0	– 55.5	50.1	0.0	0.0	0.0	0.0
95	– 38.8	34.9	0.0	– 38.8	34.9	0.0	0.0	0.0	0.0
100	– 14.6	13.0	0.0	– 14.6	13.0	0.0	0.0	0.0	0.0

Under the baseline scenario, long-term sustainability of the 1995 fiscal policy would require future generations to face a 53.2% increase in taxes. Alternatively, a 9.7% increase in taxes paid (or cut in transfers received) by all generations (viz. future as well as currently living Italians) would be sufficient to restore intergenerational balance and ensure government debt sustainability. To appreciate the relevance of population ageing on the above results, it has been shown that, under the unchanged population scenario, government debt sustainability would be consistent with a 6.9% *cut* in taxes paid by all generations.

Reference to the 1995 situation shows that alternative policy measures, if applied to both current and future generations, would allow the government to restore generational balance without significant fiscal tightening. The speeding-up of the transition to the new pension regime, legislated in 1995, would help to reach the target. If the pro rata transition were applied, an 8% increase in all taxes paid by current as well as future generations (or a transfer cut of similar magnitude) would ensure government debt sustainability and intergenerational equity, despite the unfavourable demographic scenario i.e. likely to prevail in future decades. The above fiscal tightening would further decrease to: (i) 7.8% if, under the baseline macroeconomic scenario, the fertility rate of future Italian women should rise toward the currently observed average European values or (ii) 6.1% if the real interest rate were lower than in the baseline case (3% instead of 5%).

While still generationally unbalanced, public finances have greatly improved their long-run equity in the 1990–95 period, confirming the high degree in flexibility of the Italian economy. A comparison between the results presented in this paper and generational accounts reported in Franco et al. (1994) and Sartor (1999) is inhibited by methodological changes and by reference to different demographic scenarios. However, a measure of the improvement in the intergenerational equity of Italian public finances can be obtained by referring to the absolute difference in generational accounts of the newborns and the unborn. The first study, based on year

1990, showed that government debt sustainability would have required future generations to pay over ECU 130 000 (1990 exchange rate) more net present 1990-value payments as compared to what newborns expected to pay during their lifetime. According to the estimates presented in this chapter, in the absence of pension reform the difference would be reduced to ECU 114 400, despite the less favourable demographic scenario; taking into account the effects of the pension reform legislated in the 1990s further decreases the absolute difference in generational accounts to ECU 65 800. The improvement would appear much greater if reference were made to 1997, as fiscal policy continued its restrictive stance.

Overall, the above results show the substantial improvement of the intergenerational sustainability of Italian public finances, whose current situation is not significantly different from that prevailing among its major European partners.

10. Netherlands: finances and ageing

A. Lans Bovenberg ([1]) and Harry ter Rele ([2])

10.1. Dutch fiscal policy since 1960

10.1.1. The period from 1960 to 1983

During the past decades the size of the government sector as well as fiscal policy in the Netherlands have gone through substantial changes. Table 55 shows that between 1960 and 1983, when it reached its peak, the government expenditure to GDP ratio rose by 27.6 percentage points from 34.7% to 62.3%. Table 55 reveals also that this rise was concentrated on expenditure categories with important redistributive effects, such as social insurance, health, education and subsidies. Indeed, these categories accounted for by far the largest part of the increase in the spending ratio (23.3 percentage points). Higher interest payments made up a large part of the remaining 4.3 percentage points.

Until 1973, the rise of expenditure originated primarily in the build-up of the welfare state which included the expansion of disability schemes (both in terms of coverage and generosity), an extension of the public supply of health services, and a relative increase of the benefit levels for the old-aged as compared to wages.

After 1973, the economic downturn was the main factor behind the continuing rise in social security expenditure. Unemployment benefits soared. Loss of employment contributed also to the further rise in disability benefits, as a generous eligibility practice allowed a large number of redundant employees to enter the disability scheme which was more generous than the unemployment schemes. As the resulting rise of social insurance premiums eroded business profits through higher wage costs, a vicious circle emerged of increasing inactivity numbers, higher social security expenditure, higher social insurance premiums and labour costs, lower profits and more shedding of labour. By the early 1980s, these schemes which had been designed in the affluent 1960s and early 1970s turned out to be far more expensive than originally envisaged. An important share of the rise of social security was due to the increased number of recipients under the age of 65. However, higher social security spending was directed also to those over the age of 65, due to both demographic trends and a steady rise of benefit levels.

Also, health expenditure continued to contribute to the increased share of the government sector in the economy. This can be attributed to (relative) volume and price factors, the latter not preventing a substantial increase in the volume of supply. The development reflected the high priority that was attached to a further expansion of the welfare state until the end of the 1970s. Higher subsidies on housing, public transport and private enterprises added to this additional expenditure.

An important element after 1973 was the sharp increase of government revenue from natural gas, due to higher oil prices. Between 1973 and 1983, gas revenue rose from 0.9% to 4.9% of GDP (see Table 55) and facilitated the financing of the welfare state. These higher revenues from natural gas turned out to be a mixed blessing, because they helped to mask the need for structural reforms of the welfare state, a phenomenon which was referred to in those days as the ‘Dutch disease’.

Another feature of government policy during this period was that a significant part of the expenditure increase after 1973 was debt financed. Since the early 1960s, the so-called *structural fiscal policy* had served as a guideline for fiscal policy. According to this policy, government borrowing was set so as to match the structural level of net saving in the private sector adjusted for a desired structural surplus on the current account of the balance of payments to finance development aid. Based on the trend rate of economic growth, the so-called ‘structural budget norm’ was established which defined

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Table 55

Government sector expenditure and revenue, 1960–98

(% GDP)

	1960	1973	1983	1990	1995	1998 (a)
Expenditure						
Defence, general government and infrastructure	13.7	14.0	15.0	13.8	13.8	13.4
Education	4.2	6.0	5.9	4.6	4.6	4.4
Subsidies	1.2	1.6	4.2	3.5	2.6	2.3
Health	2.5	5.9	7.9	8.1	8.8	8.7
Social insurance	8.8	15.4	22.1	18.2	16.1	14.2
– Unemployment benefits	0.3	0.8	4.1	2.2	2.6	2.2
– Disability benefits	2.0	4.7	6.8	6.4	5.1	4.4
– Old age benefits (b)	2.6	4.7	5.6	5.7	5.2	5.0
– other benefits	3.9	5.2	5.6	4.0	3.3	2.6
Transfers abroad	1.7	1.2	1.8	2.2	2.4	2.4
Interest payments	2.6	2.5	5.3	5.8	5.6	4.9
Total government expenditures	34.7	46.5	62.3	56.2	54.0	50.3
Revenue	35.5	46.2	56.5	51.5	49.9	48.7
– of which: from gas	0.0	0.9	4.9	1.5	1.3	1.1
Fiscal deficit (excluding net asset purchases)	– 0.8	0.3	5.8	4.7	4.0	1.6
Government debt	45	43	63	79	79	70

(a) These figures involve estimates.
(b) These expenditures also include sickness benefits.

the resources available for either tax cuts or spending increases. Until the early 1970s, this policy did not lead to substantial fiscal deficits. However, structural fiscal policy began to show serious weaknesses at the end of the 1970s because the projected trend growth rate repeatedly proved to be overly optimistic. Consequently, fiscal deficits surged and interest payments started to consume an increasing part of the government budget.

10.1.2. The period from 1983 to 1994

In the early 1980s, during the most serious economic slowdown since World War II, Dutch fiscal policy underwent a crisis. The fiscal deficit of the government sector, excluding borrowing for net asset purchases, rose to 5.8% of GDP in 1983. Including borrowing for net asset purchases, the fiscal deficit amounted to even more than 8% of GDP. Moreover, revenue from natural gas proved to be rather volatile due to changes in the oil prices. At that time, taxation and social insurance contributions accounted for nearly 50% of GDP. The structural norm was subsequently replaced by a norm for the *actual* deficit. Indeed, though pro-cyclical in nature, actual fiscal deficit reduction was to become the primary objective of fiscal policy for more than a decade and three successive cabinets. In view of the high tax burden, fiscal adjustment was pursued through expenditure cutbacks. A major part of these cutbacks was found in the benefit levels of social security recipients and the wages of government sector employees. Dwindling revenues from natural gas added to the need for expenditure cutbacks.

Another important development originating in the early 1980s was the policy of continued wage moderation in the private sector. During that period, the labour market, business profits and the public finances were in such a bad state that the need for drastic measures became increasingly plain. Contrary to what is now sometimes suggested in praise of the Dutch consensus model, the severe austerity programmes for the government budget met with strong opposition. Yet there was enough underlying support for the general course of policy to get this policy implemented. At the same time, the unions managed to win sufficient backing for the policy of wage moderation. The government expenditure cutbacks and private sector wage moderation together succeeded in tempering and ultimately turning around the vicious circle of increasing inactivity, taxes and wage costs.

10.1.3. The present situation

By the time the fiscal deficit had reached a more sustainable level in the early 1990s, the scope for a more long-term oriented fiscal policy re-emerged. Indeed, two important lessons had been learned from the experiences in the 1980s and early 1990s. First, spending overruns were accommodated in booms, while spending had to be cut substantially during slumps to meet the targets for the actual deficits. To avoid unrest in the budgetary process and to better control spending, the government set a ceiling on its expenditure for the period 1994–98, which more or less excluded any rise in real terms. Hence, the fiscal deficit was allowed to fluctuate with tax receipts within certain limits, outside of which measures had to be taken. The second lesson from fiscal policy in the early 1990s was that the budgetary process can be seriously disrupted if growth turns out to be slower than expected. Accordingly, the 1994 coalition has estimated receipts from taxation and social insurance contributions on the basis of a so-called cautious economic scenario which assumed that the economy would grow at a modest rate of only about 2% per annum during its four-year term. A similar cautious policy line, but then one that assumes an average growth rate of 2¼% per annum, is pursued also by the present cabinet which took office in August 1998.

Table 55 shows that government sector expenditure in 1998 is expected to amount to 50.3% of GDP, down 12.0 percentage points from the peak of 62.3% in 1983. Nevertheless, government sector finances still suffer from a number of serious weaknesses, such as the high level of disability benefits which implies a disability rate about twice as large as in neighbouring countries, and a high level of government debt. Also the economy as a whole features some weak elements, one of them being the low rates of labour force participation among females (in terms of hours) and the elderly.

The EMU convergence criteria set by the Maastricht Treaty have been an important guideline for fiscal policy during recent years. Whereas the fiscal deficit satisfied the norm of 3% of GDP in 1997, the stock of government debt (at 72% of GDP in 1997) still exceeded the EMU reference value of 60% of GDP. Therefore, in order to qualify for the single currency, the government had to resort to the Treaty clause stating that if the government debt-to-GDP ratio exceeds the 60% norm, it should be declining sufficiently rapidly. Indeed, this ratio is expected to decline to 70% of GDP in 1998 and 69% in 1999.

10.1.4. Future fiscal policy and ageing

In recent years, several analyses have pointed out that the prospective ageing of the population would demand a further reduction of the fiscal deficit and the public debt-to-GDP ratio. This would allow lower interest payments to offset higher spending on old-age benefits and health care. The Study Group on the Budget Margin, an influential advisory body for the cabinet, has identified the need to cut the fiscal deficit and government debt, not only to deal with the ageing problem, but also to create a safety margin for the deficit in face of the EMU ceiling of 3% of GDP. In response to the ageing problem, the cabinet has recently established a savings fund for government pensions. The inflows into the fund in 1998 and 1999 will be about 0.6% of GDP. The inflows in later years have not been determined yet. This practice is intended to earmark part of the savings from fiscal debt reduction to the financing of government pensions, when the population ages over the coming decades. In this way, public awareness of the ageing problem and public support for further debt reduction is strengthened.

The government has not yet outlined a more complete strategy to deal with the costs of ageing. The generational accounting approach pursued in this chapter, and in previous Dutch generational accounting studies such as Van Kempen (1996), Bovenberg and ter Rele (1999) and ter Rele (1997), is intended to provide a more comprehensive insight on how ageing affects the government finances.

10.2. The age distribution of benefits and burdens

As was shown in Chapter 2, generational accounting requires assigning the benefits and burdens of the government budget to specific age groups. This is done by allocating the budget items included in the net benefit concept over the age groups. Appendix 1 of ter Rele (1997) explains how the future age profiles employed in the present study were constructed by using information for the base-year 1995.

As in other EU Member States, public transfers to the personal sector in the Netherlands generally rise with age. The two main components of this rise are social security and health care. Benefits from social security increase with age mainly due to old-age pension benefits (AOW), which are paid to citizens over 65 years of age, and disability benefits, which increase with age for those

younger than 65 years. Health-care costs rise with age because of a higher frequency of illness and need for institutional care among the elderly. Benefits from expenditure on education accrue to the young. Benefits from other non-age-specific government expenditure are distributed evenly over all age groups.

Average tax payments also vary with age. Until the age of about 50, labour income (and hence tax revenue from this income) rises with age, leading to an upward slope in the tax profile. Beyond the age of 50, tax payments fall due to a gradually decreasing participation of older workers in the labour force. The declining labour income is not fully offset by various forms of pension income which are subject to income tax. Accordingly, both incomes taxes (which include social insurance premiums) and indirect taxes (which are mainly linked to net income) fall with age. Compared to indirect taxes, direct taxes drop more rapidly after age 65 because pensioners are exempt from contributing to various social insurance schemes, including the government old-age scheme. Overall, compared to the middle-aged, the elderly contribute significantly less to the budget.

10.3. The intergenerational impact of present fiscal policies

10.3.1. The extrapolation of current policies

This section first presents the baseline generational accounting results, employing the sustainability indicators which were derived in Chapter 2. Subsequently, it adds several elements to a benchmark scenario. The first departure from the baseline involves the treatment of revenue from financial assets. In a further step future changes in the Dutch economic environment affecting the life-cycle pattern of net taxes will be added. These changes include, first, the maturing of private funded pension funds; second, an increase in labour force participation; third, a rise in pension contributions; and fourth, a flattening of the age-earnings profile. These factors have to be taken into account when extrapolating present (average) net tax rates. Finally, revenue growth from corporate taxation is linked to GDP-growth. The scenario that incorporates all these departures from the baseline scenario will be called the country-specific scenario.

10.3.2. The implemented policy

The basis for the extrapolation of policies is the budget and the corresponding age profiles in 1995. In addition to this, we considered tax and expenditure measures that took place after 1995. Tax measures were accounted for by implementing their initial effects on revenues and adjusting age profiles accordingly. Explicit effects of policy measures on expenditures were not available in similar terms. Instead, we implemented the ceiling on expenditures which the government that took office in 1994 adopted for its legislative period until 1998. This reflects the currently expected expenditures. In addition, for the period beyond 1998 we account for the lagged impact of already legislated measures that restrict the eligibility for disability and survivor benefits. We assume that social insurance premiums are constant after 1998 and do not follow the Dutch practice to maintain balance in the social insurance accounts.

10.3.3. A separate treatment of revenues from capital

In the baseline calculations government revenue from types of government wealth that do not yield a return in the form of interest payments are deducted from non-age-specific expenditure. This implies that these revenues (such as dividends and the revenue from the natural gas resources) are treated in the same way as a tax. However, revenue from these government assets does *not* constitute a tax burden on the private sector because the revenues are collected in exchange for a service delivered to the private sector by the government. Hence, when constructing the age profiles of net benefits we will not deduct revenue from these assets from non-age-specific expenditures in a second, alternative stage. Consequently, the value of these assets is deducted from government debt in the intertemporal budget restriction. In this way, the treatment of all government assets (barring physical assets such as infrastructure) is analogous to that of government debt. This alternative approach yields a different sustainability outcome if the present

Table 56

Assets of pension funds, 1991

(% of GDP)

Netherlands (1)	75.9
Germany (1)	15.5
United Kingdom	60.1
France	4.6
Denmark	51.6
Belgium	10.5

(1) 1992

Source: Report by the European Commission's network of experts on supplementary pensions.

revenue from these assets does not correspond to their permanent level. This is clearly the case with revenue from natural gas.

10.3.4. Rising pension incomes

A projected increase in private pension incomes is the second factor requiring an adjustment of the age profile. Government pension benefits in the Netherlands are flat (i.e. unrelated to income) so that the government benefit level is relatively low for middle- and high-income earners. For these income groups, collective labour agreements supplement the government benefits with compulsory occupational pension provisions. These provisions are financed by funded pensions funds, which have accumulated sizeable financial assets (see Table 56). During the coming decades, these funds are expected to mature so that an increasing part of the population will have accumulated substantial pension rights when reaching retirement age.

Higher pension incomes strengthen the tax base because retirement benefits are subject to income tax while indirect taxes are levied on consumption out of these benefits. It is assumed that the average net income of an individual over 65 years of age relative to that of an individual between 35 and 49 years of age rises from 78% to 85% between 1995 and 2020. These figures were derived from Deelen (1995) and the 'European renaissance'-scenario in CPB (1992). The resulting increase in tax payments alleviates the generational imbalance.

10.3.5. Rising labour force participation

The traditional method of generational accounting implicitly assumes that the currently observed rate of labour force participation remains constant in the future. For the Netherlands, this assumption is unrealistic. This country has traditionally featured a low participation rate of women. Over the past decade, however, the participation rate of women has started to rise sharply and is expected to continue to increase substantially in the future. Rising educational levels of women contribute to this development. Moreover, lower fertility not only gives rise to ageing but also boosts participation of women. Recent policy measures limiting the eligibility for disability benefits are expected to further increase labour force participation, especially of the age groups of over 50.

A higher participation rate widens the tax base by raising labour incomes. To account for this effect, we assume that labour incomes and taxes paid by a particular age group depend not only on labour productivity and the number of persons in that group but also on the projected labour force participation rate of the age group involved.

Table 57 compares current age-specific participation rates with projections of these participation rates in 2020 for three alternative scenarios, called 'Divided Europe', 'European coordination' and 'Global competition', which are explained in detail in CPB (1996). Five key determinants shape these scenarios: international political and economic developments, demography, social and cultural factors, technology and the economy. The pace and nature of these determinants differ across the three scenarios however.

The projections for the European coordination scenario, on which the analysis hereafter will mainly focus, show that the participation of those between 20 and 64 years of

Table 57

Participation rates of various age groups, 1995 and 2020

	1995	2020 ([1])		
		Divided Europe	European coordination	Global competition
Participation				
20–34	73.1	76.6	75.8	77.2
35–49	72.0	79.2	84.1	86.2
50–64	37.7	43.7	55.3	60.5
Total	64.1	65.3	70.5	73.9

([1]) Adjusted for rise in part time employment.

Source: Participation rates derived from CPB (1997).

age (adjusted for the rise in part-time employment) will rise by about 10% between 1995 and 2020. The older age groups are expected to feature the largest boost in labour force participation.

10.3.6. Linking corporate taxes to GDP

In the baseline calculations, future corporate tax revenues are generated by employing the standard extrapolation practice of generational accounting. This procedure generates a growth of corporate tax revenues that depends on the growth of the population in the 'shareholding' age brackets, as the age profile is based on share ownership. However, because corporate tax is levied on domestic profits, it seems more appropriate to 'link' this tax base to GDP. GDP in our calculations is assumed to grow in line with the population in the 'working' age brackets, labour participation and labour productivity. Accordingly, we assume a constant ratio of domestic profits to GDP. This approach seems appropriate for a small open economy in which corporate tax revenues depend on domestic investments rather than domestic savings.

10.3.7. Higher occupational pension contributions

During the last decade or so, pension funds were in the comfortable position of collecting high returns on their investments. This enabled them to levy only a low level of tax deductible pension contributions. As the returns to investment are expected to be lower in the future, pension contributions will have to rise, thereby eroding the tax base. Per percentage-point lower excess of returns to investment over productivity growth, pension contributions will have to rise by 10%. Over the last decade, returns exceeded productivity growth by 4 percentage points. The benchmark-scenario, in contrast, assumes that the return to investment equals 5% and the productivity growth rate is 1.5%. Accordingly, pension contribution rates will rise by 5%.

10.3.8. Flatter age-earnings profile

Another phenomenon that calls for adjusting the future age profile of taxes is an expected flattening of the age-earnings profile. Wages currently rise rather sharply with age. A number of developments, however, are expected

Table 58

Present values of generational accounts

(1 000 ECU) (*)

	Effect of:						
Age in 1995	Baseline scenario	Separate treatment of capital revenue	Higher pension incomes	Higher participation	Linking corporate taxes to GDP	Flatter wage profile and higher pension contributions	Country-specific scenario
0	– 52.8	– 13	2	10	– 1	1	– 54.1
5	– 38.2	– 13	2	12	– 1	1	– 37.3
10	– 2.6	– 12	2	14	– 1	1	0.5
15	39.9	– 12	2	16	– 1	– 1	44.3
20	83.8	– 12	3	16	– 1	– 1	88.9
25	106.7	– 12	3	16	– 1	– 3	111.4
30	100.5	– 12	4	15	– 1	– 3	104.3
35	84.2	– 11	4	12	– 1	– 2	86.5
40	59.7	– 10	5	9	– 1	– 2	60.5
45	28.4	– 9	6	6	– 1	– 2	28.1
50	– 9.3	– 9	6	3	– 1	– 1	– 10.6
55	– 48.2	– 8	6	1	– 1	0	– 50.2
60	– 82.5	– 7	6	0	0	0	– 84.2
65	– 110.2	– 6	5	0	0	0	– 111.8
70	– 113.8	– 5	4	0	0	0	– 115.6
75	– 115.0	– 4	2	0	0	0	– 116.9
80	– 112.8	– 3	1	0	0	0	– 114.6
85	– 105.8	– 2	1	0	0	0	– 107.4
90	– 94.4	– 2	0	0	0	0	– 95.7
95	– 80.3	– 1	0	0	0	0	– 81.4
100	– 31.7	0	0	0	0	0	– 32.2

(*) 1995 value; baseline (g = 0.015, r = 0.05).

to reduce wages of older workers compared to wages of the young. First, market forces increasingly link wages to productivity, thereby reducing the importance of implicit life-time labour contracts. Second, the ageing of the labour force renders younger workers more scarce compared to older workers, thereby reducing the relative wages of the latter.

We assume that wages of young workers of 20 years of age will increase by 9% relative to the average wage between 1995 and 2020. A worker of 45 years old will experience an average rise in wages. Wages of older workers of 60 years will lag the average by 10%, according to the 'European renaissance' scenario in CPB (1992) and Deelen (1995). The flattening of the age profile of earnings dampens the rise in tax revenues due to a change in the composition of the labour force towards older workers with higher wages.

10.3.9. The results

Table 58 (column 1) reveals the generational accounts of the baseline scenario for selected existing generations. Tables 59a and 59b provide a breakdown of these generational accounts over budget items for the baseline and country-specific scenario, respectively.

The pattern of the accounts over the age groups reflects the age profile of net taxes. For the young and the age group over 50 years the accounts are in deficit, for the middle group in surplus. Columns 2 to 6 of Table 58 show how the various factors mentioned in Section 10.3.1 affect the results. The switch in capital revenue treatment, thereby abandoning the interpretation as a burden, leads to substantially lower net taxes for present generations. In contrast, the increase of participation and the rise of pension incomes substantially boost net taxes on existing generations by raising the level of taxes. The increase of pension contribution rates and the flattening of the age profile of wages yield only small effects. Column 7 reveals the results of the country-specific scenario.

Table 60 tests present policies for intergenerational sustainability. The baseline results show that intertemporal

Table 59a:

Composition of generational accounts, Netherlands — Baseline scenario

(1 000 ECU) (*)

	Tax payments						Transfer receipts						
Generation's age in 1995	Labour income	Capital income	Other income	Seigno-rage	VAT	Social security contribution	Public pensions	Health	Unem-ployment	Welfare	Youth and study allowance	Education	Non-age-specific expenditure
0	17.9	10.1	2.2	0.8	64.1	63.7	10.3	45.2	9.3	3.7	14.5	46.5	82.2
5	21.2	12.0	2.6	1.0	73.7	74.5	12.2	47.8	11.0	4.4	12.6	55.3	81.3
10	25.2	14.2	3.1	1.1	84.8	88.3	14.5	53.9	13.1	5.3	10.3	44.1	79.9
15	29.8	16.8	3.7	1.3	98.1	104.6	17.2	60.9	15.5	6.3	7.5	30.7	78.3
20	34.3	20.0	4.4	1.5	110.3	120.1	20.4	67.4	18.0	7.7	4.2	15.0	76.5
25	35.6	23.1	4.8	1.5	113.4	125.2	24.1	73.4	17.7	8.8	0.0	1.2	74.3
30	33.7	26.0	5.2	1.5	112.2	122.1	28.6	78.2	15.4	9.3	0.0	0.0	71.8
35	30.3	28.5	5.5	1.4	108.3	114.7	33.9	82.1	13.6	9.2	0.0	0.0	68.8
40	25.9	29.7	5.9	1.4	102.2	104.2	40.1	86.0	12.1	8.8	0.0	0.0	65.2
45	20.5	29.6	6.1	1.2	93.9	90.8	47.4	89.3	10.4	8.1	0.0	0.0	61.1
50	14.0	28.3	6.3	1.1	83.2	74.0	56.0	90.8	8.4	7.1	0.0	0.0	56.4
55	7.6	25.7	6.3	1.0	71.0	56.7	66.6	89.3	6.1	5.5	0.0	0.0	51.0
60	2.6	22.1	5.9	0.8	59.5	40.9	80.2	83.7	3.4	3.4	0.0	0.0	45.3
65	0.0	18.1	4.6	0.7	48.7	26.6	99.5	72.0	0.0	0.0	0.0	0.0	39.1
70	0.0	14.1	3.8	0.5	39.3	21.5	85.4	76.3	0.0	0.0	0.0	0.0	32.8
75	0.0	10.5	3.0	0.4	30.9	16.9	70.6	80.7	0.0	0.0	0.0	0.0	26.5
80	0.0	7.5	2.3	0.3	23.5	12.8	56.1	83.4	0.0	0.0	0.0	0.0	20.6
85	0.0	5.2	1.7	0.2	17.5	9.5	43.6	81.4	0.0	0.0	0.0	0.0	15.6
90	0.0	3.5	1.3	0.2	12.7	6.9	33.3	74.5	0.0	0.0	0.0	0.0	11.7
95	0.0	2.2	0.9	0.1	9.1	4.9	24.9	64.6	0.0	0.0	0.0	0.0	8.5
100	0.0	0.7	0.4	0.0	3.1	1.7	9.1	25.7	0.0	0.0	0.0	0.0	3.1

(*) 1995 value; baseline (g = 0.015, r = 0.05).

Table 59b

Composition of generational accounts, Netherlands — Country-specific scenario

(1 000 ECU) (*)

	Tax payments						Transfer receipts						
Generation's age in 1995	Labour income	Capital income	Other income	Seigno-rage	VAT	Social security contribution	Public pensions	Health	Unem-ployment	Welfare	Youth and study allowance	Education	Non-age-specific expenditure
0	20.3	9.3	2.3	0.8	70.3	70.1	10.3	47.7	10.6	3.7	14.5	46.5	95.0
5	24.1	11.1	2.7	1.0	80.9	83.3	12.2	50.8	12.6	4.4	12.6	55.3	93.9
10	28.4	13.1	3.2	1.1	93.2	98.3	14.5	57.3	14.8	5.3	10.3	44.1	92.3
15	33.3	15.6	3.8	1.3	107.2	115.4	17.2	64.8	17.4	6.3	7.5	30.7	90.5
20	37.8	18.6	4.5	1.5	119.9	131.3	20.4	71.8	19.9	7.7	4.2	15.0	88.3
25	39.0	21.7	5.0	1.5	123.2	136.2	24.1	78.3	19.6	8.8	0.0	1.2	85.8
30	36.9	24.6	5.4	1.5	121.8	132.6	28.6	83.4	17.2	9.3	0.0	0.0	82.9
35	33.0	27.1	5.8	1.4	117.4	124.0	33.9	87.4	15.3	9.2	0.0	0.0	79.4
40	28.0	28.4	6.2	1.4	110.5	112.2	40.1	91.0	13.6	8.8	0.0	0.0	75.3
45	22.0	28.4	6.5	1.2	101.2	97.3	47.4	93.6	11.6	8.1	0.0	0.0	70.6
50	14.9	27.4	6.7	1.1	89.3	78.9	56.0	93.9	9.2	7.1	0.0	0.0	65.1
55	7.9	25.0	6.7	1.0	75.8	59.9	66.6	90.9	6.5	5.5	0.0	0.0	59.0
60	2.6	21.5	6.3	0.8	63.2	43.1	80.2	84.1	3.5	3.4	0.0	0.0	52.3
65	0.0	17.7	4.9	0.7	51.6	28.3	99.5	72.0	0.0	0.0	0.0	0.0	45.2
70	0.0	13.9	4.0	0.5	41.4	22.8	85.4	76.3	0.0	0.0	0.0	0.0	37.9
75	0.0	10.4	3.1	0.4	32.3	17.7	70.6	80.7	0.0	0.0	0.0	0.0	30.6
80	0.0	7.5	2.4	0.3	24.3	13.3	56.1	83.4	0.0	0.0	0.0	0.0	23.8
85	0.0	5.2	1.8	0.2	18.0	9.8	43.6	81.4	0.0	0.0	0.0	0.0	18.0
90	0.0	3.4	1.3	0.2	13.0	7.1	33.3	74.5	0.0	0.0	0.0	0.0	13.5
95	0.0	2.2	1.0	0.1	9.2	5.0	24.9	64.6	0.0	0.0	0.0	0.0	9.8
100	0.0	0.7	0.4	0.0	3.1	1.7	9.1	25.7	0.0	0.0	0.0	0.0	3.5

(*) 1995 value; baseline (g = 0.015, r = 0.05).

