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Generational Accounting for France

Prepared by Joaquim Levy and Ousmane Doré [1]

Authorized for distribution by Max Watson

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Abstract

This paper presents the first set of generational accounts prepared for France, illustrating the impact on different generations of current policy settings. It was developed using age profiles of taxes and transfers drawn from a 1990 survey and recent demographic projections. The results reported suggest that if all living generations were protected from future policy changes, current policy rules would imply a net tax burden on future generations more than 1½ times as large as that on current newborn generations. If the assumption that young living generations are protected is relaxed, a large net-tax imbalance in favor of "babyboomers" emerges.

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Author's E-Mail Address: Jlevy@imf.org and odore@imf.org

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Contents **Page**

Charts

Appendices

Appendices Tables

SUMMARY

In recent years, concern has mounted about the long-term viability of France's extensive social security system in general, and its pay-as-you-go pension schemes and universal health care system in particular. Prospective aging of the population has led to further concerns that the implied tax burden on future generations will be too high, assuming continuation of the general thrust of current policy settings. While several recent studies have addressed aspects of these issues, none of them has dealt explicitly with the global impact of fiscal policy on the welfare of current and future generations in France. This paper presents the first set of generational accounts prepared for France, to determine whether current fiscal policies can be sustained without requiring future generations to pay higher net taxes over their lifetimes than those paid by current generations.

Estimates for France indicate that if all current generations continue to benefit from the present system of taxes and transfers, future generations—in order to guarantee the solvency of the government—will shoulder a net tax burden that is more than 1½ times as large as that confronting newborn generations.

The paper also computes the impact on young generations in the case where (departing from the standard presentation of generational accounts) living generations aged less than 25 are not assumed to be protected from future policy changes. Retrospective calculations of net tax paid by living generations suggest that, in this case, the net tax burden on young generations will be substantially larger than that faced by the "babyboom" generations.

Alternative scenarios show that the intergenerational imbalance implied by current fiscal rules in France can be greatly attenuated by policies aimed at fostering higher employment and later retirement among the cohorts aged 55-65.

I. 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 OECD countries, its pension outlays are also relatively large (Table 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 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 tax 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 declining number of workers, with the old-age dependency ratio likely to rise from 0.35 in 1995 to 0.60 by 2030 (Tables 2 and 3).

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 which imply markedly increased burdens on some generations relative to other generations, constitute a cause for concern. As pointed out by Kotlikoff (1992), the standard measure of the budget deficit cannot appropriately address this question. 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. In spite of the substantial fiscal consolidation projected to take place in the next five years in order to align the fiscal stance in France with the pattern envisaged by the "Stability and Growth Pact," social benefits (in particular pensions) imply a projected net tax burden on future French citizens, adjusted for income growth that is about **one and a half times** as large as that facing current young generations. While the precise size of this generational imbalance depends on a number of assumptions, including rates of discount and productivity growth, the direction of the imbalance is unmistakable, as it holds under alternative assumptions about these parameters. 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. Compared with the situation in other countries for which generational accounts have been

Table 1. France: Comparative Fiscal Indicators, 1994
(In percentage 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 2. France: Comparative Demographic Factors, 1990-1995

	France	USA	Japan	Germany	Italy
Population (1994)	57,960	260,651	124,960	81,407	57,190
Fertility rate 1/	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 2/	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
1/ Number of children per woman of child bearing age.
2/ Number of net immigrants per 1000 people.

Table 3. France: 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 1/	22.1	23.6	24.6	32.3	39.1	43.5
Very elderly dependency ratio 2/	39.2	43.4	49.6	41.9	48.8	56.6
Total dependency ratio 3/	52.2	52.8	51.2	59.6	67.9	73.6

Source: Bos and other (1994)
1/ Population aged 65 and over as a percent of the population aged 15-64.
2/ Population aged 75 and over as a percent of the population aged 65 and over.
3/ Population aged 0-14 and 65 and over as a percent of the population aged 15-64.

computed (OECD, 1995), the size of the generational imbalance reported here for France is larger than that of Germany and Sweden, while smaller than that reported for Italy—before the 1995 reform—and the United States.

This paper departs from the standard presentation of generational accounting—which is based only on remaining future net tax payments—in that it provides also an indication of the size of generational imbalance existing between currently living generations (old versus younger ones) taking into account the net tax paid by current adults in the past. On this basis, the calculations show that protecting the "Babyboom" 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 aged less than 25 that is quite more than **one and a half times** as large as that facing those born around 1950.

The paper is organized as follows. The generational accounting framework is outlined, followed by a discussion of its major limitations in Section B. The specific case of France, including the construction of the accounts, a discussion of key parameters used, and the main findings is presented in Section C. The next section (Section D) places France's generational policy in an international perspective. In Section E, the lifetime net tax payments of current adults are calculated and compared with those of younger living generations. Alternative scenarios on policies aimed at redressing the generational imbalance are discussed in Section F. The final section summarizes these findings and concludes. Appendices provide details on the calculation of the accounts, including the data used, and sensitivity analysis with respect to key parameters.

II. The Generational Accounting Framework

Government deficits, taxes, transfer payments, and other expenditures affect the distribution of income and wealth among members of both the same generation and different generations. Conventional deficit accounting provides little information regarding either distribution. Take for example the case of a change in an unfunded pay-as-you-go social security system which lowers the net taxes of the old while increasing those of the young by an equal amount, but avoids the need for government borrowing at any date. Despite the complete absence of any change in government deficit, the introduction of this social security scheme has generational effects, in that the generational account of the current old falls, while that of every younger generation rises. Standard generational accounts provide estimates of the remaining lifetime net taxes of persons born at different times under certain economic and demographic assumptions. Therefore, they not only provide a new perspective for the study of the distributional effects of fiscal policy, which has traditionally been focused on intra-

generational aspects,[2] but they can be a useful tool in assessing the sustainability of government accounts. In recent years, generational accounts have been computed for more than a dozen countries, including Germany, Italy, Norway, Sweden, and the United States.

A. The Methodology

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" refer 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, i.e., 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 onwards 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:

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

The first term on the left hand side of this equation adds together the present value of the net payments of existing generations. The expression $N_{t,k}$ {k=t,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 term (s=D) is $N_{t,t-D}$, the present

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[2]See, for example, Dossiers de la DARES (1996), INSEE Economie et Statistique No. 296–297, 1996, for detailed discussions of intragenerational income distribution in the case of France.

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 the equation 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 expresses the present value of government consumption. In the latter expression, 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:

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

In this expression $T_{s,k}$ 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 the intertemporal equation. 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 the equation and requires an offsetting increase in the second term on the left hand side; i.e., this requires 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, i.e., 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.

B. Limitations of Generational Accounting

Advocates of generational accounting argue that conventional fiscal deficits are essentially meaningless, as gauges either of macroeconomic policy or of intergenerational

fairness of government policy, and should be replaced by generational accounts.[3] Although these claims have some merits, they have met with a number of criticisms recently (Muellbauer (1992), Haveman (1994), and Buiter (1996)). On the one hand, given the importance of old-age entitlement programs in the industrial world, it is certainly true that conventional deficit measures miss a major part of the action in fiscal policy in the long run, by just providing a snapshot of the present situation without clarifying future trends. On the other hand, there are some practical obstacles to making a wholesale switch to a newer, untested measure of fiscal policy. As with most tools of policy analysis, generational accounting offers a useful perspective, but serves as an imperfect indicator. The accounts often suggest a rough magnitude and general pattern of results, which may be ambiguous and subject to uncertainty as regards future demographic changes and future growth. Apart from the heavy data requirement, the implementation of generational accounting requires specific assumptions on a number of difficult conceptual and theoretical issues, which often raise questions about their ultimate usefulness. Indeed, generational accounts as usually constructed suffer from a number of limitations.

First, generational accounts say nothing about the intergenerational distribution of public consumption. They do not impute to any particular generation the value of the government purchases of goods and services. Therefore, they do not show the full net burden that any generation receives from government fiscal policy as a whole. This reflects mostly difficulties in empirical implementation. There is no clear method of allocating the benefits of government purchases such as defense, highways, research, across generations. The reason is that most government purchases are made to provide public services that are used collectively rather than individually.

