BANCA D'ITALIA

Temi di discussione

del Servizio Studi

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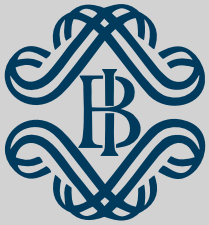

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Research Preject on Saving in Italy

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Generational Accounting: The Case of Italy

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Abstract

This paper considers the implications for existing and future generations of Italians of the current course of Italian fiscal policy. Italy has a very high debt to GDP ratio as well as a very significant social security program. these aspects of fiscal policy would, by themselves, raise concerns about the size of the burden to be passed to future generations. But the concern is compounded when one considers the demographic transition underway in Italy. Like the U.S., Japan and most other Western European countries, Italy is aging due to its low fertility rate. The implication of the aging process is that there will be relatively few young and middle age Italian workers in future years to share the burden of the Italian government's massive implicit and explicit liabilities.

To understand the size of the burden that is slated to be passed to future generations of Italians we utilize a new technique to understand generational policy: Generational accounting. Generational accounting indicates a huge difference in the projected lifetime net tax treatment of current and future Italians. Unless Italian fiscal policy is dramatically and quickly altered, future generations of Italians will be forced over their lifetimes to pay the government four or more times the amount Italians who have just been born are slated to pay given the current policy. Such large payments may not be affordable because they may exceed the lifetime incomes of those born in the future. If Italian generational policy is, indeed, on an unsustainable trajectory, those Italians who are now alive will ultimately be forced to pay much more than the amount suggested by the current policy.

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Introduction

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.[1] Generational accounting measures directly how much existing generations can be expected to pay, on net, to the government over their remaining lifetimes. The present value of the projected net payments by those now alive together with a) the government's net wealth and b) the present value of the projected net payments by future generations must cover c) the present value of government purchases/spending on goods and services. Generational accounting uses this equation -- the government's intertemporal budget constraint -- to infer the likely burden to be imposed on future generations. Specifically, generational accounting involves the projection of the present value of government spending, the calculation of the government's net wealth, and, as mentioned, the estimation of the present value of net payments to be made by current generations. The present value payments required of future generations is then determined as a residual.

Generational accounting represents an alternative to deficit accounting for purposes of understanding generational policy. Conventional deficit accounting has been criticized on a number of grounds including its failure to account for implicit government liabilities, its failure to adjust for inflation and growth, its failure to capture pay-as-you-go social security and related policies, and its neglect of policies that redistribute across generations through the change in the market price of assets[2]. While many economists have suggested adjusting the deficit to deal with these and other problems, there is a fundamental problem with deficit accounting for which no adjustment is available. This problem is the lack of an economic basis for

the tax and transfer labels that are attached to government receipts and payments. Unfortunately, the deficit depends on which labels/words are chosen to describe government receipts and payments and, as such, is entirely arbitrary.

For example, the government is free to label workers' social security contributions "taxes" and retirees' social security benefits "transfers;" alternatively, it is free to label these contributions "loans" to the government and to label retirees' benefits "return of principal and interest" on these "loans" plus an additional "old age tax" equal to the difference between benefits and the "return of principal plus interest" on the "loans." Using the second set of words rather than the first to describe the same economic reality changes not only the level of the reported deficit, but also the sign of its changes over time. This is not an isolated example; every dollar the government takes in or pays out is arbitrarily labeled from an economics perspective.

Correcting the deficit for one or more of its alleged shortcomings does not, in the end, avoid its primary shortcoming -- this labeling problem -- and eventuate in the measure of a well-defined economic concept. Rather it simply replaces one deficit based on arbitrary labels with another (see Kotlikoff (1989)).

Generational accounting deals naturally with all of the concerns that have been raised about deficit accounting. It takes account of inflation and growth, including growth due to demographic change. It puts implicit and explicit government liabilities on an equal footing, and thus avoids the danger of missing most of generational action by considering only those liabilities labeled as official liabilities by the government. Indeed, generational accounting captures all policies that alter the generational

distribution of fiscal burdens. Most importantly, generational accounting provides the answer to an important economic question, namely whether the government's course of fiscal policy, unless modified, will necessitate that future generations pay a much larger share of their lifetime incomes to the government than will current generations. Thus generational accounting exposes the generational imbalance in fiscal policy.

Italy represents one country for which there should be acute concern about the generational imbalance in fiscal policy. Italy has one of the most generous pay-as-you-go social security and welfare systems of any of the leading industrialized countries. In addition, after Belgium, Italy has the highest ratio of officially labeled debt to GNP ratio. Finally, its fertility rate is one of the lowest of the industrialized countries. The low Italian fertility rate implies a declining number of Italians available to shoulder Italy's huge implicit and explicit obligations.

This paper develops a set of generational accounts for Italy. It indicates that there is an extremely serious imbalance in Italy's generational policy. Unless Italy makes dramatic policy changes in the near future, future generations of Italians will face lifetime net tax burdens that are four or more times the burdens facing Italians who have just been born. This estimate takes into account the fact that future Italians will have higher incomes because of economic growth. The tripling or more of the net tax burden is, therefore, above and beyond the increase in net taxes that will arise because of growth.

The paper proceeds by first describing general features of the Italian fiscal system and Italian demographics. Section II describes the method of generational accounting. Section III details the data used in our analysis. The fourth section presents baseline generational accounts for Italy for 1990.

and explores the sensitivity of the accounts to growth rate, interest rate, and fertility assumptions. The fifth section compares the Italian generational accounts with those for the U.S. Section VI examines the factors causing the highly significant imbalance in Italian generational policy. The seventh section considers alternative methods of equalizing the growth-adjusted fiscal burden on future and current Italians, while section VIII discusses the likely effect of such policy initiatives on Italian national saving. The final section summarizes our findings.

I. Italian Fiscal Policy and the Italian Demographic Transition

Measured relative to GNP, the Italian government is much larger than are the government sectors in the U.S. and Japan. However, the Italian government is not large when compared with governments of other continental European countries. As can be seen from Table 1, total government budgetary expenditures as a share of GDP are in line with those of Germany and France, but are some 15 to 20 percentage points higher than those of the U.S. and Japan. The larger expenditure/GDP ratio is explained almost entirely by the greater importance of social security expenditures (19 percent of GDP as compared with 12 and 10 percent in the U.S. and Japan, respectively), and of interest payments (9 percent of GDP, as compared with 5 and 4 percent in the U.S. and Japan, respectively). The ratio of tax revenue and social security contributions to GNP, while higher than in the U.S. and Japan, are in line with those observed in Germany and far lower than in France.

Transfer payments to households and firms dominate the Italian general government budget: in 1990, the social security system and interest payments constituted 58 per cent of the total budget. The largest expenditure item in the Italian general government budget is public pensions (26 per cent of the

budget), followed by government wage and salary payments (24 per cent), and interest payments (18 per cent). The public pension system is based on a pay-as-you-go scheme, with contribution rates and benefits varying for private and public workers. The Italian welfare system covers other important aspects of life, such as universal health care assistance, unemployment compensation and a heavily subsidized education system.

The Italian government raises its revenues mainly through direct taxes and payroll taxes. In 1990, each of these taxes raised 37 per cent of overall revenue. The most important direct tax is the progressive personal income tax, which is applied to all income sources except for interest income. Interest income is taxed at a flat rate, currently 30 per cent for bank deposits and 12.5 per cent for government bonds. Capital gains are taxed at a favorable rate in the case of real estate and are virtually tax exempt in the case of stocks and shares. Corporate taxes are levied at a high nominal rate (over 46 per cent[3]), although generous depreciation allowances and a plethora of exemptions reduce the effective tax rate, particularly for manufacturing industries. Relative to the U.S., a substantial fraction of revenues (26 percent for Italy compared with 18 percent for the U.S.) is collected through indirect taxation, particularly the VAT and taxes on petroleum products.

Since the mid-sixties, Italian fiscal policy has been characterized by deficit spending. The absorption of government bonds into private portfolios has been eased by the large propensity to save of Italian households, an underdeveloped financial market, and, until the mid-eighties, legal restrictions on capital movements. Until the early-eighties, the growth of public debt has been damped by low, and often negative, ex-post real interest rates. Since 1984, however, the Italian real interest rates on government debt have exceeded Italian growth rates, putting the growth of public debt on

an unsustainable path. The Italian government has laid out several medium-term plans for halting the growth of public debt, but deficit reduction has repeatedly fallen short of official targets. Although the primary deficit has been reduced since 1986, the government has been unsuccessful so far in running a primary surplus sufficiently large to keep interest payments from growing faster than the economy.