Table 60

Testing sustainability

	Effect of:						
	Baseline scenario	Separate treatment of capital revenue	Higher pension incomes	Higher participation	Linking corporate taxes to GDP	Flatter wage profile and higher pension contribution	Country-specific scenario
							(% GDP)
IPL	75.9	38.2	– 22.6	– 66.4	5.3	3.9	34.3
							1 000 ECU
Generational account present newborn	– 52.8	– 13	2	10	– 1	0	– 54.1
Generational account future unborn	– 12.5	8	– 11	– 25	2	2	– 36.6
Absolute difference	40.3	21	– 13	– 35	3	2	17.5
							(% GDP)
Immediate tax change required for sustainability	2.5	1.2	– 0.8	– 2.2	0.2	0.1	1.0

Baseline (g = 0.015, r = 0.05).

public liabilities (IPL, cf. equation (6) in Chapter 2 of this volume) amount to 75.9% of base-year GDP which is only slightly more than the initial explicit debt (64.9%). In consequence, an average member of future generations pays a negative net tax of ECU 12 500 (ECU 1 = NLG 2.08). The difference between the net tax paid by a newly born and that by future generations indicates that present policies are unsustainable. Future generations pay a higher net tax than do newly borns, a difference that amounts to around ECU 40 300 in present value terms. The required tax change in the baseline to arrive at sustainability is 2.5 percentage points of GDP. Columns 2 to 6 of Table 60 show the isolated effect of the different factors discussed in Section 10.3.1 on the sustainability measures provided by generational accounting. Column 7 reveals the results of the country-specific scenario. On the one hand, the different treatment of some government assets (Column 2) substantially widens the intergenerational imbalance, thereby making current policies more unsustainable. On the other hand, the higher pension incomes and the increase in labour force participation (Columns 3 and 4) improve sustainability. These two latter factors reduce the additional tax burden of future generations by about ECU 13 000 and ECU 35 000 respectively. The impact of the other factors is only small. In the country-specific scenario, future generations face a negative net tax burden of ECU 36 600. However, as the net tax level of newly borns generated by present policies is even more negative (– ECU 54 100), the country-specific scenario still indicates a lack of sustainability. However, as the intertemporal public liabilities are reduced to 34.3% of

Table 61a

Sensitivity to discount rate and productivity growth in the baseline scenario

Productivity growth (%)		1			1 1/2		2		
Discount rate (%)	3	5	7	3	5	7	3	5	7
									(1 000 ECU)
Generational account Present newborn	– 46	– 55	– 59	– 46	– 53	– 58	– 49	– 50	– 58
Generational account Future unborn	– 1	– 15	– 15	3	– 13	– 16	4	– 9	– 17
Absolute difference	46	40	44	49	40	42	53	41	41
									(% GDP)
Immediate tax change required for sustainability	2.8	2.4	2.7	3.0	2.5	2.6	3.3	2.5	2.5

Table 61b

Sensitivity to discount rate and productivity growth in the country-specific scenario

Productivity growth (%)		1			1 1/2		2		
Discount rate (%)	3	5	7	3	5	7	3	5	7
									(1 000 ECU)
Generational account Present newborn	– 44	– 57	– 62	– 42	– 54	– 62	– 42	– 51	– 60
Generational account Future unborn	– 27	– 41	– 39	– 19	– 37	– 40	– 14	– 31	– 39
Absolute difference	17	16	23	23	18	22	28	19	22
									(% GDP)
Immediate tax change Required for sustainability	1.0	0.9	1.3	1.4	1.0	1.3	1.7	1.2	1.3

Table 62

Sensitivity to participation rate in country-specific scenario

	Divided Europe	European coordination	Global competition
			(1 000 ECU)
Generational account Present newborn	– 57	– 54	– 51
Generational account Future unborn	– 25	– 37	– 43
Absolute difference	33	18	7
			(% GDP)
Immediate tax change required for sustainability	1.0	0.9	1.3

base-year GDP, the tax change required to restore intergenerational sustainability falls to 1.0% of GDP.

10.4. Sensitivity analysis

Table 61a shows the sensitivity of the results of the baseline scenario with respect to the discount rate and productivity growth. Table 61b does the same for the country-specific scenario. The generational imbalance in both scenarios turns out to be fairly insensitive to either variable, both when expressed in ecu and when expressed as the required tax change.

Section 10.3.2 employed a base-case assumption for the expected growth of labour force participation. However, in view of the considerable uncertainty surrounding this important variable, CPB has constructed two alternative scenarios for the future development of the participation rate (see Table 57). All three scenarios involve an increase in labour force participation. Whereas the 'low' case projects an accumulated growth of only 2% until 2020, the 'high' case involves an accumulated growth of 15% by 2020. This compares to 10% growth in the base case.

Table 62 reveals that the generational imbalance of the country-specific scenario is rather sensitive to labour supply. Indeed, in the global competition scenario featuring high labour participation the additional labour supply nearly offsets the effect of ageing so that future generations almost benefit as much from government finances as the newly born do. This reveals that a high level of labour supply is an important factor in establishing intergenerational sustainable government finances.

Tables 63a and 63b explore the sensitivity of the generational accounts with respect to demography.

The second columns of these tables contain the accounts if the age structure were to remain constant. They reveal that without ageing, future generations would benefit substantially more from the government budget than do present generations. In particular, compared to current generations, they would enjoy an additional lifetime benefit of ECU 12 000 in the baseline scenario and ECU 40 000 in the country-specific scenario. This compares with an additional burden of respectively ECU 40 000 and ECU 18 000, if the prospective changes in age structure are taken into account. This contrast reveals that ageing puts a heavy burden on the government finances. These results underscore the merits of the forward-looking features of intergenerational accounting.

The assumption of a constant age structure, while useful for analytical purposes, is clearly not realistic. To further pursue the sensitivity analysis with respect to demographic developments, we employ alternative demographic scenarios provided by Statistics Netherlands. In particular, we construct two alternative variants with rather extreme assumptions for the ageing of the population. To analyse the impact of substantial ageing, the first variant combines the assumption of a low birth rate with that of a high life expectancy. The other variant consid-

Table 63a

Sensitivity to demographic assumptions in the baseline scenario

	Medium birth rate, high life expectancy	No change in age structure	Low birth rate, high life expectancy	High birth rate, low life expectancy
				(1 000 ECU)
Generational account Present newborn	– 53	– 32	– 53	– 52
Generational account Future unborn	– 13	– 44	– 13	– 21
Absolute difference	40	– 12	40	31
				(% GDP)
Immediate tax change required for sustainability	2.5	– 0.8	2.3	2.0

Table 63b

Sensitivity to demographic assumptions in the country-specific scenario

	Medium birth rate, high life expectancy	No change in age structure	Low birth rate, high life expectancy	High birth rate, low life expectancy
				(1 000 ECU)
Generational account Present newborn	– 54	– 30	– 54	– 53
Generational account Future unborn	– 37	– 69	– 38	– 43
Absolute difference	18	– 40	16	10
				(% GDP)
Immediate tax change required for sustainability	1.0	– 2.5	0.9	0.7

ers the other extreme case by assuming that a high birth rate coincides with low life expectancy. The two last columns of Tables 63a and 63b show the consequences of alternative demographic assumptions. As expected, in the low ageing scenario (column 4) the generational imbalance shows a moderate fall. Surprisingly, the high ageing scenario also shows a (small) drop in the tax increase required to restore sustainability, when compared to the baseline scenario of the first column. Both the high ageing and the baseline scenarios feature the same life expectancy so that net taxes of present generations and thereby the total inheritance of future generations coincide. Since the net tax obligation of future generations (the inheritance) is negative (in either scenario), the scenario with the lower birth rate features a lower net tax for the average unborn.

Finally, Table 64 reveals that net government debt raises the intergenerational imbalance by ECU 34 000 (i.e. ECU 40 000 minus ECU 6 000) in the baseline scenario, and by ECU 15 000 (ECU 18 000 minus ECU 3 000) in the country-specific scenario. The different impact in the two scenarios stems primarily from the difference in the definition of net government debt (see Section 10.3.1).

10.5. Establishing generational balance

10.5.1. Policy measures and their generational effects

Table 65a indicates the effects of policy adjustments that would ensure sustainable government finances in the baseline scenario. It explores adjustments for a number

Table 64

Impact of government debt

(1 000 ECU) (*)

	Baseline scenario		Country-specific scenario	
	Actual debt	Zero debt	Actual debt	Zero debt
				(1 000 ECU)
Generational account Present newborn	– 53	– 53	– 54	– 54
Generational account Future unborn	– 13	– 47	– 37	– 51
Absolute difference	40	6	18	3
				(% GDP)
Immediate tax change required for sustainability	2.5	0.4	1.0	0.2

of budget items. The measures are permanent and are implemented immediately. The necessary adjustments turn out to range from 2.0 to 2.6% of GDP. Table 65b shows the results for the country-specific scenario. As could be expected from the relatively small generational imbalance of this scenario in Table 60, the required policy changes are quite modest. Indeed, an adjustment in one of these budget items of about to 1.0% of GDP would suffice (see column 1).

The policy adjustments required are about the same for all alternatives — irrespective of their age profile. Tables 65a and 65b, however, indicate that the measures yield quite different effects on various generations. In particular, future generations benefit most from changes in budget items affecting the end of the life cycle, such as health and transfer payments. Changes in these budget items also exert the smallest (negative) effect on the present value of net benefits of newly borns because the effect of these measures is discounted more heavily.

10.5.2. Transforming the generational accounts into annual budgets

10.5.2.1. Why a transformation?

Transforming generational accounts into the corresponding future annual budgets is useful for a number of reasons. First, it explicitly yields the implied size of future budget items. This facilitates communication with the various parties in the decision-making process. Second,

Table 65a

Measures to establish intergenerational sustainability in the baseline scenario

	Required adjustment	Effect on generational account of			
		Future generations	Newly born	30-year old	60-year old
	% GDP	*1 000 ECU*			
Defence, general government	– 2.5	– 27	13	12	7
Education	– 2.6	– 14	26	0	0
Health	– 2.0	– 33	7	11	15
Transfer payments net of taxes	– 2.4	– 33	7	12	15
Income tax	2.6	– 32	8	17	6
Indirect taxes	2.3	– 32	8	15	8

Table 65b

Measures to establish intergenerational sustainability in the country-specific scenario

	Required adjustment	Effect on generational account of			
		Future generations	Newly born	30-year old	60-year old
	% GDP	1 000 ECU			
Defence, general government	– 1.2	– 11	6	5	3
Education	– 1.2	– 5	12	0	0
Health	– 0.9	– 14	3	5	7
Transfer payments net of taxes	– 1.0	– 14	3	6	7
Income tax	1.1	– 14	4	8	3
Indirect taxes	1.0	– 13	4	7	3

it provides a link with the traditional tools for analysing fiscal policies, such as the fiscal deficit and government debt. This helps to transform policy objectives with respect to generational balances into more concrete deficit targets. Third, it enables one to make explicit possible trade-offs between establishing generational balance and possible other aspects of fiscal policy, such as the EMU-criteria, the exposure of the budget to interest rate fluctuations, and the possible impact of government borrowing on the capital market and aggregate demand.

10.5.2.2. An example of sustainable future budgets

Table 66 reveals the budgets for selected years, if intergenerational sustainability is established in the country-specific scenario by immediately raising (all) taxes by 1.0% of GDP (a combination of the last two options of Table 66). It shows that the ageing of the population causes expenditure on old-age benefits and health care to rise substantially. Expressed as a percentage of GDP, old-age benefits rise from 5.2% in 1995 to 6.7% in 2020

Table 66

Yearly budgets under a sustainable policy, 1995–2060

(% GDP)

	1995	2020	2040	2060
Defence, general government, infrastructure, subsidies and tranfers abroad	18.8	16.1	17.1	17.3
Health	8.8	9.3	12.2	12.4
Education	4.6	3.7	3.9	3.9
Social security				
— Old age benefits	5.2	6.7	9.4	8.9
— Other benefits	11.0	9.4	8.8	9.3
Interest payments	5.6	1.1	0.0	3.2
Total government expenditure	54.0	46.3	51.4	55.0
Income tax and social security contributions	25.7	24.7	24.9	25.5
Other revenue	20.4	22.8	23.9	24.1
Revenues from capital, including gas	3.8	1.8	1.7	1.4
Total revenue	49.9	49.3	50.5	51.1
Fiscal deficit	4.0	– 3.0	1.0	3.8

and 9.4% in 2040. Health-care expenditure rises from 8.8% in 1995 to 9.3% in 2020 and 12.2% in 2040.

Until 2020, these rises are mitigated by the effect of the increase of labour participation on GDP. The tax burden will rise also due to the maturing of pension funds and the resulting increase of taxable pension incomes. The early implementation of an intergenerationally sustainable policy implies that, until 2020, the tax burden rises more than expenditure does. This implies a (sharp) reduction of government debt and interest payments, which helps to create budgetary room for the increasing costs of the ageing of the population in later years. After 2020, the costs of old-age benefits and health care outweigh the rise in revenues, thereby widening the fiscal deficit.

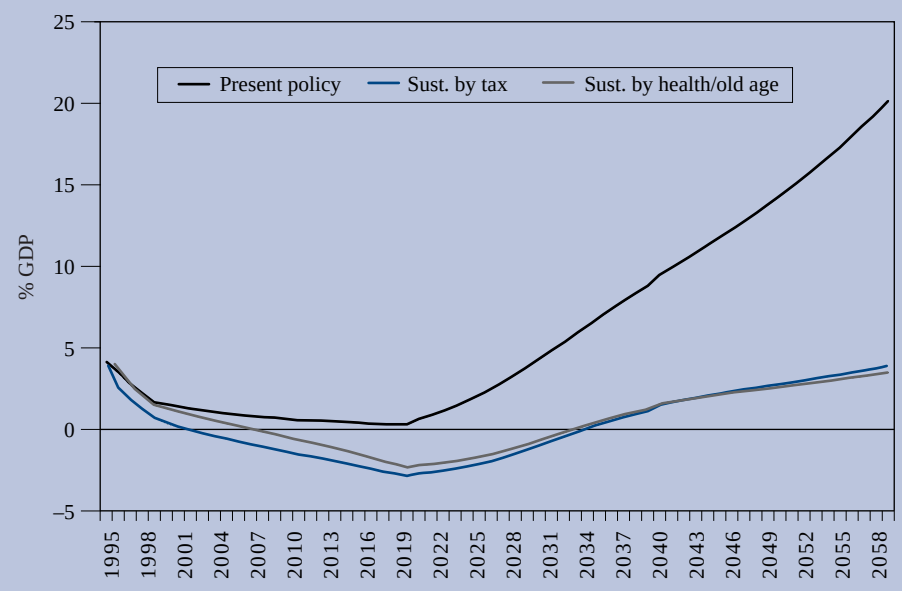
By first reducing government debt and interest payments in order to create room for the later rise of the age-related expenditure, the future costs of the population ageing are in part transferred to present generations.

10.5.3. Future deficits

Graph 6 shows how the fiscal deficit develops if present policies are continued in the country-specific scenario. This would yield very low fiscal deficits until 2020, but would eventually result in soaring fiscal deficits when ageing causes government expenditures to rise sharply. Graph 6 shows the time path of the fiscal deficit too, in the case where taxes are raised in 1996 by as much as is necessary to arrive at a sustainable policy (the combination of the last two lines of Table 65b). In this case, the budget reaches a surplus in 2002. This surplus would have to be maintained for several decades in order to sufficiently reduce government debt. Enough room is then created to prevent an explosion of the fiscal deficit by the time the ageing of the population 'hits' the budget.

Apart from raising government saving by an immediate and permanent tax rise, there are alternative ways of arriving at an intergenerationally sustainable system by reducing the costs of arrangements that are sensitive to ageing. Graph 6 shows the time path of the fiscal deficit if the growth of old-age benefits and health-care costs for the old-aged is curtailed in the period until 2020 so as to make the system sustainable. This entails a 0.3% slower growth of these expenditures per year so that age-specific expenditure rises with 1.2% per year until 2020. After 2020, the per capita expenditure rises again with 1.5% per year.

Graph 6: **Fiscal deficits with present policies and sustainable policies**



Graph 6 shows that the fiscal deficit in the two sustainable scenarios is still rising slightly in 2060. When the size and composition of the population eventually reaches a steady state, growth, the fiscal deficit, and government debt reach a constant level relative to GDP.

10.6. Summary and conclusions

This chapter computed generational accounts for the Netherlands in order to assist government decision-making. Traditionally, intertemporal aspects of fiscal policy are assessed on the basis of the fiscal deficit, government debt and net government wealth. Generational accounting offers a more direct and explicit measure of the intergenerational effects of present fiscal policies. It has the advantage of being forward-looking, thereby enabling one to incorporate future developments, and to test the present system of government expenditures and taxes for sustainability. This approach is of particular interest because after 2010 Dutch government finances will be heavily burdened by the ageing of the population. At the same time, the coming decades are expected to show rising labour force participation rates and taxable pension incomes from maturing funded private sector schemes. These factors will help to alleviate the burden from ageing by generating additional tax revenues.

The calculations indicate that the present system of benefits and taxes, if continued, is intergenerationally unsustainable. However, the necessary adjustment to ensure sustainability can be considered quite small in the light of the size of the ageing of the population. The generational accounts can be transformed into the corresponding future yearly budgets. These show that an early implementation of an intergenerationally sustainable system implies that the present fiscal deficit in the Netherlands turns into a surplus during the course of the coming decade, as the costs of ageing will not start to rise before 2010. This surplus can be established with relatively small policy changes. The factors alleviating the burden of population ageing create the opportunity of sharply reducing government debt and interest payments. This helps to finance the future rise of the age-related expenditures, thereby mitigating the costs for future generations of tax payers. In this way, future costs are partly transferred to the present.

These results have to be interpreted with care. The calculations require many assumptions about future developments. Section 10.4 reveals that the outcomes are sensitive to some of these assumptions. Behavioural responses to fiscal policy changes are not captured by the calculations. Furthermore, generational accounting does not include intergenerational redistribution that occurs outside the government sector, including environmental externalities, redistribution performed by supplementary pension schemes, inheritances within families and intergenerational transfers of know-how.

11. Austria: restoring generational balance

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11.1. Introduction

Recently, Austria has had to cope with some major external shocks. First, given its geographical location and historical ties, the reform and opening up of central and eastern European countries (CEECs) in the late 1980s had important effects on Austria. Trade creation and trade diversion towards CEECs resulted in higher than usual growth of total exports and imports. Needless to say that the integration of CEECs put a lot of adjustment pressure on Austrian industry, probably more than in other western European countries.

Second, Austria's accession to the European Union (EU) in 1995 required further adjustments. The net fiscal cost of EU membership for the general government budget is estimated at 2% of GDP in 1995 (including contributions to the EU and compensation payments to Austrian farmers). On the positive side, consumers now enjoy considerably lower prices for many goods and services. The EU-related decline in the price level is estimated at 1.5 percentage points between 1995 and 1997 (cf. European Commission (1998b)). Relying on a dynamic general equilibrium model, Keuschnigg and Kohler (1996) provided a more complete estimate of the overall effects of EU membership. On average, the net welfare gain was estimated at 1.24% of GDP.

Eastern enlargement of the EU will put additional fiscal pressure on current Member States. The potential entrants will qualify for large amounts of transfers under the Structural Funds and common agricultural programmes. In addition, EU countries, and Austria in particular, might face a significant increase in immigration. On the other hand, closer integration holds mutual gains from trade. Keuschnigg and Kohler (1997) find for Austria that the dynamic gains from integration clearly exceed the expected budgetary costs.

The recent shocks create new demands on government budgets and come on top of an already difficult stance of the government sector. During more than two decades, fiscal policy allowed for a substantial increase in government debt. Once a mere 19% of GDP in 1970, government debt grew at an accelerating pace, reaching 69% of GDP in 1995. Expenditure growth was mainly driven by an expanding welfare state and lately by increasing interest payments on government debt.

Since 1975 the budget has been permanently in deficit. With a net deficit in excess of 5% of GDP in 1995, the situation was seemingly unstable. In the absence of any drastic action, this perspective threatened Austria's participation in EMU. The government finally pushed through a rather courageous consolidation package in 1996 followed by an equally impressive pension reform in 1997. Consequently, government debt as a percentage of GDP is now starting to decline rather significantly.

Apart from the fact that these measures may be successful in stabilising the level of officially recorded government debt (as a percentage of GDP), they also involve massive intergenerational redistribution. If the government is to remain solvent, it must meet its intertemporal budget constraint. For any given path of government expenditures on goods and services, taxes may be collected now or later, and the burden will correspondingly fall on current or future generations. Such long-term considerations are absent in conventional government sector accounting. Consequently, not much is known about the intergenerational effects of actual fiscal policy. In this study we employ the standardised approach to generational accounting as described in Chapter 2 of this vol-

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ume in order to gauge the level of Austria's intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2) and to evaluate the intergenerational impact of fiscal policy. No such study is available for Austria up to date.

We proceed by discussing recent economic developments as well as current fiscal policy. Then we turn to baseline results regarding the intergenerational stance of Austrian fiscal policy in 1995. Finally, we evaluate the intergenerational consequences of the consolidation package of 1996 and the pension reform of 1997 that were required to meet the Maastricht criteria. We also calculate the fiscal consequences and intergenerational effects from increased immigration as it might come with EU membership of the eastern applicant countries. In the concluding section we reflect on the main findings.

11.2. Economic performance and fiscal policy

11.2.1. Recent economic performance

Macroeconomic policies in Austria have traditionally emphasised a stable exchange rate towards the German mark. The hard currency policy combined with high aggregate wage flexibility succeeded in squeezing inflation in the tradable sector (cf. European Commission (1998b)). Inflation slowed down from 6.3% in the 1970s to less than 2% in 1997. For about four decades, the level of unemployment in Austria has been consistently lower than the average of OECD or EU countries. Lately, however, labour market performance deteriorated. In 1997, it reached 4.3% up from an average of 3.4% in the 1980s. Relatively high labour costs including a high and increasing tax burden have at least partially contributed to the increase in unemployment.

During more than two decades, fiscal policy allowed for an increase in government debt. Already in 1987, the budget deficit exceeded 4% of GDP. The 1994 tax reform delivered significant tax cuts and further aggravated the situation. A deficit in the social security system, mostly determined by accelerated early retirement, required large federal transfers. On top of that, contribution payments to the EU had to be financed for the first time. The government deficit hit the 5.1% mark in 1995.

Clearly, the Maastricht Treaty imposed a precise timing in fiscal consolidation and forced the government to take more prompt and drastic action than it would otherwise have taken. The newly elected government delivered early in 1996 a rather drastic fiscal consolidation package amounting to 4% of GDP within two years (cf. Kramer and Lehner (1996), Lehner (1997), European Commission (1998b)), one third to be covered by higher revenues and two thirds by lower spending. In view of the long-run intergenerational non-sustainability of the current pension system, exacerbated by an ageing population and increasing life expectancy, an additional and more extensive pension reform was agreed upon by the end of 1997 (see below).

The objectives of the consolidation package have been fully achieved. According to the latest statistics, the net deficit of the entire government sector stabilised at 1.9% of GDP in 1997 and is expected to remain at that level for the next years (cf. Lehner (1998), IAS (1998)). The primary surplus is approaching 1% of GDP. Government debt finally started to decline in 1997 to 64.4% of GDP, down from 69.8% in 1996. Overall, the medium term prospects of the Austrian economy remain good (see the forecast by IAS (1998)). In 1998, real GDP is expected to grow by 3.4%, slowing down to 2.6% in 1999. Inflation and interest rates remain low. Unfortunately, the unemployment rate is stuck at about 7% (4.4% according to Eurostat definition).

11.2.2. Current fiscal policy

11.2.2.1. Government expenditure

Over the last three decades, government expenditure increased from 41% of GDP in 1970 to 57.5% in 1995. Most of expenditure growth materialised in the 1970s. Both larger purchases of goods and services as well as more and better paid government personnel contributed to increasing public consumption which in 1995 absorbed about 23% of GDP, a full 6 percentage points higher than in 1970. The increase in transfers was even more significant. The share of transfers in GDP amounted to almost 30% in 1995, 12 percentage points higher than in 1970. Pension expenditures increased from about 10% of GDP in 1970 to almost 14% in 1995.

Demographic change including longer life expectancy as well as frequent use of early retirement and disability pensions is responsible for an ever larger number of pensioners. New benefits introduced during the 1970s and again in the 1990s together with a large rise in early retirement increased social security benefits and assistance grants in these periods. In 1995, Austria spent 17.6% of GDP on both categories (but excluding

unfunded employee benefits of the public sector) which is 6 percentage points higher than in 1970 and testifies to the growth of the Austrian welfare state. Last but not least, transfer spending is driven by higher interest payments which quadrupled over the period, an unavoidable consequence of the rapid accumulation of government debt.

11.2.2.2. Government revenue

Starting from a level of 35.3% in 1970, taxes and social security contributions approached a maximum of 43% in the mid-1980s, then levelled off somewhat but swelled again in the 1990s. They amounted to 43% of GDP in 1995. The personal income tax in Austria is a progressive tax based on the individual rather than the family. The income tax schedule features five brackets with marginal tax rates between 10 to 50%. The tax burden is reduced by a general income tax credit while wage earners may claim an additional wage tax credit. Tax relief for families includes a special single earner tax credit plus additional tax credits for each child. The composition of overall revenues shifted towards social security charges — from 9% of GDP in 1970 to 15.4% in 1995 — which are now about a third of total tax revenues. The importance of capital income taxes declined since the 1970s, an increasing part of the tax burden was shifted to labour.

The last decades saw a cut in nominal tax rates together with elimination of exemptions and broadening of tax bases. The 1988 reform significantly eased the effective tax burden on corporate profits in Austria which is low by international comparison. Regarding capital income taxation, the withholding tax on personal interest income was raised to 22% in 1993 but was transformed to a final tax that also covers personal wealth and inheritance taxes. The withholding taxes on dividends and on personal interest income were unified at 22% after 1994 and treated as a final tax.

The tax reform in 1994 brought further important changes in company taxation: the business tax, the general wealth tax and other taxes on enterprises were abolished. The 30% corporate tax rate was raised to 34% which is now close to the OECD average. Lately, the government limited the deductibility of the formation of investment and other reserves. In 1995, the investment allowance was cut to 9%. Recently, the debate focused much on the proper balance between business and labour taxation. Even by international comparison, Austria's current tax system is characterised by a high tax burden on labour.

Consumption taxes fluctuated around 16% of GDP. The value added tax (VAT) is, in terms of revenues, the single most important tax in Austria. With a standard rate of 20% and a reduced rate of 10%, Austria seems to have exhausted its potential VAT revenues since neighbouring Germany levies much lower rates, namely 16% and 7%, respectively. One third of indirect tax revenues stems from a number of special excise taxes with some of them increasingly serving environmental goals.

11.2.2.3. Social insurance system

Austria has steadily built its welfare state and now runs one of the most generous systems in Europe. Social expenditures accelerated rapidly in the 1970s and again in the early 1990s. In addition to new entitlements and generous eligibility rules, spending was increased by an ageing population and a recent upward trend in unemployment. Compared to the EU-12 average in 1994, Austria affords a slightly higher percentage of GDP for social welfare. Furthermore, it is more generous with family and old-age support but spends markedly less on unemployment and housing. An ever larger part of spending must be covered out of general taxes rather than contributions. In 1995, contributions covered no more than 72% of benefits.

The *pension system* in Austria is a generous paygo (pay-as-you-go) one (cf. Koch and Thimann (1997), Rürup and Schröter (1997), and Stefanits (1998)). The maximum replacement rate is 80%, among the highest in Europe. As for 1995, pension assessment is based on the best 15 years of salary, and benefits are indexed to net wages. One of the distinctive features of the Austrian system is the large share of disability and early retirement pensions. Actual retirement age fell from 61.9 for men (60.4 for women) in 1970 to 58.5 (57.1) in 1994. At the same time, both life expectancy and average duration of pensions increased. Contributions from the workforce are the main source of revenues. They amount now to 22.8% of gross income. Contributions, however, fell short of paygo pension outlays over the past 20 years. In 1995, they covered only 80% of pension expenditures even though contribution rates have almost doubled since the 1960s.

Population ageing, increasing life expectancy and very generous benefit levels made the pension system inter-

generationally unsustainable in the long run. By international comparison, Austria affords a rather high level of government spending on pensions. In 1994, pension expenditures claimed 15% of GDP as compared to an OECD average of only 10%. In the absence of basic adjustments, expenditures on pensions are expected to increase rapidly in the future when the old-age dependency ratio is expected to worsen. The fiscal pressure from the pension system is expected to increase significantly, with a peak in 2035 when pension expenditures are estimated to reach 16.25% of GDP (cf. Koch and Thimann (1997). Note, that they analyse only the employee and the self-employed pension schemes).

Austria affords generous *family assistance*. In 1990, family benefits amounted to 10% of GDP which is among the highest within the OECD (cf. OECD (1994)). Currently, the main elements of family support are income-tax credits, free social security coverage for dependants, free compulsory education and monthly cash benefits for children. *Health* expenditures have been growing rapidly, too. Indeed, Austria's spending on health is among the highest in Europe. An ageing population raises the demand for medical services and increasingly complex treatments inflate costs. The health system is only partially contribution-financed and is a mixture of centralisation and decentralisation which weakens accountability and impairs efficiency.

11.2.2.4. Recent fiscal debates: the 1996 fiscal consolidation package

The net government deficit in 1995 was 5.1% of GDP and was forecast to be a full 8% of GDP in 1997 (cf. Lehner (1996)). In the absence of any drastic action, this perspective threatened Austria's participation in EMU. To reverse the trend, the government finally pushed through a consolidation package in 1996. The objective was to reduce the net deficit to 3% in 1997 to meet the Maastricht deficit criterion where a quota of 2.7% was set for the central government and 0.3% for the State and local governments. Compared to the original budget projections, this required a huge savings volume. The federal government alone was to trim ECU 7.6 billion from its budget over the two-year period where two thirds were meant to come from lower expenditures.

Spending cuts mainly targeted employment and compensation of civil servants and cuts in general administration. Additional savings come from stricter eligibility criteria for unemployment benefits and tightening of other social transfers. Transfers to the public pension scheme were restricted, especially by limiting early retirement. Full pensions were made available only after the age of 60 while required contribution periods were extended from 35 to 37.5 years. Subsidies to business and earmarked transfers to off-budget funds were cut. Over the 1996/97 period, expenditure savings amount to ECU 5 billion. For 1998/99, additional expenditure cuts of 1.2 and 1.4 billion are budgeted.

On the revenue side, the government relied predominantly on wage and personal income taxes and to a lesser extent on corporate and interest income taxes, an energy tax as well as a variety of indirect taxes. Taxes on income account for almost three quarters of additional revenues. The tax rate on interest and dividend income, a final withholding tax, was raised from 22 to 25% and a new energy tax on gas and electricity consumption was introduced. The other revenue increases came from cutting tax allowances and deductions.