Second, generational accounts do not allow for the general equilibrium repercussions of alternative budgetary policies. In addition, generational accounts ignore all changes in before-tax income and relative prices caused by alternative budget programs. As demonstrated by Buiter (1996), these general equilibrium responses of pre-tax, pre-transfer, and pre-subsidy factor incomes and rate of return may reverse, counteract, or reinforce the impact of budgetary policy changes. For example, policies that decrease the net tax payment by existing generations and increase the net tax payment by future generations are likely to stimulate more current consumption and thereby reduce the saving available to finance investment. This, in turn, will lower productivity and real wage growth and raise real interest rates, which on balance can harm future generations.[4]

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[3]In pointing out the virtue of generational accounting, Kotlikoff (1997) has gone as far as suggesting that membership in the EMU should be predicated on the degree of a country's generational imbalance as opposed to its debt to GDP ratio.

[4]Recently, there have been attempts to address some economic effects of tax incidence through the use of general equilibrium models, but problems in modeling taxes and benefits

(continued...)

Third, generational accounts do not incorporate intergenerational transfers taking place outside the public sector: altruism and bequest motives may raise the possibility of private intergenerational transfers offsetting government transfers. Indeed, the usefulness of generational accounts is closely tied to the strict life-cycle model of household consumption (Buiter, 1996). In addition, for generational accounting to provide useful additional information (relative to standard budget accounting), consumers are required to be forward-looking with perfect foresight, and not subject to liquidity constraints.

Fourth, the computation of generational accounts is highly sensitive to assumptions on the future growth of productivity and population, which are subject to considerable uncertainty. Moreover, the choice of discount rate needed to carry out net present value calculations is also difficult: while the absence of liquidity constraint implies that all generations are supposed to have a similar cost of waiting regardless of their age, the riskless setting in which generational accounts are computed implies that the correct discount rate cannot be easily derived from observed long-term interest rates.[5]

Finally, generational accounts as usually presented include only future net tax payments and exclude past net payments. Therefore, they cannot be used to address the politically relevant question of how current younger generations fare compared to their elders based on relative lifetime net tax burdens under current policies.

Some of these problems can be minimized, and the use of sensitivity analysis provides some help in forming judgments. For instance, increasing the share of government expenditure that is assigned to individual cohorts will reduce the arbitrariness of the distribution of the fiscal burden, because a smaller part of total taxes becomes diverted toward undifferentiated "government consumption." Estimation of private intergenerational transfers can also shed some light on the generational stance of fiscal policy, and retrospective calculations can widen

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[4](...continued)
and calibrating the model have limited their usefulness for policy discussion. See Perraudin (1997) and SM/97/250.

[5]A distinction should be made between the assumptions of: (i) no individual and aggregate liquidity constraints and (ii) government solvency. The first implies that, as long as the government is solvent, the interest rate at which the public debt is financed is the discount rate, regardless of how large the public deficit may be at any given moment (which explains why interest payments wash out when net present values are computed). The second presumes that the debt inherited by future generations is lower than the present value of their wealth. Therefore, it is important that, after the burden on future generations is computed, the postulated solvency of the government be verified; a simple comparison of the generational accounts between current and future generations does not permit verification as to whether this assumption is satisfied or not. In the generational accounting framework, insolvency is the only circumstance in which the debt would "explode."

the scope of the policy implications (see Kotlikoff, 1994). In this paper, these problems are in part dealt with by a careful assignment of government expenditures based on well-established concepts of national accounts, as well as by the computation of retrospective generational accounts that permit to compare the lifetime net tax burden of some adult cohorts with that of younger and future generations.

III. The Construction of Generational Accounts for France

A. 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 Appendix I.

The resulting age and sex profiles (i.e., the relative tax weight of different living cohorts) are assumed constant through time, except for adjustments reflecting projected changes in the participation rate of women.[6] 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 the year 2002. For years beyond 2002, it is assumed that all taxes and transfers increase at the same rate as productivity growth.[7] Five categories of taxes are distinguished: income tax, property tax, value-added tax, 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

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[6]The profile for pensions also varies over time, as explained below.

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

categories of transfers were included in government consumption. Charts 1 and 2 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 I), then by a rule that assumes that spending grows over time from its 2002 level to keep pace with population and productivity growth.[8] This amounts to assuming that per capita consumption rises at the productivity growth rate. Our estimate of spending includes both government spending on goods and services (excluding health and education spending) as well as public investment, netted by those taxes and receipts not included in the five categories described above. For government net wealth, estimates computed by INSEE (1993) are used. In 1995, the consolidated net wealth of the general government is estimated to be F 800 billion (about 10 percent of GDP), reflecting the 1993 estimate, adjusted for the growth in government debt and the sale of government assets through privatization in the intervening period. The net financial wealth, which is used for the baseline calculation was negative, with net liabilities amounting to F 2,800 billion, obtained by netting off from the general government debt (estimated at F 4,059 billion in 1995), the financial assets of the general government.

Using the government intertemporal budget constraint given above, 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 tax payment of successive generations rises at the economy's rate of productivity growth.

The procedure followed in this study was aimed at minimizing the arbitrariness in the labeling of taxes and transfers, by making sure that all flows are fully taken into account on a national accounts basis, e.g., by recovering the government deficit figure after all flows are considered (Table 4). The age and gender distribution of the net tax burden was allocated as large a fraction as possible 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 (1995), and Section B above).

