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The Effects of Social Security on the Distribution of Wealth in Italy

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Abstract:

The degree of substitutability between social security wealth and private wealth is a much-debated topic; however, less time and energy has been devoted to the study of the distributive properties of a measure of wealth summing future pension benefits net of contributions to the other traditional components of households' net worth (financial and real activities, net of liabilities). The present paper has two essential aims: by using six cross-sections of the Bank of Italy's Survey of Income and Wealth (1991, 1993, 1995, 1998, 2000 and 2002), it firstly aims to estimate an "augmented" measure of net worth incorporating social security wealth, and secondly it examines the composition and distribution of such augmented wealth among Italian households during the period 1991-2002. The result is that augmented wealth is found to have remained constant in real term over the last decade due to two opposing forces, namely an increase in net worth and a parallel, stronger decline in social security wealth, resulting from the two main pension reforms implemented in 1992 and 1995. Wealth inequality, after rising steeply at the beginning of the 1990s, levelled off during the second part of the period in question. The major contribution towards this upwards movement came from social security wealth, the distribution of which, although less unequal than that of real wealth and financial wealth, widened at a much faster pace at the beginning of the decade.

1. Introduction

Future social security benefits constitute a major part of total household wealth in all developed countries. Any analysis of the accumulation and distribution of wealth, and of its evolution over time, would therefore be misleading were it not to include the value of annuities expected from the private and public pension system. In order to take account of the effects of the pay-as-you-go system on wealth distribution in the US, Feldstein (1976) introduced an “augmented” definition of household wealth, whereby social security wealth was added to the other traditional components of each household’s net worth. Other studies, and in particular those by Kennickel and Sunden (1999) and by Wolff (1987, 2003 and 2005), further refined the analysis of the distributional effects of the pension system on total wealth for the United States. All of these studies concluded that social security wealth had a clearly mitigating effect on the distribution of total wealth, whereas the effect of private pension wealth was perceived as being of a more mixed nature. Recently other studies provided empirical evidence on the distributive properties of an augmented wealth definition in Canada (Shamsuddin 2001) and the United Kingdom (Banks et al. 2005).

The main aim of this present paper is to estimate an augmented definition of wealth for Italian households, in order to evaluate the effects of the Italian Social Security system on the distribution of total wealth during the period 1991-2002. Several important events during this decade render this analysis of particular interest: i) three structural reforms of the public pension system were introduced (1992, 1995 and 1997), nearly halving the aggregate value of net social security wealth, reducing the internal rate of return and enhancing the actuarial degree of fairness of the system. The reduction in social security wealth was of an uneven nature, affecting diverse cohorts and productive categories within Italian society to different degrees; ii) there were important changes to the allocation of financial activities during the course of the decade, ending in the bursting of the financial bubble; iii) the real component of net worth, and in particular real estate, grew steadily from 1992 onwards, thus counterbalancing the effect of the bursting of the financial bubble.

The distributive effects of ii) and iii) on the net worth of Italian households have been empirically analysed by Jappelli and Pistaferri (2000), and with particular accuracy by Brandolini et al. (2004). Both the latter studies base their estimations of net worth on the Bank of Italy’s “Survey of Household Income and Wealth” (SHIW). By using adjusted data from this survey’s historical archive for the period 1991-2002, we estimate a broader definition of household wealth which

includes the present value of those future pension benefits (net of payroll taxes) expected by the retired and active population.¹

The paper is organised as follows: section 2 provides a brief review of the literature on the distributive effects of social security systems on the distribution of wealth; section 3 describes the data sources and the accounting framework for the definition of total wealth used in this paper; this section also illustrates the adjustment procedures which have been followed to correct the SHIW microdata for non-response, non-reporting and under-reporting; section 4 presents the estimation of social security wealth; section 5 offers new microeconomic evidence of the composition and inequality of total wealth in Italy during the period 1991-2002; section 6 presents our conclusions.

2. Overview of recent studies

The introduction and growth of public pension programs radically influences the process of saving and wealth accumulation. In Italy, as in the majority of developed countries, future social security benefits represent a substantial part of total household wealth. Since Feldstein's study (1974), which introduced the concept of social security wealth for the first time, this variable has been empirically estimated using both aggregate and survey data. In particular the degree of substitutability between social security wealth and private wealth has been tested in a large number of analyses designed to verify the validity of the life-cycle hypothesis (for Italy studies, see Rossi and Visco 1990, Jappelli 1995, Attanasio and Brugiavini 2003). Social security wealth measures and estimates have also been widely employed in political and economic debate in order to gauge the sustainability of the public pension system, the long-term effects of pay-as-you-go systems on public finance (Brugiavini and Peracchi 2004, Sartor 1999), and the effects of pension rules on labour supply decisions (Brugiavini and Peracchi 2003).

Fewer studies have tried to analyse the distributive properties of social security wealth: some exceptions are the works by Feldstein (1976), Wolff (1987, 2003 and 2005), Mc Garry and Davenport (1997) and Kennickell and Sunden (1999), providing estimations of the distributive effects of this variable in the US. All of these studies define the total wealth of each household as the sum of net worth, pensions and social security wealth. According to Feldstein (1976), the exclusion of social security wealth would distort the real picture of the distribution of household wealth. In his study he uses survey data to estimate a measure of social security wealth derived from the current distribution of earnings in a steady-state hypothesis. He finds that total wealth in the US

¹ We wish to thank Giovanni D'Alessio for kindly providing us with the complete series of adjusted data for real and

is much less concentrated after the inclusion of social security wealth. The Gini coefficient for net worth is 0.72, while for total wealth it is down to 0.51. Moreover, the distribution of total wealth among income classes is more similar to the distribution of social security wealth than to that of net worth. Wolff (1987) shows that social security wealth has a pronounced equalising effect on the distribution of total wealth. He simulates the lifetime wealth distribution of the US population and finds that private pension wealth is less equally distributed than disposable wealth, but its magnitude is very low. In contrast, the inclusion of social security wealth produces a marked reduction in measured wealth distribution. The Gini coefficient decreases from 0.73 to between 0.49 and 0.60. This marked reduction in inequality can be explained by the fact that social security wealth is much more evenly distributed than disposable wealth, and its magnitude is very close to that of traditional household wealth. Kennikel and Sunden (1999) also find that social security wealth constitutes a substantial part of total wealth, and its introduction has had an equalising effect on US wealth distribution. In particular, they show that the bottom 90% of the population hold the overwhelmingly proportion of social security wealth, whereas the top 0.5% own 45% of business assets and 30% of traded corporate stocks. Gustmann et al. (1997) estimate that pensions, social security wealth and health insurance account for half of the wealth held by all households with an average age of between 51 and 61. In a more recent paper, Wolff (2005) estimates distributive trends for various measures of wealth which show that the inclusion of social security wealth results in a marked reduction in the Gini coefficient for total wealth, from 0.826 to 0.665 in 2001. This reflects both the lower level of inequality in social security wealth than in marketable wealth, as well as its relatively low correlation to net worth. Over a 19-year period (1983-2001) the equalising effect of social security wealth decreased. Recently the idea to estimate an augmented measure of wealth has been used outside the US. For example Banks et al. (2005) provide a detailed reconstruction of such a variable for people aged between 50 and the state pension age for the UK. They find that state pension wealth is more equally distributed than private pension wealth. Moreover according to their estimation pension wealth and non-pension wealth do not act as substitutes for each other. Finally the composition of total wealth varies considerably across the wealth distribution.

Relatively few studies have empirically explored wealth distribution in Italy (Cannari and D'Alessio 1994, Jappelli and Pistaferri 2000, Brandolini *et al.* 2004, Faiella and Neri 2004). To our knowledge, none of these studies includes an estimate of social security wealth and its redistributive impact. Cannari and D'Alessio (1994) examine household wealth inequality using the 1991 SHIW, and show that at the beginning of the last decade, the proportion of net worth (defined as the total

financial wealth used in this paper.

market value of dwellings, consumer durables and financial assets, net of debts) held by the richest decile amounted to 39%, while the corresponding figure for the poorest decile was a mere 0.2%. Using data drawn from four cross-sections (1989, 1991, 1993 and 1995) of the Bank of Italy's SHIW, Jappelli and Pistaferri (2000) characterise the static and dynamic features of wealth distribution, and compare them with consumption and income inequality. They distinguish between net worth and financial wealth, where the former is defined as the sum of households' financial assets and real net assets. The authors find that wealth distributions are by far more right-skewed and dispersed than the corresponding distributions for consumption and disposable income: net worth and financial wealth displayed Gini indexes of 0.59 and 0.70 respectively in 1995, as opposed to scores of 0.30 and 0.36 for consumption and disposable income. Examining wealth distribution by income deciles, they also discover that both mean and median wealth monotonically increase with the household's ranking in the income distribution table, implying a strong correlation between the relative positions of the two distributions. Finally, the transition matrices for net worth and financial wealth in 1993 and 1995 show a relatively limited degree of wealth mobility, with slightly less immobility in the distribution of financial wealth. Using the SHIW historical archive, Brandolini *et al.* (2004) have more recently investigated the composition and distribution of wealth among Italian households, together with its evolution from 1989 to 2000. They find that wealth distribution is a lot more unequal than income distribution: in 2000 the Gini index was 0.61 for net worth, compared with 0.37 for disposable income. The corresponding values of the Gini index for the main components of net worth were 0.60 for real assets, compared with a much higher value of 0.81 for financial assets. Wealth inequality declined from 1989 to 1991 and then rose considerably during the rest of the decade, due mainly to the large gains made at the very top of the distribution. In particular, a substantial part of the increase in net worth inequality was traceable to financial assets, which have both increased their weight in portfolios and become more heavily concentrated. Based on the SHIW and the Survey of Consumer Finances (Federal Reserve Board), Faiella and Neri (2004) compare Italian and American households' wealth in 1998. They find that tangible assets are the main wealth component in both countries. In the US households hold a higher share of financial assets and show a greater propensity to invest in more diversified and risky portfolios. American households also have a stronger tendencies to debt. In both countries the level and the composition of wealth seems to be correlated with similar households' characteristics.

3. Data sources and the accounting framework

The data used in this study are taken from the 1991, 1993, 1995, 1998, 2000 and 2002 Surveys of Household Income and Wealth (SHIW) conducted by the Bank of Italy.² The sample size is about 8,000 units per year. The survey gathers information on household microeconomic behaviour and on the socio-demographic characteristics of household members. The basic unit of observation is the “household”, defined as all persons related by blood, marriage or affection, residing under the same roof and pooling all or part of their incomes. Institutional population is not included. No allowance is made in this paper for taking account of the household size or composition: in other words, no equivalence scale is used.³ The SHIW, much like all sample surveys on household income and wealth, suffers from a lack of response. In the six surveys used in this paper the response rate (net of those units not found at the address given) has been variable, and sometimes has been considerably low. It has ranged from a minimum of 36.1% in 2002 to a maximum of 72.0% in 1993. Non-response in statistical surveys is obviously a matter of concern whenever it produces samples where the less co-operative segments of the population, usually the richer households, are under-represented. To limit these potentially distorting effects, each household is weighted by an appropriate sample weight.

The principal concept of wealth used in this study is “augmented” wealth, which is defined as the sum of net worth and social security wealth (Davies and Shorrocks 2000, Wolff 2003). The first component of augmented wealth is net worth, which is equal to the total value of all those assets the household can sell in the market, less any debts.⁴ According to a number of authors (Feldstein 1976, Wolff 1987, Jappelli and Modigliani 1998), net worth is not a satisfactory definition of wealth in those countries where there is a mandatory, public system. If contributions to a social security scheme are perceived by individuals as a substitute for other forms of lifecycle saving, then a definition of wealth which is capable of measuring the stock of resources to be used to finance consumption during old age, perhaps ought to consider the present value of future pension entitlements as well. This point is forcefully argued by Jappelli and Modigliani (1998); they point out that in any pension scheme, contributions entitle workers to receive a retirement pension, and so contributions should be regarded as a component of life-cycle saving. On the other hand, pension

² This study does not use the last available SHIW, released in January 2006 and referred to the 2004 balance sheets of Italian households, since the adjustment coefficients to correct the 2004 micro-data for non-response, non-reporting and under-reporting are still not available.