Since a number of measures contained in the 1996/97 consolidation package were short term in nature, such as the salary cuts of civil servants, and due to new spending pressure — transfers to social security and pension funds increased by almost 15% — additional budget relief equivalent to 1% of GDP had to be enacted. The federal budgets of 1998/99 aim to stabilise the net deficit in nominal terms at about ECU 5.2 billion, thus allowing a further reduction relative to GDP.

11.2.2.5. Recent fiscal debates: pension reform

The 1997 pension reform comes on top of the consolidation package. A series of measures try to strengthen the link between benefits and contributions paid, make early retirement less attractive, and harmonise the eligibility criteria and benefit rules for different pension schemes. Phased in between 2003 and 2020 the pension base is calculated over an extended period of the best 18 years (up from 15) which puts downward pressure on pension levels. Over the entire contribution period, pension rights are accumulated by 2 percentage points per year.

The accumulated percentage points are reduced by 2 (previously 1.6 to 1.8) for each year of early retirement prior to the statutory retirement age, up to a maximum deduction of 10 percentage points or 15% (starting with 2000). Eligibility for early retirement on account of reduced capability to work is also tightened. To strengthen revenues and harmonise pension schemes, contribution rates of self-employed and civil servants increase from around 15% and 10.75%, respectively, to 20.25%.

In addition, pensions of civil servants are harmonised with the general system. Their pensions are also assessed on the basis of the best 18 years instead of the last salary (starting with 2003) and the adjustment factor of the general pension system is applied (starting with 2000) (the reform also includes some other, less important elements, cf. BMAGS (1997)).

11.2.2.6. Recent fiscal debates: future agenda

The fiscal consolidation programme adopted in 1996 was fully implemented and the 1997 pension reform further helped to restore fiscal stability. The figures for the budget deficit and government debt attest to the success. The net deficit of the entire government sector now seems to stabilise at about 1.9%, giving an important 'breathing space' before further reforms are attacked. The government debt finally started to decline in 1997 to 64.4% of GDP, down from 69.8% in 1996.

A major step in future fiscal reform is planned for 2000. The discussion focuses on restructuring taxes. An expert commission is preparing proposals concerning a reduction in labour taxes and a strengthening of green taxes. The tax treatment of savings as well as the scope for capital income taxation more generally will be addressed. Finally, further structural reforms of the pension and health-care systems are intended for the medium term. Some important elements of the pension reform 1997 have not yet been enacted. In both areas, the reform measures of 1996/97 are considered insufficient in order to ensure long-run intergenerational sustainability of the social security system. At the same time, the government wants to bring the deficit close to balance. The manœuvre room for major fiscal reform thus seems to be rather tight.

11.3. Baseline results and sensitivity analysis

11.3.1. Data and basic assumptions

To quantify the inter- and intra-generational impact of fiscal policy, generational accounting must keep track of the distribution of taxes and benefits across various population groups. Breaking down aggregate budget figures according to their age-gender distribution amounts to formidable empirical work and is especially difficult in our case since Austria has not yet been the subject of such a study before.

Regarding mortality and fertility rates as well as migration, we closely follow the projections of the Austrian Statistical Office (cf. ÖSTAT (1996,1997a)) which forecasts a slight rise in fertility and life expectancy. The fertility rate increases from 1.4 in the base-year to 1.5 in 2010 and is assumed to remain constant thereafter. Life expectancy at birth rises linearly from 72.48 in 1995 to 75.27 in 2010 for males and from 79.04 to 81.59 for females, and subsequently remains constant at that level. The Statistical Office instead assumes that life expectancy increases further after 2010. Given the long horizon of our projection, we choose to be somewhat more conservative. Finally, net immigration expands the labour force by a constant rate of 17 000 per year, i.e. 0.21% of the population.

A critical part of generational accounting concerns the construction of age-gender tax and benefit profiles. Following the methodology described in Chapter 2, we implemented separate profiles for all major tax and spending categories. The distribution of labour taxes was retrieved from ÖSTAT (1995), data on social security contributions were directly provided by the Association of Austrian Social Insurance Institutions (*Hauptverband der Österreichischen Sozialversicherungsträger*). Furthermore, we used the capital income profiles that were available in the European Union Household Panel compiled by Eurostat (1995). Finally, we allocated payments of VAT and other indirect taxes on the basis of the consumer expenditure survey in ÖSTAT (1984).

Non-age-specific expenditures are determined residually by subtracting from total expenditure all age-specifically distributed taxes and transfers as well as interest payments. Since there is no clear evidence for an age-specific demand pattern for expenditures such as defence, general administration and the like, these expenditures were distributed evenly across age groups. By way of contrast, age-gender profiles are quite uneven for many social expenditure categories. Pension income of all sorts and benefits from old-age care can be tracked over lifetime according to the household panel. Eurostat (1995) similarly provides necessary information on age-specific transfer income from family allowances, social assistance and unemployment benefits including unemployment insurance.

The spending programmes on education and health care were attributed to household groups based on Eurostat (1995) and ÖSTAT (1997b, 1998a, 1998b). This way we obtained the tax benefit position for a representative

member of each group. Next, aggregates are calculated by multiplying the profiles with the population weight of the age groups. To reconcile the implied total revenue and spending volumes with actual budget figures, some adjustments were required at various stages. Decomposing government activity in this way and finding the age-gender profiles of taxes and benefits is at the heart of generational accounting and eventually results in generational tax benefit accounts such as those listed in Tables 68 through 72.

Table 67 reports the consolidated government budget in Austria for the base-year 1995. Macroeconomic data were retrieved from data bases of the Austrian Economic Research Institutes, IAS and WIFO, as well as OECD and ÖSTAT national accounts publications of various years. Compilation of revenue figures was based on revenue statistics of ÖSTAT, Eurostat and OECD. Intergovernmental grants and transfers have been cancelled out. Further note that, throughout the paper, an exchange rate of ATS 13.182 per ecu is used (cf. European Commission (1997)).

On the revenue side, capital income taxes include parts of the personal income tax, the corporate tax, wealth and business tax, interest and dividend tax as well as farmers' business tax. Other indirect taxes refer to special excise taxes on mineral oils, tobacco and alcohol as well as an energy tax on electricity and gas consumption. The VAT, labour income taxes and social security contributions alone make up for more than 80 % of revenues. We further refer to government net financial liabilities equal to 49.8 % of GDP, which are derived from the government debt equal to 69.2 % of GDP by subtracting various financial assets of the government sector. Such assets may be cash, bank deposits, loans to the private sector and foreign exchange reserves.

The per capita receipts and expenditures are projected to grow in line with GDP, i.e. we adjust future budgets by both the demographic transition and overall productivity growth. In fact, the GDP trend is determined by a constant growth rate of labour productivity assumed to be 1.5 %. As in the other country studies, our computations use a real interest rate of 5 %.

11.3.2. Baseline findings

Table 68 displays the age-specific net payments to the government, in present value terms, of all living and future generations. The figures reflect the structure of government revenues and expenditure in Austria in 1995 under the baseline scenario. For a newborn, the present value of benefits received over the entire lifetime exceeds the present value of taxes paid by ECU 17 800. The negative net transfer payments during the first seven years of life may readily be explained by the fact that current benefits weigh much more than the present value of income taxes that are paid only later in life.

Net payments increase during the first two decades reaching a maximum of ECU 81 300 at age 20 when individuals start working and, therefore, bear the full burden of wage taxes and social security contributions. Thereafter, generational accounts gradually decline as the retirement period approaches. Health-care benefits

Table 67

Government receipts and expenditure in Austria, 1995

(billion ECU)

Receipts		Expenditure	
Labour income taxes	15.5	Pensions	25.2
Capital income taxes	5.6	Old-age care	1.3
Value added tax	13.6	Health	10.5
Other indirect taxes	7.3	Unemployment	1.8
Social security contributions	27.3	Family-related benefits	4.8
Government deficit	9.0	Social assistance	2.7
		Education grants	0.1
		Education	7.7
		Non-age-specific expenditure	16.4
		Interest payments	7.8
Total	78.3		78.3

Source: Austrian Central Statistical Office, WIFO, Eurostat, OECD.

increase with age as well. Consequently, lifetime income is increasingly dominated by old-age pension transfers and health-care benefits rather than by the tax burden associated with current wage and capital income. At around age 41, the tax benefit position breaks even and, from now on, old-age transfers start to dominate until the present value of net transfers received over the remaining lifetime approaches a maximum of 211 200 at the age of 65 when retirement begins. Thereafter, net benefits decline along with remaining life expectancy.

Table 68 also shows the age-specific generational accounts separately for males and females. As in the case of other EU countries, the Austrian fiscal system implies a large amount of redistribution between genders. Males face high net payments for at least four decades, while females only for two. Furthermore, the maximum present value of net payments by females at age 20 represents less than a quarter of the burden faced by males. However, females' maximum net benefit position at age 65 makes up for almost three quarters of the males' account.

Tables 69 and 70 split up the overall net liability of males and females into various tax and transfer components. Among transfers, non-age-specific expenditures are spread rather evenly across lifetime. Pensions and health-care benefits are received later in life and mainly benefit the old. The other social transfers, in particular education and family-related transfers, are targeted towards the young. On the tax side, VAT and excise taxes tend to be rather neutral in terms of intergenerational redistribution. The present value of social insurance payments and of labour income taxes weighs more heavily for younger generations. By way of contrast, capital income accrues later in life, hence the burden of capital income taxes rests more on older generations.

Tables 69 and 70 also provide evidence for significant intra-generational redistribution across genders. As expected, indirect taxes do not differentiate much between males and females. Transfers such as social assistance, education and non-age-specific transfers are rather evenly distributed across genders. By way of contrast, health and family-related benefits are much larger

Table 68

Generational accounts, Austria

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 17.8	8.1	– 45.1
5	– 12.1	19.0	– 44.9
10	15.9	53.2	– 23.2
15	57.5	101.3	10.5
20	81.3	130.9	30.6
25	78.7	130.1	25.6
30	62.6	108.8	13.5
35	39.0	77.1	– 1.5
40	11.5	42.8	– 20.9
45	– 32.2	– 9.0	– 56.2
50	– 83.7	– 68.3	– 99.1
55	– 148.3	– 151.3	– 145.5
60	– 206.1	– 239.9	– 175.2
65	– 211.2	– 246.5	– 180.5
70	– 191.8	– 227.7	– 170.6
75	– 167.5	– 195.5	– 152.8
80	– 136.1	– 156.9	– 126.5
85	– 106.0	– 123.9	– 99.0
90	– 81.6	– 97.2	– 76.6
95	– 59.7	– 73.2	– 56.9
100	– 23.2	– 29.9	– 22.1
Increase in all taxes, future (%)	82.7	–	–
Future generational account	119.4	168.1	68.2
Absolute difference	137.2	160.0	113.3
IPL (% of GDP)	192.5	–	–

(*) 1995 value; baseline (r = 0.05, g = 0.015).

for women, especially during their first three decades of living. Given lower female labour force participation, labour income taxes of females are only between 21 to 43% of taxes for males. A similar pattern holds for unemployment benefits. Capital income taxes paid by females represent only 46 to 72% of their male counterparts. Reflecting past wage incomes, pensions are again higher for males than for females.

What is the size of Austria's intertemporal public liabilities in 1995? Clearly, the officially recorded net financial liabilities, equal to 49.8% of GDP, are part of it. The paygo pension system is built on a 'contract between generations' where workers pay contributions today in exchange for the promise that they will receive a pension when retired. Consequently, pension rights accumulated under the paygo system are as much a government liability as, for example, previously issued government bonds. Multiplying the per capita numbers in Table 68 by the size of the age group and adding up over all cohorts, we obtain an implicit government debt amounting to 142.7% of GDP. Adding the officially recorded government debt, equal to 49.8% of GDP, Austria's intertemporal debt ([1]) in 1995 amounts to 192.5% of GDP.

In order to service these liabilities, some generations will have to pay higher taxes or to forego social benefits. The burden on each generation is uniquely measured by the present value of net taxes at the beginning of their life. Assuming that all future cohorts, born in 1996 or later, start their life with the same net present value of taxes, we ask the following hypothetical question: By how much do we have to deteriorate the tax benefit position of future generations in order to enable the government to service its intertemporal public liabilities and to fulfil its intertemporal budget constraint?

Table 68 reports a required net payment of ECU 119 400 which is higher by ECU 137 200 than the net (negative) liability of the 1995 cohort! The higher net payment could be brought about, for example, by increasing the lifetime tax burden of future generations by 82.7%. The

([1]) True liabilities are computed as described in Chapter 2, based on equation (6).

Table 69

Composition of male generational accounts, Austria

(1 000 ECU) (*)

	Tax payments				Transfer receipts						
Generation's age in 1995	Labour income taxes	Capital income taxes	VAT/ excise taxes	Social insurance	Pensions/ old age	Health	Unemployment insurance	Social assistance	Family-related benefits	Education	Non-age-specific expenditure
0	41.0	14.1	55.6	82.7	39.3	19.8	4.9	9.5	8.0	48.2	55.6
5	48.7	16.8	60.5	98.2	46.6	21.3	5.8	10.0	9.5	57.3	54.7
10	57.7	19.9	66.3	116.4	55.3	23.0	6.9	10.5	11.3	46.7	53.6
15	68.3	23.2	72.7	137.9	65.5	25.0	8.2	10.5	13.4	26.0	52.2
20	79.0	24.5	77.3	153.8	77.7	27.8	9.6	9.2	15.6	12.9	50.7
25	87.9	25.2	76.9	153.9	92.4	30.7	9.1	7.4	18.2	6.9	49.1
30	92.5	25.5	75.4	144.2	109.6	34.1	8.4	6.9	20.1	2.6	47.1
35	98.7	25.1	74.0	127.1	129.9	38.1	8.1	6.9	18.8	1.2	44.8
40	106.9	25.4	71.8	105.5	153.8	42.1	7.8	6.6	13.8	0.7	42.0
45	110.1	25.7	64.1	82.3	182.7	47.0	6.9	7.0	8.2	0.4	39.0
50	112.8	25.5	54.4	57.0	216.5	49.4	5.1	6.6	4.5	0.2	35.6
55	96.7	24.8	43.3	28.4	256.1	47.8	2.8	3.1	2.7	0.2	31.9
60	64.6	19.2	31.1	4.3	280.6	46.6	0.0	2.1	1.7	0.1	28.0
65	46.3	10.5	21.4	0.7	252.7	46.7	0.0	1.4	0.5	0.1	24.0
70	29.6	7.8	15.6	0.2	213.8	45.8	0.0	1.2	0.1	0.0	19.9
75	21.4	5.9	10.1	0.0	174.3	42.2	0.0	0.6	0.0	0.0	15.9
80	16.5	4.3	7.4	0.0	135.5	37.0	0.0	0.5	0.0	0.0	12.2
85	12.6	3.0	5.7	0.0	103.8	31.8	0.0	0.3	0.0	0.0	9.3
90	9.5	2.0	4.3	0.0	79.0	26.9	0.0	0.0	0.0	0.0	7.1
95	7.0	1.3	3.1	0.0	57.8	21.7	0.0	0.0	0.0	0.0	5.1
100	2.8	0.4	1.2	0.0	22.9	9.3	0.0	0.0	0.0	0.0	2.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Table 70

Composition of female generational accounts, Austria

(1 000 ECU) (*)

	Tax payments				Transfer receipts						
Generation's age in 1995	Labour income taxes	Capital income taxes	VAT/ excise taxes	Social insurance	Pensions/ old age	Health	Unemployment insurance	Social assistance	Family-related benefits	Education	Non-age-specific expenditure
0	17.5	10.1	57.0	52.4	27.2	20.9	3.5	9.7	15.8	48.3	56.8
5	20.7	12.0	62.2	62.3	32.3	23.2	4.2	10.1	18.7	57.4	56.2
10	24.6	14.3	68.2	73.8	38.3	26.0	4.9	10.6	22.2	46.7	55.3
15	29.1	16.7	75.0	87.4	45.4	29.2	5.9	10.7	26.3	26.1	54.2
20	33.7	17.7	79.8	96.8	53.2	32.1	6.6	9.4	30.0	13.0	53.0
25	35.4	17.9	79.6	90.7	61.9	34.7	6.3	7.7	28.8	6.9	51.5
30	35.0	17.3	78.4	79.4	72.2	37.9	5.2	7.2	21.7	2.6	49.8
35	36.3	16.9	77.3	68.6	84.3	41.6	4.8	7.2	13.8	1.2	47.8
40	38.5	16.5	75.3	56.0	98.1	44.2	4.5	6.9	7.4	0.7	45.5
45	37.7	17.0	67.9	41.2	114.3	47.5	3.8	7.3	3.8	0.4	42.9
50	35.9	16.7	58.4	24.5	133.0	50.0	2.7	6.9	1.7	0.3	39.9
55	26.6	13.5	47.2	7.7	149.9	49.4	0.5	3.4	0.7	0.2	36.4
60	17.3	9.1	34.7	1.2	153.2	48.9	0.1	2.4	0.3	0.1	32.6
65	12.0	6.6	24.5	0.3	144.9	48.9	0.0	1.6	0.2	0.1	28.3
70	7.2	5.2	18.0	0.1	128.7	47.3	0.0	1.4	0.1	0.0	23.6
75	5.1	3.9	11.9	0.0	111.3	42.8	0.0	0.7	0.0	0.0	18.8
80	3.8	2.7	8.6	0.0	90.5	36.4	0.0	0.6	0.0	0.0	14.2
85	2.8	1.7	6.3	0.0	69.4	29.8	0.0	0.3	0.0	0.0	10.4
90	2.1	1.1	4.7	0.0	52.4	24.4	0.0	0.0	0.0	0.0	7.7
95	1.5	0.6	3.3	0.0	37.8	19.0	0.0	0.0	0.0	0.0	5.4
100	0.6	0.2	1.2	0.0	14.3	7.7	0.0	0.0	0.0	0.0	2.0

(*) 1995 value; baseline (r = 0.05, g = 0.015).

two genders share quite unequally in this burden. Future-born males would face net payments of ECU 168 100 as compared to only ECU 8 100 for 1995-born males. By way of contrast, future females would face net payments of ECU 68 200 at the beginning of their life as compared to an ECU 45 100 net benefit position of a current newborn female. Again, this highlights the stark tendency of current Austrian policy to redistribute in both the inter- and intra-generational dimensions.

For an alternative way of characterising the intergenerational imbalance, we ask: in order to serve intertemporal debt by how much must we increase taxes once and for all such that the lifetime tax burden of a current newborn and a future newborn are exactly the same? Relative to the baseline scenario, this method of satisfying the intertemporal government budget constraint relieves future generations and puts a higher burden on current generations. In this case, a permanent increase of all taxes by 16.6% would be necessary to equalise the accounts of current and future newborns who would then face a net lifetime tax payment of ECU 9 700 each. As a result, taxes would increase from 39.1% ([1]) to 45.6% of GDP. Alternatively, the fiscal imbalance could be removed by permanently cutting transfers by 14.8%, thus equalising lifetime net payments faced both by current and future newborns at ECU 9 300. Consequently, transfer payments would decline from currently 44.2% of GDP to 37.7%.

Two thought experiments help to identify the sources of intergenerational imbalance. The first experiment assumes that the officially recorded government debt is zero in the base-year, thus leaving only the implicit debt amounting to 142.7% of GDP. As a consequence, future generations would bear a lower tax burden than in the baseline scenario to service the implicit government liabilities. Their tax burden would swell only by 61.3%, compared to 82.7% in the baseline scenario. The absolute difference in the generational accounts of current and future newborns shrinks to ECU 101 700, down from ECU 137 200. Furthermore, intergenerational bal-

([1]) These figures for revenues and expenditures as a percentage of GDP do not correspond to those found elsewhere in the paper because contributions of public sector employees have been netted out.

ance could be restored in this case via a permanent increase in taxes by 12.3% (instead of 16.6% in the baseline) or a permanent cut in transfers by 11% (instead of 14.8%).

The second experiment assumes a constant base-year population structure. Under this scenario, intertemporal government liabilities amount to only 67.7% of GDP which means that implicit government debt reduces to 17.9% of GDP. Consequently, a comparatively moderate increase in lifetime taxes for future generations equal to 21.6% would now be enough to satisfy the government's intertemporal budget constraint. A tax increase of only 5.8% would suffice if it were extended to all generations. Similarly, the instantaneous and permanent cut in transfers that would be required to restore intergenerational balance, is no more than 5.7%. To conclude, the unfavourable demographic developments are a much bigger source of fiscal imbalance than the officially recorded level of government debt.

11.3.3. Sensitivity analysis

Our results might not be robust with respect to variations in some important parameters. The most crucial aspects of 'calibration' are the interest and productivity growth rates as well as population projections. The upper part of Table 71 reports how strongly basic results are affected by variations in interest and productivity growth. Low discount rates and high growth rates inflate the figures for intertemporal government debt. Within a reasonable range of parameter values, our estimate for the intertemporal public liabilities varies from 106.2 to 690.1% of GDP. All figures, however, are considerably higher than the explicit government debt of 49.8% of GDP. Consequently, within the range of parameter values tested, future generations would always face a higher tax load to service the debt. As with debt figures, the additional tax burden of future generations implied by current fiscal policy increases with lower interest and higher productivity growth, and remains within the range of ECU 126 500 and ECU 164 800.

In the last subsection, we have already checked how the results change when the population structure is kept constant. Both intertemporal government liabilities as well as the absolute difference in the accounts of future generations relative to those of current newborns represent about one third of baseline values, thus testifying to the importance of ageing. We also simulate a high and low migration scenario. In the former, migration swells to 24 000 per year until 2000, in the latter it declines to 10 000 annually until 2000, and stays constant thereafter. Recall, that the baseline scenario assumes that base-year

Table 71

Sensitivity analysis, Austria

(1 000 ECU) (*)

Productivity growth (%)		1	
Discount rate (%)	3	5	7
IPL (% of GDP)	354.0	164.5	106.2
Difference in the accounts of future and current newborns	153.9	133.2	126.5
Productivity growth (%)		1.5	
Discount rate (%)	3	5	7
IPL (% of GDP)	474.6	192.5	116.7
Difference in the accounts of future and current newborns	160.3	137.2	127.1
Productivity growth (%)		2	
Discount rate (%)	3	5	7
IP L(% of GDP)	690.9	230.4	129.8
Difference in the accounts of future and current newborns	164.8	142.1	128.5
Population projection	Baseline migration	Low migration	High migration
IPL (% of GDP)	192.5	198.0	187.1
Difference in the accounts of future and current newborns	137.2	157.5	120.8

(*) 1995 value.

net immigration of 17 000 per year stays constant. Table 71 shows that intertemporal government liabilities do not differ very much from the baseline case. Similarly, the absolute difference in the accounts of future relative to current generations is not much affected, either. High migration is a fiscal relief as it reduces intertemporal public liabilities, implying a lower net tax burden on future generations.

11.4. Restoring fiscal balance

11.4.1. Consolidation package

To satisfy the Maastricht debt and deficit criteria and to qualify for EMU required to consolidate government budgets faster and deeper than would probably have been politically acceptable otherwise — the latest consolidation package testifies to this necessity and is an impressive achievement on the way to fiscal intergenerational sustainability. The consolidation volume amounted to 4.5% of GDP but was stretched over the two-year period of 1996/97. Further consolidation in 1998 and 1999, each worth 1% of GDP, helped to sustain the budgetary improvements.

The consolidation package had immediate effects. The government debt ratio in 1997 fell by 5.4 percentage points against 1996. Table 72 shows the results of the numerical evaluation of this scenario. However, the budget cuts are treated as permanently affecting expenditures and revenues while in reality at least part of the measures had only a one-off effect. Hence, we implicitly assume further effort on the part of government to sustain the consolidation. Comparing the second and third column of Table 72, the package raises the net lifetime tax burden across the board for all presently living generations. Prior to the reform, newborns in 1995 received more transfers than they paid taxes over their lifetime. The budget consolidation changed their net benefit into a net tax position. For a 20-year-old at the beginning of a working career, the present value of net tax payments over the rest of life increases by 33%. A 45-year-old who previously received net transfers worth ECU 32 200 in present value, will now be a net tax payer. Finally, at

Table 72

Generational accounts for policy experiments, Austria

(1 000 ECU) (*)

Generation's age in 1995	Baseline accounts	Consolidation policy	Pension reform case a	case b	a and b	Migration scenario
0	– 17.8	6.6	7.3	9.0	9.7	– 17.8
5	– 12.1	13.7	14.6	16.6	17.5	– 12.1
10	15.9	41.4	42.5	44.8	45.9	15.9
15	57.5	83.0	84.3	87.1	88.3	57.5
20	81.3	107.8	109.3	112.6	114.1	81.3
25	78.7	106.1	107.9	111.8	113.6	78.7
30	62.6	91.0	93.1	97.8	99.8	62.6
35	39.0	68.7	71.3	76.8	79.3	39.0
40	11.5	43.0	45.5	51.0	53.4	11.5
45	– 32.2	1.3	3.4	7.9	10.0	– 32.2
50	– 83.7	– 48.2	– 46.8	– 43.6	– 42.3	– 83.7
55	– 148.3	– 112.5	– 112.0	– 111.1	– 110.7	– 148.3
60	– 206.1	– 173.2	– 173.2	– 173.2	– 173.2	– 206.1
65	– 211.2	– 182.7	– 182.7	– 182.7	– 182.7	– 211.2
70	– 191.8	– 168.7	– 168.7	– 168.7	– 168.7	– 191.8
75	– 167.5	– 149.2	– 149.2	– 149.2	– 149.2	– 167.5
80	– 136.1	– 123.0	– 123.0	– 123.0	– 123.0	– 136.1
85	– 106.0	– 97.4	– 97.4	– 97.4	– 97.4	– 106.0
90	– 81.6	– 76.4	– 76.4	– 76.4	– 76.4	– 81.6
95	– 59.7	– 57.2	– 57.2	– 57.2	– 57.2	– 59.7
100	– 23.2	– 23.2	– 23.2	– 23.2	– 23.2	– 23.2
Increase in all taxes, future (%)	82.7	11.8	8.7	1.8	– 1.2	77.4
Future generational account	119.4	26.4	22.1	12.5	8.2	110.6
Absolute diff.	137.2	19.9	14.8	3.5	– 1.5	128.5
IPL (% of GDP)	192.5	27.3	20.1	4.2	– 2.8	187.6

(*) 1995 value; baseline (r = 0.05, g = 0.015).

the statutory pension age of 65 for men, the net present value of pension rights and other entitlements is reduced by 13%. Intertemporal government debt is now slashed to 27.3% of GDP, down from almost double of current GDP prior to reform! This is a huge step towards fiscal balance but requires that the permanent nature of the budget cuts is sustained.

The remaining intertemporal public liability implies a further tax burden equal to ECU 19 900 on future generations in order to restore the fiscal balance, which is equivalent to an 11.8% increase of their tax burden. At the start of their life, future generations would face a present value of net taxes equal to ECU 26 400. Compared to the base case, these figures are small. We may conclude that the 1996/97 package largely, though not completely, corrected a major intergenerational imbalance existing in 1995.

11.4.2. Pension reform

The 1997 pension reform means additional fiscal tightening. The Ministry of Labour, Health, and Social Affairs estimated that the reform would reduce pension expenditures of the employee and self-employed schemes by 1.5% of GDP by 2030. Budget transfers to the pension fund for federal civil servants are estimated by the Ministry of Finance to fall by 0.1% of GDP. Two thirds of the estimated savings stem from the inclusion of a demographic factor, which means that the replacement rate is gradually reduced as life expectancy increases. Such a reduction is in principle agreed upon by the coalition government. Without the inclusion of the demographic factor, the total reduction in expenditures would not exceed 0.5% of GDP by 2030.

The pension reform contains a number of measures which cannot all be modelled in every detail. As a starting point, we consider the effect on the projected aggregate expenses of the pension system in 2030 when the reform will be fully effective. Then we adjust the life-cycle pension profiles in order to generate exactly the aggregate pension expenditure as of 2030. Letting the reform start in 2000, we adjust the pensions only of those people who retire in 2000 or later. The adjustment is phased in over 20 years.

In our simulations we use the projections by the Austrian government. When the pension reform will have full effect in 2030, overall pension expenditures are estimated to be 10.5% lower than in a base case of no reform being implemented. A reduction of 2.5% (case a in Table 72) would be the result of changes in the benefit assessment rules while a further reduction of 8% (case b) would be caused by the modification of the annual adjustment formula to reflect increased life expectancy. In the base case, pension benefits, excluding civil servants, are projected to rise from 10.4% in 2000 to 14.2% of GDP in 2030. Under the reform scenario, this figure would change to 13.8% (case a) and to 12.7% (case b) in 2030. It is also expected that the reform would lower expenditures on pensions of civil servants by 0.2% of GDP in 2030 as compared to the baseline scenario.

The results are shown in Table 72 under the heading ‘Pension reform’. Since the pension reform comes on top of the fiscal consolidation package, we now compare with the third column of Table 72 to obtain the differential effects of the pension reform. Since the reform affects new retirees only after 2000, only generations younger than 60 who retire later than 2000 see their pensions reduced. Consequently, their net benefit position must decline.

The demographic scenario of case b involves quantitatively more significant adjustments. Furthermore, the changes under the two scenarios relative to column 3 may just be added to give the effect of the combined scenario in the sixth column. Consider a newborn in 1995. Because she/he will receive a less generous pension when old, the present value of net taxes rises by ECU 700 in case a and by ECU 2 400 in case b, giving a total increase of the lifetime net tax burden by ECU 3 100 if both elements of the reform are implemented. This is an increase by almost one half relative to the position after the consolidation package.

In absolute terms, a 35-year-old in 1995 will face the highest increase in net tax burden among current generations equal to ECU 10 600. Because of the delayed start and long phasing in, the reform then rapidly loses its importance among current generations with still higher age. A 55-year-old male, for example, who retires at the statutory age in 2005, will see his pension only moderately reduced because his retirement still falls into the phasing-in period.

Incorporating the demographic factor under case b is a quantitatively more significant action than the change in the benefit assessment rule under case a, and would reduce the intertemporal government debt to a mere 4.2% of GDP, down from 27.3%. The account of a future newborn generation would have to exceed that by

a current newborn only by ECU 3 500. An increase in future taxes by 1.8% would suffice to restore fiscal intergenerational sustainability. These amounts are almost negligible if we compare to the imbalances of the baseline scenario.