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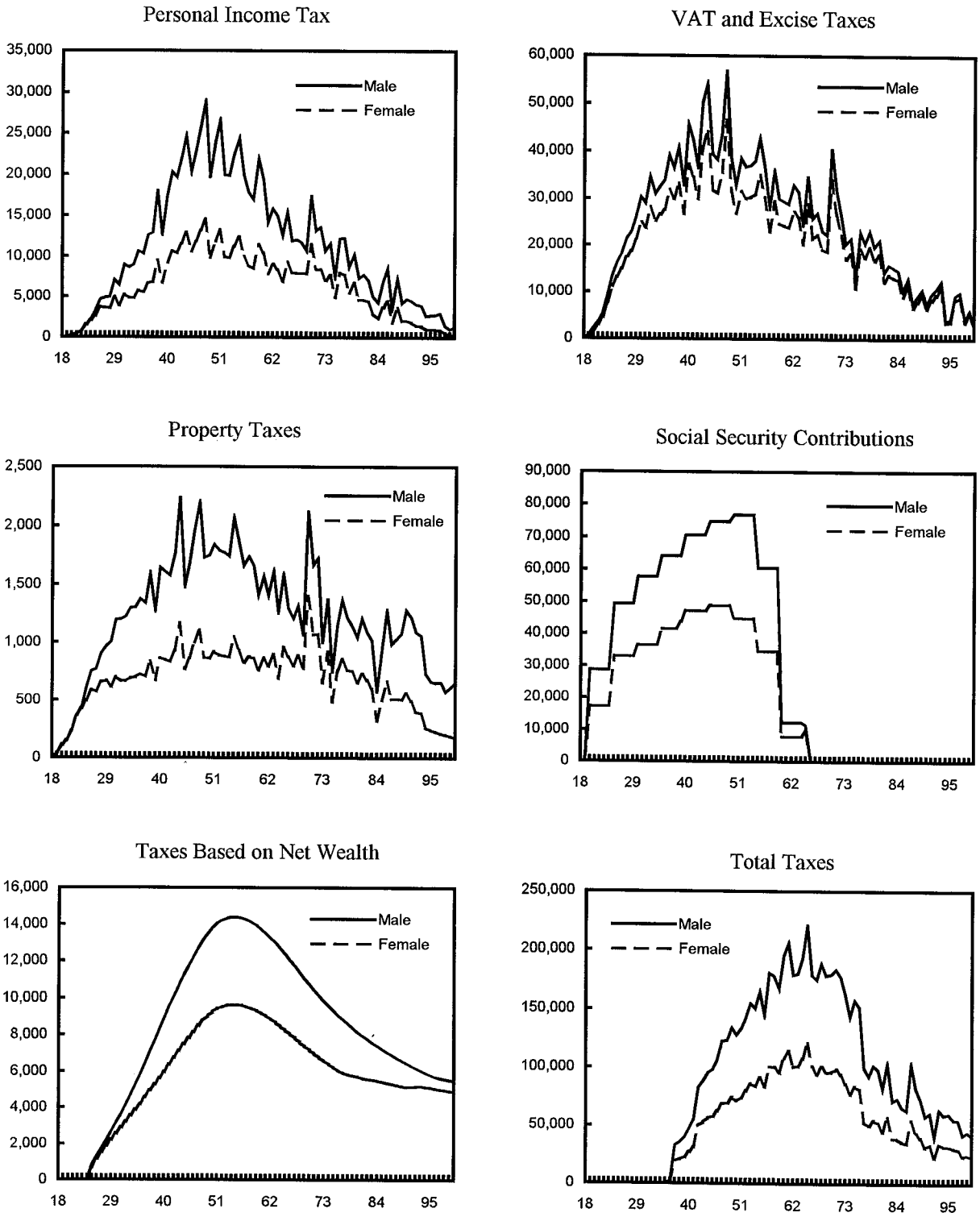
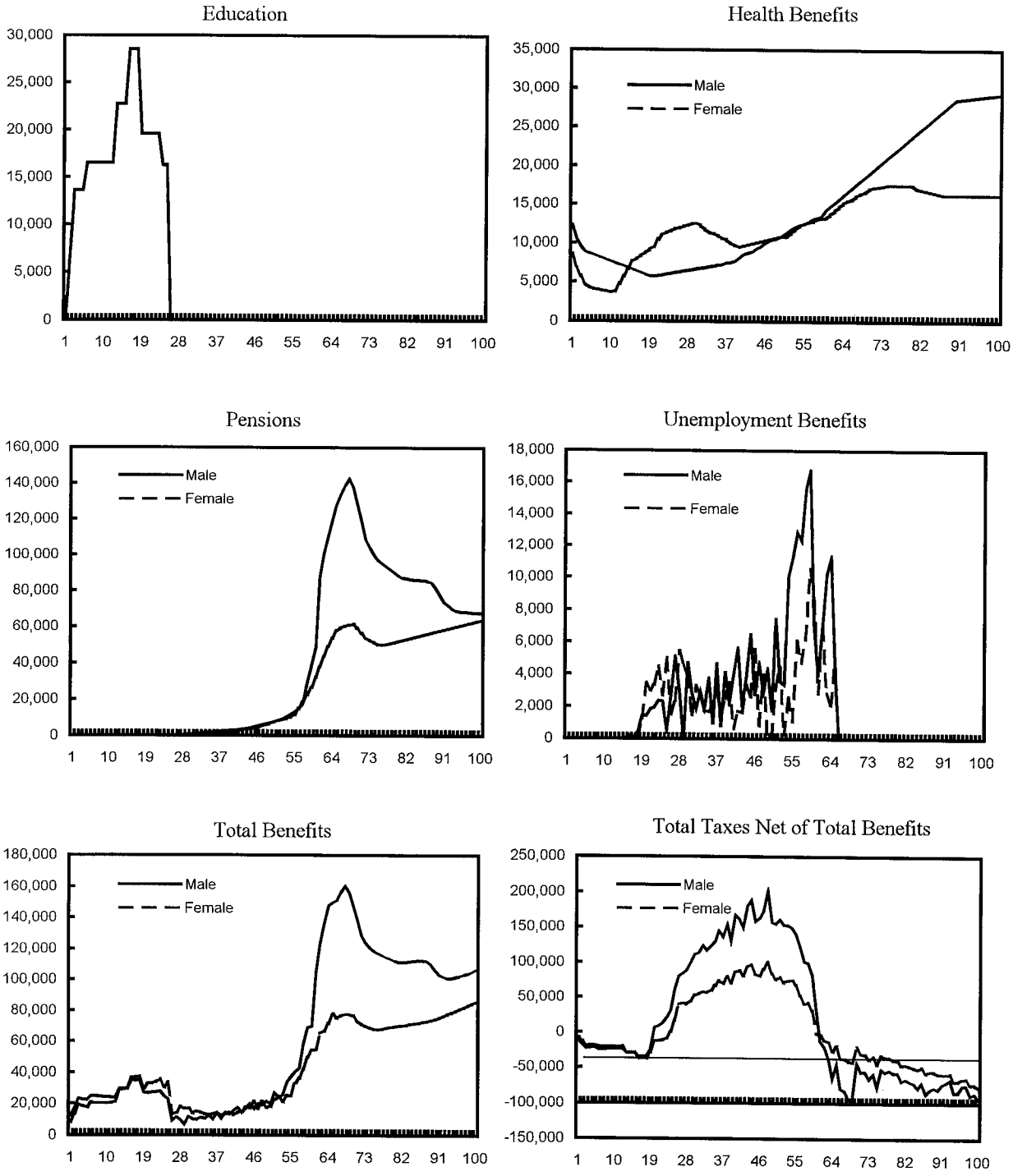
[8]Generational accounts treat public investment as if it was consumed the year it was made. That is, government purchases for any year include the purchase of new public capital, but exclude the services of existing public capital. It would, however, make no difference whether the accounts included the prospective purchase of public assets when they are bought or the consumption of their services when they are used (to the extent that no specific beneficiary to these services can be distinguished). The present value of prospective government purchases would be the same in either case (because the value of the asset is the present value of its services). Despite the inherent uncertainties in assigning the respective flows of services, investments in health, education, and some social services were lumped with current transfers in the accounts presented here.

Chart 1.
France: Profiles of Tax Incidence



Source: Data provided by Insee; and Staff calculations.

Chart 2.
France: Profiles of Government Transfers



Source: Data provided by Insee; and Staff calculations.

Table 4. France: Accounts of the General Government (1995)
(In millions of francs)

		INCOME	EXPEND.	NET TAXES		Incidence
					as % of GDP	
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
Income Tax	r612	398,392		398,392	5.19	Income Tax
Other Income & Wealth/Property Taxe	r613					
Property Taxes (Taxe d'habitation)		40,017		40,017	0.52	Income Based Tax
Other Income & Wealth Taxes		168,754	3,314	165,440	2.15	Net-wealth Based Tax
Soc 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 Expenditure
Unemployment			98,430	-98,430	-1.28	Unemployment Benefits
Others, including family allowances			162,717	-162,717	-2.12	Government Consumption
Gov. Pensions and other Entitlements	r642		152,453	-152,453	-1.98	Pensions
Other Social Transfers	r643		220,277	-220,277	-2.87	Government Consumption
Gov Soc Sec Contr.(contrib. fictives)	r63+r65	350,931	205,770	145,161	1.89	Government Consumption
Transfers to Private Agen	r66		15,695	-15,695	-0.20	Government Consumption
Other Domestic Transfers	r69	63,626	102,722	-39,096	-0.51	Government Consumption
Intern. Official Transfers	r67	20,171	78,383	-58,212	-0.76	Government Consumption
Interests	r41	38,299	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-societes"	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 Non-discretionary expenditure			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 Expenditure
Social Interventions	f4		112,000	-112,000	-1.46	Unemployment Benefits
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 non-material 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			
Capital Expenditure on						
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 Expenditure
Social Interventions			18,009	-18,009	-0.23	Unemployment Benefits
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	

Source: Insee, Rapport sur les Comptes de la Nation, 1995; and Staff calculations.

B. 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 1.0 percent per year over the long run (baseline case). A discount rate of 3 percent is assumed; this is midway between the average yield on government bonds and the real rate of return to private sector capital, and thus provides a reasonable indicator of society's trade-off between present and future consumption. Alternative values of 4 percent and 5 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 (1995). This trend is extrapolated through 2200 by assuming that the birth rate stabilizes after 2050.

