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11 Generational Accounting for France

Joaquim Levy and Ousmane Doré

11.1 Introduction

This paper presents a set of generational accounts to contribute to the assessment of France's long-term fiscal position. Understanding the sustainability of fiscal policy in France from a generational perspective is important in many respects. France has one of the most extensive social security and welfare systems among the large industrialized countries; public expenditure on health as a share of GDP is the highest in Europe; and compared to other Organization for Economic Cooperation and Development (OECD) countries, its pension system is generous (table 11.1). Not only are benefits high, but so is the level of taxation; taxes needed to finance social security funds have risen from less than 15 percent of wage income in 1950 to almost 50 percent in 1996. In recent years, there have been mounting concerns regarding the continuing viability of such an extensive social security system in general, and its unfunded pay-as-you-go pension schemes and its universal health care in particular. Slower rates of economic growth and the prospective aging of the population have led to further concerns that the implied taxation burden on younger (working) generations in the future will be too high, assuming the continuation of the general thrust of current policy settings. Projected trends of changes in the age structure reveal that an increasing number of retirees must be supported by a declin-

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Table 11.1 **Comparative Fiscal Indicators, 1994 (percent of GDP)**

	France	United States	Japan	Germany	Italy
General government					
Tax revenue	43.0	30.1	30.6	38.1	37.8
Spending	53.9	33.4	37.4	49.1	52.7
Deficit	5.0	1.8	4.1	2.3	7.8
Gross public debt	59.5	63.0	88.9	62.5	122.1
Public pensions	13.5	7.1	5.7	12.3	14.2
Public health	7.2	6.5	5.1	6.1	6.3
Education	5.0	5.4	2.8	3.1	4.3

Source: OECD (1995).

Table 11.2 **Comparative Demographic Factors, 1990–95**

	France	United States	Japan	Germany	Italy
Population (1994)	57,960	260,651	124,960	81,407	57,190
Fertility rate[a]	1.8	2.1	1.5	1.3	1.3
Life expectancy at birth	77.2	76.6	79.1	75.8	77.4
Net migration rate[b]	1.2	2.5	0.0	5.6	1.0
Participation rate	66.7	76.0	76.1	69.7	58.2

Source: Bos et al. (1994).

[a]Number of children per woman of childbearing age.

[b]Number of net immigrants per 1,000 people.

ing number of workers, with the old-age dependency ratio (for a constant participation rate) likely to rise from 0.35 to 0.60 by 2030 (tables 11.2 and 11.3).

Recent reform efforts have contributed to reducing social security spending below trend, but the long-run sustainability of the system remains in question. A reform of the basic pension system effected in 1993, while formalizing the indexation of pensions to the CPI instead of wages (pensions had been loosely indexed to the CPI since 1987), failed to attack longer term problems, in particular the relatively low minimum retirement age enshrined in legislation passed in 1982. Health expenditure growth has been curbed in recent years, but mainly through the imposition of expenditure ceilings that have created strong pressures for an eventual catch-up process. A far-reaching reform of the health system was announced in late 1995 but has yet to be fully implemented. More generally, a substantial fiscal consolidation has taken place since 1995, reducing the fiscal deficit from around 6 percent of GDP to close to 3 percent of GDP, but it has been achieved largely through the compression of expenditure and an increase in taxes, rather than structural, forward-looking changes in expenditure patterns. Therefore, while current government accounts have improved, and further consolidation is envisaged by the "Stability and Growth Pact" signed by candidates to the European Economic and Monetary Union

Table 11.3 **Demographic Transition**

	1995	2000	2010	2020	2030	2050
Population (thousands)	58,048	59,425	60,993	62,121	62,661	62,120
Elderly dependency ratio[a]	22.1	23.6	24.6	32.3	39.1	43.5
Very elderly dependency ratio[b]	39.2	43.4	49.6	41.9	48.8	56.6
Total dependency ratio[c]	52.2	52.8	51.2	59.6	67.9	73.6

Source: Bos et al. (1994).

[a]Population aged 65 or older as a percentage of the population aged 15 to 64.

[b]Population aged 75 or older as a percentage of the population aged 65 or older.

[c]Population aged 0 to 14 and 65 or older as a percentage of the population aged 15 to 64.

(EMU), sole consideration of the conventional fiscal deficit in assessing France's fiscal policy stance—and particularly its sustainability—would be misleading.

Behind concerns about the sustainability of the welfare system and the current real level of public consumption expenditures looms the fundamental question of how fiscal policy affects the distribution of income between generations. In general, fiscal settings that imply markedly increased burdens on some generations, relative to other generations, constitute a cause for concern. The standard measure of the budget deficit cannot appropriately address this question (Kotlikoff 1992). In contrast, generational accounting provides a tool for the investigation of the intergenerational distributional effects of fiscal policy. The purpose of this paper is thus to use this technique to determine whether current fiscal policies in France can be sustained without requiring future generations to pay higher net taxes over their lifetimes than current generations pay.

Our calculations indicate that France's generational policy is imbalanced against future generations. Despite the ongoing fiscal contraction, the pattern of social benefits (in particular pensions) implies a projected net tax burden adjusted for income growth on future French citizens that is about *twice* as large as that facing current young generations. While the precise size of this generational imbalance depends on a number of assumptions, including the rates of discount and productivity growth, the direction of the imbalance is unmistakable, as it holds under alternative assumptions about these parameters. It is also noteworthy that these projections do not build in feedback effects from policies that may be necessary to ensure the "balancing" in the future of the government's intertemporal budget constraint, such as increases in taxation, which could significantly weaken the underlying growth of income, thereby amplifying the imbalance. The size of generational imbalance existing between selected currently living generations is also computed, taking into account the net tax paid by current adults in the past. On this basis, the calculations show that protecting the "baby boom" generations from any change in fiscal policy (thus leaving to young and future generations the full responsibility to redress any fiscal imbalance) would imply a projected net tax burden on those now under age 25 that is more than *twice* as large as that facing those born around 1950.

Section 11.2 provides an overview of developments in France's public finances. Following a brief presentation of the generational accounting framework, section 11.3 presents estimates of generational accounts for France based on policies in place in 1995. In section 11.4, the lifetime net tax payments of current adults are calculated and compared with those of younger living generations. Sensitivity analysis with respect to key parameters is conducted in section 11.5, and alternative scenarios on policies aimed at redressing the generational imbalance are discussed in sections 11.6 and 11.7. Finally, section 11.8 summarizes these findings and concludes. An appendix provides details on the calculation of the accounts, including the data sources.

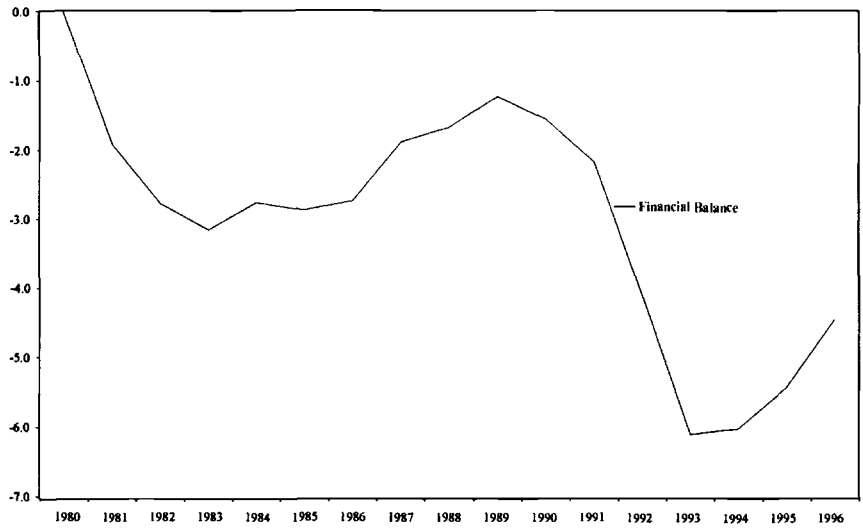

Fig. 11.1 General government financial balance (percent of GDP)
Source: INSEE, quarterly national accounts.

11.2 Public Finances in France

France's overall public finances deteriorated from a surplus in the early 1980s to persistent deficits in the 1990s (fig. 11.1), which have accumulated over the years, leading to a rise in the ratio of public debt to GDP from 20 percent to close to 60 percent. The deterioration of the general government balance that began in the late 1980s reflected in large part a marked increase in overall spending, mainly social expenditures. In the 1990s, it has been aggravated by relatively weak economic growth, which has reduced tax buoyance and has increased outlays associated with entitlements (e.g., minimum income payments and a number of tax allowances). Public spending as a share of GDP rose from 46.5 percent of GDP in 1980 to about 53.8 percent in 1995, one of the highest levels among large industrial countries.