Enacting the full pension reform would entirely remove any intergenerational imbalance between present and future generations, and would completely eliminate intertemporal government debt. If the government could ensure that both measures, the consolidation package plus the pension reform including the demographic factor, remain permanently effective, then it should be able to fully restore fiscal balance.

11.4.3. Immigration scenario

Finally, we evaluate the fiscal effects of large-scale immigration from 2000 to 2005, amounting to 1% of the work force per year. As a result, 36 000 immigrants are added to the 17 000 of the base-year 1995. After 2005, the net influx resembles the baseline figure of 17 000 on an annual basis. Immigrants are on average 17 years younger as compared to the current residents which are aged 38 years on average. This is an important scenario since eastern enlargement of the EU is hotly debated in Austria, and the labour market effects of immigration are much discussed. Moreover, not much is known about the fiscal and generational consequences of immigration.

Given the lack of adequate data, the age-gender profiles for immigrants in the base-year are taken to be the same as those of residents. However, the baseline age-gender profiles are weighted averages of residents and immigrants, as both are included in the household panel. The last column of Table 72 displays our findings. Since the scenario retains the current status quo on tax rules and benefit entitlements, immigration cannot affect the generational accounts of current living residents.

This is not the case for future residents whose accounts are indeed depending on how many immigrants will share in the overall burden. Hence, the important question we want to answer is how immigration alleviates the demographic burdens, i.e., the intergenerational stance of fiscal policy under a large-scale immigration scenario. The quantitative impact of large-scale immigration, however, is rather low. Intertemporal liabilities are reduced by only 5 percentage points to a level of 187.6% of GDP. Moreover, the German country study seems to imply that even this minor effect may have to be regarded as an upper bound (cf. Bonin/Raffelhüschen/Walliser (1997)).

11.5. Conclusions

Applying a standardised methodology of generational accounting, we evaluated the intergenerational incidence of the Austrian tax transfer system as of 1995. For this purpose, we computed the present value of lifetime tax payments net of transfers both for currently living as well as future generations. According to our baseline results, Austrian fiscal stance in 1995 was characterised by pronounced intergenerational imbalances in favour of currently living generations.

We found that overall government debt was about four times higher than officially recorded debt levels. To correct this imbalance by means of taxation, future generations would face a lifetime tax load that is 82.7% higher than the tax burden of current newborns. To satisfy the Maastricht criteria and to qualify for EMU, the government enacted a consolidation package in 1996 and a pension reform in 1997. Rather surprisingly, we found that full implementation with permanent effect of the combined reforms might be enough to restore intergenerational sustainability in government finances and re-establish intergenerational equity in Austria.

12. Finland: macroeconomic turnabout and intergenerational redistribution

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12.1. Introduction

Among the EU Member States, the Finnish economy has shown especially high variability in most macroeconomic indicators during the last decade. For example, the annual GDP growth rate in real terms topped in 1989 (1997) at a value of 5.7 (6.0)% while the bottom figure of – 7.1% was realised in 1991 after the breakdown of the eastern European trade patterns had seriously taken effect ([5]). Moreover, the unemployment rate soared from the 3% level in the 1960s and 1970s to 18% in 1994 and returned to a lower level of 14.5% until 1997.

A most obvious and specifically Finnish macroeconomic phenomenon has been the ups and downs of the general government deficit during the 1990s. In 1990, there was no such thing as a public deficit. In fact, the GDP share of public net lending was + 5.4% in 1990. It fell to – 8.0% until 1994, thus realising deficits. At present (1998), there is a minor surplus, amounting to 1.2%. As a consequence, the overall government gross debt (EMU calculation) rose from the comparatively low level of 14.5% of GDP in 1990 to its maximum level of 59.6% in 1994.

Status-quo projections of the central government's gross debt became an actual topic in the early 1990s. The situation was dramatically changed. Before, real interest rates used to be negative and central government deficits used to vary around zero — in the 1990s, both fiscal indicators have displayed high and positive values. In other words, status-quo projections resulted in exploding paths of government spending. Thus it is not at all surprising that the fiscal imbalance and other contemporary phenomena with intergenerational aspects already induced a debate on intergenerational issues in the early 1990s. As a first contribution to these debates, the Prime Minister's Office (PMO) published a corresponding report in 1994. This report included the first generational accounting for Finland based on the traditional method of this approach (cf. PMO (1994)). The line of arguing continued in the future report of the government, in which the generational effects of the 1990s fiscal policy were evaluated (cf. PMO (1997)). A set of more advanced generational accounts were presented in Vanne (1998) in which the burdens for the respective generations were expressed as percentages of their life-time earnings.

In what follows, we employ the standardised and advanced method of generational accounting outlined in Chapter 2 of this volume in order to analyse the generational impacts of different policies that are at the centre of present fiscal debates. We first compute the intergenerational distribution of net tax burdens in a baseline simulation where fiscal policy remains unchanged. Additionally, we investigate the intergenerational redistribution for three policy experiments. The first experiment illustrates the effect of the latest reforms and incentives on the average retirement age. The second policy experiment implements the outlined path of contribution rates to the public pension schemes. The third reflects the partial privatisation of public services.

The outline of the Finnish country study is as follows. Section 12.2 describes the recent economic performance, the ageing process and the current and future stance of fiscal policy in Finland. We continue with a brief data description and an outlining of the institutional settings of the Finnish public sector. Section 12.4 specifies the basic assumptions underlying the calculations and summarises the baseline results, which are then subjected to an extensive sensitivity analysis. Section 12.5 reports both the

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([5]) The figures quoted in this and the following section are to be found in EMI (1998), ETLA (1998), FMF (1998), Statistics Finland (1997b and 1998a). Unemployment figures follow the national definition; Eurostat definition figures, which are available only since 1995, may be slightly lower.

isolated and combined effects of the three policy experiments while Section 12.6 summarises our findings.

12.2. Basic economic facts and outlook

12.2.1. Economic performance

Real growth rate variability in Finland has undeniably been highest among the EU Member States during the last 10 years. In the very long run history the average real growth rate per capita has been quite high. From 1945 to 1989 the average annual real growth rate per capita was 3.7%. Since 1989, Finland has met a period of deep economic recession and a period of rapid growth. The average annual real growth rate was – 3.5% per capita in the four-year period 1989 to 1993 and + 4.4% in the four-year period 1993 to 1997. The living standard of 1989 was not achieved until 1997. The amplitude of the cycle in the 1990s has been the largest in the western world. This means that Finland has been an economic laboratory also in unemployment, public deficits and in correcting the course of the economy.

Due to high price and wage inflation rates and a narrow target zone exchange rate policy, the competitiveness of the Finnish economy was poor in 1990. The current account was in deficit, and real interest rates were high. In the late 1980s, high domestic demand had been financed by credit expansion. Years of rapid growth and low unemployment had raised unrealistically optimistic expectations. At the same time both western and Soviet export demand were declining. Positive, however, was that general government had been in surplus and the GDP share of central government gross debt amounted to only 10% approximately.

In 1991 (and at the end of 1990) it turned out that a large share of past investments could not meet the high return requirements. Private investment collapsed in 1991, exports were still declining and unemployment as well as public finances deteriorated rapidly. Firms and households were obliged to sell their assets in order to service their debts, which accelerated the decline of asset values. Lenders observed declining collateral values, and the debt deflation process was further accelerated (cf. Kiander and Vartia (1998)). Later this led to a bank crisis, to government guarantees, and to other banking industry support measures in order to stop the process. In November 1991 the Finnish markka was devalued by 12%, that is, the target zone was shifted, and in September 1992 the markka was allowed to float, which resulted initially in further devaluations. Exports began to grow in 1992 while domestic demand was still declining and real GDP decreased by 7.1% in 1991 and by 3.6% in 1992.

Rising unemployment and shrinking tax bases caused huge central government deficits. This happened in spite of the fact that large expenditure cuts and various measures aiming towards tax revenue increases were installed basically every year in the period 1991 to 1994. Hence, the public budgets will not display surpluses in the short run. The main direct reason for this stance in fiscal policy has been high, though declining, unemployment. Real economic growth since 1994 has been rapid but it has been based on a high labour productivity increase. On the demand side high growth rates have aimed towards specific export goods.

In the short run, competitiveness of the economy has been maintained by low price and wage inflation rates. In fact, the combination of high unemployment and comprehensive collective agreements in the spirit of Finnish incomes policy tradition are reasons behind the low wage rises. Low wage rises compared to labour productivity development have led to remarkable changes in the functional income distribution.

In spite of the high GDP growth rate, the fixed investment rate has remained below 20% of GDP, though the level used to be 25% during the past decades. In contrast to fixed investments, research and development investments have expanded rapidly. Finland is now one of the leading economies when it comes to the R & D investment share of GDP. The Finnish economy has already gone through a rapid structural change in the 1990s, and variations of investment strategies indicate further changes. A remarkable fact combined with the continuing structural change is that the difference of average education levels between the youngest and oldest age groups of the workforce is — within the OECD region — the largest in Finland. Of course, this also explains the relatively high unemployment and retirement rates among the elderlies. The competitiveness of the economy is still high and economic key agents are confident with respect to the overall future standing. Free labour resources are available, though due to the rapid structural change there is already excess demand for certain skill-types of workforce.

During the course of the 1990s every macroeconomic indicator has either constantly or at least temporarily dis-

played 'bad figures'. At the beginning of the decade the current balance, the inflation rate, the interest and GDP growth rate were far from being on 'healthy' levels. In the middle of the decade, unemployment and central government deficit showed alarming developments. However, at the end of the decade all indicators will most likely be in a range sufficient to meet even the tough convergence and stability criteria of the Maastricht Treaty. On the other hand, there are endangered candidates like the unemployment rate, tax rates and the general government gross debt which are among the first candidates likely to display insufficient figures.

12.2.2. Fiscal policy

Finland is a typical Nordic welfare state, although until the recession in the early 1990s the GDP share of general government expenditure was well below the Nordic average. While until the 1990s the overall tax load was at the average EU level, it rose during the recession to 6 percentage points above the EU average. In spite of rapid economic growth following the recession and large scale expenditure cuts, both tax rates and debt ratios have only slightly decreased from their historically top values of 48.1% in 1996 (overall tax rate) and 59.6% in 1994 (GDP share of general government gross financial debt).

The development of the tax load in the 1990s is a result of both poor average growth rates and discretely rising statutory tax rates deemed to be necessary in order to control the deficit and debt ratios. In what follows, we divide the tax revenue aggregate into three subcategories: income (direct) taxes, indirect taxes and social insurance contributions. Each aggregate shows a specific pattern during the 1990s. Automatic stabiliser effects have been the driving forces underlying the U-shaped pattern of the income tax-to-GDP ratio during the 1990s. The bottom value of average direct tax rates was realised in 1993. The 1997 amendments concerning major tax scheme adjustments stopped the rise. The majority of direct tax revenues are raised via labour income taxes through both the central government and local jurisdictions. Central government taxes display a progressive tax schedule while local taxes are indirectly progressive, i.e. tax deductions imply constant marginal but rising average tax rates with rising income.

In line with increasing economic growth patterns, the GDP share of capital income taxes and corporate taxes has risen significantly. This was triggered by two reforms of capital income taxation which have been passed into law in the early 1990s. In 1993 the typical Scandinavian approach to capital income taxation was passed and the so-called dual-income taxation came into force. Both capital income and firms' profits were first taxed with a low flat rate of 25% of taxable income. Later, in 1996, the tax rate was raised to 28%.

Indirect taxes have also shown a U-shaped pattern in the 1990s. Their bottom was reached in 1995. In early 1995, Finland joined the European Union. As a consequence, import duties and some special excise taxes had to be removed. Ever since 1995 there has been a steady rise in the share of indirect taxes to GDP. This was mainly due to a significantly increased petrol tax as well as a revenue-increasing push in the demand for vehicles.

As compared to direct and indirect taxes, social insurance contributions show an opposite pattern in the 1990s. Employers' as well as employees' and insured persons' statutory social insurance contribution rates topped in 1993–95. In this particular period, they were approximately 3 percentage points higher than in 1990 and 2 percentage points higher than they are at the time being. In 1993, structural changes took place which introduced wage-related contributions of the private and public sector's employees to pension schemes as well as unemployment insurance. Also in 1993, employees' contributions to the pre-existing unemployment benefit schemes were introduced at an initial rate which was as low as 0.3% of payroll.

On the general government expenditure side all the main items show a hump-shaped GDP ratio pattern in the 1990s. This is due to common effects of both GDP growth rates and expenditure cuts. The main pension benefit amendments were passed into law in 1993 and in 1996. In addition to recent reform measures it might be worth noting that the private sector statutory earnings-related pension schemes are not yet fully mature. In fact it will take decades until the last pensioners who do not have full accrued pension rights will have passed away.

The 1993 pension reform was basically a cut of pension benefits within the public sector's earnings-related pension schemes. In the long run, these changes are expected to lower the share of pension expenditures to GDP by approximately 1 percentage point, ceteris paribus. After this study's base-year 1995, there has been one additional major pension reform. In 1996, both the private sector's mandatory and earnings-related pension schemes as well as the national pension scheme were subjected to various changes (cf. Franco and Munzi (1996)). Overall,

the long-run effects of the expenditure cuts implied by all four measures are forecasted to encompass about 2% of GDP.

In various years during the 1990s, expenditure cuts have also been targeted at a range of other social in-cash and in-kind transfers. Note that these reforms have not been phased in but have been made fully effective from the very beginning of the respective changes. Also public services have been cut in the 1990s. For instance, the main part of age-related services, for example, comprehensive schools and hospitals, are run by local governments with, however, a high central government subsidisation. These subsidies have been cut and hence, the financial load was shifted to local governments. Nevertheless, the shrinking of local governments' tax revenues in the early 1990s has made it impossible to avoid overall cutbacks in these expenditure items.

The aggregate net lending of the general government is projected to be slightly positive in 1998. In the base-year of our calculations (1995), there was a significant deficit of 4.7% of GDP. The top deficit was reached already two years before, when it was 8% of GDP. Consolidated public gross debt was close to 60% of GDP at the end of 1995. On the other hand, there was also a stock of publicly held financial assets. The combined figure of the assets of private sector employees' pension funds, the shares owned by the State, cash funds and gross lending of the public organisations turn the sign of the general government's net financial debt in equation (1) negative ([1]). Overall, the net financial wealth figure amounted to FIM 46 billion or 8.4% of GDP (Statistics Finland (1997c)).

12.2.3. Ageing and future fiscal policy

As in most European countries, there is a double ageing process to be expected in the not-so-distant future. In fact, elderlies will make ever-higher proportions of the population and among the elderlies, the share of the oldest-old will increase. The latter fact is due to continuously decreasing mortality rates. For example, life expectancy at birth of females (males) was 80.2 (72.8) years in 1995 while in 1965 the respective figures were by approximately 7 years lower (Statistics Finland (1997a)). At the same time, total fertility rates of 1.7 are below the reproduction level and net immigration is basically nil.

In 1995, average individuals retired at age 58 while only 10% of the eligible persons retired at the normal retirement age of 65. The decrease in the average retirement age was not stopped until as late as 1996 when the minimum age of the early retirement schemes was raised to age 58. The effective retirement age has increased slightly ever since. A range of considered reform measures are aiming towards a continuation of the policy of further raising the average retirement age. This policy is underpinned by a continuously decreasing mortality which serves as a proper argument in this context. The above-mentioned facts are underlying our policy experiments of raising the effective retirement age as a consequence of both likely changes in the incentives and likely changes in the legal settings.

The role of public services is bigger in Finland than in many other EU countries. The only way to seek balance in this part of the public economy is to assume higher prices for the public services or by privatising them in some way. Without taking any explicit stance on the particular way to carry out this policy, we will discuss that issue below in the context of an experiment, in which the magnitude of public services, or to be more accurate, their long-run GDP share under a constant population, will be decreased.

12.3. Data description and institutional settings

12.3.1. Macro-data

The base-year for the generational accounts in the Finnish country study is 1995. We use national income and product accounts (NIPA) provided by Statistics Finland as the basis for aggregates of public revenues and expenditures. A decomposition of current public revenues and expenditures is presented in Table 73.

Net capital income is captured in the net financial wealth variable of the intertemporal budget constraint of the overall public sector presented as equation (1) in Chapter 2 of this volume. Interest expenditures in 1995 exceeded materialised cash returns on public financial assets by 0.5% of GDP. As we stated earlier, public net financial wealth was positive, that is, 8.4% of GDP. Negative net returns are mainly due to soft loans included in the finan-

([1]) Cf. Section 2.2 in Chapter 2 of this volume. Note that many of the companies are only partly owned by the State, and their stocks are quoted on the stock exchange. A large part of the pension fund assets is invested in government bonds — a fact for which we will adjust in the subsequent calculations.

Table 73

Public receipts and expenditures in Finland, 1995

(billion ECU)

Receipts		Expenditures	
Earnings income taxes	13.7	Pensions	12.8
Capital income taxes	3.1	Public health care	4.5
VAT	7.2	Social services and welfare	3.3
Excise taxes	4.5	Sickness insurance	1.4
Other indirect taxes	2.3	Education expenditure	6.4
Social insurance contributions		Unemployment benefits	3.8
Paid by insured persons	4.5	Transfers related to children	2.9
Paid by employers	10.1	Other social transfers	1.4
Other receipts	2.0	Subsidies	3.2
Deficit	3.7	Net investment	1.3
		Net interest payments	1.1
		Non-age-specific expenditure	10.1
Total	51.0	Total	51.0

Sources: Statistics Finland (1997b, 1998b), FMF (1997), VATT (1998), SII (1996a).

cial assets. It is very likely though that the sign of the net returns will change in the next few years, because the pension funds are increasing the share of stocks in their portfolios.

The primary balance of general government displayed a deficit amounting to 4.1% of GDP in 1995. According to projections of the Ministry of Finance, it is likely that it will show a surplus of 2.8% of GDP as of 1998. For the generational accounting calculations, the aggregates presented in Table 73 were distributed according to the age and gender profiles as far as the respective micro-data were available.

12.3.2. Age and gender profiles

The ideal data would have been published statistics diversified by gender and cohorts, that is one-year-age-groups ranging from 0 to 100 for 1995 to be used as explained in equations (3) and (4) in Chapter 2 of this volume. Wherever published statistics of these types were not available or if the age grouping was not dense enough with respect to variability by age, we used unpublished statistics with a more suitable age grouping. If this kind of data was not available, either, we used our own estimates, typically drawn from micro-simulation models as described in Riihelä and Sullström (1993, 1994) and Salomäki (1996).

On the revenue side of Table 73, age profiles were available for earnings income taxes, capital income taxes, value added taxes, other indirect taxes, social insurance contributions paid by employees and insured persons as well as social insurance contributions paid by employers. These revenue items covered 97.3% of the total public receipts in the primary balance. Since 1993 the Finnish income taxation system has been of the dual type. Earnings and transfer incomes are still taxed by a progressive tax schedule. Capital incomes and profits retained by firms are taxed by a constant rate, 25% in 1995.

Earnings income includes wages, other labour incomes and almost all transfers. Taxes on them consist of central and local government taxes. We first formed a consistent earnings income profile on one-year-age basis for both genders, and then used statistics on average earnings income tax rates in 10-year-age-groups (Statistics Finland (1998b)). Wages in some profiles were formed by using 10-year-age-group statistics and dividing these aggregates into one-year figures by a formula presented in Lappeteläinen (1994). The total share of all taxes on property is only 2.3% of all tax revenues and 1.1% of GDP. Property taxes were included in the earnings income tax aggregate.

We assumed that capital income and profit taxes are borne by the owners of the assets and firms. Age and gender profiles for capital income were drawn from individual income and property statistics (Statistics Finland (1998b)). We assumed that interest income source taxes show the same profiles as other individual capital

incomes. Profit taxes paid by firms were assumed to be paid by shareholders. The profiles could be drawn from the published distribution of dividend income by age (Statistics Finland (1998b)).

A pure value added tax system has been in force in Finland since mid-1994. The general tax rate was 22 % in 1995, but tax rates of 17, 12 and 6 % were applied to certain commodity groups. As to other indirect taxes, excise taxes on tobacco, alcohol, cars and many other commodity-specific taxes, for example, with environmental goals were among the most important. There are no age-profile statistics available on indirect taxes. We used household expenditure survey sample data of Statistics Finland and a micro-simulation model (cf. Riihelä and Sullström (1993, 1994), and Suoniemi and Sullström (1995)) to calculate the profiles.

In order to derive tax contents of different consumption patterns, input-output statistics data were used. The most recent year for both the household expenditure survey and input-output data to be available was 1990. We used these patterns and simulated legislation of the year 1995 with the model. The consumption data of the sample was on a household basis. This was converted into an individual basis by assuming weight 1 for every adult and weight 0.5 for every child in a household. Sample data yield non-smoothed results. We smoothed the age profiles by a local polynomial regression of a third degree.

Employers' and employees' social insurance contributions are sums of contributions to various schemes. In every scheme there are both employers' and employees' contributions. In every scheme earnings income is the basis for employers' contributions. The same holds also for employees' contributions, except for the national pension and health insurance schemes where the basis is earnings income plus taxable transfer income. In addition to the employees' and employers' contributions, tax finance is needed in every other scheme, except for private sector employment pension schemes, which are, on the contrary, cumulating funds.

Employer contributions were assumed to be paid by wage-earners. Contribution rates of private employment pension schemes are age-dependent because of higher disability risk at the end of the working career (Division for Actuarial Basis of the Statutory Earnings Related Pensions Schemes (1998)). The contribution rates by age were calculated from the income and tax statistics (Statistics Finland (1998b)). We used, however, direct statistics on contributions to national pension and health insurance schemes for those at the age of 54 and below as well as contributions to self-employed persons schemes (CPSI (1998)).

For general government expenditure, age profiles were available for the items pensions; public health care, social services and welfare; sickness insurance; education expenditure; unemployment benefits; transfers related to children; other social transfers; and subsidies. These variables covered 79.7 % of the total expenditures in the primary 1995 balance of the Finnish general government.

The age and gender profiles of total pension benefits are published by the Central Pension Security Institute and the Social Insurance Institution. We needed statistics by narrower age brackets, and we used unpublished statistics (CPSI and SII (1998)). Public health care and social service age and gender profiles are based on running costs and age-specific service demand data collected by the Ministry of Social Affairs and Health (1997). Age profiles show a U-shaped pattern, because day-care services dominate at the early age and health-care costs at the old age. Health insurance as well as the student benefit system are run by the SII. The age and gender profiles for health insurance are published in SII (1996b) and age profiles for student benefits in SII (1997). In Table 73, student benefits are included in the education expenditure item. Education service age profiles were taken from Mäki et al. (1996) (also in Franco and Munzi (1997)). The profiles are based on the running costs and age-specific service demand for different types of schools and universities in 1993.

There are three types of unemployment benefits. The main system is earnings-related and run by tens of unemployment funds. The two other systems are run by the SII. The age and gender profile statistics were collected by the Ministry of Social Affairs and Health (1998). We preferred to allocate the so-called family policy transfers to children. The age profile was last investigated with 1993 data by Mäki et al. (1996) (also in Franco and Munzi (1997)). Other social transfers include housing allowances, income support benefits, disability allowances, Military Injuries Act benefits and a few minor transfers. Housing allowances form one third of the aggregate. We used unpublished age and gender profiles of housing allowances produced by the SII (1998), and assumed all the other transfers in this category to be distributed by a flat profile along the age axis.

Subsidies are divided into two aggregates, consumption subsidies and other subsidies. The age profile for the first-mentioned subsidy type was calculated by using the data and method described above in the context of indirect taxes. Thus, the age profile for consumption subsidies is based on consumption patterns and subsidy contents of different commodities. Other subsidies are paid to farmers and other entrepreneurs. We used the age profile reported in Mäki et al. (1996). This profile is from 1993, and calculated by a micro-simulation model of the Government Institute for Economic Research (TUJA-model; about the model, see Salomäki (1996)). The profile is based on the age-dependency of incomes of self-employed persons.

12.4. Baseline results and sensitivity analysis

12.4.1. Basic assumptions

This section outlines the specific assumptions used in the calculations of generational accounts and intergenerational redistribution in Finland. First, the long-run gender-specific population projection will be discussed. After that, the aggregate public budget that has already been addressed in the previous section will be presented in standard form. Finally, the magnitude of exogenous parameters like productivity growth rate and real interest rate will be determined.

The population projection underlying the generational accounting calculations closely follows the official ones done regularly by Statistics Finland. The total fertility rate of 1.75 used in our projection corresponds to the official forecast. While in the 1990s the average total fertility rate has been over 1.8 (Statistics Finland (1997a)), the official forecast relies on the average of the last 15 years. Life-expectancy for women and men is assumed to continuously increase by one year per decade until 2010. This implies life-expectancies of 82.0 and 74.5 years for female and male newborns in 2010, respectively.

Net immigration is assumed to remain constant at its 1995 level of 3 265 and its 1995 age structure. While a vast emigration wave to Sweden that occurred in the 1960s and 1970s reduced the baby-boom generations living in Finland, they still (at the ages around 50) are the largest age groups. In spite of that, their children (at the ages around 25) form the smallest age groups of the current population. Finland has met modest net immigration since 1981. By following the official assumptions so closely, the population projection used in the generational accounting calculations draws the same picture as the official one, resulting in a serious increase in the old-age dependency ratio (number of people over 64 years/number of people aged 18-64). Old-age dependency will rise from 22 % in 1995 to 37 % in 2020 and over 42 % in 2030, while total population will shrink by about a quarter in the long run, that is, until 2100.

The absolute 1995 values of receipts and expenditures of the total public sector are reported in Table 73. Receipts encompass revenue from taxes on labour earnings and capital, VAT, excise, and other indirect taxes, as well as social insurance contributions by insured persons (including the self-employed) and by employers. The payment of these items can be attributed to the Finnish population according to the micro-profiles discussed in Section 12.3.2. Those taxes that have not been distributed by age are summarised under other receipts. The expenditure side begins with pension payments as the largest item, followed by health, social services and welfare, and health insurance.

Education expenditure consists of public education services as well as transfers to students. Further transfers are found in the categories unemployment benefits, transfers related to children which encompasses child, youth, and maternity benefits, and other social transfers. Subsidies can be classified into mainly agricultural and consumption subsidies, and are distributed by age according to the respective profiles. Non-age-specific expenditure as reported in Table 73 is calculated by subtracting from total government expenditure all age-specifically distributed expenditure on transfers, public services, and subsidies, as well as net investment and net interest payments.

For the calculation of future net payments, the age-specific per capita payments of the 1995 base-year, as well as net investment and government consumption, are assumed to increase with the productivity growth rate. In the baseline scenario an annual productivity growth rate of 1.5 % is assumed, which corresponds to the long-term EU average. For the calculation of present values for future receipts and expenditures a long-term real interest rate of 5 % is used as discount rate. Of course these values will be subject to sensitivity analysis in Section 12.4.3.

All calculations and concepts of illustrating the intergenerational redistribution in Finland follow the standard-

ised concept presented in Chapter 2 of this volume. Furthermore, in order to adhere to standardisation rules, the exceptionally high unemployment in the base-year is treated, in the baseline calculations, as if it persisted forever. It should be kept in mind, however, that a pure 1995 projection marks a worst case scenario in what concerns unemployment and its effects on the public budget. In fact, unemployment has been significantly decreasing until 1998 and is expected to decrease further. To take account of this, additional calculations have been carried through which might be regarded as a sensitivity analysis with respect to the development of unemployment.

12.4.2. Baseline findings

Table 74 shows the age-specific net payments of all living cohorts aged 0 to 100 years in the 1995 base-year under baseline parameters. While the second and third column report the accounts of male and female representatives of the living cohorts, the first column shows average accounts.

The first result that deserves to be pointed out is that the generational account of a current newborn is significantly negative: the present value of future public services and transfers received from the public sector exceeds the present value of taxes and contributions by ECU 83 200. This is remarkable since the net present value of benefits derived from non-age-specific expenditure and subsidies amounts to only ECU 67 800 for the average Finnish 1995 newborn, implying that even without taking account of this large benefit category, current newborns would still receive a net transfer from the public coffers over their life cycle.

During childhood and youth, net payments to the public sector remain strictly negative, but the accounts turn positive at age 13 due to lower discounting of future tax and contribution payments. For older cohorts, the discounted net payments steadily increase until a peak is reached with net payments amounting to ECU 87 400 at the age of 25. For the average Finn aged 25 to 43, the generational accounts are positive but falling, which is due to the lower discounting of future old-age benefits. Already at age 44, the accounts turn negative as the present value of rest-of-life benefits and transfers exceeds the present value of rest-of life tax and contribution payments. The

Table 74

Generational accounts for Finland

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 83.2	– 60.3	– 107.0
5	– 42.4	– 15.3	– 70.9
10	– 16.8	15.7	– 50.6
15	25.5	64.1	– 14.3
20	63.7	108.7	17.2
25	87.4	137.1	35.2
30	80.5	130.3	28.2
35	63.2	111.4	13.1
40	29.2	72.9	– 15.2
45	– 11.5	27.1	– 52.0
50	– 67.3	– 36.3	– 98.9
55	– 127.3	– 104.7	– 148.9
60	– 159.4	– 142.1	– 175.4
65	– 163.8	– 149.3	– 175.6
70	– 148.6	– 133.5	– 159.0
75	– 133.3	– 117.9	– 141.8
80	– 114.7	– 101.4	– 120.8
85	– 101.8	– 91.3	– 105.7
90	– 83.3	– 73.6	– 86.1
95	– 64.9	– 55.7	– 67.4
100	– 24.5	– 22.3	– 24.8
Increase in all taxes, future (%)	91.5		
Future generational account	71.6	113.6	28.2
Absolute difference	154.8	173.8	135.2
IPL (% of GDP)	253.2		

(*) Baseline (r = 0.05, g = 0.015).

maximum present value of net transfers, occurring at age 64, amounts to ECU 164 500. This remarkably high value explains why the second break-even takes place so early in Finland.

With further increasing age in the base-year, the absolute value of the average generational accounts decreases as less and less years of receiving net transfers remain.