Other technical assumptions made in this paper concern participation rates, the growth rate of medical expenditure, and pension indexation. 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.[9] This trend is captured in the implementation presented here by incorporating the observation that this increase 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 50–60 is likely to approach that of cohorts aged 40–50 (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.[10]

The current profile of pension payments reflects several influences, among which the growth of real wages in the past and the indexation of benefits. This profile, however, is bound to change over time. 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 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.

In the medium term, aggregate health care expenditure as a proportion of GDP is assumed to fall marginally, while beyond the year 2002, individual health care spending is

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[9]See, for example, DARES (1997).

[10]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.

assumed to rise in line with productivity. This assumption contrasts markedly 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. However, to the extent that the reform of public health care announced in 1995 will take its full effect in the coming years, it may not appear implausible.[11]

C. Main Results

The baseline case compares the generational accounts of males and females born in 1995 with the average of those born after 1995 (Table 5). The projections reflect policies that were in place or had been announced as of 1995; therefore, it takes into account the medium-term fiscal plans contained in the convergence program presented by the previous government. 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 6 under the assumptions of a 1 percent productivity growth and discount rates of 3, 4, and 5 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 3 percent discount rate), the generational account (i.e., the remaining net tax payments) is about US$145,000 for newborns in 1995,[12] rising to a peak of US$330,000 for those who turned 25 in 1995 (who have thus completed

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[11]In a version of the paper published elsewhere (Generational Accounting around the World, Kotlikoff et al., Forthcoming), the central scenario assumes that health care will increase faster than labor productivity. Although it is reasonable to make such an assumption, not least because health care is a superior good, *public* expenditure on health care need not grow as fast, in view of quantitative constraints. For example, the growth in expenditure on hospitals in France has moderated substantially since global budgets were introduced in the 1980s. One of the main objectives of the 1995 reform was to introduce controls and incentives to reduce the growth of other components of public expenditure on health care (such as reimbursements of ambulatory services and laboratory exams). For a full discussion of these issues, see Chapter 1 of IMF Staff Country Report No. 97/19, March 1997.

[12]The results are presented in 1995 U.S. dollars for ease of comparison with other country cases.

Table 5. France: Baseline (Standard) Generational Accounts1/

	Males	Females
Newborn in 1995 (in $)	144,380	114,132
Future generations (in $)	235,332	186,029
Generational imbalances (% difference)	63	63

Source: Staff calculations.

1/ Present value of lifetime net tax payments as of 1995 assuming productivity growth rate of 1 percent and a discount rate of 3 percent.

Table 6. France: Baseline Generational Accounts

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	144,380	114,132	114,444	68,057	74,899	34,100
5	181,889	144,389	158,789	98,421	118,889	62,058
10	223,387	178,850	208,862	135,118	171,151	98,081
15	260,593	207,943	254,327	169,607	221,657	134,665
20	312,309	250,303	313,862	219,673	288,647	189,357
25	331,838	272,427	341,750	251,912	327,020	228,877
30	291,367	247,649	308,475	238,412	305,839	224,498
35	227,156	206,821	248,583	207,895	257,446	202,969
40	140,690	150,190	163,514	160,041	182,301	163,406
45	45,062	84,690	66,311	100,729	91,786	110,490
50	-48,644	20,261	-29,270	39,182	-1,409	52,609
55	-175,725	-68,041	-156,185	-48,754	-128,515	-33,780
60	-221,021	-124,506	-207,258	-106,734	-188,542	-92,403
65	-217,883	-126,368	-207,740	-112,508	-193,887	-100,970
70	-163,808	-106,164	-156,823	-96,278	-147,504	-87,808
75	-173,388	-115,251	-166,762	-107,469	-159,106	-100,594
80	-99,638	-74,534	-96,250	-70,305	-92,425	-66,506
85	-107,900	-78,326	-104,879	-75,155	-101,693	-72,233
90	-98,822	-76,170	-95,995	-73,824	-93,438	-71,618
>95	-103,223	-75,965	-101,138	-74,452	-99,131	-72,997
Fut. Generations	235,332	186,029	169,454	100,770	111,975	50,980
Percentage Difference	**63**	**63**	**48**	**48**	**50**	**50**

Source: Staff calculations

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 US$115,000, which peaks at US$273,000 at age 25. The fact that accounts for females are lower than 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 pension receipts.

In the baseline scenario, the average net payment burden of future generations is somewhat **over one and a half times** higher than that faced by the youngest generation alive in 1995 (represented by the 0–4 year old cohort of 1995). If all generations born before 1995 are protected from any change in their lifetime net-tax profile, future generations will have to pay on average about 63 percent more than the youngest "protected" generations, in order to guarantee the ultimate solvency of the government. Assuming that the tax burden of future generations[13] 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 US$235,000, while women would pay US$180,000 over their lifetime.[14]

Generational imbalances are, however, sensitive to the discount and productivity growth rates assumed, as well as to the accounting conventions adopted. Appendix II shows the impact of varying these parameters in the range of 3 percent and 5 percent, and 0.75 percent and 1.5 percent, respectively. Increasing the discount rate to 5 percent, for instance, would reduce the imbalance by 20 percent, while raising productivity by 0.5 percentage points would cut the imbalance by some 10 percent. Although the net present value of all net taxes decreases monotonically with higher interest rates, the change in the imbalance needs 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). By contrast, for parameters in the range chosen, the imbalance always decreases when productivity growth increases (mainly because pensions are indexed to CPI and not to

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[13]Total net tax payments by all future generations derived as residuals from the intertemporal budget equation, amounted to F 60,555 billion.

[14]The lifetime net present value of labor income for someone earning the 1995 minimum wage is about US$300,000 (taking into account pension payments, which are deferred labor income and using a 3 percent discount rate), while that of the average worker is around US$700,000. Therefore, for average workers, the present value of **net** tax payments will correspond to about one third of their lifetime labor income adjusted for productivity growth, thus ensuring the solvency of the government accounts.

wages).[15] Changes in the rules regarding the accounting of government wealth or the incidence of corporate income taxes, can also lead to changes in the imbalance of the order of 15–50 percentage points (see Appendix II). Although these figures illustrate the magnitude of the uncertainty associated with any computation of generational accounts, they all point to a worsening of the net tax burden on future generations in France.

IV. International Comparisons

An interesting question is how France compares with other countries for which there have been standard generational accounting studies. Table 7 from the OECD (1995) presents comparative generational accounts for other industrial countries: Germany (Raffelheuschen and Walliser, 1995), Italy before the 1995 reform (Franco et al., 1994), Sweden (Hageman and Christoph, 1995), and the United States (Auerbach, Gokhale, and Kotlikoff, 1993). International comparisons of generational accounts require a great deal of caution because the technical and policy assumptions are different across studies (e.g., while figures provided in Table 7 were based on similar discount and productivity growth rates, accounting conventions including the classification of tax incidence were by no means homogenous). Nonetheless, some interesting patterns emerge. Measured in absolute 1995 U.S. dollars, newborn males in France appear to be facing a lower net tax burden than their counterparts in the United States, Germany, Sweden, and Norway, and a higher one than that facing Italian newborn males before the implementation of the 1995 pension reform; newborn women, by contrast, appear to bear a heavier burden in France than in the United States, Norway, and Italy, while bearing an approximate equivalent burden than their counterparts in Germany and Sweden. For the United States, the higher average net tax burden of newborn generations can in part be attributed to the smaller proportion of public spending directed to social transfers vis-à-vis France. While in France the overall level of taxation, including social contributions, is considerably higher than in the United States, this difference tends to be offset in the calculation of the net tax burden for France by the counterpart of those contributions (i.e., large social transfers)[16] and a relatively large outlay related to public hospitals and higher education.

In all four countries, there is a generational imbalance against future generations implied by prevailing fiscal policies. The imbalance (measured in percentage differences) appears to be much lower in France than in Italy (326 percent difference before the 1995 pension reform) and the United States (100 percent), but somewhat larger than in Sweden

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[15]Sensitivity analysis with respect to another source of uncertainty—the demographic assumptions—was not performed, but as shown below, a less optimistic assumption about the demographics in France, e.g., using Dinh (1995) "central" projection of 1.8 fertility rate, would tend to worsen the imbalance.