Meanwhile, a series of tax increases have contributed to a ratio of government revenue to GDP that is both the highest among the seven major industrial economies and heavily dependent on wage-based social security contributions.[1] French public accounts reached a low point in 1993, when, in part due

1. The general government revenue ratio reached 48.9 percent in 1995 after slightly declining in the second half of the 1980s. Contrary to what happened in many other developed countries, France had no major tax reform in the 1980s, but specific changes undertaken almost every year in the tax rules (and in particular a reduction in income tax rates in the late 1980s when the economy was booming) have changed considerably the structure of the tax system: a relatively low share of personal income tax in government, and yet a high burden of taxation. Revenues from income taxes were 7.2 percent of GDP in 1994, compared to an average of 10 percent of GDP for the seven large industrial countries. Social security contributions, on the other hand, are very high,

to the recession that began in 1992, the deficit widened to 6.1 percent of GDP. Thereafter, and under the aegis of the Maastricht Treaty on Economic and Monetary Union, fiscal policy has been oriented toward consolidation in order to meet public deficit and debt criteria established by this treaty.[2] Efforts to strengthen the public finances undertaken since mid-1995 appear on balance to have yielded some results, with the general government deficit declining to close to 3 percent in 1997. This improvement, however, has resulted chiefly from increases in taxes, and to a lesser extent from belt-tightening measures.[3]

Even a cursory analysis of the expenditure dynamics witnessed in the past three decades makes clear that the public sector, which has traditionally played a considerable role in France, has continued to expand, while experiencing some changes in its scope since the early 1970s. As shown in figure 11.2, total outlays of the general government as a share of GDP rose very rapidly between the early 1970s and early 1980s, falling thereafter until the late 1980s as a result of stronger economic growth over this period and some reform efforts aimed at containing spending (e.g., global budgets for hospitals) and shifting the focus of industrial policy (e.g., by cutting subsidies to enterprises). Slower growth since 1991 has in part been responsible for a sharply rising expenditure share in recent years. Current transfers—mainly to households—have been the most rapidly rising item, representing 45 percent of total spending in 1980 and more than half in 1995, whereas the share of public consumption in total gen-

at 21 percent of GDP compared to an average of 11 percent for the seven large industrial countries. Some broadening of the income tax base has taken place in recent years, through the introduction of a number of broad-based flat income taxes, notably the Contribution Sociale Généralise (CSG; introduced in 1991 and used to finance social security) and the Remboursement de la Dette Sociale (RDS; introduced in February 1996 and earmarked to finance a sinking fund set up to repay the deficit accumulated by the social security administration in recent years). Reductions in the burden of wage-based social security taxation were initially pursued through the introduction of a system of partial exemptions from payment of employer social security contributions. More recently, a gradual raise of the rate of the CSG was decided upon, to permit the financing of public health care to be shifted away from social security contributions (from 1998, the CSG rate will be raised by 4.1 percentage points to 7.5 percent of capital and wage incomes).

2. These criteria consist of capping the general government deficit at 3 percent of GDP, and the stock of public debt at 60 percent of GDP. While the deficit criterion has been strengthened in 1995 in accordance with the "Stability and Growth Pact," there has been some flexibility in the interpretation of the debt criterion. The latter criterion, while somewhat forward looking, does not take into account the implicit debt of the social security system, which in the case of France was estimated to be at about 100 percent of GDP in 1993 (Kuné, Petit, and Pinxt 1993). Maastricht deficit criteria were set on a national accounts basis, with a view to homogenizing cross-country comparisons and bringing a degree of transparency to fiscal accounts that is absent in most public budgeting accounting. Nevertheless, as 1998 approached, Eurostat endorsed the recording as deficit-reducing current revenues receipts from some operations that could be plausibly classified as exchange of assets (and as such usually classified as financial operations).

3. The contribution of public enterprises to the consolidation effort was mixed, as several of them needed to be recapitalized, in addition to the cases of some public banks that produced large contingent shortfalls. On the other hand, the transfer of France Telecom's future pension liabilities to the state budget, against a lump-sum payment (recorded as a deficit-reducing current revenue), while generating a negative cash flow in coming years (ceteris paribus burdening future generations) contributed to the narrowing of the fiscal deficit in 1997.

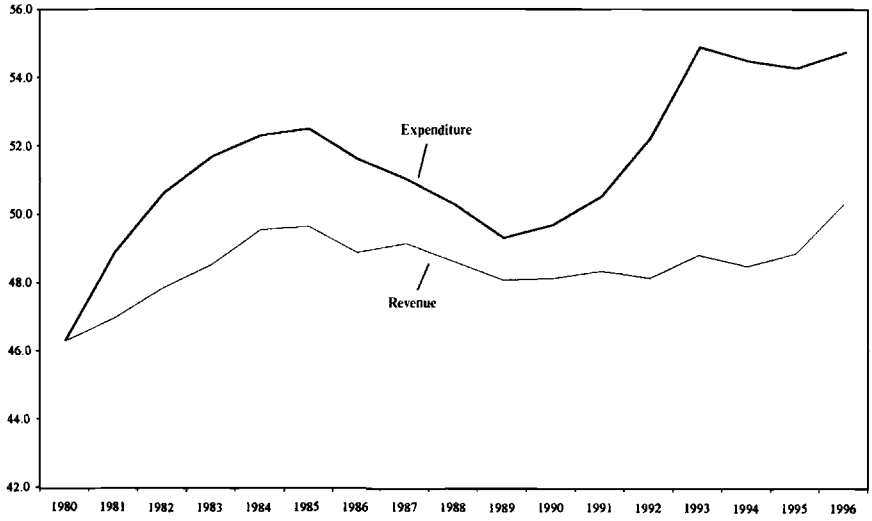

Fig. 11.2 General government revenue and expenditure (percent of GDP)
Source: INSEE, quarterly national accounts.

eral government expenditure has declined, largely as a result of strict public sector wage policy.[4]

A widely observed source of spending growth has been the expansion of the social security system. Previously close to balance, the social security accounts have run deficits of about 1 percent of GDP from 1992 onward.[5] Between 1980 and 1995, social security spending as a share of GDP rose by 5 percentage points. Expenditure on pensions, which represented only about 5 percent of GDP in 1960, rose to 10 percent in 1980 and more than 12 percent in 1995. Health expenditure has increased at an annual rate of 0.7 percentage points greater than that of nominal GDP since 1980; its share in GDP rose from 4 percent in 1960 to over 9 percent in 1995. Demographic factors have accounted for a good share of the rise in social expenditure (according to the OECD, about 50 percent of the increase in health care costs can be attributed to population aging). However, policies and economic conditions have also played a role. For instance, the coming to maturity of the pension system instituted in 1945 lies behind the increase in contribution rates required to balance the pay-

4. The share of compensation of public sector employees in GDP has remained flat despite a continuous increase in total public sector employment, which currently represents 25 percent of total domestic employment as opposed to 20 percent in 1980.

5. By law the social security system has to close the year in balance; in recent years this has required complex financial operations, promptly reversed at the beginning of the new year. This window dressing has not, however, been hidden from the public, as biannual reports of the finances of social security pointing to the sources of imbalances in the accounts of the system have received wide publicity.

as-you-go scheme, and increases in health care expenditure have often been associated with higher income levels. In the case of pensions, while life expectancy had risen substantially, the minimum retirement age was reduced in 1982 from 65 years to 60, and as in other European countries, a number of early retirement schemes were introduced after 1980.

Other social outlays also increased due to changing economic conditions. Most notably, unemployment benefits rose extremely fast in real terms during the 1970s, when the rate of unemployment increased from 2 percent to 8–9 percent. The average annual real growth rate of benefits per capita was, however, curtailed in the 1980s when policy reforms made the system progressively less generous while tightening the eligibility requirements. However, because of the sharp rise in the number of unemployed in recent years, total outlay on unemployment benefits has gone up from less than 1 percent of GDP in 1980 to 1.7 percent in 1995.[6]

The projected impact of population aging has been extensively studied since the late 1980s, particularly regarding pensions (the *Livre Blanc sur les Pensions* summarizing these studies and published in 1992 formed the basis for the reform implemented in 1993). Partly due to a decline in the fertility rate in the 1960s and 1970s and to the continuous lengthening of life expectancy, the old-age dependency ratio (i.e., the ratio of the number of people aged 65 or older to the working-age population) has risen from 12 percent in 1965 to about 15 percent in 1995 and is likely to increase over the coming decades to peak in 2030 at 23 percent. Official demographic projections (taking into account the trend decrease in mortality) show that at the current retirement age of 60 years, there will be 2.6 persons of working age for every person of retirement age in 2000, but only 1.2 persons in 2050. The implication of these demographic developments is that spending on pensions and health care is likely to rise markedly. Recent official French studies (Briet, Zaidman, and Rubenstein 1996) show that under unchanged policies, the average rate of contribution needed for financial balance of the basic pension system would have to increase from 18.9 percent in 1990 to 48 percent in 2040. Other studies indicate that aging by itself would tend to increase the share of health expenditure in GDP by about 3 percentage points by 2050 (e.g., Lenseigne and Ricordeau 1997). A study of the combined impact of these trends on future generations has not, however, been done. The generational accounts computed here are thus the first attempt to bring together these prospective developments in an unified framework.

6. For a number of reasons, unemployment benefits as such represent a relatively small part of replacement income. Since the early 1990s, social minima (Revenu Minimum d'Insertion—RMI) have had an increasing importance, while family allowances have increasingly been reoriented from responding to demographic policies toward being a key element of the social safety net (nevertheless, until 1997, the basic family allowance was targeted at encouraging childbearing, not being means tested and being quite generous to families with three or more children).

11.3 Generational Accounting

11.3.1 The Basic Framework

Generational accounting is a new technique developed by Auerbach, Gokhale, and Kotlikoff (1991) and Kotlikoff (1992) that can be used to study the effects on different generations of the government's fiscal policy. In this framework, the explicit analysis of the impact of fiscal policy on the welfare of different generations starts out by computing generational accounts, which simply show the present value of the expected net tax payments of a representative individual of a given generation, where "net taxes" refers to taxes paid less transfers received and a "generation" is defined as a cohort of individuals of the same age and sex.

Generational accounts are based on the premise that all government purchases must be paid for; that is, for a given path of government spending, a reduction in one generation's account can only be achieved through expanding other generations' accounts in a way that respects the government's intertemporal budget constraint. The budget constraint implies that the government's current net wealth plus all future taxes paid to the government minus all transfers paid by the government (future net taxes) must cover all future government spending on goods and services. In order to compare the intergenerational burden, the sum of future net taxes is split into an amount paid by all existing generations from the base year onward to the end of their lives and the remaining amount, which has to be paid by all future generations during their lives. Hence, more formally, the government's intertemporal budget constraint can be written as

$$(1) \qquad \sum_{s=0}^{D} N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} + W_t = \sum_{s=t}^{\infty} G_s \prod_{j=t+1}^{s} \frac{1}{1 + r_j}.$$

The first term on the left-hand side of equation (1) adds together the present value of the net payments of existing generations. The expression $N_{t,k}(k = t, \ldots, t - D)$ stands for the present value of net remaining lifetime payments to the government of the generation born in year k discounted to year t. The index of this summation runs from age 0 to age D, the maximum length of life. Hence, the first element of this summation ($s = 0$) is $N_{t,t}$, which is the present value of net payments of the generation born in year t; the last element ($s = D$) is $N_{t,t-D}$, the present value of remaining net payments of the oldest generation alive in year t, namely, those born in year $t - D$. The second term on the left-hand side of equation (1) adds together the present value of remaining net payments of future generations. The third term on the left-hand side, W_t, denotes the government's net wealth in year t. The right-hand side of equation (1) expresses the present value of government consumption. In the latter expres-

sion, G_s stands for government consumption expenditure in year s. All future flows are discounted to year t at the pretax rate of return r_j.