³ See Sierminska and Smeeding (2005) for a discussion of some definitional issues, such as the choice of the appropriate unit for assessment, and the equivalence scale question.

⁴ Following the definition used in the SHIW, net worth is here defined as the total value of tangible assets (real estates, business equity and other valuables) and financial assets (transaction and saving accounts, government bonds, equities and other assets), net of financial liabilities (mortgages and other debts).

benefits represent the utilisation of pension wealth that was previously accumulated prior to retirement. It is clear that the importance of this point increases with the size of the public pension system and with its degree of actuarial fairness, and is not related to whether the system is funded or not (Lindbeck and Persson 2003).

In the case of actuarial fairness, the measurement of social security wealth at a given time is simply equal to the accrued capitalised value of pension entitlements. In all other situations (i.e. when the pension system's internal rate of return is different from the market interest rate), the social security wealth of each individual should be measured as the difference between the present value of future pension benefits and that one of future payroll taxes.

Italy has a very extensive public pension system: the payroll tax is equal to 33% of gross earnings for employees and to 19% for the self-employed. Moreover the degree of actuarial fairness of the system will gradually increase as the 1995 reform is phased in. Therefore we believe that the definition of augmented wealth could offer a more complete description of both the level and the distributive properties of total wealth among Italian households. Accordingly, our definition of augmented or total wealth, TW , at time t can be summarised as follow:

$$TW_t = AR_t + AF_t - PF_t + SSWN_t$$

where AR is the sum of consumer durable goods, jewellery and other valuables, real estate and businesses; AF is the sum of all financial assets; PF measures all debts and $SSWN$ is the present value of future pension benefits net of the expected contributions to be paid from the time of observation until retirement. Our definition of total wealth does not include cash and currency, severance indemnity and the cash value of life insurance and private retirement accounts, which are not recorded in our data source.

Comparisons with external sources such as the national accounts show that the quality of net worth estimates in the SHIW is under-reported, this being particularly so in the case of financial assets. According to some calculations made from the SHIW historical archives, transactions and savings accounts appear to have been underestimated over the last decade by an average of 64%, government bonds by 70%, and private bonds, company shares and investment shares by 85% (Brandolini *et al.* 2004). The discrepancy between the SHIW estimates and the corresponding aggregate figures is lower, albeit still remarkable, in the case of real assets, which were underestimated by around 26% for the same period.

The discrepancies between aggregate and survey data can be accounted for on several grounds: firstly, by the existence of irreconcilable differences in classifications and definitions, which prevent micro and macro data from being fully comparable; secondly, by the difficulty of including in a statistically representative way the wealthiest households in the sample (selection bias), being wealth distribution highly concentrated; and thirdly, by interviewees' tendency to be reticent about the assets they actually own (non-reporting) or to under-value their declared asset holdings (under-reporting).

A range of statistical techniques have been adopted in to correct for the probabilities of avoiding the interview (non-response), and for non-reporting and under-reporting of both financial assets and dwellings not occupied by their owners, in the SHIW. To correct for non-response, weights adjusted for differential response rates across households with different characteristics (among which income and wealth) have been recalculated (D'Alessio and Faiella 2002).⁵ The correction for non-reporting and under-reporting of financial assets is based on the outcome of a statistical matching of the 1987 SHIW with the micro-data survey carried out in the same year by the Banca Nazionale del Lavoro on a sample of its customers (Cannari and D'Alessio 1993). The procedure to account for the non-reporting of dwelling not occupied by their owners is based on the assumption that the probability of owning a dwelling other than one's own residence follows a Poisson distribution. The estimates of this distribution have been used to impute ownership (Cannari and D'Alessio 1990).

The correction procedures have a substantial impact on the surveys carried out in the 1990s. On average, the adjustments increase the mean values of real estate and financial assets by 31 and 148%, respectively. Overall, the shortfall compared with macro sources is reduced from 75 to 39% for total financial assets, from 26 to 8% for real assets, and from 41 to 17% for net worth (Brandolini *et al.* 2004). Furthermore, the adjustments bring the composition of household wealth closer into line with aggregate evidence. However, the corrections vary considerably from one year to the next, and consequently so do the remaining discrepancies with respect to aggregate figures.

Although we believe that the adjusted data are meant to provide a more realistic picture of the distribution of household wealth than the one implied by the raw micro data, the manipulation which is inevitably contained in the above mentioned corrections should recommend to interpret the empirical evidence which is presented in section 5 with particular care.

⁵ The procedures to correct for non-response is based on the assumption that households requiring at least two visits before accepting the interview are representative of non-responding units and on figures on the number of contacts needed in the 1998 SHIW to obtain the interview. Bank of Italy does not address the non-response issue through the over-sampling of high-income households, since a reliable list of rich households from which to get the additional units is not available.

4. The calculation of social security wealth

The survey data (SHIW) do not contain information about social security wealth, and so the present section describes how we estimated this variable. Social security wealth is defined as the sum of expected future benefits less the sum of contributions a worker expects to pay between the time of observation and his/her retirement. According to this definition, at each point of time and for each individual, social security wealth expresses an individual's accrued entitlements to wealth resulting from participation in the public pension scheme.

For each individual present in the six surveys (1991, 1993, 1995, 1998, 2000 and 2002) we first computed the present value of future pension benefits. In doing so we used information about age, gender, occupation, seniority, expected retirement age, earnings, life expectancy and the relevant social security legislation in force during the year of observation. Next we estimated the present value of the individual's contributions to his/her pension scheme and we net out this value from the current value of future benefits. Both future pensions and future contributions are discounted back to the year of observation in order to render the value of social security wealth comparable with other components of total wealth.

Since figures for net worth are collected at the household level, we need to sum up social security wealth computed at time t for each household. For household i observed at time t we have:

$$SSWN_{i,t} = \sum_{j=1}^N \left[(1+r)^{(t-p)} \sum_{k=p}^{p+d} (1+r)^{(p-k)} B_j (1+i)^{(k-p)} - \sum_{k=t}^{p-1} c_k W_{kj} (1+r)^{(p-1-k)} \right]$$

where N is the maximum number of individuals within the household receiving a pension, p is the expected year of retirement of individual j , d is the life expectancy at retirement of individual j , B_j is the pension benefit received by individual j upon retirement, r is the discount rate, i is the real annual growth of the pension benefit, c_k is the payroll tax rate at year k and $W_{k,j}$ is gross wage at year k for individual j .

The estimation of social security wealth necessarily involves numerous approximations together with the use of a series of hypotheses, all of which we shall be looking at in the next part of this section. In particular, we have adopted the following hypotheses:

1. we express all social security wealth values in 2002 constant Euros, and we assume perfect foresight regarding future inflation and a complete price-indexation mechanism;
2. we assume that workers have full knowledge of the pension rules;

3. there are two forms of reasoning leading individuals to retire: either they have a sufficient number of years of pension contributions to access a seniority pension, and thus they leave the job immediately; or they exit the labour market when they reach the legal retirement age;
4. life expectancies used for the computation of social security wealth are taken from forecasted survival estimations furnished by the National Statistical Office (Istat);
5. lifetime earnings used to compute future pension benefits and future contributions are estimated in terms of gender, of three different levels of education, and for employees and the self-employed separately;
6. a constant rate of growth of gross wages and a discount rate, respectively equal to 1.5 and 2.5%, are assumed;
7. indexation of pensions only corresponded to earnings growth in 1991. Thereafter, pensions for each individual have been kept constant in real terms.

4.1 Earnings profiles

The estimation of lifetime earnings is particularly important because the calculation of the level of pension benefit has gradually shifted from a final-salary formula (adopted in 1991) to a lifetime-earnings formula (1992), and then to a contribution-related formula (after 1995). We have estimated 9 stylised profiles of lifetime earnings obtained from a combination of gender, education (three levels - primary, secondary and tertiary) and employment status (employee or self-employed).

The income figures from the surveys are net of personal income tax, and so we grossed up net incomes using the following procedure : by defining YN_i and YL_i as the net income and the gross income of individual i , respectively, his/her gross income is calculated by solving the following equation:

$$YL_i = \frac{YN_i - (t_{j+1} - t_j)Y_{j+1} - \dots - (t_{j+n} - t_{j+n-1})Y_{j+n} - D_i}{(1 - t_{j+n-1})}$$

where:

Y_j = the upper limit of personal income tax bracket j ;

t_j = the marginal tax rate of income bracket j ;

D_i = tax credit;

$YL_{j+n} < YN_i < YL_{j+n-1}$.

We computed gross earnings for the 1991, 1993, 1995, 1998, 2000 and 2002 surveys by taking account of those changes in the personal income tax law made during the period in question. Earnings profiles by gender, occupation and educational level are obtained as a result of regressing the logarithm of gross earnings on a third degree polynomial on age. The shape of earnings profiles for different occupations, gender and educational levels are observed in figures 1 and 2, where we plot the estimated value of the log of income against age. Nominal gross wages for each worker are then calculated on the basis of the appropriate regression coefficients, taking into account a constant annual real growth rate of 1.5%.

Figure 1

Gross earning profiles by gender and level of education. Employee males and females.

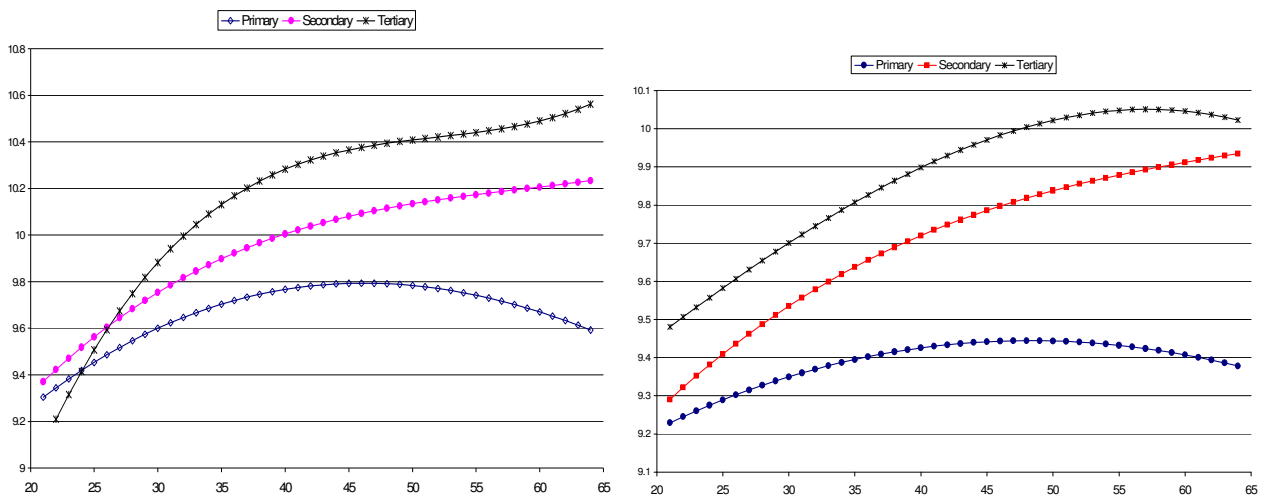
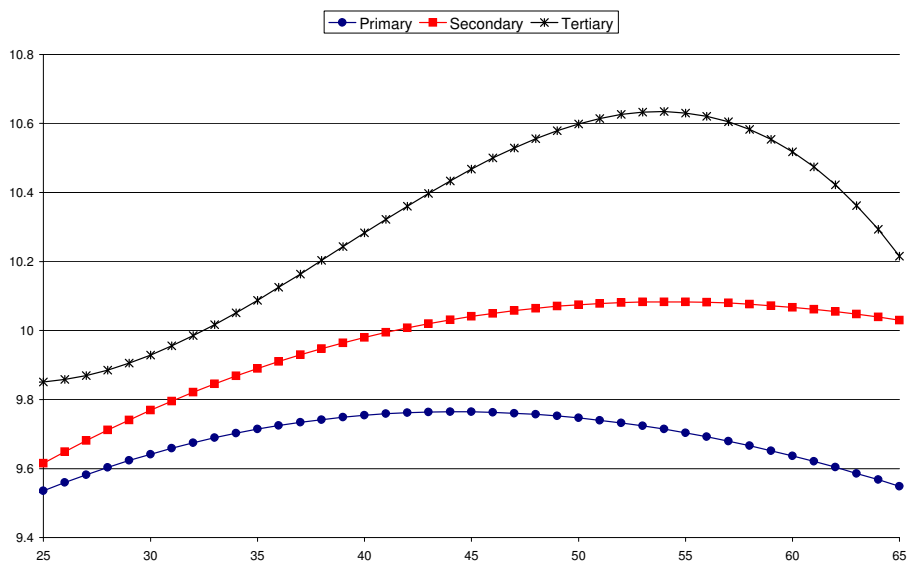


Figure 2

Gross earning profiles by level of education. The self-employed.



