Working Paper 51/06

THE SOCIAL SECURITY EARNINGS TEST REMOVAL. MONEY SAVED OR MONEY SPENT BY THE TRUST FUND?

Giovanni Mastrobuoni

The Social Security Earnings Test Removal. Money Saved or Money Spent by the Trust Fund? *

Giovanni Mastrobuoni

August 2006 †

*Collegio Carlo Alberto, giovanni.mastrobuoni@collegiocarloalberto.it. I thank Orley Ashenfelter, Harvey Rosen and participants at the Princeton Public Finance seminar for helpful comments. I'm extremely grateful to the Princeton Center for Economic Policy Research and the Industrial Relations Section at Princeton University for financial support.

Abstract

Beneficiaries of Social Security face restrictions on how much they can earn without incurring the earnings test (ET). In 2000, President Clinton eliminated the ET between age 65 and 70. In this paper I evaluate how this removal impacts the long–term finances of the Trust Fund. I find that starting in 2006 the Social Security Administration is actually saving money and that the removal appears to be Pareto–efficient. A removal of the remaining part of the ET is likely to be even less costly and to produce larger increases in labor supply and contributions.

Keywords: earnings test, social security, claiming, retirement

JEL classification codes: H55, J26

1 Introduction

Beneficiaries of Social Security face restrictions on how much they can earn without incurring the earnings test (ET). Before year 2000, the benefits above the annual exempt amount were subject to a 50 percent tax for those below age 65 and were subject to a 33 percent tax for those between age 65 and 70. On April 7, 2000, President Clinton signed the "Senior Citizens Freedom to Work Act of 2000," which eliminated the 33 percent earnings test.[1] Although benefits that are taxed away are actuarially adjusted and later returned to the beneficiary as soon as she either reaches age 70 or her earnings fall below the earnings test, empirical evidence seems to suggest that workers perceive the tax to be permanent (Gruber and Orszag, 2003).

The earnings test removal (ETR) was seen as an opportunity to increase the number of retired people going back to work. Since the Trust Fund is projected to become insolvent in about forty years, policy makers' main concern was that the ETR might worsen the long–term finances of the fund. Fifteen years ago, Honig and Reimers (1989) estimated the cost of a complete removal to be close to 2 billion dollars or a 2.3 percent increase in the present discounted value of the stream of benefits, the so called Social Security Wealth (SSW). A few years later, Gustman and Steinmeier (1991) estimated the budgetary cost of an ETR for beneficiaries above age 65 considering different behavioral assumptions. The largest estimated cost is equal to 92 billion dollars when workers and retirees time their application to maximize the SSW. The cost drops to 43 billion dollars if liquidity constrains force workers to claim benefits as soon as they retire, and to -12 billion dollars, in which case the administration actually saves money, if workers claim at age 65, meaning as soon as they are not subject to the ET.

Following the ETR, economists have shown that it has positive labor supply effects (Tran

[1] The legislation, effective retroactively to January 1, 2000, still requires that the test's higher exempt amount be applied to beneficiaries' earnings in the year they attain their normal retirement age.

2004, Song 2004, Loughran and Haider 2005, Song and Manchester 2005) but, despite the difficult financial situation of the Trust Fund, its long–term impact on the budget has not been investigated yet. The aim of this paper is to estimate this impact.

2 The impact of the ETR on the Trust Fund

2.1 Changes in claiming behavior

The ETR can only affect workers' SSW if it induces them to change their claiming behavior. Figure 1 shows the dramatic change in the probability of claiming within a month of reaching the normal retirement age (NRA) conditional on not having claimed before (the hazard rate).[2] Workers born in 1935, the first cohort not subject to the ET, are 25 percentage points more likely (65% to 90%) to claim their benefits at the NRA than workers born just one year earlier.

This jump happened despite a decreasing trend in the hazard. Between 1989 and 1999 the hazard rate dropped from 70 percent to 60 percent. This decrease is probably due to the increase in the actuarial adjustment for claiming after the NRA. This adjustment, called the delayed retirement credit (DRC), increased during this period from 3 percent to 5.5 percent and is scheduled to reach 8 percent for the 1943 cohort. A higher DRC gives incentives for late claiming, and generates a reduction in the hazard at the NRA. For women, who face longer life–expectancy, the reduction in the hazard rate seems less pronounced.

The increase in the hazard rate due to the ETR generates a gap between the cumulative distribution functions of entitlement age (Figures 2 and 3). Notice that the CDFs for workers born in 1934 (1935, etc.) converge towards the 1935 CDF with a 1 year (2 years, etc.) lag, which corresponds to the year of the ETR. Most workers who would have otherwise claimed

[2]The NRA is increasing over time, and what was known as the 65-spike should now be renamed the NRA-spike. See Appendix B.

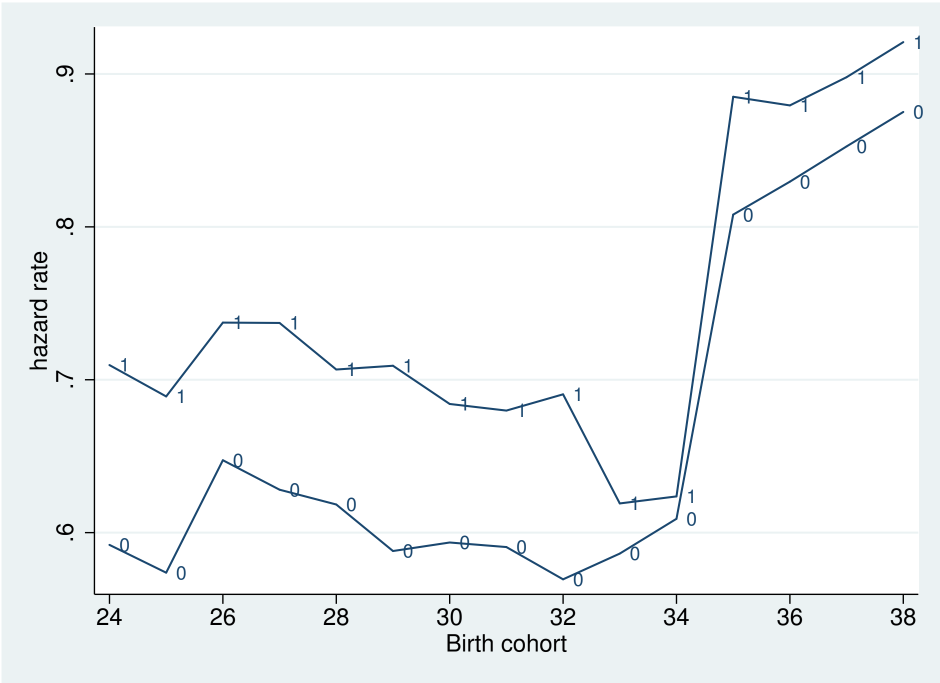

Figure 1: Hazard rates at the normal retirement age for cohort 1924 to 1938. Men (1) and women (0). Based on 1% of the SSA's Master Beneficiary Data.