The term $N_{t,k}$ is defined more explicitly as follows:

$$N_{t,k} = \sum_{s=\max(t,k)}^{k+D} T_{s,k} P_{s,k} \prod_{j=t+1}^{s} \frac{1}{1 + r_j}. \tag{2}$$

In expression (2) $T_{s,k}$ stands for the projected average net payment to the government made in year s by a member of the generation born in year k. The term $P_{s,k}$ stands for the number of surviving members of the cohort in year s who were born in year k. For generations who are born in year k, where $k > t$, the summation begins in year k.

Generational accounts are defined simply as a set of values of $N_{t,k}$, one for each existing and future generation, with the property that the combined total value adds up to the right-hand side of equation (1). This formulation makes clear the implications of the government budget constraint; holding the right-hand side of the equation fixed, increased (decreased) government payments to (receipts from) existing generations mean a decrease in the first term on the left-hand side of equation (1) and require an offsetting increase in the second term on the left-hand side of equation (1); that is, they require reduced payments to, or increased payments from, future generations.

This framework can be used easily to make two types of comparison. First, through the use of lifetime net tax rates, it can be used to compare the lifetime net taxes of future generations, of the generation of people just born, and of different generations born in the past; that is, it can be used to determine how much future generations are likely to pay in net taxes as compared to generations alive today. Second, generational accounting can be used to compare the effects of actual or proposed policy changes on the remaining lifetime net tax payments of generations currently alive and on future generations.

11.3.2 The Case of France

Generational Profiles and Benchmarking Aggregates

The construction of generational accounts necessitates first projecting each currently living generation's average taxes less transfers for each future year during which at least some members of the generation will be alive, and then converting these projected net tax payments by individuals into an aggregate present value. This requires projections of population by age and sex, as well as a discount rate to convert flows of net taxes into present values. In the case of France, projections of average future taxes and transfers by age and sex start with the 1995 aggregate taxes and transfers, as well as medium-term projections of transfers and taxes for all levels of government. These aggregate taxes and transfers are distributed across the population by age and sex in each year according to the age and sex pattern observed in 1990 from official survey

data. The primary sources for these distributions are the 1990 Enquête sur les Revenus Fiscaux des Ménages, the 1991–92 Enquête sur les Actifs Financiers, and the 1990 Enquête sur les Budgets des Familles. A detailed account of the construction of these profiles can be found in the appendix.

The resulting age and sex profiles of net taxes (i.e., the relative tax weights of different living cohorts) are assumed constant through time, except for adjustments reflecting projected changes in the participation rate of women and pension indexation (the profile for pensions also varies over time, as explained below). The actual value of individuals' taxes and payments in the medium term are found by scaling individuals' payments to achieve aggregate values consistent with taxes in 1995 and the medium-term fiscal projections, which assume inter alia that the economy returns to its "potential" level by year 2002. For years beyond 2002, it is assumed that all taxes and transfers not governed by other explicit factors increase at the same rate as productivity growth.[7] Five categories of taxes are distinguished: income tax, property tax, value-added tax (VAT), social security contributions, and taxes based on individual wealth (including corporate income taxes, the incidence of which was shifted to asset holders). Transfer payments are categorized into pensions, health, education, and unemployment benefits. For each of these items, the aggregate amounts are allocated according to the existing profiles; all other categories of transfers and nondiscriminated government revenues were included in government consumption. Figures 11.3 and 11.4 present the distribution of taxes and benefits in the base year 1995.

The next step in the construction of France's generational accounts involves an estimation of the initial stock of government net wealth and projections of future government consumption. Government consumption is determined by a projection over the medium term (see appendix), then by a rule that assumes that spending grows over time from its 2002 level to keep pace with population and productivity growth. This amounts to assuming that per capita public consumption rises at the productivity growth rate. The estimate of spending includes both government spending on goods and services (excluding health and educational spending) and public investment, netted by those taxes and receipts not included in the five categories described above (it is customary in generational accounts to lump public investment together with public current expenditure and not explicitly record the flow of services from past investment, as this convention has no impact on the present value of the net tax burden to the extent that individual benefits from public investment cannot be identified). For government net wealth, estimates computed by Institut National de la Statistique et des Etudes Economiques (INSEE 1994) are used. In 1995, the consolidated net wealth of the general government was estimated to be FF 800 billion (about 10 percent of GDP), reflecting the 1993 estimate, adjusted for

7. E.g., the projected distribution of taxes and transfers by age and sex for, say, 2017 would be equal to the 2002 distribution multiplied by $(1 + n)^{15}$, where n is the rate of productivity growth.

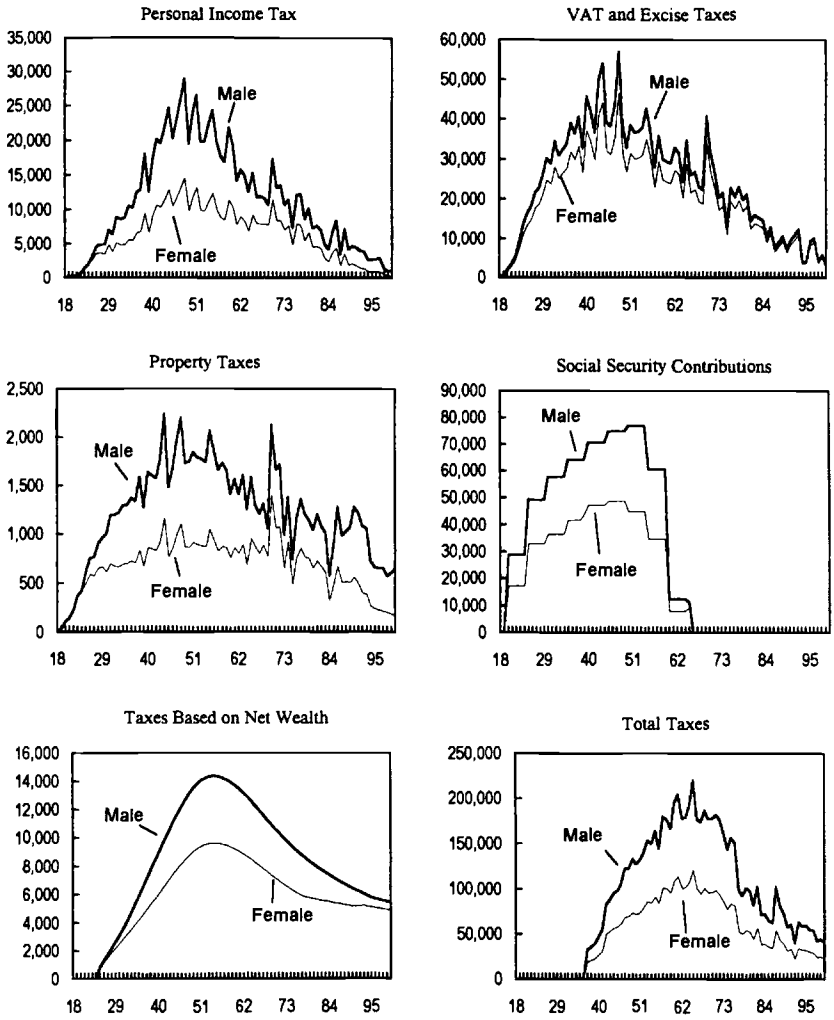

Fig. 11.3 Profiles of tax incidence (francs)
Sources: Data provided by INSEE; authors' calculations.

the growth in government debt and the sale of government assets through privatization in the intervening period. The net financial wealth that is used for the baseline calculation was negative, with net liabilities amounting to FF 2,800 billion, obtained by netting off from the general government debt (estimated at FF 4,059 billion in 1995), the financial assets of the general government.

Using the government intertemporal budget constraint, the average present value lifetime net tax payment of each member of each future generation was then determined as a residual under the assumption that the average lifetime

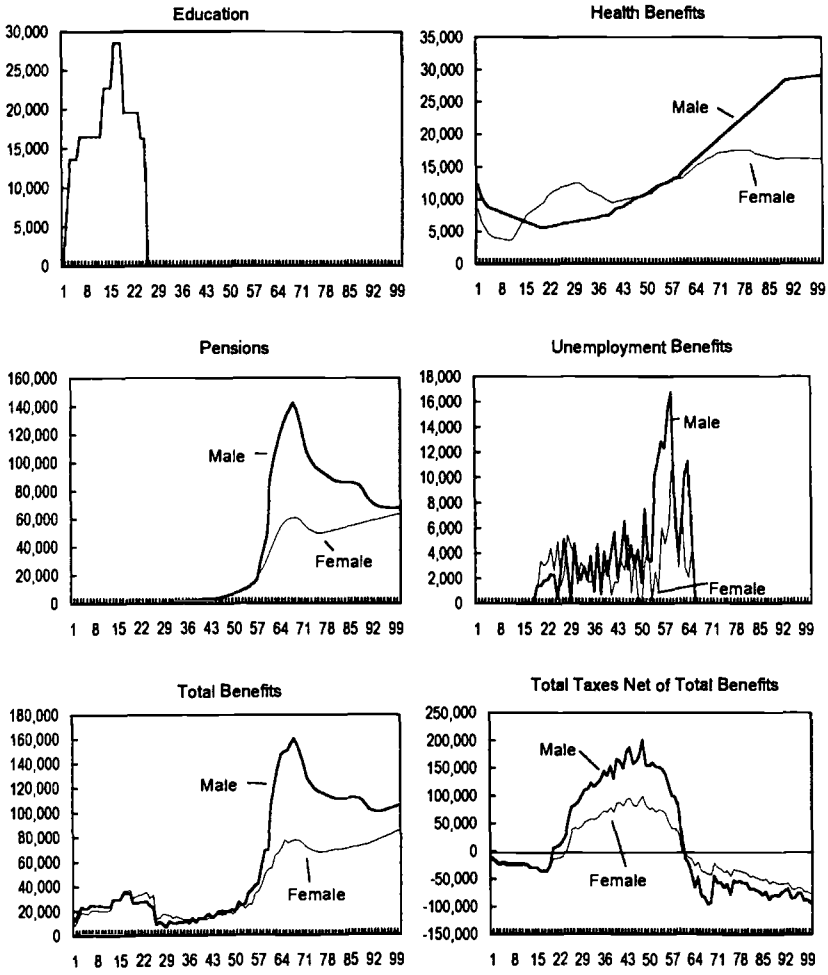

Fig. 11.4 Profiles of government transfers (francs)
Sources: Data provided by INSEE; authors' calculations.