Gross wage profiles are then used to estimate the lifetime path of contributions and to compute pension benefits. We assume continuous career with the likely effect to overestimate the social security wealth. The age of an individual at his/her first year of participation in the labour market is exogenously defined according to the education level: respectively 20, 25 and 30 years for primary, secondary and tertiary level.

4.2 Computation of pension benefits

It is not the aim of this subsection to give a detailed description of all the changes introduced in the pension law from 1992 to 2002.⁶ The reforms of the nineties have tackled several aspects of the system, changing retirement age and eligibility criteria, benefits computation and indexation rules. In particular the 1992 reform modified the indexation of pension benefits, increased the legal retirement age and made less generous the earning related formula used to compute pension benefits. The 1995 reform introduced a contribution related formula making the Italian social security system almost actuarially fair. The 1997 introduced important rules in order to restrict eligibility criteria for people who wanted to anticipate retirement with respect to the legal age. A very slow transitional path to the new system characterized all reforms, making effective changes very slow to enter in action: in particular in 1992 pensioners and workers with more than 15 years of contributions were nearly not affected by the reform, with the exception of the change in the indexation rule, which affected all present and future pensioners.

In order to take account of the effects of the reforms we split our sample data into different groups according to occupational status and seniority during the year in which the individual from the sample was observed. Firstly, we isolated retired people: pensions are not calculated for this group, since SHIW surveys report the net value of pension benefits received. In order to maintain a degree of homogeneity with the estimated values of future pension benefits for the active population, we grossed up net pension benefits by following the same procedure described in the previous subsection. The active population was split into four different groups according to seniority accrued in 1992. In particular, the first group comprised all individuals from the 1991 survey, as no reform had been enacted yet in 1991. The second group comprised all workers with at least 15 years of contributions in 1992. The third group comprised all workers with less than 15 years of contributions in 1992. The fourth group consisted of all those workers who entered the labour

⁶ For a description of the Italian social security system see for example Ragioneria Generale dello Stato (2004) or Franco (2002).

market after 1995. In each of the four groups, employees and the self-employed were analysed separately.

The first year pension benefit is then computed as a weighted average of various different components. Pension benefits for those individuals in the first and the second groups were calculated as follows:

$$P_A = r * (N_1 W_1 + N_2 W_2)$$

where:

$r = 0.02$, N_1 and N_2 are the number of years of contributions paid in before and after 1992, W_1 and W_2 are pensionable earnings before and after 1992.

Pension benefits for individuals in the fourth group are computed according to the contribution related formula introduced after 1995:

$$P_B = k * MC$$

where:

k is the legal transformation coefficient and MC is the capitalised value of career contributions with a real rate of return of 1.5%. Finally, pension benefits for individuals in the third group were computed as a weighted average of P_A and P_B , the weights, β and $(1-\beta)$, being given, respectively, by the ratio between the number of years of contributions made by the individual before and after the 1995 reform, and by the total number of working years:

$$P_c = \beta P_A + (1 - \beta) P_B$$

A synthesis of the rules used for the computation of pension benefits is reported in the appendix.

5. The composition and inequality of total household wealth: microeconomic evidence

Having drawn up a broad definition of household wealth with an incorporated social security component, this section presents a series of new estimates of the composition and distribution of total wealth in Italy during the period 1991-2002. Our analysis is based on the data sets of the last six surveys by the SHIW Historical Archive of the Bank of Italy.

Median total wealth of an Italian household was about 19% lower in 2002 than in 1991, as the first row in Table 1 shows. However, the decline in real terms was not a continuous one. In fact, after falling by 23% between 1991 and 1998, median total wealth rose by 6% from 1998 to 2002. Median disposable income displayed a similar trend, with a 5.2% fall during the first half of the decade, a subsequent 10% recovery by 1998, and substantial stability thereafter. Mean total wealth was higher

than the median, and it experienced a much less pronounced variation during the course of the decade. In fact, after falling by 11% between 1991 and 1995, mean total wealth went back to the original levels by the end of the 1990s.

Table 1
Mean and Median Household Wealth, 1991-2002 (at 2002 prices in thousands of euro)

	1991	1993	1995	1998	2000	2002	% Change 1991-2002
<i>Total wealth</i>							
Median	325.1	269.6	255.8	249.4	252.0	264.6	-18.6
Mean	419.9	382.3	373.4	404.0	420.2	422.0	0.5
Percent with zero or negative values	0.0	1.4	3.0	3.1	3.2	3.6	
<i>Real and financial assets*</i>							
Median	134.0	140.4	134.2	129.4	135.2	143.6	7.2
Mean	222.3	242.2	239.4	270.2	284.7	284.5	28.0
Percent with zero or negative values	0.5	1.9	1.8	1.7	1.6	1.5	
<i>Social security wealth</i>							
Median	157.9	100.6	89.9	88.3	90.9	94.3	-40.3
Mean	197.5	140.1	133.9	133.8	135.6	137.5	-30.4
Percent with zero or negative values	13.2	19.6	22.4	21.1	20.7	21.0	
<i>Disposable income**</i>							
Median	23.0	21.3	21.8	24.0	23.6	23.3	1.3
Mean	26.9	26.1	26.7	28.6	28.7	28.3	5.2

Source: our calculations from SHIW-HA figures.

Median and mean values are expressed at 2002 prices calculated using the consumer price index.

(*) Net of financial liabilities.

(**) Total household income net of taxes and social security contributions.

The time trend for median total wealth is the product of two opposing tendencies; on the one hand, a 7% increase in real and financial assets, and on the other, a stronger fall in social security wealth, with an almost 41% fall in the median figure. The reduction in social security wealth appears to be mainly concentrated between 1991 and 1995. This reduction may be explained by the abolition of the indexation of pensions to real wage growth after 1991, involving all current and future pensioners, together with the changes in the computation of pension benefits introduced by the 1992 and 1995 reforms, which was to chiefly affect young workers and the self-employed. Due to its sharp fall, social security wealth, which accounted for almost half of wealth owned by Italian households in 1991, represented less than one third of total wealth by the beginning of the current decade. The rise in net worth is largely attributable to the increase in home-ownership and dwelling size, the exceptional rise in house prices, the substantial shift in household portfolios towards higher-risk assets, and the remarkable increase in stock market prices during the late 1990s. It is

noticeable to consider the increasing share of households with zero or even negative values in social security wealth, from 13.2% in 1991 to 21.0% in the last survey.

A detailed breakdown by various different percentiles of wealth distribution is shown in Table 2. In 2002, the top 1% of all families owned 12% of total household wealth; the top 20% of households held 57%. By focussing on the two components of total wealth, we estimated that the richest quintile owned 62% of real and financial assets, and 46% of social security wealth.

Table 2
Distribution of Household Wealth, 1991-2002

<i>Year</i>	<i>Percentage Share of Total Wealth and its components held by</i>							
	<i>Top 1%</i>	<i>Next 4%</i>	<i>Next 5%</i>	<i>Next 10%</i>	<i>Top 20%</i>	<i>2nd 20%</i>	<i>3rd 20%</i>	<i>Bottom 40%</i>
<i>Total wealth</i>								
1991	6.2	11.9	12.3	17.4	47.9	24.5	15.2	12.4
1993	8.2	14.2	11.5	16.3	50.2	23.2	15.3	11.2
1995	8.6	14.1	11.7	17.5	52.0	22.6	14.9	10.5
1998	14.4	14.6	12.0	16.0	57.0	19.8	13.5	9.8
2000	15.5	15.4	10.5	15.2	56.6	20.5	13.1	9.8
2002	11.9	16.7	11.7	16.4	56.7	20.2	13.6	9.6
<i>Real and financial assets</i>								
1991	9.3	14.6	13.5	16.5	53.9	23.0	13.0	10.1
1993	11.1	16.3	12.2	15.9	55.4	21.2	13.6	9.8
1995	11.3	16.3	12.0	16.7	56.2	20.3	13.2	10.3
1998	19.8	16.2	12.2	14.8	63.1	16.5	11.4	9.0
2000	21.4	17.6	10.1	13.6	62.7	17.3	11.1	9.0
2002	16.0	19.0	11.6	15.4	62.0	17.5	11.5	9.0
<i>Social Security Wealth</i>								
1991	2.8	8.9	11.0	18.4	41.1	26.1	17.7	15.1
1993	3.2	10.6	10.4	17.1	41.3	26.6	18.3	13.8
1995	3.7	10.4	11.2	19.1	44.4	26.8	18.0	10.8
1998	3.5	11.2	11.6	18.5	44.8	26.3	17.7	11.3
2000	3.0	11.0	11.4	18.6	44.0	27.2	17.3	11.5
2002	3.2	12.0	11.9	18.7	45.8	25.6	17.9	10.7

Source: our calculations from SHIW-HA figures.

In order to calculate percentile shares, households were ranked according to their total wealth.

The figures show that total wealth inequality, while rising steeply at the beginning of the 1990s, substantially levelled off during the second half of the decade. For example, the share of total wealth held by the top 1% rose from an initial figure of 6.2% in 1991 to 8.6% in 1995, before remaining stable around 14-15% for the rest of the decade and decreasing in 2002. The share of

total wealth held by the richest quintile showed a monotonically increasing trend, from 48% in 1991 to 57% in 2002. At the other extreme of the distribution range, the share of total wealth held by the bottom two quintiles was considerably reduced, falling from 12.4% in 1991 to 9.6% at the end of the period. A similar trend characterised the inequality in the distribution of real and financial assets. For example, the share held by the top 1% grew from an initial 9.3% to 21.4% in 2000, before falling to 16% in 2002. This trend is probably due to the strong increase in stock market prices during the late 1990s and the subsequent fall at the beginning of this decade which, first, benefitted and, then, hurt the richest percentile.

Not surprisingly, given that social security wealth is essentially correlated with lifetime distribution of earnings, it appears concentrated to a smaller degree than real and financial wealth are. At the beginning of the 1990s, the share of social security wealth held by the top 1% “only” amounted to 2.8%, while the figure for the corresponding percentile with regard to the distribution of real and financial wealth was 9.3%. The same was true of the shares held by the next top 4% of the richest decile of the two distributions.

The pension reforms implemented in the nineties seem to have reduced the equalising effect of social security wealth on total wealth. In fact, the percentage of social security wealth accruing to the bottom 40% of the distribution considerably fell, from 15.1 to 10.7%.

Table 3, showing the Gini index for total household wealth and its components, substantially confirms the previously-mentioned picture. There was a substantial rise in total wealth inequality during the last decade, from 44% to 57%, followed only by a slight downwards shift at the beginning of the next one. The major contribution to this upwards trend came from social security wealth, whose distribution widened during the first part of the decade at a much faster pace than that of real assets and financial assets. In particular, the Gini index for social security wealth rose by around fourteen percentage points, from 47% in 1991 to 61% in 1995. It remained roughly stable thereafter until 2002. Net worth shows a much less sustained increase in the Gini index even though the dynamics of the financial component displays a remarkable increase of 12 percentage points. Table 3 also shows the trend in disposable income inequality. It is worthwhile to note that the trend for income is partially different from that one displayed by wealth. In fact, disposable income inequality, after rising steeply between 1991 and 1998, from 32.4% to 38.8%, returned at the end of the period to values (33.1% in 2002) which are not sensibly higher than the initial ones.