The size and the structure of the Italian population is also expected to experience substantial changes. Although the Italian population has been growing, albeit slowly, in recent years, the Italian fertility rate has been below replacement since 1970's. The Italian total fertility rate, which was 2.7 in the mid-sixties, fell to 1.7 in 1980 and 1.3 in 1990 -- one of the lowest rates among industrialized countries. The remarkably low Italian rate of fertility portends important changes in the size and distribution of the Italian population. Table 2 reports these projected changes based on two fertility assumptions. Under the first the fertility rate gradually rises over the next decade to the level (around 2.1) required for replacement of the population. Under the second the fertility rate moderately recovers from the current exceptionally low value and reaches from 1991 the EC value (around 1.6). The Italian population is projected to fall under both fertility rate scenarios. Under the first assumption -- replacement rate fertility -- the Italian population falls by 8 percent by the 2050, and by 9 percent by the 2200. Under the second assumption -- fertility constant at the EC average value -- the Italian population falls by 27 percent by 2050, and by 84 percent by 2200!

Both fertility assumptions imply a rapid aging of the Italian population. Currently, 17 percent of Italian males and 23 percent of females are aged 60 and older. By the turn of the century 20 and 26 percent of respectively

Italian males and females will be in this age group under both fertility assumptions. By 2030 over 23 percent of the Italian males and 29 percent of females population will be 60 and older if the fertility rate rises to the replacement value, and 26 and 32 percent respectively will be 60 and older if the fertility rate remains constant at the EC average value. Since a large fraction of government's transfers are allocated to older age groups, the maintenance of current entitlements implies that current demographic trends will put increasing pressure on government spending.

II. The Method of Generational Accounting

To clarify the method of generational accounting, we write the government's intertemporal budget constraint for year t as:

$$(1) \qquad \sum_{s=0}^{D} N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} = W^{g}_{t} + \sum_{s=t}^{\infty} G_{s} \prod_{j=t+1}^{s} \frac{1}{(1+r_{j})}$$

The first term on the left hand side of (1) adds together the present value of the remaining lifetime net payments of all generations alive at time t. By net payments we mean all taxes paid to and all transfers received from general government (central and local government as well as independent government agencies such as the Italian Social Security System). The expression $N_{t,k}$ stands for the time t present value of remaining lifetime net payments of the generation born in year k. A set of generational accounts is simply a set of values of $N_{t,k}$ divided by $P_{t,k}$ (the generation's current population size in the case of existing generations or initial population size in the case of future generations), with the property that the combined total value of the $N_{t,k}$s adds up to the right hand side of Equation (1). In our calculation of

the $N_{t,k}$'s for existing generations (those whose $k \leq 1990$) we distinguish male from female cohorts, but, to ease notation, we omit sex subscripts in Equations (1) and (2).

The term $N_{t,k}$ is defined by:

$$(2) \qquad N_{t,k} = \sum_{s=\max(t,k)}^{k+D} \bar{T}_{s,k} P_{s,k} \prod_{j=t+1}^{s} \frac{1}{1+r_j}$$

In expression (2) $\bar{T}_{s,k}$ stands for the projected average net payment to the government made in year s by a member of the generation born in year k. By a generation's average net payment in year s we mean the average across all members of the generation alive in year s of payments made, such as income, payroll, and indirect taxes, less all transfers received, such as social security, welfare, and unemployment insurance. 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 prior to year t, the summation begins in year t. For generations who are born in year k, where $k>t$, the summation begins in year k. Regardless of the generation's year of birth, the discounting is always back to year t. In dividing the total present value payments of each generation (the $N_{t,k}$s) by the generation's population size we are, in effect, discounting for mortality; note that dividing the term $P_{s,k}$ in Equation (2) by the generation's base year population size forms a survival probability.

Returning to the first term in Equation (1), the index s in the first summation runs from age 0 to age D, the maximum age of life. The first element of this summation is $N_{t,t}$, which is the present value of net payments of the generation born in year t; the last term is $N_{t,t-D}$, the present value of remaining net payments of the oldest generation alive in year t, namely those born in year t-D.

The second term on the left hand side of (1) adds together the present value as of time t of net lifetime payments of future generations. The right hand side consists of W^g_t, the government's net wealth in year t, plus the present value of government expenditures on goods and services. In the latter expression, G_s stands for government expenditure on public goods and services in year s, and r_j stands for the pre-tax rate of return in year j.

Equation (1) indicates the zero-sum nature of intergenerational fiscal policy. Holding the right hand side of Equation (1) fixed, a decrease in the present value of net taxes paid by existing generations (a decrease in the first term on the left hand side of Equation (1)) requires an increase in the present value of net taxes paid by future generations (an increase in the second term on the left hand side of (1)).

To determine the aggregate present value net payments required of future generations we simply solve Equation (1) for the second term on the left hand side. While future generations, as a group, can be expected (given current policy) to pay this derived amount, there are many ways this collective burden may be allocated between those generations arriving in the future. For purposes of illustrating the size of the burden that will likely be imposed on future generations relative to that imposed on current generations, we assume that the burden on each successive generation remains fixed as a fraction of the lifetime income of that generation; that is, the absolute fiscal burden of successive generations is assumed to grow at the rate of growth of their lifetime incomes, which we take to be the rate of growth of productivity.

The construction of generational accounts involves two-steps. The first step entails projecting each currently living generation's average taxes less transfers in each future year during which at least some members of the generation will be alive. The second step converts these projected average

net tax payments into a present value using an assumed discount rate and taking into account the probability that the generations' members will be alive in each of the future years (i.e., we discount for both mortality and interest).

In projecting each currently living generation's taxes and transfers, we consider first their taxes and transfers in the base year, in this case, 1990. The totals of the different taxes and transfers in the base year are those reported by the Italian National Accounts. In using these data we are using the same fiscal aggregates that underlie the conventionally calculated Italian general government deficit. These totals of base year taxes and transfers are distributed to the different generations according to their ages and sexes based on the Bank of Italy's Survey on Households' Income and Wealth (henceforth SHIW) and the Survey of Consumer Expenditures by ISTAT (henceforth CES). Future taxes and transfers by age and sex are assumed to equal their 1990 values with adjustments for growth. The calculations presented here are based on yearly projections up to year 2200. Three different interest rate and growth rate assumptions have been made, centered around our base case assumption of a 5 percent real interest rate and a 1.5 percent rate of productivity growth.

As mentioned, inferring the fiscal burden on future generations requires not only knowing the sum total of generational accounts of current generations, but also the government's initial net wealth position and the projected present value of the government's spending on goods and services. While in principle a measure of total net wealth is required, an estimate of net financial wealth has been used, owing to the difficulties of assessing the value of real non-marketable wealth[4]. The government's net financial wealth is estimated in a manner consistent with the general government deficit

reported in the National Accounts[5]. The present value of non education and non health government spending on goods and services is projected assuming that the per capita level of this spending remains constant in the future except for an adjustment for growth. We treat education and health spending differently from other government spending. These expenditures represent purchases of goods and services by the government on behalf of specific age groups. We treat these expenditures, in effect, as additional age-specific transfer payments. That is, our estimates of the present value of net payments by current generations are net of the projected value of education and health spending on these generations.

Taxes on capital income require special treatment. Unlike other taxes, taxes on capital income may be capitalized into the value of existing (old) assets. Take, as an example, an increase in the nominal capital income tax rate in the presence of a provision that permits firms to immediately deduct from taxable income their new investment. As described in Auerbach and Kotlikoff (1987) and by other economists, this will lead to a fall in the market value of existing capital. While owners of existing capital will be hurt by the capital loss, new investors in capital will be unaffected by the increase in the nominal capital income tax. If they buy existing capital the decline in the price of that capital will just make up for the higher tax on the future income to be earned on the existing capital. If they buy new capital, the larger immediate deduction (the amount of the deduction is proportional to the tax rate) makes up for having to pay higher taxes on the future income earned on the new capital.

In this example, it would clearly be inappropriate to charge the higher capital income tax against the generational accounts of new investors (who, by the way, are typically young and middle age) rather than to the generational

accounts of the owners of existing capital (who, by the way, are typically old). Instead, generational accounting ascribes to the owners of existing assets all inframarginal taxes capitalized in the price of their assets. As discussed at more length in Auerbach, Gokhale, and Kotlikoff (1991), owners of existing assets can be viewed, from the perspective of generational accounting, as owning assets valued at replacement cost (rather than market value), but owe a tax equal to the value of the inframarginal taxes capitalized into the market value of the asset.

III. Data Sources and Data Construction

Chart 1 reports the age and sex profiles for the appropriation account of the General Government, as well as those relative to private net wealth, income, consumption and the propensity to consume out of wealth. Separate profiles are derived for males and females in each of the 91 cohorts. The relative profile is obtained by benchmarking individual positions against a forty years old male.