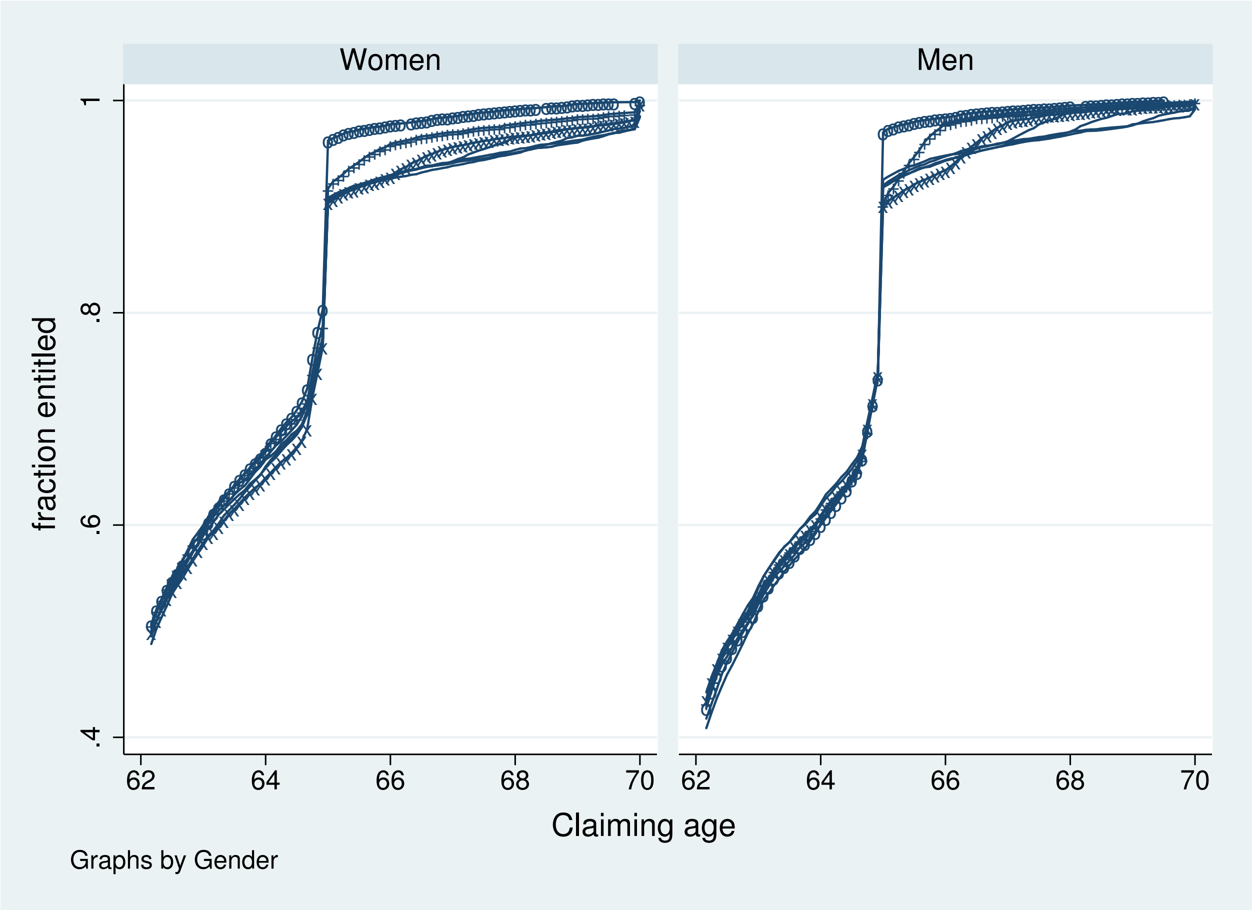

Figure 2: CDF of entitlement age. pre-1932 (-), 1933 (x), 1934 (+), 1935 (o).

after their NRA respond to the ETR by claiming at the NRA. On the other side, there do not seem to be changes in distribution of claiming ages before age 65.

Despite the rising DRC, these adjustments are not yet actuarially fair, and the observed changes in claiming behavior are likely to produce changes in workers' SSW. For a worker born in year c who claims at age x, $NRA_c < x \leq 70 \times 12$, the SSW evaluated at the NRA depends on the cohort–specific probability of survival until age (in months) t, $p_{c,NRA_c}(t)$, the benefits claimed at age x, $B_c(x)$, and the real interest rate i,

$$SSW(x,c) = \sum_{t=x}^{112\times 12} \frac{p_{c,NRA_c}(t) B_c(x)}{(1+i)^{t-NRA_c}} \quad . \tag{1}$$