Table 3
Gini Index for Total Household Wealth, its Components and for Disposable Income

	1991	1993	1995	1998	2000	2002
<i>Total wealth</i>	44.2	50.1	52.1	56.8	57.4	55.7
<i>Real and financial assets*</i>	56.6	59.2	59.7	65.4	65.6	63.1
Real assets	60.9	63.1	61.9	63.5	62.4	62.1
Financial assets	67.4	69.7	72.9	81.0	82.9	79.1
Financial liabilities	92.5	92.0	91.6	93.1	93.5	92.6
<i>Social security wealth</i>	47.4	56.2	61.4	62.1	61.7	61.1
<i>Disposable Income**</i>	32.4	35.1	35.8	38.8	35.6	33.1

Source: our calculations from SHIW-HA figures.

(*) Net of financial liabilities.

(**) Total household income net of taxes and social security contributions.

To explore whether our inequality estimates are sensitive to the inclusion of extreme observations, we recalculated Gini indexes for 1991 and 2002 first excluding the largest observations in each of the wealth distribution and, second, excluding the top and bottom percentile groups: see Table 4.

Table 4
Sensitivity of Gini Index to different treatments of extreme values: 1991 and 2002

	Total Wealth	Net Worth	Social Security Wealth
All observations (as in Table 3)			
1991	44.2	56.6	47.4
2002	55.7	63.1	61.1
% increase	26.0	11.5	28.9
Drop richest one			
1991	44.2	56.6	47.3
2002	55.4	62.8	61.1
% increase	25.3	10.9	29.2
Trim Top and Bottom 1%			
1991	41.2	53.2	46.1
2002	50.9	57.7	59.7
% increase	23.5	8.4	29.5

Source: our calculations from SHIW-HA figures.

In the first case, the total wealth Ginis for 1991 and 2002 were, respectively, 44.2% and 55.4%. Thus removal of the largest observation had very little impact on the Gini, and on its change over time. The robustness of Ginis holds even when they were calculated with respect to each of the wealth component (net worth and social security wealth). Removing the top and bottom 1% of the distributions had a more substantial effect on the estimates. In this case, the estimated Ginis for total

wealth were 41.2% for 1991 and 50.9% for 2002, implying an increase in the index of only 23.5% (compared to 26% if estimated on all observations). It is interesting to notice that trimming the top and the bottom percentiles had a smaller impact on the inequality estimates of social security wealth than on the inequality estimates of net worth. Apparently, the tails of net worth distribution are longer than their counterparts of social security wealth distribution.

Tables 5a-5c display the Gini index trend for the three measures of wealth used in this study by age of the head of the household. Figures show that, during the period in question total wealth inequality increased among middle-aged and, above all, among the elderly households, whose Gini indexes advanced, respectively, by 8 and 22 points: from 42.8% to 51.1% among the former, and from 37.7% to 59.5% among the latter. The exception is young households, for whom Gini coefficient firstly increased, from 45.8% in 1991 to 55.9% in 1998, and then fall to 43.2% at the end of the period. The trend of inequality by age class for net worth seems to mirror rather closely that one for total wealth, while a different picture emerges with respect to the age class inequality for social security wealth. In fact, the strongest increase in social security wealth inequality took place among young households, whose Gini climbed from 44.1% to 79.1% during the first half of the decade.

Table 5a
Gini index for Total Wealth by Age Class

<i>Year</i>	<i>Less than 46</i>	<i>From 46 to 60</i>	<i>More than 60</i>
1991	45.8%	42.8%	37.7%
1993	46.1%	49.3%	49.6%
1995	50.6%	50.0%	50.3%
1998	55.9%	54.3%	51.5%
2000	52.6%	54.9%	56.8%
2002	43.2%	51.1%	59.5%

Source: our calculations from SHIW-HA figures.

Table 5b
Gini index for Net Worth by Age Class

<i>Year</i>	<i>Less than 46</i>	<i>From 46 to 60</i>	<i>More than 60</i>
1991	60.2%	55.2%	50.5%
1993	55.2%	58.5%	60.6%
1995	55.6%	59.3%	60.6%
1998	61.2%	65.5%	62.6%
2000	57.6%	65.3%	67.2%
2002	48.7%	61.2%	67.6%

Source: our calculations from SHIW-HA figures.

Table 5c
Gini index for Social Security Wealth by Age Class

<i>Year</i>	<i>Less than 46</i>	<i>From 46 to 60</i>	<i>More than 60</i>
1991	44.1%	46.5%	42.5%
1993	55.5%	54.3%	51.4%
1995	79.1%	56.1%	51.2%
1998	83.7%	54.1%	48.8%
2000	77.9%	53.8%	52.9%
2002	72.7%	51.7%	57.7%

Source: our calculations from SHIW-HA figures.

Figures 3a-3b give a graphical picture of changes in the distribution of total wealth between 1991 and 2002. In particular, figure 1a is a way of depicting the distribution of total wealth similar to that one suggested by Pen (1971). The device used is to imagine a parade in which every person (in our case, every wealth unit) marches past in an hour and where her/his height in the parade corresponds to her/his total wealth. The attraction of Pen's Parade is that it not only brings out the relative positions of different people, but also allows one to identify who appears where in the distribution. Figure 1a excludes the two tails of the distribution (the 5% poorest and the 5% richest) in order to highlight the extent of differences in total wealth for the remaining part of the population.

The Pen's Parades of total wealth for 1991 and 2002, as shown in Figure 3a, are similar in shape, except that the wealthy households (the tall and the real giants in Pen's jargon) became somewhat richer over the eleven year period, relative to the majority of other households. Figure 1b displays percentage changes in total wealth, which are negative for the majority of people, rising monotonically with the percentile level, from around -90% at the 5th percentile to 18% at the 95th percentile. The crossover point occurs at the 80th percentile, with households above this point enjoying positive gains and those at or below this point suffering losses.

Figure 3a
**Total wealth in 2002 Euro by Total Wealth Percentile,
 All households, 1991 and 2002**

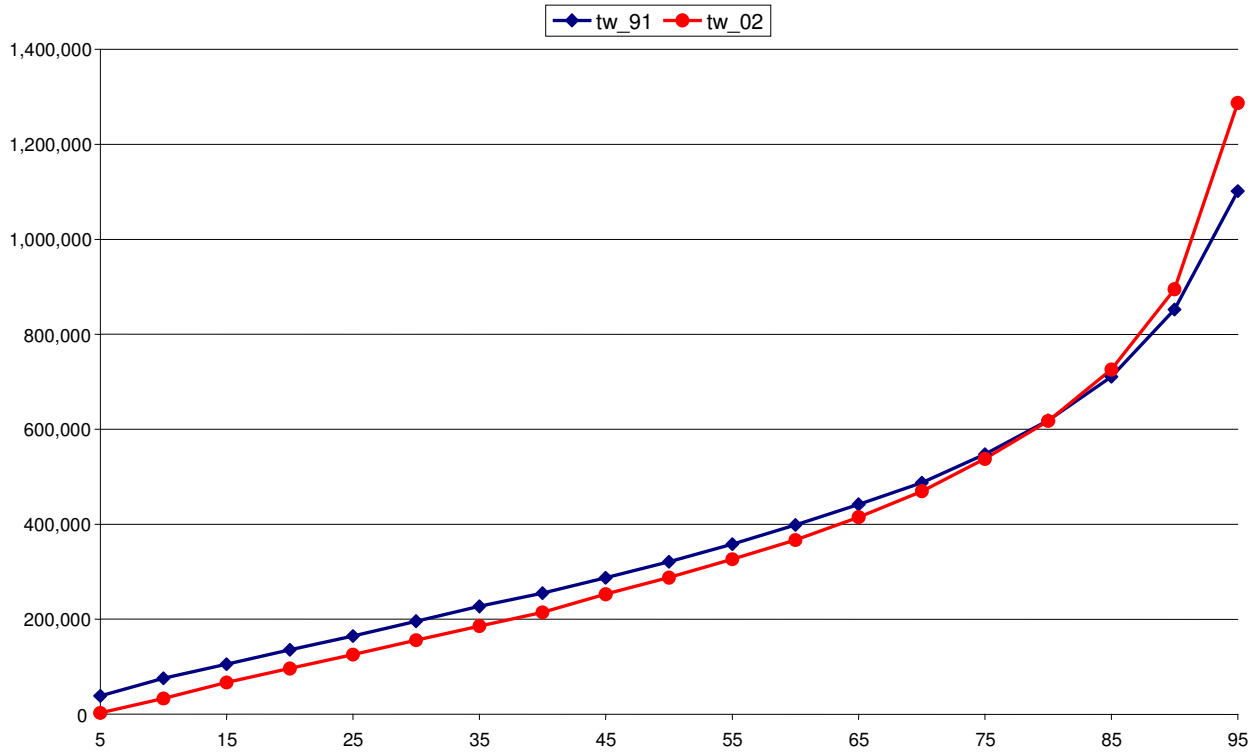
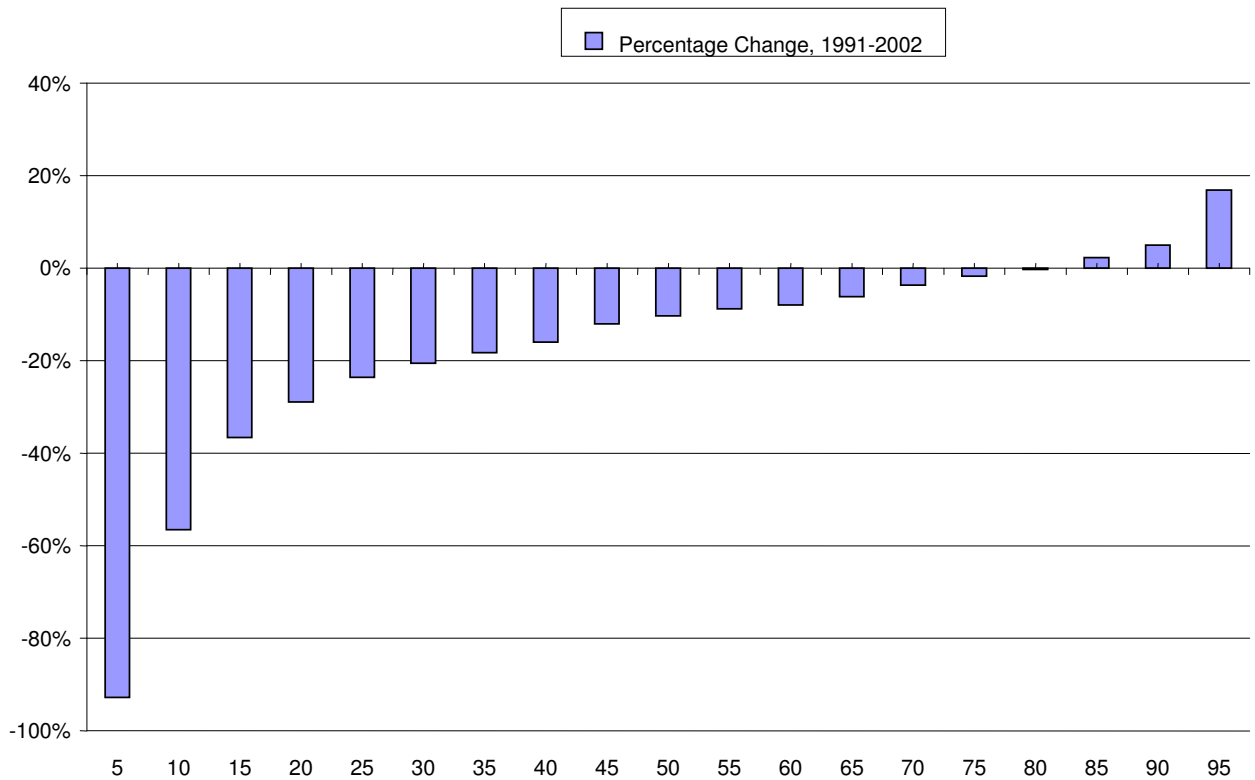


Figure 3b
**Percentage Growth of Total Wealth (in 2002 Euro)
 All households, by Percentile, 1991 and 2002**



The pattern of distributional changes in total wealth between 1991 and 2002 is the product of the changes which take place in the distributions of net worth and social security wealth. The distributional pattern in net worth, as shown in Figures 3c-3d, shows percentage losses for the first quintile and percentage gains at or above the 20th percentile, where the percentage increase remain relatively flat between the 35th and 85th percentile, at around 17%, and then rise to 32% at the 95th percentile. It is of note that, differently from what happened for total wealth, the crossover point for net worth occurs quite close to the left tail of the distribution, at around the 20th percentile.