tax payment of successive generations rises at the economy's rate of productivity growth.[8]

The classification of taxes and transfers adopted aimed at minimizing the arbitrariness in the labeling of taxes and transfers. All flows were fully taken into account on a national accounts basis (table 11.4), and the age and gender distribution of the net tax burden was allocated in as large a fraction as possible

8. Detailed Excel spreadsheets used in the calculation of the accounts are available from the authors upon request.

Table 11.4 **Accounts of the General Government, 1995 (millions of francs)**

				Net Taxes		
		Income	Expenditures	Amount	% of GDP	Incidence
Current account						
Operational income	N2	160,512		160,512	2.09	Government consumption
Subsidies	R30		127,910	−127,910	−1.67	Government consumption
VAT	R21	533,338		533,338	6.94	Consumption-based tax
Other taxes on goods and services	R22	563,061		563,061	7.33	Consumption-based tax
Customs taxes	R29	177		177	0.00	Consumption-based tax
Corporate income tax	R611	121,219		121,219	1.58	Net-wealth-based tax
Personal income tax	R612	398,392		398,392	5.19	Income-based tax
Other income, wealth, and property taxes	R613					
Property taxes (*taxe d'habitation*)		40,017		40,017	0.52	Income-based tax
Other income and wealth taxes		168,754	3,314	165,440	2.15	Net-wealth-based tax
Social security contributions	R66	1,479,788		1,479,788	19.27	Wage-based tax
Social security transfers	R641					
Pensions			741,094	−741,094	−9.65	Pensions
Health			406,937	−406,937	−5.30	Health expenditures
Unemployment			98,430	−98,430	−1.28	Unemployment
Others, including family allowances			162,717	−162,717	−2.12	Government consumption
Government pensions and other entitlements	R642		152,453	−152,453	−1.98	Pensions
Other social transfers	R643		220,277	−220,277	−2.87	Government consumption
Government social security contributions (*contribution fictives*)	R63+R65	350,931	205,770	145,161	1.89	Government consumption
Transfers to private agents	R66		15,695	−15,695	−0.20	Government consumption

Other domestic transfers	R69	63,626	102,722	−39,096	−0.51	Government consumption
International official transfers	R67	20,171	78,383	−58,212	−0.76	Government consumption
Interests	R41	38,229	309,487	−271,188	−3.53	Debt service
Income from land	R43	3,763	151	3,612	0.05	Neutral
Dividends	R44	17,078		17,078	0.22	Neutral
Income of "quasi societies"	R45	0		0	0.00	Neutral
Insurance premiums	R51	1,960	2,063	−103	0.00	Neutral
Insurance payments	R52	933	1,060	−127	0.00	Neutral
Total income		3,962,019				
Total nondiscretionary expenditures			2,628,463			
Disposable income	N3	1,333,556				
Final consumption	P30		1,480,894			
Education	F1		380,000	−380,000	−4.95	Education
Culture	F2		47,000	−47,000	−0.61	Government consumption
Health	F3		258,000	−258,000	−3.36	Health expenditures
Social interventions	F4		112,000	−112,000	−1.46	Unemployment
Other			683,894	−683,894	−8.90	Government consumption
Capital account		−43,589	360,189			
Gross savings	N4	−147,338				
Fixed investment	P41		240,321			
Stockbuilding	P42		−1,538			
Purchase of land	P71		5,213			
Purchase of nonmaterial assets	P72		443			
Subsidies to investment	R71	49,343	92,945			
Taxes in capital	R72	47,336				
Other capital transfers	R79	7,070	22,805			

(continued)

Table 11.4 (continued)

	Income	Expenditures	Net Taxes		Incidence
			Amount	% of GDP	
Capital expenditures					
Education		36,019	−36,019	−0.47	Education
Culture		23,412	−23,412	−0.30	Government consumption
Health		25,213	−25,213	−0.33	Health expenditures
Social interventions		18,009	−18,009	−0.23	Unemployment
Other		257,535	−257,535	−3.35	Government consumption
Capital income	103,749		103,749	1.35	Government consumption
Net borrowing requirements	−403,778			−5.26	

Sources: INSEE (1996) and authors' calculations.

to individual cohorts, so as to minimize the problem that the generational accounts do not recognize the intergenerational distributional implications of the government consumption program (see Buiter 1996).

Key Assumptions and Other Technical Aspects

A key ingredient in the calculation of generational accounts is the economic and demographic assumptions needed in order to extend and discount the components of the zero-sum equation. They are the rate of productivity growth, the discount rate, and the rate of population growth. For present purposes, the average annual growth of productivity is assumed to be constant at 1.5 percent per year over the long run (baseline case). A discount rate of 5 percent is assumed in the baseline, but this does not necessarily imply that this rate would be the most plausible actual discount rate. Indeed, alternative values of 3 percent (which could be viewed as close to real long-run risk-free interest rates) and 7 percent are also used to gauge the sensitivity of the results to this particular parameter. The projection of population by age and sex for 1995–2050 provided by INSEE corresponds to the "high growth" case (i.e., a fertility rate of 2.1 percent and no immigration) found in Dinh (1994). This trend is extrapolated through 2200 by assuming that the birthrate stabilizes after 2050.

Other technical assumptions made in this paper concern the rate of participation of the working-age population in the labor force, pension indexation, and the growth rate of medical expenditure. As regards the rate of participation, a number of studies point to past and projected increases in the participation of women in the labor force (see, e.g., Direction de l'Animation de la Recherchée, des Etudes et des Statistiques [DARES] 1997). This trend is captured here by incorporating the observation that the increase in the female participation rate has taken place through two mechanisms. First, women who have entered the labor force when young have in their majority remained active until retirement. Therefore, the future participation rate of cohorts aged 50 to 60 is likely to approach that of cohorts aged 40 to 50 (adjusted for some early retirement). Second, there has been a gradual, albeit small, rise in the participation rate of women in their 20s, which is expected to continue (at a decreasing pace) until about 2020.[9]

The current profile of pension payments reflects several influences, among which are the growth of real wages in the past and the indexation of benefits. This profile, however, is bound to change overtime. Since 1993, and following the proposals in the *Livre Blanc sur les Retraites,* pension benefits (in the *régime général*) have been adjusted in line with the CPI instead of according to wages. Accordingly, baseline projections assume that pensions will continue

9. Using the participation rate as a measure of economic activity is akin to assuming that the unemployment rate is constant in the long run; in the baseline, this rate is assumed to correspond to the current NAIRU (nonaccelerating inflation rate of unemployment).

to be indexed to the CPI (although the 1993 pension reform leaves the door open for a change in this rule) and that wages will rise in line with productivity growth. As to health care, it is assumed that aggregate health expenditure as a proportion of GDP will stabilize over the medium term, but beyond the year 2002, individual health care spending is assumed to rise faster than productivity (half a percentage point above the rate of productivity through 2030). This is consistent with the experience of the 1980s and early 1990s, when per capita real public health expenditures after adjustment for demographic changes rose faster than labor productivity, and in contrast with the objectives of the health care reform announced in 1995 (see discussion below on the impact that fully achieving the objectives of such reform would have on the generational accounts).

Main Results

The baseline case compares the generational accounts of males and females born in 1995 with the average of those born after 1995. The projections reflect policies that were in place or had been announced as of late 1995; therefore, they take into account the medium-term fiscal plans contained in the convergence program presented at the time. In the baseline scenario (and except where indicated otherwise), the participation rate of women is projected to rise while that of men is projected to remain constant, and a zero-indexation rule is assumed for pension expenditures, reflecting the fact that accounts are computed in constant prices.

The baseline generational accounts for male and female cohorts for the base year 1995 are presented in table 11.5 under the assumptions of 1.5 percent productivity growth and discount rates of 3, 5, and 7 percent. A negative value means that the generation is projected to receive more in transfers than it will pay in taxes over its remaining lifetime. Not surprisingly, a life cycle pattern emerges, with working-age generations having the higher tax burden and older generations being net recipients (working-age generations face many years of paying taxes before starting to receive pensions, while some of the benefits they receive indirectly, such as free education for their children, are rather assigned to younger generations).

For males in the baseline case (with a 5 percent discount rate), the generational account (i.e., the remaining net tax payments) is about U.S.$82,000 for newborns in 1995, rising to a peak of $320,000 for those who turned age 25 in 1995 (who have thus completed their education and have to wait yet some 35 years before retiring). Thereafter, the account falls, becoming negative for those aged 50 in 1995, individuals approaching retirement and thus a reduced level of income taxes and the receipt of public pension benefits. For females, the lifetime pattern is similar, but the accounts at each age are generally much lower than for males. For example, newborn females in 1995 face a net lifetime fiscal burden of some $37,000, which peaks at $220,000 at age 25. The fact

Table 11.5 **Generational Accounts: Baseline (U.S. dollars)**

Generation's Age in 1995	$r = 3$		$r = 5$		$r = 7$	
	Male	Female	Male	Female	Male	Female
0	140,348	110,681	82,219	37,221	25,623	−3,714
5	174,584	138,844	125,360	64,988	63,904	17,299
10	211,835	170,319	175,370	99,916	113,065	47,738
15	243,973	195,695	222,248	134,520	164,013	82,022
20	290,671	234,637	284,845	186,730	235,394	138,292
25	306,148	253,627	318,688	223,498	284,190	184,112
30	263,625	227,146	293,748	216,809	278,405	190,447
35	199,287	185,985	242,716	193,579	246,843	180,957
40	115,108	130,656	166,777	153,313	188,989	154,209
45	23,743	67,894	77,456	100,826	112,966	112,738
50	−64,100	7,174	−12,524	44,393	29,276	63,238
55	−184,251	−76,278	−134,743	−39,257	−91,104	−16,650
60	−232,282	−136,466	−197,014	−100,390	−164,612	−76,703
65	−225,530	−134,762	−199,879	−106,926	−175,435	−87,475
70	−168,734	−111,542	−151,497	−91,855	−134,820	−77,305
75	−177,047	−119,018	−162,135	−103,600	−148,190	−91,496
80	−101,447	−76,301	−93,948	−67,958	−86,935	−61,197
85	−109,300	−79,461	−102,905	−73,212	−96,974	−67,889
90	−99,988	−76,940	−94,438	−72,308	−89,642	−68,203
95+	−104,084	−76,387	−99,945	−73,395	−96,111	−70,623
Future generations	285,138	224,865	161,450	73,089	99,330	−14,396
Percentage difference	103	103	96	96	288	288

Source: Authors' calculations.