In order to calculate the generational accounts, the receipts listed in the appropriation account for general government have been broken down into taxes on capital, labor, and commodities, social security contributions, and other revenues. To determine the aggregate amount of taxes on capital and labor income we allocate total income tax revenue to capital and labor according to their shares of national income. The payments in the appropriation account have been broken down into spending on health, education, pensions, unemployment benefits, household responsibility payments, other social security transfers, and other programs. The aggregate 1990 values of each of these different payments and receipts are allocated by age and sex according to cross section age-sex profiles, which are assumed to be

constant through time apart from an age/independent shift to account for growth in the economy. Thus, while relative receipts and payments across age groups do not vary over time, their absolute amount grow at the economy's rate of growth.

Income and consumption profiles have been computed from SHIW. As the survey records personal after tax income, the amount of labor taxes paid on this personal income was derived by applying the methodology developed in Franco and Sartor (1990). The profile for social security contributions has been derived by applying nominal social security tax rates to the estimated profile of gross-of-tax individual labor income taxes, taking into account the industry, type of worker, and region of work.

Revenue from direct taxes on capital has been separated into marginal and inframarginal taxes, according to the methodology outlined in Auerbach, Gokhale, and Kotlikoff (1991). The relevant tax parameters have been calculated based on estimates and data reported in Giannini (1989). We estimate that inframarginal taxes represent 36 per cent of total corporate tax revenue. Marginal and inframarginal taxes on capital were imputed to each member of the cohort in proportion to his/her holdings of gross wealth (excluding real estates).

The age and sex profile for net indirect taxes was obtained by applying nominal consumption tax rates to each of the 185 goods surveyed in the ISTAT CES. In the case of excise duties, the implicit rate of taxation has been obtained by dividing the unitary tax by the average price of the good. Since the survey records household, and not individual consumption, it was necessary to impute total household consumption of each good to each member of the household. With the exception of consumer durables and those items whose consumption is age-specific (such as toys or education fees), all consumption

expenditures were imputed assuming that each member receives an equal share of total household consumption. In the case of rents, the amount imputed to young household members (aged 18 or less) was set equal to half the amount imputed to adults. Consumer durables have been imputed only to adult members of the family.

On the benefit side, the age profiles for health expenditure were obtained from hospital and ambulatory care utilization profiles and from pharmaceuticals consumption profiles, as described in Franco (1992). For education, profiles were obtained using the data on the Ministry of Education's expenditure per student in each educational level (from infant school to university). Unemployment and short term disability benefits and sick pay were imputed to citizens aged 20 to 59, assuming constant per capita payments. Maternity benefits were imputed to females aged 20 to 39. Severance pay provisions were imputed to citizens aged 55 to 65. In both cases, constant per capita payments were assumed. For pensions, profiles were obtained from the SHIW[6], while the profiles for households' responsibility payments are those estimated by Franco and Sartor (1990).

IV. Baseline Generational Accounts and Sensitivity Analysis

Table 3 presents the baseline generational accounts for males and females at every fifth age for nine different combinations of growth and interest rates. The table assumes, perhaps optimistically, that in year 2000 the Italian fertility rate will reach the level required to stabilize the Italian population (the replacement rate fertility assumption of Table 2). All amounts are in 1990 dollars[7]. The accounts indicate the average amount an individual in the specified age-sex group will pay in net taxes over the rest

of his/her life. For example, assuming a real interest rate of 5 percent and a growth rate of 1.5 percent, the projected present value net payments of 40 year old males and females are $95,500 and $6,300, respectively. Females pay much less labor income and social security taxes because they earn less. Notice that males age 50 and over and females age 45 and older have negative generational accounts. They can expect to receive, in present value, more in future transfers than they can expect to pay in taxes. The size of the generational accounts first rise and then fall with age. This reflects the fact that young children are years away from their peak tax paying years, while older individuals are in or near their retirement years in which they are on the receiving end of the government's tax and transfer programs.

To better understand the numbers in Table 3, consider Table 4 which decomposes the generational accounts into the present values of each of the various tax payments and transfer receipts. In the case of 40 year old males their generational account of $95,500 represents the difference between $224,500 in the projected present value of future taxes less $129,000 in the projected present value of future transfers. For 40 year old females their $6,300 reflects $129,600 in projected taxes in present value less $123,300 in projected transfers in present value. For 40 year old males the largest payment item is social security contributions, while for 40 year old females the largest payment item is labor income taxes. On the receipt side, the largest component for both males and females is social security pensions.

In addition to detailing the remaining lifetime payments of current generations, Table 3 indicates in the next to last row the payment required of the generation born in 1991 assuming it as well as all future generations pay the same amount except for growth. If the Italian government's fiscal policy were generationally balanced, the amount Italians born in 1991 would pay would

equal the amount newborns in 1990 pay times (1+g), where g is the growth rate. The last row in Table 3 indicates the percentage difference between the amount newborns pay in 1990 times (1+g) and the amount Italians born in 1991 pay under our illustrative assumption of equal growth-adjusted treatment of future Italians. Note, that in the calculation of the burden on future generations we assume that the ratio of the burden of future males relative to that on future females is the same as the ratio of the accounts of newborn males to that of newborn females; i.e., we assume that in the future males will be treated by the fiscal system relative to females in the same manner as newborns are slated to be treated.

The comparison of the first and next to last rows in Table 3 show a huge imbalance in the generational stance of Italian fiscal policy. For the nine combinations of interest and growth rate assumptions the percentage difference in the treatment of future Italians compared to 1990 newborn Italians ranges from 173.6 percent to 604.2 percent; i.e., depending on assumptions, future Italians will pay, in present value, somewhere between 2.7 and 7.0 times the amount the newborn Italians are expected to pay, given current policy. Under our base case assumptions of a 5 percent real interest rate and a 1.5 percent rate of growth, future Italians pay almost 4 times what 1990 newborns pay.

As the table indicates, which values one assumes for the interest rate and growth rate has an important effect on the size of the generational accounts. The extent of the generational imbalance is also quite sensitive to the growth and interest rate assumptions. The higher the interest and growth rates, the larger the absolute value of the generational accounts. Higher interest rates increase the percentage difference in accounts of current and future newborns, while higher growth rates do the opposite.

While the generational policy imbalance indicated in Table 3 is extremely large, it may, nonetheless, represent an underestimate of the problem for the following two reasons. First, the pension system has not yet reached full maturity. Second, the figures in Table 3 are based on the replacement rate fertility assumption. If we instead calculate the burden on future generations based on the assumption of a nearly constant fertility rate (to be precise, constant age-specific fertility rates), the percentage difference in the net lifetime payments of future and newborn Italians rises from 292.5 percent to 365.9 percent. Note that changing the assumption about future fertility leaves unchanged the generational accounts of current generations.

V. Comparing the Italian and the US Generational Accounts

It may be instructive to compare the Italian base case generational accounts with the U.S. generational accounts computed under the same assumed interest and growth rates assumptions. Table 5 does just this. There are a number of interesting differences between the Italian and American accounts. First, the generational policy imbalance is much smaller in the U.S. than in Italy. The percentage difference in the treatment of future generations relative to current newborns is 292.5 percent for Italy, but only 28.6 percent for the U.S. Future Italian males (females) will pay $259,500 ($56,300) compared to $104,100 ($14,100) for future American males (females).

While future Italians pay more, young and middle age Italians are slated to pay less than their American counterparts. In the case of 40 year old American males, the remaining lifetime net tax bill is over twice the corresponding bill for 40 year old Italian males. The larger Italian generational imbalance is also reflected in the age at which net payments break even. In the case of both Italian males and females, the break-even age

(viz. the age at which gross payments to the government equal benefits received) is ten years less than the breakeven ages for American males and females. This phenomenon is largely explained by the greater generosity of the Italian pension system relative to that of the U.S. Compare, for example, the -$111,200 generational account of 70 year old Italian males with the corresponding -$49,000 generational account for 70 year old American males.

A final interesting difference between the Italian and American generational accounts is the situation of males relative to females. While Italian policy provides older females with more net payments than does American policy, it extracts somewhat larger net payments from younger females and much larger net payments from future females.

VI. Understanding the Generational Imbalance in Italian Fiscal Policy

Much of the generational imbalance in Italian fiscal policy reflects the pending demographic transition. Under the base case interest and growth rate assumptions, the percentage difference in the treatment of future and newborn Italians falls by more than half (126.8 percent compared with 292.5 percent) if the Italian population is assumed to experience no demographic change in the future. By no demographic change we mean that the number of Italians in each age-sex group in future years would equal the corresponding 1990 number of Italians.