Figures 3e-3f give a picture of changes in the distribution of social security wealth between 1991 and 2002. In fact, the pattern is quite dramatic, showing percentage losses for all percentiles. In particular, the losses imply negative values of social security wealth in 2002 for the households up to the 10th percentile, and zero values for those belonging to the second decile. Percentage losses for the remaining part of the distribution decrease monotonically with the percentile level, ranging from around 70% at the 25th percentile to 16% at the 95th percentile.

Figure 3c
**Net worth in 2002 Euro by Net Worth Percentile,
 All households, 1991 and 2002**

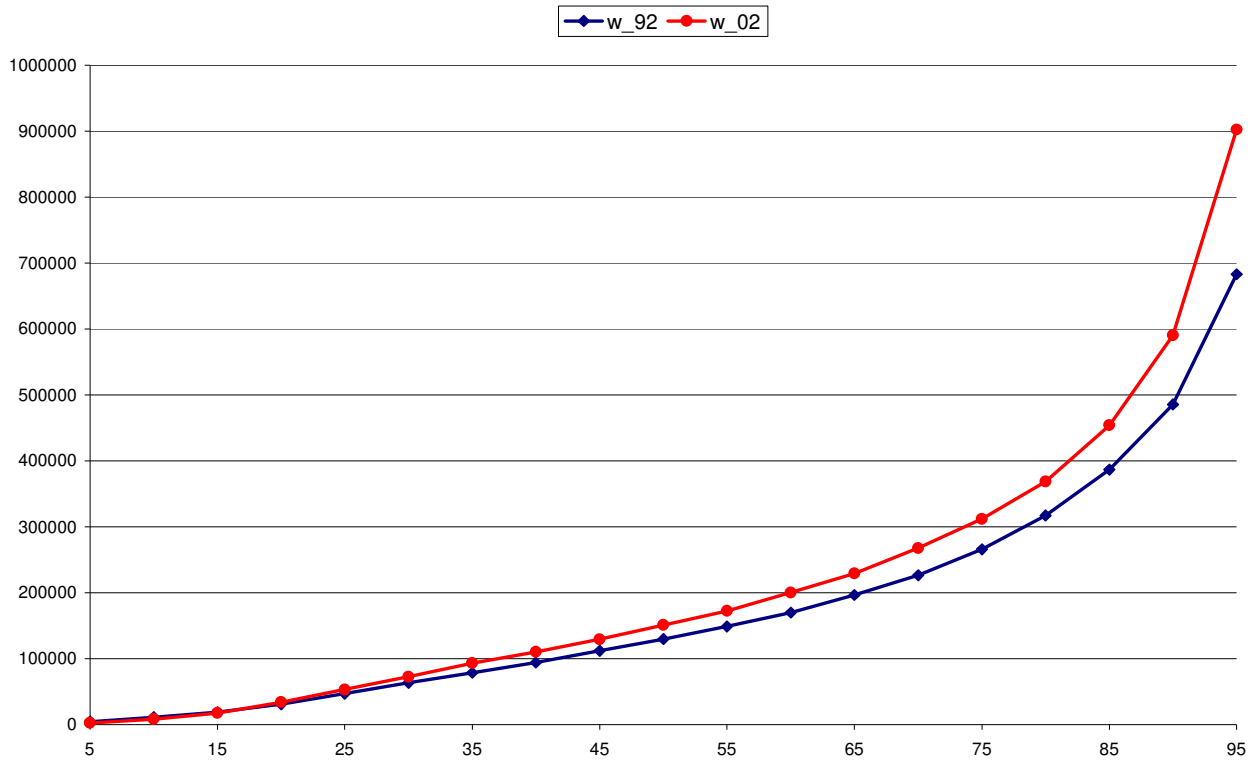


Figure3d
**Percentage Growth of Net Worth (in 2002 Euro)
 All households, by Percentile, 1991 and 2002**

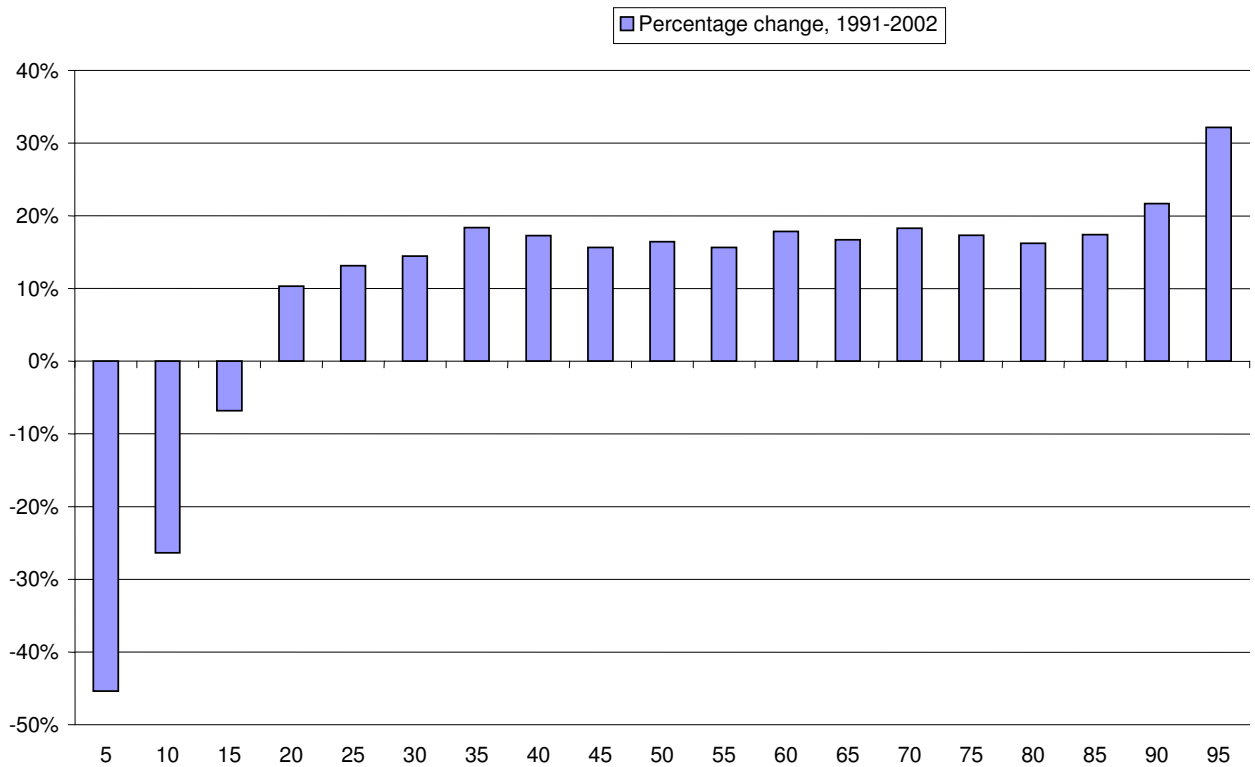


Figure 3e
**Social Security Wealth in 2002 Euro by Social Security Wealth Percentile,
 All households, 1991 and 2002**

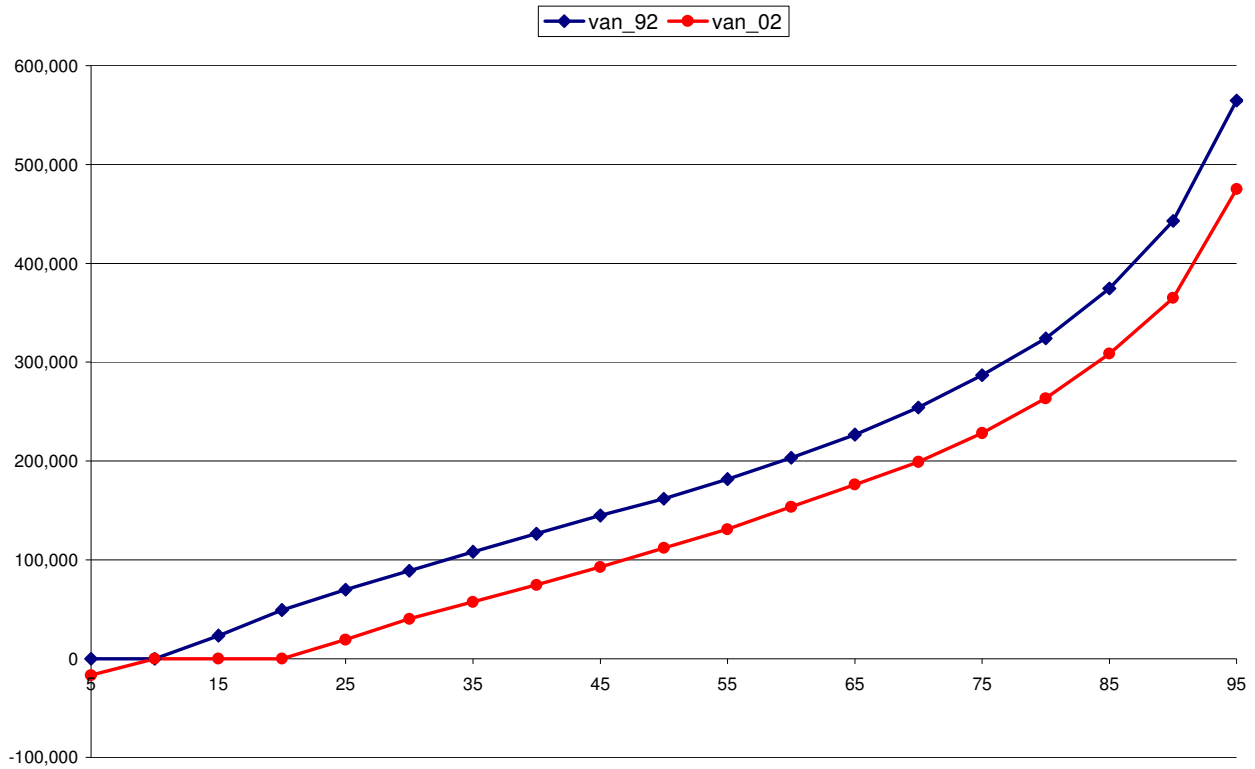
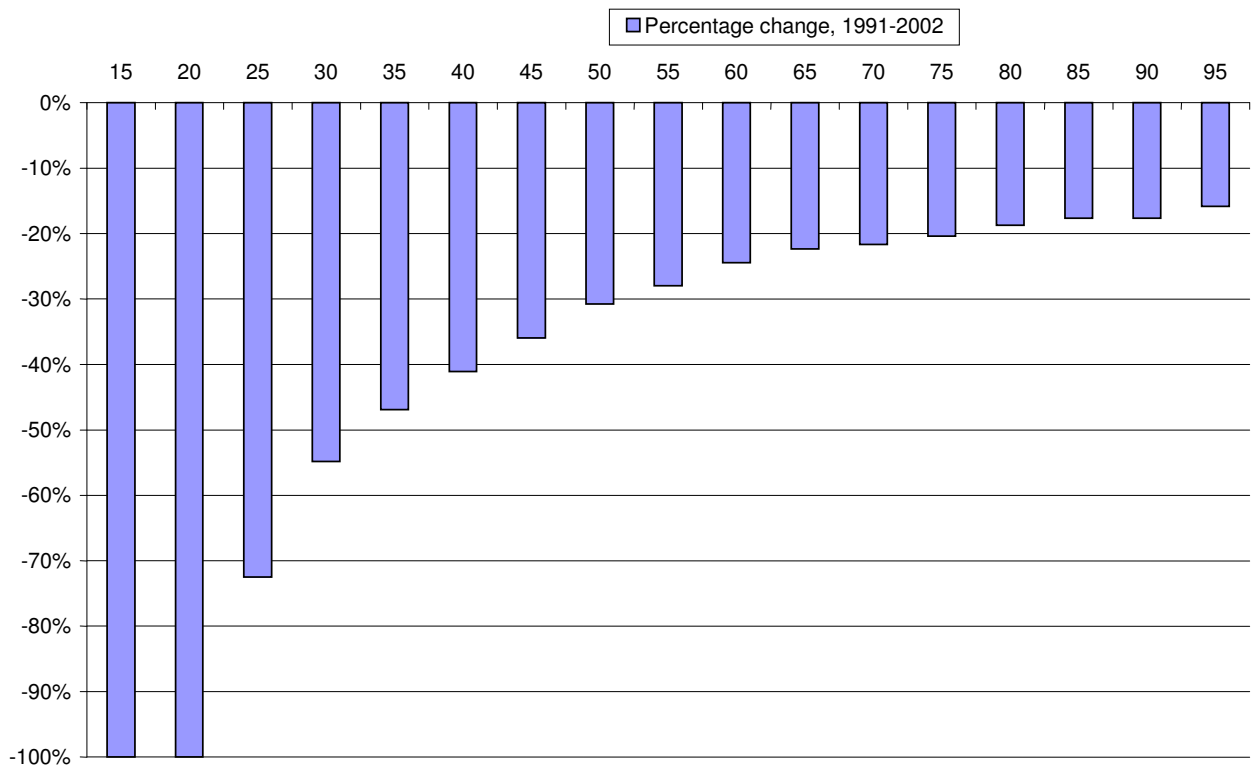