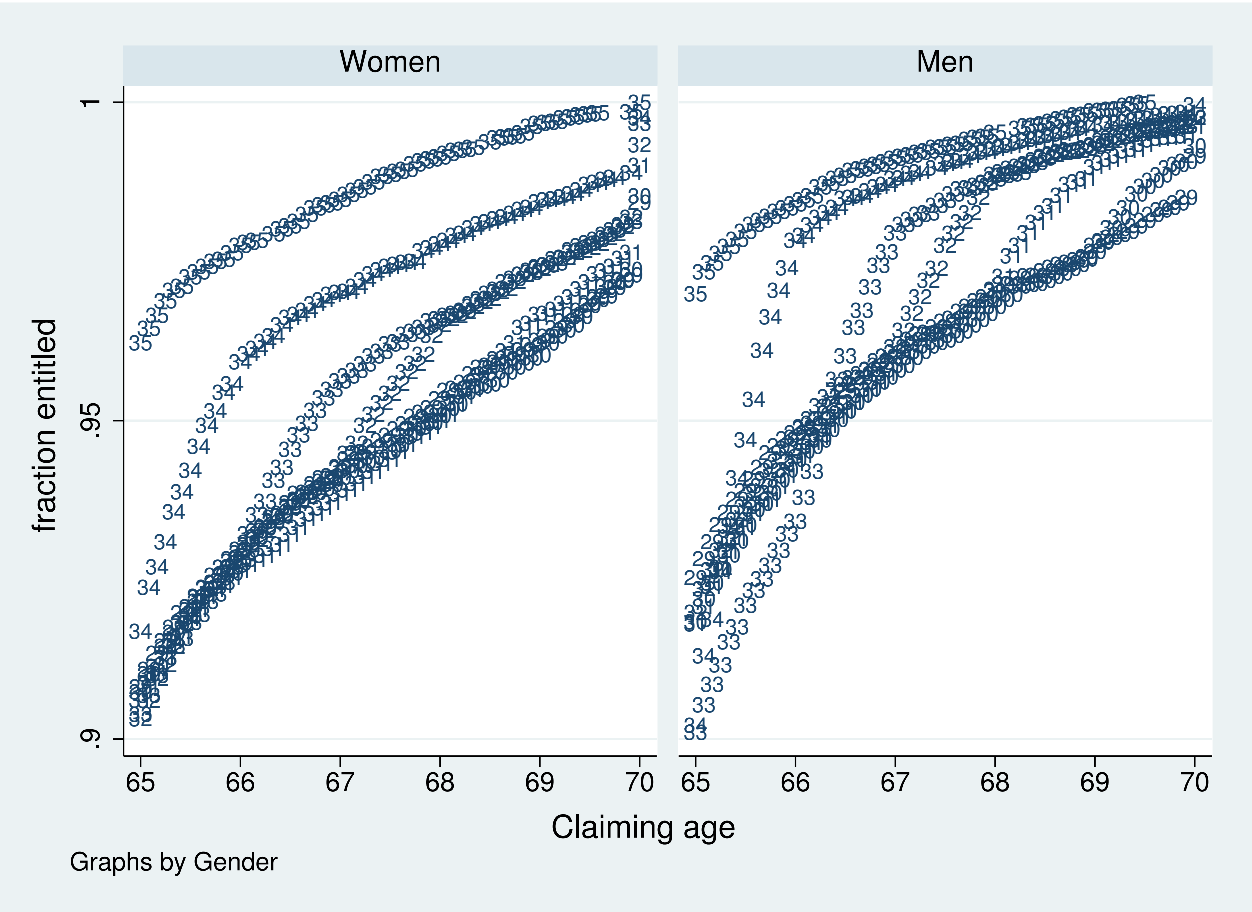

Figure 3: CDF of the claiming age. Based on 1% of SSA's Continuous Work History Sample.

The SSW for a worker who claims at the NRA, but would have otherwise claimed at age x, is equal to

$$SSW(NRA_c, x, c) = \sum_{t=NRA_c}^{112\times 12} \frac{p_{c,NRA_c}(t) B_c(NRA_c)(1-\delta_t \tau)}{(1+i)^{t-NRA_c}}, \tag{2}$$

where $\delta_t = \delta \times 1(t < x)$ represents the change in the federal income tax rate, τ, that is due to the earlier claiming, a concept that will be clarified in section 2.2.2.

The percentage change in the SSW that is due to the ETR is

$$\frac{\Delta SSW(x,c)}{SSW(x,c)} = \frac{SSW(NRA_c, x, c) - SSW(x,c)}{SSW(x,c)} \quad . \tag{3}$$

In order to evaluate the cohort–specific percentage change, I weight the relative importance of each claiming age x. Defining $\beta(x)$ as the difference between the CDFs that is due to the ET, the weighted average effect for cohort c is simply

$$\overline{\frac{\Delta SSW(c)}{SSW(c)}} = \sum_{x=NRA\times 12}^{70\times 12-1} \frac{\beta(x)}{\sum_{y=NRA_c\times 12}^{70\times 12-1} \beta(y)} \frac{\Delta SSW(x,c)}{SSW(x,c)} \; . \tag{4}$$

To construct the βs I use the youngest cohort that has not been affected by the ETR (1929) and the oldest cohort that has been entirely affected by the ETR (1935).

2.2 The Social Security Wealth

These changes in the SSW, evaluated at the NRA, differ across cohorts mainly because of different DRCs, different NRAs, and different cohort-specific mortality tables. Higher DRCs make it more attractive for worker to claim their benefits later. The NRA is 65 for workers born before 1938. Staring with the 1938 cohort, the NRA increases by 2 months every year.[3]

[3] After a 12 year break at age 66 (between cohort 1943 and cohort 1954), the NRA is scheduled to reach age 67 for workers born in 1960 and later.

This increase squeezes the age interval affected by the ETR, reducing the changes in SSW.

Mortality tables are probably the most important factor when calculating the SSW, and adverse selection has to be taken into account in order to make sound assumptions.

2.2.1 Mortality estimates for late claimers

Since SSA's actuarial adjustments are based on population wide mortality tables, workers with higher life expectancy have an incentive to claim later much in the same way annuitants with higher life expectancy have an incentive to buy more annuities Hurd et al. (2004). Because of this selection, it is certainly problematic to use SSA life tables for late claimers. Using these tables I would certainly overstate the long–term cost of the ETR. Waldron (2001, 2004) uses the 1973 CPS data linked to Social Security death records to show that even after controlling for education, male workers who claim at age 65 or later have considerably lower mortality log-odds, and that these differences are widening with age. Men born between 1906 and 1931 who claim at 65 or later have log-odds that are about 20 to 30 percentage points lower than average. Unfortunately she does not carry out the same analysis for women.

If using the SSA's mortality tables generate an upper bound for the budgetary cost, life insurance annuity tables (Johansen, 1997) are likely to generate a lower bound. People who buy life insurance tend to live longer, and their mortality tables might better reflect late claimers' mortality tables. Since annuity tables are periodic, meaning that they measure the probability of survival at a given point in time, I need to convert them into cohort–specific tables. Mortality log-odds after age 60 tend to be linear with respect to age; therefore, I first measure the distance between the SSA's and the annuitants' periodic mortality log–odds and then impute this same distance to SSA's cohort–specific log–odds to generate annuity cohort–specific log–odds (see Appendix C).

For men, the difference between the "annuity" and the "SSA" log–odds is approximately constant across ages and equal to 0.55 (see Equation 7 in Appendix C). For women, the gap

Table 1: Differences between late claimers' $(65, 70]$ and early claimers' $[62, 65]$ summary statistics

	Average for early claimers	T-stat	Difference wrt late claimers	T-stat	Obs.
Panel A: Female sample					
Married	0.75	63.71	-0.24	-7.48	1638
Widowed	0.10	11.51	0.15	6.41	1638
Black	0.07	10.11	0.05	2.67	1638
Hispanic	0.05	8.24	0.00	0.29	1637
High School	0.47	35.46	-0.10	-2.87	1638
College	0.35	27.15	0.12	3.54	1638
Household Wealth (10,000)	33.58	20.02	4.19	0.92	1638
Panel B: Male sample					
Married	0.82	76.53	0.01	0.54	1571
Widowed	0.05	7.60	0.01	0.84	1571
Black	0.07	9.58	0.01	0.71	1565
Hispanic	0.05	8.13	0.01	0.66	1565
High School	0.38	28.57	-0.15	-4.72	1565
College	0.42	30.71	0.18	5.68	1565
Household Wealth (10,000)	34.10	18.61	15.64	3.69	1571

is 1.1, but is decreasing with age. In terms of life-expectancy at age 65, the difference is approximately equal to 3.3 years for men (21.1 vs. 16.8 for the 1941 cohort) and 3.7 years for women (23.9 vs. 20.2 for the 1941 cohort).

The predictions will be carried out using the SSA's mortality estimates (upper bound) and the annuitants' mortality estimates (lower bound). The average of the two is very close to Waldron's estimate, though it is likely that, since she controls for education and I am not, even this average is likely to understate the late claimers' probability of survival.