Note: Productivity growth assumed to be 1.5 percent; r is the discount rate (percent).

that accounts for females are lower than for males reflects, first, the lower female participation rate and lower pay scale, so that their lifetime gross taxes (mainly labor income and social security taxes) are lower, and second, greater longevity, which tends to increase the present value of their pensions receipts.

In the baseline scenario, the average net payment burden of future generations is about *two times* higher than that faced by the youngest generation alive in 1995 (represented by the 0–4-year-old cohort of 1995).[10] If all generations born before 1995 are protected from any change in their lifetime net tax profiles, future generations will have to pay on average about 96 percent more than the youngest "protected" generation, in order to guarantee the ultimate solvency of the government. Assuming that the tax burden of future genera-

10. A baseline scenario incorporating recent health care reforms would yield smaller generational imbalance. See, e.g., Levy and Doré (1998).

tions will be shared by men and women proportionally to the net tax burden faced by men and women belonging to the 1995 newborn generation, the lifetime net tax paid by males in future generations would amount to $161,000, while women would pay $73,000 over their lifetimes.

11.4 Sensitivity Analysis

11.4.1 Sensitivity with Respect to the Parameter Values

Generational imbalances are sensitive to assumptions regarding discount and productivity growth rates. Table 11.6 shows the impact of varying these parameters in the range of 3 and 7 percent and 1 and 2 percent, respectively. For a given productivity growth, a higher discount rate tends to increase the generational imbalance as measured by the percentage difference in the present value of taxes paid by future generations and the newly born, since it gives a lower weight to future payments.[11] On the other hand, the effect of rising productivity is ambiguous, lowering the relative burden of future generations for sufficiently high discount rates, and increasing it for low discount rates. (Indeed, when the generational imbalance is expressed as a ratio of the present value of lifetime incomes, the effect of change in productivity can be reversed.) The intuition for this result is that higher productivity increases the present values of both taxes and transfers. However, because of the life cycle pattern of consumption and the discounting factor, when the discount rate is sufficiently high the increase in the present value of taxes (which are paid earlier in life) outweighs the increase in the present value of benefits. For low enough discount rates, the increase in benefits (which come later in life), together with higher government consumption (which also grows at the productivity rate forever), implies a higher burden on future generations (even after adjusting for "effective" labor). For parameters in the range chosen, the imbalance always decreases when productivity growth increases (mainly because pensions are indexed to the CPI and not to wages).

11.4.2 Sensitivity with Respect to Accounting Conventions

Although the technique of generational accounting aims for an analysis of public finances free of labels that can be misleading, some conceptual problems arise when accounts are being calculated. Because generational accounts deal with net flows, differences in the way some taxes or benefits are classified

11. In general, the change in the imbalance is not a positive monotonic function of the change in discount rate. Although the net present value of all net taxes decreases monotonically with higher interest rates, the change in the imbalance need not, owing to the uneven distribution of taxes over the lifetimes of current generations (e.g., the impact of a higher discount rate is more marked for women than for men). Moreover, the ratio of net cash flows of newborns and future generations may either rise or fall.

Table 11.6 **Sensitivity Analysis with Respect to Productivity and Discount Rates (thousands of U.S. dollars)**

	$g = 1$			$g = 1.5$			$g = 2$		
	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$
Newborns									
Male	125.2	66.5	15.8	140.3	82.2	25.6	153.1	99.1	36.4
Female	91.4	25.1	−10.1	110.6	37.2	−3.7	130.8	50.9	3.5
Future generations									
Male	264.9	147.5	187.2	285.1	161.4	99.3	304.4	178.5	94.1
Female	193.2	55.5	−117.9	224.8	73.1	−14.4	260.3	91.8	9.1
Generational balance (% difference)	111	122	1,077	103	96	288	99	80	158

Source: Authors' calculations.

Note: g is productivity growth (percent); r is discount rate (percent).

Table 11.7 **Sensitivity with Respect to Accounting Conventions: Education Recorded as Government Consumption (U.S. dollars)**

Generation's Age in 1995	$r = 3$		$r = 5$		$r = 7$	
	Male	Female	Male	Female	Male	Female
0	222,079	193,096	151,549	102,057	82,520	48,274
5	249,491	215,546	191,668	128,791	121,403	71,836
10	271,493	230,785	229,356	153,518	161,657	95,668
15	289,738	241,963	264,836	177,480	203,801	122,096
20	311,105	255,172	304,397	206,387	254,158	157,151
25	309,455	256,946	321,884	226,706	287,284	187,219
30	263,625	227,146	293,748	216,809	278,405	190,447
35	199,287	185,985	242,716	193,579	246,843	180,957
40	115,108	130,656	166,777	153,313	188,989	154,209
45	23,743	67,894	77,456	100,826	112,966	112,738
50	−64,100	7,174	−12,524	44,393	29,276	63,238
55	−184,251	−76,278	−134,743	−39,257	−91,104	−16,650
60	−232,282	−136,466	−197,014	−100,390	−164,612	−76,703
65	−225,530	−134,762	−199,879	−106,926	−175,435	−87,475
70	−168,734	−111,542	−151,497	−91,855	−134,820	−77,305
75	−177,047	−119,018	−162,135	−103,600	−148,190	−91,496
80	−101,447	−76,301	−93,948	−67,958	−86,935	−61,197
85	−109,300	−79,461	−102,905	−73,212	−96,974	−67,889
90	−99,988	−76,940	−94,438	−72,308	−89,642	−68,203
95+	−104,084	−76,387	−99,945	−73,395	−96,111	−70,623
Future generations	377,796	328,491	222,801	150,040	116,899	68,386
Percentage difference	70	70	47	47	42	42

Source: Authors' calculations.

Note: Productivity growth assumed to be 1.5 percent; r is the discount rate (percent).

can have an impact. These problems are illustrated by adopting alternative assumptions about the classification of educational expenditure.[12]

In the baseline case presented above, educational expenditures were classified as transfer payments, and thus allocated to specific cohorts of the population. The scenario presented below indicates that if education is treated as government consumption, the generational imbalance would be reduced by 50 percent (table 11.7). While the average lifetime net tax payments of both the

12. The sensitivity of generational accounts with respect to the incidence of particular taxes (capital income tax), and the treatment of selected sources of government income associated with its net wealth, is treated elsewhere. If corporate income taxes are netted off government consumption instead of being lumped with other capital income taxes whose incidence was assumed to be proportional to the net wealth of individuals, the relative additional burden on future generations vis-à-vis the newly born increases. Considering total net wealth of the government instead of its financial net wealth and offsetting it against operational income received by the government would also increase the relative intergenerational imbalance. See Levy and Doré (1998).

newborns and future generations increase, the percentage difference between them actually declines. The intuition for a smaller generational imbalance under this category of classification is as follows: Treating education as government consumption amounts to reducing transfer payments that were to be received when young and having higher government spending to finance. Because future generations would face both the cut in educational transfers and the incipient tax increase in later years, their accounts will fall in relative terms.

11.5 Generational Accounts of Baby Boomers

The standard practice of generational accounting includes only future net tax payments and does not incorporate past net payments of currently living generations. Therefore, the only meaningful comparison of generational accounts is between those of newly born generations in the base year and those of future generations, for whom lifetime net tax payments are available. Although this way of presenting generational accounts yields insightful results regarding intergenerational imbalances, its interpretation may have less policy relevance than measures aimed at comparing the accounts of those presently living. Indeed, by comparing only the tax burden of unborn generations with that of current children, standard generational accounts avoid addressing the real political dilemma, which involves a trade-off among living generations. To address this kind of question, it is rather more interesting to compare the net tax burden of, say, current adults (e.g., some cohorts of baby boomers) with that of young generations (e.g., those under age 25, who have not fully entered the labor force yet) under the assumption that young generations will bear the same tax burden as all future generations. Such estimates involve the retrospective calculations of generational accounts as a first step (such calculations are presented for instance by Auerbach, Gokhale, and Kotlikoff 1994 for the case of the United States). But they also involve the netting out of the present value of past net taxes of those living generations lumped with future generations from the government wealth, and the adjustment of accounts of different generations to past (and varying), as well as projected (and constant), productivity growth.

The advantage of this approach of contrasting living adult and young generations, relative to the standard accounts, which assume that all generations alive in 1995 will be "protected" for their entire lifetimes, is that this assumption is somewhat implausible. Owing to demographic changes evident already in the early decades of the next century, the heavier burden on future generations will start to be apparent at a relatively early date, implying heavy pressure for policy changes that most likely will affect currently living generations.[13] As a

13. Of course, policy changes that formally affect only future generations' accounts can have an impact on the welfare of current generations. For instance, a cut in public expenditure on education for future generations, while not directly affecting the tax profile of current generations

Table 11.8 **Generational Accounts for Baby Boomers: Lifetime Net Tax Payments Converted into 1995 Present Values (thousands of U.S. dollars)**

	$g = 1.5$			Historical Productivity Growth		
	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$
Current generations[a]						
Males	135,233	71,752	27,395	108,607	27,094	−15,094
Females	105,683	53,101	16,666	76,016	15,729	−16,992
Average	120,458	62,427	22,031	92,312	21,412	−16,043
Future generations[b]						
Males	262,600	106,317	30,429	237,188	54,021	−98,530
Females	206,120	58,225	−7,357	186,173	29,585	23,822
Average	234,360	82,271	11,536	211,680	41,803	−37,354
Generational imbalance (% difference)						
Males	94	48	11	118	99	n.a.
Females	95	10	−144	145	88	n.a.
Average	95	32	−48	129	95	n.a.