A second very important factor in explaining the generational imbalance is the large level of Italian debt relative to GNP. As mentioned in section I, since the mid-eighties the Italian public debt is on an unsustainable path. For example, Blanchard et al. (1990) estimated that the gap between the actual primary balance and the level required in 1989 to avoid a debt to GNP runaway was equal to 5.2 percent of GDP. The effect of the large amount of debt on

generational accounts has been estimated by assuming, counterfactually, that the Italian debt is zero. In this case, the percentage imbalance in generational policy declines from 292.5 percent to 189.2 percent. This exercise indicates that while the government's debt accounts for about one third of the imbalance in generational policy, most of the imbalance in policy has nothing to do with officially labeled government debt. This illustrates the point that sole focus on debt can be highly misleading for assessing a government's generational policy.

A third critical factor underlying the generational imbalance in policy is the scale of Italy's social security system. To see the importance of social security, suppose that pension benefits were immediately and permanently reduced by 20 percent. In this case the generational imbalance would decline from 292.5 percent to 153.3 percent.

Table 6 summarizes the effects on the generational policy imbalance of these three counterfactual experiments. It also considers alternative combinations of these experiments. If any two of the three experiments are combined, the 292.5 percent generational imbalance falls to between 50.6 percent and 60.1 percent. Thus, the generational policy imbalance is so great that even the consideration of two dramatic reversals of circumstances is insufficient to close the gap between the fiscal treatment of current and future Italian newborns. If, on the other hand, all three experiments are combined, the gap is closed; indeed, it is more than closed. Future generations end up paying 12.4 percent less than current generations.

The imbalance in generational policy exposed here has been partially explored in a number of recent studies considering the future finances of the Italian social security system. In 1986, the Treasury Technical Committee on Public Expenditure (Franco and Morcaldo (1986)) projected a very substantial

rise in the theoretical equilibrium social security tax rate (i.e., the ratio of total pension benefits to total income subject to pension contribution) for the Employee Pension Fund. Recent estimates by the National Institute for Social Security (INPS (1991)) and the State Accounting Office (Ragioneria Generale (1991)) have concurred on the seriousness of the problem. INPS projects the rate to rise from 39.5 in 1990 to 45 percent in 2010. The State Accounting Office put the rate at 48 percent in 2010 and 57 percent in 2025.

VII. Alternative Tax Policies to Restore Generational Balance

An alternative way to understand the magnitude of the generational imbalance is to consider the size of the immediate and permanent increase in alternative tax rates required to restore generational balance. Consider, for example, the immediate and permanent increase in the average labor income tax rate from its current value of 12.4 percent to 21.4 percent. This huge increase is just sufficient to restore generational balance. As indicated in the first column of Table 7, raising the income tax in this manner raises the generational accounts of all current generations. For middle age males net lifetime payments rise, in present value, by anywhere from $30,000 to $60,000. For middle age females net lifetime payments rise, in present value, by anywhere from $20,000 to $35,000. The large additional payments of these and other currently living generations permit a significant decline in the fiscal burden of future generations. In the case of males the decline is $161,700, and in the case of females it is $19,200.

Of course, raising labor income taxes is not the only way to restore generational balance. Columns two, three, and four in Table 7 show the changes in generational accounts if social security contributions, capital income taxes, or indirect taxes, respectively, are raised to correct the

generational imbalance. While the impact on future generations is fairly similar regardless of which tax is increased, the distribution of the additional burden across current generations is quite sensitive to the choice of tax instrument. Compare, for example, rectifying the generational imbalance by raising social security taxes with the alternative of raising capital income taxes. For Italians age 60 and over the former policy involves a very small increase in their remaining lifetime payments, while the latter policy involves a significant increase. This difference simply reflects the fact that older Italians are, in the main, retired, and pay very little in social security taxes. On the other hand, they pay a significant share of capital income taxes reflecting their considerable share of total Italian wealth.

Since an immediate and permanent increase in tax rates that restores generational balance seems unlikely, Table 8 explores more realistic, although still quite painful initiatives that would close the gap between the treatment of future and current generations. The table shows the change in generational accounts resulting from three different policies. The first involves an equal revenue switch from social security payroll taxation to indirect taxation[8]. The second involves a 63 percent increase in income tax rates for 10 years which would lower the Italian debt to GDP ratio to about .6 by the turn of the century. A debt to GDP ratio of .6 is one of the requirements proposed by the EC for participation in the European monetary union. The third policy involves a gradual reduction in social security pension benefits[9]. According to this policy pensions would ultimately be reduced by 20 percent, but the reduction would occur over a 10 year period, with benefits being reduced by 2 percent per year.

The first policy of replacing social security payroll taxation with indirect taxation has little effect on the percentage difference in the treatment of future and newborn Italians, but it does redistribute substantial sums between males and females. Males pay a much larger share of total payroll taxes than do females, reflecting their larger share of total labor earnings. In contrast, the male share of indirect tax payments is quite close to the female share. Hence, switching from payroll to indirect taxes moves the fiscal system away from a tax paid primarily by males toward a tax paid by both males and females. In the case of 40 year old males this "revenue neutral" change in tax bases reduces their remaining lifetime net tax bill by $37,500, while it increases the bill of 40 year old females by $26,700. Future males also benefit greatly by this provision, but this gain to future generations of Italians is almost completely offset by the loss to future females.

The second policy of reducing the ratio of public debt to GDP from .9 to .6 reduces the percentage difference in the treatment of future and newborn Italians by raising the net payments of all currently alive Italians, with the exception of the newborn. The percentage gap in the treatment of future and newborn Italians is reduced from 292.5 percent to 204.7 percent. The adjustment is mainly born by middle-age individuals, who are close to their peak income tax paying years.

The third policy of gradually cutting social security benefits by 20 percent is more effective than the previous one in reducing the intergenerational imbalance. Its intragenerational effects are also different. This policy redistributes substantial sums from existing older Italians toward younger and future Italians. The percentage gap in the treatment of future and newborn Italians is reduced from 292.5 to 170.4

percent. Sixty year old males pay $22,900 more, while sixty year old females pay $19,900 more. The growth-adjusted benefit to future male Italians is $68,100; it is $6,200 for future females.

VIII. The Impact on National Savings of Alternative Tax Policies

This section considers the likely impact effects on national savings of the various fiscal policy experiments described in the previous section. Specifically, for each policy we first multiply each living generation's marginal propensity to consume out of lifetime resources by the projected policy-induced change in its account. We then sum these products across all living generations to determine the aggregate change in consumption.

Let Xc_k be the marginal propensity to consume out of lifetime wealth for a typical member of the generation born in year k, and $\Delta N^j_{t,k}$ the present value change in the remaining lifetime net payments of the generation born in year k induced by policy j (where j ranges from 1 to 7, corresponding to the policies described in table 7 and in table 8). Then the effect on national saving at time t when the policy is implemented, is equal to:

$$\Delta S^j = \sum_{s=0}^{D} Xc_s \Delta N_{t,t-s}$$

That is, the increase in national saving is equal to the reduction in the consumption of all generation alive at time t.

To compute the marginal propensities to consume out of lifetime resources we have first estimated lifetime wealth for each individual born in year k. Our methodology here is outlined in the Appendix. Under the assumption of

homothetic preferences marginal and average propensities coincide and are estimated by the average ratio of current consumption of each individual in an age/sex cohort to his/her lifetime resources. The last rows of Table 7 and Table 8 report the net national saving rate, as a percentage of net national income, induced by the corresponding policy. Recall that the net national saving rate in 1990 was around 8.6 per cent. Hence, the effect of the policies of these tables is to more than double the national saving rate.

The four policies described in Table 7 call for a reduction in the consumption of the existing population ranging from 10 to 12 per cent, a considerable sacrifice. However, since the various policies are differently distributed across age and sex, they have also different implications for the level of total current consumption and national savings. Thus, restoring generational balance through indirect taxation or raising taxes on capital has the largest impact on national saving, while increasing social security contributions has the smallest effect.

The policies described in Table 8 have a smaller impact on national saving. In the case of switching from social security taxation to indirect taxations, national saving in the initial year increases by a 2.3 percentage points. It rises by 4.4 percentage points if social security benefits are reduced by 20 per cent over 10 years, and it rises by 3.6 percentage points in the case we reduce the debt/GNP ratio to .60 in 10 years.

IX. **Summary and Conclusion**

There is a very serious imbalance in Italy's generational policy. Unless major and quite painful steps are taken and taken soon, future generations of

Italians will be forced to pay over their lifetimes four or more times the net taxes expected to be collected from current young Italians. This generational policy imbalance reflects the combination of the explicit liability to service huge amounts of government debt and the implicit liability to pay substantial sums to existing generations in the form of pension and health benefits. Were there a large projected number of future Italian workers to share these burdens, these liabilities would be less troubling. But the Italian population is rapidly aging and declining.