2.2.2 Earnings, Income and the ET

Social Security benefits are not always tax exempt, and the ETR might have influenced the amount of Social Security benefits subject to the federal income tax (FIT). Since 1983, if beneficiaries file a federal tax return as "an individual," ("a couple") and the combined adjusted gross income plus tax–exempt interest is between \$25,000 and \$34,000 (\$32,000 and \$44,000), they pay taxes on up to 50 percent of their Social Security benefits. Moreover, since 1993, if the combined income is more than \$34,000 (\$44,000), up to 85 percent of the Social Security benefits are subject to income tax. Because these thresholds are not being adjusted for inflation over time, more and more beneficiaries pay income taxes on their benefits (Orszag, 2002).

The IRS collects the tax, but the revenues due to the 1983 reform go to the Social Security Trust Fund and those due to the 1993 reform go to the Medicare Trust Fund. Table 2.2.2 shows that between 1990 and 2002 the number of tax returns that contained taxable Social Security benefits doubled from 5 to 10 million, and the fraction of taxable benefits increased from 8.8 percent to 24.1 percent. During the same period the amount of taxes collected increased from 8 billion dollars (in 2004 dollars) to more than 21 billion dollars. The per–return tax increased from \$1,500 to \$2,000. At the time of the ETR, the corresponding average tax rate (τ in equation 2), calculated dividing the average tax by the average total benefit of those workers who filed a return, is close to 9 percent.

Before the ETR, the main reason people claimed after their NRA was to avoid the ET. In other words, would–be late claimers have earnings above the ET thresholds. But, these workers now claim and collect their benefits as soon as they reach their NRA, and this makes them more likely to have part of their benefits be subject to the federal income tax. Table 3 shows that after 2000, half of the workers who claim their benefits at the NRA would be subject to the ET had the ET not been eliminated.[4] Overall, the probability of being subject to the 50 (85) percent FIT, (denoted in the table $> FIT$ and $> FIT2$), conditional on being subject to the ET ($| > ET$), is close to 90 (75) percent. How much lower would these probabilities be if workers decided to retire and had no earnings? Keeping

[4]After the 2000 ETR, I assume that the ET threshold would have been in real terms equal to the 1999 ET threshold.

Table 2: Federal income tax of Social Security benefits (FIT). Values are expressed in $2004.

Source:	SSA	IRS	IRS	SSA	IRS	Medicare	ALL	ALL
Statistic:	benefits	returns	taxable benefits	fraction taxed	total tax	total tax	total tax	tax rate
Tax Year	billions	millions	billions	in %	billions	billions	per return	in %
1990	333.5	5.1	28.5	8.8	8.0	0.0	1,575	6.8
1991	343.2	5.3	28.3	8.5	8.1	0.0	1,529	6.6
1992	350.0	5.5	29.1	8.5	7.7	0.0	1,401	6.0
1993	355.7	5.7	29.0	8.3	6.8	0.0	1,197	5.2
1994	361.5	5.9	49.2	13.8	6.3	4.8	1,894	8.2
1995	364.6	6.6	56.6	15.7	7.0	4.9	1,803	7.8
1996	372.2	7.4	64.1	17.6	7.6	4.2	1,600	6.9
1997	378.7	8.3	72.5	19.5	10.0	5.9	1,912	8.3
1998	379.1	8.9	79.6	21.0	11.5	7.5	2,137	9.2
1999	386.9	9.5	85.2	22.5	13.7	9.7	2,457	10.6
2000	397.1	10.6	98.6	25.5	12.6	8.0	1,939	8.4
2001	407.5	10.7	99.6	25.1	13.2	8.7	2,051	8.9
2002	410.5	10.8	98.2	24.1	12.7	8.5	1,962	8.5

everything else constant the answer can be found by adding earnings W to the FIT thresholds, $> FIT + W| > ET$. The probability for workers who claim after the NRA when the ET was still in place drops from 93 percent to 39 percent. The numbers are very similar for workers who claim at the NRA after the ETR. When I compute the SSW I assume that between the NRA and the age at which workers would have claimed in the absence of the ETR (x) the probability of being subject to the FIT increases by 50 percent. In terms of equation 2, this means that I set $\delta = 0.5$.

2.3 The long–term budgetary impact

The last two elements needed to compute the change in fSSW are the real interest rate and the average monthly benefit. I estimate the budgetary impact using three different interest rates: 2.1 percent, 2.9 percent, and 3.6 percent, which correspond to the high cost, intermediate cost, and low cost assumptions used in the 2006 SSA Trustees Report. Table 4 shows the percentage changes in SSW for men without dependent spouse (independent),

Table 3: Probability of having benefits subject to the ET and the FIT.

	Claim before 2000				Claim after 2000			
	Claim at NRA		Claim after the NRA		Claim at NRA		Claim after the NRA	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
$> FIT \| > ET$	0.77	0.43	0.93	0.26	0.95	0.22	0.94	0.24
$> FIT + W \| > ET$	0.30	0.46	0.39	0.49	0.38	0.49	0.53	0.50
$> FIT2 \| > ET$	0.60	0.50	0.78	0.42	0.85	0.36	0.91	0.28
$> FIT2 + W \| > ET$	0.24	0.43	0.28	0.45	0.24	0.43	0.40	0.49
	N=198		N=376		N=169		N=148	

Notes: Based on the HRS (1992–2002). $> ET$ ($> FIT$) represents the probability of being subject to the ET (FIT). $FIT2$ represents the second threshold, above which 85 percent of the benefits become taxable. W stands for earnings. After the 2000 ETR, I assume that the ET threshold would have been in real terms equal to the 1999 ET threshold. For example, $> FIT2 + W| > ET$ represents the probability that conditional on being subject to the ET income without earnings is above the second federal income tax threshold and up to 85 percent of the benefits are taxable.

women whose benefits are based on their own earnings history (independent), and couples with dependent benefits using the two different assumptions about mortality and the three different assumptions about the real interest rates. I restrict the analysis to workers born before 1944, but the results based on these nine cohorts that I analyze seem sufficient to grasp the trends in the data.

When I use the SSA's mortality assumptions, independent men show large percentage changes in SSW (*Panel A*). Using the intermediate interest rate, the change is equal to 7.93 percentage points for the 1935 cohort. However, because of the downward trend in mortality it drops to 4.05 percentage points for the 1943 cohort. When I use the annuitants' mortality table instead (*Panel B*), the change is only 4.16 percentage points for the 1935 cohort and 0.77 percentage points for the 1943 one. For this cohort, using the lower real interest rate (2.1 percent), the percentage change becomes negative, meaning that SSA's benefit payments decrease.

However, based on SSA's 2004 Benefits and Earnings Public-Use File men without a dependent spouse represent only around 25 percent of the population. Most men and women are either married or widowed, and their SSW changes are, due to their joint probability

Table 4: Changes in SSW (in percent) using cohort-specific SSA and annuitants' mortality.