[16]In 1994, social transfers as a percentage of GDP amounted to 23.3 percent and 13.2 percent in France and the United States, respectively.

Table 7. France: International Comparison of Generational Accounts1/
(In thousands of dollars) 2/

	USA	Italy	Germany	Sweden	Norway
Males					
New borns in 1993	191	102	311	272	181
Future generations	384	433	390	333	299
Generational imbalance (in % difference)	102	326	25	23	64
Females					
New borns in 1993	92	19	133	134	42
Future generations	186	79	166	165	70
Generational imbalance (in % difference)	102	327	26	23	66

Source: OECD (1995)

1/ Present values of future net tax payments per capita as of 1993, assuming productivity growth of 1 percent, a a discount rate of 3 percent.

2/ In constant prices, adjusted for income growth, converted to US dollars using 1993 nominal exchange rates.

(23 percent) and Germany (25 percent). As noted above, differences in methodology and assumptions could partly explain these differences. Nevertheless, the relatively smaller generational imbalance compared to Italy can be attributed somewhat to, among other factors, a higher debt-to-GDP ratio in Italy and a more marked demographic change (which prompted a deepening of the reform of the pension system in 1995).[17] The relatively smaller imbalance vis-à-vis the United States stems largely from less optimistic assumptions on the projected growth of public expenditure in health care.[18] The imbalance vis-à-vis Sweden (a country with a larger welfare system) can be traced to several sources. On the one hand, since 1994, the Swedish economy has undergone a substantial fiscal adjustment aimed at moving the fiscal accounts into surplus by year 2000, and retirement age at 65 years is higher than in France. On the other hand, discrepancies in the recording of social benefits (in good measure recorded as government consumption instead of social transfers) appear to have tilted the imbalance against current generations (whose burden is higher than in France).

V. Generational Accounts of Babyboomers

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 newlyborn generations in the base year and those of future generations, for which lifetime net tax payments are available. Although this way of presenting generational accounts yields insightful results regarding intergenerational imbalances, its interpretation may have a lesser 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 fail to address 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 cohort of babyboomers), 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 (the standard assumption that all generations alive in 1995 will be "protected" for their whole lifetime is somewhat implausible, given that owing to demographic changes evident already in the early decades of the next century, the heavier

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[17] The impact of the public debt can be substantial, especially when higher discount rates are considered. It can be gauged by computing the generational accounts under the assumption of zero debt. In the absence of public debt, the imbalance in France would have been some 10 percent smaller in the 3 percent discount rate case, moving to two thirds and a half as the discount rate was increased towards 5 percent.

[18] The larger imbalance reported in the study on the United States, in fact, stems largely from the assumption made on the growth of health care expenditure, which indicates that real medical costs per recipient will grow much faster than productivity through the year 2020, in line with early projections from the Health Care Financing Administration.

burden on future generations will start to be apparent at a relatively early date, and will imply heavy pressures for policy changes).

As a 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 young and future generations.[19] For this purpose, not only future net transfers were projected (as it is done in the standard exercise), but a retrospective account of past net transfers of selected adult generations was computed.[20]

The calculations reported in Table 8 indicate that under the present system of taxes and benefits, the projected net tax burden on generations currently aged less than 25 is on average close to **two times** as large as that faced by those born around 1950. Results vary somewhat, depending on the rate of productivity growth used for comparing the burden on current adult generations and the discount rate, but except for the largest discount rate, the imbalance is significant. If generations are put on equal footing by assuming a 1 percent productivity growth rate, the imbalance is of the order of 90 percent. However, as in many other industrialized countries, productivity growth in France was much higher in 1950–70 than in recent years. Thus, an "historical" measure should weigh early benefits differently from later tax payments, and net taxes instead of being measured in constant francs and later adjusted by a constant rate of growth of productivity, should reflect the size of the economy at different times (i.e., past net taxes should be adjusted for GDP growth over the period). Computing the generational imbalance in this way confirms that future generations would bear a larger burden than current adult generations.

VI. Redressing the Generational Imbalance

Undoubtedly, the pending demographic transition, with the projected increase in the dependency ratio, is the root cause of most of the intergenerational imbalance. Were the demographic structure to remain unchanged, a significant imbalance would not emerge (Table 9). In the face of the demographic changes, however, delaying changes in the status quo (e.g., regarding that of current adult generations, and in particular concerning pensions)

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[19]This generation, born at the beginning of what became to be known as the "30 glorious" years of economic growth, has played a key role in national life, since attending university in the late 1960s and early 1970s.

[20]Details of the computation of the past net tax burden can be found in Appendix I. Kotlikoff (1994) also presents retrospective accounts for the United States.

Table 8. France: Generational Accounts of Living Generations 1/
(In 1995 US dollars)

Productivity Growth	1%			Historical		
Discount Rates (percent)	3	4	5	3	4	5
Current Generations 2/						
Men	128,552	87,115	57,852	106,566	74,404	51,630
Women	103,103	69,066	43,837	80,252	54,956	36,252
Average	115,828	78,091	50,845	93,409	64,680	43,941
Future Generations 3/						
Men	213,771	160,414	114,871	213,771	160,414	114,871
Women	168,985	95,394	52,298	168,985	95,394	52,298
Average	191,378	127,904	83,585	191,378	127,904	83,585
Generational Imbalance 4/						
Men	66	84	99	101	116	122
Women	64	38	19	111	74	44
Average	65	64	64	105	98	90

Source: Staff Calculations.

1/ Lifetime net tax payments of presently-living generations converted into 1995 present values.

2/ Refer to current adults aged 25 or more (represented by the 1950-55 cohorts).

3/ Refer to current youngsters (under 25 years of age)

4/ Percentage difference between the lifetime net tax payments of young and adult generations in 1995.

Table 9. France: Generational Accounts
With Unchanged Population Profile

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	241,472	173,074	180,497	105,056	118,504	58,237
5	285,067	205,905	232,469	138,904	169,914	89,792
10	325,760	237,912	284,660	175,656	225,785	127,248
15	383,143	279,509	351,011	221,994	295,771	174,686
20	378,429	276,778	359,413	235,636	319,466	199,813
25	396,529	294,219	386,956	264,104	357,772	236,145
30	346,413	259,013	345,198	241,283	329,068	223,210
35	277,616	215,027	281,541	207,724	277,206	198,430
40	189,597	158,360	196,551	159,600	201,941	157,998
45	84,108	88,226	92,864	95,934	105,421	100,448
50	-35,969	20,290	-23,148	35,287	-1,531	46,255
55	-139,175	-50,615	-125,350	-35,898	-104,397	-24,198
60	-185,644	-99,124	-175,281	-86,930	-161,726	-76,861
65	-180,647	-100,225	-173,159	-90,850	-163,418	-82,901
70	-126,611	-79,424	-122,020	-72,883	-115,820	-67,213
75	-159,962	-117,209	-153,403	-108,939	-145,731	-101,586
80	-104,806	-74,362	-101,434	-70,858	-97,939	-67,664
85	-94,747	-68,408	-92,283	-65,977	-89,796	-63,722
90	-83,771	-65,449	-81,675	-63,647	-79,755	-61,946
>95	-149,770	-64,408	-143,664	-63,198	-133,916	-62,033
Fut. Generations	205,548	147,326	99,215	57,747	35,588	17,489
Percentage Difference	1	1	1	1	0	0

Source: Staff calculations

would only increase the cost of adjustment borne out by subsequent generations.[21] The recognition of the need for an early adjustment motivated the pension reforms in France designed in the early 1990s and partially implemented in 1993 (mainly affecting the "*régime général*") and 1996 (with respect to supplementary mandatory pension schemes)—most notably **the indexation of pensions to the CPI** instead of wages. Table 10 shows that, were pensions still indexed to wages, e.g., increasing at real rates of 1–1.5 percent a year, the intergenerational imbalance would be almost twice as large, raising to more than 100 percent. This illustration underscores the intergenerational redistribution of resources implied by major pension reforms. Together with that in Table 9, it suggests that creating incentives so that projected increases in life expectancy are accompanied by longer working lives and contribution periods for a full pension could eliminate most of the problem that is manifest in current projections.