From the second and third columns in Table 74 further information can be derived about the above-described average generational accounts. As these columns display gender-specific net payments to the public sector, the high degree of redistribution from male to female cohorts becomes visible. While male current newborns receive a net transfer of only ECU 60 300, female current newborns' net transfer amounts to ECU 107 000, thus exceeding the male accounts by 77%. The maximum generational account of female cohorts, occurring at age 25 like the one for males, falls short of the latter by 74%. The maximum net transfer, occurring at age 65 for both, is by 18% higher for female cohorts.

To better understand this rather extreme redistribution between the two sexes, it is helpful to take a look at Tables 75 and 76, which decompose the generational accounts according to the separate payment categories. The first five categories show the present values of future payments to the public sector, while the remaining columns display the present values of benefits and transfers received from the public sector. Excise and other indirect taxes are summarised in the category 'Other indirect taxes'. 'Social insurance contributions' comprise payments both from the insured persons and from employers. Sickness insurance is included in the 'Health and welfare' category, while 'Non-age-specific net benefits (NASNB) and Subsidies' is calculated by adding up the non-age-specific expenditure in Table 73 with subsidies and net investment, and subtracting non-age-specific government receipts.

A comparison of Tables 75 and 76 shows that while taxes, especially labour income taxes, and contributions are significantly higher for male cohorts, benefits are roughly equal for the two sexes, which explains why the

Table 75

Composition of male accounts for Finland

(1 000 ECU) (*)

	Tax payments					Transfer receipts					
Generation's age in 1995	Labour income	Capital taxes	VAT	Other indirect taxes	Social insurance contribution	Pensions	Health and welfare	Unemployment benefit	Child and youth	Education	NASNB and subsidies
0	51.7	13.1	33.9	31.6	59.7	27.7	46.3	15.3	39.0	55.5	66.4
5	61.3	15.4	35.9	33.6	707	32.6	33.9	18.1	13.7	65.9	68.0
10	72.7	18.1	38.2	36.0	83.7	38.3	32.4	21.5	8.6	62.4	69.8
15	86.2	21.3	40.6	38.7	99.2	45.1	29.7	25.5	2.7	47.1	71.8
20	101.7	24.8	41.6	39.8	116.0	52.8	29.6	29.2	0.0	29.9	73.6
25	113.1	28.1	39.8	37.7	126.3	62.4	31.4	28.0	0.0	12.6	73.5
30	112.5	30.4	37.2	35.1	125.1	73.6	33.6	25.7	0.0	5.7	71.4
35	112.0	33.1	34.7	32.8	116.0	86.6	36.1	23.3	0.0	3.3	68.1
40	103.1	32.5	31.9	30.0	101.5	101.7	38.3	20.7	0.0	1.8	63.5
45	93.0	31.9	28.3	26.4	84.1	119.3	40.9	17.8	0.0	1.0	57.6
50	77.7	26.8	23.9	21.9	61.2	139.2	42.6	14.8	0.0	0.4	50.7
55	59.6	20.8	19.5	17.1	35.1	158.5	43.4	11.8	0.0	0.2	42.8
60	47.5	17.0	15.4	12.6	17.2	170.5	43.1	2.7	0.0	0.1	35.4
65	33.5	12.7	11.9	8.8	8.3	151.3	44.5	0.0	0.0	0.0	28.7
70	27.7	10.5	9.3	6.2	6.8	125.1	46.1	0.0	0.0	0.0	22.9
75	22.1	8.5	7.1	4.3	5.5	99.8	47.4	0.0	0.0	0.0	18.0
80	17.2	6.6	5.2	2.7	4.2	77.5	45.8	0.0	0.0	0.0	14.1
85	13.2	5.1	3.8	1.7	3.2	59.5	48.2	0.0	0.0	0.0	10.6
90	9.3	3.8	2.7	1.2	2.3	42.0	43.2	0.0	0.0	0.0	7.7
95	6.0	2.7	1.8	0.9	1.5	26.7	36.4	0.0	0.0	0.0	5.5
100	2.4	1.1	0.7	0.4	0.6	10.7	14.6	0.0	0.0	0.0	2.1

(*) 1995 value; baseline (r = 0.05, g = 0.015).

Table 76

Composition of female accounts for Finland

(1 000 ECU) (*)

	Tax payments					Transfer receipts					
Generation's age in 1995	Labour income	Capital taxes	VAT	Other indirect taxes	Social insurance contribution	Pensions	Health and welfare	Unemployment benefit	Child and youth	Education	NASNB and subsidies
0	35.4	5.3	34.8	32.3	39.9	25.6	51.4	13.8	39.0	55.6	69.2
5	42.0	6.1	36.9	34.5	47.2	30.1	40.0	16.3	13.7	66.0	71.4
10	49.8	7.1	39.4	37.1	55.9	35.3	40.1	19.4	8.6	62.6	73.8
15	59.0	8.2	42.1	39.9	66.2	41.5	38.7	23.0	2.7	47.3	76.6
20	69.4	9.3	43.3	41.1	77.1	48.5	39.3	26.1	0.0	30.1	79.0
25	76.3	10.2	41.6	39.2	83.3	57.2	41.1	25.5	0.0	12.6	79.0
30	75.4	10.7	39.1	36.6	83.1	67.2	43.2	23.6	0.0	5.7	77.0
35	74.4	11.4	36.8	34.4	78.9	78.9	45.8	21.1	0.0	3.3	73.7
40	67.8	11.3	34.2	31.8	70.3	92.3	48.7	18.5	0.0	1.8	69.1
45	60.0	11.2	30.7	28.2	57.7	107.5	52.1	15.9	0.0	1.0	63.3
50	49.0	10.1	26.4	23.7	41.5	124.2	55.1	13.4	0.0	0.4	56.6
55	36.0	8.8	22.0	18.9	23.5	140.9	57.4	10.6	0.0	0.2	49.0
60	27.8	7.5	17.9	14.2	10.4	150.2	58.8	2.5	0.0	0.1	41.6
65	18.2	5.9	14.2	10.2	5.3	132.9	62.0	0.0	0.0	0.0	34.5
70	14.9	5.0	11.3	7.3	4.3	108.9	64.9	0.0	0.0	0.0	27.9
75	11.7	4.0	8.5	5.0	3.4	85.4	67.1	0.0	0.0	0.0	22.0
80	8.7	3.0	6.2	3.1	2.5	63.7	64.0	0.0	0.0	0.0	16.7
85	6.3	2.2	4.3	2.0	1.8	46.0	64.2	0.0	0.0	0.0	12.1
90	4.3	1.6	3.0	1.4	1.2	31.1	57.9	0.0	0.0	0.0	8.6
95	2.6	1.2	2.0	1.0	0.8	18.8	50.1	0.0	0.0	0.0	6.0
100	1.0	0.4	0.7	0.4	0.3	6.9	18.4	0.0	0.0	0.0	2.1

(*) 1995 value; baseline (r = 0.05, g = 0.015).

generational accounts are generally higher for male cohorts. The cause of this strong gender-specific redistribution is obviously found in a combination of weaker female labour market participation (although it is very high in international comparison), lower female wage level and higher female life-expectancy.

The distribution of net tax burdens between current and future generations is documented in the last part of Table 74. The generational accounts given for future cohorts are based on a hypothetical change in all taxes for future generations which would ensure the financing of the intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2 of this volume). These liabilities are calculated as the present value of the gap opening in the public intertemporal budget constraint if future generations were attributed the same tax and transfer structure as current newborns. In Finland, the intertemporal public liabilities in the baseline scenario amount to 253% of GDP, thus marking a sharp contrast to the explicit net financial debt of the total general government sector including social insurance, which is in fact negative. So while Finland possesses an officially reported net financial wealth of more than 8% of GDP, generational accounting exposes the fact that the true perspectives are not so rosy at all.

Financing the intertemporal debt by future generations' tax payments — while keeping taxes paid by currently living generations constant — requires that for them, all taxes are increased by 92%, which results in future newborns' generational accounts of ECU 71 600. So while current newborns receive a net transfer over their remaining life cycle, the picture completely changes for future generations. The absolute difference between future and current newborns' generational accounts amounts to ECU 154 800.

Alternatively, the extent of the liabilities passed over to future generations might be illustrated by two scenarios involving both living and future generations in the financing of the intertemporal debt. In the first scenario, all generations' tax and contributions payments are hypothetically adjusted so that the intertemporal public liabilities will be covered. This requires an increase in all

tax categories of 19%, which raises the tax quota by almost 9 percentage points to over 55% of GDP. Current as well as future newborns could then receive a net transfer of ECU 51 000 over their life cycle, which implies a loss of ECU 32 200 for average current newborns. Looking beyond this average value shows that while the net life-cycle transfer to female current newborns shrinks by only 26%, the net transfer to male current newborns decreases by 60%, thus even reinforcing the already strong redistribution between the two sexes.

The second scenario finances the intertemporal debt by lowering all benefit categories by 16%, thereby decreasing the transfer quota by almost 8 percentage points to 43% of GDP. The present value of net payments from the public sector for both current and future newborns would then amount to ECU 43 100. As transfers and benefits are more evenly distributed between the two sexes, male and female current newborns would be affected to rather the same extent. This is reflected by the absolute differences to their baseline generational accounts which are ECU 39 800 and ECU 40 500, respectively.

For a better understanding of the sources of intergenerational imbalance in Finland, two hypothetical scenarios are usually analysed. The first assumes financial net debt to equal zero in order to assess the contribution of outstanding public debt to the total degree of intergenerational imbalance. However, this hypothetical scenario is not appropriate to use in the case of Finland since net financial wealth, albeit small, is positive. But further information can be gained from the second standard analysis, assuming a hypothetically stationary population structure which rules out any effects of demographic change. Table 77a shows that in this scenario, the absolute difference between generational accounts is lower by ECU 95 700, or 62%.

Migration, on the other hand, does not play a comparable role in Finland. The calculations for a hypothetical scenario assuming zero net migration in 1995 and all future years result in an absolute difference in generational accounts of ECU 162 000, deviating from the baseline result by only ECU 7 200 or 5%. The main lesson to learn from this demographic sensitivity analysis is that while even a population stationary at the 1995 structure cannot fully ensure intergenerational balance, the largest part of intergenerational redistribution can be explained by population ageing and its impact on the public budget.

Table 77a

Sensitivity analysis — Population

(1 000 ECU)

Assumption on population	Baseline population projection	Baseline, without migration	Constant population structure
Absolute difference	154.8	162.0	59.1

Table 77b

Sensitivity analysis — Productivity growth and discount rate

(%)

Productivity growth		1.0	
Discount rate	3.0	5.0	7.0
Absolute difference	176.5	148.4	127.9
Productivity growth		1.5	
Discount rate	3.0	5.0	7.0
Absolute difference	184.2	154.8	132.7
Productivity growth		2.0	
Discount rate	3.0	5.0	7.0
Absolute difference	191.4	161.7	137.9

Table 77c

Sensitivity analysis — Unemployment

(1 000 ECU)

Assumption on unemployment	Baseline: 1995 value	Decrease until 1998	Decrease until 2005
Absolute difference	154.8	145.5	127.4

Productivity growth rates and real interest (discount) rates in percent. Absolute differences between current and future generations' generational accounts in thousands of ECU.

12.4.3. Sensitivity analysis

Table 77b also shows the results of sensitivity analysis with respect to the key economic variables. The absolute difference in the accounts of current and future newborns is calculated for alternative productivity growth rates and real interest rates: 1.0, 1.5 and 2.0% for productivity growth have been combined with real interest rates of 3, 5 and 7%, and applied to the Finnish case. While the central combination of a 1.5% productivity growth rate and a 5% discount rate represents the baseline, the other values show how baseline results would change if alternative combinations had been chosen.

The absolute difference between current newborns' generational accounts and future newborns' tax increase-adjusted generational accounts, amounting to ECU 154 800 in the baseline case, rises with increasing productivity growth rates and with sinking real interest rates used for discounting. The most favourable scenario, using r = 7% and g = 1%, results in an absolute difference of ECU 127 900, which is 17% lower than the baseline result. The most unfavourable scenario, on the other hand, using r = 3% and g = 2%, results in an absolute difference of ECU 191 400 which is 24% higher than the baseline outcome. With a mean value of ECU 157 300, the nine observations show a mean deviation of ECU 21 600, which corresponds to 14% of the mean value.

Roughly the same span as between baseline and the most favourable productivity growth and interest rate combination results from alternative assumptions on the development of unemployment. Table 77c shows the absolute differences in generational accounts for three unemployment scenarios. While the highest value for the absolute difference results from the baseline scenario, which considers the 1995 situation only and thus projects the extremely high 1995 unemployment level of about 17% into all future years, the other extreme case is marked by the assumption that the public expenditure on unemployment can be halved until 2005. In this case, the absolute difference is by 18% lower than in the baseline scenario.

While the development of unemployment underlying this scenario may well be plausible, it should be kept in mind that it is an optimistic projection. Therefore, a compromise scenario has been tested that assumes the same path of unemployment spending but stops at 1998 as this is the last year for which observations are available that can confirm the downward trend in unemployment spending. For this scenario the absolute difference between generational accounts amounts to ECU 145 500.

12.5. Policy experiments and generational balance

From the baseline generational accounts and their decomposition, the main sources of intergenerational imbalance have become obvious. First, the ageing process in the Finnish population, combined with a very low average retirement age of 58, renders the pension system unsustainable when constant contribution rates are assumed. The existence of some partly funded subsystems does not significantly change this. Therefore, one of the main aims of the reforms in the last decade has been to raise the average retirement age. Apart from this, the outspoken public policy in handling the upcoming problem of financing the pension system is to steadily increase the contribution rates to the public pension schemes by 0.2 to 0.3 percentage points of wages annually. Calculations by other authors have shown that if this policy was sustained until a total contribution rate to the public employment pension system of 30% was reached in 2035, this policy would suffice to ensure sustainability in this subsystem of the public sector.

But the intergenerational imbalance in Finland that has been ascertained in the previous chapter does not stem from the pension system alone. Population ageing will

lead to corresponding increases in public expenditure on health, welfare and other age-related public services. This second source of future burdens might be partly offset by the privatisation of various public services, either by completely selling them to the private sector or, alternatively, by levying charges on the use of public services.

To capture the main effects on intergenerational redistribution of the policy measures underway, three policy experiments have been designed. The first consists of increasing the average retirement age; the second implements the outlined path of contribution rates to the public pension schemes; and the third reflects the partial privatisation of public services. In the following, these experiments will first be analysed separately so that their isolated effects on intergenerational redistribution can be shown. Apart from assessing the degree to which these measures help to restore generational balance, the experiments show the extent of the measures necessary if generational balance should be attained by them. Finally, combinations of the three policies will be tested and evaluated in their potential to achieve intergenerational balance.

12.5.1. Isolated effects of policy reforms and intergenerational balance

Table 78 reports the isolated effects on intergenerational redistribution for the three policy experiments. The first experiment illustrates the effect of the latest reforms and incentives on the average retirement age. As an approximation, the average retirement age is steadily increased by three months per year, until, in 2015, the total shift in retirement age amounts to five years. The average retirement age will thus increase from the 1995 value of 58 years to a new value of 63 years in 2015. Of course, increasing the average retirement age does not only imply later retiring, but also a longer stay in the labour force (employed or unemployed). This is reflected in higher income tax payments and social insurance contributions, but also in higher unemployment benefits. However, the positive effect prevails. From the public budget perspective, this combination of both reduced spending and increased revenue is therefore an effective measure to relieve, to some degree, the public budget from the impact of the dreary demographic development.

The five-year shift in average retirement age lowers the tax change for all future generations needed to close the public intertemporal budget constraint from 91.5% in the baseline scenario to 70.9%. This results in an absolute difference between generational accounts of ECU 121 700 compared to ECU 154 800 in the baseline case. While this measure is apt to substantially decrease the degree of intergenerational imbalance, it is by far not sufficient to achieve balance. In fact, if generational balance should be achieved by solely increasing the average retirement age, the necessary shift to be performed until 2015 would be 16 to 17 years, implying an effective retirement age as high as 75.

Even if the higher average retirement age of 63 could be attained within five years, implying a rather implausible annual shift of a full year, the absolute difference between generational accounts would still amount to ECU 113 900. While in the retirement age scenario reported in the second column of Table 78 an instant and permanent cut in all pension expenditures, for current as well as for future generations, of almost 43% would be necessary to ensure intergenerational balance, the same shift in retirement age achieved in the shorter period would still demand a cut in all pension benefits of 40%. However, compared to the baseline case that reports 51% for this additional indicator, the retirement age experiment proves an important factor for Finland's way to intergenerational balance.

The second policy experiment proves to be as effective in reducing future generations' burden. The third column in Table 78 reports the results of gradually increasing the contribution rates to public employment pension schemes by 0.235 percentage points annually for 40 years. Starting at the 1995 total contribution rate of 20.6%, this increase leads to 30% in 2035. While this scenario does not affect 1995 pensioners at all, younger cohorts pay a considerably larger amount of contributions over their remaining lifetime.

The net transfer to 1995 newborns is reduced from ECU 83 200 in the baseline scenario to ECU 71 800. This leaves future generations with generational accounts amounting to ECU 49 600 and thus results in an absolute difference between generational accounts of ECU 121 400, which is almost 22% lower than the baseline value. To restore intergenerational balance by increasing the contribution rate to the public employment pension schemes, the necessary 2035 rate would be almost 65%. Of course, this hypothetical scenario of financing the total public sector's sustainability gap by contributions to one pension subsystem is thoroughly implausible. It may, however, serve to give an assessment of this experiment's relative contribution to restoring intergenera-

Table 78

The generational impact of policy experiments

(1 000 ECU)

Generation's age in 1995	Baseline	Expenditure 1: retirement age	Expenditure 2: contributions	Expenditure 3: public services
0	– 83.2	– 79.1	– 71.8	– 63.5
5	– 42.4	– 37.5	– 30.2	– 24.6
10	– 16.8	– 11.0	– 4.1	– 1.7
15	25.5	32.4	38.0	38.3
20	63.7	71.9	75.4	75.1
25	87.4	97.1	97.6	98.1
30	80.5	92.0	88.9	90.9
35	63.2	77.0	69.7	73.5
40	29.2	45.2	33.7	39.4
45	– 11.5	5.4	– 8.7	– 1.4
50	– 67.3	– 52.3	– 66.0	– 57.3
55	– 127.3	– 116.4	– 126.8	– 117.5
60	– 159.4	– 154.0	– 159.4	– 150.0
65	– 163.8	– 162.8	– 163.8	– 154.9
70	– 148.6	– 148.8	– 148.6	– 140.7
75	– 133.3	– 133.5	– 133.3	– 126.8
80	– 114.7	– 115.0	– 114.7	– 109.9
85	– 101.8	– 102.1	– 101.8	– 98.6
90	– 83.3	– 83.6	– 83.3	– 81.4
95	– 64.9	– 65.1	– 64.9	– 63.9
100	– 24.5	– 24.5	– 24.5	– 24.5
Increase in all taxes, future (%)	91.5	70.9	67.1	55.2
Future generational account	71.6	42.6	49.6	30.8
Absolute difference	154.8	121.7	121.4	94.3
IPL (% of GDP)	253.2	199.2	199.81	52.7

Average generational accounts, baseline (r = 0.05, g = 0.015).

tional balance. Indeed the degree to which the long-term increase in contribution rates reduces intergenerational redistribution is fully comparable to the effect of increasing the average retirement age by five years.

The third experiment consists of a gradual cut in all public services by 20 % until 2010. This affects public health services, welfare and social services, public services in education, as well as a wide range of public services like public order and safety, defence, housing and community amenities, recreation and culture services, transport and communication and others, that have been included in the 'NASNB and subsidies' category. As the fourth column in Table 78 shows, this measure significantly increases the generational accounts of all living generations.

The net transfer to current newborns is reduced from ECU 83 200 in the baseline to ECU 63 500. Future newborns' generational accounts amount to a net lifetime payment to the public sector of ECU 30 800 (baseline: ECU 71 600), which results in an absolute difference in generational accounts of ECU 94 300. This implies a 39 % change compared to the baseline, which shows that among the three policy experiments that have been analysed, the third is the most effective in terms of reducing the intergenerational imbalance caused by the current fiscal policy in Finland. If the policy of cutting down public services was implemented, an increase in average retirement age by 11 years until 2015 would in fact be sufficient to eliminate intergenerational redistribution.

12.5.2. Combined effects of policy reforms and intergenerational balance

While the isolated effects of the planned measures on intergenerational redistribution are considerable, neither of them suffices by itself to restore intergenerational balance. Table 79a therefore reports the absolute difference between generational accounts resulting from various combinations of those measures. If only two of the measures were to be combined, the recommendation from

the generational accounting perspective would certainly be to combine the 20% cut in all public services until 2015 with either the retirement age increase or the contribution rate increase. This policy combination would reduce the intergenerational imbalance by 60%. Combining the cut in public services with the long-term increase in pension contributions renders an eight year increase in average retirement age until 2015, sufficient for intergenerational balance.

To appreciate this result from the reversed perspective, all three policy experiments have been combined to an ambitious total project. This implies that average retirement age is effectively increased by five years until 2015, while at the same time the contribution rate to the employment pension schemes is increased by annually 0.235 percentage points until a total of 30% is reached in 2035, and the expenditure on public services is cut down by 20% until 2010.

Table 79b reports the results of the all-experiments combination for three macroeconomic scenarios differing in the underlying assumption on the development of unemployment. For the baseline scenario treating the high 1995 unemployment as a constant long-run value, this results in an absolute difference between generational accounts of ECU 26 600 which reflects a 14% increase in all taxes for future generations. An equalisation of current and future newborns' generational accounts could be achieved by increasing for both current and future generations, instantly and permanently, all taxes by 3%, which reflects a tax quota increase of only 1.4 percentage points. Alternatively, a further cut in all benefits for all generations by less than 3% would be sufficient to restore intergenerational balance.

If the decrease in unemployment that has been observed until 1998 is taken into account, the results are even more favourable: in this case, the absolute difference between generational accounts amounts only to ECU 15 000, based on an 8% increase in all taxes for future generations. The increase in the tax quota, or, alternatively, the decrease in the transfer quota, for all generations sufficient to restore intergenerational balance would be less than 1 percentage point either way.

The optimistic scenario assuming unemployment to further decrease until 2005 at the same rate as observed between 1995 and 1998 even overshoots intergenerational balance, so that the generational accounts for future newborns, resulting from a 3% cut in all taxes, would exceed the current newborns' accounts by ECU 6 500. In the light of these results, the planned reforms prove to be suitable as well as sufficient to restore inter-

Table 79a

Combined effects of policy experiments — The generational impact of combined policy experiments

(1 000 ECU)

Experiment combined with	Expenditure 1: retirement age	Expenditure 2: contributions	Expenditure 3: public services
Expenditure 1: retirement age	121.7	86.7	61.2
Expenditure 2: contributions		121.4	61.4
Expenditure 3: public services			94.3

Absolute difference in generational accounts, combined policies. Baseline: ECU 154 800.

Table 79b

Combined effects of policy experiments — Unemployment and generational impact of all experiments

(1 000 ECU)

assumption on unemployment	Expenditure 1 +2 +3 baseline	Expenditure 1 +2 +3 decrease until 1998	Expenditure 1 +2 +3 decrease until 2005
Current newborns' account	– 47.6	– 45.1	– 39.6
Increase in all taxes (%)	13.9	7.8	– 3.3
Future generational account	– 21.0	– 30.1	– 46.1
Absolute difference	26.6	15.0	– 6.5
IPL (% of GDP)	42.0	23.7	– 10.1

generational balance, if unemployment stays on its downward path and if these measures are taken seriously. It should be recapitulated that, for example, the assumed increase in the employment pension scheme contribution rate is a very long-run instrument that might lose public support before the total rate of 30% is reached in 2035.

12.6. Summary

The Finnish economy has shown negative as well as record-high real growth rates in the course of the 1990s. Recently, the economic performance seems to be stabilising, but as in most EU Member States, high unemployment rates and public deficits are rather persistent phenomena. It is in the form of these imbalances that the deep recession following the restructuring of traditional trade patterns with eastern Europe seems to be still present in today's Finland.

In the last decades, the total fertility rate in Finland has been below reproduction level. Since continuously decreasing mortality rates fuel the double-ageing process, too, the historically exceptionally favourable age structure of the present population will turn into the opposite during the next two decades. Thus, some breathing room for potential reforms of the paygo-financed pension systems is still present but running out soon.

These two stylised facts expose the main causes for a severe intergenerational imbalance which is only partially recorded as public deficits. Applying an advanced method of generational accounting to the 1995 Finnish fiscal policy reveals that the liabilities hidden in generational contracts are enormous. In the baseline scenario, assuming status quo conditions with respect to the macroeconomic performance, the intertemporal liabilities of the entire public sector make up 253% of GDP. The absolute difference in the net tax load between current and future generations amounts to a figure of ECU 154 800, indicating a tremendous redistribution to the disadvantage of future generations.

This imbalance cannot be cured through minor alignments of current fiscal policy. This is shown by specific policy experiments with 1) a realistic increase of effective retirement age, or 2) an increase of social insurance contributions alone, or 3) a decrease of public consumption expenditures. The absolute difference in net tax burdens of current and future generations would thus shrink to approximately ECU 121 700 and ECU 121 400 in the two first experiments and ECU 94 300 in the latter.

By analysing different combinations of the three policy experiments, we found that in order to design an intergenerationally balanced and sustainable fiscal policy all three measures are needed. Without altering the unfavourable labour market assumptions, the combined result of all three experiments would imply an absolute difference of ECU 26 600 to the disadvantage of future generations instead of ECU 154 800 in the baseline. Assuming that future unemployment stays constant at the more favourable 1998 level further reduces the imbalance to an absolute difference between generational accounts amounting to ECU 15 000. Hence, if future labour markets continue to recover from structural unemployment, and if the measures analysed in the policy experiments are effectively carried through, the Finnish fiscal policy will be sustainable or — in the case where the 1995 unemployment rate can be halved until 2005 — will even slightly overshoot, to the advantage of future generations.

13. Sweden: the Swedish welfare state on trial

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13.1. Introduction

The Swedish economy has performed rather poorly since the 1970s. In 1970 Sweden was one of the richest countries in the world with moderate inflation and very low unemployment: GDP per capita was 114% of the OECD mean, the inflation rate 6.7%, and the unemployment rate 1.5%. The growth of the Swedish economy after 1970, however, was significantly lower than in other OECD countries. This led to a per capita GDP that was only 96% of the OECD average in 1995. Inflation increased to over 10% around 1990, decreasing sharply thereafter resulting in 2.5% in 1995. The unemployment rate stayed around 2% until 1990, when it rose significantly in connection with the fight against inflation. It became 8% in 1995.

There were several reasons behind the determined fight against inflation in the early 1990s. Many economists and politicians claimed that the high inflation was responsible for the bad growth performance of the Swedish economy since in an environment with high and increasing inflation, firms were more inclined to increase prices than to lower costs through productivity growth. Another important argument for the low inflation policy was the wish to coordinate monetary policy with the rest of Europe.

Although Sweden does not fully participate in the final stage of EMU the country commits to the principles of nominal convergence and fiscal discipline. The main reason why Sweden does not participate is the inflexible Swedish labour market. There is a fear that, for instance, a wage shock would increase unemployment from an already high level and that the inflexible labour market would prevent unemployment from returning to a normal level. The Swedish government, therefore wants to keep the possibility of a depreciation of the Swedish krona as a potential cushion in the fight against unemployment even though it has committed itself to low inflation by granting the central bank the task of solely conducting monetary policy in order to obtain price stability. However, the ambition is that Sweden shall join the EMU after substantial labour market reforms.

Independent of whether or not the country eventually joins the EMU, the government has promised tough fiscal discipline. In fact, an official target of an average budget surplus of 2% of GDP over the business cycle was announced in 1997 (cf. SCB (1997a), p. 150). The welfare state is, however, subject to several challenges that could prevent the government from reaching its ambitious goal for the budget while sustaining the welfare state at its present level. It may, for instance, be hard to motivate labour market insiders to support outsiders, especially if the fraction of unemployed is persistently large. Moreover, it may very well be equally difficult to motivate employed agents to support the large group of retired elderly. A tax revolt is one possible result, another is that the increased mobility within Europe may induce young and mobile individuals to emigrate to countries with less ambitious welfare schemes, thereby eroding the tax base of the welfare programmes.

Another challenge for the welfare state is the double-ageing phenomenon. Higher life expectancy in combination with low birth rates, creates an increase of the share of retired individuals who do not work. The effect is reinforced by the tendency towards early retirement that we observe in Sweden. The pension reform of 1998 is, however, a counter-acting force that makes the retirement age more flexible and encourages individuals to postpone their retirement.

A generous welfare state of the Scandinavian type is, of course, much easier to sustain if almost everybody is in the work-force and contributes to it. The Swedish popu-

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lation has in the past been very homogenous and almost everybody has been working. No groups of the population can *ex ante* be identified as less productive. Immigrants, at least until the 1990s, have relatively successfully been integrated into Swedish society. The vision of a generous welfare state, therefore, goes very much in hand with the vision of a population where everybody has jobs, pays taxes, and where no severe problems with free riders exist.

In the following analysis, we employ the method of generational accounting outlined in Chapter 2 in order to analyse the generational impacts of both today's fiscal policy and future policies that are of special interest. We start to compute the intergenerational distribution of tax burdens in a baseline simulation where fiscal policy as of 1995 is assumed to remain unchanged for living generations. Then, we compute the intergenerational distribution for three other scenarios. In the first one, we determine future labour income taxes or future transfers in a way that the average government budget surplus amounts to 2% of GDP until the government debt turns zero. This is in line with the government's so-called budget target declaration. In the second simulation we increase the effective retirement age by two years, aiming at tempering the effects of population ageing. Finally, we investigate the consequences of an annual emigration of 2% of all 25-year-old individuals.

The outline of the Swedish country study is as follows. We start with a survey of the fiscal situation in Sweden in Section 13.2. A brief description of the tax and transfer system is given in Section 13.3, while Section 13.4 comments on the current debate on fiscal policy. The further sections assess the degree of fiscal balance in Sweden from the perspective of generational accounting. First, we document rather briefly the utilised sets of Swedish micro- and macro-data in Section 13.5. Section 13.6 reports the baseline results with respect to the generational stance of current fiscal policy in Sweden. Furthermore, the impact of the policy experiments on generational distribution is evaluated. Section 13.7 summarises our results.