Group	Single women			Single men			Married couples		
Real int. rate (in%)	2.1	2.9	3.6	2.1	2.9	3.6	2.1	2.9	3.6
Panel A: SSA's Mortality Assumptions									
1935	3.74	5.01	6.16	6.66	7.93	9.09	2.73	3.90	4.96
1936	3.71	4.98	6.13	6.60	7.88	9.03	2.72	3.89	4.95
1937	2.70	3.95	5.08	5.57	6.83	7.97	1.78	2.93	3.98
1938	2.79	4.03	5.15	5.67	6.92	8.04	1.88	3.02	4.05
1939	1.88	3.06	4.14	4.73	5.93	7.01	1.04	2.14	3.14
1940	1.90	3.06	4.10	4.73	5.89	6.94	1.10	2.17	3.14
1941	1.06	2.16	3.17	3.84	4.96	5.96	0.33	1.36	2.29
1942	1.10	2.17	3.13	3.83	4.91	5.88	0.38	1.37	2.27
1943	0.33	1.35	2.27	3.02	4.05	4.98	-0.33	0.62	1.47
Panel B: Annuitants' Mortality Assumptions									
1935	1.40	2.60	3.69	2.97	4.16	5.24	0.52	1.63	2.64
1936	1.38	2.58	3.67	2.94	4.12	5.20	0.51	1.62	2.63
1937	0.40	1.58	2.66	1.97	3.14	4.21	-0.39	0.70	1.69
1938	0.50	1.66	2.72	2.06	3.22	4.27	-0.31	0.77	1.76
1939	-0.35	0.77	1.79	1.21	2.32	3.34	-1.09	-0.05	0.90
1940	-0.28	0.80	1.80	1.25	2.33	3.32	-1.01	0.01	0.93
1941	-1.06	-0.02	0.93	0.46	1.51	2.45	-1.72	-0.75	0.14
1942	-0.97	0.04	0.95	0.51	1.52	2.43	-1.63	-0.69	0.17
1943	-1.67	-0.71	0.17	-0.20	0.77	1.64	-2.28	-1.38	-0.56

of survival, significantly lower.[5] Using a real interest rate of 2.9 percent, and the SSA's mortality assumptions, the changes drop from 3.90 percentage points for the 1935 cohort to 0.62 percentage points for the 1943 one. With the annuity tables, the changes starting with the 1939 cohort are already close to zero. Changes for independent women tend to lie between those for independent men and dependent couples.

Finally, I use these results to estimate the budgetary impact on the Trust Fund. According to the HRS, women who claim late and are subject to the ET receive on average almost the same monthly benefit amount as men do (approximately $1,100 in 2004 dollars). Multiplying the individual SSW changes by the number of workers who claim their benefits after the NRA and before age 70 (for each cohort there are approximately 120,000 late claimers), and summing the effect over the three different types of beneficiaries gives the cohort–specific budgetary effect, assuming that the removal has no effects on earnings, and therefore on contributions.[6] Table 5 shows these effects for cohorts 1935 to 1943 using the SSA mortality tables (*Panel A*) and using the annuity tables (*Panel B*). In *Panel A*, depending on the interest rate used, for the 1935 cohort the change in SSW that is due to the ETR varies between 0.86 and 1.15 billion dollars ($2004). These changes drop over time, and the last cohort we consider has changes that range between 0.07 and 0.41 billion dollars. Using the annuity tables, for each cohort these changes drop by between 0.5 and 0.7 billion dollars, resulting in negative changes for workers born at or after 1938 when the 2.1 percent interest rate is used and workers born at or after 1940 when the 2.9 percent interest rate is used.

Each of these effects is evaluated at the workers' NRA. In order to compute the total effect evaluated in year 2000, we need to take the discounted sum of the cohort–specific budgetary effects. The total effect ranges between 4.12 and 6.46 billion dollars for SSA's

[5] In my simulations, I assume that for married couples the wife is two years younger than her husband and receives dependent spouse benefits as soon as her husband claims his benefits. Both assumptions are close to the sample averages, and small perturbations of these assumptions generate negligible changes in the results.

[6] For each cohort approximately 20 percent are independent women, 25 percent are independent women and 55 percent are dependent couples.

mortality assumptions and between -0.64 and 3.36 billion dollars for the annuitant's mortality assumptions. Notice, that since the effects for the 1943 cohort are close to zero or negative, extending the analysis to workers born after 1943 would only lower the total budgetary effect.

Recent studies have shown that the ETR increased labor supply. Loughran and Haider (2005) use CPS data to estimate the change in earnings due to the ETR. Their identifying assumption is that people aged 70-71 are not affected by the ETR, and that in the absence of the ETR, their earnings would have followed the same trend as the earnings of workers aged 65 (the NRA in their sample) to 69. They estimate a change in earnings of $2,100 for men and $500 for women. They do not find significant differences in their estimates across ages.

Multiplying these estimates by the payroll tax rate (12.4 percent) and by the size of the population in the Social Security area (around 4.5 million men and 5.2 million women, *SSA's 2005 Annual Statistical Supplement*) gives the total yearly change in contributions. Since the increase in earnings due to the ETR happens only between the NRA and age 70, younger cohorts have lower increases in the present discounted value of contributions. In order to estimate a cohort–specific effect on the contributions, the increase in the NRA has to be taken into account. These changes are approximately equal to 1.4 billion dollars for the 1935 cohort and 1.2 billion dollars for the 1943 cohort.

But, whenever these additional yearly earnings enter the benefit formal (the total real earnings are larger then the lowest 35 years of earnings), SSA recomputes the benefits. In order to take this additional change in the SSW into account, I use SSA's 2004 Benefits and Earnings Public-Use File.[7] What I can do is to simulate the effect on the benefits of an increase of $500 ($2100) in earnings for women (men) between the age of 65 and 69. The average increase in monthly benefits is $1.87 for independent women and $4.13 for men (the data

[7]Since earnings histories are available only for SSA beneficiaries the data cannot be used to estimate the effect of the ETR on earnings.

does not contain information on marital status).[8] Then I calculate the present discounted value of this average increase in benefits using SSA's mortality assumptions (this time the estimate is based on the entire population of beneficiaries) and sum it across beneficiary types (independent women, independent men, and dependent couples).

Looking at *Panel C* it is immediately clear that the recomputation tends to neutralize the increase in contributions. The net gain lies between 0.07 and 0.25 billion dollars for the 1935 cohort and between 0.16 and 0.31 billion dollars for the 1943 cohort. Using Loughran and Haider's estimates, the benefits from the increased contributions outweigh the costs among younger cohorts. Without using any estimates of labor supply effects, it is still possible to calculate the change in earnings that would be necessary to keep the Trust Fund financial situation unchanged. Using intermediate assumptions, both in terms of mortality and interest rates (the average between *Panel A*'s and *Panel B*'s estimate that uses a 2.9 percent interest rate), the break–even change in earnings is equal \$5.618 for the 1935 cohort and only \$61 for the 1943 cohort.