Increasing the participation rate (through 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 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 percent of GDP. A characteristic of the French labor market since the mid-1980s is the relatively low level of labor force participation, particularly for people aged 55–65, while life expectancy continued to increase. As the participation rate of this group of people declined from 31.5 percent to 16.5 percent, despite a significant increase in the participation rate of women, its share in the active population fell from 18.7 percent in the 1960s to 9.4 percent in 1995 (Dares, 1997). Between 1968 and 1995, participation rates for males aged 60–65 dropped from 68 percent to about 15 percent with only a small 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 age group of 55–59 experienced an increase in participation rates from 42–55 percent during the same period. Table 11 shows that by inducing a gradual rise in the participation rate of those aged 60–65 in 2005–2015 to 40 percent, the imbalance between newborn and future generations is reduced dramatically (vanishing for a discount rate of 4 percent).

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[21]It should be noted that generational accounts are silent about how the adjustment will be effected. On the one hand, 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, would likely reduce their actual net income to the extent that parents would have to shoulder the cost of educating their children. On the other hand, differences in the treatment of taxpayers based on specifics characteristics (e.g., senior citizens often pay lower health contributions than working-age persons, couples and large families tend to benefit from income tax deductions), while marginal today, could become more prominent in the future.

Table 10. France: Generational Accounts

Without Pensions Indexed to CPI 1/

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	125,563	101,236	104,509	62,059	69,939	31,257
5	161,632	130,500	147,564	91,635	113,008	58,681
10	201,587	163,814	196,180	127,407	164,180	94,054
15	236,908	191,559	239,873	160,796	213,324	129,841
20	286,492	232,768	297,314	209,766	278,632	183,662
25	303,949	253,468	322,986	240,668	315,109	222,097
30	261,659	227,444	287,490	225,829	291,863	216,534
35	195,507	185,333	225,101	193,837	241,037	193,633
40	107,150	127,426	137,372	144,387	163,128	152,490
45	9,080	60,367	36,897	83,155	69,179	97,629
50	-86,702	-5,207	-61,743	19,966	-27,467	37,945
55	-214,809	-93,699	-190,806	-68,946	-157,371	-49,820
60	-234,424	-132,032	-219,741	-113,036	-199,648	-97,721
65	-227,561	-132,176	-216,832	-117,480	-202,088	-105,254
70	-170,064	-110,113	-162,734	-99,724	-152,893	-90,830
75	-178,201	-118,255	-171,319	-110,165	-163,327	-103,025
80	-101,603	-75,913	-98,111	-71,551	-94,150	-67,637
85	-109,477	-79,293	-106,384	-76,062	-103,111	-73,086
90	-99,925	-77,002	-97,041	-74,616	-94,433	-72,373
>95	-104,297	-76,877	-102,174	-75,332	-100,132	-73,847
Fut. Generation	263,378	212,351	205,398	121,967	149,506	66,817
Percentage Difference	**110**	**110**	**97**	**97**	**114**	**114**

Source: Staff calculations

1/ Pensions indexed to wages in early years, and to 1.2 percent rate (+ inflation) thereafter.

Table 11. France: Alternative Policy Scenario
Change in Male and Female Participation Rates1/

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	163,614	130,450	126,369	77,191	81,826	39,265
5	202,634	162,097	172,290	108,825	127,116	68,231
10	245,786	198,040	224,160	146,947	180,929	105,439
15	284,906	228,675	271,742	183,004	233,322	143,394
20	339,104	272,639	333,979	234,794	302,758	199,668
25	361,071	296,559	364,747	269,022	343,909	241,085
30	323,134	273,613	334,657	257,691	325,967	238,889
35	261,904	234,982	278,597	229,808	281,614	220,101
40	178,825	181,067	198,055	185,247	211,448	184,068
45	76,121	110,716	95,766	122,951	117,806	129,545
50	-32,011	35,632	-13,574	52,706	12,795	64,568
55	-173,906	-65,343	-154,529	-46,552	-127,107	-31,972
60	-219,768	-122,548	-206,099	-105,097	-187,536	-91,025
65	-217,204	-125,219	-207,106	-111,534	-193,330	-100,141
70	-163,489	-105,577	-156,523	-95,774	-147,239	-87,373
75	-173,255	-114,981	-166,636	-107,235	-158,994	-100,390
80	-99,593	-74,437	-96,207	-70,220	-92,387	-66,431
85	-107,887	-78,298	-104,866	-75,130	-101,682	-72,211
90	-98,822	-76,170	-95,995	-73,824	-93,438	-71,618
>95	-103,223	-75,965	-101,138	-74,452	-99,131	-72,997
Fut. Generation	193,658	175,797	117,008	92,733	58,244	43,137
Percentage Difference	**18**	**35**	**-7**	**20**	**-29**	**10**
	26		3		-16	

Source: Staff calculations

1/ The participation rate of men aged 60-65 gradually increases from 15 percent to 40 percent in 2005-2015; that of women ages 60-65 raises from 13 percent to 40 percent.

Although representing an improvement, the lower imbalance reflected in this scenario is achieved mainly by increasing the burden on current young generations. This points to the need for an early increase in the participation rate for people aged 55–65. Table 12 shows that bringing forward the process, and allowing for a small increase in the participation rate of males aged 55–60, would lead to a greater reduction of the imbalance, with a decline in the burden on future, as well as current young generations. Indeed, Table 13 shows that such an early action would also cut the imbalance between "babyboomers" and young generations by half.

An increase to 40 percent in the participation rate of those aged 60–65 is consistent with both a three-year increase in the effective retirement age, and a five-year increase in the effective retirement age with fewer working hours in later years—thus leaving ample room for a variety of policy alternatives.[22] 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 one half of workers already retire with 40 years of contributions, while the effective pension for those with less than 32.5 years of contributions is determined by the relatively high level of the minimum pension (Briet, et. al, 1995). 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 60, but it would create incentives for longer careers and enhance economic activity.[23] 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).

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[22]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 the wages, working hours, and accrual of pension rights to ensure that the labor market clears for older workers is also likely to be required at an early stage.

[23]In principle, working at an increasingly older age should become less of a burden, as intellectual work tends to be increasingly substituting for repetitive manual work. 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 an early age, while being fair to those who entered later (e.g., by staying longer in school) or wanted to have a more flexible working life profile. 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. Moreover, if greater wage differentiation is also allowed, increasing the number of years of contribution would not create disincentives to accumulating greater human capital.

Table 12. France: Alternative Policy Scenario
With Early Change in Participation Rates 1/

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	179,304	145,199	136,179	85,370	87,582	43,853
5	219,563	178,084	183,400	118,130	133,955	73,706
10	264,076	215,361	236,756	157,521	189,061	111,960
15	304,760	247,387	286,084	194,978	243,028	151,127
20	360,992	292,791	350,558	248,312	314,515	208,813
25	384,998	318,399	383,743	284,376	358,018	251,962
30	349,108	297,102	356,271	274,999	342,783	251,732
35	290,354	260,631	303,416	249,640	301,842	235,533
40	203,337	204,496	330,209	203,996	230,153	199,157
45	100,824	131,757	118,570	140,407	137,699	144,096
50	-15,304	43,142	2,185	59,478	26,930	70,720
55	-160,512	-60,606	-141,944	-42,286	-115,459	-28,102
60	-214,222	-120,151	-200,907	-102,934	-182,711	-89,059
65	-216,289	-124,420	-206,250	-110,836	-192,558	-99,526
70	-162,982	-105,124	-156,046	-95,370	-146,803	-87,011
75	-172,935	-114,678	-166,335	-106,959	-158,716	-11,138
80	-99,467	-74,321	-96,088	-70,112	-98,276	-66,331
85	-107,817	-78,224	-104,800	-75,061	-101,620	-72,147
90	-98,789	-76,127	-92	-75,784	-93,407	-71,580
>95	-103,223	-75,965	-101,138	-74,452	-99,131	-72,997
Fut. Generation	171,067	154,298	88,582	69,913	28,323	20,859
Percentage Difference	**0**	**0**	**-28**	**-28**	**-63**	**-63**

Source: Staff calculations

1/ The participation rate of men aged 60-65 gradually increases from 15 percent to 40 percent starting in year 2000; that of women aged 60-65 raises from 13 percent to 40 percent; a 3-5 percentage increase in the participation rate of men aged 55-60 is also allowed.