13.2. Fiscal performance

The extent of government involvement in the Swedish economy has increased significantly over the last 25 years. The share of general government expenditures to GDP increased, from 43% in 1970 to 65% in 1995. Although government revenues increased dramatically too during this period, this has not been sufficient to completely balance the budget. As a consequence of the deficits, the government debt-to-GDP ratio increased slowly from 1970 to 1990, and then doubled between 1990 and 1995 in connection with a severe crisis. In 1995 government debt made up 80% of GDP. Of course, the increase in government debt has also affected net interest payments that increased significantly especially between 1990 and 1995.

The expansion of government expenditures relative to GDP is primarily due to increases in transfer payments, the GDP share of which has more than doubled between 1970 and 1995, from 11 to 25%. Government consumption, including health and education costs, has increased somewhat relative to GDP, while governmental investment has decreased.

The corresponding expansion of government revenues is primarily due to increases in social security contributions. Most of the social security contributions are payroll taxes paid by employers, i.e. employees do not directly observe these taxes since they are not part of actual and official wages. The social security contribution's share of GDP has approximately doubled between 1970 and 1995, from 8 to 14%. Indirect taxes also contribute to the expansion while direct taxes' share of GDP was roughly constant until it decreased somewhat with the tax reform of 1990.

As mentioned above, Sweden underwent a severe crisis in the early 1990s which was triggered by a collapse of real estate prices and resulted in substantial losses for Swedish commercial banks (cf. Lindbeck 1997). GDP, in real terms, fell by 4.7% between 1990 and 1993 and unemployment increased dramatically to nearly 8%. The crisis put a lot of pressure on government budgets. Tax revenues decreased, transfer payments and government consumption increased, and government debt almost doubled. Two facts are worth mentioning in this context. First, welfare programmes did manage to deliver assistance to those who needed it. Second, however, this assistance was very costly. In order to guarantee the survival of the welfare state, it is therefore necessary to operate with a large buffer in the form of financial assets. This insight is manifested in the government's target of a 2% average budget surplus over the business-cycle.

13.3. The tax and transfer system

Its ambitious welfare programmes have made Sweden the archetype of a Scandinavian welfare state. All resi-

dents are guaranteed a respectable living standard. The government sector provides collective insurance against temporary and permanent income losses, social services, education and health care. The production of services, education and health care is carried out almost entirely by the government sector. As a result, none of these activities is exposed to competition.

Recently, this monopolistic situation has been questioned in public debates and there is increasing evidence of potential gains from exposing the government production to competition. The present aim for most political parties is not, however, to entirely privatise the production, but rather to allow private enterprises to have a share of around 20 % of the market. The sole reason for the privatisation is to increase efficiency. Hence, the government sector will continue to pay for the services even in the case where part of the production is privatised. The ambitious welfare state is the reason for the large government sector while government activity in the business sector does not play a significant role.

As mentioned above, transfer payments have more than doubled between 1970 and 1995 as a result of a number of very costly reforms. For instance, a maternity assistance programme was introduced to support and promote fertility which, in fact, increased birth rates dramatically. Parents are together entitled to a paid parental leave of 450 days. For 360 of these days, they receive 80 % of the labour income they had before the leave and for the remaining 90 days they receive a relatively small amount that is independent of their income and the same for all recipients.

It is an intentional policy that many transfer payments are offered without means testing or are related to past contributions. Sweden has carried the welfare state further than most other countries in Europe, both in terms of coverage and generosity. Safety nets are not only provided for the less fortunate in the society, they are also extended to the general population. This is a policy that most Swedes regard as both fair and necessary in order to get the support of the middle class. In fact, the middle class is only willing to pay the high taxes necessary to sustain the welfare state if they get something in return.

The welfare state has led to a high level of taxation. The level of total tax revenues including social security contributions to GDP in 1995 is 50 %. This is one of the highest in Europe. However, it should be kept in mind that, unlike Sweden (and Denmark), most EU countries pay transfers on a net-of-tax basis. In some European countries, household subsidies are given in the form of deductions from the tax base rather than through direct transfer payments. These factors probably account for some of the difference in gross tax rates between Sweden and other European countries. Still it is clear that Sweden is a country with very high taxes.

In 1990, a remarkable tax reform was enacted in Sweden. Before 1990 marginal taxes — sometimes as high as 80 % — as well as large tax wedges made the tax system fairly inefficient. The idea of the reform was to decrease deadweight losses without changing total tax revenues. The reform broadened the tax bases, introduced a flat tax rate of 30 % on all capital incomes, made capital losses and interest payments deductible at the same rate, and set the marginal tax on labour incomes to 50 % at a maximum. The new tax scheme was changed almost immediately, however, after the severe economic crisis which occurred in the early 1990s.

As mentioned above, the share of retired individuals in Sweden is increasing, and is expected to increase even more in the not-so-distant future. The effective retirement age is also considerably lower than the stipulated one due to factors such as generous early retirement programmes for the unemployed. These features put significant pressure on the pay-as-you-go (paygo) pension system. The system was therefore reformed in 1998. The main objectives were to design a system that is more robust with respect to demographic changes and the performance of the Swedish economy, but also to encourage individuals to postpone their retirement.

The new pension system is actuarially fair for most individuals, with two exceptions. First, a minimum pension for low income earners is guaranteed. Second, when calculating the primary insurance amount, incomes over a certain ceiling are not taken into account, even though contributions are paid on these incomes. The pension entitlement one acquires during working years will be annuitised according to, primarily, the average life expectancy at the time of retirement. While pensions in the new system are indexed by the average net income growth, pensions that still stem from the old system are indexed by the minimum pension.

The minimum pension is determined by the parliament each year. The implicit rule is that the base amount should be fixed in real terms, but since this is not regulated by law, exceptions are made whenever the financial

situation requires it. The new pension system is to a large degree still a paygo system even though it is possible to put a small fraction of the money in pension funds managed, for instance, by banks or trade unions. The return on the individual pension fund is of course not determined by the average payroll growth.

The redistributive capacity of the Swedish tax system is quite significant. The Swedish distribution of income before taxes and transfers is compressed much more than that of most other European countries. The distribution of disposable incomes is therefore even more egalitarian than in the rest of Europe. The redistributive effects of taxes and transfers are further enhanced by specific provisions of public services, such as education and subsidised childcare.

13.4. Current debates on fiscal policy

At the centre of the Swedish fiscal policy debate is a difficult and well-known question: How can the government collect enough tax revenues to pay for the welfare state without letting the combined effect of taxes and transfers destroy work incentives? The question may not always be as clearly stated, but is always implicitly present. Those who claim that it is impossible to sustain the present welfare state and high taxes often refer to the increased mobility within Europe as the force that will erode the welfare state.

At any rate, there is a strong public opinion that wants to decrease tax pressure. Decreased taxes are especially important to motivate entrepreneurs and owners of small firms and are considered as an important key in fighting unemployment. However, all political parties agree upon the principle that tax cuts must be fully funded. Stated differently, for every tax cut there must be a corresponding cut in expenditures. The political parties are reluctant, after all, to specify permanent reductions in the welfare schemes.

There is a general concern that high unemployment — which has existed only since 1990 — will become permanent. A labour market reform to increase flexibility is therefore very high on the political agenda. Most politicians and economists regard such a reform as the best way to reduce high structural unemployment. At the same time, there is also a growing concern that a significant part of the long-term unemployed will never return into the active labour force. Labour market programmes and education of unemployed are activities that are frequently utilised to significantly decrease the duration of the unemployment status.

In Sweden there is also a strong tendency towards early retirement, which further decreases the labour force. This tendency is explained by the existence of various generous early retirement programmes. Many people now feel entitled to receive public retirement benefits already at the age of 60, regardless of their health status or other conditions. It is therefore difficult to scale back the demand on these types of benefits. The pension reform of 1998, however, encourages individuals to postpone their retirement, although it does so with rather mild pressure. It is very likely that there will be more serious attempts in the future to increase the effective retirement age.

Furthermore, as in all Scandinavian countries, there is an ongoing debate in Sweden about a ‘green’ tax structure where labour income taxes are swapped against taxes on emissions of carbon dioxide, sulphurdioxides, and other substances that contribute to the pollution of the environment. Such a tax switch might induce a double-dividend implying both an increase in employment and an improvement of the environment. But even if this works out, it will probably not raise enough tax revenues to sustain the welfare state in the long run (cf. Jensen and Raffelhüschen (1998) for a generational accounting experiment of a tax switch for income taxation to a green tax in the case of Denmark). One of the most striking arguments is that high taxes on pollution will decrease the externality and thereby erode the tax base for this Pigouvian type of green tax. Hence, in calculating the intergenerational effects of fiscal policy reforms, we refrain from considering double-dividend effects.

13.5. Method and data sources

In order to calculate generational accounts for Sweden we use the methodology as described in Chapter 2 of this volume. The data comes from two main sources, Statistics Sweden (SCB) and the Ministry of Finance (MF).

SCB (1996a, 1 997b) provides the official demographic data and the majority of the macro-data. Other parts of the macro-data, e.g. on child and health care, stem from Statistics Sweden and the Swedish Association of Local Authorities (cf. SCB/Svenska-Kommunförbundet (1996)) while parts of education expenditures are taken from the National Agency for Education (cf. Skolverket

(1996)). The ecu exchange rate is the official 1995 average provided by the Swedish Central Bank.

Most individual age-sex-profiles were taken from the income distribution survey which is published in SCB (1996b). More detailed information was provided, upon request, by the Ministry of Finance. Some profiles could not be taken from this source. These exceptions concern the following. (1) The child care profiles are from SCB/Svenska-Kommunförbundet (1996) and include day care centres, leisure time centres, pre-school groups and family day care units. (2) The health-care profiles are approximated by the average days in hospital by average individuals. These data are from the National Board of Health and Welfare (cf. Socialstyrelsen (1997)). (3) The education profiles stem from SCB (1996c) and the National Agency for Education (cf. Skoleverket (1996)). These profiles consist of compulsory school, upper secondary education and higher education. Included also are adult education and special schools for the physically and mentally disabled.

All other profiles are retrieved from the so-called HINK micro-database provided by the Ministry of Finance. They consist of taxes and transfers to and from all government authorities. Taxes are divided into capital income tax, local and federal labour income tax, wealth tax, property tax, social security contributions, and indirect taxes. Indirect taxes are distributed in accordance with disposable income. Transfers consist of housing allowances, child allowances, social assistance, pensions, sickness pay, labour market assistance, maternity benefits and educational expenditures. The remaining non-age-specific expenditures by the government sector are distributed evenly over the life cycle.

The aggregates in our calculation do not exactly correspond with the numbers in the national income and product accounts (NIPA) since they stem from different sources with different definitions and treatments of the raw data. We therefore multiply each micro profile by a factor so that this profile after aggregation over age and gender exactly corresponds with the NIPA-figures.

13.6. The baseline results and sensitivity analysis

13.6.1. Basic assumptions

This paragraph specifies the basic assumptions underlying the Swedish generational accounting calculations. Of course, the assumptions play a major role in firstly, projecting the Swedish demographic development, secondly, preparing the aggregate government budget of the base-year 1995, and thirdly, estimating the government's financial net debt position in the base-year. Finally, assumptions are made concerning the rate of productivity growth and the interest rate — both being exogenous in the calculations.

Our population projections start in 1995 and extend to 2020. They are based on fertility, mortality and net immigration assumptions taken from Statistics Sweden (SCB). In the baseline calculations, fertility rises from a — by international standards already high — level of 1.73 in 1995 to 1.83 in 2012. It stays constant thereafter. Furthermore, in the period from 1995 to 2010 female (male) life expectancy is assumed to increase from 81.53 (76.51) to 83.3 (78.5) years. Since our projections cover a much longer period of time, we deviate from the official statistics by holding life expectancy at birth constant after 2010. In correspondence with Statistics Sweden, we finally assume a constant net immigration of 12 000 individuals per year which amounts to 0.14% of the base-year population.

Table 80 shows the overall government budget for 1995 which, in combination with the age-profiles, determines the per capita payments for specific cohorts in the base-year. The budget covers the entire government sector, consisting of the central government, various local governments, and social insurance institutions. All intergovernmental transfers are cancelled out. The official Swedish figures are converted into ecu by the 1995 average exchange rate of ECU 0.108 per Swedish krona.

The tax receipts of the government sector comprise taxes on capital and wealth, the central and local government labour income tax, social security contributions, property taxes, VAT and other indirect taxes. Note that the capital tax revenue is negative due to very generous opportunities of tax deduction ([1]). The government's transfers encompass pensions, housing allowances, social assistance, labour market assistance, sickness pay, parent allowances, health care and special care for the old, childcare, general education and educational grants. Corresponding with the methodology described in Chapter 2, interest paid on government debt will be ignored while calculating the generational accounts.

([1]) This is similar to all other Scandinavian countries. See, for example, Jensen and Raffelhüschen (1997, 1999) for the Danish or Steigum and Gjersem (1999) for the Norwegian country study.

Table 80

Government receipts and expenditure in Sweden, 1995

(billion ECU) (*)

Receipts		Expenditure	
Local and federal government tax	33.5	Pensions	21.7
Capital income taxes	– 0.6	Housing allowances	2.1
Wealth tax	5.5	Social assistance	3.7
Property tax	1.2	Labour market assistance	5.9
Other indirect taxes	24.5	Sickness pay	2.0
Social security contributions	26.3	Parent allowances	2.0
Government deficit	11.8	Child allowances	1.8
		Childcare	3.7
		Education grants	1.0
		Education	10.8
		Health and special care for the old	14.8
		Non-age-specific expenditure	28.0
		Interest Payments	4.7
Total	102.2		102.2

Source: Statistics Sweden, Svenska Kommunförbundet, and Skolverket.

In the intertemporal budget constraint of the Swedish government we only take net financial wealth into account. The figure is negative, i.e. it is a real debt, and amounts to ECU – 65.7 billion. Existing real wealth, such as infrastructure, will enter the calculation through the corresponding returns, unless it is provided free of

Table 81

Baseline generational accounts, Sweden

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 99.0	– 65.6	– 133.8
5	– 79.6	– 40.2	– 121.4
10	– 29.5	17.3	– 79.0
15	22.1	77.5	– 36.0
20	78.5	141.3	12.9
25	104.9	171.7	35.2
30	111.4	176.2	43.3
35	105.2	163.2	43.9
40	84.5	134.4	32.5
45	49.1	91.0	6.3
50	0.4	35.4	– 36.2
55	– 61.2	– 34.8	– 88.0
60	– 119.0	– 104.7	– 132.8
65	– 152.0	– 144.5	– 158.9
70	– 152.9	– 145.8	– 158.9
75	– 139.6	– 130.0	– 147.2
80	– 122.3	– 114.0	127.7
85	– 100.1	– 95.7	– 102.5
90	– 78.5	– 79.0	– 78.4
95	– 58.4	– 60.8	– 57.6
100	– 20.0	– 22.7	– 19.4
Increase in all taxes, future (%)	74.0	-	-
Future generational account	36.1	89.9	-20.0
Absolute difference	135.1	155.5	113.9
IPL (% of GDP)	236.5	–	–

(*) 1995 value; baseline (g = 0.015, r = 0.05).

charge. The figure labelled non-age-specific expenditure encompasses all non-age-specific transfers net of non-age-specific taxes as well as government net investment. Accordingly, this figure constitutes a kind of transfer that is evenly distributed over the entire base-year population. All the other tax and transfer aggregates are distributed over the base-year population by means of gender-specific age-profiles.

To produce generational accounts, the per capita net tax payments in the base-year have to be extrapolated with an exogenous growth rate and subsequently discounted by an exogenous real interest rate. In the baseline calculations, we set the real interest rate to 5% and the annual productivity growth rate to 1.5%.

13.6.2. Baseline findings

Table 81 displays the generational accounts of living generations by age and gender. While the second and third columns report results for males and females, respectively, the first column shows the general accounts.

Net tax payments are negative for the very young cohorts and become positive around age 15. The scale of received net-transfers, for example ECU 99 000 for a present newborn is, on average, very high as compared to other industrialised countries. This can be explained by the large transfers to the young in form of childcare, child allowances, education, and education grants, while their future tax payments, due to discounting, are of lesser importance.

The generational accounts stay positive until the age of 55. At the age of 55, future pension payments, health benefits etc. outweigh net tax contributions and in every subsequent year of the life cycle, generational accounts stay negative. Net tax payments peak around the age of 30 at a value of ECU 111 400 for average individuals. Thus the maximum payment amounts to only 70% of the maximum net transfers, which can be found around the age of 70 at a value of ECU 152 900.

What is striking about the Swedish accounts at first sight is the extent of transfers towards the young, which is

Table 82

Composition of male generational accounts, Sweden

(1 000 ECU) (*)

	Taxes				Transfers						
Generation's age in 1995	Local and federal government tax	Capital income tax	VAT/Excise taxes	Social security contribution	Pensions	Health	Unemployment	General welfare	Youth and maternity	Education	Non-age-specific expexditure
0	80.2	8.3	50.0	68.3	32.5	23.9	15.7	10.0	41.2	61.0	88.1
5	95.1	9.7	59.4	81.1	38.5	26.6	18.7	11.9	30.4	72.4	87.0
10	112.7	11.1	70.3	96.0	45.3	29.7	22.1	14.1	9.6	66.5	85.5
15	133.2	12.5	83.3	113.5	53.2	33.3	26.2	16.7	4.9	47.0	83.8
20	154.8	13.1	96.1	130.8	62.2	37.5	30.1	17.8	3.5	20.7	81.8
25	168.3	15.0	100.8	139.2	72.5	41.6	28.0	15.5	3.9	10.6	79.5
30	172.4	19.1	101.0	137.6	84.2	45.2	24.1	14.3	3.3	5.9	76.8
35	169.0	25.1	98.2	128.8	97.3	48.7	19.7	12.7	2.1	3.8	73.6
40	161.0	31.3	93.2	115.1	112.2	52.8	17.2	10.0	1.1	2.9	69.9
45	148.1	37.1	86.4	96.3	130.1	56.9	14.5	7.2	0.5	2.1	65.6
50	130.6	41.9	77.7	73.0	148.6	60.2	11.2	5.5	0.2	1.6	60.6
55	109.9	42.5	67.0	46.3	167.6	63.4	8.7	4.6	0.1	1.1	55.0
60	88.9	39.1	55.1	20.6	182.3	67.6	5.1	4.3	0.0	0.5	48.6
65	68.0	35.2	44.2	4.0	179.0	70.4	0.8	3.7	0.0	0.0	41.9
70	50.0	30.2	34.4	0.7	152.5	70.1	0.0	3.4	0.0	0.0	34.9
75	36.3	24.6	26.0	0.3	121.5	64.9	0.0	3.0	0.0	0.0	27.8
80	22.2	18.7	18.2	0.1	92.6	56.6	0.0	2.8	0.0	0.0	21.2
85	12.7	13.6	12.3	0.0	69.2	46.5	0.0	2.7	0.0	0.0	15.9
90	6.0	9.7	7.7	0.0	51.5	36.8	0.0	2.4	0.0	0.0	11.8
95	2.2	6.7	4.9	0.0	37.4	26.8	0.0	1.9	0.0	0.0	8.6
100	0.6	2.5	1.8	0.0	13.8	9.9	0.0	0.7	0.0	0.0	3.2

(*) 1995 value; baseline (g = 0.015, r = 0.05).

very high by international standards. What is even more astonishing, however, is the degree of inter-gender redistribution which can be found in a similar magnitude only in Denmark (cf. Jensen and Raffelhüschen (1997)). While, for instance, men are net contributors over a period of nearly 45 years, women's accounts are positive for less than 30 years. In addition the peak of male accounts is four times higher than its female counterpart. Hence, it is not surprising that the generational account of a female newborn is twice as high in absolute terms as the male newborn's account. Specifically, females receive a net transfer of ECU 133 800 over their lifetime as opposed to ECU 65 600 in the case of male newborns.

In order to understand this gender-specific imbalance take a closer look at Tables 82 and 83 which decompose the male and female accounts with respect to specific taxes and transfers. First, note that men, over their entire life cycle, pay more central and local government labour income tax than their female counterparts. Since women receive fewer pension payments than men, the imbalance must be attributed solely to gender-specific income differentials.

Because the rate of unemployment is lower among women than among men, namely 6.9 versus 8.5 %, these income differences can only partially be ascribed to a lower female labour force participation rate which is 76.1 % as opposed to 80.3 % on the male part. Although one of the highest female participation rates worldwide, it is natural that it falls short of the rate of males. What is much more significant in explaining gender-specific wage differentials, however, is the share of part-time workers, which is much higher among women as compared to men. In fact, it is mostly due to this fact that average female wages amount to only 88 % of those of the male counterparts.

A second reason for the inter-gender redistribution can be identified when inspecting the generational accounts of health expenditures. Due to child bearing and a longer life expectancy, women's health expenditures exceed those of men over most of the life cycle. A third source of imbalance are parent allowances, and diverse social assistance payments the entitlement of which is predominantly claimed by women. This becomes obvious, when inspecting the accounts for youth and welfare.

Table 83

Composition of female generational accounts, Sweden

(1 000 ECU) (*)

	Taxes				Transfers						
Generation's age in 1995	Local and federal government tax	Capital income tax	VAT/Excise taxes	Social security contribution	Pensions	Health	Unemployment	General welfare	Youth and maternity	Education	Non-age-specific expexditure
0	50.7	4.1	51.2	45.6	25.7	25.5	13.6	17.6	48.8	65.4	88.9
5	60.2	4.8	60.8	54.1	30.5	28.8	16.1	20.8	39.5	77.6	88.0
10	71.3	5.5	72.1	64.1	36.0	32.6	19.1	24.7	20.3	72.6	86.7
15	84.3	6.3	85.4	75.8	42.4	36.5	22.6	29.3	17.6	54.2	85.2
20	97.7	7.1	98.8	87.2	49.3	40.4	25.7	32.7	18.3	28.2	83.4
25	103.5	8.5	103.8	91.3	57.2	43.8	23.4	32.6	18.9	14.8	81.3
30	102.8	11.0	103.0	90.1	65.1	46.6	19.5	30.9	13.7	8.9	78.9
35	99.5	14.4	99.0	86.0	74.3	49.3	16.5	26.1	6.8	5.9	76.0
40	94.0	17.1	92.5	78.4	84.6	52.5	13.9	19.5	1.9	4.5	72.6
45	84.7	19.7	84.3	66.3	95.4	56.1	10.5	14.5	0.3	3.3	68.7
50	71.7	21.5	74.6	49.3	106.9	59.8	7.5	12.3	0.1	2.5	64.2
55	56.4	21.5	63.9	29.9	117.5	64.0	4.8	12.5	0.0	1.7	59.2
60	43.1	20.6	53.8	13.2	124.6	69.5	2.6	12.6	0.0	0.8	53.5
65	30.4	19.0	44.0	2.3	120.4	73.8	0.5	12.7	0.0	0.0	47.1
70	21.6	16.4	35.7	0.3	104.2	75.6	0.0	13.0	0.0	0.0	40.1
75	14.7	13.4	27.5	0.1	85.6	72.4	0.0	12.3	0.0	0.0	32.6
80	9.1	10.3	20.1	0.1	66.8	64.4	0.0	10.9	0.0	0.0	25.2
85	5.2	7.5	14.1	0.0	49.5	52.4	0.0	8.8	0.0	0.0	18.6
90	3.2	5.4	9.3	0.0	36.0	40.4	0.0	6.6	0.0	0.0	13.4
95	1.4	3.7	5.6	0.0	25.6	28.6	0.0	4.6	0.0	0.0	9.5
100	0.4	1.2	1.8	0.0	8.6	9.5	0.0	1.5	0.0	0.0	3.2

(*) 1995 value; baseline (g = 0.015, r = 0.05).

Apart from marked transfers towards the young and a significant gender-specific redistribution, there is another feature which is remarkable about the Swedish case study. Inspecting the generational account for welfare benefits, one finds that the decrease with age is much more pronounced than in other countries. This cannot be explained by shorter remaining life spans alone, but is also partly due to the fact that, in Sweden, the elderly receive few welfare benefits. Instead, they receive a subsistence pension, which makes any additional welfare benefits superfluous.

In order to assess fiscal policy with respect to sustainability and intergenerational distribution we take a look at the intertemporal or overall debt as reported in Table 81. This figure is obtained by multiplying the demographic structure of future years with the age-specific per capita net tax payments of the base-year, while at the same time discounting and adjusting for GDP growth. If these payments add up to a negative figure, this gives the excess demands of all — current and future — generations or the residual of the government's intertemporal budget constraint (cf. equation (1) in Chapter 2). Stated differently, this is the overall government debt, henceforth labelled intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2), which indicates whether current fiscal policy is on an intergenerationally sustainable growth path. As can be seen, Sweden is far from pursuing an intergenerationally sustainable fiscal policy, as its intertemporal public liabilities amount to 235.5% of GDP. Note, that explicit debt totals 36.7% of GDP and therefore accounts for only one sixth of total debt.

A second indicator reported in Table 81 is the percentage tax increase for future generations necessary to meet the government's intertemporal budget constraint. For Sweden to attain an intergenerationally sustainable growth path it needs a tax increase of 74.0% for all future generations.

While the preceding indicator addresses the question of sustainability, the following indicators aim at quantifying the distributive implications of a prevailing fiscal policy. Specifically, the third indicator is the absolute difference between net tax burdens of living and future generations, provided that future generations' tax load was increased in order to meet the government's intertemporal budget constraint. The 74% tax increase results in a net tax burden of future newborns that totals ECU 36 100. In contrast, current newborns receive a net transfer of ECU 99 000 which constitutes an absolute difference of ECU 135 100. The imbalance displayed in these figures becomes even more pronounced when focusing merely on male agents. The absolute difference of ECU 152 700 observed here reveals the fact that future male agents not only pay for presently living generations, but also finance transfers to future females.

The last indicator to assess the distributive impact of fiscal policy is the immediate tax increase or transfer reduction necessary to equalise the generational accounts of current and future newborns. In order to construct this indicator, we first proceed in a manner similar to the calculation of the intertemporal public liabilities. That is to say, we extrapolate age-specific net taxes per capita which are observed in the base-year into the future, weigh them with the future demographic structure, and discount the payments to the base-year. As per capita payments are held constant — except for a growth adjustment — the growth-adjusted generational accounts of current and future newborns are of equal size. Subsequently, we employ a scaling constant to either (a) increase the tax payments or (b) decrease the transfer payments per capita for both living and future generations until true government debt vanishes. What we derive are the immediate tax increases or transfer reductions necessary to bring fiscal policy back on a sustainable growth path and at the same time restore intergenerational balance.

The results of this experiment are displayed in Table 84 for the baseline interest rate and growth rate of 5 and 1.5% respectively. The first line reports the percentage change needed immediately to finance the true liabilities of the Swedish government sector. Moreover, the table reports the generational accounts of living and future generations that would prevail in face of the respective policy.

First, consider the case where intergenerational balance is achieved by adjusting all taxes. Such a policy requires a once-and-for-all tax increase of 14.8%. As a consequence, the net transfer a current newborn receives over his lifetime would decline from the initial ECU 99 000 to ECU 72 100. Similarly, this transfer would now accrue to future newborns who formerly had to pay a lifetime net tax of ECU 36 100. This relief of the burden on future generations does not come as a surprise when taking into account the fact that in the baseline case, their taxes were increased by 74.0% as compared to 20.3% in the experiment at hand. Finally, as a result of this equalising burden experiment the tax quota would increase by 7.6% points to 58.9% of GDP.

Table 84

Restoring intergenerational balance in Sweden

(1 000 ECU) (*)

	Baseline accounts	All taxes	All transfers
Percentage change	–	14.8	– 13.1
Generation's age in 1995			
0	– 99.0	– 72.1	– 62.0
5	– 79.6	– 47.6	– 40.7
10	– 29.5	8.4	8.1
15	22.1	66.9	59.0
20	78.5	130.1	114.1
25	104.9	160.0	140.1
30	111.4	167.0	146.2
35	105.2	159.4	139.6
40	84.5	135.6	118.8
45	49.1	95.5	83.9
50	0.4	40.6	36.1
55	– 61.2	– 28.8	– 24.4
60	– 119.0	– 94.4	– 81.5
65	– 152.0	– 134.0	– 116.0
70	– 152.9	– 139.1	– 120.6
75	– 139.6	– 129.4	– 112.2
80	– 122.3	– 115.3	– 100.0
85	– 100.1	– 95.6	– 82.9
90	– 78.5	– 75.7	– 65.7
95	– 58.4	– 56.7	– 49.2
100	– 20.0	– 19.5	– 16.9
Future generations	36.1	– 72.1	– 62.0

(*) 1995 value; baseline (g = 0.015, r = 0.05).

Alternatively, consider the experiment where intergenerational balance is achieved by reducing all transfers, which includes non-age-specific transfers, for both living and future generations. This would require a reduction of transfers by 13.1 % or, stated differently, a decline of the transfer quota from 55.2 to 48.0 % of GDP. As a result, the generational accounts of current and future newborns would total ECU – 62 000. We find that the two financing alternatives generate different generational accounts for current and future newborns, namely ECU – 62 000 by reducing transfers as opposed to ECU – 72 100 by increasing all taxes. This can be explained by the different extent to which living cohorts aged 1 to 100 are hit by the respective policy.

Equally important is the question of how the two financing alternatives affect the distribution within current generations. Note that we cannot take into account their effect on macroeconomic variables unless employing a large scale computable general equilibrium model. However, by comparing the generational accounts of living cohorts before and after the experiment one can at least specify the primary effects of one or the other equalising burden experiment. As is obvious from a first inspection of Table 84, a policy that increases taxes places a heavier burden on generations in their working years, while a transfer reduction policy predominantly hits pensioners and young persons.

In order to identify the sources of intergenerational imbalance, two thought experiments are conducted. First, the calculations are carried through while assuming a government net debt of zero in 1995. Then, the simulation is executed while keeping the demographic structure of the base-year constant. The results of these experiments are reported and contrasted to the corresponding baseline findings in Table 85. With regard to the first experiment, one naturally finds that the intertemporal public liabilities are reduced from 236.5 to 199.8 % of GDP — the difference exactly corresponding to explicit government debt. This implies that taxes for future generations have to be increased by 62.5 % instead of the baseline 74.0 %. Accordingly, generational imbalance, as measured by the absolute difference of the accounts of

future and current newborns, is only slightly reduced, namely by 15%.