Subtracting the total change in contribution evaluated in year 2000 from the final change in SSW gives the total budget effect,

$$BUDGET_{2000}(i) = \sum_{c=1935}^{1943} N_c \frac{\Delta\overline{SSW}(c,i)}{(1+i)^{c-1935}} - \sum_{c=1935}^{1943} \sum_{t=NRA_c}^{69} \frac{N_{c,t}\Delta\overline{W}_t \times 0.124}{(1+i)^{t-NRA_c+c-1935}} \qquad (5)$$

Using SSA's mortality assumptions, the Social Security Trust Fund is going to spend between 3.27 and 4.32 billion dollars on the first nine cohorts that were subject to the ETR. Using the annuitants' assumptions reduces the cost by around 4 billion dollars. But based on reasonable estimates of a change in earnings, and assuming that "would–be" late claimers continue to claim at their NRA the Trust Fund is likely to start saving money starting with

[8]Kestenbaum et al. (1999) estimate that beneficiaries aged 65 to 69 whose benefits are recomputed the average increase in monthly benefits is \$13 for men and \$11 for women. According to Loughran and Haider the ETR increased earnings by about 30 percent for men and 20 percent for women, so that a naive estimate equal to 30 percent of \$13 for men and 20 percent of \$11 is reassuringly quite close to my estimate.

Table 5: Total budgetary impact of the ETR in billions of 2004 dollars.

	Panel A: SSA Mortality Assumptions			*Panel B: Annuitants' Mortality Assumptions*			*Panel C: Contributions & Recomputation*			*Panel D: Break–even change in earnings*
i(in%)	2.1	2.9	3.6	2.1	2.9	3.6	2.1	2.9	3.6	2.9
1935	0.86	1.03	1.15	0.32	0.59	0.78	0.07	0.17	0.25	5,618
1936	0.85	1.02	1.15	0.32	0.59	0.78	0.07	0.17	0.25	5,603
1937	0.63	0.82	0.96	0.04	0.34	0.55	0.07	0.17	0.25	4,043
1938	0.64	0.82	0.96	0.06	0.35	0.56	0.09	0.19	0.27	3,760
1939	0.42	0.62	0.77	-0.18	0.13	0.35	0.10	0.20	0.28	2,221
1940	0.43	0.62	0.75	-0.16	0.14	0.35	0.12	0.22	0.29	2,092
1941	0.23	0.43	0.58	-0.37	-0.07	0.15	0.14	0.23	0.30	964
1942	0.24	0.43	0.56	-0.34	-0.05	0.16	0.15	0.24	0.30	946
1943	0.07	0.26	0.40	-0.54	-0.24	-0.02	0.16	0.24	0.31	61
Total	4.12	5.53	6.46	-0.64	1.75	3.36	0.86	1.61	2.14	
-Panel C	3.27	3.92	4.32	-1.49	0.14	1.22				

Notes: The change that is due to an increase in earnings, and therefore contributions is based on estimates taken from Loughran and Haider 2005. Their estimated effect of the ETR on earnings for men (women) aged 65-69 is equal to $2100 ($500). The break–even change in earnings represents the average change in earnings needed to cover the average between *Panel A*'s and *Panel B*'s estimated cost.

the 1941 cohort.

3 Conclusions

Following the 2000 ETR, several papers have analyzed its effect on labor supply, but despite the difficult financial situation of the Trust Fund, its effect on SSA's finances is still unknown. Using intermediate assumptions in terms of both real interest rates and mortality rates, I find that for the 1935 cohort the Trust Fund increased its spending by about 4 billion dollars as a result of the ETR. However, because of increasing life–expectancy, higher actuarial adjustments for late claiming, and increasing NRA, these effects are decreasing over time, and for workers born in 1943, the additional cost is probably close to zero. At the same time, the ETR is believed to have significantly increased earnings and therefore contributions between the NRA and age 69. Using estimates from Loughran and Haider (2005), I find that each cohort contributes additional 0.20 billion dollars as a result of the ETR. Nevertheless, the Trust Fund appears to have increased it's liabilities towards the first workers who were subject to the ETR. But for workers born after 1941 the Trust Fund seems to actually have saved money. If workers maximize their family utility function, by a revealed preference argument, the ETR has been for workers born after 1941 Pareto–improving. There are two reasons that suggest that removal of the remaining part of the earnings test (between age 62 and the NRA) is unlikely to produce larger costs. First, if we believe that after age 62 disutility from work is increasing with age, labor supply between age 62 and the NRA is going to respond even stronger to an ETR. Second, mortality between age 62 and the NRA is low, especially because the additional removal would affect much younger cohorts, and the actuarial adjustments are high. Thus, most workers are better off claiming around the NRA. For these workers, earlier claiming is likely to produce lower long–term spending for the Trust Fund. These results suggest benefits for repealing the remaining portion of the earnings test.

References

Berkeley Mortality Database. Life tables. Online at http://demog.berkeley.edu/wilmoth/mortality.

Jonathan Gruber and Peter Orszag. Does the social security earnings test affect labor supply and benefits receipt? *National Tax Journal*, 4(56):755, 773 2003.

Alan L. Gustman and Thomas L. Steinmeier. Changing the social security rules for workers over 65. *Industrial and Labor Relations Review*, 44(4):733–745, July 1991.

Marjorie Honig and Cordelia Reimers. Is it worth eliminating the retirement test? *American Economic Review*, 79(2):103–07, 1989.

Michael D. Hurd, James P. Smith, and Julie M. Zissimopoulos. The effects of subjective survival on retirement and social security claiming. *Journal of Applied Econometrics*, 19 (6):647–823, November 2004.

Robert J. Johansen. Review of adequacy of 1983 individual annuity mortality table. *Insurance: Mathematics and Economics*, 19(2):145–145, 1997.

Bertram Kestenbaum, Michael Shackleford, and Chris Chaplain. Effect on benefits of earnings at ages 65 or older, 1995. *Social Security Bulletin*, 62(1):4–9, 1999.

David Loughran and Steven Haider. Do the Elderly Respond to Taxes on Earnings? Evidence from the Social Security Retirement Earnings Test. Labor and Population Program Working Papers WR-223, RAND, 2005.

Olivia S. Mitchell, James M. Poterba, Mark J. Warshawsky, and Jeffrey R. Brown. New evidence on the money's worth of individual annuities. *American Economic Review*, 89(5): 1299–1318, 1999.

Peter R. Orszag. Tax on social security benefits providing more trust fund revenue. *Tax Notes, 9, 2002, p. 1359*, (9):1359, December 2002.

Jae G. Song. Evaluating the Initial Impact of Eliminating the Retirement Earnings Test. *Social Security Bulletin*, 65(1), 2004.

Jae G. Song and Joyce Manchester. New evidence on earnings and benefit claims following the removal of the retirement earnings test in 2000.

Bac V. Tran. *The Impact of the Repeal of the Retirement Earnings Test on the Labor Supply of Older Workers.* PhD thesis, University of Maryland, Baltimore, October 2004.

Hilary Waldron. Links Between Early Retirement and Mortality. Technical Report 93, SSA, Office of Research, Evaluation, and Statistics, 2001.

Hilary Waldron. Heterogeneity in Health and Moratlity Risk Among Early Retiree Men. Technical Report 105, SSA, Office of Research, Evaluation, and Statistics, 2004.