Source: Authors' calculations.

Note: g is productivity growth (percent); r is discount rate (percent).

[a]The 1950–55 cohort.

[b]Current youngsters (under 25 years of age) and all future generations.

yardstick, the generation born in 1950–55 was chosen to represent adult living generations in the computation of the imbalance between "protected" adult generations and "ultimately unprotected" young and future generations.[14] For this purpose, not only future net transfers were projected (as is done in the standard exercise), but retrospective accounts of past net transfers of adult generations were computed, considering in one case only constant productivity growth of 1.5 percent, and in another case taking into account the historical productivity growth rates observed in 1950–95 (details of the computation of the past net tax burden can be found in the appendix).

The calculations reported in table 11.8 indicate that under the present system of taxes and benefits (and a discount rate of 5 percent), the projected net tax burden on generations currently under age 25 is on average about *two times* as

(when public expenditure on education is recorded among transfers), would likely reduce their actual net income to the extent that parents would have to shoulder the cost of educating their children. It should also be kept in mind that differences in the treatment of taxpayers based on specific characteristics that might be implied by the coexistence of "protected" and "unprotected" generations already exist, although they are marginal (e.g., senior citizens often pay lower health contributions than working-age persons, couples and large families tend to benefit from income tax deductions).

14. The generation born in the early 1950s is representative in many ways. It fully experienced what came to be known as the "30 glorious" years of economic growth (which lasted until the 1980s) and is associated with the May 1968 students' movement, as well as subsequent transformations in the university and society in general.

Table 11.9 **Sources of Generational Imbalance (thousands of U.S. dollars)**

	Baseline Case		Constant Demographic		Zero Debt	
	A	B	A	B	A	B
Newborns						
Male	151.5	82.2	176.5	107.5	151.5	82.2
Female	102.1	37.2	109.5	45.1	102.1	37.2
Future generations						
Male	222.8	161.4	184.1	113.7	182.1	114.5
Female	150.1	73.1	114.2	47.6	120.5	51.8
Generational imbalance (% difference)	47	96	4	6	20	39

Source: Authors' calculations.

Note: A: educational expenditure treated as government consumption. B: Educational expenditure treated as government transfers.

large as that faced by those born around 1950, when the "historical" rate of productivity growth is used for comparing the burden on current adult generations. If generations are put on an equal footing without considering past fluctuations of the productivity growth rate (i.e., by simply using the 1.5 percent growth rate adjustment), the imbalance is on the order of 35 percent. The imbalance is very sensitive to the discount rate chosen, particularly when the adjustment to productivity is made using the simple constant rate.[15]

11.6 Sources of Generational Imbalance

The generational imbalance reported above reflects three major factors: future demographic changes, the level of public debt, and the underlying fiscal position of the general government (including the extensive social security system). In the absence of demographic changes (i.e., assuming a constant population structure), France's generational imbalance would be much smaller (6 percent). Likewise, the imbalance falls to 40 percent when the debt level is zero (table 11.9). To the extent that generational accounts reflect the current stance of fiscal policy, redressing the generational imbalance can also be achieved by changes in policies that result in strong improvement in fiscal positions. Increasing government revenues from general or specific taxes, cutting government consumption across the board, or addressing the problems in the pension and public health care systems are policies that could help correct the generational imbalance.

15. The use of a high real discount rate yields results that are somewhat curious but not implausible given that real interest rates in the 1970s and early 1980s were actually negative.

Table 11.10 **Alternative Ways to Achieve Generational Balance (percentage change from baseline)**

Variant	Cut in Government Purchases	Cut in Government Transfers	Increase in All Taxes	Increase in Income Tax
A	17.2	11.5	7.1	66
B	22.2	9.8	6.9	64

Source: Authors' calculations.

Note: A: Educational expenditure treated as government consumption. B: Educational expenditure treated as government transfers.

11.7 Restoring Generational Balance

What changes in taxes and transfers would be required to restore the generational accounts of the newborn and future French to fiscal balance? Table 11.10 suggests the magnitude of the policy adjustments necessary to achieve generational balance in France's fiscal policy. The measures considered there are an across-the-board increase in the overall level of taxes, an increase in the income tax, a cut in transfers, and a cut in government consumption. These measures are assumed to be permanent and to take effect as of 2002. The sizes of the policy adjustments required to restore generational balance are calculated under two variants: educational expenditure treated as government consumption (variant A) and as government transfers (variant B).

The overall level of taxes would have to be raised by 7.1 percent (variant A) and 6.9 percent (variant B) for generational balance to be restored under the baseline assumption of 1.5 percent productivity growth and 5 percent discount rate. If the adjustment is made solely by raising traditional personal income taxes, these will increase by 66 percent (variant A) and 64 percent (variant B), as these taxes represent a small share of government revenues (less than half of French households pay traditional direct income taxes; as mentioned in section 11.2, flat income taxes introduced in the 1990s are much broader based). It appears that a policy of increasing the level of taxation would involve substantial increases in the burden on young and middle-aged generations; for example, newborn and 30-year-old males would be required to pay an additional $40,000 and $30,000 in net terms, respectively. The net payment burden on future generations, on the other hand, falls by about 40 percent. Restoring balance through expenditure reductions would require permanently reducing the size of government purchases by 17.2 percent under variant A and 22.2 percent under variant B. Alternatively, permanent across-the-board reductions in transfers of 11.5 percent (variant A) and 9.8 percent (variant B) would yield a generationally balanced policy.

In view of the already high level of taxation in France, expenditure cuts as a way to achieve intergenerational balance would appear to be preferable to further increases in the tax burden. Moreover, while there may be scope for

reductions in government consumption, it is in the area of social transfers that France (together with other European countries) should focus the adjustment. In particular, as noted above, the pending demographic transition, with the projected increase in the dependency ratio, is at the root of a large portion of the intergenerational imbalance implicit in current policies. Therefore, policies need to address the challenges in these areas. In fairness, the recognition by the French of the need for an early adjustment motivated both the health care reforms announced in November 1995 (reflecting discussions among social partners and several studies carried out in past years) and the pension reforms designed in the early 1990s and partially implemented in 1993 (mainly affecting the basic pension scheme, *régime général*) and 1996 (with respect to supplementary mandatory pension schemes)—most notably the indexation of pensions to the CPI instead of to wages.

The baseline scenario discussed in section 11.3 incorporates conservative assumptions about the growth in health care spending. In particular, it builds on trends in the past 20 years, and on the argument that total health care expenditure will increase faster than labor productivity because health care can be viewed as a superior good. This argument carries some weight, and in the case of France where public health care has now been officially recognized as a universal right, it is broadly appropriate. On the other hand, the reforms enacted in 1995 aimed at establishing incentives and mechanisms that would slow down the growth of these expenditures, while guaranteeing the quality of services.[16]

While some aspects of the reform of the health care system have already brought results, it is still too early to judge how fast some of its key provisions will be implemented. The importance of fully implementing the reform can, however, hardly be overestimated. Table 11.11 shows the intergenerational impact of assuming that the reform will take full effect before the year 2000, inter alia limiting the growth in per capita health spending (for a given age) to labor productivity growth after 2000. This alternative future path for outlays on health care would cut the intergenerational imbalance roughly by half, giving a net tax burden on future generations that is one and a half times as large as that facing newborns.

The early pension reform also alleviated the future intergenerational imbalance. The calculations presented in table 11.12 show that, were pensions still indexed to wages, for example, increasing at real rates of 1 to 1.5 percent a year, the intergenerational imbalance would be more than twice as large, rising to more than 140 percent. However, it is clear that if projected increases in

16. Expenditure restraints on hospital care, while relatively successful, proved to be increasingly distortionary. A major aspect of the 1995 reform was an attempt to regionalize hospital budgets and consolidate the system, with a view also to correcting the geographic imbalance in the distribution of beds and services entailed by demographic changes that had occurred since the 1970s. For a full discussion of the 1995 health care reform, see International Monetary Fund (IMF 1997, chap. 1).

Table 11.11 Generational Accounts with Slower Health Care Growth (U.S. dollars)

Generation's Age in 1995	$r = 3$		$r = 5$		$r = 7$	
	Male	Female	Male	Female	Male	Female
0	163,911	138,791	91,798	47,767	29,997	1,058
5	197,376	166,135	134,982	75,719	68,356	22,337
10	233,805	196,517	185,072	110,671	117,666	52,941
15	265,136	220,521	232,068	145,103	168,828	87,257
20	310,975	257,625	294,787	196,910	240,460	143,427
25	325,158	274,815	328,539	233,285	289,436	189,176
30	280,868	246,194	303,230	226,044	283,700	195,383
35	214,606	202,881	251,676	202,238	252,103	185,786
40	128,316	145,323	174,998	161,298	194,068	158,880
45	34,954	80,375	84,874	108,062	117,787	117,195
50	−54,870	17,546	−6,049	50,778	33,702	67,372
55	−177,018	−68,199	−129,391	−33,994	−87,273	−13,082
60	−226,786	−130,417	−192,746	−96,225	−161,420	−73,743
65	−221,542	−130,482	−196,657	−103,828	−172,928	−85,178
70	−166,082	−108,793	−149,290	−89,775	−133,045	−75,702
75	−175,118	−117,140	−160,499	−102,119	−146,836	−90,312
80	−100,522	−75,421	−93,155	−67,249	−86,272	−60,621
85	−108,674	−78,918	−102,363	−72,760	−96,511	−67,510
90	−99,533	−76,594	−94,051	−72,009	−89,307	−67,944
95+	−104,084	−76,387	−99,945	−73,395	−96,111	−70,623
Future generations	259,404	219,650	130,203	67,750	50,819	1,793
Percentage difference	58	58	42	42	69	69

Source: Authors' calculations.