Keeping the demographic structure of the base-year constant leads to a true government debt of 154.5% of GDP. This indicates that unlike other countries, the unsustainability of Swedish government finances is not primarily driven by the combination of an ageing population and a paygo social security system. Rather, the problem is a structural imbalance prevailing already under today's circumstances. This view is enforced when eliminating both explicit debt and demographic transition. In this case still true liabilities of 117.7% of GDP remain, which would necessitate a tax increase of 50.2% for future generations. Admittedly, for those generations, the lifetime net tax burden of formerly ECU 36 100 turns into a net tax transfer of ECU 21 600, but the difference compared to the current newborn's lifetime transfer of ECU 86 500 is still tremendous. Thus, this paragraph might be properly concluded by stating that explicit government debt, demographic transition and structural reasons account for respectively 15, 35 and 50% of fiscal imbalance in Sweden.

13.6.3. Sensitivity analysis

In the following paragraph our findings are tested with respect to their sensitivity to variations in the exogenous variables. Moreover, it is outlined to what extent alternative population projections modify the outcomes. Specifically, we employ two alternative projections carried through by Statistics Sweden with regard to the development of future fertility.

Table 85 summarises the results of the sensitivity analysis. In this table, we utilise the absolute difference of current and future newborns' generational accounts as an indicator for fiscal balance or imbalance, respectively. The numerical value of this indicator is first reported for various combinations of interest rate and productivity growth rate — the first set to 3, 5 and 7%, the latter to 1, 1.5 and 2%. Note, that there is neither a monotonic relation between indicator and interest rate nor between indicator and productivity growth. Consequently, it is not even possible to make qualitative judgements a priori of how fiscal imbalance is affected by different interest or growth rates.

Table 85

Sensitivity analysis, Sweden

(1 000 ECU) (*)

Productivity growth rate		1	
Discount rate	3	5	7
Difference in the accounts of future and current newborns	141.5	134.1	134.1
Productivity growth rate		1.5	
Discount rate	3	5	7
Difference in the accounts of future and current newborns	144.8	135.1	133.5
Productivity growth rate		2	
Discount rate	3	5	7
Difference in the accounts of future and current newborns	148.5	136.7	133.3
Population projection	Main fertility assumption	Low fertility assumption	High fertility assumption
Difference in the accounts of future and current newborns	135.1	137.3	132.6
Policy experiments to identify the sources of imbalance	Baseline	No government debt	No demographic change
IPL (% of GDP)	236.5	199.8	154.5
Increase in all taxes, future (%)	74.0	62.5	44.7
Difference in the accounts of future and current newborns	135.1	114.1	85.1

(*) 1995 value.

As can be seen, our findings are extremely robust to alternative parameter specifications. Namely, all alternative outcomes lie between ECU 133 200 and ECU 148 300, which is within a range of about 10% of the baseline value. It goes without saying that in this case, too, the qualitative results of the Swedish baseline calculations are unaffected by sensible parameter variations.

We find a similar robustness when changing the fertility assumptions underlying the demographic projection. In choosing alternative fertility rates, we again stick to Statistics Sweden which, in addition to its baseline conjecture, offers a low- and high-fertility-scenario. The latter suggests an increase in fertility from 1.73 to 1.96, the former a decline to 1.72 — both in the period from 1995 to 2017. Recall that for the baseline, we assumed an increase from 1.73 to 1.83 until 2012. Upon inspection of the last row in Table 85, it becomes clear that an increase in fertility is favourable for fiscal balance. However, the effect remains small.

13.6.4. Generational impact of policy reforms and future challenges

In view of the pronounced fiscal imbalance reported in the previous sections, we now present potential fiscal policy solutions for this severe problem. These solutions are related to the public discussion in Sweden or have been proposed by well-known policymakers. First, we discuss the commitment of the government to attain a budget surplus of 2% over the business cycle. We then turn to a rise in the retirement age. While the recent pension reform has increased the incentives to delay retirement, a delay of two years as we have simulated seems rather unlikely. Therefore, consider our simulation as an upper-bound estimate of the reform's positive fiscal impact. Another way of relieving the government sector is through tax increases. However, the Swedish tax quota is already far above the European average, which adds another constraint to the problem. In order to illustrate the dimension of this constraint, we finally simulate emigration of younger individuals who are trying to avoid taxes.

In our first simulation experiment, the surplus policy starts in 1996 and the goal of 2% surplus is achieved either by increasing all taxes or by reducing all transfers. Recall that transfers include all non-age-specific government expenditures. This policy cannot be pursued into the indefinite future because the government's intertemporal budget constraint has to be met. Therefore, by the time the explicit government debt becomes zero, taxes or transfers are kept constant and no longer evolve endogenously.

The results of the policy experiments are reported in Table 86, which includes (1) the accounts of both living generations and future newborns, (2) the increase in future generations' taxes necessary to serve government liabilities, (3) the absolute difference of current and future lifetime burdens, and, (4) the intertemporal indebtedness. In order to allow for direct comparison, Table 86 also reports the baseline accounts. Obviously, the tax-increase-policy as well as the transfer-reduction-policy increase the generational accounts of living generations. This is not surprising, given that the policy is initiated in 1996. Furthermore, we find our previous observation confirmed that tax increases favour pensioners and young people relative to workers, while for transfer reductions the opposite holds.

However, the straightforward winners of the surplus policy are, of course, future generations. Their lifetime net tax payment of ECU 36 100 turns into a lifetime transfer of ECU 64 300 (tax increases) or ECU 57 300 (transfer reductions) respectively. Hence, the gap between living and future generations' accounts is reduced to a mere ECU 9 200 or ECU 5 800, respectively. Moreover government liabilities are reduced to 16.2 or 9.3% of GDP, respectively. In order to properly understand the impacts of this policy experiment, note that explicit debt becomes *nil* already in 2009 and thus taxes and transfers remain on their growth-adjusted 2009 level thereafter.

We will now turn to the experiment in which we increase the effective retirement age. As already mentioned, the 1998 pension reform increases incentives to postpone retirement. Since the pension reform alone is not sufficient to postpone the retirement by two years, we assume that additional measures are taken so that in 2000 people delay their normal retirement age 65 for two years and work instead. This implies that their pension payments are higher and are received later, which we modelled in terms of a constant social security wealth. At the same time, we also let other government receipts and expenditures be affected. Specifically, sickness pay, labour market assistance, local and federal government tax, other indirect taxes and social security contributions are prolonged at the growth adjusted pre-65 level.

Table 86 shows that the generational accounts of cohorts aged 60 and older are not at all affected by the reform since these people are already pensioners when the

Table 86

Generational accounts for policy experiments and challenges, Sweden

(1 000 ECU) (*)

Generation's age in 1995	Baseline accounts	Pension reform	Surplus policy		Youth emigration
			Tax adjustment	Transfer adjustment	
0	– 99.0	– 98.2	– 73.5	– 63.1	– 99.0
5	– 79.6	– 78.6	– 49.4	– 41.9	– 79.6
10	– 29.5	– 28.2	6.2	6.5	– 29.5
15	22.1	23.6	64.3	57.6	22.1
20	78.5	80.3	127.0	112.8	78.5
25	104.9	107.2	156.4	138.7	104.9
30	111.4	114.2	163.1	144.8	111.4
35	105.2	108.6	155.5	138.1	105.2
40	84.5	88.4	131.7	117.4	84.5
45	49.1	53.3	91.9	82.5	49.1
50	0.4	4.6	37.3	34.6	0.4
55	– 61.2	– 58.8	– 31.7	– 25.8	– 61.2
60	– 119.0	– 119.0	– 96.8	– 82.9	– 119.0
65	– 152.0	– 152.0	– 135.8	– 117.5	– 152.0
70	– 152.9	– 152.9	– 140.5	– 122.2	– 152.9
75	– 139.6	– 139.6	– 130.5	– 113.7	– 139.6
80	– 122.3	– 122.3	– 116.2	– 101.5	– 122.3
85	– 100.1	– 100.1	– 96.3	– 84.6	– 100.1
90	– 78.5	– 78.5	– 76.3	– 67.6	– 78.5
95	– 58.4	– 58.4	– 57.2	– 51.4	– 58.4
100	– 20.0	– 20.0	– 20.0	– 20.0	– 20.0
Increase in all taxes, future (%)	74.0	70.4	4.4	2.9	76.8
Future generational account	36.1	30.7	– 64.3	– 57.3	41.2
Absolute difference	135.1	128.9	9.2	5.8	140.2
IPL (% of GDP)	236.5	225.6	16.2	9.3	237.5

(*) 1995 value; baseline (g = 0.015, r = 0.05).

reform becomes effective. However, for younger cohorts, the fiscal net effect increases their payments by slightly more than ECU 4 000 at a maximum and approximately ECU 2 000 on average. Of course, if living cohorts share a larger part of the overall fiscal burden, future generations must necessarily profit. Their lifetime burden declines from ECU 36 100 to ECU 30 700, thereby reducing the difference as compared to present newborns by 4.6%. In spite of this minor effect, the pension reform is far from being able to restore fiscal balance. This can easily be seen by the negligible reduction of the intertemporal public liabilities from 236.5 to 225.6%.

Finally, we will turn attention to a rather hypothetical experiment which has a very controversial background: the experiment of specific youth emigration. As stated above, there is a growing concern in Sweden that young people with solid education and high motivation might leave the country in order to avoid high tax burdens. This fear is not groundless, given that Sweden displays the highest tax quota in Europe. Consequently, as Europe grows together and the Swedish population ages, it becomes probable that young tax-paying cohorts will move to regions with less generous welfare systems.

In the simulation reported under the heading 'youth-emigration' in Table 86, we make the ad hoc assumption that beginning in the base-year 1995, 2% of all 25-year-old Swedish citizens emigrate, beginning in 1995. This will have no effect on the lifetime burden of living generations, as per capita taxes and transfers are exogenous in calculating the generational accounts. However, 25-year-old individuals are not only strong net contributors to the government's resources but also more fertile than the average. Due to both arguments, the emigration will adversely affect future generations.

This result is numerically illustrated in the last column of Table 86. The first point which is immediately striking is that the generational accounts of living generations have not changed relative to the baseline, whereas future generations are worse off. Specifically, the lifetime tax bur-

den of future generations has increased from ECU 36 100 to ECU 41 200, thus enlarging the gap between future and current generations' net burdens from ECU 135 100 to ECU 140 200. Consequently, the intertemporal debt figure increases, although only slightly, by just 1 percentage point. It seems, then, that taking into account the level of fiscal liabilities from which the simulation departs, the fiscal impact of youth emigration can be safely ignored. The reason for this is simply that through the emigration of some 25-year-old citizens, society not only loses net contributors, but also net recipients, namely their children, who have a negative generational account. Stated differently, in general, an offspring augments the true liabilities by approximately the same amount which some parents try to avoid by emigration.

13.7. Conclusion

Being the archetype of a Scandinavian welfare state, Sweden, more than most other countries, depends on sound assessments of its fiscal policy's long-run effects. This paper describes the recent stance of fiscal policy in Sweden and applies generational accounting in order to evaluate its intergenerational implications.

In line with common intuition, but very much in contrast to Hageman and John (1997, 1999), we find an imbalance to the detriment of future generations in the magnitude of 235.5 % of GDP. The imbalance is outstanding compared to other EU Member States. The explanation for the deviation from previous studies is not that the results are sensitive to the choice of base-year since 1995 was chosen in all hitherto known studies.

Explicit government debt accounts for 15 % of the imbalance and population ageing for 35 %, while the remaining 50 % are due to structural imbalances. Sweden deviates also in the composition of the imbalance from other EU Member States where most of the imbalance is accounted for by two predominant factors: explicit government debt and population ageing. The large structural imbalances may reflect that the government sector in Sweden is not designed to handle persistent high unemployment. In fact, the unemployment rate was around 2 % until the crisis in the early 1990s when it increased dramatically to nearly 8 %. The generational accounting exercise implicitly assumes that high unemployment will persist in the future. This may very well be true, but the government sector has not yet adapted to this changed situation.

Inspired by recent fiscal debates, we simulated three policy experiments and evaluated their effect on government's finances. Our results suggest that an increase in the factual retirement age (partly already induced by the 1998 Pension Reform Act) hardly improves the intergenerational stance, while a permanent commitment to a 2 % budget surplus over the business cycle does. The surplus policy turns lifetime net tax payment of future generations, amounting to ECU 36 100 in the baseline case, into a lifetime net transfer of approximately ECU 60 000. Hence, the gap between living and future generations is reduced from ECU 135 100 to ECU 9 200 when taxes are adjusted or to ECU 5 800 when transfers are adjusted instead. Finally, the emigration of young Swedes would hardly affect the intergenerational stance at all since the cost of supporting 2 % of the population for their first 25 years is low.

14. UK: rolling back the UK welfare state?

Roberto Cardarelli ([1]) and James Sefton ([2])

14.1. Introduction

Once a welfare leader, with an impressive range of social legislation produced in the immediate aftermath of World War II, the United Kingdom remained welfare expansionist until the mid-1970s. The share of GDP devoted to welfare grew steadily over most of the century until 1976. Hence, when the economic crises of the mid-1970s forced the industrialised countries to change their social policies, the UK needed to implement a more radical adjustment than most. The tight monetary and fiscal discipline imposed in the 1980s and 1990s, and the shift toward the adoption of supply-side policies, have drastically changed both the dimension and the structure of the UK welfare state. The oil shock of the 1970s, however, is not the only reason of this change of attitude toward social spending. For most of the 20th century, government expenditure on health, education, housing and social security grew faster than the economy as a whole. It also grew as a percentage of government expenditure. Clearly, this could not continue forever. When real consumer spending fell for the first time in 1974, it appeared that limits to the acceptable level of taxation to finance welfare expenditure had been reached.

At the same time, the social and economic environment has been changing substantially over the last two decades. Family structure, the labour market and the distribution of income are all very different today from those that inspired the foundations of the welfare state in the UK, and its subsequent evolution. It is thus inevitable that most of the institutions across the welfare state have came under scrutiny in recent years.

The objective of this paper is to discuss the current state and the future challenges of the welfare state in the UK and in particular to evaluate the generational stance of current fiscal policy. The questions we will try to answer are: is there a problem of intergenerational sustainability of the welfare state in the UK? What are the main sources of pressure on welfare spending? Which are the real policy options? To answer these questions we apply to the UK the method of generational accounting as an alternative to the more traditional analysis of the fiscal setting based on the concepts of deficit and debt.

In this paper we follow the generational accounting approach outlined in Chapter 2, assuming that all future taxes and transfers grow with productivity ([3]). This assumption, shared by all country studies in this volume, has the advantage of allowing sensible cross-country comparisons of the generational stance of current fiscal polices. However, when applied to evaluate a specific country's fiscal framework, this assumption may lead us to misleading conclusions. As far as the UK is concerned, for example, from 1980 onwards social security transfers (and basic pensions among them) have been linked to prices rather than earnings. Moreover, while the total welfare spending in 1995 absorbs the same share of GDP as in 1973, some types of expenditure have absorbed an increasing share of national wealth (such as health) and other a decreasing share (education and housing).

All these considerations together suggest that incorporating more realistic assumptions on the future of taxes and transfers in the UK could sensibly change the final results. For the sake of comparability with other European countries, this paper sticks to the productivity growth rule. For a more specifically designed UK generational account experiment, we refer the reader to a study of the National Institute of Economic and Social Research that uses official projections for all taxes and

([1]) National Institute of Economic and Social Research, London.
([2]) National Institute of Economic and Social Research, London.

([3]) As we will make clear below the only tax or transfer category that escapes this rule is the expenditure on the State earning related pension scheme, or SERPS.

transfers. However, to give a flavour of the possible difference between using the standard 'productivity growth rule' and more realistic projections, we present the generational accounts for the case where the expenditure on social security transfers remains constant, or where the earning indexation is restored at some point in time.

After presenting the baseline generational accounts, our attention will be focused on the generational impact of some major policy changes that have taken place in the UK over the recent past. In particular we will consider the impact of the decision to link social security transfers to prices rather than earnings from the start of the 1980s. Further, we will investigate the generational impact of some substantial reforms of the pensions system in the UK. It is well known that, due to these reforms, the present pension system in the UK will not be able to guarantee an adequate minimum standard of income in old age. In this study we will try to assess whether this is the necessary price to pay in order to maintain the government finances on an intergenerationally sustainable long-term path.

The layout of the chapter is as follows. Section 14.2 presents a quick survey of the fiscal trends in the UK. Section 14.3 assesses the generational stance of current fiscal policy in the UK and in Section 14.4 we perform a sensitivity analysis of the results. Section 14.5 evaluates the generational impact of the policy reforms that we have mentioned above. Section 14.6 concludes.

14.2. Trends in fiscal policy

One of the main changes in the UK macroeconomic policy over the last 25 years has been the downgrading of fiscal (and in particular taxation) policy as a macroeconomic instrument. Since the early 1980s fiscal policy in the UK has been set within the framework of a medium term financial strategy (MTFS), rather than used to fine-tune the economy. The main objective of this strategy has been to achieve and maintain 'sound and sustainable' government finances over the medium term. This objective has in turn been identified with respect to two basic criteria: the stabilisation of the debt-to-GDP ratio and the observance of the so-called 'golden rule', according to which the government should only borrow to invest. While the first objective has been achieved, government borrowing has been on average too high for the golden rule to be satisfied. Overall the MTFS could not avoid substantial deviations of out-turns from medium-term fiscal objectives. To improve the fiscal policy framework a code for fiscal stability has been published in the 1998 budget, with the intention of having fiscal objectives underpinned by a statute.

The search for sound government finances has been part of a wider political agenda. Its principal aim has been to reduce the role of the State in the UK economy and to remove policy-induced obstacles. A review of taxation policy since the 1970s reveals a number of measures in this direction. The most important one is the reduction of income and capital taxation. The standard and top rates of income tax have been brought down from 33 and 83% in 1978 to 23 and 40% in 1997, respectively. At the same time taxation of both personal and company profits has been profoundly lightened. The decline in income tax has been partly offset by an increase in national insurance contributions and an increase in indirect taxation, most notably through successive rises of the value added tax rate.

After a rapid growth in the 1970s, government expenditure has absorbed a relatively stable proportion of national wealth. This result has been mainly achieved through a consistent cut in government investments, as both current expenditure on goods and services and transfer payments to the personal sector have risen significantly. In particular, from 1990 to 1994, welfare spending as a proportion of GDP has risen from 21.6 to 26.6%, partly because of the recession occurring in the first part of the 1990s (cf. Evans (1988)). This recent rapid growth has spread fears that the welfare state could become 'unsustainable' in the future. However, it turns out that in 1996 the share of wealth spent on welfare is slightly lower that in 1976. Since then, the total has fluctuated with the business cycle, rather than presenting a medium-term upward trend.

What has changed in the last two decades has rather been the *composition* of welfare spending. Social security has been playing an increasingly dominant role, taking more resources than health and education together in 1995/96, whereas the two services had considerably outweighed social security in 1973/74. While in 1973/74 social security spending amounted to 8.2% of GDP, by 1995/96 it had reached 11.4%. At the same time, government spending on education has fallen from 6.7% of GDP to 5.2%. Government spending on health, on the contrary, has increased from 3.8% of GDP in 1973 to 5.7% in 1995. The main policy changes in this field have been

reforms of the National Health Service (NHS). The common theme of these reforms has been to introduce elements of competition into the centrally financed system. The promotion of internal competition between public providers is intended to bring efficiency gains and cost savings in the NHS. Indeed, these gains are more long-term ones, as the first effect of the reforms has been to actually increase the budget taken by the NHS.

As for the demographic changes, the UK population has been subjected to an ageing process similar to the one affecting most other industrialised countries. The old-age dependency ratio (i.e. the number of those over pension age over those in working age) will rise from 28% in 1996 to 45% in 2066, with a drastic acceleration from 2030. However, the UK went through the ageing process relatively earlier than other countries. OECD data reveals that, compared to the other European Union countries, the UK is predicted to have fewer older people and a below-average old-age dependency ratio in the next 50 years.

Of relatively more importance are therefore the changes in the UK labour market and distribution of income. First, much higher unemployment has accompanied economic growth in the last two decades. There were more than 2 million unemployed in 1995, against 600 000 in 1973. At the same time, women's participation in the labour force has risen, as has economic inactivity among working-age people. Deep changes have also affected the family structure, and this too has produced an increasing pressure on welfare expenditure. The proportion of births outside marriage increased from 8 to 30% between 1970 and 1991, and the annual divorce rate is almost five times larger in 1987 than in 1951. Therefore, the number of lone-parent families has increased drastically.

In addition to these general economic and social changes, the demand for social security has been greatly affected by changes in the distribution of incomes. Both the gap between rich and poor and the number of people with low income have increased substantially during the 1980s. The main cause must again be found in the labour market. Not only have unemployment and economic inactivity risen, but rewards differentials have also become wider. The consequence has been a relevant increase in the number of households with incomes below the average. In 1994, the number of those with incomes below 50% of the average was almost three times higher than in 1979.

The main policy response to the challenges coming from this changing environment has been to shift the focus from universal coverage to fiscal constraint, economic incentives and administrative efficiency. This implied a change in social policy's address from social insurance to poverty relief and private provision. The social security budget has consequently devoted additional resources to means-tested benefits, like income support and family credit, both introduced in the mid-1980s. In 1997, more than 10% of the population claimed income support, and, including their partners and families, more than 17% was dependent on it.

A major element that pushed many people into the system of means-tested benefits has been the decision taken at the start of the 1980s of indexing social security benefits to prices rather than earnings. Since then, the value of the flat rate basic retirement pensions has steadily fallen relative to net average earnings. In 1983, the basic pension for a single person was 32% of net average male earnings. Ten years later, it was 22%. By 2050, if average earnings grow in real terms at 1.5% per annum and the basic pension continues to be adjusted with prices, it will be about 7%. This policy will become indefensible in the long term for future governments, unless they are ready to openly abandon the idea of a State basic pension sufficient to meet the minimum needs of elderly people.

The change in uprating policy was taken as a response to the burden posed on pension expenditure by the introduction of the State earning related pension scheme (SERPS) in 1978. This second tier of the State pensions scheme, related to individual earning history, was introduced to supplement the basic retirement pension and to reduce the number of pensioners on means-tested assistance. One of the main objectives of the Thatcher government was the complete abolition of SERPS, accused of failing '*to take into account the very substantial financial debt being handed down to future generations*' (DHSS (1985, par. 1.1)). Rather than being abolished, however, SERPS was amended first in 1986 and then in 1995, in order to make it less generous. Further, tax incentives have been introduced to encourage individuals to contract out of the scheme and adopt occupational or private pensions. In Section 14.4 we will investigate the intergenerational impact of these changes in pension policy.

To relieve the pressure on social spending coming from higher unemployment and economic inactivity, changes have been introduced to a series of benefits, such as unemployment, incapacity and sickness benefits. Under

the Major government (1990–96) unemployment benefits were made less generous and more difficult to get. Their contributory part was reduced to the first six months, after which they are means-tested. Consequently, only 20% of the unemployed were covered by social insurance in the 1990s, against 40% in the 1970s. Incapacity benefits have also been made more difficult to get, the earnings-related component has been deleted and they have been made taxable.

A common theme of these changes has been the attempt to reduce the labour market disincentives related to social security, in particular to ensure that the benefit rates are not close to, or even greater than, in-work incomes. The fact that benefits have decreased relative to incomes certainly improves the incentives to work, and helps to reduce the dependency on social security. However, the greater reliance on means-tested benefits goes in the opposite direction, and a side-effect of means-tested transfers is that benefits are reduced as income rises. This may produce high marginal tax rates, discouraging people from trying to earn higher incomes. This phenomenon is particularly important for women, who are more unlikely to find jobs paying high enough to get clear of the trap. The first moves of the new Labour government in the field of social policy have been especially focused on the problem of the poverty trap. Not only has the one parent benefit been abolished, but family credits and disability working allowances will be replaced by a system of tax allowances. The ultimate objective is clearly to make it easier for those on means-tested benefits to re-enter the labour market. This strategy has been given the name of 'welfare to work'.

The overall picture of the UK welfare state describes a system that, in quantitative terms, has managed to maintain intact its role even in a period characterised by a strong commitment against taxation and government expenditure. However, different economic and social conditions, and new forms of pressure, have deeply changed its face and raised issues on its future capacity to meet rising expectations, rising demands and rising costs. The objective of the next three sections will be to assess whether among the future challenges to the UK welfare state there are also the ones related to its degree of intergenerational redistribution.

14.3. Baseline results

Constructing generational accounts for the living generations requires two steps. First, we need to identify all taxes and transfers included in the government budget of the base-year (1995). We start from the national accounts summary indication of the receipts and expenditures of the general government (central government and local authorities) (Table 9.1 of the Blue Book). Once we disaggregate some of its components we have Table 87, which shows the whole list of taxes and transfers considered in this study. Each of these aggregates is then allocated among the representative male and female agents of each living generation with the help of per capita age- and gender-specific tax and transfer profiles. We then need projections for the future development of aggregate taxes and transfers that reflect future fiscal policies. In the absence of other projections, we assume that all taxes and transfers per capita classified by cohort and sex increase at the rate of productivity growth g indefinitely ([1]). A baseline per capita rate of growth of labour productivity of 1.5% per annum is assumed in this study, and participation rates and number of hours worked are assumed to remain unchanged. By sticking to the original profiles we can calculate for every period in the future the taxes paid and transfers received.

As we consider all aggregate taxes and transfers in real values, indexing them with productivity growth amounts to a nominal indexation to wages. This assumption, which is quite standard in the generational accounting literature, does not reflect the current practice in the UK of uprating benefits with prices. Clearly, if maintained in the indefinite future, this practice will make the social security benefits a negligible fraction of earnings. In our baseline results we chose to stick to the productivity growth assumption for the sake of comparability with the other country studies. This procedure implicitly builds a fiscal policy change in the calculations which is not fully consistent with our general status quo perspective. By doing so, calculations yield a pessimistic upper bound of what might be the actual intertemporal public liabilities induced by the continuation of current fiscal practice.

The only exception to the productivity rule regards the expenditure on earning related pensions. As we pointed out above, the SERP scheme was introduced in 1978 and

([1]) Deviations from this rule reflect recent legal amendments. We consider the replacement of unemployment benefits with jobseeker's allowance which is assumed to reduce benefit expenditure by ECU 0.37 billion from 1997. Further, we take into account the introduction of incapacity benefits which replace invalidity benefits since April 1995. Following GAD estimates, this measure is assumed to reduce expenditure on invalidity by about 20% in 2000.

Table 87

Public revenue and expenditure, United Kingdom, 1995

(billion ECU)

Revenue		Expenditure	
Taxes on income		Social security	
Income tax		Retirement pensions	36.6
Employed	67.1	Widows' benefits	1.2
Self-employed and others (net)	15.2	Unemployment benefit	1.4
Corporation tax	27.4	Incapacity benefits	10.0
Social security contributions		Statutory sick pay	0.0
Employed	52.3	Maternity benefits	0.0
Self-employed and others	1.9	Statutory maternity pay	0.6
Council taxes	11.2	Social Fund benefits	0.4
Expenditure taxes		War pensions	1.5
Cars, motorcycles and other vehicles	4.0	Family benefits	
Alcohol	11.3	Family credit	1.5
Tobacco	11.0	Child benefit	8.2
Food	2.5	One-parent benefit	0.4
Energy	1.9	Income support	20.3
Petrol	10.6	Other social security benefits	
Clothing	4.4	Disability living allowances	5.5
Vehicle excise duty	3.2	Disability working allowances	0.0
Other goods and services	19.0	Severe disablement benefits	1.2
Companies and public corporations	30.3	Industrial death benefits	1.2
Rents	6.9	Attendance allowances	3.2
Gross trading surplus	0.8	Invalid care allowance	0.9
Interest and dividends	6.4	Housing benefits	13.0
Taxes on capital		Educational grants	4.5
Taxes on capital gains	1.5	Expenditure on goods	
Inheritance tax	1.7	Education	
Deficit	48.1	Maintained schools	26.2
		Full-time higher education	4.2
		Part-time higher education	2.8
		Full-time further education	1.4
		Part-time further education	3.3
		Social security	17.5
		Health	
		Hospital services	26.4
		General medical, dental services	12.7
		Pharmaceutical services	5.4
		Community health services	4.4
		Housing	5.1
		Transport and communications	3.8
		Subsidies	
		Agriculture	3.1
		Transport	3.1
		Housing	1.5
		Other	1.6
		Interest payments	31.6
		Non-age-specific expenditure	72.6
Total	338.5	Total	338.5

Source: National Accounts, Office for National Statistics.

was supposed to reach full maturity at 2027, when almost all of the retired will have complete entitlements to this additional pension (subsequent reforms have shifted this date ahead in time). Using the rate of productivity growth for the whole pension expenditure would therefore seriously underestimate the development of SERP expenditure in the transition phase. In order to take full account of the maturing effect we have first used official projections by the Government Actuary's Department (cf. GAD (1995)), which cover

the period from 1994 to 2050. Second, we gradually extend the age- and gender-specific SERP transfer profiles, as they do not reflect a matured system in the base-year. Finally, while average lifetime labour earnings (and therefore per capita SERPS pensions) are assumed to grow at rate *g* for each future cohort of pensioners, SERP transfers remain constant over the entire remaining lifetime of all retirees belonging to a given cohort. In Section 14.4 we will show how the generational accounts change, if we assume that the other social security benefits are not increased with earnings, but are tied back to earnings at different moments in the future.

As for the per capita age-sex profiles, we make extensive use of some of the official surveys on household behaviour in the UK. In particular, we relied on the Family Resource Survey 1995–96, based on a sample of around 26 000 households, to disaggregate social security benefits and most of the taxes among the population. We also used the Family Expenditure Survey, which surveys 7 000 households and contains detailed information on households and personal expenditure. We used it especially to disaggregate taxes on expenditure. The General Household Survey, based on information on 15 000 households, contains information on the use of health-care facilities. To disaggregate health expenditure we also used data provided by the Department of Health and in particular by the NHS Executive. We use departmental data also to attribute expenditure on education ('Education statistics for the UK') and revenues from the inheritance tax ('Inland revenue statistics').