A Data

Health and Retirement Survey I use the 1992-2002 waves of the Health and Retirement Survey, a biyearly panel survey of around 13,000 individuals aged 51 to 61 in their first wave. I delete observations of those who get disability benefits. In order to obtain the exact date of claiming, I use the retrospective information. However, I restrict the sample to workers who claimed after 1992 and use only the first wave following the claiming date. Finally, I discard observations for which no exact measure of the monthly claiming age can be established.

SSA's Master Beneficiary File http://www.ssa.gov/policy/docs/microdata

Annuity tables Data extracted from Johansen (1997).

Cohort-specific life tables Office of the Actuary of the Social Security Administration Database

B How the "65 spike" became the "NRA spike"

Notice that the 1938 cohort's second spike is at 65 and 2 months and not 65 (Fig. 4). The reason for this is that for that cohort, the NRA increased by two months. The 1983 amendments scheduled a yearly increase in the NRA starting with the 1938 birth cohort. The NRA will reach age 66 for workers born in 1943. After a 10 year break, the rise will resume and stop at age 67 for workers born in 1960 or later. Given this evidence, when forecasting claiming behavior for future retirees, I will assume that the second spike coincides with the NRA.

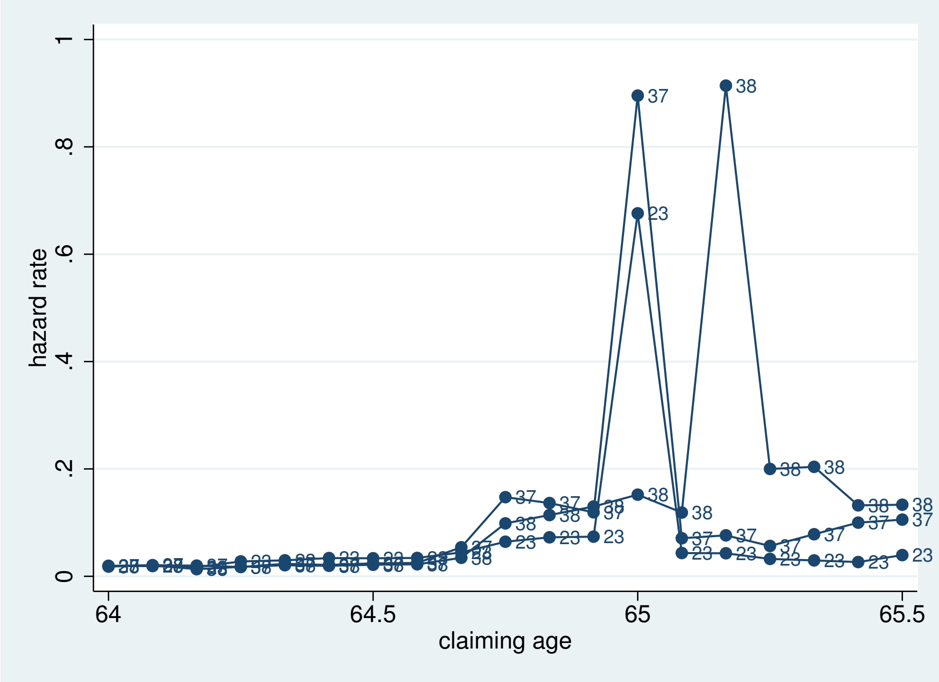

Figure 4: Hazard rates for cohort 1924, 1937 and 1938. Based on 1% of SSA's Master Beneficiary Data.

C Cohort-specific annuity tables

In order to generate cohort-specific annuity life tables, I follow an approach that is slightly different than the one used by Mitchell et al. Mitchell et al. (1999). Define $q^p_{x-1}(x,y)$ and $q^c_{x-1}(x,y)$ to be respectively the periodic and the cohort-specific mortality probabilities for the whole population and q' the basic (unloaded) ones for the annuitants. The authors first interpolate $q'^p_{x-1}(x,1983)$ and $q'^p_{x-1}(x,2000)$ to get $q'^p_{x-1}(x,1995)$. Then they multiply this number by $\frac{q^c_{x-1}(x,1995)}{q^p_{x-1}(x,1995)}$ to get the cohort-specific mortality rates.

I use an alternative approach. Since log-odds, $LO = log(\frac{q}{1-q}) = \alpha + \beta x$ are linear in age (see Fig.5), the difference in the periodic mortality between annuitants and the population is equal to $\alpha' - \alpha + (\beta' - \beta)x$, which can be easily estimated using OLS.

Assuming that the same difference applies to cohort-specific mortalities,

$$q'^c_{x-1}(x,y) = \frac{exp(LO'^c(x,y))}{1+exp(LO'^c(x,y))}\ , \tag{6}$$

where

$$\begin{aligned} LO'^c(x,y) &= LO^c(x,y) + \widehat{\alpha}' - \widehat{\alpha} + (\widehat{\beta}' - \widehat{\beta})x \\ &= LO^c(x,y) - 0.54679439 + 0.00028393x \text{ for men} \\ &= LO^c(x,y) - 1.0997845 + 0.00803148x \text{ for women}\ . \end{aligned} \tag{7}$$

Finally, I interpolate the life tables using a spline to get monthly probabilities. Figure 5 shows the fit for the first step using periodic tables.

Figure 5: Periodic mortality probabilities, and log odds for annuitants, the general population and the implied "low mortality" population.

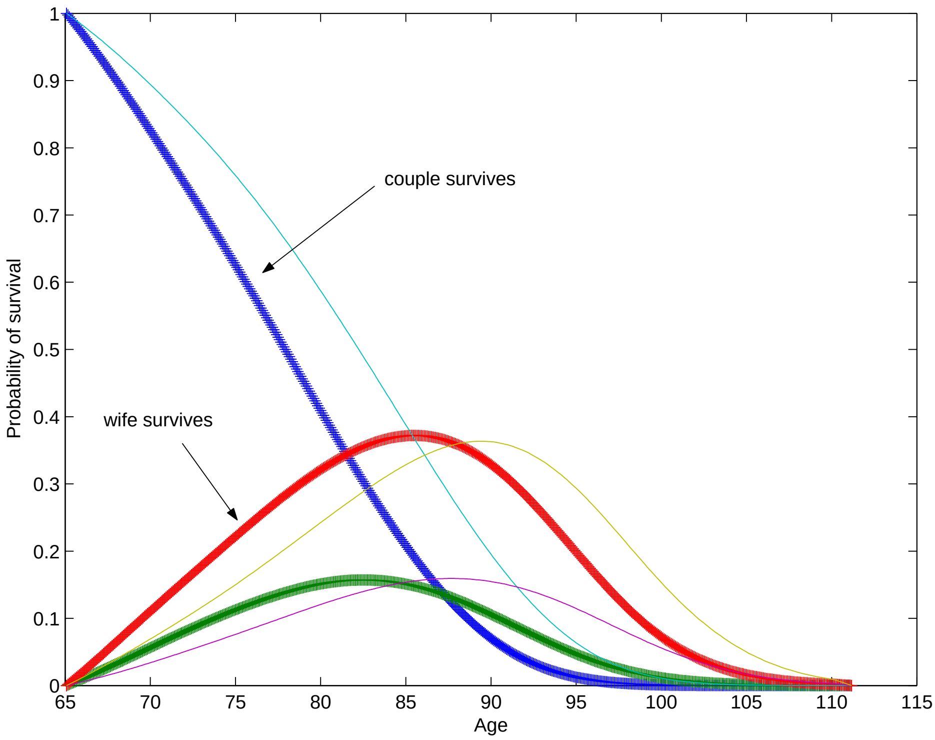

Figure 6: Survival probabilities conditional on age 65. SSA estimates have a solid line.