Table 13. France: Generational Accounts of the Babyboomers 1/
With Early Increase of Participation Rate

Productivity growth	Discount Rate of 3%	
	1%	**Historical Rate**
	Slow Increase	
Babyboomers 1/		
Males	166,017	129,235
Female	129,622	97,976
Average	147,819	113,605
Future generations 2/		
Males	171,067	171,067
Female	154,298	154,298
Average	162,683	162,683
Imbalance		
Males	3	32
Female	19	57
Average	10	43

Source: Staff Calculations.

1/ Lifetime net tax payments for the 1950-55 cohorts.

2/ Including generations born after 1970.

VII. Conclusions

This paper attempts to contribute to ongoing discussions about the long-run sustainability of fiscal policy in the face of an aging population in France using a framework designed to capture the intergenerational aspect of the problem. It presents for the first time a set of generational accounts for France with a view to assessing the implications for future generations, given current fiscal rules, of the growth in government spending and debt when the effects of demographic projections and other factors such as the anticipated change in labor force participation rates are taken into account. 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 would help alleviate such an imbalance, in particular those aimed at fostering higher employment and later retirement among the cohorts aged 55–65. This paper has presented such a policy scenario, indicating that an early, but gradual, increase to 40 percent in the 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.

A number of caveats call for a careful interpretation of the results presented here. First, the accounts do not reflect private intergenerational transfers, which could contribute to lowering the size of the imbalance. Second, as this is a pure accounting model, no behavioral responses on the part of economic agents are built into the present framework. Finally, the results are sensitive to the long-term economic and demographic assumptions underlying this kind of study. Nonetheless, if interpreted with care, the generational accounts for France as presented in this paper can be used to gauge the extent of direct intergenerational redistribution implied by changing fiscal policies, and thereby assist public decision-making in this area.

SOURCES AND DATA CONSTRUCTION

As explained above, average net tax payments for each generation were calculated by distributing aggregate taxes and transfers across 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 the 1990 data from surveys conducted by the tax administration department of the Ministry of Finances 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.

A. Computation of Profiles

Chart 1 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 tax survey conducted by the Ministry of Finance (*Enquête sur les revenus fiscaux des ménages*, 1990). INSEE provided a break down of the results of the 1990 tax survey on these taxes according to the age of the head of households 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, etc. Therefore, in order to take these factors into account, a more detailed disaggregation of the 1984 and 1990 tax surveys (Canceill, 1989, and Campagne, et. al, 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 (e.g., 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'âge et le mode de vie*; INSEE, 1990), permitted to disaggregate by gender the figures by household in the original survey.[24] 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

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[24]Of course, this is an approximation based on a number of assumptions (e.g., that in a household comprising a couple but 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 comprise the majority of the childless couples for which Canceill has information on). The overall impact of the imprecisions arising from these assumptions would appear minor.

wages computed by INSEE (Colin, 1995 and Perotin, 1989), and the average proportion between the wages received by men and women found in Bayet (1996).[25] 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).[26]

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 impots sur le revenue et le patrimoine*) were computed using the age distribution of net wealth found in Lolliviet and Verger (1996), adjusted for the distribution among genders based on figures in Sturrock (1995) and Franco et al. (1993). Following the tack taken in the U.S. Congressional Budget Office study (Sturrock, 1995), incidence of corporate income tax was assumed to be related to 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 Chart 2. 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 Mizrahi and Mizrahi (1995). The profile of expenditure on **pensions** and **unemployment benefits** was based on figures provided by INSEE (Accardo, 1996).[27] The age and gender distribution of pension expenditure found there was smoothed, permitting the elimination of some outliers, especially for old and young ages. Expenditure on **minimum support income and other specific social transfers** was distributed according to the profile of unemployment benefits.[28]

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[25]Age profiles for men and women in different professions shown in Colin (1995) do not provide a full coverage of the working population, and 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).

[26]"*La population active devrait encore augmenter pendant une dizaine d'années*" DARES 97.02-No.07.

[27]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.

[28]Ideally, these should be allocated according to the distribution of RMI. However, given the

(continued...)

Computation of the relative tax weights

The assignment of the actual weight of individual taxes and benefits was based on national accounts figures (INSEE, 1996) and followed closely the taxonomy perfected by the French statisticians, which guarantees the internal consistency of fiscal magnitudes. General government *resources and uses* (see Table 4) were taken from the national accounts yearbook "*Comptes et Indicateurs Economiques*" (Tableau 10.17, *Administrations publiques, S60*). They were classified as much as possible according to the groups of taxes and transfers listed above, with those items which could not be assigned to any group being lumped into the 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[29] 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 capital fixe des administration publiques*). Finally, payments of pensions to government employees were lumped with the pensions to private sector workers, although the contributions which 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).[30]

The taxes and transfers identified in Table 4 were grouped together in Table A1 to show the weight of individual taxes and transfers and of government consumption as percent of GDP for the period 1995–2002. The aggregates' taxes and transfers for 1996–2002 reflect inter alia the changes in taxation 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 in 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).

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[28](...continued)
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.

[29]Found in the P30 line in the national accounts.

[30]This problem can be dealt with by including government pensions in the 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.

Table A1. France: Medium-term Fiscal Projection
(In 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 we	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 (in percent)		1.5	2.4	3.0	3.0	3.0	3.0	3.0

Source: Staff projections based on the authorities' Convergence Plan.

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.

B. Computation of Generational Profiles for the 1950–55 Cohorts

To compute the past net tax burden of the 1950–55 cohorts, national account flows covering the resources and uses of the public administration in the 1970–95 period were distributed over individual net payment profiles based on the profiles derived for 1995. Health expenditure on health and education in 1950–70 were also estimated from available sources. Unfortunately, while some work on per capita expenditure on health is available, less is available on total expenditure in education (data for the 1950s and 1960s comprise mainly the budget of *l'Education Nationale*, not covering education spending). The main adjustments on these profiles comprised changes in the age distribution of health expenditure, VAT, and social security taxes (based on Mizhari and Mizhari (1994), and INSEE sources).[31] To compare the net payment 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 1990 francs were discounted back to 1950), and then adjusted for productivity growth (essentially, adjusting by how far productivity deviated from the period average). Adjusted flows using a 1.0 percent productivity growth rate (and varying growth rate reflecting historical values) were also computed (see Table 8).

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[31] 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 however 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 40–55 years.

SENSITIVITY ANALYSIS

The calculation of the generational accounts is quite sensitive to the assumptions made about economic and demographic projections. Tables A2 and A3 report the estimated accounts for males and females under alternative assumptions about the parameter values. For a given productivity growth, a higher discount rate tends to lower the generational imbalance as measured by the percentage difference in the present value of taxes paid by future generations and newly born, since it gives a lower weight to future payments.[32] 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 much 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).

Although one of the main objectives of generational accounting is to free the analysis of public finances from labels that can be misleading, some conceptual problems remain when accounts are actually implemented. The same way standard "deficit" account can be highly misleading when not done according to the principles of national accounts, alternative assumptions regarding inter alia tax incidence can changes results quite substantially. Because generational accounts deal with net flows, differences on how some taxes or benefits are classified do have an impact on the results. These problems are illustrated by adopting alternative assumptions about incidence of particular taxes, as well as regarding the treatment of selected sources of government income associated to its net wealth. To shed some light on the first problem, generational accounts were recalculated under the assumption that corporate income taxes are netted off government consumption (as was done in Hageman and John, 1995) instead of being lumped with other capital income taxes, which incidence was assumed to be proportional to the net wealth of individuals (corporate income tax amount to about 2 percent of GDP). Under this alternative hypothesis, the relative additional burden on future generations vis-à-vis the newly born for the 3 percent discount rate increases from 56 percent to 73 percent (Table A4).