Note: Per capita health care grows at the rate of productivity (1.5 percent) beyond the medium term. r is the discount rate (percent).

life expectancy are not accompanied by longer working lives and contribution periods for a full pension, it will be difficult to eliminate the intergenerational problem that is manifest in the baseline projections.

Increasing the participation rate (by tightening eligibility requirements for benefits and increasing the taxation of replacement income, including from early retirement) would thus appear to be a policy that could substantially contribute to improving the generational stance of fiscal policy: a higher participation rate not only widens the tax base by raising labor income and GDP but also reduces pension expenditure as a percentage of GDP. A characteristic of the French labor market since the mid-1980s is the relatively low level of labor participation, particularly for people aged 55–65, while life expectancy continues to increase. As the participation rate of this group of people declined from 31.5 to 16.5 percent despite a significant increase in the participation rate of women, its proportion in the active population fell from 18.7 in the 1960s to 9.4 percent in 1995 (DARES 1997). Between 1968 and 1995, participation

Table 11.12 **Generational Accounts with Pensions Indexed to Wages (U.S. dollars)**

Generation's Age in 1995	$r = 3$		$r = 5$		$r = 7$	
	Male	Female	Male	Female	Male	Female
0	120,266	95,632	77,400	34,150	24,494	−4,375
5	153,501	122,946	119,789	61,416	62,470	16,453
10	189,721	153,537	168,934	95,764	111,244	46,657
15	220,516	177,825	214,740	129,660	161,680	80,633
20	265,813	216,025	276,075	181,148	232,396	136,536
25	280,017	234,012	308,535	217,020	280,375	181,873
30	236,592	206,805	282,164	209,403	273,614	187,630
35	171,357	164,947	229,501	185,122	240,820	177,414
40	86,425	109,011	151,768	143,688	181,442	149,758
45	−6,249	45,385	60,110	89,752	103,347	107,087
50	−95,426	−16,380	−32,550	31,597	17,029	56,039
55	−217,149	−100,465	−158,023	−53,811	−106,825	−25,696
60	−232,282	−136,466	−197,014	−100,390	−164,612	−76,703
65	−225,530	−134,762	−199,879	−106,926	−175,435	−87,475
70	−168,734	−111,542	−151,497	−91,855	−134,820	−77,305
75	−177,047	−119,018	−162,135	−103,600	−148,190	−91,496
80	−101,447	−76,301	−93,948	−67,958	−86,935	−61,197
85	−109,300	−79,461	−102,905	−73,212	−96,974	−67,889
90	−99,988	−76,940	−94,438	−72,308	−89,642	−68,203
95+	−104,084	−76,387	−99,945	−73,395	−96,111	−70,623
Future generations	304,165	241,862	187,446	82,704	134,982	−24,111
Percentage difference	153	153	142	142	451	451

Source: Authors' calculations.

Note: Productivity growth assumed to be 1.5 percent; r is the discount rate (percent).

rates for males aged 60–65 dropped from 68 percent to about 15 percent with virtually no change for those aged 55–59. For females aged 60–65, there was a decline from 35 percent to about 13 percent, whereas those in the 55–59 age group experienced an increase in participation rates from 42 to 55 percent during the same period. Table 11.13 shows that by inducing rises in the male participation rates of those aged 55–59 and 60–65 in 2010 to 75 and 50 percent, respectively (and 73 and 40 percent for women), and keeping the replacement rate of initial pensions unchanged, the imbalance between newborn and future generations is eliminated. Moreover, if the increase starts to take place by the year 2000, so that by 2005 most of the adjustment is completed, the imbalance between baby boom generations and future generations (including current young generations) would be eliminated for the central assumption of a discount rate of 5 percent (table 11.14).

An increase to 50 percent in the participation rate of those aged 60–65 is consistent with both a three-year increase in the retirement age and a five-year

Table 11.13 **Generational Accounts with Changes in Participation Rates (U.S. dollars)**

Generation's Age in 1995	$r = 3$		$r = 5$		$r = 7$	
	Male	Female	Male	Female	Male	Female
0	181,166	139,765	96,847	46,270	30,667	−778
5	217,531	169,622	142,309	75,532	70,329	21,059
10	257,096	202,881	195,039	112,196	121,261	52,548
15	291,917	230,041	245,156	148,747	174,475	88,119
20	342,242	270,757	311,905	203,146	248,913	145,978
25	361,080	291,767	350,320	242,506	301,468	193,831
30	321,878	267,212	330,548	238,703	300,386	202,677
35	261,476	228,326	285,847	218,970	275,050	196,478
40	181,689	176,041	217,529	183,281	225,388	174,340
45	91,219	113,997	133,615	134,064	156,837	137,060
50	−53,935	22,056	−4,363	55,046	35,467	71,003
55	−180,793	−72,449	−132,053	−36,686	−89,124	−14,883
60	−230,286	−134,078	−195,433	−98,753	−163,432	−75,559
65	−224,474	−133,385	−199,026	−105,959	−174,786	−86,785
70	−168,290	−110,899	−151,133	−91,395	−134,540	−76,972
75	−176,883	−118,743	−161,999	−103,400	−148,085	−91,350
80	−101,399	−76,215	−93,908	−67,894	−86,904	−61,149
85	−109,300	−79,461	−102,905	−73,212	−96,974	−67,889
90	−99,988	−76,940	−94,438	−72,308	−89,642	−68,203
95+	−104,084	−76,387	−99,945	−73,395	−96,111	−70,623
Future generations	249,662	192,607	96,817	46,256	−1,752	44
Percentage difference	38	38	0	0	−106	−106

Source: Authors' calculations.

Note: From 2005 onward, the participation rates for males and females increase to 75 and 73 percent for the 55–59 cohorts, 50 and 40 percent for the 60–64 cohorts, and 8 percent for people aged 65 and older. Productivity growth assumed to be 1.5 percent; r is the discount rate (percent).

increase in the retirement age with fewer working hours in later years—thus leaving ample room for a variety of policy alternatives.[17] However, a key measure to achieve this objective would be to consider increasing the number of years required for retiring with a full pension to 45 (adjusting at the same time the formula for computing benefits and the minimum contributive pension). While the 1993 reform included a gradual increase in the number of years from 37 to 40, it fell short of the increase to 42 proposed in the *Livre Blanc*. Its potential effect is thus projected to be quite limited because more than half of workers already retire with 40 years of contributions, while the effective pen-

17. While increasing the proportion of people younger than age 65 who work could lead to a surge in output and taxes (even under the assumption of a constant share of labor in GDP) and reduced pressures on pensions, achieving this goal would require that both labor supply and demand be stimulated. In this regard, calibration of wages and working hours to ensure that the labor market clears for older workers is also likely to be required at an early stage.

Table 11.14 **Generational Accounts for Baby Boomers with Changes in Participation Rates (thousands of U.S. dollars)**

	$g = 1.5$			Historical Productivity Growth		
	$r = 3$	$r = 5$	$r = 7$	$r = 3$	$r = 5$	$r = 7$
Current generations[a]						
Males	169,306	83,277	31,092	139,180	36,903	−11,861
Females	128,755	60,740	19,073	96,718	20,517	−14,888
Average	149,031	72,009	25,083	117,949	28,710	−13,374
Future generations[b]						
Males	244,558	82,779	291	218,910	31,291	−101,547
Females	187,960	47,347	−12	168,248	17,897	4,046
Average	216,259	65,063	140	193,579	24,594	−48,751
Generational imbalance						
Males	44	−1	−99	57	−15	n.a.
Females	46	−22	n.a.	74	−13	n.a.
Average	45	−10	−99	64	−14	n.a.

Source: Authors' calculations.

Note: From 2015 onward, the participation rates for males and females aged 60–65 increase to 50 and 40 percent, respectively. g is productivity growth (percent); r is discount rate (percent).

[a]The 1950–55 cohort.

[b]Current youngsters (under 25 years of age) and all future generations.

sion for those with fewer than 32.5 years of contributions is determined by the relatively high level of the minimum pension (Briet et al. 1996). The increase in the number of years of contributions (if accompanied by an adjustment of the minimum contributive pension) would not require the abolition of the right to retire at age 60, while it would create incentives for longer careers and enhance economic activity.[18] From a fiscal point of view, the increase in the number of years should be accompanied by a change in the formula for computing benefits (i.e., the number of years of contributions used in the denominator of the formula should increase accordingly).

11.8 Conclusions

This paper has presented the first set of generational accounts for France with a view to assessing the implications for future generations, given current

18. In principle, working at increasingly older ages should become less of a burden, as intellectual work tends to be replacing repetitive manual work. It would also be compatible with more flexible working lives (admitting career switches and breaks) that have become increasingly common among skilled workers. In this context, increasing the number of years of contribution, instead of the minimum retirement age, protects those who have entered the labor force at early ages, while being fair to those who entered later. In particular, given that education in France is free, it is equitable to require from those who received more benefits to stay much longer in the labor force. In this connection, if greater wage differentiation is allowed, increasing the number of years of contribution would not need to create disincentives to accumulating human capital.

fiscal rules, of the growth in government spending and debt, taking into account the effects of demographic projections and other factors such as the anticipated change in labor force participation rates. The calculations reported in this study indicate that the present system of benefits and taxes, if continuously maintained for current adults, is out of balance in the long run from a generational perspective. The size of the standard generational imbalance implies that a lack of fiscal policy adjustment will leave future generations of French citizens facing a lifetime net tax burden that is more than one and a half times as large as those confronting current adult generations based on existing policies.

Fortunately, policies can be specified that could help alleviate such an imbalance, in particular those aimed at fostering higher employment and later retirement among cohorts aged 55–65. It is shown that an early but gradual increase to 40 percent in the labor force participation rate of people aged 60–65—combined with longer pension contribution periods—would sharply reduce the generational imbalance between young and future generations, as well as the imbalance between current adult and young generations, with a decrease in the absolute net tax burden on future generations. Moreover, a specific set of policies is presented that could help restore balance; for example, a 10 percent cut in transfer payments, a 17 percent reduction in government spending, a 7 percent increase in taxes, or some combination of these policies could, under plausible economic and demographic assumptions, bring France's generational policy into balance.