Figure 3f
**Percentage Growth of Social Security Wealth (in 2002 Euro)
 All households, by Percentile, 1991 and 2002**



An alternative way of presenting data about household wealth distribution is through the Lorenz curve, which indicates the share of wealth that is received by the bottom $x\%$ of wealth units. Lorenz curves for Italian total wealth, net worth and social security wealth are shown in Figure 4a, 4b and 4c. The comparison of Lorenz curves for, respectively, total wealth, net worth and social security wealth at the beginning and at the end of the period suggest that wealth inequality increased unambiguously between 1991 and 2002: in fact, the two curves for each definition of wealth do not intersect. Since the Lorenz curves do not cross, it can be argued that the same inequality ordering is confirmed not only by a comparison in terms of Gini index, as previously shown in Table 3, but also by all standard relative inequality indices, namely all measures satisfying anonymity, scale independence, the strong principle of transfers, and population replication (Atkinson 1970, Foster 1985).

As far as our Lorenz curve comparison is concerned, it is worthwhile to remind that the curves take a non-standard shape.⁷ In fact, even though the mean value of each definition of wealth (total wealth, net worth and social security wealth) is positive, the wealth held by the poorest households is sometimes zero or negative: therefore the Lorenz curve has a negative slope, lying below the horizontal axis, over the ranges of negative wealth values, and is horizontal, in correspondence to the population subgroup that has zero wealth. In particular, the 2002 and 1991 Lorenz curves for social security wealth hang beneath the horizontal axis up to, respectively, the poorest 31% and 13% of the population. The same applies for the 2002 and 1991 Lorenz curves for net worth, which hang beneath the horizontal axis up to, respectively, the poorest 5% and 3% of the population.

⁷ On the particular features of wealth distributions that make empirical analysis non-standard in several ways, see Jenkins and Jäntti (2005).

Figure 4a
Lorenz Curve for Total Wealth. 1991 and 2002

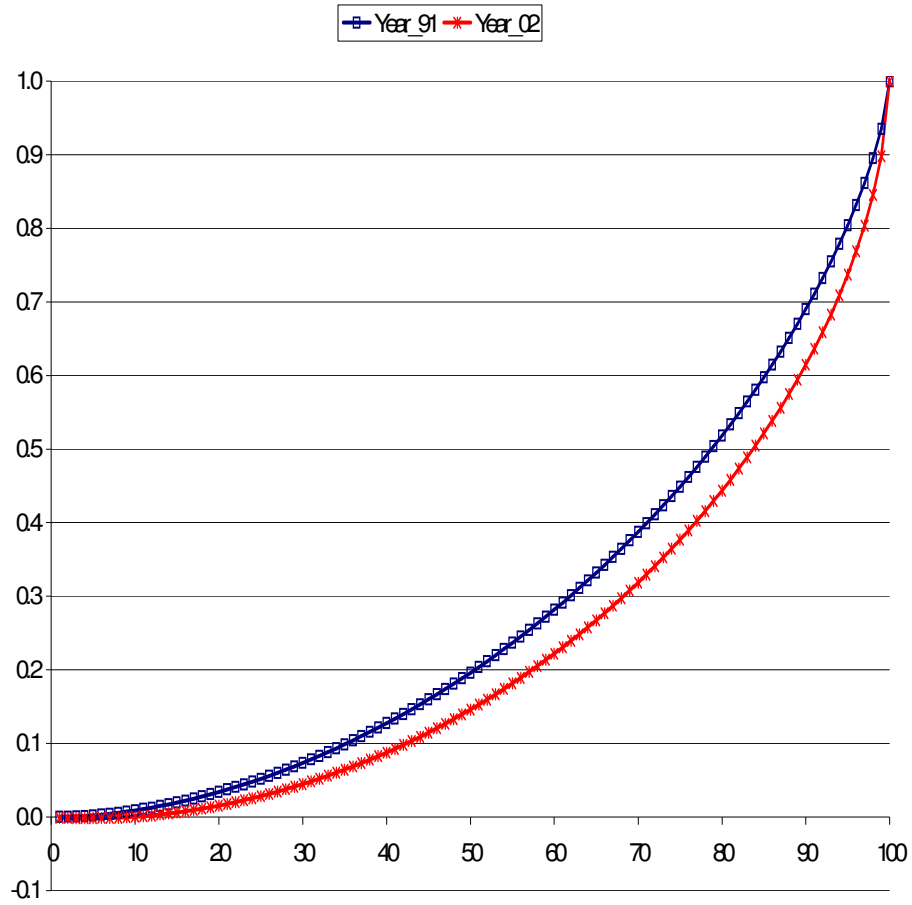


Figure 4b
Lorenz Curves for Net Worth and Social Security Wealth. 1991 and 2002

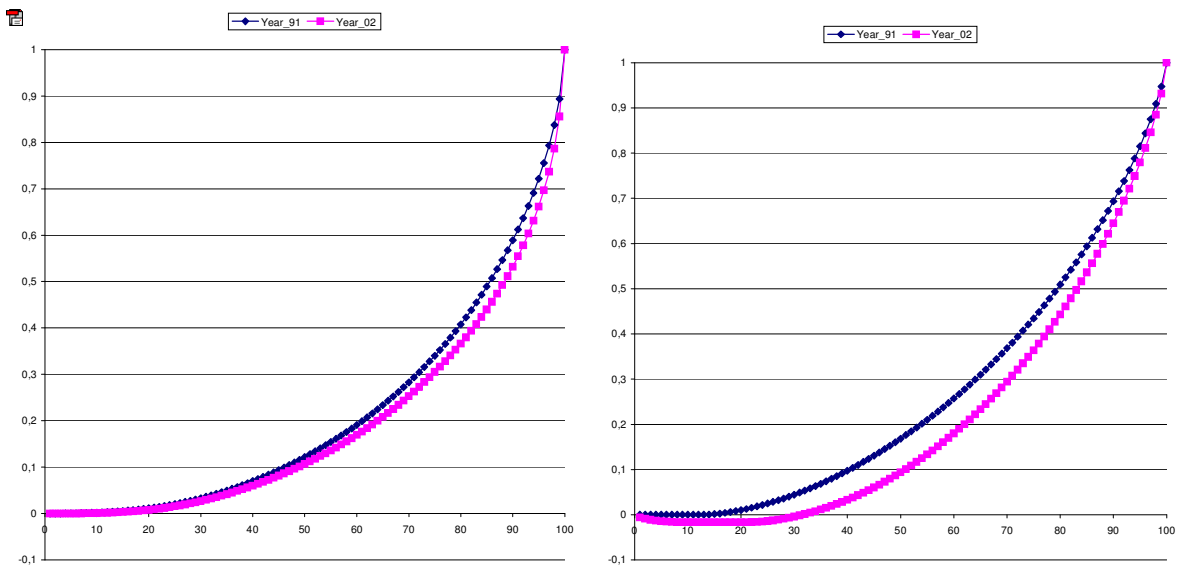


Table 6 analyses the composition of total household wealth and its components. In 1991, social security wealth was the relative most important household asset, accounting for about 47% of total wealth, as shown in table 4. The second largest asset was real estate, representing 32% of total wealth, followed by transactions and saving account (6.9%) and government bonds (5.6%). Financial liabilities were negligible at round 1% of total wealth. The two most striking changes that took place between 1991 and 2002 were the fall in social security wealth to 33%, and the rise in real estate to 39%.

Table 6
Composition of Total Household Wealth

	1991	1993	1995	1998	2000	2002
<i>Real assets</i>	36.9	44.1	43.9	41.2	41.5	45.6
Real estate	32.0	37.6	38.5	35.6	35.9	39.3
Business equity	3.9	5.8	4.5	4.8	4.6	5.0
Valuables	1.0	0.8	0.9	0.8	1.0	1.3
<i>Financial assets</i>	16.7	20.1	21.1	26.4	27.1	22.8
Transactions and saving accounts	6.9	7.9	7.8	6.6	7.7	7.4
Government bonds	5.6	6.4	6.4	2.9	2.5	2.4
Private bonds, equities, mutual funds	4.2	5.8	6.9	16.9	16.9	13.0
<i>Financial liabilities</i>	0.6	0.9	0.9	0.7	0.9	1.0
<i>Real and financial assets*</i>	52.9	63.3	64.1	66.9	67.7	67.4
<i>Social security wealth</i>	47.1	36.7	35.9	33.1	32.3	32.6

Source: our calculations from SHIW-HA figures.

(*) Net of financial liabilities.

The ratio of financial assets to total wealth increased from 16.7% in 1991 to 22.8% in 2002, reaching a peak of 27.1% in 2000 before the bursting of the financial bubble. Figures show that households have replaced government bonds with riskier investments such as equities, private bonds and mutual funds, whose share on total wealth in the decade went up from 4.2% to 13%.

There are considerable differences in household portfolios, depending on the level of wealth. Tables 5 and 6 provide a breakdown in terms of the top 1% of households, the next 19% and the bottom 80%, at the beginning of the period and then at the end.

In 1991 the richest 1% of households invested about 41% of their savings in real estate, and 19% in private bonds, equities and mutual funds. Social security wealth accounted for 21% of total wealth. Among the next 19% of households, 43% of their wealth took the form of social security wealth, while real estate accounted for 34%. The role of social security wealth was even more pronounced in the case of the bottom 80% of the population, as it accounted for some 53% of their total wealth.

Table 7
Composition of Household Wealth by Wealth Class in 1991

	<i>All Households</i>	<i>Top 1%</i>	<i>Next 19%</i>	<i>Bottom 80%</i>
<i>Real assets</i>	36.9	48.1	39.7	33.3
Real estate	32.0	40.5	34.1	29.3
Business equity	3.9	6.2	4.9	2.8
Valuables	1.0	1.4	0.7	1.2
<i>Financial assets</i>	16.7	30.9	17.5	14.4
Transactions and saving accounts	6.9	5.0	6.1	7.8
Government bonds	5.6	7.0	6.6	4.6
Private bonds, equities, mutual funds	4.2	18.9	4.7	2.0
<i>Financial liabilities</i>	0.6	0.2	0.4	0.9
<i>Real and financial assets*</i>	52.9	78.8	56.8	46.8
<i>Social security wealth</i>	47.1	21.2	43.2	53.2

Source: our calculations from SHIW-HA figures.

(*) Net of financial liabilities.