Our papers can be downloaded at:

http://cerp.unito.it/publications

CeRP Working Paper Series

N° 1/00	Guido Menzio	Opting Out of Social Security over the Life Cycle
N° 2/00	Pier Marco Ferraresi Elsa Fornero	Social Security Transition in Italy: Costs, Distorsions and (some) Possible Correction
N° 3/00	Emanuele Baldacci Luca Inglese	Le caratteristiche socio economiche dei pensionati in Italia. Analisi della distribuzione dei redditi da pensione (only available in the Italian version)
N° 4/01	Peter Diamond	Towards an Optimal Social Security Design
N° 5/01	Vincenzo Andrietti	Occupational Pensions and Interfirm Job Mobility in the European Union. Evidence from the ECHP Survey
N° 6/01	Flavia Coda Moscarola	The Effects of Immigration Inflows on the Sustainability of the Italian Welfare State
N° 7/01	Margherita Borella	The Error Structure of Earnings: an Analysis on Italian Longitudinal Data
N° 8/01	Margherita Borella	Social Security Systems and the Distribution of Income: an Application to the Italian Case
N° 9/01	Hans Blommestein	Ageing, Pension Reform, and Financial Market Implications in the OECD Area
N° 10/01	Vincenzo Andrietti and Vincent Hildebrand	Pension Portability and Labour Mobility in the United States. New Evidence from the SIPP Data
N° 11/01	Mara Faccio and Ameziane Lasfer	Institutional Shareholders and Corporate Governance: The Case of UK Pension Funds
N° 12/01	Roberta Romano	Less is More: Making Shareholder Activism a Valuable Mechanism of Corporate Governance
N° 13/01	Michela Scatigna	Institutional Investors, Corporate Governance and Pension Funds
N° 14/01	Thomas H. Noe	Investor Activism and Financial Market Structure
N° 15/01	Estelle James	How Can China Solve ist Old Age Security Problem? The Interaction Between Pension, SOE and Financial Market Reform
N° 16/01	Estelle James and Xue Song	Annuities Markets Around the World: Money's Worth and Risk Intermediation
N° 17/02	Richard Disney and Sarah Smith	The Labour Supply Effect of the Abolition of the Earnings Rule for Older Workers in the United Kingdom
N° 18/02	Francesco Daveri	Labor Taxes and Unemployment: a Survey of the Aggregate Evidence
N° 19/02	Paolo Battocchio Francesco Menoncin	Optimal Portfolio Strategies with Stochastic Wage Income and Inflation: The Case of a Defined Contribution Pension Plan
N° 20/02	Mauro Mastrogiacomo	Dual Retirement in Italy and Expectations
N° 21/02	Olivia S. Mitchell David McCarthy	Annuities for an Ageing World

N° 22/02	Chris Soares Mark Warshawsky	Annuity Risk: Volatility and Inflation Exposure in Payments from Immediate Life Annuities
N° 23/02	Ermanno Pitacco	Longevity Risk in Living Benefits
N° 24/02	Laura Ballotta Steven Haberman	Valuation of Guaranteed Annuity Conversion Options
N° 25/02	Edmund Cannon Ian Tonks	The Behaviour of UK Annuity Prices from 1972 to the Present
N° 26/02	E. Philip Davis	Issues in the Regulation of Annuities Markets
N° 27/02	Reinhold Schnabel	Annuities in Germany before and after the Pension Reform of 2001
N° 28/02	Luca Spataro	New Tools in Micromodeling Retirement Decisions: Overview and Applications to the Italian Case
N° 29/02	Marco Taboga	The Realized Equity Premium has been Higher than Expected: Further Evidence
N° 30/03	Bas Arts Elena Vigna	A Switch Criterion for Defined Contribution Pension Schemes
N° 31/03	Giacomo Ponzetto	Risk Aversion and the Utility of Annuities
N° 32/04	Angelo Marano Paolo Sestito	Older Workers and Pensioners: the Challenge of Ageing on the Italian Public Pension System and Labour Market
N° 33/04	Elsa Fornero Carolina Fugazza Giacomo Ponzetto	A Comparative Analysis of the Costs of Italian Individual Pension Plans
N° 34/04	Chourouk Houssi	Le Vieillissement Démographique : Problématique des Régimes de Pension en Tunisie
N° 35/04	Monika Bütler Olivia Huguenin Federica Teppa	What Triggers Early Retirement. Results from Swiss Pension Funds
N° 36/04	Laurence J. Kotlikoff	Pensions Systems and the Intergenerational Distribution of Resources
N° 37/04	Jay Ginn	Actuarial Fairness or Social Justice? A Gender Perspective on Redistribution in Pension Systems
N° 38/05	Carolina Fugazza Federica Teppa	An Empirical Assessment of the Italian Severance Payment (TFR)
N° 39/05	Anna Rita Bacinello	Modelling the Surrender Conditions in Equity-Linked Life Insurance
N° 40/05	Carolina Fugazza Massimo Guidolin Giovanna Nicodano	Investing for the Long-Run in European Real Estate. Does Predictability Matter?
N° 41/05	Massimo Guidolin Giovanna Nicodano	Small Caps in International Equity Portfolios: The Effects of Variance Risk.
N° 42/05	Margherita Borella Flavia Coda Moscarola	Distributive Properties of Pensions Systems: a Simulation of the Italian Transition from Defined Benefit to Defined Contribution
N° 43/05	John Beshears James J. Choi David Laibson Brigitte C. Madrian	The Importance of Default Options for Retirement Saving Outcomes: Evidence from the United States

N° 44/05	Henrik Cronqvist	Advertising and Portfolio Choice
N° 45/05	Claudio Campanale	Increasing Returns to Savings and Wealth Inequality
N° 46/05	Annamaria Lusardi Olivia S. Mitchell	Financial Literacy and Planning: Implications for Retirement Wellbeing
N° 47/06	Michele Belloni Carlo Maccheroni	Actuarial Neutrality when Longevity Increases: An Application to the Italian Pension System
N° 48/06	Onorato Castellino Elsa Fornero	Public Policy and the Transition to Private Pension Provision in the United States and Europe
N° 49/06	Mariacristina Rossi	Examining the Interaction between Saving and Contributions to Personal Pension Plans. Evidence from the BHPS
N° 50/06	Andrea Buffa Chiara Monticone	Do European Pension Reforms Improve the Adequacy of Saving?
N° 51/06	Giovanni Mastrobuoni	The Social Security Earnings Test Removal. Money Saved or Money Spent by the Trust Fund?