Appendix
Source and Data Construction

As explained above, average net tax payments for each generation were calculated by distributing aggregate taxes and transfers across the population of cohorts according to the age/sex profiles of payments and benefits observed. This required first an estimation of a generational profile (i.e., by individual cohorts of age and gender) of different taxes and benefits in some base year. This was done principally using 1990 data from surveys conducted by the tax administration department of the Ministry of Finance and INSEE. In a second step, the aggregate weight of each tax or benefit was computed using information in the annual national accounts published by INSEE.

Computation of Profiles

Figure 11.3 presents the age/sex profiles for the five categories of tax considered (personal income tax, property tax, wealth tax, social security tax, and consumption tax). The profiles corresponding to *personal income taxes, property taxes,* and *consumption taxes* were based primarily on data from a 1990

tax survey conducted by the Ministry of Finance (Enquête sur les Revenus Fiscaux des Ménages). INSEE provided a breakdown of the results of the 1990 survey on these taxes according to the age of the head of household surveyed, but a disaggregation by gender was necessary for the study at hand and was thus inferred from additional sources. This disaggregation is not trivial because the differences in income between men and women vary over the life cycle according to marital status, childbearing, and so forth. Therefore, in order to take these factors into account, a more detailed disaggregation of the 1984 and 1990 tax surveys (Canceill 1989; Campagne, Contenci, and Roineau 1996) and data on the number of individuals at each age living in different types of households (from the 1990 population census) were also used. Canceill (1989) provides several tables showing the average income and personal income tax payments of different types of households (persons living alone; couples without children; couples with one, two, or three children; households headed by single parents; etc.). Crossing this information with census data on the population living in different types of households (*individus selon le sexe, l'age, et le mode de vie;* INSEE 1990), guided us in disaggregating by gender the figures by household in the original survey.[19] The disaggregation of VAT, and other indirect taxes, was computed by assuming similar consumption profiles for men and women (i.e., assuming that for each age cohort, individuals of both genders pay the same amount of consumption-based taxes).

The profiles corresponding to *social security contributions* were based primarily on the distribution of wages and employment. They were estimated using the age profiles of wages computed by INSEE (Colin 1995; Perotin 1989) and the average proportion between the wages received by men and women found in Bayet (1996).[20] The average individual contribution to the social security system was then computed by adjusting the average contribution paid by employed persons to the employment rate of different age and gender cohorts estimated using data in DARES (1997).

The profile corresponding to *corporate income taxes and wealth taxes* was based on the distribution of financial assets across ages (Enquête sur le Patrimoine des Familles). This, along with the profile of other taxes related to wealth and income (*autres impôts sur le revenue et le patrimoine*), was computed using the age distribution of net wealth found in Lollivier and Verger (1996), adjusted for the distribution among genders based on figures in Sturrock (1995) and Franco et al. (1992). Following the generational accounting

19. This approximation is evidently based on a number of assumptions (e.g., in households comprising a couple headed by a man, both adults would have the same age), as well as some judgment about the tax incidence on certain populations (e.g., retired couples, which make up the majority of childless couples on which information could be found in Canceill). The overall impact of imprecisions arising from these assumptions appear to be minor.

20. Age profiles for men and women in different professions shown in Colin (1995) do not provide full coverage of the working population and thus had to be marginally adjusted according to the full-coverage profiles provided in Perotin (1989); for the same reason, the overall average men-to-women wage ratio was taken from Bayet (1996).

study by the U.S. Congressional Budget Office (Sturrock 1995), the incidence of corporate income tax was assumed to be related to the net wealth of individuals.

The profiles of individualized transfers comprising pensions, health benefits, public expenditure on education, and unemployment benefits (in addition to minimum income benefits, typically the RMI) are shown in figure 11.4. The profiles for expenditure on *education* were based on the average cost per student (in 1988) for different school ages (Ministère de l'Education Nationale 1990), attendance rates, and the assumption that these costs were the same for students of both genders. The profiles for expenditure on *health care* were computed using the chart found in Caussat and Glaude (1993) and data in Mizhari and Mizhari (1995). The profiles of expenditure on *pensions* and *unemployment benefits* were based on figures provided by INSEE.[21] The age and gender distribution of pension expenditures found there was smoothed, permitting the elimination of some outliers, especially for old and young ages. Expenditures on *minimum support income and other specific social transfers* were distributed according to the profile of unemployment benefits.[22]

Computation of the Relative Tax Weights

The assignment of the actual weights of individual taxes and benefits was based on national accounts figures (INSEE 1996) and followed closely the taxonomy perfected by French statisticians, which guarantees the internal consistency of fiscal magnitudes. General government *resources* and *emplois* (income and expenditures; see table 11.4) were taken from the national accounts yearbook *Comptes et Indicateurs Economiques* (table 10.17, *administrations publiques,* S60). They were classified as much as possible according to the group of taxes and transfers listed above, with those items that could not be assigned to any group being lumped into general government net consumption (see Hagemann and John 1995 for a rationale behind this choice of aggregation). Government expenditures on services for which beneficiaries could be identified but which are usually included in government consumption in the sense of the national accounts (e.g., payment of hospital personnel and teachers) were lumped with transfers. This breakdown of government consumption (found in the P30 line in the national accounts) and investment was computed based on figures in tables 10.07 and 10.08 of the national accounts yearbook (*ventilation fonctionelle de la consommation et de la formation brute de capi-*

21. The profile of unemployment benefits reflects the increase in unemployment in the years before the minimum retirement age (60 years) and before the standard retirement age (65 years). While the first peak is easy to understand, the causes of the concentration of unemployment benefits close to 65 years of age are not obvious.

22. Ideally, these should be allocated according to the distribution of the RMI. However, given the relatively small magnitude of these categories of transfers (about 0.3 percent of GDP in 1995), changing the profile from unemployment benefits to RMI is unlikely to change the results obtained thus far.

tal fixe des administration publiques). Finally, payments of pensions to government employees were lumped with pensions to private sector workers, although the contributions that fund them were left at the charge of the government and not shifted to government employees (in the case of the private sector, both employers' and employees' contributions are shifted to employees).[23]

The taxes and transfers identified in table 11.4 were grouped together in table 11A.1 to show the weight of individual taxes and transfers and of government consumption as percentages of GDP for the period 1995–2002. The aggregate taxes and transfers for 1996–2002 reflect inter alia the changes in taxation that have occurred since 1995 and the government goals for 1997–2002. In particular, it assumes a fiscal rule consistent with the government's convergence targets of a general government deficit below 3 percent after 1997. This fiscal consolidation was assumed to be achieved chiefly through a compression in net government consumption, together with a curbing of health expenditure and unemployment benefits, and a constant tax pressure, except for the gradual reduction in personal income tax included in the 1997 budget (which envisaged a reduction in income taxes totaling 0.8 percent of GDP by the year 2001).

The actual average tax payment and transfer receipts of individuals in each age cohort can then easily be computed by scaling the age and gender profiles of individual taxes and transfers such that the respective figures aggregated by cohorts are made consistent with the aggregate weight of the corresponding tax or transfer for a given year.

Computation of Generational Profiles for the 1950–55 Cohorts

To compute the past net tax burden of the 1950–55 cohort, national accounts flows covering the income and expenditures of the public administration in the 1970–95 period were distributed over individual net payment profiles based on the profiles derived for 1995. The main adjustments to these profiles comprised changes in the age distribution of health expenditure, VAT, and social security taxes (based on Mizhari and Mizhari 1995, and INSEE sources).[24] To compare the net payments of the 1950 and 1995 generations, the present value of net taxes paid by the 1950 generation was computed as of 1950 (i.e., flows in 1995 francs were discounted back to 1950) and then adjusted for productivity growth. The relative burden on each generation was computed by scaling dis-

23. This problem can be dealt with by including government pensions in government consumption, or by distributing the *contributions fictives* made by the government to itself on behalf of its employees according to the age profile of public workers.

24. Changes in the distribution of income taxes were not pursued, because for 1970 only the distribution of taxable income was available. While the distribution of taxable income does not permit an easy estimate of the distribution of taxes, owing mainly to changes in the effective marginal tax rates, it shows a clear concentration of those paying income taxes; as fewer and fewer households were subjected to the income tax over the years, those liable to any tax started to be concentrated in the cohorts of 40 to 55 years of age.

Table 11A.1 France: Medium-Term Fiscal Projection (percent of GDP)

	1995	1996	1997	1998	1999	2000	2001	2002
Personal income tax	5.3	5.3	5.0	4.8	4.7	4.6	4.5	4.5
Property taxes	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Taxes related to consumption	14.6	14.8	15.0	15.0	15.0	15.0	15.0	15.0
Taxes related to individual net wealth	3.8	3.8	3.8	3.7	3.7	3.7	3.7	3.7
Social security contributions	19.3	19.3	19.3	19.2	19.2	19.2	19.2	19.2
Total taxes	43.6	43.7	43.6	43.2	43.1	43.0	42.9	42.9
Expenditure on pensions	11.6	11.6	11.5	11.5	11.5	11.5	11.5	11.5
Health care expenditure	9.0	8.9	8.8	8.8	8.7	8.6	8.5	8.5
Unemployment benefits								
Narrow sense	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
Large sense	2.7	2.7	2.5	2.4	2.2	2.1	2.1	2.1
Expenditure on education	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total transfers	28.8	28.2	27.8	27.7	27.4	27.2	27.1	27.1
Government consumption	16.3	16.1	15.5	15.5	15.1	14.7	14.6	14.5
Interest payments	3.5	3.5	3.3	3.2	3.2	3.2	3.2	3.2
Primary balance	−1.5	−0.6	0.3	0.0	0.6	1.1	1.2	1.3
Overall fiscal balance	−5.0	−4.1	−3.0	−3.2	−2.6	−2.1	−2.0	−1.9
Memorandum item								
Real GDP growth (%)		1.5	2.4	3.0	3.0	3.0	3.0	3.0

Source: Staff projections based on the authorities' convergence plan.

counted net taxes according to a 1.5 percent productivity growth rate and (in the "historical" case) taking into account the fluctuation of past productivity growth.

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