The second issue is illustrated by considering the whole net wealth of the government (instead of only the financial net wealth), but classifying the operating income of the government (*excedent d'exploitation*) as the return on the universe of assets owned by the

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[32]The decline needs not be monotonic, although the net cashflow of both newborn and future generations will fall with higher discount rates, the ratio between them can increase.

Table A2. France: Generational Accounts

With Productivity Growth of 0.75 Percent a year

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	134,410	102,665	104,608	59,400	66,866	27,837
5	173,656	134,047	149,867	90,105	111,088	55,679
10	217,450	170,187	201,554	127,677	164,243	92,040
15	257,422	201,497	249,291	163,603	216,316	129,485
20	312,001	246,291	311,403	215,479	285,294	185,468
25	334,207	270,762	341,908	249,600	325,862	226,441
30	295,750	247,908	310,848	237,780	306,704	223,457
35	232,717	208,383	252,516	208,530	259,903	203,070
40	146,336	152,289	168,023	161,355	185,577	164,212
45	49,712	86,560	70,301	102,068	94,920	111,461
50	-45,860	21,339	-26,812	40,017	623	53,269
55	-175,370	-68,227	-155,964	-48,917	-128,341	-33,919
60	-218,566	-121,997	-205,163	-104,770	-186,809	-90,854
65	-216,476	-124,726	-206,540	-111,187	-192,882	-99,901
70	-163,084	-105,224	-156,220	-95,501	-146,993	-87,163
75	-173,086	-114,756	-166,552	-107,056	-158,934	-100,248
80	-99,539	-74,340	-96,192	-70,140	-92,381	-66,367
85	-107,925	-78,293	-104,929	-75,131	-101,746	-72,217
90	-98,893	-76,215	-96,095	-73,870	-93,535	-71,665
>95	-103,327	-76,042	-101,240	-74,528	-99,233	-73,071
Fut. Generation	224,091	171,165	159,477	90,556	104,764	43,615
Percentage Difference	**67**	**67**	**52**	**52**	**57**	**57**

Source: Staff calculations

Table A3. France: Generational Accounts

With Productivity Growth of 1.5 Percent a year

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	164,316	139,022	135,142	87,108	92,176	47,983
5	197,695	166,322	177,064	116,323	135,279	75,893
10	234,078	196,797	223,363	150,810	185,327	110,929
15	265,389	220,930	263,836	182,006	232,304	145,482
20	311,216	258,082	317,914	228,134	295,011	197,334
25	325,433	275,318	340,427	256,393	328,795	233,753
30	281,160	246,652	302,755	239,434	303,502	226,471
35	214,937	203,298	239,911	206,385	251,983	202,626
40	128,697	145,738	153,951	157,246	175,352	161,684
45	35,415	80,846	58,049	97,981	85,302	108,500
50	-54,319	18,099	-34,272	37,514	-5,536	51,293
55	-176,467	-67,660	-156,650	-48,418	-128,879	-33,494
60	-226,156	-129,818	-211,640	-110,885	-192,161	-95,669
65	-220,808	-129,807	-210,236	-115,271	-195,974	-103,201
70	-165,300	-108,112	-158,068	-97,887	-148,561	-89,141
75	-174,010	-116,271	-167,199	-108,320	-159,463	-101,305
80	-99,843	-74,931	-96,372	-70,642	-92,520	-66,791
85	-107,853	-78,394	-104,781	-75,206	-101,590	-72,269
90	-98,680	-76,081	-95,799	-73,734	-93,245	-71,527
>95	-103,016	-75,813	-100,934	-74,303	-98,931	-72,849
Fut. Generation	258,919	261,982	172,279	139,514	104,677	78,370
Percentage Difference	**58**	**58**	**42**	**42**	**39**	**39**

Source: Staff calculations

Table A4. France: Generational Accounts With Different Tax Incidence 1/

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	123,273	95,188	100,124	56,562	65,662	26,930
5	159,088	123,847	142,549	85,339	107,895	53,498
10	198,688	156,557	190,391	120,219	158,030	87,855
15	233,810	183,937	233,359	152,814	206,068	122,610
20	283,016	224,740	289,957	200,976	270,102	175,341
25	300,128	245,134	314,868	231,043	305,284	212,538
30	258,308	219,629	279,589	216,195	281,685	206,497
35	193,643	178,764	218,591	184,952	231,664	183,848
40	108,276	122,979	133,969	137,193	156,334	143,904
45	14,268	58,699	37,821	78,362	66,247	90,971
50	-76,877	-3,768	-55,710	18,063	-25,514	33,828
55	-197,934	-87,100	-177,141	-65,669	-147,787	-48,943
60	-238,867	-139,904	-224,222	-120,587	-204,314	-104,966
65	-232,044	-138,672	-221,284	-123,742	-206,616	-111,291
70	-174,258	-115,376	-166,864	-104,806	-157,030	-95,740
75	-183,572	-123,884	-176,583	-115,609	-168,528	-108,293
80	-104,610	-79,124	-101,065	-74,663	-97,068	-70,656
85	-112,598	-82,548	-109,448	-79,217	-106,129	-76,147
90	-102,822	-79,815	-99,887	-77,361	-97,231	-75,053
>95	-106,875	-79,130	-104,716	-77,554	-102,639	-76,037
Fut. Generation	219,965	169,851	164,558	92,963	113,800	46,673
Percentage Difference	**78**	**78**	**64**	**64**	**73**	**73**

Source: Staff calculations

1/ Capital income tax and per capita government consumption are both reduced by 2 percent of GDP.

government (e.g., owing to fees and charges on services provided by the government). In this case, the 1995 net wealth of the government would be positive, but the general income of the government would be reduced by about 2 percent of GDP (i.e., net government consumption would be increased by an equivalent amount). As Table A5 indicates, treating the government wealth and income this way would substantially increase the relative intergenerational imbalance.

Table A5. France: Generational Accounts

Including All Government Assets 1/

	Remaining Net Tax Payments (in 1995 U.S. Dollars)					
	Discount Rate					
	3%		4%		5%	
Age in 1995	Male	Female	Male	Female	Male	Female
0	144,380	114,132	114,444	68,057	74,899	34,100
5	181,889	144,389	158,789	98,421	118,889	62,058
10	223,387	178,850	208,862	135,118	171,151	98,081
15	260,593	207,943	254,327	169,607	221,657	134,665
20	312,309	250,303	313,862	219,673	288,647	189,357
25	331,838	272,427	341,750	251,912	327,020	228,877
30	291,367	247,649	308,475	238,412	305,839	224,498
35	227,156	206,821	248,583	207,895	257,446	202,969
40	140,690	150,190	163,514	160,041	182,301	163,406
45	45,062	84,690	66,311	100,729	91,786	110,490
50	-48,644	20,261	-29,270	39,182	-1,409	52,609
55	-175,725	-68,041	-156,185	-48,754	-128,515	-33,780
60	-221,021	-124,506	-207,258	-106,734	-188,542	-92,403
65	-217,883	-126,368	-207,740	-112,508	-193,887	-100,970
70	-163,808	-106,164	-156,823	-96,278	-147,504	-87,808
75	-173,388	-115,251	-166,762	-107,469	-159,106	-100,594
80	-99,638	-74,534	-96,250	-70,305	-92,425	-66,506
85	-107,900	-78,326	-104,879	-75,155	-101,693	-72,233
90	-98,822	-76,170	-95,995	-73,824	-93,438	-71,618
>95	-103,223	-75,965	-101,138	-74,452	-99,131	-72,997
Fut. Generation	100	100	98	98	132	132
Percentage Difference	**100**	**100**	**98**	**98**	**132**	**132**

Source: Staff calculations

1/ Government net wealth is estimated at $800 billion French francs by considering non-financial government assets. Imputed yield (excedent net d'exploitation) of non-financial assets is netted out from government revenues, increasing per capita net government consumption by 2 percentage points of GDP in 1995-2002.

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