There are a large variety of fiscal measures that can be used to bring Italian policy into generational balance. For example, one could raise income taxes. The current average rate of taxation on total income (capital plus labor income) is 14 percent. To bring Italian policy into generational balance would require immediately and permanently raising the average income tax rate to 23 percent. Precisely which fiscal measures are taken and how quickly they are implemented will determine how the burden of adjusting to generational balance will be distributed over different cohorts of Italians. One thing, however, is clear. The longer the delay in making the adjustment to a balanced course of policy, the larger will be the generational imbalance that needs to be addressed. In our base case calculations, future generations will pay four times more than current newborn Italians if all the adjustment is forced on future Italians. But this calculation assumes that those Italians born in the immediate future will share in the larger lifetime net tax burden. Suppose, instead, that the next 10 generations of Italians are left off the hook and treated in the same manner as current newborn Italians are projected to be treated. Then generations of Italians born after the turn of the century will be left with a growth-adjusted lifetime net tax bill that

is five rather than four times larger than the bill facing current Italian newborns.

Even a four times larger lifetime generational account for future generations may be infeasible because the required net payments may exceed the present value of these generations' labor earnings. If this is indeed the case, then policy will have to be adjusted in a manner that raises the lifetime net payments of Italians now alive.

Notes

[1] See also Auerbach, Gokhale, and Kotlikoff (1991)

[2] Consider a policy which lowers the market price of an asset, such as a tax on land. Since the sellers of land are, on average, older generations and the purchasers of land, are, on average, younger generations, such a policy redistributes between the old and the young. The physical land is unchanged, but the old are forced to sell their same land at a lower price to the benefit of the young purchasers of land.

[3] As from 1991, the corporate tax rate is 47.826 per cent.

[4] The derivation of a correct measure of non-financial wealth is an extremely complex task, as it involves adjusting the general government appropriation account through the following steps:

i) assessment of the market value of general government's real assets, including historic buildings and building sites as well as loss-generating public enterprises;

ii) inclusion among current costs of market rents of those assets (such as Government buildings) currently used by general government;

iii) exclusion from revenues of profits, dividends and other incomes currently earned on assets.

[5] More precisely, a measure of net financial wealth has been derived by capitalizing net interest payments (i.e. interest payments minus interest income) at the nominal interest rate before tax on newly issued government bonds (currently around 12 per cent). According to this measure, net debt in 1990 was equal to 77 per cent of GDP.

[6] It should be noted that the Italian pension system has not yet reached full maturity. The ratio of the average pension benefit to per capita GDP is likely to increase significantly in the future.

[7] The exchange rate used for calculation was 1,257 lire per dollar.

[8] More precisely, the average indirect tax rate has been increased to the level required to offset the revenue loss arising in the base year from the reduction in the social security tax rate. In the following years, revenue neutrality need not occur.

[9] As previously noted, the ratio of the average pension benefit to per capita GDP is likely to increase in the absence of policy action.

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Appendix

The estimation of lifetime resources and of the marginal propensity to consume

Lifetime resources at time t for an individual born in year k is the sum of nonhuman plus human wealth. Human wealth is defined to include not only the present value of after-tax future earnings, but also the present value of social security benefits, i.e. the level of pension wealth. Of course, for a retired individual human wealth is equal to the value of pension wealth. To estimate lifetime resources we have used the 1989 SHIW, which contains information on the value of household net worth, earnings and pension income, and personal characteristics such as age, sex, years of education, occupation etc.

The overall sample of income recipients (14,552 observation) was split into two parts. The first includes only working persons over age 16 years and below 60 (the retirement age is 55 for women); the second group includes retired people aged over 60 (55 for women) and below 91 (maximum length of life) whose income comes only from social security benefits. The pension wealth of the last group was computed by taking the present value of social security benefits on the assumption that benefits are constant up to death at the value currently observed for each single person.

To account for the rapidly increasing probability of death after average life expectancy has been reached, the discount rate in the computation of the pension wealth portion of lifetime resources has been set equal to 12 per cent.

For the first group, pension wealth has been computed following the previous procedure after setting the level of social security benefits at 80

per cent of the projected earnings at age 60 (see below) on the assumption that all members of the male labour force retire at 60 (55 for female members). To compute the other portion of human wealth we have first fitted a WLS regression of current earnings against a vector of demographic characteristics and a second order polynomial in age to allow for cohort effects (see Table 9).

For an individual born in year k the fitted value of earnings a t is:

$$Y_{t,k} = bX_k + a(t - k) + a_1(t - k)^2$$

where X_k is the vector of characteristics of the specific individual aged t − k. Projected earnings j years ahead are computed as

$$Y_{t+j,k} = [bX_k + a(t+j-k) + a_1(t+j-k)^2] \ (1+g)^j$$

where g is the rate of growth of productivity (1.5 per cent per year). Thus, the present value of earnings is given by

$$H_k = \sum_{i=\,t-k}^{60} (1 + r)^{(t-k)-i} \ y_{t+i-(t-k)}$$

where (1 + r) is the discount rate set at 5 per cent.

For each individual lifetime wealth is then obtained adding together his/her human wealth and his/her share of the household net holdings of real and financial assets, according to the method of division defined in Section III.

For individuals below age 16 we have assumed that they own only human wealth. The last has been computed by assuming that they enter the labour force at age 17 and taking the average human wealth of the individuals aged 17

and discounting it back appropriately. Thus, for example, for those aged 10, lifetime resources are given by $(1 + g)^7(1 + r)^{-7} H_{17}$, where H_{17} is the average value of human wealth of working individuals aged 17.

For young dependents (aged below 28) which have not yet started to work, we have assumed that they start working within a year and we have imputed to them the human wealth of those working individuals one year older, adjusting for growth and discounting.

Finally, given lifetime wealth and consumption for each single individual in the sample, the average and marginal propensity to consume have been computed by dividing the consumption of each single cohort (imputed according to the methodology described in Section III) by the cohort average lifetime resources. The age pattern is shown in Chart 1 separately for males and females.

Table 1

Comparative Fiscal Ratios in 1989

Ratio	Italy	U.S.	Japan	Germany	France
Taxes/GDP[a]	37.8	30.1	30.6	38.1	43.8
Total Outlays/GDP	51.7	37.3	32.1	45.2	49.5
Direct Spending/GDP[b]	20.3	20.1	15.4	21.0	21.5
Transfers/GDP[c]	21.4	12.6	12.6	20.4	25.0
Interest Payments/GDP	9.0	4.9	4.1	2.7	2.8
Deficit/GDP	10.1	1.7	-2.5	-.2	1.2
Net Debt/GDP	95.9	30.8	14.6	22.4	24.7
Social Security & Education/GDP[d]	24.0	17.3	14.8	24.1	28.4
Pensions/GDP	12.8	7.2	5.3	11.8	12.7
Health/GDP	5.4	4.4	4.8	6.4	6.8
Unemployment/GDP	.7	.4	.4	1.5	2.8
Education/GDP	5.1	5.3	4.3	4.4	6.1

[a] Including social security contributions
[b] Purchases of goods and services including investment goods
[c] Non interest transfers on current account
[d] Data refer to 1985

Table 2

Projected Size and Age-Sex Distribution of the Italian Population

Fraction of Males in Specified Age Groups

	Replacement Rate Fertility				Average EC Fertility			
Age	1990	2010	2030	2050	1990	2010	2030	2050
0-17	.230	.231	.231	.245	.230	.207	.186	.181
18-25	.133	.096	.106	.109	.133	.099	.089	.093
26-49	.339	.347	.296	.321	.339	.357	.317	.312
50-59	.122	.129	.132	.118	.122	.132	.147	.151
60+	.173	.196	.232	.205	.173	.202	.258	.262
Total Males (millions)	27.7	27.9	27.0	25.8	27.7	27.1	24.3	20.2

Fraction of Females in Specified Age Groups

Age	1990	2010	2030	2050	1990	2010	2030	2050
0-17	.206	.207	.209	.222	.206	.185	.166	.160
18-25	.121	.087	.096	.100	.121	.089	.080	.082
26-49	.320	.320	.271	.295	.320	.328	.288	.280
50-59	.123	.127	127	.114	.123	.130	.140	.142
60+	.228	.258	.294	.267	.228	.265	.324	.333
Total Females (millions)	29.4	29.3	28.3	26.9	29.4	28.6	25.7	21.4