Table 8
Composition of Household Wealth by Wealth Class in 2002

	<i>All Households</i>	<i>Top 1%</i>	<i>Next 19%</i>	<i>Bottom 80%</i>
<i>Real assets</i>	45.6	41.7	45.8	46.5
Real estate	39.3	31.6	38.2	42.6
Business equity	5.0	7.5	6.6	2.7
Valuables	1.3	2.5	1.0	1.3
<i>Financial assets</i>	22.8	49.7	23.7	14.5
Transactions and saving accounts	7.4	10.3	6.6	7.3
Government bonds	2.4	3.5	2.2	2.4
Private bonds, equities, mutual funds	13.0	35.8	14.9	4.8
<i>Financial liabilities</i>	1.0	0.2	0.5	1.8
<i>Real and financial assets*</i>	67.4	91.1	69.1	59.2
<i>Social security wealth</i>	32.6	8.9	30.9	40.8

Source: our calculations from SHIW-HA figures.

(*) Net of financial liabilities.

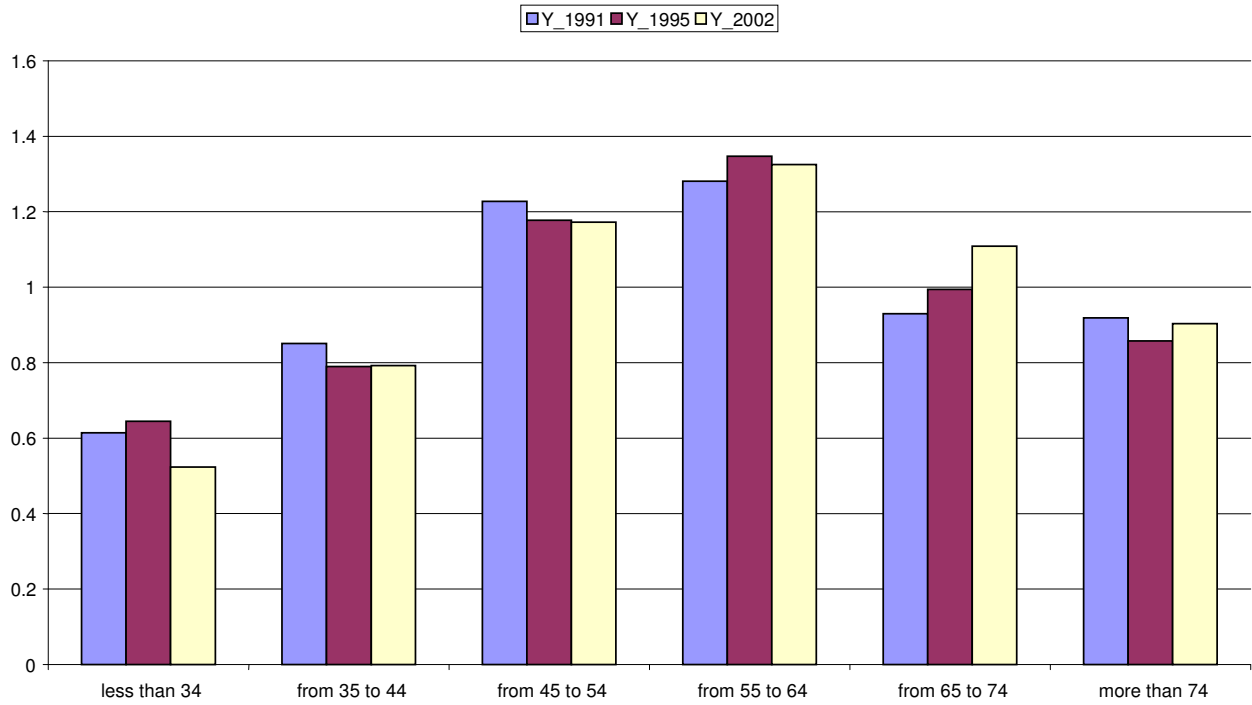
Eleven years later the picture was rather different. Social security wealth accounted for a smaller share of total wealth for all categories, while the weight of real estate rose sharply in the case of all percentiles of the distribution with the exception of the richest one. The growing weight of net worth was particularly evident in the top 1%, where the two items underlying the substantial

increase in the share in real and financial assets were transaction and saving accounts, and, above all, risky financial assets (private bonds, equities and mutual funds).

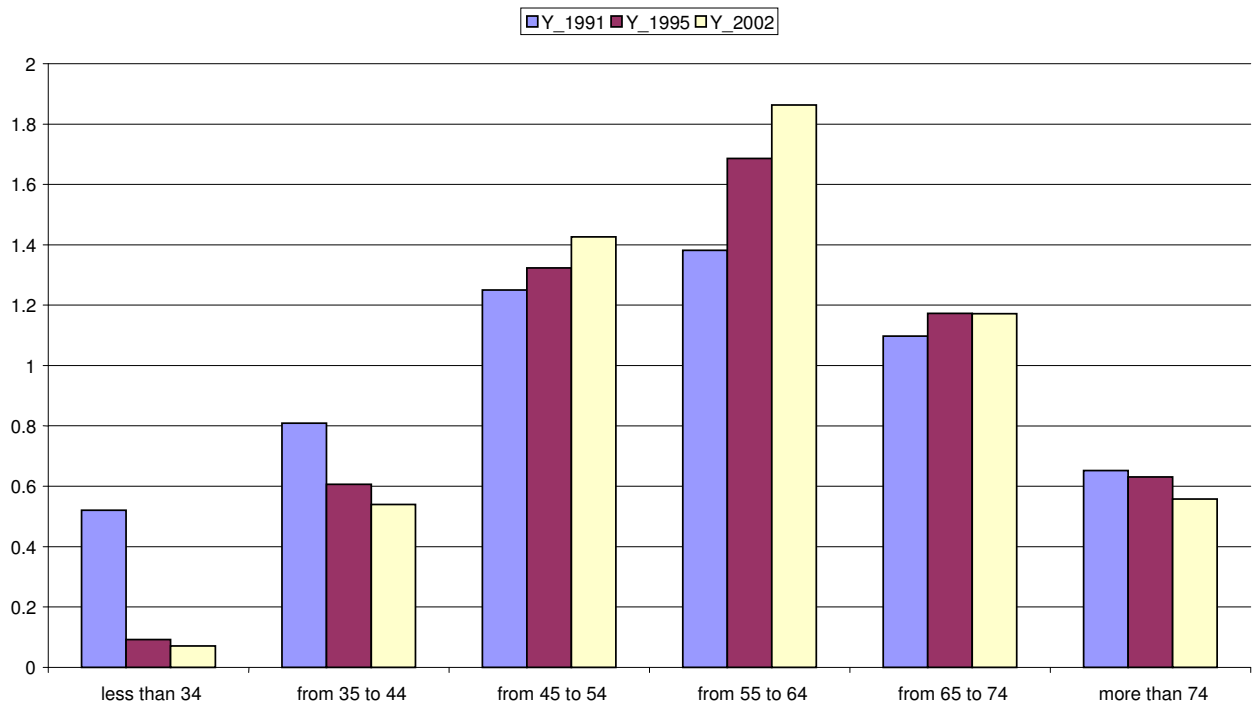
Figure 5 shows the ratio of net worth, social security wealth and total wealth (by age class) to the overall mean of the corresponding variable (1991, 1995 and 2002). Cross-sectional data such as those presented here do not enable us to draw up a true life-cycle profile because of the simultaneous presence of age, time and cohort effects. Notwithstanding this limitation, figures show that at the beginning of the decade, the net worth held by elderly households (aged 65 and over) amounted to approximately 90% of the overall mean. In the same year, the peak value of net worth (almost 1.3) was reached by the 55-64 age-group. From 1991 to 2002 younger age groups saw their ratio drop from 60 to around 50%. If we now consider the age distribution of social security wealth, we see that the changes which took place during the decade were much more significant. In 1991 the younger households' ratio was approximately equal to 0.5. The same ratio reached a peak (1.4) for the 55-64 age group and decreased thereafter. The picture was rather different after implementation of the two pension reforms, which particularly affected younger generations, especially those aged below 34 who saw their ratio fall to around 0.1 in 1995 and in 2002. The very slow transition to the new pension system at the same time produced a relative improvement for adult generations, and in particular for those aged between 55 and 64. The shifts in the distribution of social security wealth over the past decade have also affected the changes in the ratio of mean total wealth by age class to overall mean (see the lower part of Figure 5).

Figure 5
Age distribution of wealth

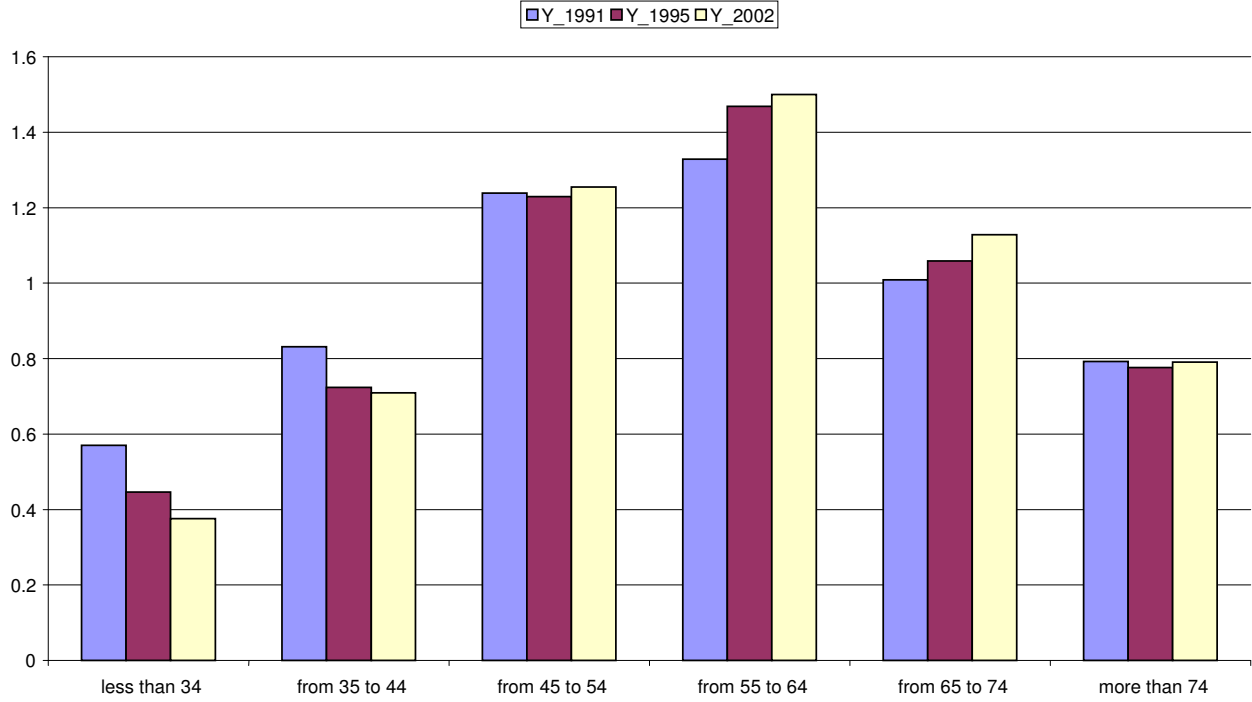
Net Worth: ratio of Wealth by Age Class to Overall Mean



Social Security Wealth: Ratio of Wealth by Age Class to Overall Mean



Total Wealth: Ratio of Mean by Age Class to Overall Mean



In order to evaluate the role played by the various components of total wealth on its overall variability we computed a decomposition of Gini index as in Pyatt, Chen and Fei (1980). The Gini index $G(w)$ of total wealth w can be expressed as follows:

$$G(w) = \sum_{k=1}^4 \left(\frac{w_k}{w} \right) G(w_k) R(w, w_k)$$

where w_k are the components of total wealth (real assets, financial assets, financial liabilities and social security wealth), $G(w_k)$ represents the Gini index for the k component and $R(w, w_k)$ is the correlation coefficient among ranks:

$$R(w, w_k) = \frac{\text{cov}(w_k, r(w))}{\text{cov}(w_k, r(w_k))}$$

where $\text{cov}(\)$ is the covariance between the k component of total wealth and $r(x)$, which shows the rank of the household according to w and w_k .