Another step is represented by demographic projections, which in this study closely reflect the 1996-based national population projections of the Government Actuary's Department. Starting from 1995, the initial year population plus immigrants less the numbers of deaths generates the number in the population — one year older — at the start of the following year. As the newborn cohort, we count survivors of those born during the year. In the baseline calculations the total fertility rate is equal to 1.75 children per woman in 1995, increases to 1.8 in 2005, and remains constant thereafter. Life expectancy at birth, which is 74.6 for men and 79.5 for women in 1995,

Table 88

Baseline generational accounts, United Kingdom, 1995

(1 000 ECU) (*)

Generation's age in 1995	Average	Male	Female
0	– 35.2	– 10.5	– 61.2
5	– 25.2	4.7	– 56.5
10	– 5.9	30.9	– 42.7
15	17.5	60.3	– 27.5
20	36.5	86.5	– 16.1
25	48.4	102.6	– 8.7
30	48.4	102.8	– 8.0
35	40.3	90.0	– 10.9
40	25.4	67.2	– 16.8
45	3.7	36.3	– 28.8
50	– 22.2	0.5	– 44.8
55	– 50.4	– 39.3	– 61.3
60	– 69.8	– 71.9	– 67.8
65	– 77.1	– 85.8	– 69.2
70	– 73.8	– 85.6	– 64.0
75	– 63.6	– 78.6	– 52.9
80	– 51.7	– 68.3	– 42.2
85	– 41.6	– 59.4	– 33.9
90	– 29.0	– 46.9	– 24.0
95	– 13.0	– 24.7	– 10.6
100	5.3	– 1.2	6.3
Increase all taxes, future (%)	74.0		
Future generational accounts	29.8	69.6	– 11.9
Absolute difference	65.1	80.1	49.3
IPL (% of GDP)	184.4		

(*) 1995 value; baseline (g = 0.015, r = 0.05).

rises to 76.1 for men and 80.1 for women by 2005 and does not change thereafter. Finally, annual net migration amounts to 53 000 people from 1995 onwards.

In the intertemporal budget constraint, the notion of debt considered is the net financial wealth of the public sector (central government, local authorities and public corporations). Existing real wealth will be considered only insofar as it produces a return, as in the case of the petrol resources that represent a source of tax revenues. Finally, the discount rate *r* used to take all future taxes and transfers back to the base-year is set to 5%.

Table 88 reports generational accounts for cohorts ranging in age from 0 to 100 in the base-year 1995. The average column shows net payments for males and females combined, while the other two columns report the gender-specific accounts. We first notice that the account of a current newborn is negative. This means current newborns receive on average (in present 1995-value) a net transfer of ECU 35 200 (ECU 1 = GBP 0.82) over their entire lifetime. The average accounts remain negative throughout childhood and turn positive between the age of 10 and 15. Even if at that age net taxes are still negative, the effect of the lower discounting of future net payments is such that its present value turns out to be positive. With access to the labour force the accounts increase dramatically and net taxes reach their peak between the age of 25 and 30. Over most of the years of active participation to the labour force the accounts are positive but decreasing and the break-even is reached around the age of 50. With the age of retirement, net transfers reach their maximum just when, on average, individuals leave the labour force.

Curiously, at very old age the average accounts become positive again. The first intuition would be to attribute this phenomenon to the payment of inheritance taxes, that we assume to be borne by those who leave a bequest (rather than those who receive it). Tables 89 and 90, however, show that this is true only for women as, when they are very old, men still receive a positive transfer from the government. Further inspection of these tables reveals that men receive much larger net transfers than women starting from the age of around 60. Before that age the accounts are negative for women and positive for

Table 89

Composition of male generational accounts, United Kingdom

(1 000 ECU) (*)

	Tax payments					Transfer receipts						
Generation's age in 1995	Labour income	Capital taxes	VAT/ excise taxes	Social insurance contribution	Other revenue	Social welfare	Health	Unem-ployment insurance	Welfare/ housing	Youth/ maternity	Education	Non-age-specific expenditure/ subsidies
0	36.3	12.0	31.1	23.7	5.2	15.3	17.4	0.5	5.4	6.8	35.3	38.0
5	43.2	14.2	36.1	28.1	6.2	18.2	14.7	0.6	6.5	8.1	37.6	38.2
10	51.2	16.9	43.4	33.3	7.3	21.5	14.2	0.7	7.7	9.6	29.0	38.4
15	60.7	20.0	50.8	39.5	8.6	25.5	14.8	0.9	9.1	11.4	19.1	38.4
20	70.9	23.2	56.6	45.6	9.6	29.9	15.6	1.0	10.2	12.5	11.9	38.3
25	77.7	25.0	60.2	48.1	10.1	34.5	16.5	0.9	10.3	12.3	6.6	37.6
30	79.1	25.0	62.4	46.6	10.2	39.5	17.3	0.8	9.8	11.7	5.0	36.3
35	75.3	23.3	61.8	42.0	9.9	45.1	18.3	0.7	9.3	10.9	3.6	34.4
40	66.7	20.5	59.7	35.4	9.5	51.6	19.3	0.7	9.0	9.7	2.3	32.1
45	53.3	16.8	57.2	27.6	8.9	58.6	20.4	0.6	8.9	8.2	1.4	29.3
50	37.6	12.6	54.2	19.5	8.3	66.7	21.2	0.5	9.1	6.9	0.9	26.3
55	22.8	8.5	47.3	11.5	7.6	76.0	21.8	0.3	9.5	5.9	0.6	23.1
60	11.8	5.3	40.1	4.9	6.7	84.0	22.1	0.2	9.9	4.6	0.2	19.7
65	5.7	3.6	33.3	1.0	5.7	84.2	22.4	0.0	10.1	1.8	0.1	16.4
70	3.4	3.3	25.6	0.0	4.6	74.7	23.0	0.0	10.3	1.2	0.0	13.4
75	2.2	3.6	19.4	0.0	3.3	61.1	23.8	0.0	10.4	1.2	0.0	10.6
80	0.8	3.9	15.5	0.0	2.4	47.1	24.8	0.0	9.7	1.2	0.0	8.3
85	0.5	4.6	10.9	0.0	1.8	36.3	25.9	0.0	7.7	0.9	0.0	6.3
90	0.4	8.7	8.0	0.0	1.3	29.1	24.7	0.0	5.9	0.7	0.0	4.8
95	0.3	20.3	6.1	0.0	1.0	22.9	20.7	0.0	4.5	0.5	0.0	3.7
100	0.1	14.6	2.1	0.0	0.4	8.0	7.3	0.0	1.6	0.2	0.0	1.3

(*) 1995 value; baseline (r = 0.05. g = 0.015).

men (with the only exception of the newborn generation). The UK generational accounts show a strong intergender redistribution. Taking into account the entire life cycle, the government tax/transfer system strongly redistributes away from men towards women who at any age exhibit negative generational accounts and therefore receive a significantly higher lifetime net transfer (ECU 61 200) than newborn males (ECU 10 500).

The tables showing the composition of the generational accounts suggest some explanations for this result. First, the gender imbalance can be mainly explained with the fact that men pay over their entire lifetime more taxes than women, whose position in the labour market is still relatively more precarious, in terms of both wages and tenure. At the same time, however, social welfare and health transfers add another dimension to the pure and simple gender redistribution, as they cause much larger net transfers to men than for women after the age of 60.

As for social welfare (pensions, sickness and disability benefits, income support), present value transfers to men are higher than those to women for almost all the cohorts (from around 20 years of age onward). In particular, pensions and invalidity benefits are mainly concentrated on old-aged men, and the recent trend of reduced labour market participation for the oldest segment of male population has certainly amplified the gender difference in these kinds of transfers. As far as health transfers are concerned, women benefit more from this expenditure only in the first 45 years of life, mainly because of child bearing. For older ages, however, present value health transfers to men are significantly larger. This is due to the poorer health of men in old age, which is reflected by their lower life expectancy as compared to women.

We now turn to the implications of these accounts in terms of sustainability of the current fiscal stance, using the set of fiscal sustainability indicators derived in Chapter 2. While the explicit debt in the UK is 51.2% of GDP, the intertemporal public liabilities (IPL, cf. equation (6) in Chapter 2 of this volume) amount to 184.4% of GDP. This term represents the entire set of liabilities generated by the current fiscal policy, which have to be

Table 90

Composition of female generational accounts, United Kingdom

(1 000 ECU) (*)

	Tax payments					Transfer receipts						
Generation's age in 1995	Labour income	Capital taxes	VAT/ excise taxes	Social insurance contribution	Other revenue	Social welfare	Health	Unem-ployment insurance	Welfare/ housing	Youth/ maternity	Education	Non-age-specific expenditure/ subsidies
0	15.5	7.2	25.2	12.8	5.8	15.5	21.3	0.2	5.5	15.2	33.1	37.0
5	18.4	8.6	29.9	15.2	6.9	18.4	20.25	0.2	6.5	18.0	35.2	37.1
10	21.9	10.2	35.2	18.0	8.1	21.8	21.2	0.3	7.7	21.4	36.8	37.0
15	25.9	12.1	41.1	21.4	9.6	25.8	22.8	0.3	9.1	25.3	17.3	36.8
20	29.8	13.7	45.3	24.1	10.7	30.0	23.6	0.4	10.2	28.2	11.0	36.4
25	30.8	14.0	47.6	23.8	11.2	33.7	23.2	0.4	10.1	27.3	6.0	35.5
30	29.1	13.2	48.6	21.6	11.0	37.2	22.1	0.3	9.5	23.8	4.4	34.2
35	24.9	12.2	48.5	18.9	10.6	41.1	21.1	0.2	8.9	18.4	3.6	32.6
40	21.1	10.8	46.1	15.7	10.0	45.3	20.7	0.2	8.4	12.1	2.9	30.8
45	16.2	8.7	42.5	11.6	9.3	50.1	20.8	0.2	8.1	7.3	2.0	28.6
50	11.4	6.4	39.5	7.2	8.7	56.7	20.9	0.2	8.2	4.8	1.3	26.2
55	6.9	4.4	35.7	3.4	7.8	62.5	20.9	0.1	8.3	3.7	0.6	23.6
60	3.2	3.0	31.6	0.8	6.8	60.1	20.7	0.0	8.3	3.0	0.3	20.8
65	1.6	2.4	27.4	0.0	5.5	57.0	20.5	0.0	8.0	2.7	0.1	17.9
70	1.0	2.4	23.7	0.0	4.1	49.8	20.0	0.0	7.5	2.7	0.0	15.1
75	0.6	2.7	20.8	0.0	2.8	38.8	19.2	0.0	6.7	2.7	0.0	12.3
80	0.5	2.8	16.2	0.0	1.7	28.0	17.9	0.0	5.3	2.4	0.0	9.7
85	0.1	3.2	12.1	0.0	1.1	20.9	16.1	0.0	4.0	1.8	0.0	7.4
90	0.1	5.0	8.9	0.0	0.7	15.3	13.5	0.0	3.0	1.3	0.0	5.6
95	0.1	10.5	6.4	0.0	0.5	10.8	10.1	0.0	2.2	0.9	0.0	4.0
100	0.0	13.0	2.0	0.0	0.2	3.4	3.2	0.0	0.7	0.3	0.0	1.3

(*) 1995 value; baseline (r = 0.05. g = 0.015).

financed by future generations in order to balance the government's intertemporal budget constraint. It is obtained by applying the age/gender tax and transfer profiles to future generations, and assuming that they will face the same fiscal policy as those currently living. Under this assumption, the intertemporal debt is a more realistic indicator of the actual burden left by current policies to future generations, as it includes liabilities (such as pensions) that are normally excluded from official statistics of government debt.

Keeping everything else constant (taxes and transfers of current generations and transfers to future generations) the intertemporal public liabilities are eliminated through a proportionate increase in all future tax payments by 74%. This 74% increase in taxes implies that future male generations will be burdened with a net (present value) tax payment of ECU 69 100, rather than receiving a net transfer of ECU 10 500 as the current newborn generation. At the same time, future female generations still receive a net lifetime transfer from the State that is however only 20% of the net lifetime transfer to their current newborn counterpart (ECU 11 900 against ECU 61 200). Meeting the government budget constraint thus implies that future male agents will have to pay for the net transfers to current generations and future female generations.

Clearly, the intergenerational imbalance could be removed by an act of 'generational solidarity', and then, by current generations sharing with the future ones the burden of the higher taxation required to restore fiscal sustainability. We thus calculate the once-and-for-all proportional increase in all taxes that absorbs the fiscal gap in the government's intertemporal budget constraint and therefore equalises the generational accounts of present and future newborn generations. In this case, all generations would be asked to pay 15.7% more in taxes, something that would take the tax revenue share from 38.3 to 44.3% of GDP. Therefore, a current male newborn will have to pay a lifetime net tax of ECU 6 500, rather than receiving a net lifetime transfer. His (and all other living net tax payers') help in paying for the transfers to present and future net receivers would allow future male generations to save more than ECU 63 000 from their lifetime bill to the State.

The same objective can be achieved by a once-and-for-all cut of transfers by 14.1%. This would imply to take the transfer proportion of GDP from 41.1 to 35.3%. As in the case of a tax increase, the account of a newborn male individual becomes positive, and it is almost equal to the one following the tax increase (ECU 6 300 against ECU 6 500). On the other side, the net transfer to a newborn female individual decreases more with a cut in transfers (ECU – 43 200) than after the tax increase (ECU – 50 700).

In order to assess the sources of the generational imbalance in the UK we run two hypothetical experiments. The first one consists of assuming that the explicit debt in 1995 is zero. The second one assumes that there is no demographic change and the age structure of the population remains the same. Our results show that, with zero explicit debt, the intertemporal public liabilities amount to 133.6% of GDP, and that the intergenerational balance is restored through a once-and-for-all increase in taxes equal to 11.2% of current revenues. With no demographic changes, the intertemporal public debt is 144.8% of GDP, and the balance is restored with extra revenue from taxes equal to 12.6%. Comparing these results with the baseline scenario, we conclude that a larger part of the additional burden to future generations comes from the existence of the explicit debt, rather than from the demographic changes. This confirms what we observed in Section 14.2, namely, that the pressure on the welfare state deriving from the ageing of the population does not represent in the UK the same threat as in other European countries.

14.4. Sensitivity analysis

In this section, we test our results against different assumptions on the main parameters used in the calculations, and in particular on the interest rate and the growth rate.

Table 91 shows that, starting from the baseline values, lower productivity growth rates and higher discount rates worsen the intergenerational imbalance. The difference in the accounts ranges from a minimum of ECU 64 300 (high growth and medium discount) to a maximum of ECU 69 900 (low growth and high discount), which is within a range of less than 10% around the correspondent baseline value. The overall impression is therefore that our baseline results are very robust to different assumptions on g and r.

Rather than testing the sensitivity of our results with respect to the underlying demographic assumptions, we now consider the implications of alternative hypotheses concerning the uprating criteria of social security transfers. We already mentioned that the current practice in

Table 91

Sensitivity analysis — discount rate and growth rate

Growth rate %	Interest rate %	IPL % of GDP	Present new-borns (ECU 1 000)	Future new-borns (ECU 1 000)	Absolute difference (ECU 1 000)
	3.0	312.7	– 36.1	29.6	65.7
1.0	5.0	164.4	– 35.5	30.5	66.0
	7.0	117.8	– 35.8	34.2	69.9
	3.0	407.1	– 38.1	27.4	65.5
1.5	5.0	184.8	– 35.2	29.8	65.1
	7.0	125.7	– 35.9	32.3	68.2
	3.0	586.3	– 42.3	23.0	65.3
2.0	5.0	212.2	– 35.0	29.3	64.3
	7.0	127.6	– 35.8	30.8	66.7

Table 92

Sensitivity analysis — year of return to productivity adjustment

	All transfers (contributory and non contributory)									
Year of switch	1997	1998	1999	2000	2005	2010	2015	2020	2030	never
Increase all taxes, future (%)	71.3	68.7	66.2	63.9	53.6	45.4	38.9	33.9	26.6	15.9
Absolute difference	62.7	60.4	58.2	56.1	47.1	39.9	34.2	29.8	23.5	14.1
Contributory transfers only										
Year of switch	1997	1998	1999	2000	2005	2010	2015	2020	2030	never
Increase all taxes, future (%)	72.7	71.6	70.4	69.3	64.6	60.7	57.7	55.2	51.7	46.5
Absolute difference	64.0	62.9	61.9	61.0	56.8	53.4	50.7	48.5	45.5	40.9

the UK is to index social security transfers to prices rather than earnings. In the generational account framework, where all values are at 1995 prices, incorporating this practice amounts to keeping the age- and gender-specific expenditure on social security transfers constant for the indefinite future. The last column of Table 92 shows what happens to our indicators of fiscal imbalance if we abandon the assumption of productivity growth for all transfers (with the only exception of SERPS). The dimension of the imbalance is strongly reduced, with the difference in current and future newborns now 71% smaller than in the baseline case (from ECU 49 300 to ECU 14 100). Consequently, the tax increase and the transfer cut necessary to restore the generational balance are much lighter than in the baseline case (they are both slightly above 1% of GDP). These results, which are closer to generational accounting results previously reported by the National Institute of Economic and Social Research and HM Treasury, should be interpreted as a great caveat towards the conclusion that the UK *current* fiscal policy suffers from a serious problem of long term sustainability. Table 92 also reveals that abandoning the assumption of productivity growth only for contributory transfers (basic pensions, incapacity benefits, jobseekers's allowance) would not change our baseline results to the same extent. This result could be interpreted as an indication of a much larger role played by non-contributory benefits (income support, family credit, housing benefits, disability benefits) in determining the UK fiscal imbalance.

These results, however, must in turn be interpreted with some caution, as they imply a government that is only concerned about maintaining citizens' real consumption possibilities. Even acknowledging that private pension provision is likely to permit reducing the State's role in providing social security benefits in the future, political feasibility may require reintroduction of earnings uprating at some point of time, if price indexation actually entails a continued reduction of the relative value of social security benefits.

Table 92 shows how our indicators of the intergenerational fiscal imbalance are considerably affected by different hypotheses on the *timing* of such a policy switch. Clearly, the more distant in time is the return to their productivity indexing, the smaller is the fiscal imbalance.

14.5. The generational impact of pension reform

As we pointed out in Section 14.2, the search for 'sound and sustainable' government finances in the UK has produced several reforms of the pension system. Only the reform of the National Health Service in the 1980s has revealed the same policy concern about the financial sustainability of the welfare state. In particular, the objective of this section is to evaluate how and if the 1986 Social Security Act and the 1995 Pension Act have succeeded in reducing the size of the fiscal intergenerational imbalance with their cuts on pension expenditure.

The 1986 Social Security Act contained a whole package of economic measures, affecting many social security benefits in addition to pensions. However, as far as the pensions system is concerned, the two reforms shared the same political motivation, namely, to relieve the pressure on pension expenditure coming from population ageing and the introduction of the SERPS in 1978. Introduced by the Labour party under the slogan 'half pay in retirement', the SERPS pension was intended to be a proportion of the individual earnings between an upper and lower limit of, in 1975, GBP 10 and GBP 70 per week respectively. The lower limit was the amount of basic pension, while the upper limit was about 1.5 times the average male earnings.

The intention was that these limits would rise annually with earnings. At pension age, each year's earnings on which he or she paid contributions were to be revalued in line with the rise in economy-wide earnings, and the pension was to be based on the best 20 years of revalued earnings. The total revalued earnings were then multiplied by an accrual factor to arrive at the additional pension entitlement. In 1978 the accrual factor was 1.25%, so that after staying into the scheme for 20 years or more a person would receive an annual pension of roughly 25% of his or her earnings, in addition to the basic pensions. A crucial part of the scheme was that the State retained an important residual responsibility for the earning related pensions of those who would prefer to contract out of the scheme. In particular, the contracted out scheme had to satisfy some minimum conditions, for example, each member was to receive a guaranteed minimum pension (GMP), similar but not identical to SERPS.

The original SERP scheme was first changed by the Social Security Act of 1986. The main changes included, first, the abolition of the best 20 years rule, so that the pension would be based over a person's entire working life. Second, a gradual reduction of the accrual rate to be applied on the revalued earnings from 1988 onwards (only for those retiring after 1999). The reduction of the accrual rate was designed so that the maximum SERPS in the new regime will eventually represent 20% of lifetime average earnings, taking a working lifetime of 49 years. However, as the average working life is likely to be considerably shorter, the actual SERPS pension is expected to fall to about 16% of average lifetime income.

Table 93 shows that these cuts almost halved the cost of SERPS pensions expected by 2043–44, compared with what it would have been. The contribution rate was expected to rise over 18% up to 2031 and fall thereafter, when the increase in the number of pensioners is more than compensated by the assumption that pensions remain price-indexed, while contributions rise with earnings. The change in the SERPS formula smoothed out this profile, and replaced it with one of roughly constant contribution rates until 2030. Moreover, the efficacy of SERPS was seriously hindered by the decision in 1980 of tying basic pensions to an index of prices rather than earnings. As both the lower and upper limits increase with the basic pensions, they will fall as a proportion of average earnings to the point that most contributors will have earnings above the upper limit and their contributions and pensions will, in effect, cease to be earning related. With price indexation and a 2% growth of real earnings per annum the upper limit will be less than 60% of average male earnings by 2030, implying a maximum

Table 93

Fiscal effects of Social Security Act 1986 and Pension Act 1995

(1 000 ECU)

	Social Security Act					Pension Act					
	SERPS		Contributions			SERPS		Total pensions		Contributions	
	Existing	Proposed	Existing	Proposed		Existing	Proposed	Existing	Proposed	Existing	Proposed
	(billion ECU at 1995 prices)		(billion ECU at 1995 prices)			(billion ECU at 1995 prices)		(billion ECU at 1995 prices)		(% of earnings)	
2003–04	7.3	7.1	14.3	14.1	2000-01	5.1	5.1	41.4	41.4	17.6	17.7
2023–24	28.7	17.5	16.8	14.4	2020-21	17.7	13.3	66.3	56.3	18.7	18.8
2043–44	43.3	22.4	16.5	12.2	2040-41	23.8	12.5	82.7	66.8	18.7	15.8
2053–54	54.9	24.8	1.5	10.8	2050-51	23.6	12.1	80.5	63.7	16.8	14.0

Source: Government Actuary's Department.

SERPS pension of only 10% of average male earnings (cf. Dilnot et al. (1994)). Despite the cuts, the total cost of State pensions was expected to nearly double between 1993/94 and 2033/34. Moreover, demographic projections started to change for the worse, as the number of pensioners over the period up to 2030/31 was almost twice as great as the one anticipated in 1986. This implied an upward pressure on contribution rates, which were again expected to rise steeply until 2030/31.

The strong commitment of the Conservative government to reduce both government expenditure and taxation called for another reform that was implemented in 1995. It contained three main elements. First, the pension age at which women qualify for a State pension has been raised from 60 to 65, thus equalising pension ages for men and women. This change is expected to be completed in 10 years, from 2010 to 2020. Second, the arrangements described above, by which the State scheme was to retain part of the liability for the pensions of contracted out employees, has been eliminated. Third, the formula has changed again, as the lower earning limit in each financial year is now deducted from the relevant earning before and not after revaluation to retirement age.

The implementation of the Pension Act will make the expenditure on SERPS in 2050–51 almost 49% lower than what it would have been without the changes, while the total expenditure on retirement pensions (basic and SERPS) will be 20% lower (cf. Table 93). Without the reform, the contribution rates would have risen from 17.6 to 20% between 2000 and 2030 (assuming a growth of real earnings of 1.5% per annum), falling to 16.8% thereafter. As for the previous reform, the effect of the Pension Act is to prevent even this temporary rise in contribution rates, as they are now expected to decrease steadily all over the period.

In view of the figures in Table 93 it may be surprising that further reductions in the cost of the State pensions were considered necessary. After all, the different dynamics imposed to benefits and contributions by the switch to a price uprating of pensions seems to guarantee the financial stability to the system (even more if we take into account the comparatively mild ageing process expected in the UK). However, over and beyond the problem of financial soundness of the National Insurance Fund, the reforms were motivated also with the need to pursue a policy of generational fairness, by which no excessive fiscal burden was to be left to future generations. As Atkinson points out, '*an atmosphere has been created in which pension provision is seen as a burden on the economy and as a threat to our future'* (Atkinson (1994, p. 1)). With the help of our indicators of fiscal intergenerational imbalance, we thus try to answer the question: did these reforms really succeed in reducing the burden imposed by the pension system to future generations?

Table 94 shows the impact of the 1986 and 1995 reforms on the intertemporal public liabilities, the difference in the accounts of current and future newborn generations, and the tax increase that future generations must sustain in order to remove the gap in the government's intertemporal budget constraint. As for the 1986 Social Security

Table 94

Intergenerational impact of 1986 Social Security Act and 1995 Pension Act

	Social Security Act	Pension Act 1995			
	1986	global	(1)	(2)	(3)
Increase all taxes future (%)	77.2	65.5	68.3	66.8	67.0
Absolute difference	67.9	57.9	60.3	59.0	59.1
Intertemporal debt (% of GDP)	192.7	164.3	171.4	167.7	168.0

(1) Equalisation of retirement age.
(2) Equalisation of retirement age and changes in contracting out clause.
(3) Equalisation of retirement age and change in SERPS formula.

Act we proceed in the following way: we assume that from our base-year (1995) onward the formula to calculate SERPS returns to its original version, so that all cohorts retiring from 1988 conserve a replacement ratio of 25% of their earnings. We believe that this hypothetical experiment, even if does not replicate exactly the conditions in 1986, can give us an idea of the relative generational importance of the changes in the SERPS formula. Table 94 shows that without these changes the intertemporal public liabilities would have been almost 8 percentage points higher (as compared to the baseline case), while the difference between the accounts would have been ECU 2 800 larger.

As for the 1995 Pension Act we report its global impact on our indicators, and also disaggregate it in its three main components. Looking at the global impact of this reform it appears that it has been more effective in reducing the intergenerational imbalance than the 1986 change in the SERPS formula. The intertemporal public liabilities are more than 20 percentage points lower than in the baseline case, the accounts differ for more than ECU 7 000, and the fiscal burden imposed on future generations in order to absorb the gap is almost 9 percentage points smaller.

The disaggregation of the global effects shows that most of these improvements come from the equalisation of pension age between men and women, rather than from the changes in the contracting out rules, or the change in the SERPS formula. Table 94 shows that the effect of the equalisation of pension age would be even larger if the transitional period was anticipated before 2010. In particular, if the increase of women pension age was phased-in starting from 1998, its impact on the generational imbalance would be as large as the global impact of the actual reform.

The overall impression is that both reforms have helped in reducing the burden left to future generations, especially the 1995 Pension Act. However, even after these changes, the fiscal imbalance remains on a significant level. We conclude this section with two further experiments. We have stressed that both the basic and the earning related pensions do not guarantee a minimum level of pension in old age. The general feeling on the future of the State pension system in the UK is that, if this is to play any role at all in the next century, either SERPS will be abolished, as is suggested by the Green Paper on pension reform published in 1998, or the basic pension will be linked again to earnings. We have already shown the effect on generational accounts of a return to the earning uprating of the basic pension. Table 95 shows what would happen to the fiscal imbalance if SERPS were abolished altogether (given the female retirement age remains at 60). The intertemporal public liabilities as a percentage of GDP would decrease by 34.2 percentage points. At the same time, the extra net tax payment for future generations would be around ECU 12 000 less than in the baseline case. Hence if the current pension system is assumed to present a problem of 'generational fairness', it would be worthwhile to get rid of the SERPS rather than trying to make it less generous with reforms such as the ones implemented in 1986 and 1995.

Nevertheless, even if the elimination of SERPS managed to correct the fiscal imbalance, at the same time it would worsen the problem represented by the increasingly inadequate living standard of those in retirement. To

Table 95

Intergenerational impact of pension reform measures

	Anticipating the age equalisation			Eliminating SERPS	Minimum pension
from	1998	2000	2005		
Increase all taxes future (%)	65.7	66.2	67.3	55.3	48.0
Absolute difference	58.1	58.5	59.5	48.9	42.2
Intertemporal debt (% of GDP)	164.9	166.1	169.0	138.8	120.0

solve this problem some authors have advanced a proposal based on the idea of a minimum pension guarantee (cf. Atkinson (1994)). This minimum could be identified with the definition of the poverty threshold adopted by the European Union, i.e. 50% of the average income.

Here is an example of the proposal. Assume that by 2030 basic pensions will be 7.5% of average gross male earnings, as it has been estimated. Since male earnings are approximately twice the average income, the total State pension has to be some 25% of average male earnings in order to place the pensioners above the poverty line. This in turn implies that SERPS should cover the remaining 17.5%, something that would be possible only if a representative individual earned 95% of average male earnings. As this is clearly unrealistic, the State should step in and provide the difference.

Table 95 shows the result of a slightly different experiment, based on the assumption that from 1999 onward the State guarantees all future retirees a pension equal to 50% of average earnings, rather than bringing the total pension (public plus private) up to that level. The effect of this policy on the fiscal imbalance is by far the most dramatic of the whole lot of policy changes that we have examined. All three indicators show considerable improvements. It is possible that this result is driven by our assumption of a straightforward introduction of the minimum pension to all pensioners. As the average (SERPS plus flat rate) pension that those retiring from 1999 are entitled to receive is larger than 50% of average earnings, our experiment necessarily implies a significant redistribution from current to future generations.

14.6. Conclusions

The main conclusion of this study is that, in the event of a return to earning indexation of social security transfers, the current fiscal policies in the UK do present a problem of long term sustainability. If this uprating rule was restored immediately, the intergenerational redistribution implied by current policies would be expressed by intertemporal public liabilities that are 184% of GDP, a figure that is above the European average. On the other hand, keeping to the current practice of price indexation, in particular of State pensions, appears as an important means to alleviate (if not eliminate) fiscal burdens on future generations. A growing share of private pension provision in the future might render strategies which, maintaining real transfers, reduce the relative level of State benefits compared to average income, politically feasible.

The fiscal imbalance is obtained despite the rigid fiscal discipline followed since the 1980s and the relatively early start of the ageing process in the UK. We showed that one of the reasons behind the imbalance is likely to be the extra burden imposed by the State earning related pension scheme (SERPS). However, the reforms to the pension system that have tried to reduce the scale of this expenditure have also failed to produce a sufficient intergenerational impact. More serious measures, including the abolition of SERPS as suggested by the Green Paper on pension reform, might be in order. In addition, the main policy suggestion is that other types of expenditure should be the objective of a policy of control and restraint if we believe that the burden left to future generations should be reduced.

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