Table 3

Accounts for Age Zero and Future Male Generations

(thousands of dollars)

	g=.010			g=.015			g=.02		
Generation's Age in 1990	r=.04	r=.05	r=.06	r=.04	r=.05	r=.06	r=.04	r=.05	r=.06
0	78.3	52.8	33.7	94.0	65.1	43.0	111.2	79.1	53.7
5	96.4	70.0	48.8	111.9	83.0	59.3	128.3	97.3	71.0
10	131.6	105.6	83.3	146.2	118.6	94.4	160.9	132.5	106.5
15	181.5	158.1	136.8	193.7	170.0	147.6	205.5	182.2	159.0
20	212.5	194.3	176.4	221.2	203.8	185.7	228.9	213.0	195.0
25	212.7	201.4	188.7	217.2	207.5	195.4	220.3	213.0	201.8
30	185.5	181.6	175.0	185.8	184.1	178.7	184.3	185.6	181.8
35	143.5	146.7	146.4	139.8	145.6	146.9	134.3	143.3	146.7
40	90.4	99.7	105.1	83.5	95.5	102.7	74.9	90.0	99.4
45	32.2	46.0	56.0	23.2	39.4	51.2	12.7	31.7	45.6
50	-31.4	-15.0	-2.0	-41.4	-23.0	-8.4	-52.6	-31.9	-15.5
55	-99.4	-82.9	-69.1	-109.0	-91.1	-76.0	-119.4	-99.9	-83.5
60	-149.2	-135.5	-123.5	-157.0	-142.3	-129.6	-165.4	-149.6	-136.0
65	-143.0	-133.2	-124.5	-148.5	-138.1	-128.9	-154.3	-143.3	-133.5
70	-114.4	-108.0	-102.3	-117.9	-111.2	-105.2	-121.5	-114.5	-108.3
75	-86.9	-83.0	-79.4	-89.0	-84.9	-81.2	-91.2	-87.0	-83.1
80	-65.6	-63.4	-61.3	-66.8	-64.5	-62.4	-68.0	-65.6	-63.5
85	-48.3	-47.3	-46.3	-48.9	-47.8	-46.8	-49.4	-48.4	-47.3
90	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5	-9.5
Future Generations	275.0	250.0	239.6	290.9	259.5	240.3	310.2	272.9	246.6
Percentage change	247.9	368.6	604.2	205.1	292.5	451.2	173.6	238.2	350.3

Table 3 (continued)

Accounts for Age Zero and Future Female Generations

(thousands of dollars)

	g=.01			g=.015			g=.02		
Generation's Age in 1990	r=.04	r=.05	r=.06	r=.04	r=.05	r=.06	r=.04	r=.05	r=.06
0	17.4	10.5	3.8	20.1	14.1	7.2	21.4	17.5	10.7
5	25.7	18.5	10.7	28.3	22.4	14.7	29.1	25.9	18.8
10	49.6	42.8	34.6	51.5	46.7	39.0	51.3	49.8	43.1
15	85.6	81.0	73.9	85.9	83.8	77.8	83.8	85.6	81.2
20	103.5	102.9	98.8	101.4	103.9	101.2	96.8	103.5	103.0
25	96.9	101.0	100.9	92.0	99.6	101.4	84.6	96.6	101.0
30	70.2	79.1	83.2	62.8	75.3	81.6	52.9	69.8	78.9
35	35.3	48.3	56.2	25.8	42.3	52.6	14.0	34.8	47.9
40	-2.2	13.9	25.0	-13.0	6.3	19.7	-25.8	-2.7	13.3
45	-39.3	-21.5	-8.1	-50.7	-30.1	-14.6	-63.8	-40.0	-22.1
50	-77.2	-59.2	-44.8	-88.3	-68.0	-51.9	-100.7	-77.8	-59.8
55	-111.2	-94.5	-80.7	-121.1	-102.8	-87.6	-132.0	-111.8	-95.1
60	-129.4	-115.6	-103.9	-137.5	-122.5	-109.8	-146.1	-129.9	-116.1
65	-122.2	-111.8	-102.7	-128.1	-117.0	-107.3	-134.4	-122.5	-112.2
70	-104.4	-97.4	-91.1	-108.3	-100.9	-94.3	-112.4	-104.6	-97.6
75	-83.4	-78.9	-74.7	-85.9	-81.2	-76.8	-88.5	-83.6	-79.0
80	-64.6	-62.0	-59.6	-66.0	-63.4	-60.9	-67.5	-64.7	-62.1
85	-47.7	-46.5	-45.4	-48.4	-47.2	-46.0	-49.0	-47.8	-46.6
90	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6
Future Generations	61.0	49.6	27.1	62.3	56.3	40.1	59.7	60.5	49.4

Table 4

The Composition of Male Generational Accounts (r=.05, g=.015)

Present Values of Receipts and Payments

(thousands of dollars)

		Payments						Receipts				
Generation's Age in 1990	Net Payment	Direct Taxes Labour	Social Sec. Contr.	Indirect Taxes	Direct Taxes Capital	Seign.	Other Reven.	Pension Benefits	Health Exp.	Other Soc.Sec. Benef.	Househ. Respon. Paym.ts	Education
0	65.1	43.3	75.8	30.0	5.0	0.1	9.4	23.1	19.1	4.9	1.7	49.9
5	83.0	51.4	90.1	33.9	6.0	0.1	9.3	27.4	19.9	5.5	2.0	52.8
10	118.6	61.0	106.9	38.3	7.1	0.1	9.1	32.5	20.9	6.2	2.4	41.7
15	170.0	72.1	126.6	43.4	9.1	0.1	8.8	38.6	22.1	7.1	2.8	19.5
20	203.8	80.5	141.1	46.6	14.4	0.0	8.5	45.9	23.2	8.0	3.4	6.9
25	207.5	83.9	143.1	45.5	17.9	0.0	8.2	54.7	24.1	8.2	3.4	0.7
30	184.1	82.2	135.2	42.0	18.2	0.0	7.9	65.1	25.0	8.2	3.2	0.0
35	145.6	76.8	119.0	37.8	18.7	0.0	7.4	77.5	25.5	8.1	2.9	0.0
40	95.5	68.0	96.1	33.2	20.3	0.0	6.9	92.3	26.0	8.1	2.4	0.0
45	39.4	58.6	73.2	28.4	19.2	0.0	6.3	109.7	26.4	8.2	2.0	0.0
50	-23.0	46.5	49.5	23.5	18.3	0.0	5.7	130.2	26.3	8.3	1.6	0.0
55	-91.1	33.6	24.6	18.9	16.5	0.0	5.1	154.5	25.7	8.2	1.3	0.0
60	-142.3	22.9	3.8	15.2	16.0	0.0	4.4	172.6	24.5	6.3	1.1	0.0
65	-138.1	15.9	0.1	12.0	14.6	0.0	3.7	157.2	22.5	3.8	1.0	0.0
70	-111.2	11.3	0.0	9.8	11.5	0.0	3.0	124.0	19.7	2.5	0.8	0.0
75	-84.9	7.7	0.0	8.2	8.7	0.0	2.4	92.8	16.5	2.0	0.6	0.0
80	-64.5	4.5	0.0	6.4	5.7	0.0	1.9	67.6	13.2	1.6	0.5	0.0
85	-47.8	1.9	0.0	4.8	4.2	0.0	1.4	48.5	10.1	1.2	0.3	0.0
90	-9.5	0.2	0.0	1.2	3.1	0.0	0.4	11.5	2.5	0.3	0.0	0.0
Future Generations	259.5											

Table 4 (continued)

The Composition of Female Generational Accounts (r=.05, g=.015)

Present Values of Receipts and Payments

(thousands of dollars)

		Payments						Receipts				
Generation's Age in 1990	Net Payment	Direct Taxes Labour	Social Sec. Contr.	Indirect Taxes	Direct Taxes Capital	Seign.	Other Reven.	Pension Benefits	Health Exp.	Other Soc.Sec. Benef.	Househ. Respon. Paym.ts	Educa-tion
0	14.1	31.0	33.4	33.9	5.0	0.1	9.7	20.7	20.2	5.8	1.9	50.3
5	22.4	36.8	39.7	38.4	5.9	0.1	9.5	24.6	21.3	6.6	2.3	53.3
10	46.7	43.6	47.1	43.7	7.0	0.2	9.4	29.2	22.5	7.5	2.7	42.3
15	83.8	50.5	55.5	49.7	8.8	0.2	9.2	34.6	23.9	8.7	3.2	19.6
20	103.9	53.0	61.7	53.1	13.9	0.0	9.0	41.1	25.3	9.7	3.8	6.9
25	99.6	52.3	59.9	51.1	17.2	0.0	8.7	48.7	26.6	9.8	3.7	0.7
30	75.3	48.8	53.1	45.3	18.4	0.0	8.4	57.8	27.8	9.5	3.5	0.0
35	42.3	43.0	43.0	38.8	19.5	0.0	8.0	68.7	28.8	9.2	3.1	0.0
40	6.3	37.8	31.7	33.1	19.3	0.1	7.6	81.6	29.9	9.0	2.7	0.0
45	-30.1	32.5	21.6	28.3	18.6	0.1	7.1	96.1	30.8	9.0	2.2	0.0
50	-68.0	26.8	11.8	24.1	17.3	0.1	6.5	112.2	31.3	9.2	1.8	0.0
55	-102.8	21.3	4.5	20.5	15.8	0.0	5.9	129.0	31.1	9.1	1.5	0.0
60	-122.5	16.4	0.9	17.3	13.6	0.0	5.2	137.6	30.0	7.1	1.3	0.0
65	-117.0	12.9	0.1	14.3	12.0	0.0	4.5	127.4	27.7	4.4	1.1	0.0
70	-100.9	9.9	0.0	11.9	8.6	0.0	3.7	106.8	24.1	3.1	0.9	0.0
75	-81.2	7.3	0.0	9.9	7.5	0.0	2.9	85.5	20.2	2.4	0.7	0.0
80	-63.4	5.1	0.0	7.6	6.5	0.0	2.2	66.7	15.8	1.9	0.5	0.0
85	-47.2	3.4	0.0	5.5	4.7	0.0	1.6	49.1	11.7	1.4	0.3	0.0
90	-7.6	0.7	0.0	1.2	4.0	0.0	0.4	11.0	2.5	0.3	0.0	0.0
Future Generations	56.3											