While in 1991 total wealth concentration basically depended on both real assets and social security wealth (whose relative contribution amounted around to 40-41%), a different picture emerged a decade later, where real assets maintained a primary role (44.2%) and the relative contribution of social security wealth became smaller (28.4%). Another component of total wealth, financial assets, acquired a considerable weight (27.6%) in explaining total variability. Financial liabilities are the most concentrated component of total wealth both at the beginning and the end of the period but their relative contribution to the overall inequality is negligible, since their (negative) share of total wealth is of very little size.

Since Gini index is not exactly decomposable, the value obtained by the decomposition, namely the sum of absolute contributions, might differ from that one shown in the last row of column (b). In fact, this is the case for 2002.

Table 9
Inequality Decomposition of Total Wealth. 1991 and 2002
(percentage values)

	Share of Total Wealth (a)	Decomposition of the Gini Index			
		Gini Index (b)	Rank Correlation (c)	Absolute contribution (a)*(b)*(c)	Relative Contribution (a)*(b)*(c) %
1991					
Real Assets	0.37	0.61	0.82	0.18	41.4
Financial Assets	0.17	0.67	0.74	0.08	18.7
Financial Liabilities	-0.01	0.93	0.21	-0.001	-0.3
Social Security Wealth	0.47	0.47	0.80	0.18	40.1
Total Wealth	1.00	0.44	-	0.44	100.0
2002					
Real Assets	0.46	0.62	0.86	0.25	44.2
Financial Assets	0.23	0.79	0.85	0.15	27.6
Financial Liabilities	-0.01	0.93	0.13	-0.0012	-0.2
Social Security Wealth	0.33	0.61	0.79	0.16	28.4
Total Wealth	1.00	0.56	-	0.55	100.0

Source: our calculations from SHIW-HA figures.

Since Gini index is not exactly decomposable, the value obtained by the decomposition might differ from that one shown in the last row of column (b).

A further way to elicit those factors underlying changes in the size distribution of total wealth during the last decade is through the decomposition of inequality indices by homogeneous subgroups of the population. Our aim is to disentangle the inequality within groups from the inequality between groups. We used an index of the class of entropy measures, the half squared coefficient of variation, which can be obtained from the following general formula, when $\alpha = 2$:

$$E_{\alpha} = \frac{1}{\alpha^2 - \alpha} \left[\frac{1}{N} \sum_{i=1}^N \left(\frac{w_i}{\mu} \right)^{\alpha} - 1 \right]$$

where N is the total number of households, w_i is the wealth of household i and μ is the mean value of wealth. One useful characteristic of this index is that it permits the exact decomposition of inequality by population subgroups even in the presence of negative values of wealth. In order to separate the “between” and “within” components, and at the same time to isolate the impact of the changes in population shares that occurred from 1991 to 2002, we have rewritten the half-squared coefficient of variation as follows:

$$E = E^W + E^B + E^P = \sum_{k=1}^K p_k \left(\frac{\mu_k}{\mu^*} \right)^2 E_k + \frac{1}{2} \left[\sum_{k=1}^K p_k \left(\frac{\mu_k}{\mu^*} \right)^2 - 1 \right] + E^P$$

where E^W is the within-groups component net of variations in relative group sizes, E^B is the corresponding between-group component, E^P is a residual term which deperates the effects on total inequality caused by changes in population share, K is the number of groups into which the population can be divided, p_k are the population weights calculated in the base year (2002), μ_k is the mean value of wealth for group k , and μ^* is the total mean at fixed weights according to the formula $\mu^* = \sum_k p_k \mu_k$.

The results of the decomposition of inequality into different population subgroups are presented in Table 8. The population (heads of households) has been sorted into five sociodemographic categories: area of residence, education, work status, age and gender. In keeping with the results obtained by Brandolini *et al.* (2004), who performed the same analysis on net worth, overall inequality in total wealth is mainly accounted for by the within-component, while the between-component appears to play a marginal role. This result holds for all our partitioning. For example, in 2002 the differences across households, grouped by area of residence, accounted for just 1.5% of total inequality, while the remaining 98.5% was determined by the inequality within each single geographical area. The contribution of the between-group component had been even smaller in previous years (with the sole exception of 1995), ranging from 0.7 in 1991 to 1.2 in 2000. The “education” category revealed the greatest between-group inequality; however, even in this case the within-group component played a much greater role.

Table 10
Decomposition of the Half-Squared Coefficient of Variation by Population Subgroup

<i>Year</i>	<i>Within-groups at fixed weights</i>		<i>Between-groups at fixed weights</i>		<i>Group relative size effect</i>		<i>Total</i>
	<i>Value</i>	<i>Share</i>	<i>Value</i>	<i>Share</i>	<i>Value</i>	<i>Share</i>	
<i>Area of residence (1)</i>							
1991	2.018	98.9	0.013	0.7	0.009	0.4	2.039
1993	1.748	97.9	0.018	1.0	0.020	1.1	1.786
1995	1.488	97.4	0.031	2.0	0.008	0.5	1.528
1998	3.624	98.3	0.036	1.0	0.026	0.7	3.686
2000	3.841	98.7	0.045	1.2	0.003	0.1	3.890
2002	2.493	98.5	0.038	1.5	0.000	0.0	2.531
<i>Education of household head (2)</i>							
1991	1.941	95.2	0.025	1.2	0.073	3.6	2.039
1993	1.714	96.0	0.045	2.5	0.027	1.5	1.786
1995	1.495	97.8	0.054	3.6	-0.021	-1.4	1.528
1998	3.533	95.9	0.067	1.8	0.085	2.3	3.686
2000	3.745	96.3	0.066	1.7	0.079	2.0	3.890
2002	2.478	97.9	0.053	2.1	0.000	0.0	2.531
<i>Work status of household head (3)</i>							
1991	2.189	107.3	0.050	2.4	-0.199	-9.8	2.039
1993	1.729	96.8	0.048	2.7	0.009	0.5	1.786
1995	1.507	98.6	0.042	2.7	-0.020	-1.3	1.528
1998	3.616	98.1	0.068	1.8	0.003	0.1	3.686
2000	3.827	98.4	0.037	1.0	0.026	0.7	3.890
2002	2.474	97.7	0.057	2.3	0.000	0.0	2.531
<i>Age of household head (4)</i>							
1991	2.057	100.9	0.027	1.3	-0.045	-2.2	2.039
1993	1.761	98.6	0.033	1.8	-0.008	-0.4	1.786
1995	1.537	100.6	0.041	2.7	-0.051	-3.3	1.528
1998	3.696	100.3	0.045	1.2	-0.055	-1.5	3.686
2000	3.832	98.5	0.041	1.0	0.018	0.5	3.890
2002	2.488	98.3	0.043	1.7	0.000	0.0	2.531
<i>Gender of Household head</i>							
1991	2.245	110.1	0.025	1.2	-0.231	-11.3	2.039
1993	1.788	100.1	0.030	1.7	-0.032	-1.8	1.786
1995	1.524	99.7	0.031	2.0	-0.027	-1.7	1.528
1998	3.679	99.8	0.038	1.0	-0.031	-0.8	3.686
2000	3.861	99.2	0.023	0.6	0.006	0.2	3.890
2002	2.512	99.2	0.019	0.8	0.000	0.0	2.531

Source: our calculations from SHIW-HA figures.

- (1) The three areas of residence are: Northern Italy, Central Italy, Southern Italy and the Islands.
- (2) The three levels of education of household heads are: no formal education or primary school; middle school or high school; university degree.
- (3) The five levels of work status of household heads are: blue-collar worker or office worker; senior official or manager; self-employed; pensioner; other (first-job seeker, unemployed, housewife, etc.).
- (4) The four levels of age classes are less than 34, from 35 to 44, from 45 to 54, from 55 to 64, from 65 to 74 and more than 74.

6. Conclusions

This paper estimates an “augmented” measure of net worth including social security wealth, and it examines the composition and distribution of this augmented wealth among Italian households during the period 1991-2002. The main aim of this analysis is to evaluate the impact of the structural pension reforms introduced over the last decade on the distribution of total wealth. Our evidence is based on six cross-sections of the Bank of Italy’s Survey of Household Income and Wealth (1991, 1993, 1995, 1998, 2000 and 2002).

The main results presented in this study are the following:

- Augmented wealth was found to have remained roughly constant during the last decade as the combined result of two opposing factors, namely an increase in net worth (i.e. real and financial assets net of debts) and a stronger, parallel decline in social security wealth, due to the two main pension reforms introduced in 1992 and 1995.
- The rise of net worth is largely attributable to an increase in home-ownership and dwelling size, a rise in house prices, a shift in household portfolios towards risk-bearing assets, and the increase in stock market prices that marked the late 1990s.
- The key factors underlying the reduction in social security wealth were the abolition of indexation of pensions to real wages growth after 1991, which affected all current and future pensioners, together with the changes made to the computation of pension benefits, which mainly affected young workers and the self-employed.
- As a result of these trends the shares of the two components of wealth changes dramatically in different direction: while in 1991 the share of social security wealth accounted for about one half of total wealth, at the end of the period it amounted to less than one third. This reduction affected all the households regardless their position in the distribution of total wealth.
- After rising steeply at the beginning of the 1990s, augmented wealth inequality levelled off during the second part of the period. The major contribution to the initial rise came from social security wealth, the distribution of which, although less unequal than the distribution of real and financial wealth, widened during the first half of the decade at a much faster pace. In fact, the pension reforms implemented over the last decade seem to have reduced the equalising effect of social security wealth on augmented wealth.
- Wealth Inequality by age class show different time patterns. While the variability of net worth among young households tends to decrease, the opposite occurs among middle-aged and the elderly households, probably given by the increasing propensity of these subgroups

to subscribe risky financial assets. Social security wealth inequality shows an increasing trend for all age classes, and is particularly marked among young households.

- The Gini decomposition by wealth factor shows that, while in 1991 total wealth inequality basically depended on both real assets and social security wealth, a different picture emerged a decade later, where real assets maintained a primary role and the relative contribution of social security wealth became smaller. Another component of total wealth, the financial one, acquired a considerable weight in explaining total variability.
- The results of the decomposition of inequality into different population subgroups sorted by some socio-demographic categories (area of residence, education, work status, age and gender) show that overall inequality in total wealth is mainly accounted for the within-component, while the between-component seems to play a marginal role. This result holds for all our partitioning.

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Appendix: Computation of pension benefits

<i>Workers in 1991 and workers with at least 15 year of contribution in 1992</i>	<i>Workers with than 15 years of contribution in 1992</i>	<i>Workers entered in the labour market after 1995</i>
<p>The pension formula is:</p> $P_A = 0.02 * (N_1 W_1 + N_2 W_2)$ <p>where</p> <p>W_1 and W_2 are pensionable earnings N_1 and N_2 are years of contributions</p> <p>For contribution before 1992 W_1 is the average of the last five and ten years respectively for dependent and self employed.</p> <p>For contribution after 1992 W_2 is the average of the last 10 and 15 years respectively for dependent and self employed</p> <p>The contribution rate is 27% of earnings for dependent workers and 12% for the self employed in 1991.</p>	<p>The pension formula is:</p> $P_A = 0.02 * (N_1 W_1 + N_2 W_2)$ <p>where:</p> <p>W_1 and W_2 are pensionable earnings N_1 and N_2 are years of contributions</p> <p>For contribution before 1992 W_1 is the average of the last five and ten years respectively for dependent and self employed.</p> <p>For contribution after 1992 W_2 is the average wage of the number of years progressively increasing. Past wages are indexed by a rate of 1% each year.</p> <p>The contribution rate is 33% of earnings for dependent workers and 20% for the self employed</p>	<p>The pension formula is:</p> $P_B = k * MC$ <p>where:</p> <p>k is an almost actuarially fair transformation coefficient which ranges from 0.472 at the age of 57 to 0.614 at the age of 65. Coefficient are adjusted every ten years in order to take into account of increased longevity.</p> <p>MC is the sum of contribution accrued during the whole working life and capitalized at the rate of growth of nominal Gdp up to a maximum threshold of taxable income.</p> <p>The contribution rate is 33% of earnings for dependent workers and 20% for the self employed.</p>