Table 5

A Comparison of Italian and U.S. Generational Accounts

r=.05, g=.015

(thousands of dollars)

Generation's Age in 1990	Italian Males	American Males	Italian Females	American Females
0	65.1	80.9	14.1	10.9
5	83.0	100.7	22.4	19.5
10	118.6	137.4	46.7	44.6
15	170.0	187.7	83.8	76.7
20	203.8	218.9	103.9	101.7
25	207.5	244.2	99.6	109.3
30	184.1	236.4	75.3	104.9
35	145.6	217.6	42.3	95.7
40	95.5	198.7	6.3	81.6
45	39.4	168.1	-30.1	60.2
50	-23.0	117.1	-68.0	32.8
55	-91.1	65.5	-102.8	-.8
60	-142.3	10.9	-122.5	-36.3
65	-138.1	-40.0	-117.0	-66.3
70	-111.2	-49.0	-100.9	-70.2
75	-84.9	-46.0	-81.2	-65.1
80	-64.5	-38.4	-63.4	-55.3
85	-47.8	-29.6	-47.2	-44.9
90	-9.5	-1.5	-7.6	-7.4
Future Generations	259.5	104.1	56.3	14.1

Table 6

Understanding the Source of Generational Imbalance in Italian Fiscal Policy

Percentage Difference in Generational Accounts of Future Italians and 1990 Italian Newborns

	(1) Base Case	(2) No Demographic Change	(3) Zero Debt	(4) Lower Social Security Benefits
Percentage Difference	292.5	126.8	189.2	153.3

	(2) & (3)	(2) & (4)	(3) & (4)	(2) & (3) & (4)
Percentage Difference	59.3	50.6	60.1	-12.4

Table 7

Changes in Generational Accounts Required to Attain Generational Balance

(thousands of dollars)

	Tax to be Increased			
	Labor Income Tax	Social Security Contributions	Capital Income Tax	Indirect Taxes
Males				
Ages				
0	31.2	41.7	23.9	28.8
10	44.0	58.8	33.7	36.8
20	58.2	77.6	45.1	44.7
30	59.4	74.4	45.9	40.3
40	49.1	52.8	42.4	31.9
50	33.5	27.2	33.4	22.5
60	16.6	2.1	23.6	14.6
70	8.2	0	12.0	9.4
80	3.2	0	4.3	6.1
Future Generations	-161.7	-151.0	-169.1	-164.1
Females				
Ages				
0	22.4	18.4	23.6	32.5
10	31.5	25.9	33.2	42.0
20	38.3	33.9	44.5	51.0
30	35.2	29.2	46.0	43.4
40	27.3	17.5	41.0	31.8
50	19.3	6.5	32.0	23.2
60	11.9	.5	21.3	16.6
70	7.2	0	11.6	11.4
80	3.7	0	5.9	7.3
Future Generations	-19.2	-23.3	-18.0	-8.9
Average net propensity to save	18.9	18.1	19.6	19.3

Table 8

Changes in Generational Accounts Arising from three Hypothetical Policies

(thousands of dollars)

	Switching from Social Security to Indirect Taxation	Reducing Debt/GNP Ratio to .6 Over 10 Years	Cutting Social Security Benefits by 20% Over 10 years
Males			
Ages			
0	-22.8	.0	4.6
10	-39.2	2.7	6.5
20	-58.9	15.8	9.2
30	-61.2	23.7	13.0
40	-37.4	25.2	18.2
50	-8.1	22.4	24.5
60	23.1	12.8	22.9
70	17.3	7.5	11.8
80	11.2	3.3	4.4
Future Generations	-96.8	-58.1	-68.1
Females			
Ages			
0	26.4	.0	4.1
10	30.1	4.0	5.8
20	32.0	13.1	8.2
30	26.8	16.1	11.6
40	26.7	14.4	16.0
50	30.8	12.1	20.9
60	29.7	8.2	19.8
70	21.0	5.9	12.1
80	13.4	3.7	5.2
Future Generations	99.5	-12.6	-6.1
Average net propensity to save	10.9	12.2	13.0

Table 9

Earnings function estimates
(dependent variable: individual earnings[1])

Variable	Coefficient	t-statistics
Education	379.7	4.6
Education squared	-3.1	-0.8
Age	554.6	14.2
Age squared	-5.7	-11.2
Male	3,240.8	21.5
Married	1,374.8	6.9
Occupation		
Operative and laborer	-4,716.3	-16.9
Clerical	-3,247.7	-10.4
Precision craft	886.1	1.7
Professional	5,398.8	8.1
Manager	11,418.7	8.9
Entrepreneur	21,005.9	9.8
Other	-7,338.2	-20.8
Sector		
Agriculture	-4,740.8	-15.5
Industry	33.2	0.1
Services	-119.2	-0.4
North	1,192.1	6.3
South	-707.8	-3.9
Constant	2,905.8	3.2
Adjusted R^2	.78	
Standard Error	507.7	
Dependent variable mean	30,633.3	
Observations	9,290.0	

[1] The equation has been estimated by WLS using as weights the fitted values of a OLS first stage regression. The sample of 9,290 observations is obtained excluding individuals with zero labor earnings, individuals not in the labor force or older than 65. The dependent variable is expressed in thousands of 1989 lire.

Chart 1

AGE AND SEX PROFILE

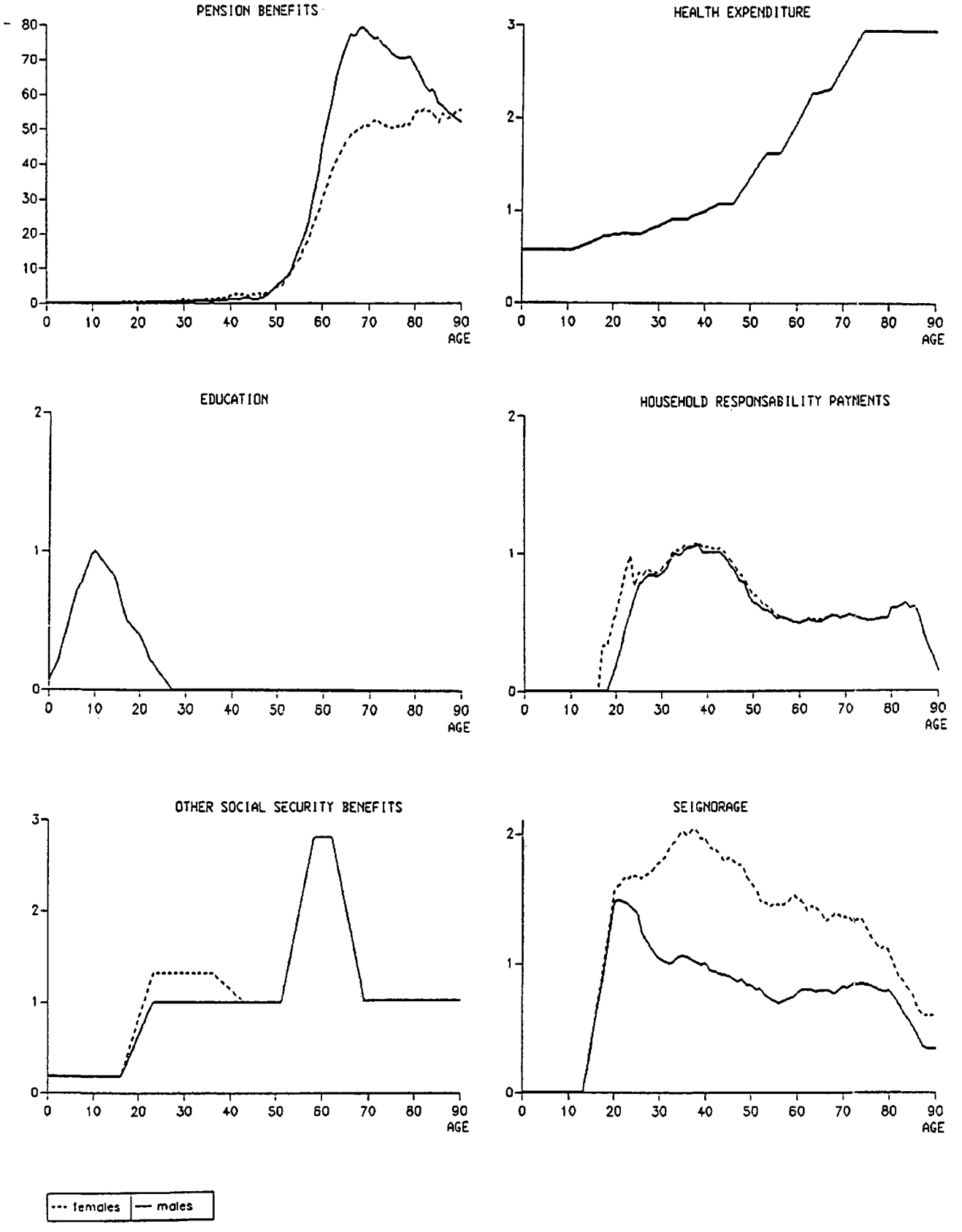


Chart 1
(continued)

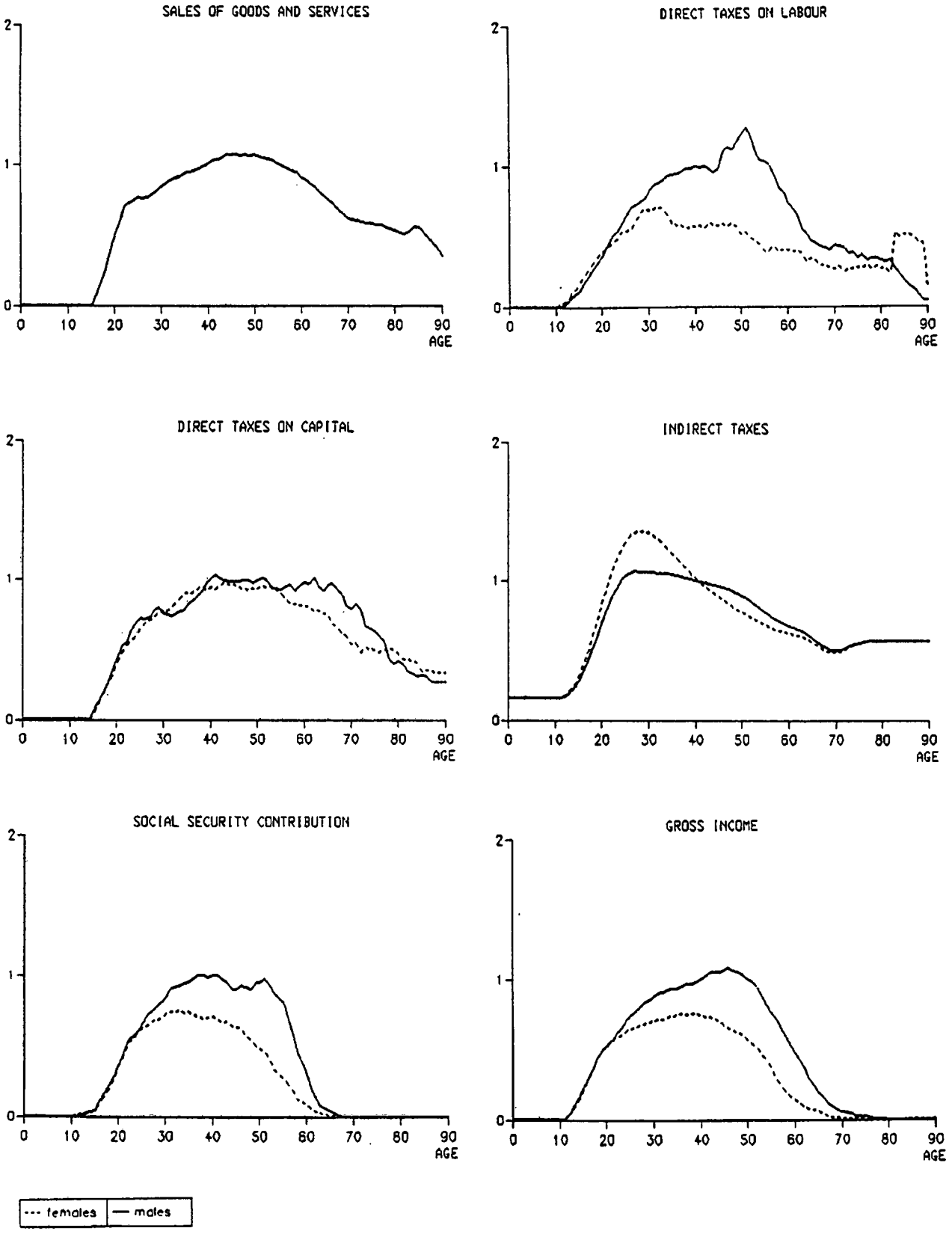
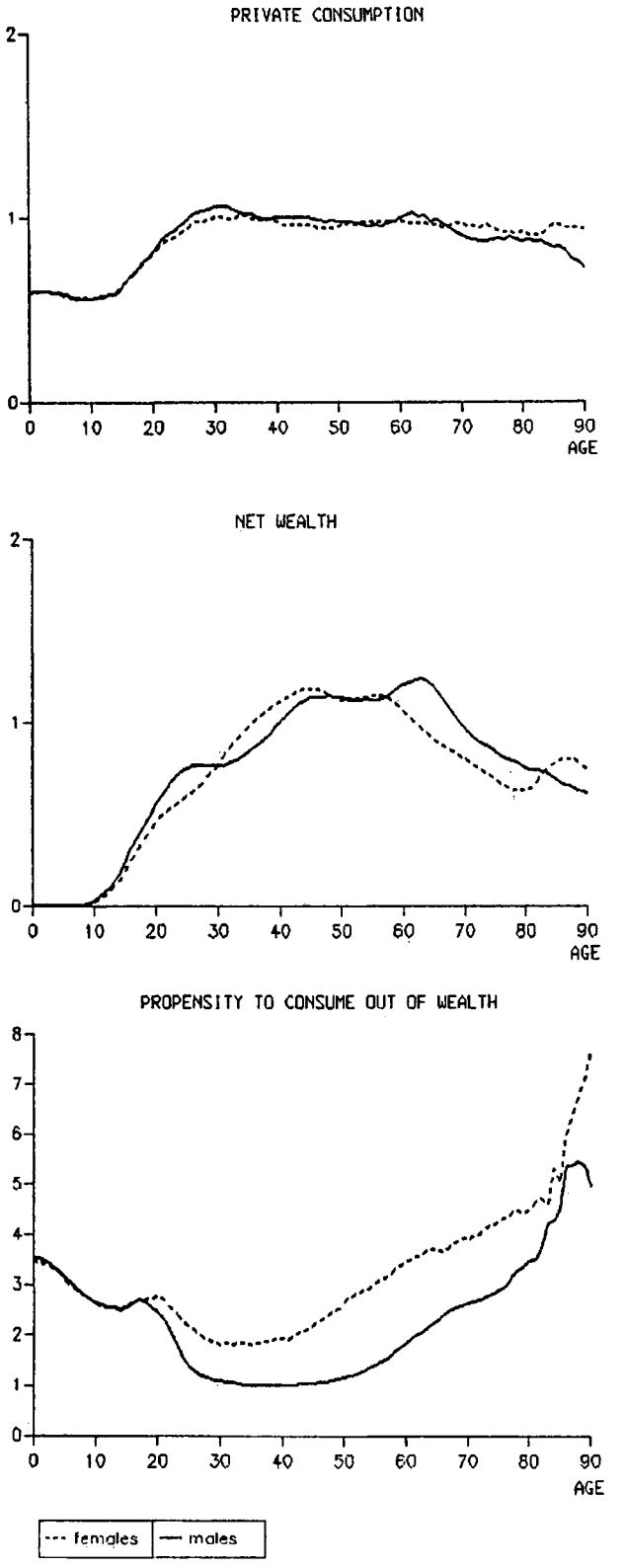


Chart 1
(continued)



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